UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

In the Matter of	)	
	)	
METROPOLITAN EDISON COMPANY	)	Docket No. 50-289
	)	(Steam Generator Repair)
(Three Mile Island Nuclear Station, Unit 1)	)	
	)	

TMIA RESPONSE TO LICENSEE INTERROGATORIES

On December 18, 1983, TMIA received a set of interrogatories and document requests from Licensee, consisting of over thirty pages. Pursuant to 10 CFR §2.740, TMIA submits this preliminary response to Licensee interrogatories at this time.

In light of the large number of requests for information, the limited time which TMIA had to prepare responses in light of the holidays and the great deal of time and energy still required of TMIA in the ongoing "management" case, and the fact that TMIA has been unable to formulate firm positions on the contentions because a great deal of the essential information has not yet been provided to TMIA, TMIA is not providing substantive responses to many of the interrogatories. Once TMIA is able to review and digest the information it needs, which will hopefully be provided in response to TMIA's first set of information requests filed December 30, fuller responses will be provided.

As to those interrogatories which TMIA in unable to provide full, substantive responses, TMIA reserves the right to object if, during its review of material, it determines that the subject matter of the interrogatories is objectionable.

TM IA further states that Louise Bradford and Joanne Doroshow, were the only individuals who participated in preparing this response, and prepared them jointly. It is possible that technical assistance will be required to provide fuller responses at a later time, but this will be dependent largely on the cooperation of individuals who can offer free time and voluntary assistance, since TMIA has no funds to pay for expert help.

Further, TMIA has not yet determined who its witnesses will be, if any, on any subject, or, what documents will be offered as exhibits or used in cross-examination. At this time, TMIA forsees that the documents it will use at the hearings will be limited to NRC and Licensee documents. Also, regarding the ability of TMIA to present witnesses on these contentions, it is very possible that the lack of funds and the inability to locate experts who can donate the required time necessary to prepare testimony will preclude TMIA from presenting an affirmative case on these contentions.

Interrogatories on Contention 1.a

1.a-1. Specifically identify and describe in detail each aspect of "[p]ost repair and plant performance testing and analysis" which you allege is inadequate to provide sufficient assurance that tube ruptures will be detected in time and prevented to avoid release of radiation beyond permissible limits.
1.a-2. State in detail each and every fact upon which you base your allegation that each aspect of the testing and analysis identified in your answer to Interrogatory 1.a-1 is inadequate.
1.a-3. Explain in detail how each fact stated in your answer to Interrogatory 1.a-2 supports your allegation that each aspect of the testing and analysis identified in your answer to Interrogatory 1.a-1 is inadequate.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of each aspect of Licensee's post repair and plant performance testing and analysis. This due to the failure of Licensee, the NRC Staff, or

any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that tube ruptures can be detected in time and prevented. It is this failure to demonstrate "reasonable assurance" through a lack of sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

1.a-4. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.a-1 through 1.a-3 above, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

The answer to the above interrogatories is based on all Licensee and NRC documents which concern testing and analysis of the subject steam generator tubes failures and repairs. Since all Licensee documents are already in the possession of the Licensee, and all NRC documents are likely in Licensee's possesion, or if not, can be located in the public document room, it would appear to be unnecessary, burdensome , and improper to require TMIA to attempt to describe these documents in writing, and in advance of receiving the data and calculations which TMIA has requested.

1.a-5. Specifically identify each proposed license condition, or portion thereof, which you allege is inadequate to provide sufficient assurance that tube ruptures will be detected in time and prevented to avoid release of radiation beyond permissible limits.

1.a-6. State in detail each and every fact upon which you base your allegation that each proposed license condition, or portion thereof, identified in your answer to Interrogatory 1.a-5 is inadequate.

1.a-7. Explain in detail how each fact stated in your answer to Interrogatory 1.a-6 supports your allegation that each proposed license condition, or portion thereof, identified in your answer to Interrogatory 1.a-5 is inadequate.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of each license condition proposed. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that tube cracking will reactivate in such an manner that the license conditions will provide the level of predictability necessary to insure that leaks can be detected in time to avoid tube ruptures. It is this failure to demonstrate "reasonable assurance" through a lack of sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

1.a-8. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatory 1.a-7 above, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.a-4.

1.a-9. Do you allege that those portions of the steam generator tubes which have been kinetically expanded have not been adequately repaired to prevent the occurrence of a tube rupture in the expanded portion?

TMIA can not now determine this with any degree of certainty. See responses to Interrogatories 1.a-1 through 1.a-8.

1.a-10. If your answer to Interrogatory 1.a-9 is other than an unqualified "no":

(a) State in detail each and every fact upon which you base your allegation that the expanded tube portions have not been adequately

repaired to prevent a tube rupture in the repaired portion of the tube;

(b) Explain in detail what your (sic) allege the radiological health and safety consequences of such a rupture to be; and

(c) Describe mechanistically the manner in which such health and safety consequences will occur.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of tube repairs. This is due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate whether and under what conditions tubes will rupture, and thus, what the resulting radiological consequences would be. It is this failure to provide sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

1.a-11. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.a-8 through 1.a-10 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.a-4.

1.a-12. Do you allege that "restart" would result in stresses sufficient to cause a rupture of the repaired portion of a steam generator tube?

TMIA can not now determine this with any degree of certainty. See responses to Interrogatories 1.a-1 through 1.a-11.

1.a-13. If your answer to Interrogatory 1.a-12 is other than an unqualified "no," state in detail each and every fact upon which you base your allegation, and explain in detail how each such fact supports the allegation.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of tube repairs or post repair testing. This is due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate whether and under what conditions tubes will rupture. It is this

failure to provide sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

1.a-14. Do you allege that "a turbine trip a maximum power" would result in stresses sufficient to cause a rupture of the repaired portion of a steam generator tube?

TMIA can not now determine this with any degree of certainty. See responses to Interrogatories 1.a-1 through 1.a-13.

1.a-15. If your answer to Interrogatory 1.a-14 is other than an unqualified "no," state in detail each and every fact upon which you base your allegation, and explain in detail how each such fact supports the allegation.

See reponse to Interrogatory 1.a-13.

1.a-16. Do you allege that "thermal shock from an inadvertent actuation of emergency feedwater at high power" would result in stresses sufficient to cause a rupture of the repaired portion of a steam generator tube?

TMIA can not now determine this with any degree of certainty. See responses to Interrogatories 1.a-1 through 1.a-15.

1.a-17. If your answer to Interrogatory 1.a-16 is other than an unqualified "no," state in detail each and every fact upon which you base your allegation, and explain in detail how each such fact supports the allegation.

See reponse to Interrogatory 1.a-13.

