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BVY 08-040

U.S. Nuclear Regulatory Commission
ATTN: Document Control Desk
Washington, DC 20555-0001

- References:
- a) Letter, VYNPC to USNRC, "Request for Exemption – 10CFR Part 50, Appendix R, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979," FVY 85-38, dated April 24, 1985
 - b) Letter, VYNPC to USNRC, "Request for Exemptions from the Requirements of 10CFR, Part 50, Appendix R: 'Special Circumstances'," FVY 86-74, dated August 15, 1986
 - c) Letter, USNRC to VYNPC, "Exemption from Appendix R of 10 CFR 50, Concerning Automatic Suppression, Separation and Repairs," NVY, 86-240, dated December 1, 1986
 - d) USNRC Generic Letter 86-10 "Implementation of Fire Protection Requirements," dated April 24, 1986

**SUBJECT: Vermont Yankee Nuclear Power Station
License No. DPR-28 (Docket No. 50-271)
Request for Revision to Existing 10 CFR 50 Appendix R Exemption**

Dear Sir or Madam:

In References (a) and (b), Vermont Yankee (VY) submitted a request for exemption from the 20' separation requirement of 10 CFR 50 Appendix R, Section III.G.2.b concerning redundant cable trays in the northwest corner of elevation 252' of the Reactor Building. The reported minimum separation between the cable trays was 18'. The USNRC granted this exemption in Reference (c).

Vermont Yankee has identified that the actual minimum physical separation distance between the cable trays is actually 17'-7.5", which is slightly less than the stated 18'. VY has performed a Fire Protection evaluation, using Reference (d) as guidance. The evaluation concluded that there is no impact on Vermont Yankee Safe Shutdown Capability. This letter is a request for a revision of the existing exemption from 18' to

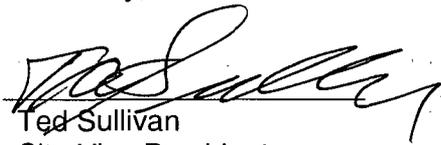
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NRR

17'-7.5". The basis for this request is contained in Attachment 1.

There are no new commitments contained in this letter.

If you have any questions or require additional information, please contact Mr. Dave Mannai (802) 451- 3304.

Sincerely,

A handwritten signature in black ink, appearing to read "Ted Sullivan", is written over a horizontal line.

Ted Sullivan
Site Vice President
Vermont Yankee Nuclear
Power Station

Attachment 1 - Basis for Revision of Existing Exemption from 10 CFR 50 Appendix R,
Section III.G.2.b

cc: Mr. Samuel J. Collins, Regional Administrator
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BVY 08-040
Docket No. 50-271

Attachment 1

Vermont Yankee Nuclear Power Station

Basis for Revision of Existing Exemption from 10 CFR 50 Appendix R, Section III.G.2.b

Basis for Revision of Existing Exemption from 10 CFR 50 Appendix R, Section III.G.2.b

1.0 Background

The regulatory requirements of 10 CFR 50 Appendix R, Section III.G.2 state:

Except as provided for in paragraph G.3 of this section, where cables or equipment, including associated non-safety circuits that could prevent operation or cause maloperation due to hot shorts, open circuits, or shorts to ground, of redundant trains of systems necessary to achieve and maintain hot shutdown conditions are located within the same fire area outside of primary containment, one of the following means of ensuring that one of the redundant trains is free of fire damage shall be provided:

- a. Separation of cables and equipment and associated non-safety circuits of redundant trains by a fire barrier having a 3-hour rating. Structural steel forming a part of or supporting such fire barriers shall be protected to provide fire resistance equivalent to that required of the barrier;*
- b. Separation of cables and equipment and associated non-safety circuits of redundant trains by a horizontal distance of more than 20 feet with no intervening combustible or fire hazards. In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area; or*
- c. Enclosure of cable and equipment and associated non-safety circuits of one redundant train in a fire barrier having a 1-hour rating, In addition, fire detectors and an automatic fire suppression system shall be installed in the fire area;*

At Vermont Yankee (VY), in the northwest corner of elevation 252' in the Reactor Building (RB), redundant cable trays are located in fire zone RB-3. The area is provided with fire detection and an automatic suppression system.

VY requested in Reference 7.1, and was granted in Reference 7.3, an exemption from the requirement to have a minimum of 20' separation between redundant equipment. Reference 7.2 provided justification for not meeting the requirements of paragraphs a) and c) of Section III.G.2 and specified a physical distance of 18' existed. As part of a re-validation of the VY Appendix R program, physical measurements made between the redundant trays at locations in the northwest corner of the Reactor Building identified that in a 10' area the separation was less than 18' and was a minimum of 17'-7.5".

