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UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Commission

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

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TMIA'S COMMENTS ON PROPOSED "NO SIGNIFICANT HAZARD CONSIDERATION" FINDING

I. INTRODUCTION

TMIA hereby submits comments on the Commission's proposed "no significant hazard consideration" finding regarding licensee's application dated February 4, 1986, which would modify TMI-1's steam generator tube repair plugging criteria, to allow tubes with cracks up to 50% throughwall and .55 inches in circumferential length to remain in service.

TMIA believes that under the criteria set forth by Congress in passing of the "Sholly" amendment to Section 189(a) of the Atomic Energy Act, and as developed in the Commission's regulations, 10 CFR 50.92, this license amendment presents a clear significant hazard consideration.

II. FACTUAL DISCUSSION

Licensee's Technical Specification Change Request (TSCR) No. 153 would allow TMI-1's operation with steam generator tube defects up to 50% throughwall with a maximum length of .55 inches. The new plugging criteria would apply to all types of internal diameter (ID) defects, including "pits" associated with grain dropout, inter granular attack (IGA) patches, cracks, and cracks underneath IGA

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areas or at the base of pits. See TSCR 148 at 12.

GPU estimates that if this amendment is approved, more than half the tubes which must be plugged under the current license could be left in service after TMI-1's current shutdown, which it estimates will end in late April. See NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 7.

Transcripts of discussions between the NRC Staff and GPU, as well as Staff concerns apparently expressed to GPU in a July 16, 1985, telephone conversation, (see TSCR 148 at 8-12), show clearly that the broad safety questions raised by any change the plugging criteria at this time would pose a significant safety hazard.

The unresolved issues surrounding both TSCR 148, which the Commission has already determined raise a significant hazard consideration, and TSCR 153, are virtually identical.

According to GPU, there are two reasons for revising the plugging criteria at this time. One reason is to more accurately reflect the condition of the TMI-1 steam generator. The other is to reflect the capabilities of eddy current (EC) testing at TMI-1. TSCR 148 at Section II; TSCR 153 at Section II.[1/]

To support both requests, the Licensee relies upon the same technical reports to demonstrate both that the amendments comply with the requirements of the GDC 14, 15 and 31 and Reg. Guide 1.121, and generally would not endanger the public. The company's safety evaluations for both TSCR 148 and TSCR 153 are is based on

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1. In TSCR 153, the company provides an additional reason -- the reduction in occupational radiation doses. This reason also was presented to the Staff during their 1985 meeting on TSCR 148, and provoked a skeptical reaction from the Staff. See NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 77.

the assumption that eddy current technology "indicates that imperfections greater than 40% throughwall are acceptable."

For both requests, the analytical basis for the Licensee's fatigue analysis is contained in GPU's Technical Document Report ("TDR") 008; the ASME Section III fatigue evaluation, Section XI Linear Elastic Fracture Mechanics results, and the Main Steam Line Break solid mechanics analysis, with a 10% margin on nominal throughwall. TSCR 148 at 4; TSCR 153 at Sec. III. The company uses identical TDR's to support its characterization of current defects, and to demonstrate the accuracy of eddy current techniques. See TDR-638, TDR-652, TDR-696, and TDR-642.

According to the Staff, any new plugging criteria at TMI-1 must be judged against both eddy current testing uncertainties, and knowledge of the form and rate of the new tube degradation. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 19, 23. Both criteria must be evaluated in light of the very same technical analyses, particularly on the issue of whether the analyses are reliable enough to support a plugging criteria change without verification through metallurgical examinations of newly pulled TMI-1 tubes.

Both must also be viewed in light of the fact that the change requested would not affect outer diameter (OD) defects, for which this is considerable operating experience, but only ID defects peculiar to TMI-1.

Indeed, the key questions raised by the Staff in 1985 concerning TSCR 148, and in 1986 concerning TSCR 153, such as whether the new ID indications can be detected, whether degradation is proceeding, and whether grain drop out has stopped or is likely

to continue, have not been answered by Licensee's technical analyses. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 14.

