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MURRAY R. EDELMAN

VICE PRESIDENT
NUCLEAR

March 15, 1983

PY-CEI/NRR-0026 L

Mr. B. J. Youngblood, Chief
Licensing Branch No. 1
Division of Licensing
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Perry Nuclear Power Plant
Docket Nos. 50-440; 50-441
Confirmatory Issue No. 36
Fire Protection

Dear Mr. Youngblood:

The purpose of this letter is to further address Confirmatory Issue No. 36 regarding the 3-hour fire rating for gypsum walls at the Perry Nuclear Power Plant. Previous submittals on this subject were dated March 12, 1982 (Question Topic No. 13) and August 31, 1982 (Attachment 2).

In a letter dated November 16, 1982, we committed to provide an Underwriter's Laboratory (UL) evaluation of the configuration differences between the Perry gypsum wall design and the U435 design tested by UL to demonstrate a 3-hour fire rating for the Perry design. After discussions with UL, we have been advised that they cannot perform such an evaluation as UL is principally a testing organization.

We have, however, obtained an evaluation of the configuration differences from the manufacturer of the 3-hour rated gypsum board construction used at Perry. Attachment 1 is a letter from the Research Fire Technology Group of Gold Bond Building Products supplying the required verification of a 3-hour fire rating.

Further, we have performed a detailed comparison of the gypsum wall designs used to separate rooms in safety-related areas at Perry and the Virgil C. Summer Nuclear Station, (see Attachment 2). Our evaluation of the two designs showed that the 3-hour firewall design at Perry is equivalent to that used at the Summer Station.

V. C. Summer 3-hour firewalls were accepted by the NRC staff based on a detailed description and an August 17, 1981 letter from the manufacturer of the gypsum board, U. S. Gypsum. As with Perry, Gilbert Associates designed the V. C. Summer firewalls based on extrapolations using the NFPA formula and typical 2-hour assemblies since there was no 3-hour rated UL tested assembly available when the firewalls were designed. It was not until early 1982 that USG tested an interior wall assembly (U435).

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Mr. B. J. Youngblood, Chief

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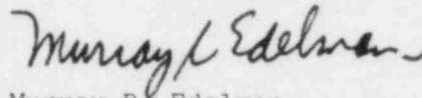
March 15, 1983

In the Summer SSER No. 4, (p. 9-3) the NRC staff stated that "the design configuration and inherent fire resistant qualities enable us to conclude that the assembly will provide 3-hour equivalent protection."

We believe that this additional information on the Perry gypsum wall design will enable the staff to reach a conclusion for Perry similar to that at the Virgil C. Summer Station and test data verification will not be required.

If you have any questions, please let me know.

Very truly yours,



Murray R. Edelman
Vice President
Nuclear Group

MRE:kh

cc: Jay Silberg, Esq.
John Stefano
Max Gildner

Attachments



December 9, 1982

Mr. Ronald C. Noll
Registered Architect
Gilbert/Commonwealth
Gilbert Associates, Inc.
P. O. Box 1498
Reading, PA 19603

Re: Perry Nuclear Power Plant
Gypsum Firewalls

Dear Mr. Noll:

As a result of your letter of November 12, 1982 concerning referenced project, our Research Fire Technology Group and I have reviewed the material you enclosed and our observations and conclusions concerning the configuration differences between UL design U435 and the Perry 3 hour firewall are as follows:

It is our opinion that the addition of the furring channel and the use of shorter fasteners and a slightly different screw pattern in the Perry Wall as compared to U435 would not decrease the fire rating.

The addition of the screw furring channel, from the technical viewpoint, when used in this configuration, would help the fire rating since the air space created by the channel helps act as an additional insulator.

The Perry Wall on the second and third layers of board used shorter screws as compared to the U435 design, however, these screws attached the board to the furring channel rather than the stud. In U435, the second and third layers were attached to the stud, therefore the screws had to be longer. The Perry Wall screws are used in accordance with Section 9.9.2 of ASTM C840 entitled, Standard Specification for Application and Finishing of Gypsum Wallboard. This section states: "Screws for application to steel framing and furring shall be in accordance with the requirements of specification C646, a minimum of 3/8 in. (9.5 mm) longer than the total thickness of gypsum board applied. I have enclosed a copy of ASTM C840 for your reference."

It is our opinion also that the difference in screw pattern between the two designs would have no affect on the fire rating. In the Perry Wall, the

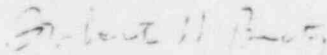
Mr. Ronald C. Noll
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screw furring channel adds to the support of the first or base layer, and the third layer (face layer) which is the most important, has the same screw pattern as does U435.

We appreciate the chance to be of service. Thank you for including us as one of your suppliers for referenced project.

Sincerely,

GOLD BOND BUILDING PRODUCTS
A National Gypsum Division



Robert W. Beitz
Manager Technical Services & Publications

RWB:jm

Enclosure

cc: R. Mapes - Research
R. M. Walls - Cleveland DM
J. W. Mueller - SF

Comparison of PNPP and V. C. Summer Station
3-Hour Rated Fire Barriers

The stud structure at Perry is designed based on 5 psf liveload, 50 lb. per linear foot hanging load, and in the control complex a seismic acceleration factor of 0.5-6.0; based on the Perry Safe Shutdown Earthquake (SSE). The stud structure at V. C. Summer is also based on 5 psf liveload and V. C. Summer Seismic Criteria. This design basis results in stud gage, stud spacing, stud thickness and top/bottom track anchorage to the building structure of technically equivalent structure between Perry and Summer. For non-bearing interior fire partitions, both stud structure designs are 2 to 12 times stronger structurally than commercial structures.

The gypsum board at Perry is "Gold Bond" Type X and the gypsum board at Summer is "USG" Type X. Both are manufactured to meet ASTM C36, "Specification for Gypsum Wallboard". Type X is defined as special fire-retardant gypsum wallboard. Based on ASTM C36, Perry's and Summer's gypsum boards are equivalent in total thickness (3"), layers (3 each side) and performance.

The furring at Perry and Summer run horizontal, perpendicular to the main steel stud structure. While Perry is of lighter gauge and further spaced, the depth of the furring is greater than Summer. Also, the location of the furring at Perry puts only one layer of gypsum between the furring and the studs for better support through the fasteners. Both Perry's increased furring depth and closer to stud location provide better structural qualities. Summer's furring actually sandwiches the first and second layers to the stud. This not only provides third layer support but also supports the second layer which is laminated with adhesive to the first layer. Perry's furring only sandwiches the first layer of gypsum. The furring is also independently screwed to the studs and therefore is providing support for the second and third layer.

The fasteners used at Perry and Summer both meet ASTM C646 and are equivalent in dimensions, hardness, material, finish, and performance. The spacing of the fasteners between Perry and Summer vary as the stud spacing varies, with a maximum stud spacing of 16" for both plants. The application of multiple layers and staggered joints results in a screw pattern of 16" x 8" for Perry and 16" x 6" for Summer.

The overall 3-hour firewall system of Perry and Summer calculate to the same rating when the NFPA formula for "Estimates of Fire Resistance by Interpolations" is used ($R = 40t^{0.7}g^{1/3}$). The introduction of horizontal furring adds to the thermal qualities. The temperature gradient across dead air space is better than through a homogeneous material (gypsum). The theoretical thermal resistance R of air is 6.00 vs R of gypsum - 0.18. Thus, the overall 3-hour firewall system at the Perry Nuclear Power Plant is technically equivalent to those at V. C. Summer.