1.a-18. Do you allege that "rapid cooldown" following a LOCA will result in stresses sufficient to cause a rupture of the repaired portion of a steam generator tube?

TMIA can not now determine this with any degree of certainty. See responses to Interrogatories 1.a-1 through 1.a-17.

1.a-19. If your answer to Interrogatory 1.a-16 is other than an unqualified "no," state in detail each and every fact upon which you base your allegation, and explain in detail how each such fact supports the allegation.

See response to Interrogatory 1.a-13.

1.a-20. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.a-8 through 1.a-10 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.a-4.

1.a-21. Identify each person you propose to call as a witness in support of Contention 1.a

1.a-22. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 1.a.

1.a-23. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention 1.a.

As explained in the introductory paragraphs, TMIA has identified neither witnesses nor documents which TMIA intends to offer as exhibits or during cross-examination. If and when this information is determined, it will be made available to the Licensee.

Interrogatories on Contention 1.b

1.b-1. General Design Criterion 14, 10 CFR Part 50, App. A (GDC14) reads as follows:

> Criterion 14-Reactor Coolant Pressure Boundary. The reactor coolant pressure boundary shall be designed, fabricated, erected and tested so as to have an extremely low probability of abnormal leakage, of rapidly propagating failure, and of gross rupture.

Do you allege that, as a result of the kinetic expansion repair process, the portion of the reactor coolant pressure boundary represented by the repaired portions of the steam generator tube fails to meet GDC 14?

TMIA is unable at this date to identify and describe in detail the information requested. See responses to Interrogatories 1.a-1 through 1.a-20.

1.b-2. If your answer to Interrogatory 1.b-1 is other than an unqualified "no," state in detail each and every fact upon which you base your allegation that as a result of the kinetic expansion repair process, the portion of the reactor coolant pressure boundary represented by the repaired portions of the steam generator tube fails to meet GDC 14

1.b-3. Explain in detail how each such fact stated in your answer to Interrogatory 1.b-2 supports your allegation.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of the tube repairs, and thus whether GDC 14 can be met. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate whether and under what conditions tubes will rupture. However, TMIA does maintain that because of the uniqueness and extent of the corrosion damage, its history of affecting other primary pressure boundary materials, the uniqueness and deforming character of the repair method used, and the extraordiary large number of tubes which were repaired, there is a possibility that simple compliance with design basis standards for normal operating plants may not be sufficient in this case to insure safety. At the very least, determination of compliance with the "low probability" criteria in GDC 14 must be under a different and more stingent standard than might be used in a "normal" situation, since this is clearly not a "normal" situation.

1.b-4. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.b-1 through 1.b-3 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.a-4.

1.b-5. State in detail each and every fact upon which you base your allegation that, as a result of the kinetic expansion repair process, a simltaneous rupture in both steam generators is not "an incredible event," and explain in detail how each such fact supports the allegation.

As of this date, the primary basis is a memo from former ACRS Chairman Paul Shewmon to Ray Fraley dated September 19, 1982, in which he states, "It isn't an incredible event for this plant, and it seems to me that it might present the operators with at least a challenge the Subcommittee could look into." This interpretation was confirmed by

Richard Major in a memo to D. Moeller, Chairman ACRS Subcommittee on TMI-1, dated September 30, 1982, and became a concern of Chairman Edward Markey, Subcommittee on Oversight and Investigations, House Interior Committee in correspondance to the Commission dated January 21, 1983 and March 23, 1983. In addition, Licensee's TDR 406, §2.1.3.1., provides support for such a possibility. And the possibility of multiple tube ruptures, with no noted distinction between ruptures in one or both sceam generators, was also a recongnized as a concern of Licensee's Third Party Review Group's. See February report at page 4. Yet there is no apparent analysis contained in the TPR report as to the consequences of multiple steam tube ruptures. In addition, the NRC Staff has also recognized this as a serious policy concern regarding the NRC's overall steam generator program. See SECY-82-72, dated February 18, 1982, pages 2-3. Beyond these items, TMIA is unable at this date to identify and describe in detail any additional information, based on the failure of the Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to conclude whether a simltaneous rupture in both steam generators is not "an incredible event."

1.b-6. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatory 1.b-5 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See above response.

1.b-7. State in detail each and every fact upon which you base your allegation that, as a result of the kinetic expansion repair process, a simltaneous tube rupture in both steam generators "could lead to a

sequence of event not encompassed by emergency procedures," and explain in detail how each such fact supports the allegation.

As of this date, the primary basis is a memo from former ACRS Chairman Paul Shewmon to Ray Fraley dated September 19, 1982, in which he states, "It isn't an incredible event for this plant, and it seems to me that it might present the operators with at least a challenge the Subcommittee could look into." This interpretation was confirmed by Richard Major in a memo to D. Moeller, Chairman ACRS Subcommittee on TMI-1, dated September 30, 1982, and became a concern of Chairman Edward Markey, Subcommittee on Oversight and Investigations, House Interior Committee in correspondance to the Commission dated January 21, 1983 and March 23, 1983. And the useability of plant "guidance, procedures, and training" for multiple tube ruptures, with no noted distinction between ruptures in one or both steam generators, was also a recongnized as a concern of Licensee's Third Party Review Group's analysis. See February report at page 4-5. Yet there is no apparent analysis contained in the TPR report as to the adequacy of such "guidance, procedures, and training." In addition, the NRC Staff has also recognized this as a serious policy concern regarding the NRC's overall steam generator program, but the Stafff's effort is still ongoing. See SECY-82-72, dated February 18, 1982, pages 2-3. Beyond these items, TMIA is unable at this date to identify and describe in detail any additional information, based on the failure of the Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis supporting TDR 406, the Licensee's training materials, or the SER, §4.3.1, which would be required to determine if a simltaneous rupture in both steam generators would be emcompassed by emergency procedures.

1.b-8. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatory 1.b-7 and correlate

each such document as specifically as possible (page and paragraph number) with each such fact.

See above response.

1.b-9. State in detail each and every fact upon which you base your allegation that, as a result of the kinetic expansion repair process, a simltaneous tube rupture in both steam generators, occurring in conjuction with a LOCA, could create essentially uncoolable conditions, and explain in detail how each such fact supports the allegation.

See above response.

1.b-10. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.b-9 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See above response.

1.b-11. Identify each person you propose to call as a witness in support of Contention 1.b
1.b-12. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 1.b.
1.b-13. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention

See response to Interrogatories 1.a-21 through 1.a-23.

Interrogatories on Contention 1.c
1.c-1. Do you allege that any of the types of plugs used in the TMI-1 steam generators are inadequate of perform their intended purposes?

TMIA is unable at this date to identify and describe in detail the

information requested.