Unresolved safety questions concerning the nature of new indications discovered in a 1984 steam generator inspection, and the capability of EC testing to accurately asses the size and configuration, indeed the very existence of tube defects which must be removed from service, both increase the risk of an accident, and significantly decrease the safety margin.

A. The Form of New Tube Degradation Has Not Been Determined.

In November, 1984, steam generator testing revealed new defects on TMI-1's steam generators. TDR-638 at 7. The testing which GPU relies on to establish that the new tube defects are not new indications or the result of crack growth, is inconclusive.

As a result of the new 1984 indications, GPU eddy current tested 100% of the "A" steam generator tubes, and the outer 16 tube periphery in the "B" steam generator. TDR-638 at 6. In the A steam generator, the indications were primarily, but not exclusively, in Upper Tube Sheet (UTS) and 16th tube span, concentrated in outer periphery. The defects also varied in throughwall depth and circumferential length. But over 20% were greater than 50% throughwall and were not small in circumferential extent. Ibid. Therefore, from this data alone, it is unreasonable to generalize about the condition of tubes, and the cause of new tube cracking.

GPU also determined that typical tubes had IGA patches. Fiberscope inspection conducted on 6 tubes pulled from the A steam generators with typical ECT revealed that 4 out of 6 had patchlike areas. But on the basis of this evidence, GPU can only conclude

that "the patches appeared similar to surface deposits seen during the initial tube failure analysis" which were "found to be associated with partial throughwall IGA". Id. at 21 (emphasis added).

The company's review of historical EC data, to establish that these new indications actually existed in 1981 but were not picked up, is deficient. TDR-652 concludes that the 1984 indications reveal that by knowing the specific locations of the new indications, a majority can be found in the 1982 EC tapes. But not all of these indications could be found, clearly leaving open the possibility that some of these new indications may be the result of new indications or new growth. Similarly, in considering circumferential extent, GPU could only determine that most, but not all indications could be identified in previous exam data. Id. at 28.

Moreover, the testing results do not support GPU's generalizations about the similarity between the two sets of data. In 1984, 79% of the indications in the A steam generator were determined to be above the 15th support plate. In 1982, 82% were above 15th. In 1984, 57% in the B steam generator were above 15th support plate. In 1982, 74% were above 15th. Moreover, because of the kinetic expansion, the company could not examine the UTS properly. Id. at 17.

Moreover, this data does not substantiate a conclusion that growth is not occurring. In 1984, in the A steam generator, 47% were less than 40% throughwall; in B, 59% were less than 40% throughwall. In 1982, 3% less than 40%, 50% greater than 90%. Id.

at 18-19.

GPU also relies on TDR-686, to characterize IGA in TMI-1 tube samples, and to to help clarify the sensitivity and accuracy of EC examination for IGA/IGSAC (intergranular stress assisted cracking). Its consultants examined IGA using data from metallurgical samples in B&W/Batelle failure analysis, and LTCT. 20 areas of IGA were detected. Id. at 14. Those 9 which were within .5" of IGSAC were not analyzed at all, after the company made an unverified determination that only the other 11 were representative of the IGA which potentially could have remained in service.

In its analysis of 1985 testing, B&W could not determine whether the mechanism which caused damage to the tubes at Unit 1 was active or inactive during the storage period. B&W Attachment at 8. Since B&W found no change in IC, it concluded that growth or propagation was "doubtful." Ibid. However, since the company never did a destructive examination of the 1982 tubes, it refused to conclude that new corossion may not have occurred.

The Staff and the company have noted on several occasions that there is insufficient information to conclude that all pits due to grain drop out have been detected. Staff scientist Johnston noted that there are possibly a number of pits which can not be detected (i.e. grains haven't dropped out yet); that there is possibly a high density of pits; that no one knows how close they are and their real load-carrying capability; that there is no way of knowing if the pits will stay separate, "which makes it difficult to just buy a set of curves and say OK." NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 31.

