

REGULATOR INFORMATION DISTRIBUTION SYSTEM (RIDS)

ACCESSION NBR: 8008260430 DOC. DATE: 80/08/22 NOTARIZED: NO DOCKET #
 FACIL: 50-305 Kewaunee Nuclear Power Plant, Wisconsin Public Service 05000305
 AUTH. NAME AUTHOR AFFILIATION
 MATHEWS, E. R. Wisconsin Public Service Corp.
 RECIP. NAME RECIPIENT AFFILIATION
 EISENHUT, D. G. Division of Licensing

SUBJECT: Forwards comments on NUREG-0577 re potential for low fracture toughness & lamellar tearing & NRC 800519 transmittal ltr. Comments require numerous corrections to rept & protest excessive transmittal ltr requirements.

DISTRIBUTION CODE: A018S COPIES RECEIVED: LTR 1 ENCL 1 SIZE: 4
 TITLE: Component Support Fracture Toughness (USI A-12)

NOTES: I&E: 3 copies all material. 05000305

ACTION:	RECIPIENT ID CODE/NAME		COPIES		RECIPIENT ID CODE/NAME		COPIES	
			LTR	ENCL			LTR	ENCL
ACTION:	VARGA, S.	04	7	7				
INTERNAL:	A/D MATL & QU	11	1	1	GEN ISSUES	BR07	1	1
	I&E	06	5	5	MATL ENG	08	1	1
	NRC PDR	02	1	1	OP EX EVAL	BR09	1	1
	OR ASSESS	10	1	1	<u>REG FILP</u>	01	1	1
	SNAIDER, R.	13	1	1				
EXTERNAL:	ACRS	12	16	16	LPDR	03	1	1
	NSIC	05	1	1				

AUG 28 1980

MA
4

60

WISCONSIN PUBLIC SERVICE CORPORATION



P.O. Box 1200, Green Bay, Wisconsin 54305

August 22, 1980

Mr. Darrell G. Eisenhut, Director
Division of Licensing
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Washington, D. C. 20555

Dear Sir:

Docket 50-305
Operating License DPR-43
Comments on NUREG 0577 and NRC Letter dated May 19, 1980

Please find attached our specific comments on NUREG 0577 and the associated transmittal letter of May 19, 1980.

It should be noted that the comments require a number of corrections to the NUREG 0577 as well as a protest of inappropriate and excessive requirements implied by the associated transmittal.

Very truly yours,

A handwritten signature in cursive script that reads "E. R. Mathews".

E. R. Mathews, Vice President
Power Supply & Engineering

snf

Attach.

A018
S
1/1

8008260430

ATTACHMENT I

Comments on NUREG 0577

1.0 BACKGROUND

Kewaunee Nuclear Power Plant is listed under Group I (Highest Potential Susceptibility to Low Fracture Toughness) by NUREG 0577 because of the concerns stated below:

"Two items in the steam generator supports which are of concern in this regard are made of Vascomax 250 CVM. They are 0.5 in diameter Heli-coil screws into S.G., which are under pre-tension, and 1 inch diameter upper support ring girder wall bolts which are stressed under normal conditions," Section 4.7.3 of Appendix C, NUREG 0577."

The Vascomax bolts are in fact 1-1/2 inch diameter, and not 0.5 inch, installed in the lower main support pads of the steam generator using Heli-coil inserts. Also, the upper support ring girder wall bolts are not Vascomax bolts but are made from A 307 material. These wall bolts are designated Type III construction (not safety related) and are not active in transferring S. G. support reaction loads to other support elements.

Apart from lamellar tearing, two other major concerns of NUREG 0577 regarding the materials for S.G. and Pump Supports are:

- A) Fracture toughness characteristics required to resist tensile loads and
- B) Potential for stress corrosion cracking which may result in pre-mature failure under tension loads.

2.0 FRACTURE TOUGHNESS

Based on Sandia Laboratories Report (Appendix C of NUREG 0577) three different test parameters were chosen to assess the fracture toughness characteristics of materials.

- i) Charp V-notch (CVN) test: - The report states "that those plants which maintained a minimum charpy requirement for their materials of construction will be assumed to be constructed of adequate toughness materials, and placed in a higher quality category than those which did not specify any minimum."

Kewaunee required CVN tests for Vascomax 250 CVM material used in S.G. bolts and a minimum CVN value of 35 ft-lb at 40°F was reported in the Mill Test Reports.

ii) Nil-Ductility Transition (NDT) temperature

The report states that the use of structures at temperatures from 60° to 120°F (depending upon thickness) above the highest NDT measured for the materials would give assurance that locally embrittled regions could not cause catastrophic failure by allowing small cracks to grow to large sizes.

