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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

ATOMIC SAFETY AND LICENSING BOARD

Before Administrative Judges:
Sheldon J. Wolfe, Chairman
Emmeth A. Luebke
Jerry Harbour

In the Matter of	Docket Nos. 50-443-OL-1 50-444-OL-1
PUBLIC SERVICE COMPANY OF NEW HAMPSHIRE, et al.	(On-Site Emergency Planning and Safety Issues)
	(ASLBP No. 88-558-01-OLR)
(Seabrook Station, Units 1 and 2)	March 2, 1988

MEMORANDUM TO APPEAL BOARD
ON ENVIRONMENTAL QUALIFICATION
OF COAXIAL CABLE RG-58

I. BACKGROUND

On January 8, 1988, in ALAB-882, 27 NRC ___ (slip op. at 8), the Appeal Board directed this Board to examine a claim of the Applicants that, should an accident occur, cable RG-58 need maintain its integrity only to the extent necessary to avoid compromising the fulfillment of the safety function of other components, and that the high-potential test is all that need be satisfied to demonstrate the environmental qualification of the cable.[1] Applicants' claim, unsupported by

[1]The Appeal Board also stated that "no party appears to dispute
(Footnote Continued)

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affidavit, was submitted on November 25, 1987 in response to the Appeal Board's Order of November 6, 1987 (unpublished) that the NRC Staff and the Applicants specifically respond to the points raised by the NECNP Supplemental Memorandum, provide the mathematical expression describing the relationship of insulation resistance to cable length, and discuss whether we (the Licensing Board) had erred in relying on the value of 80 volts per mil of insulation in our first Memorandum on this issue. In ALAB-882 (slip op. at 8-9), the Appeal Board directed that if we find the Applicants' new claim, not previously presented to us, to be meritorious we should issue another Memorandum setting forth our reasons. Or, if we reject the claim, we should reopen the record to pursue further the question whether the RG-59 cable test results can serve as the foundation for the qualification of the RG-58 cable.

The Appeal Board summarized the events and arguments by the parties that led to their directive to us.

For the reasons given below we find that there is adequate evidence in the record, as averred by the Applicants and NRC Staff, to show that full environmental qualification of cable RG-58 is not required, that the high-potential withstand test is all that is needed to demonstrate its environmental qualification, and that the successful environmental

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(Footnote Continued)
that a high potential test of the RG-58 cable would likely have produced results similar to the acceptable results obtained in the testing of the RG-59 cable." (ALAB-882, slip op. at 7).

qualification of cable RG-59 can serve to qualify the untested RG-58 cable by comparison.

II. DISCUSSION

In our previous Memorandum of October 16, 1987 on this issue (unpublished), we dealt with the comparison of coaxial cables RG-58 and RG-59 in terms of their materials, dimensions, and insulation resistance (IR) requirements to show why we found, based on evidence in the record, that Applicants had demonstrated that environmental qualification test results of the RG-59 cable could serve to qualify the RG-58 cable by comparison.[2] The thrust of our finding was that while cable RG-58 has thinner insulation than RG-59, it also has a "proportionally"[3] lower IR

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[2] 10 C.F.R. §50.49(f)(2) provides that an item of electrical equipment may be qualified by "[t]esting a similar item of equipment with a supporting analysis to show that the equipment to be qualified is acceptable."

[3] Our perhaps unfortunate use of the term "proportional" was mistakenly taken by NECNP and the Staff to apply to the relationship between the thickness of cable insulation and the specified operating IR of cables, generally, as well as to mean a mathematically fixed relationship. In conformance with the remand in ALAB-875 (at 39) the discussion in our Memorandum went only to the comparison of the two cables, RG-58 and RG-59. Further, from our specification of the IR operating requirements for each of the cables, 1000 megohms @ 1000 ft. and 10000 megohms @ 1000 ft., respectively, and the corresponding insulation thicknesses, 40 mils and 61 mils, respectively, it should have been clear that we found no fixed mathematical ratio between operating resistance requirements and insulation thickness:

$$\frac{1000}{10000} \neq \frac{40}{61}$$

We should have used the term "approximately proportional."