Staff scientist Crutchfield noted that there continues to be

concern with grain dropout, and that there will not be full knowledge of the extent of attack until a metallurgical exam is done, and correlated between what is detected versus what has occurred and will likely occur in the future until grain dropout stops. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 21.

Moreover, some IGA at TMI-1 is deeper than in other plants. As noted by Johnston, "there is something that may have made it deeper that might be different about yours maybe than some of the other ones, a culmination of effects." NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 42.

No TMI-1 tubes have been removed and tested since the original corrosive attack in 1981.

Since tubes were last pulled from TMI-1 in 1982, the steam generators have been subjected to thermal/hydraulic loading associated with hot functional testing and plant operation, and have been subjected to new flow patterns from the last round of extensive plugging, which may have resulted in tube wear. TDR-652 at 3; See TDR-690.

In addition, it is now a well-recognized that since restart, radioactive deposits have built up on the OD of the steam generators. See Inspection Report 50-289/85-27 at 7. GPU has been unable to predict the behavior of these deposits, or analyze their affect on the steam generators.

In addition, in its most recent inspection report, the NRC noted that because the company used poor engineering analysis before using Furmanite to repair a leak in a steam generator sensing line, the Furmanite plugged an instrument line and had to

be blown into the steam generator. GPU insisted on restarting the plant in January without an understanding of the effects of the Furmanite in the steam generator, and did so despite poor technical analysis. Inspection Report 50-289/85-30 at 15.

In addition, chemistry conditions since the original corossion may have affected the conditions of tubes. According to GPU, the following chemicals must be controlled precisely to eliminate any risk of corossion: sulfate, lithium, sulfate/lithium ratio, pH, chlorides, oxygen (air), static waterline during layup, and water turnover. TDR-638 at 14-17. By the company's own report, chemistry guidelines have been violated 5% of the time. Id. at 17. There have been "spikes" of chloride and sulfate in amounts greater than specified limits.

On April 1984, the water level reached the 12th tube support plate for 8 days, preceded and followed by drained layup with elevated pH aerated water. Id. at 18. From August, 1983 to May, 1984, oxygenated water was injected into deoxigenated RCS during HPI testing. Ibid.

GPU relies on LTCT to demonstrate that these violations in chemistry conditions could not have caused new cracking, asserting that the actual values measured in LTCT "bound" any containment "spikes" reported in the Chem. and Op. History Review. TDR-638 at 13. LTCT results revealed that 3 of 54 tube samples had IGA patches between 20% and 40% throughwall and 2 had patches below 20%. However, 4 out of these of 5 exhibited scattered, shallow cracking or IGA which were not sized metallographically and therefore, their EC detectability could not be confirmed. Therefore, the conclusion that these new indications were

"consistent with IGA seen during failure analysis" and therefore judged to have been present at the start of LTCT, is inconclusive.

The Staff is requiring destructive testing on actual steam generator tubes before reaching any conclusion regarding the safety of TSCR 148. There are two purposes for this. One is "to get come confirmation on the eddy current technique versus actual metallurgical examination." NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 27 (Crutchfield). The second is to verify that no additional degradation mechanisms are going on. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 23 (Cheng).

At least one Staff member said he understood GPU would pull a tube, to verify there are not additional degradation mechanisms going on, before this amendment was approved. Id. at 23. (Cheng). See also, id. at 22 (Crutchfield: "I am not so sure I don't want [a metallurgical examination of a pulled TMI-1 steam generator tube] before I even consider two cycles.")

As noted by Staff scientist Crutchfield, "there are some questions about the accuracy of the testing technique in light of the particular method of attack." These questions stem from the fact that the company's technical analysis does not substantiate its claim that degradation is not proceeding farther, and that grain dropout has stopped, or is likely to continued. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 14. GPU can only state that they "think" corrosion arrested, but admit that there no guarantees. Id. at 21.