Ref. 1 indicates that 18Ni-5Mo-9Co maraging steel (Vascomax) exhibits shear fracture at temperatures as low as - 322°F. The normal operating temperature of the S.G. Vascomax bolts is greater than 400°F which is much above the value of NDT + 120°F (i.e., - 322 + 120 = - 202°F).

iii) Fracture Toughness (K_{IC})

The fracture toughness of Vascomax 250 CVM is reported to be greater than 100 K_{SI} in placing it amongst the low susceptibility materials (Ref. 2).

Based on the above discussion, the Kewaunee Plant should be placed in Group III (Lowest Potential Susceptibility class).

3.0 STRESS CORROSION CRACKING

In accordance with Sandia Report, susceptibility of Vascomax 250 CVM to stress corrosion cracking is the only reason for placing this material in Group I. For the same reason, an assurance of no pre-tension on these bolts would have been sufficient to place this material in Group III as in the case of Carpenter Custom 455 steel bolts used in J. M. Farley Plant Units 1 and 2.

The S.G. legs having the Vascomax bolts are not subjected to any tensile loads under all loading conditions except LOCA and hence there is no design requirement to pre-tension the bolts.

The design drawings for Kewaunee Nuclear Power Plant indicated a pre-tension on S.G. Bolts. However, it was observed during the visual and UT inspection of S.G. Bolts (May 28-31, 1980), the bolts were not pre-tensioned but were in snug tight condition with a maximum estimated pre-stress of 2 K_{SI} . This low pre-tension value precludes the possibility of stress corrosion cracking in the Vascomax bolts.

Ref. 1 Metal Handbook, Volume 10, "Failure Analysis and Prevention," 8th Edition, American Society for Metals, 1975, pp. 47.

Ref. 2 James K. Stanley, "The Current Situation on the Stress Corrosion Cracking and Hydrogen Embrittlement of High Strength Fasteners," AIAA Paper No. 72-385, Proceedings of 13 Structures, Structured Dynamics, and Materials Conference, San Antonio, Texas, April 10-12, 1972, Volume II.

ATTACHMENT II

Comments on NRC Letter Dated May 19, 1980

The comments are directed to portions of the letter that are relevant to Kewaunee Plant.

Step 4 (Page 2):

The following comments are made with reference to Attachment I of the NRC letter:

1. Part I-B of the attachment states that, "Material having Specified minimum yield strength greater than 180 KSI cannot be considered sufficiently resistant to fracture under tensile stress," and requires that the supports containing such material must be analyzed for maximum accident loading conditions after the failure of the most highly-stressed member.

This requirement goes beyond the NUREG 0577 and is not consistent with the assessment philosophy used in the evaluation of 41 operating plants. This would constitute a review of original design under more stringent design basis and cannot be justified as the method for qualifying a material with respect to fracture toughness characteristics. This requirement should be deleted from the proposed Review Procedure.

2. Part II of the attachment is relevant to the stress corrosion cracking potential of high strength materials subject to steady state tensile stress. With no pre-tension on Vascomax bolts, these bolts are considered safe against possible stress corrosion cracking. As stated earlier, the Kewaunee Nuclear Plant would examine the steam generator support bolts for indications from possible stress corrosion and assure that no significant pre-tension exists in the bolts.

Therefore, we are of the opinion that additional analysis as required in Part II of the Attachment is not needed when the bolts are not pre-tensioned.

WESTINGHOUSE PRESSURIZED WATER REACTOR LICENSEES

Docket No. 50-334
Beaver Valley Unit 1

Docket No. 50-315
D. C. Cook Unit 1

Docket No. 50-316
D. C. Cook Unit 2

Docket No. 50-348
Farley

Docket No. 50-3
Indian Point Unit 1

Docket No. 50-247
Indian Point Unit 2

Docket No. 50-286
Indian Point Unit 3

Docket No. 50-305
Kewaunee

Docket No. 50-338
North Anna 1

Docket No. 50-266
Point Beach Unit 1

Docket No. 50-301
Point Beach Unit 2

Docket No. 50-282
Prairie Island Unit 1

Docket No. 50-306
Prairie Island Unit 2

Docket No. 50-261
H. B. Robinson Unit 2

Docket No. 50-272
Salem Unit 1

Docket No. 50-280
Surry Unit 1

Docket No. 50-281
Surry Unit 2

Docket No. 50-344
Trojan

Docket No. 50-250
Turkey Point Unit 3

Docket No. 50-251
Turkey Point Unit 4

Docket No. 50-295
Zion Unit 1

Docket No. 50-304
Zion Unit 2

Docket No. 50-244
Ginna

Docket No. 50-213
Haddam Neck

Docket No. 50-206
San Onofre Unit 1

Docket No. 50-29
Yankee-Rowe