operating requirement. (Memorandum at 3). More significantly, we found that both the acceptance criteria and test results for the high-potential withstand environmental test are specified in resistance proportional to the insulation thickness (viz., 80 volts per mil of insulation thickness). (Id.) Thus, we found that the successful environmental testing of cable RG-59 could serve, by comparison, to qualify the untested cable RG-58. However, the Appeal Board found that even if a high-potential test of the RG-58 cable would likely have produced results similar to the acceptable results obtained in testing the RG-59 cable, this fact, standing alone, would not justify our ultimate conclusion; i.e, that the RG-58 cable can be considered environmentally qualified on the strength of the tests performed on the RG-59 cable. (ALAB-882 at 7). The additional requirement is for the demonstration that only the high potential test has relevance to the environmental qualification of the RG-59 cable.

In their November 25, 1987 response (at 3) to the Appeal Board, the Applicants stated that "[t]he RG-58 coaxial cable does not perform an accident mitigating function but must withstand the [accident] environment such that it does not compromise the safety function of other components. The RG-58 coaxial cable supplied by ITT Suprenant to Seabrook is color coded in accordance with Specification No. 9763-113-19. and is black with a red trace (Reference 1 at A1; Reference 7 at 2). [Footnote omitted]. Based on this color coding, acceptable performance of the RG-58 cable when

exposed to harsh environmental conditions is measured only by the cable's ability to remain intact such that its insulation system will not catastrophically fail and result in a short to ground (Reference 6). Therefore, the basis for installed (i.e. RG-58) to tested (i.e. RG-59) cable similarity only relates to the overall strength of the insulation system and its resistance to catastrophic failure with respect to environmental effects."[4]

The NRC Staff response to the Appeal Board, supported by the affidavit of Mr. Harold Walker, who is an NRC reactor engineer and an expert in this area, stated that the RG-58 and RG-59 cables are similar within the meaning of 10 C.F.R. §50.49(f)(2) because the cables are made from the same materials, are the same type of conductor, and are made by the same manufacturer. The Staff's affiant also agreed that the different operating requirements of the cables, specifically the differing requirements for insulation resistance, are important in determining similarity of performance of the two cables, and that the RG-58 cable only has to remain intact, and is not required to mitigate an accident. The Staff's affiant concluded that all these factors, collectively, provide a basis for justifying the similarity of the two cables whose primary insulation thickness differs by a factor of

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[4]Applicants' Response Regarding Environmental Qualification of RG-58 Coaxial Cable, dated November 25, 1987. References 1, 6, and 7 cited by the Applicants refer to those contained in the Environmental Qualification File (EQF) 113-19-01, which had been admitted as NECNP Exhibit 4 during the hearing.

approximately 1.5. (NRC Staff Response To Memorandum of Licensing Board and New England Coalition on Nuclear Pollution Regarding Environmental Qualification of RG-58 Coaxial Cable, December 11, 1987 at 4, and Affidavit of Harold Walker, Q&A 6 at 2-3).

NECNP, in its reply to Applicants' response regarding environmental qualification of RG-58 coaxial cable, dated December 10, 1987, questions the "probative authority" of the memorandum in EQF 113-19-01, Reference 4, (NECNP Exhibit 4) for "establishing the environmental qualification requirements for ten miles (sic) of cable inside this plant" on multiple hearsay grounds. In its response to the Staff of December 23, 1987, NECNP claims that the Staff's disagreement with our "proportionality" finding in our first Memorandum strengthens NECNP's own previous disagreement (but see n. 3, supra). NECNP asserts that the Staff's affiant's conclusion that sufficient other bases exist for justifying the similarity of the two cables (RG-58 and RG-59) cannot overcome the fact that, in NECNP's words, "it is now virtually undisputed that the Licensing Board's rationale for finding RG-58 qualified was wrong."

NECNP's arguments against the Applicants' response are, in effect, that documents in the Applicants' environmental qualification file do not provide an evidentiary basis for determining the truth of the matters contained therein, and that our earlier "proportionality" finding is insufficient to establish the similarity of the RG-58 and RG-59 cables. These arguments fail.

