Washington Public Power Supply System
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February 24, 1987
G03-87-045

Docket No. 50-508

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
Washington, D. C. 20555

Subject: NUCLEAR PROJECT NO. 3
RESOLUTION OF KEY LICENSING ISSUES
STIFF CLAMPS

Reference: Letter (G03-85-418), G. C. Sorensen to G. W. Knighton, same subject, dated July 31, 1985.

By the reference, the Supply System transmitted a comprehensive Summary Evaluation Report related to the application of ITT Grinnell Stiff Clamps at WNP-3. The report completed our responses to the NRC Staff questions (210.1 - 210.20) and completed our commitment to provide a test report.

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We indicated that it was our goal to gain resolution of this issue with the NRC and to obtain a Safety Evaluation Report (SER) section from the NRC Staff.

On December 18, 1986 we received three verbal questions from the NRC Staff following Staff review of our responses. We documented those questions and per agreement with Mr. Robert Lee of the NRC we assigned them numbers 210.21 - 210.23. Attached are our responses to the three questions. We trust that the Staff now has sufficient information with which to reach a conclusion regarding the acceptable application of the ITT Grinnell Stiff Clamps at WNP-3.

If you have any questions, please contact Mr. D. W. Coleman, WNP-3 Project Licensing Manager, Ext. 5436.

G. C. Sorensen, Manager
Regulatory Programs

DWC/cae

Attachments

cc: Mr. J. A. Adams, NESCO
Mr. R. M. Boucher, Pacific Power & Light Co.
Mr. W. L. Bryan, Washington Water Power Co.
MR. R. E. Dyer, Portland General Electric Co.
Mr. W. J. Finnegan, Puget Sould Power & Light Co.
Mr. Robert Lee, U. S. NRC
Mr. J. R. Lewis, BPA
Mr. J. B. Martin, Administrator, Region V
Mr. N. S. Reynolds, Bishop, Liberman, Cook. Purcell & Reynolds
Mr. D. Smithpeter, BPA
Ms. G. Striegel, Ebasco - Elma
Ms. J. Szupillo, Ebasco - New York
Ms. R. M. Taylor, Ebasco - Elma
Mr. H. Worchel, Ebasco - New York

Question No.

210.21S (Stiff Clamps)

Code Case N249, Rev. 8, contains a requirement that for material with a UTS value of 190 KSI, the Design Specification shall include requirements for the consideration of the effects of sustained loads, environment, and heat treatment on the susceptability to stress corrosion cracking. This requirement does not appear to be materially different from Rev. 5 of the same Code Case. Therefore, has the applicant properly addressed the Code Case requirements to show that the stiff clamp material is not subject to stress corrosion cracking under sustained load conditions?

Response

Paragraph (5) of Code Case N249, Rev. 8, covers the set of requirements for high strength materials used for component supports, which are covered by the above question. The requirements and a description of how each is addressed are included below.

a. Requirement: The maximum ultimate tensile strength (UTS) should not exceed 170 KSI, except in certain applications where a UTS up to 190 KSI is acceptable.

   Compliance: The maximum UTS of the stiff clamp samples tested was 178.1 KSI. (See response to Question 210.22S for more information.)

Since the strap material UTS exceeds 170 KSI, the following additional requirements are imposed.

b. Requirement: Impact testing should be specified.

   Compliance: Page 12, Paragraph 2 of the report, Evaluation of the ITT/Grinnel Fig. 215 Stiff Clamp Application on Safety Related Piping Systems, transmitted to the NRC via G03-85-418 on July 31, 1985, shows that in this case the Code does not require impact testing due to material thinness. (Code Paragraph NF-2311).

c. Requirement: The effects of sustained loads, environment, and heat treatment on the susceptability of the material to stress corrosion cracking must be evaluated.

   Compliance: The above conditions which contribute to stress corrosion cracking are discussed on pages 11 to 14 of the Report (G03-85-418). To reiterate our position, the following clarification is provided:

Question No.

210.21S

Response (Cont'd)

The strap material is SA-564 type 630 which has been age hardened at 1075F. The Code Tables I-7.1 and I-13.1 indicate that this material, regardless of product form, has a reduction in toughness at room temperature after exposure to 600F for about 5000 hours. Almost all of the WNP-3 stiff clamp applications are below temperatures of 500F and as stated on page 12 of the Report (G03-85-418) all high temp applications will be reviewed on a case-by-case basis for acceptability.

Beyond the above mentioned reducton in toughness, no other degradation of material properties are indicated by the Code. Therefore, there will be no long-term effect due to the sustained tensile load on the strap.

Based on the tensile loading of the high strength strap we have determined that the material is moderately susceptible to Stress Corrosion Cracking (SCC). See page 12 to 13 of the Report (G03-85-418). Because of this susceptibility, we have investigated the environment which the clamps will be exposed to at WNP-3. Pages 13 to 14 of the Report (G03-85-418) notes that the strap will be immune to SCC due to the anticipated benign environment in the WNP-3 plant.

Based on the above information we have met all of the requirements of the subject Code Case paragraph.

Question No.

210.22S (Stiff Clamps)

What is the ultimate tensile strength of the strap material? Verify that the strap UTS is less than 190 KSI.

Response

Page 10 of the Report (G03-85-418) states that, "The strap material was purchased to ASTM A-693, Type 630. ITT/Grinnell performed operations (age hardening) that altered the mechanical properties and recertified the material to SA-564, Type 630 H 1075."

On page 11, the Report (G03-85-418) states that four straps were tested which indicated an average ultimate tensile strength of 173 KSI.

To expand upon the data provided, the summary from our test report is included below.

> Three (3) randomly selected straps and one (1) broken strap were tested for mechanical properties and found to conform to the requirements of the material specification (SA-564, Type 630 Age Hardended at 1075F). Although these properties as measured are noticeably higher than the minimum values required by the specification, they are reasonably close to the values typically displayed by this material according to information received from ARMCO. This can be seen from the following comparison:

	SA-564 (req'd min.)	As tested (average)	Typical (ARMCO)
Ultimate Strength (KSI)	145	173	165
Yield Strength (KSI)	125	161	150
Elongation (%)	13 (min)	11	8
Hardness (Rc)	31 (min)	36-40	37

The ultimate strengths ranged from 169.6 KSI to 178.1 KSI.

Question No.

210.23S (Stiff Clamps)

Provide a sample calculation which shows how the analyst will verify the pipe stresses, the clamp/stiffness, and the snubber or strut stiffness.

Response

A package of sample calculations which were used for verification of the computer program for local pipe stress evaluation is attached. In addition, tables which list the stiffnesses of the stiff clamps, snubbers, and struts are included.