2.0 Existing Licensing Basis for RB-3 Separation Exemption Request

Reactor Building Northwest Corner Area – Reactor Building Fire Zone RB-3

In Reference 7.3, the USNRC approved an exemption from the Appendix R Section III.G.2.b requirement of 20' of separation free of intervening combustibles. The bases for this exemption included the existing 18' separation between redundant safe-shutdown trains, minimal fire hazards, flame-retardant characteristics of cable insulation, and the installed fire protection features.

3.0 Fire Hazards, Combustible Controls and Fire Protection Features in Fire Zone RB-3

3.1 Evaluation of Hazards/Ignition Sources and Combustible Controls

The fire hazards and ignition sources in the northwest corner of the Reactor Building remain materially unchanged from the characteristics of these areas as described in Reference 7.3, and the correspondence referenced therein, as applicable to the specific fire zone.

Transient combustible and hot work controls have been enhanced since the time the exemption was granted. Per Reference 7.5, fire zone RB-3 is designated as "Level 2" combustible control areas, which constrains transient combustibles to moderate quantities. In addition, per Reference 7.4, any planned hot work in VY Fire Zone RB-3 requires the prior review and approval of fire protection engineering.

3.2 Active Protection: Fire Detection and Suppression Features

The installed fire detection systems and automatic and manual fire suppression features in the affected zones of fire zone RB-3 remain functionally unchanged from those described in Reference 7.3 and the correspondence referenced therein, as applicable. Automatic water spray suppression is provided in the northwest corner of fire zone RB-3 for protection of cable trays. Manual suppression capabilities are provided in fire zone RB-3 in the form of accessible fire hose stations and portable fire extinguishers.

3.3 Passive Fire Protection Features

The installed passive fire protection features (fire barriers and penetration seal systems) in fire zone RB-3 remain functionally unchanged from those described in Reference 7.3 and the correspondence referenced therein.

3.4 Transient Combustible Control and FP Equipment Operating History

A review of recent VY condition reports revealed no significant fire protection related deficiencies applicable to fire zone RB-3. Topics searched included fire barriers, fire suppression, fire detection, and housekeeping/combustible loading. Hence, there is reasonable assurance that the design and operational controls have maintained the fire protection defense-in-depth measures consistent with the VY fire protection licensing basis.

4.0 **Adequacy of Existing Separation Distance to Protect Safe-Shutdown Capability and Evaluation of Actual VY Separation Distance vs. Previously Approved Separation Distance**

As described in Reference 7.3, the USNRC discussion on the original exemption request was:

...without 20' of separation a fire of significant magnitude could develop; however, there is no significant fire load on the floor area and the cable fire load is low. If a fire were to occur, the staff expects it to develop slowly, with initially a low heat release and slow temperature rise. Because of the presence of the early warning fire detection system, the fire would be detected in its incipient stages. The fire brigade would then be dispatched and would extinguish the fire. Until the fire is out, the 18 feet of spatial separation between the cable trays in question would provide sufficient passive protection to provide us with reasonable assurance that one division would remain free of fire damage. Another major factor that reduces the fire risk in this zone is that redundant cable trays are well separated after diverging from the one point where 18 feet of separation exists. The staff finds that the provision of 20-foot separation free of all intervening combustibles would not significantly increase the level of fire protection in this zone. Based on the above evaluation, the staff concludes that the existing fire protection combined with the proposed fire protection measures in the above area of Fire Zone RB-3 provides a level of fire protection equivalent to the technical requirements of Section III.G.2.b of Appendix R.

The VY re-evaluation of Appendix R compliance performed a detailed exemption request compliance review which included actual physical measurements in overhead areas of the minimum separation distance between trays. VY determined that the minimum 18' of spatial separation existed where the trays entered the reactor building from the cable spreading room, but in one area, for about a 10' horizontal distance, there is less than 18' of separation. This area is shown in Figure 1. Along this length, the minimum separation distance was found to be 17'-7.5".

The 4.5" deviation from the identified 18' separation distance is considered to have no adverse impact on the bases for approval of the exemption. While the exemption was requested due to not meeting the 20' separation criteria of Appendix R, the primary fire protection features used to justify the exemption were the existing detection system in the northwest corner, the suppression system coverage at both ceiling level, below tray and conduit obstructions closer to the floor, the lack of intervening combustibles between cable trays to propagate a fire, and protection for any redundant safe shutdown cables located in between the cable tray systems.

