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Gentlemen:

We were astonished to hear Mr. Clark of GPU Nuclear assert this morning, not once but repeatedly, that the changes to the TMI-1 steam generator tube rupture procedures and safety limits discussed today were not driven by the degraded condition of the tubes.

We are enclosing for your attention the cover sheet sheet and two pages of the GPU Technical Data Report prepared to support the new procedures. Please note that the section entitled "Introduction and Background" states as follows:

> Since extensive circumferential cracking was discovered in approximately 1200 of the 31,000 tubes, it became clear that a revised set of procedures for dealing with both single and multiple SGTRs [steam generator tube ruptures] should be developed.
>
> TDR 406, Rev. 3, p. 14

The following page lists among the activities involved:

> Define allowable steam generator stresses during cooldown (either as cooldown rate or as tube/shell delta T).
>
> Revise minimum allowable subcooling margin.
>
> Waive fuel in compression limits
>
> Develop emergency RCP NPSH [net positive suction head] limits.
>
> Id., p. 15

Please also note that Mr. Clark and Mr. Wilson are on the distribution list for this document, which goes on to discuss the need for revising the safety limits in greater detail.

Thank you again for the opportunity to address you today.

Very truly yours,

Ellyn R. Weiss
General Counsel

Enclosure: As stated.

cc: TMI-1 Service List

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GPU Nuclear
TECHNICAL DATA REPORT

TDR NO. 406	REVISION NO. 3
BUDGET ACTIVITY NO. 128006	PAGE 1 OF 81
PROJECT: TMI-1	DEPARTMENT/SECTION Safety Anal/Plant Cont
	RELEASE DATE 3/20/84 REVISION DATE 12.2.83

DOCUMENT TITLE:
SG Tube Rupture Procedure Guidelines

ORIGINATOR SIGNATURE	DATE	APPROVAL(S) SIGNATURE	DATE
T. Lewis	12.2.83	[signature]	12/2/83
L C Pino	12.2.83		
		APPROVAL FOR EXTERNAL DISTRIBUTION	DATE
		T. Broughton	12-2-83

Does this TDR include recommendation(s)? ■ Yes ☐ No If yes, TFWR/TR # _____

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ABSTRACT:

This document provides technical guidelines for dealing with single and multiple tube ruptures. A significant improvement in procedures will result from reduction of the minimum subcooling margin and RC pump trip on loss of subcooling margin, waiver of fuel-in-compression limits, and revised RCP NPSH limits. Other benefits can be derived from revision of the RC pump restart criteria and from additional guidance regarding OTSG steaming and isolation. Finally, revised guidance is provided for preventing tube leak propagation. It is recommended * that the tube-to-shell delta T be limited to 70F° * during tube rupture events. *

Revision 2 to this TDR included the following * recommendations for procedural revisions, some * of which have already been incorporated in * EP 1202-5. *

* 1. Isolate the OTSG's on a measured or projected dose rate of 50 mRem/hr whole body or 250 mRem/hr thyroid dose.

* 2. Stop the non-ES HPI pump if the RCS is cooling more than 100F/hr.

* 3. Priorities should be spelled out in EP-1202-5:
   a. Minimizing SCM has a priority over minimizing cooldown time.
   b. Keeping OTSG level below 95% is less important than control of the RCS cooldown rate.

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*COVER PAGE ONLY

1.0 INTRODUCTION AND BACKGROUND

In November 1981, primary to secondary side leaks were discovered in the tubes of both of the TMI-1 Once Through Steam Generators (OTSG). There are 15,531 tubes in each OTSG. The plant design basis for a steam generator tube rupture (SGTR) accident is the double ended offset severence of a single tube. Since extensive circumferential cracking was discovered in approximately 1200 of the 31,000 tubes, it became clear that a revised set of procedures for dealing with both single and multiple SGTRs should be developed.

This report describes a program which has been formulated to improve existing procedures and operator training by providing improved operator guidelines for dealing with tube leakage and tube rupture events. The guidelines development program will be described in detail, and the major revisions to the existing procedures which have been identified as part of the program will be discussed. The proposed guidelines will then be presented in terms of their overall scope, with a step by step discussion of required operator actions. The analytical evaluations which are the basis for the recommendations, consist of a series of simulations which are ongoing and will be documented in detail in a subsequent report. The guidelines in this TDR were tested at the B&W simulator training cycle beginning in January, 1983. The results of this training experience are discussed. Finally, the overall conclusions and major recommendations of the guidelines development program are documented.

2.0 TECH FUNCTIONS SGTR GUIDELINES DEVELOPMENT PROGRAM

Figure 1 shows the execution of the steam generator tube rupture guideline development program. The plan has three main paths: Path 1 is the development of design basis tube rupture guidelines. Path 2 is the development of multiple tube rupture guidelines; and, Path 3, is a benchmark effort to compare the RETRAN and RELAP 5 computer codes. This last effort also includes an evaluation of the B&W ATOG analysis of a single tube rupture using MINITRAP. The purpose of this TDR is to explain paths 1 & 2. The benchmarking and comparison efforts are discussed in a separate TDR describing all of the tube rupture analysis work. None of the computer analysis of Path 3 has been used to justify the recommendations of this report. The analyses were an aid in conceptualizing the physical processes during a tube rupture.

2.1 Development of Design Basis Guidelines (Path 1)

The major activities involved in developing this part of the guideline were to:

1. Search existing industry events and procedures for lessons to be learned about handling tube ruptures.
2. Define allowable steam generator stresses during cooldown (either as cooldown rate or as tube/shell delta T).
3. Determine when OTSG's should be isolated and when they should be steamed.
4. Revise the minimum allowable subcooling margin.
5. Waive fuel in compression limits.
6. Develop emergency RCP NPSH limits.
7. Redefine entry point conditions.
8. Factor in experience from use of the guidelines on the B&W simulator.

Each of these items are discussed in detail in the following sections.

2.1.1 Literature Search

Several tube rupture leaks have occurred at various operating reactors within the last four years. The experience gained from these events has offered us an opportunity to improve tube rupture guidelines. The major lessons learned from these events have been

+ Rev. 1
* Rev. 2
é Rev. 3