1.c-2. If your answer to the preceeding interrogatory is other than an unqualified "no":
(a) Identify each such type of plug and the alleged inadequacies associated with it;
(b) State in detail each and every fact upon which you base your allegation that each such type of plug is inadequate;
(c) Explain in detail how each fact stated in your answer to Interrogatory 1.c-2(b) supports your allegation that such type of plug is inadequate.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of the types of plugs used to perform their intended purpose for tubes which have been kinetically expanded. This due primarily to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that the changed dimensions and strength of the kinetically expanded tubes will not impact on the plugs' ability to perform, including the failure to explain with any support why 23 plugs were found leaking during post- repair testing. It is this failure to provide information which forms the basis for this contention.

1.c-3. Do you allege that the kinectic expansion repair process adversely impacted the ability of any of the type of plugs to perform their intended purposes?
1.c-4. If your answer to Interrogatory 1.c-3 is other than an unqualified "no":
(a) Identify each such type of plug;
(b) State in detail each and every fact upon which you base your allegation that the kinectic expansion repair process adversely impacted the ability of any of the type of plugs to perform their intended purposes; and
(c) Explain in detail how each fact stated in your answer to Interrogatory 1.c-4(b) supports your allegation that the kinectic expansion repair process adversely impacted the ability of any of the type of plugs to perform their intended purposes.

See above response.

1.c-5. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.c-1 through 1.c-4, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

The answer to the above interrogatories is based on all Licensee and NRC documents which concern testing and analysis of the subject steam generator tubes failures and repairs, particularly those tubes which have been both kinetically expanded and plugged. Since all Licensee documents are already in the possession of the Licensee, and all NRC documents are likely in Licensee's possesion, or if not, can be located in the public document room, it would appear to be unnecessary, burdensome, and improper to require TMIA to attempt to describe these documents in writing, and in advance of receiving the data and calculations which TMIA has requested.

1.c-6. Do you allege that, as a result of the kinetic expansion repair process, plugged tubes will interfere with the plant's ability to respond to transients and accidents?
1.c-7. If your answer to Interrogatory 1.c-6 is other than an unqualified "no":

(a) Identify each transient or accident for which you allege that as a result of the kinetic expansion repair process, plugged tubes will interfere with the plant's ability to respond to transients and accidents;

(b) For each such transient or accident set out in your answer to Interrogatory 1.c-7(a), state each and every fact upon which you base your allegation that, as a result of the kinetic expansion repair process, plugged tubes will interfere with the plant's ability to respond to transients and accidents;

(c) Explain in detail how each fact stated in your answer to Interrogatory 1.c-7(b) support your allegation that, as a result of the kinetic expansion repair process, plugged tubes will interfere with the plant's ability to respond to transients and accidents.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of the kinetic expansion repair process particulary as it impacts on the ability of subsequently plugged tubes to perform. Further, TMIA can not assess the adequacy of tests already performed, nor asses the reasonableness of testing with only a 1500 plugged tube maximum. It

is the failure of Licensee, the NRC Staff, and their consultants, to provide the detailed data and analysis which would be required to demonstrate that the tests performed are reasonable, or that they are adequate to demonstrate that the plugged tubes will not interfere with the plant's ability to respond to transients and accidents, which provide the basis for the contention.

1.c-8. Other than the allegations stated in Interrogatory 1.c-6 and your answer thereto, do you allege that, as a result of the kinetic expansion repair process, plugged tubes will cause the plant to fail to meet any applicable licensing criteria or requirement?

TMIA is unable at this date to identify and describe in detail whether plugged tubes will cause the plant to fail to meet any applicable licensing criteria or requirement.

1.c-9. Are there any safety deficiencies, associated with plugging the steam generator tubes, other than those contained in your answers to Interrogatories 1.c-1 through 1.c-8, which you intend to be encompassed within Contention 1.c?

TMIA is unable at this date to identify and describe in detail whether there any safety deficiencies, associated with plugging the steam generator tubes, other than those contained in answers to Interrogatories 1.c-1 through 1.c-8, which TMIA intends to be encompassed within Contention 1.c.

1.c-10. If your answer to Interrogatory 1.c-9 is other than an unqualified "no":

(a) Identify and describe in detail each such plugging safety deficiency which you allege to be the result of the kinetic expansion repair process;

(b) For each plugging safety deficiency alleged in your answer to Interrogatory 1.c-10(a), state each and every fact upon which you base your allegation; and

(c) Explain in detail how each fact stated in your answer to Interrogatory 1.c-10(b) supports your allegation of a plugging safety deficiency, and explain in detail how each such alleged plugging safety deficiency is caused by the kinetic expansion repair process.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of the kinetic expansion repair process particulary as it impacts on the ability of subsequently plugged tubes to perform. Further, TMIA can not assess the adequacy of tests already performed, nor asses the reasonableness of testing with only a 1500 plugged tube maximum. It is the failure of Licensee, the NRC Staff, and their consultants, to provide the detailed data and analysis which would be required to demonstrate that no other safety deficiencies are associated with plugging the steam generator tubes.

1.c-11. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.c-6 through 1.c-10 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.c.5.

1.c-12. Identify each person you propose to call as a witness in support of Contention 1.c.

1.c-13. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 1.c.

1.c-14. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses.

See response to Interrogatory 1.a-21 through 1.a-23.

Interrogatories on Contention 1.d

1.d-1. State in detail each and every fact upon which you base your allegation that neither the "Report of Third Party Review of Three Mile Island, Unit 1 Steam Generator Repair" (TPR") nor the Staff's Safety Evaluation Report ("SER") are credible documents in their evaluation of "the kinetic expansion repair technique, including leak tightness and load carrying capabilities."

TMIA is unable at this date to identify and describe in detail every instance in which these documents are not credible. Both seem to base their analysis and conclusions entirely on GPU documents, and those of their own consultants, who themselves have failed to reveal the detailed data and analysis which would be required to demonstrate that their conclusion are correct. If any independent analysis is used, which appears not to have been done from the face of these documents, the detailed data and analysis which would be required to demonstrate that their conclusions are correct are not revealed. In addition, it appears from both the TPR and SER that none of those who participated in preparing the relevant documents have any expertise in fracture mechanics, or in stress analysis of steam generator tubes in nuclear power plants.

1.d-2. Identify each and every document which you claim supports each fact set fortn in your answers to Interrogatory 1.d-1 above, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

The SER (NUREG-1019 and Supplement 1), including Attachments and Appendices.

1.d-3. Specifically identify and explain each of the "reports" inherent inconsistencies" to which you refer in Contention 1.d.

1.d-4. State in detail each and every fact upon which you base your allegation that each of the "reports' inherenct inconsistencies" identified in your response to Interrogatory 1.d-3 undermines or is inconsistent with the evaluation in the TPR and SER of "the kinetic expansion repair technique, including leak tightness and load carrying capabilities."

