TUELECTRIC

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November 13, 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
ADDITIONAL ELECTRICAL SEPARATION CRITERIA

Gentlemen:

This letter provides an advance copy of changes to be included in a future FSAR amendment dealing with the electrical separation between Class 1E power conduits and non-Class 1E instrument or control cable tray and cable. The new criteria is based on testing and analysis.

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 consolidates and categorizes similar individual changes by subject and related SER section.

5. 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.

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This change will be evaluated under the TU Electric 10CFR50.59 procedures per TXX-89718, dated September 28, 1989, prior to issuance as an FSAR amendment.

If you have any questions regarding this submittal please contact Joe Harnden at (214) 812-8226.

Sincerely,

William J. Cahill, Jr.

By: D R Woodlan

D. R. Woodlan
Docket Licensing Manager

WJH/vld
Enclosure

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

Enclosure to TXX-89809
November 13, 1989

Advance FSAR Change Regarding Additional Electrical Separation Criteria

In all plant areas free from potential hazards, as described above, the minimum separation required in any direction between safety related conduit and non-safety related control or instrumentation cable tray or cable is one inch.

All of the above conduit to cable tray separation distances are based on testing and analysis. | 64

All Nuclear Instrumentation System (NIS) cables are routed in conduit according to their channel assignment. A minimum separation of 6 feet is maintained between NIS conduits and raceway containing 6.9 kV circuits. Also, a minimum separation of 2 feet is maintained from NIS conduits running parallel to raceways containing electrical noise sources such as low voltage power and rod control cables. | 41 | 42

The minimum separation distance between redundant Class 1E and between Class 1E and non-Class 1E equipment and circuits internal to control equipment is six inches. In this case, the wire and cables are flame-retardant with self-extinguishing and nonpropagating characteristics. Other components such as terminal blocks, wire troughs, wire cleats, raceways, cable ties, glastic barriers, and so forth are manufactured from self-extinguishing material. | 76 | 66

Separation within the Class 1E Inverters listed in Table 8.3-10 between Class 1E train related input cables and the Class 1E channel related output cables is not required since these cables are integrally associated with each other. For the Class 1E Nuclear Instrumentation System Neutron Flux Preamplifiers, Signal Processors, and Isolation Expansion Assemblies listed in Table 8.3-10, separation between Class 1E train related cables and Class 1E channel related cables is not required inside each cabinet, since their circuits are integrally associated with each other. | 76

CPSES FSAR AMENDMENT
DETAILED DESCRIPTION

FSAR Page (as amended)	Group	Description
8.3-71	2	Adds separation requirements for Class 1E power conduits and non-Class 1E instrument/control cable tray and cable. Addition: The minimum separation between Class 1E power conduit and non-Class 1E instrument and control conduit (1/8") was specified in FSAR Amendment 76. The minimum separation between Class 1E power conduit and non-Class 1E instrument and control cable tray and cable (1") is added in this amendment as justified below. Control and instrumentation cable and raceway outside of equipment uses a minimum separation of one barrier and one inch as described in the FSAR. This criteria is based on a more restrictive test configuration of two cables one inch apart with no barrier in Reference 41 (Wyle Lab Test Report 48037-02). This test demonstrated that cables with control or instrumentation circuit energy levels have no adverse impact on each other when installed per the tested configuration. If the installed configuration has a non-Class 1E control or instrumentation cable, it follows that this non-Class 1E cable has no adverse impact on the second cable irrespective of its classification or energy level. If the second cable is a power cable, its impact on the non-Class 1E cable is not safety significant. Therefore, the separation criteria for two control or instrumentation cables can be applied to a configuration where only the non-Class 1E cable is control or instrumentation and the other a Class 1E power cable. The conduit (or an equivalent wrap of woven silicon dioxide) around the Class 1E cable provides the single barrier. FSAR Change Request Number: 89-762 Related SER Section: 8.4.4 SER/SSER Impact: Yes New criteria has not been reviewed by the NRC. The criteria, however, is an extension of testing and criteria previously reviewed by the NRC.

result in needless hindrance to successful completion of safety functions. Regulatory Guide 1.106 recommends (in Position C.1) bypassing thermal overload devices during accident conditions or (in Position C.2) selecting the setpoints for the thermal overloads in a manner that precludes spurious trips. In the Comanche Peak design, Class 1E MOV motor starters are provided with thermal overloads, connected to alarm only. Thermal magnetic breakers are used to trip the starter for sustained locked-rotor conditions. This design is in conformance with Regulatory Guide 1.106 and is acceptable.

8.4.3 Power Lockout to Motor-Operated Valves

The applicant has provided a list of valves that require power lockout in order to meet the single-failure criterion in the fluid systems. Branch Technical Position ICSB 18 (PSB) requires that all such valves and their required position be listed in the Technical Specifications and that the position indications for these valves meet the single-failure criterion. The applicant has not submitted the Technical Specifications for review, but a start toward compliance with BTP-ICSB 18 (PSB) is accomplished by providing position indication and out-of-position alarms at the control board and a control power cutoff switch for each valve.

