TVA 10697 (DNE-6-86) **QA Record**

ATTACHMENT 3

DNE CALCULATIONS

TITLE	PLANT/UNIT
System Isolation for MELB Flooding	Watts Bar 1 & 2
PREPARING ORGANIZATION: Sargent & Lundy	KEY NOUNS (Consult RIMS DESCRIPTORS LIST): Pipe Rupture, Flooding, SHUTDOWN, NUC SAFETY SYSTEMS
BRANCH/PROJECT IDENTIFIERS: WBN-OSG4-100	Each time these calculations are issued, preparers must ensure that the original (RO) RIMS accession number is filled in.

Rev	(for RIMS' use)	RIMS accession number
R0	880513B0010 (147)	B26 '88 0504 020
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APPLICABLE DESIGN DOCUMENT(S)	SAR SECTION(S)	UNID SYSTEM(S)
WB-DC-40-31.51	N/A	N/A

Revision 0	R1	R2	R3
ECN No. (or indicate Not Applicable) N/A			
Prepared			
Checked Thomas J. Kane			
Reviewed Kevin W. Ingram			
Approved Peter D. Mulcahy			
Date 5/2/88			
List all pages added by this revision.			
List all pages deleted by this revision.			
List all pages changed by this revision.			

Use form TVA 10534 if more space required.

Safety-related? Yes [X] No [ ]

Statement of Problem

The purpose of this analysis is to document the actions and time required to isolate MELB Flooding sources including the actions required to establish required alternate trains.

Abstract

These calculations contain an unverified assumption(s) that must be verified later. Yes [X] No [ ]

Analysis and review performed for this report has determined isolation methods for various systems at the Watts Bar Plant. This information is intended for use in evaluation of the effects of flooding on safe shutdown capability following postulated moderate energy line breaks (MELB) in fluid systems inside and outside containment (i.e. Auxiliary Building, Reactor Building, Control Building, Diesel-Generator Building, and ERCW Pumping Station).

The isolation times assumed for various systems and supported by telephone conversation memoranda which constitute the unverified assumptions listed on page 7 of the text.

Note: The attached calculation is Sargent & Lundy Calculation 3C38-0387-001, Revision 2, entitled "System Isolation for MELB Flooding".

[ ] Microfilm and store calculations in RIMS Service Center. Microfilm and destroy. [ ]

[X] Microfilm and return calculations to: LINDA PATTON Address: C197 IOB WBNP

cc: RIMS, SL 26 C-K

2.0 Summary

This analysis postulates a number of moderate energy break locations in various safety-related systems. It then defines an isolation activity which can generally be accomplished in 5 to 10 minutes assuming no active failure. Where possible, a second isolation activity is presented which provides alternative components which can accomplish the same isolation. The second isolation activity is provided as an alternative to listing many cases each with a single active failure.

Some postulated breaks are non-isolatable. Where possible, actions were determined which would minimize the consequences of these non-isolatable breaks. As a result, all non-isolatable moderate energy line breaks can be reduced to an elevation drive run out flow from: (1) a mechanical tank (2) the spent fuel pool, refueling cavity, fuel transfer tube and fuel transfer channel, or (3) a mechanical large reservoir.

The "results and conclusions" section of this analysis summarizes the non-isolatable moderate energy line breaks on a system by system basis.

3.0 Introduction

Analysis and review performed for this report has determined isolation methods for various systems at the Watts Bar Plant. This information is intended for use in evaluation of the effects of flooding on safe shutdown capability following postulated moderate energy line breaks (MELB) in fluid systems inside and outside containment, (i.e. Auxiliary Building, Reactor Building, Diesel Generator and Additional Diesel Generator Buildings, and ERCW pumphouse.)

The purpose of this calculation is to provide a supporting basis for the one hour detection and isolation time assumed in the flooding calculation (Reference 10). Certain lines found to be non-isolatable are discussed in Section 6.0. The effect of breaks in these lines is evaluated in Appendix I of Reference 10. Some zones evaluated in Reference 10 require detection and isolation in less than one hour, these are justified on a case by case basis in Reference 10. The isolation methods evaluated utilize a minimum number of valves to isolate various system MELB's and provide a reasonable time estimate for accomplishing the isolation.

Valves capable of being actuated from the control room are used whenever possible. The isolation methods examined herein are not the only method of isolating many of the breaks nor have they been evaluated from an operations point of view. Therefore, the methods examined should not be implemented as operating procedures without a thorough operation review of the actions prescribed.

The majority of the methods evaluated show isolation times of ten minutes or less. This is consistent with the assumption of a one hour detection and isolation time.

Breaks in the Auxiliary Building in either Essential Raw Cooling Water Discharge Header could require 30-45 minutes to isolate. The abnormally long isolation time is necessary to account for the potential cross tieing of different cooling trains downstream of the

Component Cooling System Heat Exchangers. A break in either ERCW Discharge Header would occur in a heavily traveled area of the Auxiliary Building where one would expect a break of this possible magnitude to be detected in a very short period of time. Subsequent to the break, flood levels will rise to steady state levels as the water flows to emergency sump. These levels are expected to be established in five to ten minutes and persist at these steady state levels until the break is isolated. Filling the emergency sump requires several hours, therefore, if the one hour assumption for detection and isolation is valid, filling the sump is not a concern. For this case, 15-30 minutes for detection is believed more than adequate time so that detection and isolation can be realistically accomplished within 1 hour after the break.

The cases where isolation is not achievable have been identified to TVA and either break exclusion will be documented for these systems or the safe shutdown evaluation will demonstrate that safe shutdown can be achieved without isolation of these systems.