Until TMIA receives responses to its first set of interrogatories and

request for production of documents, it will be unable to identify and describe each inconsistency. However, examples of the types of inconsistencies TMIA has already detected, are as follows:

-- The TPR analysis supports the proposition that a "break before leak" under certain situations is possible and an acceptable scenario, Attachment 6 at p. 17-18. This is not recognized in the SER, and is inconsistent with the SER conclusions.

-- The TPR analysis recognizes that the changed strength and dimensions of the expanded tubes is an important effect, Attachment 6 at p. 15, but seems to dismiss its implications without revealing the basis for doing so. There is no evidence in the SER that this effect is recognized and analyzed.

-- The TPR analysis recommends that tubes with < 40% thruwall depth should be plugged. Attachment 6 at p. 6. The SER fails to discuss this recommendation, and is inconsistent with the SER conclusions.

-- The TPR analysis finds it hard to substantiate a firm conclusion that defects below a certain size range will not propagate due to flow-induced vibrations. Attachment 6 at p. 16-17. This is not recognized in the SER, and is inconsistent with the SER conclusions.

-- The TPR analysis recognizes the importance of understanding the effects of multiple tube ruptures, Attachment 6 at p. 4-5. This is not analyzed as a separate issue in the TPR itself, or in the SER.

1.d-5. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.d-4 above, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to 1.d-2.

1.d-6. Explain what you mean by "axial symetric stress analysis" as it pertains to analyses in the TPR and SER.

This means that the stress analysis used to analyze cracking assumes that cracking has the property of "axial symmetry", -- a geometric configuration which is unchanged when rotated about a given line.

1.d-7. Identify and describe the cracks in the TMI Unit 1 steam generator tubes to which you believe "axial symmetric stress analysis" is not applicable?

TMIA has not presently developed the information requested. However, it notes that the TPR seems to reject the axial symmetric assumption analyzing stresses in the transition zone, but no analysis is provided even here to support this, or to support why axial symmetry should be assumed in cracks within the tube free span, at page 17 of Attachment 6. The TPR does nothing to explain why, if axial symmetric assumptions are incorrect in certain situations, they are correct in others. Also, in evaluating or predicting crack propagation or resistance, there is no discussion in the SER whether all cracks will propagate axial symmetrically. See SER's analysis of the corrosion scenario at page 4 of the SER. Further, the Licensee, the NRC Staff, and their consultants, have failed to provide the detailed data and analysis which would be required to demonstrate whether cracking in any tubes will occur in an axial symmetric manner. This is particularly significant in light of the apparent lack of any fracture mechanics expertise among those participating the preparing these report.

1.d-8. Where are the cracks identified and described in your response to Interrogatory 1.d-7 located?
1.d-9. What do you believe to be the cause of the cracks identified and described in your answer to Interrogatory 1.d-7?
1.d-10. Explain why "axial symetric stess analysis" is not applicable to the cracks identified and described in your answer to Interrogatory

See above response. Also, without more information from a fracture mechanics expert, these questions can not be competently answered.

1.d-11. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.d-6 through 1.d-10 above, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to 1.d-2 and 1.d-7. In addition, TMIA used the McGraw-Hill Dictionary of Scientific and Technical Terms, 2d Ed. 1974.

1.d-12. Identify each "basic assumption and conclusion" in the TPR and the SER which you allege "rest[s] improperly on axial symetric stress analysis which would not be applicable to all cracks".

See response to Interrogatory 1.d-7.

1.d-13. For each basic assumption and conclusion identified in your response in Interrogatory 1.d-12, state in detail each and every fact upon which you base your allegation that such basic assumption or conclusion "rests improperly on axial symetric stress analysis which would not be applicable to all cracks".

1.d-14. For each "basic assumption and conclusion" identified in your response in Interrogatory 1.d-12, state in detail each and every fact upon which you base your allegation that such basic assumption or conclusion undermines or is inconsistent with the evaluation in the TPR and SER of "the kinetic expansion repair technique, including leak tightness and load carrying capabilities."

See response to Interrogatory 1.d-7.

1.d-15. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.d-12 through 1.d-14, above and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to 1.d-2 and 1.d-7. In addition, TMIA used the McGraw-Hill Dictionary of Scientific and Technical Terms, 2d Ed. 1974.

1.d-16. Explain the difference between "toughness" and "hardness" interms of significance to the analysis of "crack resistance."

While hardness can be defined as the "resistance of a metal or other material to indentation, scratching, abrasion, or cutting," see, the McGraw-Hill Dictionary of Scientific and Technical Terms, 2d Ed. 1974, "the resistance of a material to rapid crack propagation is said to be

a material's 'fracture toughness' and may be said to control failures by fast fracture, [or cracking]... See, Knott, J.F., The Fundamentals of Fracture Mechanics, John Wiley & Sons, 1973; Introductory chapters.

1.d-17. State in detail each and every fact upon which you base your allegation that "hardness" has no relation to crack resistance.

See response to Interrogatory 1.d-16.

1.d-18. Specifcally identify each instance in the TPR and the SER where it is stated, suggested, or inferred that hardness was or was not used to analyze crack resistance.

A hardness test is mentioned only at page 19 of the SER. Neither the SER nor any Attachments nor Appendices mention any "toughness" tests whatsoever.

1.d-19. Specifically identify each instance in the TPR and the SER where it is stated or suggested that "toughness" was or was not used to analyze crack resistance.

See above response.

1.d-20. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.d-22 through 1.d-25 above and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See above response, and response to Interrogatory 1.d-16.

1.d-21. Specifically identify each instance in the TPR and the SER where you allege that crack resistance was improperly analyzed on the basis of hardness, rather than toughness, and state in detail each and every fact upon which you base your allegation that crack resistance should be analyzed on the basis of "toughness" rather than "hardness.

See response to Interrogatories 1.a-16 - 1.a-18.

1.d-22. State in detail each and every fact upon which you base your allegation that the alleged "failure to analyze crack resistance on the basis of toughness as opposed to hardness" undermines or is inconsistent with the evaluation in the TPR and SER of "the kinetic expansion repair technique, including leak tightness and load carrying capabilities.

See above response.

1.d-23. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.d-21 through 1.d-22 above and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See above response.

1.d-24. With respect to the phrase "failure to differentiate in their analysis between the effects of thermal stress on small versus large cracks" as used in Contention 1.d:

(a) Define what you mean by "small cracks";
(b) Define what you mean by "large cracks"; and
(c) Identify each and every specific "analysis" to which you refer.

The terms "large" and "small" cracks refer to crack leng The analysis referred to are all those in the SER and TPR which refer to testing and analyses of the test tube repairs, and the likelihood of subsequent crack propagation.

