

REPORT OF THE THIRD PARTY REVIEW OF
THREE MILE ISLAND, UNIT 1, STEAM GENERATOR REPAIR
SUPPLEMENT 2

To

R. F. Wilson - Vice President, Technical Functions
GPU Nuclear

Prepared by

THIRD PARTY REVIEW GROUP:

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William H. Layman
David J. Morgan
Richard W. Weeks
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Submitted for the Review Group

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By: _____


E. J. Wagner

Date: _____

12/3/83

PURPOSE

This report is Supplement 2 of the report of the Third Party Review of the TMI-1 steam generator repair dated February 18, 1983. It evaluates a revision to the Safety Evaluation Report (SER) made since the Review Group issued its conclusions in Supplement 1 of May 16, 1983.

BACKGROUND

The establishment and operation of the Third Party Review Group of the TMI-1 steam generator repair was previously discussed in the Review Group's Report of February 18, 1983. The report contained a conclusion concerning the adequacy of the steam generator repairs for safe operation of the TMI plant and findings, comments, and recommendations about the steam generator repair and return of the plant to operation.

In Supplement 1, of May 16, 1983, the Review Group evaluated the GPU Nuclear responses to the Review Group's Report and concluded that

"...upon satisfactory completion of the entire program as defined in the safety evaluations and as augmented by GPU Nuclear comments during and subsequent to the April 12 and 13 meeting, the TMI-1 plant can be operated safely with the repaired steam generators."

GPU Nuclear subsequently revised their SER and issued "Assessment of TMI-1 Plant Safety for Return to Service After Steam Generator Repair, Topical Report 008, Revision 3, August 19, 1983." The Review Group was requested by GPU Nuclear letters of August 22 and September 9, 1983, to review the revised SER. The GPU Nuclear letters are attached as Appendix A and B to provide explicit identity to those documents supplied for review.

Revision 3 of the SER and related documents were distributed to the specialist members of the Review Group who had interest in design analysis, which was the principal content of the revision. The reviewers were Mr. Layman, Mr. Kalnins, and Mr. Wagner. They performed the review and discussed the conclusion by telephone.

The conclusion was provided to Mr. Wetmore, of GPU Nuclear, by the Chairman on October 6, 1983. This Supplement 2 reports the Review Group's conclusion.

CONCLUSION

The Review Group reiterates the conclusion of our Supplement 1 as quoted above. Revision 3 of the SER included actions to resolve prior Review Group comments as GPU Nuclear indicated would be taken. No new or open safety questions were found in our review of the revisions of the SER.

COMMENTS

The Review Group was specifically interested in the revised actions taken by GPU Nuclear on topics upon which the Review Group commented in Supplement 1. Those topics follow and are referred to the same numbered section of Supplement 1.

E. Stress Analysis of Steam Generators

The Review Group had commented:

"For this reason, the Review Group recommended that a detailed stress analysis of the transition zone be made including the loading of the main steam line break.

Subsequent to the Review Group meeting, GPU Nuclear advised that they had completed the stress analysis of the transition zone, and the revising the stress report to include this analysis and that the analysis shows an acceptable stress condition. This resolves the Review Group's comment."

The Review Group found Revision 3 of the SER to reflect the revised stress analysis of the transition and that the stresses are acceptable.

F. Steam Generator Leak Tightness After Repair

The Review Group had commented:

"...Because of these uncertainties in the analyses, the Review Group questioned whether the results of the GPU Nuclear analysis of leak before break had sufficient margin for the limiting case of a main steam line break.

Subsequent to the meeting GPU Nuclear has pursued this issue and advised they have come to the following conclusions:

- The GPU Nuclear study on crack preparation and their interpretation of the draft analysis done by others suggests that cracks will

not grow or not grow rapidly as a result of flow induced vibration. Although growth rate is a function of the assumed threshold stress intensity, even the extreme case of no threshold revealed long time periods for crack growth to a critical size and therefore ample time for operator action to shut down the reactor prior to a tube failure either at power or during shutdown.

- The tube loads associated with the steam main line break case were calculated using a generic analysis for B&W plants. The assumptions used in this analysis are very conservative with respect to the particular plant parameters for TMI-1 and results in calculated tube loads substantially greater than would actually occur. When more realistic tube loads are taken into account, the critical crack size is estimated to be significantly larger and the corresponding leak rate is increased by approximately a factor of two. Thus GPU Nuclear concludes that because significant margin exists in the tube loading used to determine critical crack size, no further conservatisms need be added in designating administrative limits which take credit for leak before break...