Nor have they speculated as to what they will see during the current March shutdown. However, no matter what predictions they

are able to make regarding crack growth based on EC test results, the company still will not be able to confirm their results with metallographical testing. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 26.

Until actual testing is done, the Staff considers the license amendment request TSCR 148 deficient, "to be missing a piece, a substantial piece in the staff's eyes." NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 33 (Crutchfield). See also Ibid. (Weller). There appear to be significant disagreement among the Staff's technical experts as to whether TSCR 153 is also "missing a piece." Neither of these questions have been resolved for purposes of TSCR 153. Clearly, there are enough unresolved questions concerning the cause of new degradation, and Staff disagreement over the need to test pulled TMI-1 tubes, to raise a "significant hazard consideration."

B. The Requested License Amendment Relies On Unique Eddy Current Testing Methods For Which There Is Little Or No Industry Experience To Verify Their Accuracy.

GPU asserts that the request for plugging modifications is to "more accurately reflect the capabilities of eddy current testing at TMI-1". TSCR 148 at 1. The Staff has noted that the basis for changing the plugging criteria depends both on both ECT capability and knowledge of the cause of cracking and crack growth rate. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 19, 23.

But as noted by Staff scientist Crutchfield, "there are some questions about the accuracy of the testing technique in light of the particular method of attack," including whether the indications are detectable. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 14.

There is no question that IGA, which characterizes many of the new indications, can not be accurately tested using EC, unless there is grain drop out. See TSCR 148, in which the company acknowledged that its technical report TDR-686 concludes that metallographically determined sizes of IGA patches were below the established level of EC sensitivity for IGSAC. See also, NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 41. (GPU agrees that unless dropout, IGA is only detected by some of the metallurgical exams).

GPU contractor B&W found no significant change in EC results between 1981/1982 and 1985 test data. TDR-686 at 8. However, Conam found indications that B&W did not. Id. at 10. After metallography examination, Conam found one tube with individual or clustered pits near the reported ECT locations, and after bending them, found circumferential cracks in all 3 EC locations. Id. at 11. That B&W could find no EC indications where cracks existed, is evidence of EC's unreliability. TDR-686 at 11.

Conam also found visible pitting less than .005" deep and wide, which was visible by fiberscope but below the expected detectability for ECT. Id. at 18.

Conam concluded that the "metallography was not successful in determining the detectability of IGA by eddy current. . . [and] due to the close proximity of indications to each other and the imprecision of location measurements these correlations can only be considered approximate." Id. at 11.

Grain drop out can also mask otherwise detectable cracks. Past TMI-1 inspections showed that in some cases there were cracks

originating at the base of IGA or intergranular pits propogating further through the tube thickness, rather than through the IGA, masking the crack. TSCR 148 at 11-12. While GPU says this only happened once and the crack was throughwall so detected, GPU does not address this as a continuing phenomenon.

Currently, there is no way to tell without metallurgical examination, whether grain drop out will continue. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 21 (Crutchfield). Nor is there any way to determine pit density, whether pits can be expected to stay separate, and whether load-carrying capability could be affected. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 31 (Johnston).

TDR-650 concludes that the inability to call IGA defects impacts the overall statistics associated with ECT accuracy.

This uncertainty also undermines GPU's conclusions regarding predicted growth of new indications, based on examination of ISI tubes left in service. Some of the 85 ISI tubes have IGA. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 27. In light of the fact that IGA is not often detectable, GPU's conclusion that none of the ISI indications have grown is unsubstantiated.

Even regarding detectable cracks, the EC technique has deficiencies. TMI-1 steam generators must undergo a dual examination method. The differential technique is used first. If this technique fails to reveal a "relevant" indication, the tube is deemed "acceptable." If a "relevant" indication appears, a more sensitive 8x1 absolute probe is done to confirm the indication, and to determine crack length. TDR-652 at 7.

