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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
PRELIMINARY FIRE ENDURANCE AND AMPACITY TEST RESULTS

REF:
1) TU Electric Letter logged TXX-93060 from Mr. William J. Cahill, Jr. to the USNRC dated January 25, 1993
2) TU Electric Letter logged TXX-93061 from Mr. William J. Cahill, Jr. to the USNRC dated January 28, 1993
3) TU Electric Letter logged TXX-93076 from Mr. William J. Cahill, Jr. to the USNRC dated February 1, 1993
4) TU Electric Letter logged TXX-93101 from Mr. William J. Cahill, Jr. to the USNRC dated February 26, 1993
5) USNRC Letter from Suzanne C. Black to Mr. William J. Cahill, Jr. dated October 29, 1992

Gentlemen:

Via this letter TU Electric is providing information that updates the status of open issues in section 9.5 of the Nuclear Regulatory Commission's (NRC) Supplemental Safety Evaluation Report (SSER) No. 26.

TU Electric has completed the confirmatory test for a 36 inch wide cable tray with Thermo-Lag fire barriers, the first series of ampacity testing, and has completed the construction of the Thermo-Lag box configurations. Each of these subjects are summarized below:

Ampacity Derating Test

The ampacity derating test for 3/4 inch conduit, 2 inch conduit, 24 inch cable tray, and small air drop configurations, with upgraded Unit 2 Thermo-Lag installation, which were described by TU Electric via reference 4, have been completed. The derate percentages obtained from this testing were:

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D099 1/1

3/4 inch conduit = 9.1%

2 inch conduit = 6.5%

24 inch cable tray = 31.4%

Small air drop = 23.1%

Prior to the performance of the cable tray ampacity testing, it was noted that the cable tray test specimen was not in compliance with draft 11 of the IEEE Standard. TU Electric initiated a deficiency document to resolve this matter. The results of TU Electric's evaluation regarding this issue is detailed in Attachment 1 to this letter.

TU Electric has evaluated the results of these tests as described in attachment 2. From this evaluation, we have concluded via existing generic calculations that all Thermo-Lagged cable tray configurations have a derate margin in excess of 38% and all conduit configurations have a derate margin in excess of 14%. Therefore, these configurations are acceptable since the derate margins are greater than the test derate due to Thermo-Lag.

TU Electric is currently evaluating the test derate factor against the derate margin of the configuration from which the air drop is made. The initial evaluations of the small air drop test results (1-3/c #6 AWG cable in three layers of Thermo-Lag flexi-blanket) indicate the following:

Applications for which air drops are made from cable trays all have existing generic calculations with derate margins in excess of 38% and therefore they are all acceptable as is since this derate margin is greater than the test derate for the tested air drop.

Applications for which air drops are made from conduit were compensated by adding the most limiting conduit derate margin (14% based on existing generic calculations described in attachment 2) to the most limiting cable derating for cables run in conduit (10.7% based on existing generic calculations for 1/0 AWG cable in conduit). In all cases these compensated derate margins were in excess of 23.2% and therefore they would be acceptable as is since this margin is greater than the test derate for the small air drop test.

TU Electric is currently conducting additional free air drop ampacity testing on a large air drop assembly (3-1/c 750 mcm cables in two layers of Thermo-Lag flexi-blanket) to confirm these initial evaluations for all configurations at CPSES.

The NRC's SSER-26 currently states on page 9-30 that the interim ampacity derating factor for electrical raceways at CPSES Units 1 and 2 is a 31 percent derating factor for single trays enclosed with Thermo-Lag material applied against ICEA P-54-440 "Cables in Random Filled Trays". CPSES as a result of testing is modifying it's current Design Basis Documents (DBDs) to reflect a 31.4% derating factor for this application.

Additionally the NRC's SSER-26 on the same page refers to a 7.5 percent derating factor for single conduit enclosed with shell design Thermo-Lag applied against ICEA P-46-426 "Power Cable Ampacities". CPSES as a result of testing is modifying it's current DBDs to reflect a 9.1% derating factor for this application.

These adjustments in the CPSES Unit 1 and Unit 2 DBDs are being made to be consistent with the test data and as discussed above are clearly conservative with respect to existing generic calculations.

Fire Endurance Test

A confirmatory test for a 36"x4" cable tray for Thermo-Lag fire barrier has been completed. The test was performed utilizing the acceptance criteria provided in reference 5. The test specimen configuration and test methodology was described by TU Electric via reference 4. A 7 day cure time was applied to this test specimen. The results of this test were considered favorable. Since the official test report by the laboratory has not been issued to date, a summary of the preliminary test data is provided in attachment 3.

Thermo-Lag Box Design Configurations

TU Electric via reference 4 stated that specific box design configurations would be upgraded. These upgrades are complete.

