TU ELECTRIC

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December 15, 1992

William J. Cahill, Jr.
Group Vice President

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

SUBJECT: COMANCHE PEAK STEAM ELECTRIC STATION (CPSES)
DOCKET NOS. 50-445 AND 50-446
RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

REF: 1) NRC Letter dated November 25, 1992 from Brian E. Holian to William J. Cahill, Jr.

2) NRC Letter dated October 29, 1992 from Suzanne C. Black to William J. Cahill, Jr.

Gentlemen:

This is in response to a request for additional information submitted by Reference 1. We have reviewed your documents and the requested information follows:

Question 1:

What action was taken to ensure that material tested is representative of material currently installed in Units 1 and 2? Will the same controls used for procuring material for the current testing be used for future in-plant configurations and upgrades?

Response 1:

All Thermo-Lag materials tested were extracted from CPSES stock inventory. Accordingly, the procurement control levels utilized for materials tested are consistent with materials previously procured and anticipated future purchases. Specifically, TU Electric QC conducts source inspection of materials prior to shipment of the material to CPSES and upon receipt on site for both Units. However, due to the concern regarding delamination and unfilled longitudinal cracks that were developed during the forming of conduit section material, additional controls have been implemented whereby TU Electric QC source inspectors now overview the manufacturer's forming processes for conduit sections. Additionally, a visual inspection of each piece of conduit

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section material is performed to ensure no separation of material layers or unfilled longitudinal cracks are present prior to "topcoat" finish application. It should be noted that these additional controls for conduit sections were implemented subsequent to the construction of the assemblies recently tested at Omega Point Laboratories.

Question 2:

Describe the quality controls used in purchasing the Thermo-Lag material. What type of receipt inspections are performed? Provide this information for both units and for various Thermo-Lag materials including preshaped conduits, preformed panels, trowel grade material, and stress skin. Include a description of any changes which have occurred in your program. Also, include an assessment of your confidence level that material already in-plant will perform at acceptable levels as compared to the test results.

Response 2:

The Thermo-Lag materials, including preshaped conduits, preformed panels, trowel grade material, and stress skin, are procured in accordance with CPSES Specification 2323-MS-38H "Cable Raceway Fire Barrier Material" and Pre-Engineered Item Data Sheet (PEIDS) No. NES-0011. The specific sections pertaining to Quality Assurance requirements are enclosed, as Enclosure A and Enclosure B respectively, for your review. TU Electric specifications classify Thermo-Lag materials as non-safety related, however, applicable criteria of 10CFR50 Appendix B and ANSI N 45.2, as described in Enclosure B (PEIDS No.NES-0011) have been applied.

Except as described in response to Question 1, no changes to the Technical and Quality Assurance requirements have occurred since 1989, when TU Electric started procuring bulk stock from the supplier for completion of Unit 1. Additionally, as a result of the 1992 confirmatory testing, TU Electric determined the need to procure 1/4" thick (nominal) overlay fabricated sections for some conduit sizes. For these overlay sections, TU Electric imposed the same Technical and Quality Assurance requirements previously imposed for the other prefabricated section, such as thickness measurements and minimum/maximum weight criteria. The Technical and Quality Assurance requirements for the Thermo-Lag material are as follows:

a) The supplier shall implement the latest TU Electric approved Quality Assurance Program.

b) Prefabricated materials shipped by the supplier shall be fully cured.

c) The minimum thickness requirements of 1/2 inch for 330-1 panels/sections are as determined by the Quality Assurance Program of the supplier. This is verified by TU Electric's Quality Control inspectors by taking physical measurements.

d) The weight per square foot of Thermo-Lag 330-1 prefabricated panels shall be 3.0 lbs/sq-ft. minimum and 5.25 lbs/sq-ft. maximum.

e) For 1/2 inch thick (nominal) Thermo-Lag 330-1 prefabricated conduit sections, the following matrix shall be followed for minimum/maximum weight in pounds for 1/2-round, 3 foot long section:

DIA	0.75"	1"	1.5"	2"	3"	4"	5"	6"
MAX	4.0	4.5	5.7	6.6	8.9	10.9	13	15
MIN	2.3	2.6	3.3	3.9	5.3	6.6	7.9	9.4

For the 1/4 inch thick (nominal) "overlay" conduit sections:

DIA	0.75"	1"	1.5"	2"
MAX	4.0	5.0	5.8	6.3
MIN	2.9	3.5	3.7	4.0

f) The weight per square foot of Thermo-Lag 330 foil prefabricated material is 1.6 lbs/sq-ft. minimum and 2.1 lbs/sq-ft. maximum.

g) Prefabricated Thermo-Lag materials shall be free of damage as follows:

i) No holes or cracks wider than 0.05".

ii) No holes or cracks extending through the material to the stress skin.

iii) No visible mechanical damage (i.e., gouges, breaks, tears, etc.).

TU Electric Quality Control Inspectors verify the above listed attributes prior to shipment of the material to CPSES and at receipt inspection. Additionally, TU Electric imposes the 10CFR21 requirements on the supplier of the Thermo-Lag material.

These Technical and Quality Assurance requirements are utilized for both Units and for all Thermo-Lag material.

As indicated in the response to Question 3 below, TU Electric's assessment concluded that some conduit section material from the two lots with the highest incidence of delamination effects had been shipped

to the test laboratory and ultimately tested on at least three (3) test specimens. The process to install conduit section materials on the test assemblies was the same as that used at the plant. No evidence of abnormal thermal degradation of any of the material tested was observed or measured during the tests or upon detailed inspection of the material following each test. These tests were considered acceptable based upon the criteria issued by the NRC dated October 29, 1992 (Ref. 2).