5.0 Regulatory Analysis

10 CFR 50.12(a) states that the Commission may grant exemptions from the requirements of the regulations contained in 10 CFR 50 which are:

- (1) Authorized by law, will not present an undue risk to the public health and safety, and are consistent with the common defense and security; and,
- (2) If special circumstances are present.

This request for revision of existing exemptions meets the criteria set forth in 10 CFR 50.12, as discussed herein.

5.1 The requested exemption is authorized by law

10 CFR 50.12(a) authorizes the NRC to grant exemptions from its regulations.

5.2 The requested exemption does not present an undue risk to the public health and safety

The existing minimum separation distance of 17'-7.5" with the existing installed suppression and detection in the area will provide assurance that one train of safe shutdown equipment is free of fire damage for a fire in zone RB-3. The minimal fire hazards and ignition sources, combined with the nature of the fire hazards in the areas, the active and passive fire protection features, and the controls on transient combustibles and ignition sources, as discussed in Section 3.0, provide assurance that the credible fire challenge will not impact redundant safe shutdown

equipment. Therefore, as discussed in Section 4.0, the separation distance can be expected to provide adequate protection for the affected safe-shutdown cables.

Given the existing level of fire protection defense-in-depth, combined with the minimal fire challenge presented by credible fire scenarios in these areas, and the favorable fire protection equipment operating history, the reduction of separation distance by 4.5" along part of the cable tray run will not degrade the effectiveness of the VY safe shutdown capability, nor will it challenge the credited post-fire safe shutdown capability. Based on the determination that safe shutdown in the event of a fire can be achieved and maintained with reduced separation distance, the requested revision to the existing exemption does not present an undue risk to the public health and safety.

5.3 The requested exemption is consistent with the common defense and security

The requested revision to the existing exemption is not directly related to and should not adversely impact the common defense and security.

5.4 Special circumstances are present – underlying purpose of the rule

10 CFR 50.12(a) requires that special circumstance be present in order for the Commission to consider granting an exemption. Per 10 CFR 50.12(a)(2)(ii), one special circumstance is that application of the regulation in the particular circumstances would not serve the underlying purpose of the rule or is not necessary to achieve the underlying purpose of the rule.

The underlying purpose of 10 CFR 50, Appendix R, Section III.G is to provide reasonable assurance that at least one means of achieving and maintaining safe shutdown conditions will remain available during and after any postulated fire. For the areas with reduced separation distance described in this request, the credible fire challenge to these cables due to any postulated fire will be equivalent to that provided by the regulation given the physical configuration of the cable trays, existing suppression and detection and lack of significant combustible loading in the area. Therefore, the underlying purpose of the rule is satisfied and the application of the regulation in these particular circumstances is not necessary to achieve the underlying purpose of the rule.

6.0 Conclusion

The defense-in-depth objectives of the Fire Protection Program are to

- 1) Prevent fires from occurring;
- 2) Detect, control, and extinguish promptly those fires that do occur; and
- 3) Provide protection from the effects of a fire for structures, systems, and components needed to achieve and maintain safe shutdown.

The fire hazards analysis of the RB-3 fire zones with reduced separation distance between redundant trays in the northwest corner area show that these objectives are met. The first objective is supported by the fact that there are few significant ignition sources in the area and transient combustibles are controlled. Supporting the second objective are the active fire detection and suppression features in the area. The third objective is supported by the cable tray configuration and existing separation distance which provides protection from credible fire exposures even with reduced separation distance.

This request for revision of existing exemption is warranted under the provisions of 10 CFR 50.12, in that it is authorized by law, does not present an undue risk to the public health and safety, and is consistent with the common defense and security. Further, it meets the requirement for a special circumstance in that it satisfies the underlying purpose of 10 CFR 50 Appendix R by providing acceptable separation distance that will provide protection for the duration of any postulated fire such that safe shutdown can be achieved and maintained.

