UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

BEFORE THE ATOMIC SAFETY AND LICENSING BOARD

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

STATEMENT OF MATERIAL FACTS AS TO WHICH THERE IS NO GENUINE ISSUE TO BE HEARD
(TMIA CONTENTION 1.b.)

1. TMIA Contention 1.b. reads as follows:

   1. Neither Licensee nor the NRC Staff have demonstrated that the kinetic expansion steam generator tube repair technique, combined with selective tube plugging, provides reasonable assurance that the operation of TMI-1 with the as-repaired steam generator can be conducted without endangering the health and safety of the public, for the following reasons:

   b. Because of the enormous number of tubes in both steam generators which have undergone this repair process, (1) the possibility of a simultaneous rupture in each steam generator, which would force the operator to accomplish cooldown and depressurization using at least one faulted steam generator, resulting in release of radiation into the environment beyond permissible levels, "isn't an incredible event," (see, September 19, 1982 memorandum from Paul Shewmon, then Chairman of the ACRS), (2) and could lead to a sequence of events not encompassed by emergency procedures, (3) and in the course of a LOCA, such a scenario could create essentially uncoolable conditions.

2. Dr. Shewmon's memorandum of 9/19/82 is quoted out of context. Nowhere in Dr. Shewmon's memorandum is the efficacy or adequacy of the kinetic expansion tube repair process questioned, or even raised. Conversely, Dr. Shewmon is raising the issue of the number and location

of tubes which are plugged (" . . . they will probably plug many more tubes than they originally pla[illegible]d."). (McCracken and Frank Affidavit, ¶ 3).

3. The fact that Dr. Shewmon's memorandum raises a concern about plugging, rather than tube expansion, is supported by Mr. Major's memorandum of September 30, 1982. There, Mr. Major states: "The first concern [raised by Shewmon] is the extent to which the TMI-1 steam generator tubes must be plugged and taken out of service, rather than being repaired by kinetic explosive expansion against the upper tubesheet." (Emphasis added). Both memoranda also indicate that they do not have current or exact data on the status of tubes being plugged. Therefore, the comments and concerns raised were speculative, not based on the actual situation at TMI-1. (McCracken and Frank Affidavit, ¶ 4).

4. Contention 1.b. also implies that "the enormous number of tubes in both steam generators which have undergone this repair process" is somehow related to the potential for tube rupture. This contention lacks technical basis because the concern, in any repair process, is not how many tubes are repaired, but whether the repair method will restore the original tube integrity and how many tubes should have been repaired that were not (i.e., have unidentified defective tubes been left in service). (McCracken and Frank Affidavit, ¶ 5).

5. Licensee's tests (Topical Report 008, Rev. 3, Section V.C), confirmed by the Staff's evaluation (NUREG-1019, Section 3.4) and the Staff consultant's independent review (NUREG-1019, Attachment 1), demonstrate that the repaired tubes exceed the licensing basis requirement. To preclude the possibility of leaving unrepaired, defective tubes

inservice, all tubes, in both OTSG's were repaired and plugged as required, as discussed in NUREG-1019, Section 2 and NUREG-1019, Supplement No. 1, Section I. Because all tubes have been repaired and plugged as required, adequate assurances exist that defective tubes have been removed from service. The Staff's conclusion is supported and verified by the extremely low primary to secondary leakage during the steam generator hot functional testing (See NUREG-1019, Supplement No. 1, page 18 and page 22). (McCracken and Frank Affidavit, ¶ 6).

6. Steam generators, when manufactured, incorporate corrosion allowances above ASME boiler and pressure vessel code requirements into the thickness of the tube walls, to allow for degradation during operation. In addition, more tubes are installed than are needed for full power operation, to permit removal from service of tubes which have become degraded. (McCracken and Frank Affidavit, ¶ 8).

7. The actual corrosion allowance and number of excess tubes is plant-specific. However, most steam generators have 10% to 30% more steam generator tubes than are necessary for full power operation. A number of steam generators are currently operating at full power with 10% to 25% of their tubes plugged. The Staff has also conservatively established a 40% through wall (i.e., 60% tube wall remaining) plugging criteria for defective tubes. Each licensee can elect to accept the conservative 40% plugging limit or perform calculations and testing to justify a less conservative plugging limit. TMI-1 has chosen the conservative 40% tube plugging limit, which is incorporated into the plant technical specifications. (McCracken and Frank Affidavit, ¶ 8).