In addition to the fact that the document in question, EQF 113-19-01, was offered and admitted into evidence without limitations as NECNP Exhibit 4 (see Tr. 460), the Applicants' witness, in responding to cross examination by NECNP counsel, testified that the purpose of the [EQF] files is to keep a verifiable record that the equipment is indeed qualified for the environment to which it may be subjected in an accident. (Woodward, Tr. 360 at 11. 21-25). In its cross examination on this file, NECNP did not challenge appropriateness of the environmental qualification testing of these two cables to the projected accident conditions, except in regard to testing for submergence. (Tr. 376-83 generally; Tr. 377-78. Also see Finding 69 or our Partial Initial Decision, LBP-87-10, 25 NRC 177, 210 (1987) in regard to absence of qualification for submergence of these cables). That the entries in the various documents are brief, or that the size of the purchase order is for 60,000 feet (11.36 miles), does not detract from their probative value. They are part of the record introduced by NECNP and not challenged by NECNP during their cross examination.

NECNP's arguments simply are not true that the Staff's affiant's bases for finding similarity of the two cables for purposes of environmental qualification are refuted by the incorrectness of our previous "proportionality" findings. It has never been contended that

any physical differences exist between cables RG-58 and RG-59, other than their dimensions.[5]

The answer to the question can be found in the record as to whether cable RG-58 must be "fully" qualified or whether meeting the requirements of only the high potential withstand test (by comparison with the successfully tested RG-59 cable) is sufficient. As Applicants point out, and as we indicate above, the information is contained in EQF 113-19-01 (NECNP Exh. 4, References 1, 2, 6, and 7). References 1 and 7 indicate that cable RG-58 is color coded black with a red trace, and Reference 6 indicates the requirement that cables marked other than with the single color of red, white, blue or yellow must only remain intact (e.g. no shorting to ground). That the high potential withstand test does measure leakage/charging current between the main conductor and the shield (i.e., shorting to ground) is indicated in Reference 2 (Table 3, at 15, n. "d" in regard to test results of cable A5550-2C [RG-59]).

In making our original findings on the environmental qualification of cable RG-58 (LBP-87-10 at 210-211) we did not consider specifically the testing requirements for two reasons: (1) NECNP had not challenged the testing requirements for cable RG-58, other than the submergence testing requirement (see, supra p. 6), and (2) testimony indicated that

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[5]We do not consider Staff's affiant's statement that "...the potential failure modes [of the cables] must also be considered" in determining similarity of performance of the two cables, because we know of no reference to failure modes elsewhere in the record. Walker Affidavit, Q&A 6, at 2-3.

environmental qualification had been conducted in conformance with requirements and guidance set forth in, inter alia, 10 C.F.R. §50.49, NUREG 0588, and Institute of Electrical and Electronics Engineers (IEEE) Standards (App. Panel, ff. Tr. 357 at 3; Walker, Tr. 712). Absent a challenge to the testing requirements, it is technically inferable that cables RG-58 and RG-59 met the respective requirements to which they must be qualified, as set forth in the regulations and guidance documents.

III. CONCLUSIONS

Pursuant to the directions contained in ALAB-882, we have examined the Applicants claim, not previously made before us, and we find that there is an adequate evidentiary record to show that full environmental qualification of coaxial cable RG-58 is not required, that requirements of the high potential withstand test are all that is needed to demonstrate its environmental qualification, and that the successful environmental qualification of coaxial cable RG-59 can serve to qualify the untested RG-58 cable by comparison. For the reasons given above we find that that the Applicants' claim to this effect, therefore, is meritorious.

Judge Luebke was unavailable and did not participate in the preparation of this issuance.

THE ATOMIC SAFETY AND LICENSING BOARD

Sheldon J. Wolfe, Chairman
ADMINISTRATIVE JUDGE

Jerry Harbour
ADMINISTRATIVE JUDGE

Dated at Bethesda, Maryland
this 2nd day of March, 1988.