

U.S. Nuclear Regulatory Commission
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cc (Enclosure):

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ENCLOSURE

TVA'S POSITION
IN RESPONSE TO NRC ISSUES
IDENTIFIED IN INSPECTION 390,391/93-74

During the subject NRC inspection, two issues were identified which involve TVA's position regarding Regulatory Guide (RG) 1.75 at WBN. The first issue involves TVA's practice of cable splicing in certain raceways which may not meet the requirements of RG 1.75. The second issue involves the relationship of TVA's design criteria for conduit to open top tray separation in the Final Safety Analysis Report (FSAR). Responses to each issue are provided below:

ISSUE 1

Drawing 45W883-3, Revision 3, and Specification G-38 permit cable splicing in conduit raceways. This may not meet the requirements of RG 1.75 which prohibits splicing in raceways without NRC approval.

RESPONSE

As stated in the implementation section of RG 1.75, January 1975, this guide applies to construction permit applications for which the issue date of the Safety Evaluation Report is February 1, 1974, or after. Since the construction permit for Watts Bar was issued January 23, 1973, and RG 1.75 was issued after the Watts Bar design was complete, WBN is not committed to complying with the requirements of this Regulatory Guide. This is stated as Note 2 of FSAR Section 8.1.5.3.

Raceway separations at WBN are based upon meeting the intent of RG 1.6, Revision 0, IEEE Std 279-1971 and IEEE Std 308-1971. This information was previously provided to the NRC in response to FSAR question 040.25 and is documented in FSAR sections 7.1.2.2 and 8.3.1.4. However, it is noted that RG 1.75, Revision 0 established the minimum separation distances for conduit to conduit and for tray to tray carrying cables of redundant divisions. These distances are based on cable splices in raceways being prohibited. RG 1.75, Revision 1 supplemented this basis as follows:

"Splices are not, by themselves unacceptable. If they exist, the resulting design should be justified by analysis. The analysis should be submitted as part of the Safety Analysis Report."

TVA concurs with the above position and generally disallows splicing within raceways except for the following cases:

1. In accordance with Standard Drawing SD-E12.5.1-2, Revision 1, splices in conduit banks may be made in manholes, cable trays in manholes or in handholes. Cables in the Class 1E conduit duct banks to the intake pumping station and diesel generator building are spliced in the cable trays within

the duct bank manholes. The redundant duct banks have a fire rated barrier between the train A and B sections within a manhole or have completely separate manholes. Since the nearest manhole/handhole is approximately 80 feet or more away, the splices in the duct banks into the auxiliary building, intake pumping station and diesel generator building are sufficiently isolated from these areas. Therefore, a fire as a result of a splice failure in one divisional raceway would not propagate to another Category 1 structure.

2. In accordance with General Engineering Specification G-38, splices are not to be installed in conduits, except for termination to pigtail leads and pigtail extensions which can be made in flex conduits which connect to the end device. In accordance with Standard Drawing SD-12.5.1-3, Revision 1, it is acceptable for the pigtail extension splice to be located in flexible conduit connecting to the equipment. Drawing 45W883-3, Revision E, allows splices in a short rigid conduit connection adjacent to a device when a Conax Electrical Conductor Seal Assembly is used to provide an environmental moisture seal.

When splices are installed in flexible conduits or, in the case of a conductor seal assembly, a short rigid section of conduit adjacent to the device, the cable being spliced is dedicated to the one device. Therefore, due to separation and/or protection requirements, a fire caused by a splice failure in the conduit section would be sufficiently isolated from the redundant safety related circuit that it would not compromise that circuit. Since the installation of the spliced sections of cable are installed in flex at end devices or short rigid sections for conductor seal assemblies, those sections are installed by sliding the conduit over the cable rather than pulling it into the raceway thereby minimizing potential for damage to the splice due to excessive pull force. Additionally, in the case of instrumentation circuits, there is a low probability of fire due to low energy levels.

3. Finally, standard drawing SD-E12.5.9, Revision 0, details splicing methods that can be used in cable trays in areas other than that allowed by standard drawing SD-E12.5.1-2. In the two methods used for splicing in cable trays, the splice is either contained in a rigid conduit sleeve within the tray with a fire seal at each end of the conduit sleeve or it is located in the tray with a solid metal barrier between each spliced cable section and other cables. A fire seal is located at each end of the tray section containing the splices. A cable tray cover is required to be mounted on the top and bottom of the tray sections containing the splice if it is not contained in a rigid conduit sleeve. Due to the restrictions on splicing in raceways detailed on standard drawing SD-E12.1.5-2, the methods of splicing in cable trays detailed of SD-E12.5.9 are to be used only in extraordinary situations with engineering approval required.

In conclusion, even though WBN is not required to meet RG 1.75, sufficient engineering requirements exist, as explained above, that analysis for splicing in raceways does not need to be included in the FSAR.

ISSUE 2

Are class 1E conduit to open top tray separation requirements, as described in design criteria WB-DC-30-4, adequate and properly reflected in the FSAR?

RESPONSE

As mentioned in the above response to Issue 1, RG 1.75 , Revision 0 (and the current Revision 2) provides guidance for spatial separation requirements between class 1E conduit to class 1E conduit and between tray to tray configurations. In addition, these documents discuss separation requirements for enclosed raceway and associated circuits. However, guidance for spatial distances between conduit and open top trays is not included. WBN's design criteria provides requirements for spatial separation between conduit and open top trays. The rational basis for these separation requirements was added to the criteria (Appendix C) in Revision 8 on December 4, 1991. However, since the above regulatory guidance does not address conduit to open top tray spatial separations, TVA chose not to include this information in the FSAR.

Furthermore, IEEE documents did not include guidance for conduit to open top tray separations until issuance of IEEE-384-1992 in December of 1992. The separations required by WB-DC-30-4 are in some cases less than that recommended by IEEE-384-1992. This IEEE document acknowledges that lesser separation distances can be established based on listed features of the installation. The rational provided in WB-DC-30-4, Appendix C, although issued a year prior to IEEE-384-1992, takes credit for many of the same listed features (e.g., cable flame retardant characteristics, raceway fill, and mitigation measures [such as sprinklers]). The above provides the technical basis for TVA's criteria of minimum 1 inch separation between class 1E conduits and open cable trays.

Therefore, it is TVA's conclusion that the separations requirements specified are adequate and that inclusion in the FSAR is not required.