Based on the results of the testing for which TU Electric did not impose a 30 day cure time (reference 4). TU Electric is no longer requiring compensatory measures such as fire watches for configurations which have exceeded a 7 day cure time.

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

Sincerely,

William J. Cahill, Jr.

William J. Cahill, Jr.

By: Roger D. Walker

Roger D. Walker
Manager of Regulatory Affairs
for NEO

OB:tg

Attachments

cc: Mr. J. L. Milhoan, Region IV
Mr. L. A. Yandell, Region IV
Mr. B. E. Holian, NRR
Mr. T. A. Bergman, NRR
Resident Inspectors, CPSES (2)

TEST SPECIMEN DEVIATION RESOLUTION

The cables utilized at Omega Point, for the tray ampacity test, were 3/c #6 AWG 600V copper with a thermosetting XLP insulation and a PVC jacket. The test specimen was built to earlier drafts of IEEE Standard P848 "Procedure for the Determination of the Ampacity Derating of Fire Protected Cables". The previous revision of the standard allowed for the use of several different types of material in the construction of the cables utilized in the ampacity test (e.g. PVC, Hypalon, XLPE, Rubber). In order to provide consistency between ampacity derating tests, the standard was revised to recommend the use of a 3/c #6 AWG copper cable, with a XLPE insulation and a Hypalon jacket. TU Electric believes that for the reasons stated below the minor differences in construction will have no adverse effect on the ampacity derating factor established by CPSES testing at Omega Point:

> When determining the ampacity derating for a system, the ultimate goal is to determine how much heat can be dissipated through the wrap material. Considering the aforementioned, the critical criteria for cable selection is not the cable size or construction, but ensuring that uniform heat is generated within the tray. This can be accomplished with any type of cable or cable construction provided that uniformity and symmetry are maintained during both the Baseline and Wrapped test configurations. This was analyzed by Oscar M. Esteves[1] in which, he demonstrated that for any given cable depth, the cable losses in watts/sq. ft. were all substantially the same, regardless of conductor size, cable diameter or type. It is also noted that, when cables are designed in accordance with P-54-440, uniform heat generation within the cable tray is maintained.

TU Electric has concluded that the test specimen constructed for the ampacity test will satisfy the technical requirements for an acceptable ampacity derating test, and the derating factor is representative of CPSES and any facility utilizing P-54-440 for its cable tray design.

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[1] O. M. Esteves, "Derating Cables in Trays Traversing Firestops or Wrapped in Fireproofing," IEEE Transactions on Power Apparatus and Systems. Vol. PAS-102, p. 1478-1481, 1983.

CABLE DERATING EVALUATION

LOAD FLA	CABLE DEMAND 1.25 X FLA	CABLE ALLOWABLE AMP	% DERATE MARGIN	% TEST DERATE
I_1	I_2	I_3	A	B

- I_3 IS DERIVED FROM ICEA 54-440 FOR 1.15" DEPTH @ 50°C AMBIENT TEMPERATURE FOR CABLES IN CABLE TRAY
- I_3 IS DERIVED FROM ICEA 46-426 FOR CABLES IN CONDUIT
- $A = (1 - (I_2/I_3)) \times 100\%$
- B = CALCULATED DERATE FACTOR FROM TEST
- IF $A \geq B$, CABLE IS ACCEPTABLE
- IF $A < B$, EVALUATION/CIRCUIT MODIFICATION IS REQUIRED

PRELIMINARY TEST DATA

CONFIGURATION

Scheme #15-1; consisted of 36"X4" ladder back cable (straight run) tray with 90 degree sweeping bends. The cable tray was protected with 1/2 inch (nominal) thick Thermo-Lag board sections with ribs. Vertical and bottom joints were reinforced with a layer of stress skin, and trowel grade Thermo-Lag was used for build-up of the Thermo-Lag material. The longitudinal joints were also reinforced with stress skin and trowel grade Thermo-Lag material. The trowel grade Thermo-Lag was cured for 3 days before applying topcoat, and then cured for only 4 more days (total of 7 days) prior to conduct of the test.

RAW TEST DATA

Scheme #15-1; test date March 4, 1993

(a) Cable tray steel rail temperature (front); maximum - 285°F; Average = 244°F

Cable tray steel rail temperature (rear); maximum = 292°F; average = 247°F

(b) Cable temperature (power); maximum = 277°F; average = 241°F

Cable temperature (control); maximum = 224°F; average = 210°F

Cable temperature (instrument); maximum = 240°F; average = 217°F

(c) No burnthrough on the fire barrier was noted

(d) Megger was satisfactory (750 M ohm)

(e) Cable visual was satisfactory