

ML214

May 28, 1980

MEMORANDUM FOR: P. Shewmon, Chairman
Midland Subcommittee

FROM: Garry G. Young,
Reactor Engineer

SUBJECT: NRC MEETING WITH CONSUMERS POWER TO DISCUSS REACTOR VESSEL
HOLDDOWN STUD FAILURES AT MIDLAND

On May 23, 1980, the NRC Staff met with representatives from Consumers Power Company to discuss the failed reactor vessel anchor studs and proposed remedial actions. Mr. Darl Head, NRC Project Manager, conducted the meeting.

DESCRIPTION OF PROBLEM

Since the installation of the reactor vessel anchor studs at Midland-1, a total of three studs have failed. These studs were analyzed by Teledyne and failure was attributed to stress-corrosion cracking with subsequent cleavage failure. The reason for failure is that the Midland-1 studs are significantly more brittle than the average stud material. However, the material did meet the applicable material codes under which they were purchased.

Teledyne representatives stated that the design pre-load of the studs for structural stiffness of the reactor vessel support was 55 Ksi. B&W recommended a pre-load of 75 Ksi to allow for stretch of the studs during operation and Consumers used 92 Ksi for added assurance of support stiffness. The combination of 92 Ksi pre-load, exceptionally brittle stud material, and moisture in the air resulted in stress-corrosion cracking for the Midland 1 studs.

The Teledyne investigation resulted in a recommendation that the existing Midland-1 studs be restricted to a design pre-load of 6 Ksi with a short duration design load of 43 Ksi. The investigation of the Midland-2 studs revealed that no restriction needs to be applied to that material other than the original restrictions.

PROPOSED FIXES

Since the restriction on stud pre-load suggested by Teledyne results in unacceptably flexible reactor vessel supports, a new design was proposed by Consumers. The existing studs are able to handle the reactor vessel vertical loads but they cannot handle the horizontal design loads. Therefore, Consumers proposed to add upper lateral supports to the reactor vessel. These supports would be located around the head flange of the reactor vessel and would be essentially bumpers surrounding the vessel. The existing neutron shield supports located at the head flange would be stiffened and shimmed to act as upper lateral supports.

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P. Shewmon, Chairman

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Consumers has analyzed the proposed fix and found that it is actually a stronger support than the previous reactor vessel skirt support design. Additionally, the new design would not require replacement of the existing broken support studs.

The proposed fix is only necessary for Midland-1. However, the Midland-2 design would be modified to add the upper lateral support as a design enhancement.

CONCLUSION

Consumers Power Representatives stated that the details for the proposed design will be submitted to the NRC by September 1980. No actual field work on the proposed design will be allowed until NRC approval is received. The proposed fix was not seriously questioned during the meeting but the NRC Staff stated that a full review would be necessary before any type of approval is given.

Attachment:
Meeting Agenda

cc: ACRS Members
ACRS Staff
ACRS Fellows

FILE: MIDLAND-1

OFFICE	ACRS				
SURNAME	GYoung/bgs	<i>gy</i>			
DATE	5/28-80				

PROPOSED MEETING AGENDA
REACTOR ANCHOR STUDS
Friday, May 23, 1980
At 9AM
PHILLIPS BUILDING - ROOM P-114
BETHESDA, MD

- I. Opening Remarks (JWCook/DHood) - (10 minutes)

- II. Reactor Vessel Anchor Studs
 - A. Description of Hold-down Design and Criteria (TRT) - (20 minutes)
 - B. Background of Anchor Bolt Occurrences (HWS) - (10 minutes)
 - C. Results of Teledyne Investigations (HWS/WEC) - (90 minutes)
 - 1. Investigations of first two failed studs
 - 2. Investigations of the third failed stud
 - 3. Conclusions as to cause of failure
 - 4. Acceptability of the Unit 2 studs
 - 5. Allowable stresses for the Unit 1 studs
 - D. Proposed Unit No 1 RV Support Design Revision (TRT/ME) - (30 minutes)

- III. Investigations and Findings of Other Areas of Plant (HWS) - (20 minutes)

- IV. Administrative Aspects of NRC Review (DMBudzik) - (30 minutes)

ANTICIPATED ATTENDEES

<u>Consumers Power</u>	<u>Bechtel</u>	<u>B&W</u>	<u>Teledyne</u>	<u>APTECH</u>
WRBird	BDhar	JGalford	WECOoper	GEgan
DMBudzik	MELgaaly	CEMahaney	WGDobson	
JWCook	JARutgers			
HWSlager				
TRThiruvengadam				

CC: WRBird
DMBudzik (30)
JWCook
HWSlager
TRThiruvengadam