A defect's throughwall penetration is measured by an eddy current signal's phase angle, which is then compared to a

conversion curve to determine the percent throughwall. TSCR 148 at 7. However, unlike other plants, TMI-1's defects are on the inner tube diameter ("ID"). Traditional curves were designed for the more common outer diameter ("OD") defects, which GPU claims "overcalls" small volume ID defects. Ibid. Therefore, GPU designed a new, less conservative curve by extrapolating from the OD curve and factoring in "supplemental data" from EDM (electro-discharged machine) notches with various known depths." TDR-642.

The need to extrapolate, using a new curve untested either by operating experience at other plants, or destructive testing on an actual TMI-1 tube, clearly adds to the uncertainty regarding the accuracy of EC. This is particularly important regarding IGA, which can not be accurately detected, and for which EC techniques were not designed.

The accuracy of Licensee's system has been "correlated" only by using old IGSAC samples. Ibid. Its accuracy has not been confirmed by metallurgical examination on newly pulled TMI-1 tubes, which contain unverified forms of degradation admittedly difficult to detect with eddy current methods. See TDR-686; NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 41.

There are also phase angle uncertainties. Changes of about 10% throughwall can be caused by a change of only 3 degrees in the phase angle measurement. TDR-652 at 11

Moreover, both requests introduce an entirely new consideration in plugging analysis. Under the current license, all cracks greater than 40% throughwall must be plugged irrespective of circumferential length. Under both proposed revisions, plugging

criteria would define degraded tubes in terms of circumferential length in addition to throughwall penetration. Therefore, there is heavy reliance on Licensee's ability to accurately measure crack length. See NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 40 (Liaw).

Crack length measurements are not precise, but are determined by the number of coils measured. Under TSCR 153, indications revealing more than three coils must be plugged. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 12. However, coil measurements are not always accurate, and can underestimate crack size. According to TDR-686 at 13, in 2 cases of testing coil measurements, defects measuring 1 coil were actually longer than EC indicated. GPU argues that these indications would have been combined with adjacent indications and dispositioned "conservatively." However, there is no assurance that all cracks masked by inaccurate coil measurement would all be dispositioned conservatively. Staff members have expressed concern about eddy current's ability to detect circumferential length to the degree of accuracy required. See e.g. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 47 (Liaw).

The 8x1 probe, which is also relied upon to confirm a cracks's origin as OD or ID, has additional deficiencies. GPU discovered during testing that the coil orientation of the defect may change the number of coils during repeat examinations. GPU concluded, "The evaluations must factor in these limitations on repeatability." TDR-652 at 11.

In addition, evaluation of plugging criteria based on crack length under either criteria revision must resolve the yet unsolved structural problems of OD and ID surface flaws at the same

elevation. See TDR-758 at 9. In TDR-690, Conclusion 5, GPU states that indications of nearby OD and ID flaws will be dispositioned case-by-case in a "conservative manner" in light of nature of degradation. But in TDR 758 at 9, it is acknowledged that the structural problem of OD and ID surface flaws at the same elevation has not been resolved. And in TDR-652 at 71, the company states that a defect's origin as OD or ID can not be confirmed except by an 8x1 absolute probe. Yet the 8x1 probe is not always done.

As the NRC noted, the current Tech Specs., which are common throughout the industry, are based on a relatively well-defined system, based on normal corrosion, pit density, and crack length. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 32. Because of the unusual nature of TMI-1's tube degradation, there is no operating experience with which to compare GPU's predictions regarding the type of ID degradation common to TMI-1's steam generators.

As recognized by GPU contractor Conam, due to the close proximity of EC indications to each other, and the imprecision of location measurement correlations of EC indications, and visual and metallographical results, EC indications can only be considered approximate. TDR-686 at 11.

And as noted by Staff scientist Crutchfield, "When the staff was considering [the plugging change] proposal and considering what [the Staff] should do about throughwall imperfections, one of the considerations that was primary in our mind was to get some confirmation on the eddy current technique versus actual metallurgical examinations." NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 27. See also, id. at 29 (I am not convinced that we

have a correlation for this type of attack).