1.d-25. In terms of each and every "analysis" identified in your answer to Interrogatory 1-24(c).d, explain in detail the significance of a failure to differentiate between the effects of thermal stress on small versus large cracks.

According to Knott, J.F., The Fundamentals of Fracture Mechanics, John Wiley & Sons, 1973 in his chapters entitled "Specimen Dimensions -- Crack Length", this criteria is to be taken into account in predicting cracking.

1.d-26. Specifcally identify each instance in the TPR and the SER where it is stated, suggested, or inferred that there was a failure to differentiate in [an] analysis between the effects of thermal stress on small versus large cracks.

There is no discernable recognition of this criteria in either the SER or the TPR in any of the reports.

1.d-27. State in detail each and every fact upon which you base your allegation that there was a failure in the TPR and SER to "differentiate between the effects of thermal stress on small versus large cracks."

See response to above interrogatory.

1.d-28. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 1.d-24 through 1.d-27 and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.d-26.

1.d-29. State in detail each and every fact upon which you base your allegation that each "failure to differentiate between the effects of thermal stress on small versus large cracks" identified in your answer to Interrogatory 1.d-26 undermines or is inconsistent with the evaluation in the TPR and SER of "the kinetic expansion repair technique, including leak tightness and load carrying capabilities."

See response to Interrogatories 1.d-25 and 1.d-26.

1.d-30. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatory 1.d-29, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See above response

1.d-31. Identify each person you propose to call as a witness in support of Contention 1.d.
1.d-32. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 1.d.
1.d-33. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention

See response to Interrogatories 1.a-21-23.

Interrogatories on Contention 2.a

2.a-1. State in detail each and every fact upon which you base your allegation that the "causative agent" has not been properly identified.
2.a-2. Explain in detail how each fact stated in your answer to Interrogatory 2.a-1 supports your allegation that the "causative agent" has not been properly identified.
2.a-3. State in detail each and every fact upon which you base your allegation that the "source of initiation" has not been properly identified.
2.a-4. Explain in detail how each fact stated in your answer to Interrogatory 2.a-3 supports your allegation that the "source of initiation" has not been properly identified.
2.a-5. State in detail each and every fact upon which you base your allegation that the "conditions under which intitation of the IGSCC originally occurred" have not been properly identified.
2.a-6. Explain in detail how each fact stated in your answer to Interrogatory 2.a-5 supports your allegation that the "conditions under which intitation of the IGSCC originally occurred" have not been properly identified.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess whether the causative agent, the source of initiation, or the conditions under which the initiation of the IGSCC originally occurred, have been properly identified. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that the causative agent, the source of initiation, or the conditions under which the initiation of the IGSCC originally occurred, have been properly identified. It is this failure to demonstrate "reasonable assurance" through a lack of sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention. By way of support within the SER itself, TMIA notes that at pages 7-8 of the SER, the staff concludes without any support, that "the sodium thiosulfate concentration of 4-5 ppm is the contaminant which 'most likely' caused the OTSG degradation", yet states at page 8 that the failure scenerio has not been clearly established, and recognizes three previous contaminations which may have caused corrosion. The Staff also fails to deal with comments from its own consultants challenging aspects of this conclusion, such as Mr. Dillon's comment at page 12 of his report regarding "inconsistencies in the cracking environments," which "certainly invite questions," ignores his concerns about contradictions regarding

the cracking solution chemistry, and rejects Mr. Dillon's suggestion at page 29 of the SER that a corrosion test be conducted in a cold, high oxygen and high concentration sulfate environment. The Staff also fails to deal with Mr. Macdonald's comments at pages 18-24 of his report where he does not rule out other corrosion possibilities, stating that another polysulfer species must be present in the system, that sulfur deposits of an unknown form were observed in the system, that thiosulfate could have been introduced in the system sometime earlier than September, 1981. Thus, while acknowledging that the failure scenario is speculative, the Staff ignores questions raised by their own consultants, and while recognizing inconsistencies, concludes with no supporting analysis that they are irrelevant concerns. See SER at page 7-8.

2.a-7. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.a-1 through 2.a-6, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

The answer to the above interrogatories is based on all Licensee and NRC documents, including the SER, which concern determination of the causative agent, the source of initiation, or the conditions under which the initiation of the IGSCC originally occurred. Since all Licensee documents are already in the possession of the Licensee, and all NRC documents are likely in Licensee's possesion, or if not, can be located in the public document room, it would appear to be unnecessary, burdensome , and improper to require TMIA to attempt to describe these documents in writing, and in advance of receiving the data and calculations which TMIA has requested.

2.a-8. Identify in detail each and every deficiency relating to the identification of "conditions under which intitation of the IGSCC originally occurred" which you allege to be in the analysese performed by the Licensee, the NRC Staff, and the various Licensee and Staff consultants.
2.a-9. For each deficiency alleged in your answer to Interrogatory 2.a-8, state in detail each and every fact upon which you base each such allegation.
2.a-10. Explain in detail how each fact stated in your answer to Interrogatory 1.a-9 supports your allegation of deficiency stated in your answer to Interrogatory 2.a-8.

See response to Interrogatories 2.a-1 through 2.a-6.

2.a-11. Explain in detail how each fact stated in your answer to Interrogatory 2.a-8 undermines the conclusions reached by Licensee and the NRC Staff that 1) the causative agent has been removed from

the system; 2) the clean up process was reliable; 3) the procedures meant to eliminate the corrosive environment in fact did so; and 4) the Licensee's and Staff's stress analyses were reliable as to when the corrosion could reoccur.

See response to Interrogatories 2.a-1 through 2.a-6. In addition, it should be noted that the post-repair testing assumptions are based on a "cooldown" failure mode, SER at 32, and the reliance on eddy current testing during shutdown as an means to detect cracking assumes that cracking will occur during cooldown. SER at 33.

2.a-12. For each allegation stated in your answer to Interrogatory 2.a-11, state in detail each and every fact upon which you base each such allegation.
2.a-13. Explain in detail how each fact stated in your answer to Interrogatory 2.a-12 supports each allegation stated in your answer to Interrogatory 2.a-11.

See response to Interrogatory 2.a-11.

2.a-14. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.a-8 through 2.a-13, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.a-15. Do you allege that the "causative agent or source of initiation or the conditions under which the intitation occurred" differs from those identified by Licensee, the NRC Staff and their respective consultants?

TMIA is unable at this date to identify and describe in detail the information requested.