It is TU Electric's assessment that the material already in-plant will perform at acceptable levels as compared to the test results. This assessment is based upon the actions described above and in response to Question 1.

Question 3:

To what extent have delamination and porosity problems appeared in conduit sections received at CPSES? What measures have been taken to ensure that conduit sections with voids, that have been repaired, are qualified for use at CPSES?

Response 3:

A comprehensive review of these concerns was performed to determine the extent, root cause, corrective and preventive actions. To determine the extent of this concern TU Electric used visual inspection techniques to verify delaminations for all uninstalled conduct sections. It was found that the supplier's craft personnel used staples from the outside of the conduit sections to press the delaminated portion down so the material would adhere after curing was applied. For uninstalled pieces at CPSES (6 inches and longer in length) a two step approach was utilized. First, these pieces were x-rayed to detect the presence of any staples. Pieces with staples installed were considered "unsatisfactory". Next, visual inspection was conducted for each piece. A small portion of material (1/4 to 1/2 inch) was saw cut from each end of all pieces (except for the pieces which had been previously cut in the same manner for field use). A visual inspection of both ends was performed to determine unacceptable voids. Material not meeting the visual inspection criteria was either cut further to determine if the problem was localized and reinspected or scrapped. TU Electric concluded that significant incidence of the delamination condition was limited to 1/2 inch thick (nominal) prefabricated conduit sections. The review also concluded that this condition was more prevalent within two specific lots of the 1/2 inch (nominal) prefabricated sections. These two lots were comprised entirely of material for use on 3-inch diameter conduits. Additionally, the review concluded that the subject condition was found in approximately 4% of the total population of uninstalled conduit section pieces (5,684 total pieces were examined). As described in response to Question 1, criteria for source inspection of conduit sections has been enhanced; whereby removal of sufficient material (i.e., 1/4 - 1/2 inch) from the ends of each piece is required to facilitate TU Electric quality control verification of the material

adequacy. The pieces that exhibited the subject condition were either scrapped or repaired as specified by CPSES specifications and procedures.

TU Electric identified that some of the conduit section materials actually tested on 3-inch diameter conduit were from the same two material lots demonstrating the highest incidence of the subject condition. Inspection of the conduit assemblies following these tests revealed significant quantities of unconsumed Thermo-Lag material remained on 3-inch diameter and larger conduits. Also, to ensure adequate material quantities are provided to protect small conduits, applicable TU Electric specifications require the use of 1/4 inch (nominal) thick "overlay" sections on all conduits less than 3 inch diameter. Testing has confirmed the use of such "overlays" as an adequate method of protection of small conduits. Additionally, the process through which Thermo-Lag material reacts to heat (sublimation with partial intumescence through endothermic decomposition and char layer formation) results in significant expansion of the material as the char layer develops. Applicable CPSES specifications also require all conduit section material pieces to be firmly attached to the protected conduit, via stainless steel banding and/or tie wires. Test results have demonstrated conduit section materials (both with and without "overlays") installed in this manner remain secure throughout the fire endurance and hose stream tests. Therefore, due to secure material attachment, degree of material expansion and use of "overlays" on small diameter conduits, reasonable assurance (as confirmed by testing) exists to conclude that any unfilled cracks and/or potential material delaminations not detected during site fabrication and handling during installation, would be expected to perform as intended during fire exposure.

No similar conditions were identified during the installation of Thermo-Lag conduit section material in Unit 1.

Questions 4:

What has been the historical "reject rate" of the Thermo-Lag material received on-site? Has this rate increased recently as a result of the porosity and delamination problems described above, or as a result of the "stapling" issue, as discussed on-site during the November 5, 1992 management meeting. Describe the reject rate experienced for material used for the current test program, by type of material (e.g., conduit sections, preformed panels). Describe how the test configuration results will bound in-plant use of the Thermo-Lag material, including past, current, and future installations.

Response 4:

Enclosure C depicts a historical accept/reject rate of the Thermo-Lag material received on site. TU Electric inspects Thermo-Lag materials at Thermal Science Inc. (TSI) in St. Louis, Mo., prior to shipment of material to CPSES by the source inspection method and at CPSES upon receipt. The material is not shipped to CPSES unless declared acceptable by TU Electric's source inspectors. An item when rejected during the source inspection is returned back to TSI for repairs and/or is scrapped by TSI. A record of items returned to TSI during the source inspection is not kept by the inspectors because the inspection sequence is considered "in-process". No shipments were rejected specifically due to the porosity/delamination/stapling issue. Thus the rejection rate for shipments was not affected by this issue and has remained fairly constant since November of 1989.

As discussed in the response to Question 3 above, the review for the porosity/delamination/stapling issue was performed on material which had already been accepted on site and was limited to 1/2 inch thick (nominal) prefabricated conduit sections. The condition was found in approximately 4% of the population of uninstalled conduit section pieces.

Additionally, the results of fire uninstalled tests conducted with conduit section materials were acceptable and effectively bound the in-plant use of the Thermo-Lag material, including past, current, and future installations.

Should you have any questions or need additional information, please contact Obaid Bhatty at (817) 897-5839.

Sincerely,

William J. Cahill, Jr.

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Enclosure A: Appendix A of 2323-MS-38H
Enclosure B: PEIDS No. NES-0011
Enclosure C: Accept/Reject Rate for Thermo-Lag

c - Mr. J. L. Milhoan, Region IV
Mr. B. E. Holian, NRR
Mr. L. A. Yandell, Region IV
Resident Inspectors (2), CPSES

ENCLOSURE A: APPENDIX A OF 2323-MS-38H

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