7. The Shewmon and Major memoranda are referring to partial information indicating that some corrosion was being detected in tube free spans, outside of the tubesheet. However, as indicated clearly in both memoranda, the authors were unaware of the extent of the corrosion problem in the free span. Corrosion in the tube free span is the area of greatest concern because of the possibility for guillotine type tube ruptures, due to the lack of tube restraints as exists in the tubesheet. (McCracken and Frank Affidavit, ¶ 9).

8. Subsequent to the dates of the Shewmon and Major memoranda the extent of corrosion outside the tubesheet was accurately determined and characterized by 100% eddy current testing (ECT) of both OTSG's. These tests showed that less than 5% of the tubes had detectable corrosion outside of the tubesheet. NUREG-1019, Section 3.3, provides a thorough discussion of the ECT program, results, and future plans. Topical Report 008, Rev. 3, page 2 and Table I-3 provides a summary of the disposition for all OTSG tubes. (McCracken and Frank Affidavit, ¶ 10).

9. In light of the information provided (Topical Report 008, Rev. 3, and NUREG-1019) subsequent to the Shewmon and Major memoranda it is clear that the concerns expressed therein have been technically resolved because:

a. The extent of corrosion outside of the tubesheet at TMI-1 is less than that which exists in many other operating plants; and

b. Corrosion which did exist outside the tubesheet was repaired by plugging, in accordance with the technical specifications, to the same criteria as other plants are repaired. Therefore,

> the probability of single or multiple tube rupture is no greater at TMI-1 than any other plant, nor is the probability of single or multiple tube rupture any greater for TMI-1 now than prior to the corrosion problem.

(McCracken and Frank Affidavit, ¶ 11).

10. In summary, the potential for simultaneous tube rupture in both steam generators is no more credible at TMI-1 than at any other plant. All plants are repaired to the same criteria to ensure that the probability of any tube ruptures remains low. (McCracken and Frank Affidavit, ¶ 12).

11. However, even if a beyond-design-basis simultaneous rupture in each steam generator were to occur, such ruptures and resultant scenarios are encompassed by GPU's Steam Generator Tube Rupture Guidelines, TDR-406, and Procedure EP-1202-5, OTSSG Tube Leak/Rupture, as discussed in NUREG-1019, Section 4.3.1 and 4.3.2. In addition, as further discussed in Supplement 1 to NUREG-1019, Section 4.3.1, the provisions of the Emergency Plan provide adequate flexibility to the licensee's Emergency Director to deviate from procedures as necessary in order to deal with unforeseen events. As part of the TMI Action Plan, NUREG-0737, Item I.C.1, the emergency operating procedures at all PWRs are to be upgraded to address many multiple failures, beyond design basis events. TMI-1 has a program to develop and implement these procedures. These procedures will be symptom-oriented to provide additional flexibility in dealing with beyond-design-basis multiple failure events. (Orr Affidavit, ¶ 3).

12. Thus, even if beyond-design-basis multiple tube ruptures were to occur, such events are encompassed within existing emergency procedures. (Orr Affidavit, ¶ 4).

13. The present procedures dealing with multiple steam generator tube ruptures are not required to and do not deal explicitly with the beyond-design-basis event of simultaneous LOCA and steam generator tube rupture in both steam generators. This occurrence would be extremely unlikely because of the number of simultaneous failures involved. However, both the LOCA and steam generator tube rupture procedures direct the operator to maintain core cooling. (Jensen Affidavit, ¶ 3).

14. However, even if such extremely unlikely simultaneous accidents were to occur, the Staff is unable to postulate mechanistically a credible scenario which would create uncoolable conditions. Intervenors have raised questions in discovery about steam binding. It has been postulated that, for large cold leg breaks, flow of steam from the steam generators into the reactor system would retard the recovering of the core by emergency coolant. The additional steam would retard flow of steam generated by the core through the coolant loops during the reflooding process. Steam must escape the core and flow out of the reactor vessel for the core to be adequately reflooded. Reactors designed by B&W, including TMI-1, do not depend on steam flow through the coolant loops for reflooding. TMI-1 has internal vent valves which would allow steam from the core to pass directly out the break without traversing the coolant loops. No credit was assumed for relief of steam from the core through the coolant loops in the ECCS analyses performed under 10 CFR 50.46 for TMI-1. The Staff concludes that the creation of essentially uncoolable conditions by the scenario proposed by the contention is highly unlikely. (Jensen Affidavit, ¶ 4).