



Public Service of New Hampshire

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February 1, 1983

SBN-450  
T.F. B7.1.2

United States Nuclear Regulatory Commission  
Washington, D. C. 20555

Attention: Mr. George W. Knighton, Chief  
Licensing Branch No. 3  
Division of Licensing

References: (a) Construction Permits CPPR-135 and CPPR-136, Docket  
Nos. 50-443 and 50-444

Subject: Open Item Response: (SRP 5.3.1; Materials Engineering Branch

Dear Sir:

We have enclosed a response to the open item regarding reactor vessel closure studs. This item was discussed with representatives of the Materials Engineering Branch in meetings conducted on January 10-12, 1983.

The enclosed response will be included in OL Application Amendment 49.

Very truly yours,

YANKEE ATOMIC ELECTRIC COMPANY

*David A. Maidman*  
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Project Manager

ALL/fsf

cc: Atomic Safety and Licensing Board Service List

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RESPONSE TO OPEN ITEM REGARDING REACTOR VESSEL CLOSURE STUDS (5.3.1)

Westinghouse is in agreement with Regulatory Guide 1.65 except for material and tensile strength guidelines.

Westinghouse has specified both 45 ft lb and 25 mils lateral expansion for control of fracture toughness determined by Charpy-V testing, required by the ASME Boiler and Pressure Vessel Code, Section III, Summer 1973 Addenda and 10CFR Part 50, Appendix G (July 17, 1973, Paragraph IV.A.4). These toughness requirements assure optimization of the stud bolt material tempering operation with the accompanying reduction of the tensile strength level when compared with previous ASME Boiler and Pressure Vessel Code requirements.

The specification of both impact and maximum tensile strength as stated in the guide results in unnecessary hardship in procurement of material without any additional improvement in quality.

The closure stud bolting material is procured to a minimum yield strength of 130,000 psi and a minimum tensile strength of 145,000 psi. This strength level is compatible with the fracture toughness requirements of 10CFR 50, Appendix G (July, 1973, Paragraph 1.C), although higher strength level bolting materials are permitted by the code. Stress corrosion has not been observed in reactor vessel closure stud bolting manufactured from material of this strength level. Accelerated stress corrosion test data do exist for materials of 170,000 psi minimum yield strength exposed to marine water environments stressed to 75 percent of the yield strength (given in Reference 2 of the guide). These data are not considered applicable to Westinghouse reactor vessel closure stud bolting because of the specified yield strength differences and a less severe environment; this has been demonstrated by years of satisfactory service experience.

The ASME Boiler and Pressure Vessel Code requirement for toughness for reactor vessel bolting has precluded the guide's additional recommendation for tensile strength limitation, since to obtain the required toughness levels, the tensile strength levels are reduced. Prior to 1972, the Code required a 35 ft lb toughness level which provided maximum tensile strength levels ranging from approximately 155 to 178 kpsi (Westinghouse review of limited data - 25 heats).. After publication of the Summer 1973 Addenda to the Code and 10CFR Part 50, Appendix G, wherein the toughness requirements were modified to 45 ft lb with 25 mils lateral expansion, all bolt material data reviewed on Westinghouse plants showed tensile strengths of less than 170 kpsi.