Therefore, until metallurgical examinations are conducted to confirm EC predictions regarding cracking behavior, particularly regarding new IGA indications, pitting, and crack growth, EC indications can only be considered approximations. As summed up by Staff scientist Liaw, the TMI-1 steam generators are unlike any other, in terms of the appropriateness of relying on EC to tell you what you do know, and not worrying about what you don't know. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 29. Reliance on EC testing to support the proposed license amendment creates a clear safety risk.

C. The Requested Amendment Violates Regulatory Guide 1.121

Reg. Guide 1.121 calls for developing plugging criteria with a margin of safety equal to 3.0 on normal loads and 1.428 on upset loads to prevent ductile failure (circumferential) or burst (axial), and also calls for identification of error associated with ECT, as well as additional thickness degradation allowance. TSCR 148 at 5. The Staff requires an additional allowance in wall thickness to account for possible degradation due to environmental corrosion, even in the absence of active mechanisms. TSCR 148 at 8.

TDR-690 evaluates the criteria proposed by TSCR 148 against Reg. Guide 1.121. TDR-758 evaluates the criteria proposed by TSCR 153 against Reg. Guide 1.121. Both argue that an additional thickness degredation allowance for corrosion and wear is not necessary, claiming "the mechanism for continued chemical attack from the inner surface has been arrested . . and the TMI-1 steam generators do not have a history of either tube failure by wear on

the outer surface . . . TSCR 148 at 5; TSCR 153 at Section II; TDR-758 at 2.

TSCR 153 is based in part on criteria developed in TDR-690, which GPU says meets or exceeds NRC guidelines on structural margin so that an allowance of 10% nominal throughwall is adequate. GPU argues that an additional thickness degradation allowance for corrosion/wear is not necessary because the mechanism for continued chemical attack from the inner surface has been arrested. It also argues that the TMI-1 steam generators do not have a history of either tube failure by wear on the outer surface at the elevations of the lateral support plates or secondary side chemical attack. Therefore, it claims that an additional thickness degradation allowance is not appropriate.

GPU also argues that the proposed circumferential length break point (7/10ths of an inch), is adequate margin within Reg. Guide 1.121, in light of accuracy of testing process. Also, NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 13-14

The inaccuracy of the testing process has already been demonstrated.

In addition, GPU's proposed criteria based on the assumption that the only crack growth mechanism possible is mechanical fatigue growth on a primary side crack in a pure hot water environment, and therefore does not take into account the effects of a possible corrosive environment on either the primary side or secondary side. TSCR 148 at 8

Indeed, TMI-1's operating history since restart indicates that such a corrosive environment has developed. As discussed supra,

the steam generator's OD have experienced operational problems including the buildup of radioactive deposits which GPU has been unable to analyze.

And as noted in TDR-690, Conclusion 4, the last round of extensive tube plugging also may have created new flow patterns within the steam generator which could result in tube wear. In addition, the company acknowledged in an NRC meeting that there would be some regular degradation once plant operates. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 38.

Staff has also noted concern with effectiveness of new criteria in preventing multiple tube failures. TSCR 148 at 11. According to the Staff, Reg. Guide 1.121 criteria has been used in other plants and shown to be successful in stopping them. Ibid.

Failure to pull and examine actual tubes is imprudent, in light of these potential problems raises a clear safety hazard. See discussion of TSCR 153, NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 25 (Cheng says 50% figure based on no allowance for the corrosion, which should be confirmed that by pulling a tube.)

D. The Proposed Criteria Fails To Comply With General Design Criteria (GDC) 31.

Both TSCR 148 and TSCR 153 fail to establish compliance with GDC 31. Specifically, GPU has demonstrated compliance with GDC 31 by using ASME Section XI App. A methodology, which directs that variables affecting the data should be considered, including environmental effects. As demonstrated above, GPU has refused to take environmental effects into account for both license amendment requests.