The applicant states that spurious movement of an MOV as a result of an electrical fault in the motor actuation circuitry, coincident with a LOCA, has been analyzed and found to be a very low-probability event. However, to comply with the present NRC position on this issue, the applicant has made the commitment to comply with BTP-ICSB-18. Compliance is accomplished by providing a control board control power cutoff switch for each valve.

In order to meet the staff requirements that redundant valve status indication be provided to the control room operator, the applicant has provided redundant and separate valve position switches. One position switch is gear-driven and mounted on the valve operator. The second position switch is mounted on the valve stem. In the event that one position switch is inoperable, the second will be available to provide position indication. Each position switch actuates a separate indicating light in the main control room. These indicating lights are powered from separate power supplies.

The applicant has not yet submitted the draft Technical Specifications. The staff will ensure that the valves and their required positions are included in the Technical Specifications when performing this aspect of our review.

→ 8.4.4 Physical Identification and Independence of Redundant Safety-Related Electrical Systems

The applicant has provided the criteria for physical identification and separation of electrical equipment to preserve the independence of redundant equipment. Physical identification of safety-related electrical systems is accomplished as follows. Each cable and raceway is given a unique alphanumeric identification and is color coded to indicate its separation group. This identification provides a means of distinguishing a cable or raceway associated with a particular separation group.

Exposed raceways containing Class 1E cables are marked by color codes in a distinct permanent manner at intervals not to exceed 15 ft and at points of entry to and exit from enclosed areas. In general, all Class 1E cables and associated cables are jacket color-coded throughout their entire length. Cables that require field color coding will be so worked at intervals not to exceed 5 ft. Non-Class 1E equipment, raceways, and cables in raceways are not marked by color code and have a black outer jacket.

In plant areas which are free from potential hazards such as missiles, external fires, and pipe whip, the minimum separation between redundant cable trays is 3 ft between trays separated horizontally and 5 ft between trays separated vertically. In the cable spreading areas and the control room, the minimum separation between redundant cable trays is 1 ft between trays separated horizontally and 3 ft between trays separated vertically. Where plant arrangements preclude maintaining the minimum separation distance, the redundant circuits are run in solidly enclosed raceways or other barriers provided between redundant circuits in accordance with Regulatory Guide 1.75. In addition, each reactor protection system or ESF system at the channel level has its own distinct color. Protection of equipment against simultaneous failures is achieved by physical arrangement and separation between redundant Class 1E systems.

Each diesel generator, including its associated auxiliaries, is located in a separate room. The electrical switchgear of train A is separated from that of train B by locating them on different elevations.

Each Class 1E 125-V dc battery is located in a separate and independently ventilated room. Battery chargers, distribution panels, and SUPS of one train are separated from those of other trains by locating them in separate rooms. The Class 1E MCCs and distribution panels of one train are separated from those of the other train by a distance of at least 20 ft. Where it is not possible to maintain a 20-ft distance, barriers are provided to maintain proper separation. The control room and cable spreading area do not contain high-energy equipment such as switchgear, transformers, rotating equipment, high-energy piping, or other potential sources of missiles.

Based on its review of the applicant's design criteria regarding physical identification, separation, and independence of redundant safety-related electrical systems, the staff finds these criteria to be in accordance with Regulatory Guide 1.75 and, therefore, acceptable. However, the staff will verify the implementation of applicant's design criteria for these areas during a site visit.

8.4.5 Nonsafety Loads on Emergency Sources

Present regulatory practice for Operating License applications allows the connection of nonsafety loads--in addition to the required safety loads--to Class 1E (emergency) power sources if it can be shown that the connection of nonsafety loads will not result in degradation of the Class 1E system. The Comanche Peak design provides for the connection of both safety and selected nonsafety loads to the Class 1E emergency buses of the ac and dc onsite emergency power systems.

8.4.4 Physical Identification and Independence of Redundant and Safety Related Electrical Systems

27. Adds additional criteria dealing with the electrical separation between Class 1E power conduits and non-Class 1E instrument or control cable tray and cable.

In all plant areas free from potential hazards, as described above, the minimum separation required in any direction between safety related conduit and non-safety related control or instrumentation cable tray or cable is one inch.

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All Nuclear Instrumentation System (NIS) cables are routed in conduit according to their channel assignment. A minimum separation of 6 feet is maintained between NIS conduits and raceway containing 6.9 kV circuits. Also, a minimum separation of 2 feet is maintained from NIS conduits running parallel to raceways containing electrical noise sources such as low voltage power and rod control cables. | 41 | 42

The minimum separation distance between redundant Class 1E and between Class 1E and non-Class 1E equipment and circuits internal to control equipment is six inches. In this case, the wire and cables are flame-retardant with self-extinguishing and nonpropagating characteristics. Other components such as terminal blocks, wire troughs, wire cleats, raceways, cable ties, glastic barriers, and so forth are manufactured from self-extinguishing material. | 76 | 66

Separation within the Class 1E Inverters listed in Table 8.3-10 between Class 1E train related input cables and the Class 1E channel related output cables is not required since these cables are integrally associated with each other. For the Class 1E Nuclear Instrumentation System Neutron Flux Preamplifiers, Signal Processors, and Isolation Expansion Assemblies listed in Table 8.3-10, separation between Class 1E train related cables and Class 1E channel related cables is not required inside each cabinet, since their circuits are integrally associated with each other. | 76