2.a-16. If the answer to Interrogatory 2.a-15 is other than an unqualified "no," identify each and every "causative agent or source of initiation or the conditions under which the intitation occurred" which you claim caused or significally (sic) contributed to the corrosion.
2.a-17. For each "causative agent or source of initiation or the conditions under which the intitation occurred" identified in your answer to Interrogatory 2.a-16, state in detail each and every fact upon which you base your claim that the specified factor caused or

significantly contributed to the corrosion.
2.a-18. Explain in detail how each fact stated in your answer to Interrogatory 2.a-17 supports each allegation stated in your answer to Interrogatory 2.a-16.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess whether the causative agent, the source of initiation, or the conditions under which the initiation of the IGSCC originally occurred, have been properly identified. See responsé to Interrogatories 2.a-1 through 2.a-6. TMIA has conducted no independent tests.

2.a-19. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.a-15 through 2.a-18, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.a-20. With respect to contaminants other than sulfur (in its various forms and compounds) identified in yur answer to Interrogatory 2.1-16:
(a) Identify with specificity the quantity of each such contaminant which you claim could cause or significantly contribute to the corrosion;
(b) State in detail each and every fact upon which you rely for the allegation in subparagraph (a) above; and
(c) Explain in detail how each fact stated in your answer to subparagraph (a) above supports the allegation in subparagraph (a).

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess whether the causative agent, the source of initiation, or the conditions under which the initiation of the IGSCC originally occurred, have been properly identified. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that the causative agent, the source of initiation, or the conditions under which the initiation of the IGSCC originally occurred, have been properly identified. It is this failure to demonstrate "reasonable assurance" through a lack of sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

2.a-21. With respect to each contaminant identified in your answer to Interrogatory 2.a-20, do you claim that the quantity stated in your answer to Interrogatory 2.a-20(a) above was in fact present in the TMI-1 steam generator tubes?

See above response.

2.a-22. If the answer to Interrogatory 2.a-21 is other than an unqualified "no," state in detail each and every fact upon which you base your allegation.
2.a-23. Explain in detail how each fact stated in your answer to Interrogatory 2.a-22 supports each allegation stated in your answer to Interrogatory 2.a-21.

See above response.

2.a-24. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.a-20 through 2.a-23, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.a-25. Identify each person you propose to call as a witness in support of Contention 2.a
1.a-26. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 2.a.
1.a-27. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention

See response to Interrogatories 1.a-21 to 1.a-23.

Interrogatories on Contention 2.b.1
2.b.1-1. Explain how and why the concerns reaised by Mr. Dillon with respect to the clean up of the sulfur in the TMI-1 steam generators have any continuing relevancy to the contention that the corrosion which damaged the steam generators might reinitiate, now that the clean up has been completed.

TMIA is unable at this date to identify and describe in detail the information requested. However, it is TMIA's position that it is the failure of the Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to conclude that the concerns of Mr. Dillon are no longer relevant in light of post-clean up testing, which forms the basis for this contention.

2.b.1-2. State in detail each and every fact upon which you base your allegation set forth in answer to Interrogatory 2.b.1-1.
2.b.1-3. Explain in detail how each fact stated in your answer to Interrogatory 2.b.1-2 supports each allegation stated in your answer to Interrogatory 2.b.1-1.

See above response.

2.b.1-4. Do you allege that the clean up, as actually implemented, had any adverse effects on the TMI-1 steam generators?

TMIA is unable at this date to identify and describe in detail the information requested.

2.b.1-5. If your answer to Interrogatory 2.b.1-2 is other than an unqualified "no," identify each and every adverse effect which you claim resulted from the clean up.
2.b.1-6. State in detail each and every fact upon which you base your allegation of an adverse effect in your answer to Interrogatory
2.b.1-7. Explain in detail how each fact stated in your answer to Interrogatory 2.b.1-6 supports each allegation stated in your answer to Interrogatory 2.b.1-5.

TMIA is unable at this date to identify and describe in detail the information requested. However, it is TMIA's position that it is the failure of the Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to conclude that the concerns of Mr. Dillon are no longer relevant in light of post-clean up testing, which forms the basis for this contention. In addition, TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of each aspect of Licensee's post repair and plant performance testing and analysis, or post clean up and plant performance testing and analysis. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that Licensee's post repair and plant performance testing and analysis, and post clean up and plant performance testing and analysis, is adequate. It is this failure to demonstrate "reasonable assurance" through a lack of sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

2.b.1-8. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.b.1-1 through

2.b.1-7, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.b.1-9. Do you allege that the analysis and tests of the effect of the clean up performed by Licensee was deficient in any respect?
2.b.1-10. If your answer to Interrogatory 2.b.1-9 is other than an unqualified "no," identify each and every alleged deficiency in Licensee's tests and or analysis relating to the effect of the clean up on the steam generators.
2.b.1-11. For each deficiency alleged in your answer to Interrogatory 2.b.1-10, state in detail each and every fact upon which you base each such allegation.
2.b.1-12. Explain in detail how each fact stated in your answer to Interrogatory 2.b.1-11 supports each allegation of alleged deficiency stated in your answer to Interrogatory 2.b.1-10.
2.b.1-13. Explain in detail how each of the alleged deficiencies alleged in your answer to Interrogatory 2.b.1-10 supports each claim set forth in your answer to Interrogatory 2.b.1-5

See response to Interrogatory 2.b-7.

2.b.1-14. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.b.1-9 through 2.b.1-13. and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.b.1-15. Identify each person you propose to call as a witness in support of Contention 2.b.1.
2.b.1-16. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 2.b.1.
2.b.1-17. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention 2.b.1.

See response to Interrogatories 1.a-21 to 23.

Interrogatories on Contention 2.b.2
2.b.2-1. Do you allege that the sulfur contamination remaining after the cleaning process poses a risk of reinitiation of IGSCC?
2.b.2-2. If your answer to Interrogatory 2.b.2-1 is other than an unqualified "no," explain in detail the mechanism by which you allege the corrosion is likely to reoccur, including the rate and quantity of sulfur contamination.
2.b.2-3. State in detail each and every fact upon which you base your allegation that a risk of reinitiation exists, and upon which you base your explanation of the mechanism by which the corrosion is likely to recoccur.
2.b.2-4. Explain in detail how each fact stated in your answer to Interrogatory 2.b.2-2 and 2.b.2-3 supports each allegation stated in your answer to Interrogatory 2.b.2-1.

See response to Interrogatories 2.a-1 to 2.a-6. In addition, it is the failure of the Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to conclude there could be reasonable assurance that the 20-50% sulfer recognized to be remaining within the system, or Licensee's failure to flush piping and components of <1 inch in diameter, (See SER Supp. 1 at page 14). does not create a hazardous condition, which forms the basis for this contention.

