

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

Before the Atomic Safety and Licensing Board

In the Matter of)
)
METROPOLITAN EDISON COMPANY)
)
(Three Mile Island Nuclear)
Station, Unit 1))

MAR 11 1986
MEETING &
SERVICE BRANCH
REG-NG
Docket No. 50-289-OLA
(Steam Generator
Plugging Criteria)

TMIA'S MOTION TO BROADEN HEARING SCOPE

INTRODUCTION

On February 21, 1986, the NRC Staff notified the Licensing Board of its position regarding whether the hearing scope in this proceeding should be broadened to include litigation of Licensee's Technical Specification Change Request (TSCR) No. 153, which would allow TMI-1's operation with steam generator tube defects up to 50% throughwall with a maximum length of .55 inches. TMIA has requested a hearing on this license amendment request, which it has attached hereto as Exhibit 1.

The Staff and the Licensee argue that TSCR 153 is so different from the subject of this hearing, that it should be considered within the context of an entirely separate proceeding. The Staff bases this conclusion on a determination that TSCR 153 satisfies Reg. Guide 1.121, whereas TSCR 148 does not.

However, 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 have little to do with the vague provisions of Reg. Guide 1.121.

Rather, these questions concern the nature of new indications discovered in a 1984 steam generator inspection, and the capability of eddy current testing to accurately assess the size and configuration, indeed the very existence, of tube defects, whether 50% or up to 70% throughwall.

Because the unresolved issues surrounding both requests are virtually identical, TMIA hereby moves to broaden the scope to this proceeding to include TSCR 153. Requiring two separate hearings in this case would be an extraordinary waste of agency resources. In addition, it would place an unreasonable and completely unjustified financial burden on the sole intervenor, TMIA.

DISCUSSION

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 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^{2/}, and Reg. Guide 1.121, and generally would not endanger the public. The company's

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.

2. TMIA's proposed Contention 4 addresses deficiencies in the
(Footnote continued on next page)

safety evaluations for both TSCR 148 and TSCR 153 are based on 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-686, and TDR-642.

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 degradation 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

(Footnote continued from previous page)
Licensee's demonstration of GDC 31 compliance, applicable to both TSCR 148 and TSCR 153. 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. GPU has refused to take environmental effects into account for both license amendment requests.

In addition, TMIA's proposed Contention 3 addresses the failure to demonstrate compliance with GDC 32 and true for both requests. This issue concerns the form of degradation and the nature of tube defects. See NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 8-9, 39 (Liaw).

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.

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.^{3/}

Indeed, the key questions raised by the Staff in 1985 concerning TSCR 148, and in 1986 concerning TSCR 153, such as whether the new 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.

3. 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. See TDR-690.

The Staff is requiring destructive testing on actual steam generator tubes before evaluating TSCR 148. There are two purposes for this. One is "to get some 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). Until such actual testing is done, the Staff considers the license amendment 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).

NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 14.

Both criteria revisions rely on unique eddy current testing methods for which there is little or no industry experience to verify their accuracy. 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." TDR-642.

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.

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. For purposes of 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. See TDR-686 at 13; TDR-652 at 11. 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).

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.

IGA is particularly difficult to detect using eddy current methods. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 41. According to TDR-690, the inability to call IGA defects impacts the statistics associated with eddy current accuracy. TDR-690 at 9. Unless there is grain drop out, IGA is not be detectable.

Grain drop out, however, 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 propagating further through the tube thickness than through the

IGA, masking the crack. TSCR 148 at 11-12.

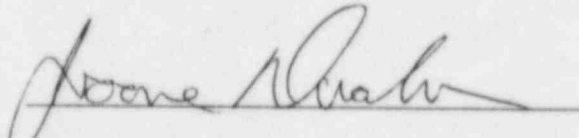
Currently, there is no way to tell without metallurgical examination, whether grain drop out will continue. NRC Staff/GPU Meeting (Jan. 29, 1986), Tr. at 21 (Crutchfield). Nor is there any way to determine pit density, whether pits can be expected to stay separate, and whether load-carrying capability could be affected. NRC Staff/GPU Meeting (Feb. 19, 1985), Tr. at 31 (Johnston). These issues pertain to both proposals, and must be resolved before there can be assurance that either proposal can be implemented safely.

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. 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, these amendments should be considered together.

Respectfully submitted,

THREE MILE ISLAND ALERT

By:



Joanne Doroshow

Dated: March 10, 1986

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

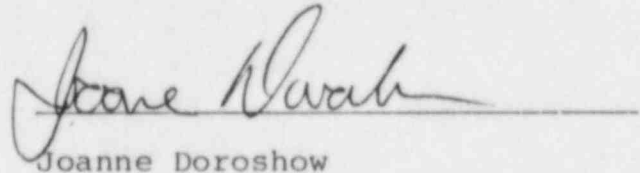


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CERTIFICATE OF SERVICE

I hereby certify that one copy of TMIA'S SUPPLEMENT TO PETITION FOR LEAVE TO INTERVENE, THREE MILE ISLAND ALERT'S FORMAL DEMAND FOR ADJUDICATORY HEARING ON AMENDMENT TO TMI-1 OPERATING LICENSE TO CHANGE TUBE PLUGGING CRITERIA, AND TMIA'S MOTION TO BROADEN HEARING SCOPE, was served this 10th day of March, 1986, by hand-delivery to all parties on the service list below.


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