7.0 References

- 7.1 Letter, VYNPC to USNRC, "Request for Exemption – 10CFR Part 50, Appendix R, Fire Protection Program for Nuclear Power Facilities Operating Prior to January 1, 1979"; FVY 85-38, dated April 24, 1985
- 7.2 Letter, VYNPC to USNRC, "Request for Exemptions from the Requirements of 10CFR, Part 50, Appendix R: 'Special Circumstances'", FVY 86-74, dated August 15, 1986
- 7.3 Letter, USNRC to VYNPC, "Exemption from Appendix R of 10 CFR 50, Concerning Automatic Suppression, Separation and Repairs", NVY, 86-240, dated December 1, 1986
- 7.4 Entergy Nuclear Procedure EN-DC-127, "Control of Hot Work and Ignition Sources"
- 7.5 Entergy Nuclear Procedure EN-DC-161, "Transient Combustible Program"

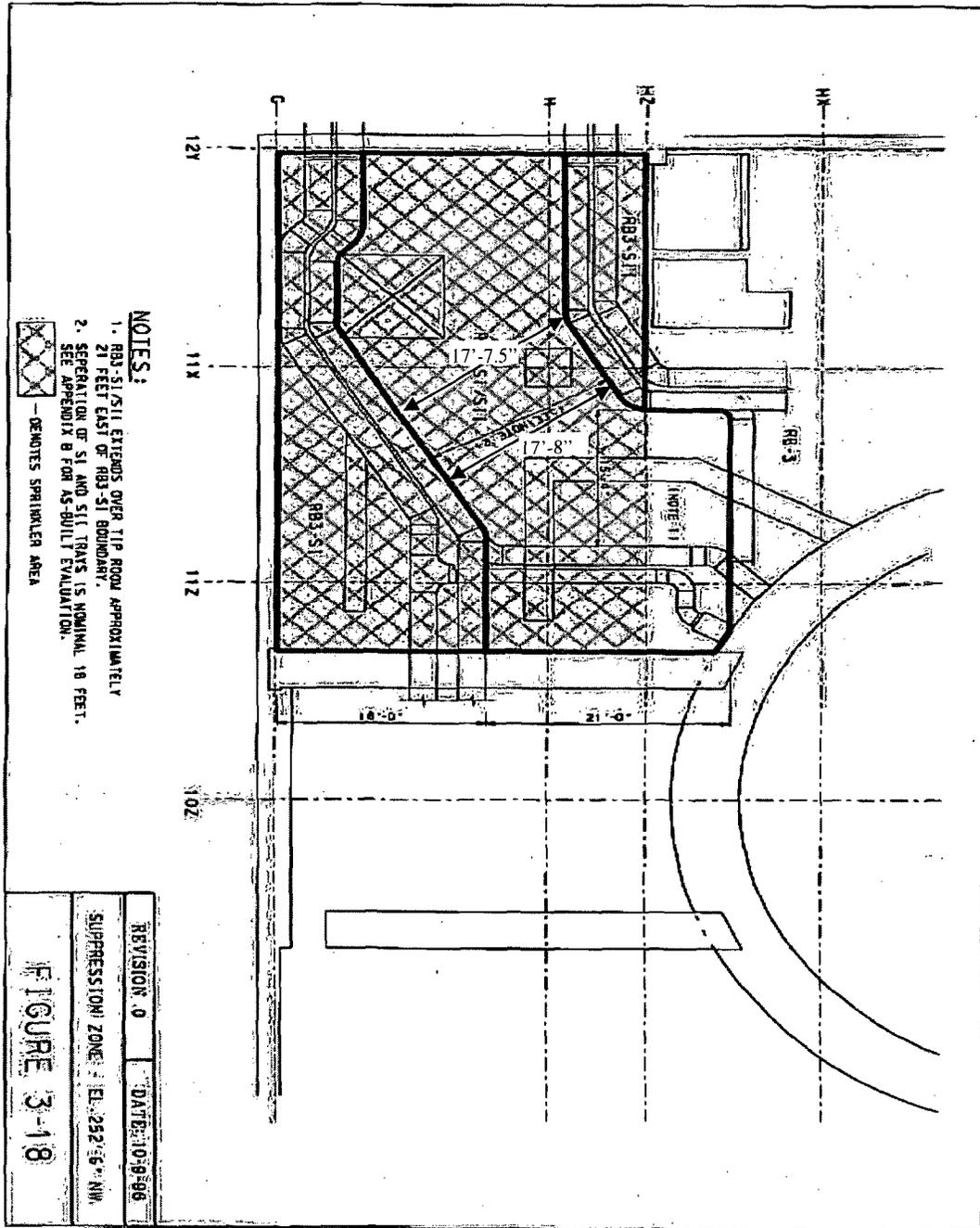


Figure 1 - Fire Zone RB-3 Layout