2.b.2-5. Do you claim that the level of sulfur compound detemined by post-cleaning testing to be in solution in the TMI-1 steam generator tubes is greater than that stated by licensee, namely 0.1 ppm sulfate?
2.b.2-6. If your answer to Interrogatory 2.b.2-5 is other than an unqualified "no," state in detail each and every fact upon which you base this allegation.
2.b.2-7. Explain in detail how each fact stated in your answer to Interrogatory 2.b.2-6 supports each allegation of alleged deficiency stated in your answer to Interrogatory 2.b.2-5.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of each aspect of Licensee's post clean up testing and analysis. This is due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that Licensee's post clean up testing and analysis is accurate and adequate. It is this failure to demonstrate "reasonable assurance" through a lack of sufficiently detailed analysis and well-supported conclusions, which forms the basis for this contention.

2.b.2-8. Do you allege that an inventory of 0.1 ppm sulfate in solution would have a significant corrosive effect on the steam generator tubes?
2.b.2-9. If your answer to Interrogatory 2.b.2-10 is other than an unqualified "no," state in details each and every fact upon which you base this allegation.
2.b.2-10. Explain in detail how each fact stated in your answer to Interrogatory 2.b.2-9 supports the allegations stated in your answer to Interrogatory 2.b.2-8.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of each aspect of Licensee's post clean up testing and analysis, including the corrosive effects of 0.1 ppm sulfate in solution. This is due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that Licensee's that the corrosive effects of 0.1 ppm sulfate in solution would have no hazardous effects.

2.b.2-11. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.b.2-1 through 2.b.2-10, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.b.2-12. Do you allege that the administrative controls imposed by Licensee are inadequate to prevent buildup of corrosive sulfur concentrations?
2.b.2-13. If your answer to Interrogatory 2.b.1-12 is other than an unqualified "no," identify each and every administrative control which you allege is inadequate and state in detail each and every fact upon which you base those allegations.
2.b.2-14. Explain in detail how each fact stated in your answer to Interrogatory 2.b.1-13 supports each allegation stated in your answer to Interrogatory 2.b.1-12.

TMIA is unable at this date to identify and describe in detail the information requested because TMIA can not yet assess the adequacy of each aspect of Licensee's post clean up testing and analysis, and thus the adequacy of the administrative controls imposed by Licensee to insure prevention of buildup of corrosive sulfur concentrations. This is due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that Licensee's administrative controls are adequate to insure prevention of buildup of corrosive sulfur concentrations.

2.b.2-15. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.b.2-12 through 2.b.2-14, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.b.2-16. Identify each person you propose to call as a witness in support of Contention 2.b.2.
2.b.2-17. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 2.b.2.
2.b.2-18. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention 2.b.2.

See reponse to Interrogatory 1.a-21 to 1.a-23.

Interrogatories on Contention 2.c

2.c-1. State in detail each and every fact upon which you base your allegation that neither the "Report of Third Party Review of Three Mile Island, Unit 1 Steam Generator Repair" (TPR") nor the Staff's Safety Evaluation Report ("SER") are credible documents in their evaluation of "causative agent."

2.c-2. State in detail each and every fact upon which you base your allegation that neither the TPR nor the SER are credible documents in their evaluation of "clean up," and explain how each such fact supports that allegation.

2.c-3. State in detail each and every fact upon which you base your allegation that neither the TPR nor the SER are credible documents in their evaluation of "procedures to prevent contaminant reintroduction," and explain how each such fact supports that allegation.

See response to Interrogatories 2.a-1 to 2.a-6.

2.c-4. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatory 2.c-1 through 2.c-3, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

1.c-5. Specifically identify and explain each of the "reports" inherent inconsistencies" to which you refer in Contention 2.c.

2.c-6. State in detail each and every fact upon which you base your allegation that each of the "reports' inherenct inconsistencies" identified in your response to Interrogatory 1.c-5 undermines or is inconsistent with the evaluation in the TPR and SER of "the causative agent.

2.c-7. State in detail each and every fact upon which you base your allegation that each of the "reports' inherenct inconsistencies" identified in your response to Interrogatory 2.c-5 undermines or is inconsistent with the evaluation in the TPR and SER of "clean up."

2.c-8. State in detail each and every fact upon which you base your allegation that each of the "reports' inherenct inconsistencies" identified in your response to Interrogatory 2.c-5 undermines or is inconsistent with the evaluation in the TPR and SER of "procedures to prevent contaminant reintroduction."

See response to Interrogatories 2.a-1 to 2.a-6.

2.c-9 Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c-5 through 2.c-8, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7.

2.c-10. Explain what you mean by "axial symetric stess analysis" as it pertains to analyses in the TPR and SER.

See response to Interrogatory 1.d-6.

2.c-11. Identify and describe the cracks in the TMI Unit 1 steam generator tubes to which you believe "axial symetric stess analysis" is not allicable?

See response to Interrogatory 1.d-7.

2.c-12. Where are the cracks identified and described in your response to Interrogatory 2.c-11 located?

See response to Interrogatory 1.d-8.

2.c-13. What do you believe to be the cause of the cracks identified and described in your answer to Interrogatory 2.c-11?

See response to Interrogatory 1.d-9.

2.c-14. Explain why "axial symetr[illegible] stess analysis" is not applicable to the cracks identified and described in your answer to Interrogatory 2.c-11.

See response to Interrogatory 1.d-10.

2.c-15. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c-10 through 2.c-14 above, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to 2.a-7. In addition, TMIA used the McGraw-Hill

Dictionary of Scientific and Technical Terms, 2d Ed. 1974.

2.c-16. Identify each "basic assumption and conclusion" in the TPR and the SER which you allege "rest[s] improperly on axial symetric stress analysis which would not be applicable to all cracks".

See response to Interrogatory 1.d-12.

2.c-17. For each basic assumption and conclusion identified in your response in Interrogatory 2.c-16, state in detail each and every fact upon which you base your allegation that such basic assumption or conclusion "rest[s] improperly on axial symetric stress analysis which would not be applicable to all cracks".

2.c-18. For each "basic assumption and conclusion" identified in your response in Interrogatory 2.c-16, state in detail each and every fact upon which you base your allegation that such basic assumption or conclusion undermines or is inconsistent with the evaluation in the TPR and SER of "the causative agent.

2.c-19. For each "basic assumption and conclusion" identified in your response in Interrogatory 2.c-16, state in detail each and every fact upon which you base your allegation that such basic assumption or conclusion undermines or is inconsistent with the evaluation in the TPR and SER of "the clean up."

2.c-20. For each "basic assumption and conclusion" identified in your response in Interrogatory 2.c-16, state in detail each and every fact upon which you base your allegation that such basic assumption or conclusion undermines or is inconsistent with the evaluation in the TPR and SER of "procedures to prevent contaminant introduction."

See response to Interrogatories 1.d-7 and 2.a-1 to 2.a-6.