In addition, in response to Review Group suggestions, GPU Nuclear will record the condenser offgas activity data during cooldown and evaluate the feasibility of using this data for determining primary-to secondary leak rates during conditions of higher tube-to-shell delta T.

GPU Nuclear also plans to use secondary-to-primary bubble testing tube as one technique for locating leaking tubes whenever the plant is shut down in response to an increase to a leak rate 0.1 gpm or more. The high sensitivity of this measurement technique provides additional assurance that flaws that could become unstable before the next eddy current inspection will be detected."

The Review Group found Revision 3 of the SER contains the following items which respond satisfactorily to our previous comments:

- a) The leak before break critical crack analysis was performed for the TMI-1 specific main steam line break in addition to the generic analysis. The leak before break analysis was also further supported by improved analysis of leakage rates through cracks.

- b) Monitoring primary-to-secondary leakage rate indications during operational cooldowns was included.
- c) Secondary-to-primary bubble testing for tube leak detection was included whenever the plant is shutdown in response to an increase in leak rate of 6 gph (0.1 gpm) or more.

APPENDIX 1 - GPU Nuclear letter dated August 22, 1983 to Mr. Edward Wagner from Mr. J.S. Wetmore, Manager, PWR Licensing.

APPENDIX 2 - GPU Nuclear letter dated September 9, 1983 to Mr. Edward Wagner from Mr. J.S. Wetmore, Manager, PWR Licensing.



GPU Nuclear Corporation
 100 Interpace Parkway
 Parsippany, New Jersey 07054
 201 263-6500
 TELEX 136-482
 Writer's Direct Dial Number:

August 22, 1983

Mr. Edward Wagner
 Cincinnati Gas & Electric
 Zimmer Nuclear Power Station
 RR#1 Box 2023
 U.S. Route 52
 Moscow, OH 45153

ATTN	RECEIVED	NOTED
	E. J. WAGNER	
	AUG 24 1983	
FILE:		
RETURN TO:		

Dear Ed:

Per our telephone conversation today, I am forwarding the below listed documents for review by the Third Party Review Group for TMI-1 OTSG Repair:

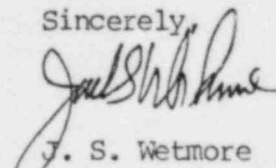
1. An SER entitled "Assessment of TMI-1 Plant Safety for Return to Service After Steam Generator Repair,"
2. TDR-417 Rev. 1 entitled "TMI-1 OTSG Tube Axial Loads and Leakage Monitoring."
3. TDR-417 Rev. 0 entitled "OTSG Leakage and Operating Limits," and
4. Report entitled "The Residual Crack Opening Displacements in Tubes and Pipes."

Item 1 consists of changes made to Topical Report 008 (changes indicated by marginal change bars) to reflect results of OTSG cold testing and updated assessment of tube axial loads and their effects on leakage rate monitoring. Items 2 through 4 provide additional information to support the changes reflected in Item 1.

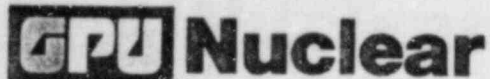
We expect to have further data to support the validity of estimates of residual crack opening displacements in the near future. A final revision to Topical Report 008 will be completed at that time.

Per your request, I have forwarded copies of the enclosed to A. Kalnins and W. Layman.

Sincerely,


 J. S. Wetmore
 Manager
 PWR Licensing

dls:0079f
 Enclosures



GPU Nuclear Corporation
 100 Interpace Parkway
 Parsippany, New Jersey 07054
 201 263-6500
 TELEX 136-482
 Writer's Direct Dial Number:
 E&L: 5066

September 9, 1983

Mr. Edward Wagner
 Cincinnati Gas & Electric
 Zimmer Nuclear Power Station
 R.R. #1 Box 2023
 U.S. Route 52
 Moscow, OH. 45153

ATTN	RECEIVED	NOTED
	E. J. WAGNER	
	SEP 14 1983	
FILE:		
RETURN TO:		

Dear Ed:

Enclosed for Third Party Review Group review is Revision 3 to typical Report 008, "Assessment of TMI-1 Plant Safety for Return to Service After Steam Generator Repair."

To minimize unnecessary delays, I have also forwarded copies directly to A. Kalnins and W. Layman.

Very truly yours,

J. S. Wetmore
 Manager, PWR Licensing

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Enclosure