E. The Proposed Criteria Fails To Comply With General Design Criteria (GDC) 31.

In addition, both TSCR 148 and TSCR 153 fail to demonstrate compliance with GDC 32, which requires that the RC pressure boundary be designed to allow for testing to assess leaktight integrity. The new criteria would allow tubes to remain in service with larger cracks than currently allowed under TMI-1's license. Therefore, it must be demonstrated not only that these cracks are no more likely to propogate throughwall than those currently permitted to remain in service, but that leakage, which could increase from larger cracks, will detect cracks before they rupture.

Without assurance that the form of degradation and the nature of tube defects has been determined, and that EC can adequately detect defects, it is not known whether there is adequate assurance ruptures will be detected by leak rate. See NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 8-9, 39 (Liaw). Therefore, GPU's program for assessing the integrity of steam generator tubes has not been demonstrated to be sufficient under the proposed criteria.

F. The Proposed Amendment Contains None Of The Assurance Required By the Staff.

Staff scientist Crutchfield told GPU that for the Staff to approve the proposed license amendment, it must contain commitments to pull a certain number of tubes in December when GPU develops a method for doing so. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 36. In addition, Crutchfield noted that the Staff wanted "to be sure that when [GPU does its] March inspection that the results are, . . .an undefined acceptable and that there is nothing there that is way beyond or substantially beyond what [GPU] would expect

to see as a result of that inspection." Ibid.

None of these assurances are provided in TSCR 153.

In sum, the questions which must be litigated and answered are fundamental to both TSCR 148 and TSCR 153. They extend far beyond whether Reg. Guide 1.121 is satisfied, which the company admits is so vague as to not set guidelines for throughwall depth or circumferential length, or make a distinction between circumferential and axial defects. TDR-690 at 4 The questions really concern whether any plugging revision which would decrease the safety margin, is appropriate at this time, when the company has the least knowledge about the true condition of the steam generator since the 1981 corrosive attack. Clearly, TSCR 153 raises a significant hazard consideration.

III. LEGAL DISCUSSION

In enacting the Sholly amendment to Section 189 of the Atomic Energy Act, Congress acceded to the Commission's request that it be permitted to make minor license amendments effective prior to any hearing requested. However, Congress was sensitive to the potential for abuse of the "no significant hazard considerations" threshold. Therefore, it required that license amendments involving irreversible consequence, such as those allowing a facility to operate for a period of time without full safety protections, require prior hearings. H.R. Rep. No. 884, 97th Cong., 2d Sess. It also required that borderline cases be resolved in favor of a "no significant hazard consideration" finding. Id. at 37.

In addition, the "Sholly" amendment required the Commission to

determine whether the amendment presents any significant safety question, but that the Commission is not to prejudge the merits of the amendment. Id. at 37-38.

This legislative history represents what Congress understood the agency would consider in judging whether a significant hazard consideration is raised. The Commission's regulations must be read in this context.

Clearly, it has been demonstrated that TSCR 153 raises questions of safety significance.

Even when read in isolation, the issues raised by TSCR 153 satisfy the requirements of 10 CFR 50.92. There is no question that the proposed amendment would reduce the margin of safety. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 43. In light of the number of yet unresolved technical questions, this margin would be significantly reduced, and the risk of a steam generator tube rupture significantly increased. No other plant in the country is licensed with the relaxed plugging criteria proposed by GPU. See e.g. id. at 45.

Moreover, it is clear that the company not only expects that testing will reveal cracked tubes, but these cracks will involve primarily the tubes' ID surfaces, previously subjected to the most severe corossive attack in the history of the U.S. nuclear industry. And because there is no industry-wide operating experience relevant to predicting the behavior of the TMI-1 steam generator tubes, the Commission has no basis to verify GPU's assertions.

In conclusion, the proposed "no significant hazard consideration" finding is inconsistent with Congress's intent and the Commission's regulations.

Respectfully submitted,

THREE MILE ISLAND ALERT

By: Joanne Doroshow

Joanne Doroshow

Dated: March 27, 1986