2.c-21. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c-16 through 2.c-20, above and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7. In addition, see the McGraw-Hill Dictionary of Scientific and Technical Terms, 2d Ed. 1974.

2.c-22. Explain the difference between "toughness" and "hardness" interms of significance to the analysis of "crack resistance."

See response to Interrogatory 1.d-16.

2.c-23. State in detail each and every fact upon which you base your allegation that "hardness" has no relation to crack resistance.

See response to Interrogatory 1.d-17.

2.c-24. Specifically identify each instance in the TPR and the SER where it is stated, suggested, or inferred that "hardness" was or was not used to analyze crack resistance.

See response to Interrogatory 1.d-18.

2.c-25. Specifically identify each instance in the TPR and the SER where it is stated or suggested that "toughness" was or was not used to analyze crack resistance.

See response to Interrogatory 1.d-19.

2.c-26. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c-22 through 2.c-25 above and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See above response. In addition, see Knott, J.F., The Fundamentals of Fracture Mechanics, John Wiley & Sons, 1973.

2.c-27. Specifically identify each instance in the TPR and the SER where you allege that crack resistance was improperly analyzed on the basis of hardness, rather than toughness, and state in detail each and every fact upon which you base your allegation that crack resistance should be analyzed on the basis of "toughness" rather than "hardness.

See response to Interrogatory 1.d-21.

2.c-28. State in detail each and every fact upon which you base your allegation that the alleged "failure to analyze crack resistance on the basis of toughness as opposed to hardness" undermines or is inconsistent with the evaluation in the TPR and SER of "the causative agent."
2.c-29. State in detail each and every fact upon which you base your allegation that the alleged "failure to analyze crack resistance on the basis of toughness as opposed to hardness" undermines or is inconsistent with the evaluation in the TPR and SER of "the clean up."
2.c-30. State in detail each and every fact upon which you base your allegation that the alleged "failure to analyze crack resistance on the basis of toughness as opposed to hardness" undermines or is inconsistent with the evaluation in the TPR and SER of "procedures to prevent contaminant introduction."

See response to Interrogatory 1.d-22. In addition, TMIA is unable at this date to assess the adequacy of each aspect of Licensee's pre and post repair testing and analysis, particularly in its evaluation of the original corrosion scenerio, or post clean up testing and analysis, and thus whether procedures to prevent reintroduction are adequate. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that Licensee's pre and post repair testing and analysis, and post clean up testing and analysis, is adequate. See also response to Interrogatories 2.a-1 to 2.a-6. In addition, it should be noted that the post-repair testing assumptions are based on a "cooldown" failure mode, SER at 32, and the reliance on eddy current testing during shutdown as an means to detect cracking assumes that cracking will occur during cooldown, SER at 33, but without adequate assurance that proper corrosion testing has been conducted, there can be no reasonable assurance cracks will propagate under these conditions.

2.c-31. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c-27 through 2.c-30 above and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 2.a-7. In addition, see Knott, J.F., The Fundamentals of Fracture Mechanics, John Wiley & Sons, 1973.

2.c-32. With respect to the phrase "failure to differentiate in their analysis between the effects of thermal stress on small versus large cracks" as used in Contention 2.c:

(a) Define what you mean by "small cracks";
(b) Define what you mean by "large cracks"; and
(c) Identify each and every specific "analysis" to which you refer.

See response to Interrogatory 1.d-24.

2.c-33. In terms of each and every "analysis" identified in your answer to Interrogatory 2.c-32(c), explain in detail the significance of a failure to differentiate between the effects of thermal stress on small versus large cracks.

See response to Interrogatory 1.d-25.

2.c-34. Specifcally identify each instance in the TPR and the SER where it is stated, suggested, or inferred that there was a failure to differentiate in [an] analysis between the effects of thermal stress on small versus large cracks."

See response to Interrogatory 1.d-26.

2.c-35. State in detail each and every fact upon which you base your allegation that there was a failure in the TPR and SER to "differentiate between the effects of thermal stress on small versus large cracks."

See response to Interrogatory 1.d-27.

2.c-36. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c-32 through 2.c-35. and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.d-28.

2.c-37. State in detail each and every fact upon which you base your allegation that each "failure to differentiate between the effects of thermal stress on small versus large cracks" identified in your answer to Interrogatory 2.c-34 undermines or is inconsistent with the evaluation in the TPR and SER of "the causative agent.

2.c-38. State in detail each and every fact upon which you base your allegation that each "failure to differentiate between the effects of thermal stress on small versus large cracks." identified in your answer to Interrogatory 2.c-34 undermines or is inconsistent with the evaluation in the TPR and SER of "the clean up"

2.c-39. State in detail each and every fact upon which you base your allegation that each "failure to differentiate between the effects of thermal stress on small versus large cracks" identified in your answer to Interrogatory 2.c-34 undermines or is inconsistent with the evaluation in the TPR and SER of "procedures to prevent contamionant reintroduction."

See response to Interrogatory 1.d-29. In addition, TMIA is unable at this date to assess the adequacy of each aspect of Licensee's pre and post repair testing and analysis, particularly in its evaluation of the original corrosion scenerio, or post clean up testing and analysis, and thus whether procedures to prevent reintroduction are adequate. This due to the failure of Licensee, the NRC Staff, or any of their consultants, to yet provide the detailed data and analysis which would be required to demonstrate that there is reasonable assurance that Licensee's pre and post repair testing and analysis, and post clean up testing and analysis, is adequate. See also response to Interrogatories 2.a-1 to 2.a-6. In addition, it should be noted that the post-repair testing assumptions are based on a "cooldown" failure mode, SER at 32, and the reliance on eddy current testing during shutdown as an means to detect cracking assumes that cracking will occur during cooldown, SER at 33, but without adequate assurance that proper corrosion testing has been conducted, there can be no reasonable assurance cracks will propagate under these conditions.

2.c.2-40. Identify each and every document which you claim supports each fact set forth in your answers to Interrogatories 2.c.2-37 through 2.c.2-39, and correlate each such document as specifically as possible (page and paragraph number) with each such fact.

See response to Interrogatory 1.d-30, and 2.a-7.

2.c.2-41. Identify each person you propose to call as a witness in support of Contention 2.c.
2.c.2-42. Identify all documents, including all relevant page citations, which you intend to offer as exhibits during this proceeding to support Contention 2.c.
2.c.2-43. Identify all documents, including all relevant page citations, which you intend to use during your cross-examination of witnesses presented by Licensee or the NRC Staff on Contention 2.c.

See response to Interrogatory 1.a-21 to 1.a-23.

Respectfully submitted,

By: Joanne Doroshow

Joanne Doroshow
Louise Bradford
TMIA

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