ATTACHMENT (3)

Non-Proprietary -- Calculation No. CA04895, Revision No. 0,

"Analysis of Hot Leg and Pressurizer MNSA Seismic Acceleration"

Calvert Cliffs Nuclear Power Plant, Inc.
March 14, 2001

Design Analysis Title Page

WESTINGHOUSE NON-PROPRIETARY CLASS 3

Title: **Analysis of BG&E Hot Leg and Pressurizer MNSAs Seismic Acceleration**

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This Design Analysis is complete and verified. Management authorizes the use of its results and attests to the qualification of the Cognizant Engineer(s), Mentor and Independent Reviewer(s).

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Independent Reviewer(s)	C. R. Schmidt	CR Schmidt	11/4/99
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1 INTRODUCTION

1.1 Objective

The objective of this calculation is to determine applicable Maximum Acceleration values for use in the analyses of Mechanical Nozzle Seal Assemblies (MNSA) to be installed on the Hot Leg RTD and PDT/Sampling nozzles, as well as on the Pressurizer Side nozzle, Upper nozzle, Bottom nozzle and Heater Sleeve nozzle at the Baltimore Gas and Electric Calvert Cliffs Station Units I and II.

The MNSA is a mechanical device that acts as a complete replacement of the "J" weld between an Inconel 600 instrument nozzle and the Hot Leg pipe or Pressurizer. Its function is to prevent leakage and to restrain the nozzle from ejecting in the event of a through-wall crack or weld failure of a nozzle. The potential for these events exists due to Primary Water Stress Corrosion Cracking.

1.2 Assessment of Impact of Plant Design Changes

This report is based on the seismic data from the Mechanical Nozzle Repair Device Design Specification (Reference 5.1) and on the actual design data of the MNSA clamps (Reference 5.4)

This calculation is in support of analytical work for the two BG&E Hot Leg and the four Pressurizer MNSA designs and is performed in accordance with the requirements of the ABB CENP Quality Procedures Manual QPM-101 (Reference 5.2).

2 METHODOLOGY

The objective of this calculation is to document applicable acceleration levels for the locations of the MNSAs to be installed on two types of BG&E Units I and II Hot Leg nozzles, as well as on four types of Pressurizer nozzles. For this purpose the OBE and SSE response spectra for the Piping and Pressurizer were retrieved from Reference 5.1.

3 ANALYSIS

3.1 Applicable Response Spectra for BG&E Units I and II Hot Leg and Pressurizer

3.3 BG&E Plant Specific Accelerations for Hot Leg and Pressurizer MNSAs

Considering the natural MNSA frequencies calculated above, in combination with the response spectra of Appendix A, the applicable maximum acceleration levels for horizontal and vertical axes are determined. The resultant horizontal acceleration is calculated by combining the two horizontal axis accelerations using the RSS method. The maximum acceleration is also calculated using the RSS method by combining the resultant horizontal and vertical axes accelerations.

3.4 Selection of Local Horizontal and Vertical Accelerations for Hot Leg Pipe MNSAs

[ ]

4 RESULTS

Based on the tabulated accelerations, the subject evaluation provides the following recommended OBE and SSE event accelerations:

5 REFERENCES

5.1. BGE Design Specification No. SP-0846, Rev. 00, "Mechanical Nozzle Repair Device".

5.2. ABB Combustion Engineering Nuclear Operations Quality Procedures Manual QPM-101, Revision 03.

5.3. Drawings

5.3.1 CE Drawing E-232-630, Revision 3, "Pressurizer Outline"
5.3.2 Bechtel Drawing FSK-MP-3195, Rev. 6, "Instrument Conn. Trim on Pressurizer No. 21"

5.4. MNSA Drawings

5.4.1 E-MNSABGE-228-001, Revision 01, "Hot Leg RTD Mechanical Nozzle Seal Assembly"
5.4.2 E-MNSABGE-228-002, Revision 01, "Hot Leg PDT/Sampling MNSA"
5.4.3 E-MNSABGE-228-006, Revision 01, "Side Pressurizer RTD Mechanical Nozzle Seal Assembly"
5.4.4 E-MNSABGE-228-005, Revision 01, "Upper Pressurizer Mechanical Nozzle Seal Assembly"
5.4.5 E-MNSABGE-228-007, Revision 01, "Bottom Pressurizer Mechanical Nozzle Seal Assembly"
5.4.6 E-MNSA-228-004, Revision 05, "Mechanical Nozzle Seal Assembly Details"
5.4.7 E-MNSA-228-013, Revision 08, "Mechanical Nozzle Seal Assembly Details"
5.4.8 E-MNSA-228-020, Revision 01, "Mechanical Nozzle Seal Assembly Details"

5.5 "Seismic Qualification of the San Onofre Units 2 & 3 MNSA Clamps for Pressurizer Instrument Nozzles and RTD Hot Leg Nozzles" Test Report No. TR-PENG-043, Rev. 00, July 3, 1997 (originally was issued as TR-PENG-033, Rev. 00).

5.6. American Society of Mechanical Engineers Boiler and Pressure Vessel Code, Section III, 1989 Edition (No Addenda).

5.7. "Formulas for Natural Frequency and Mode Shape," R. D. Blevins, Krieger, 1984.

5.8. Not Used

5.9. "Nozzle Loads for which SONGS Bottom Mounted PZR MNSA was Qualified." Calculation Number S-PENG-CALC-008, Revision 00.

APPENDIX A

RESPONSE SPECTRA
FOR APPLICABLE AREAS IN CONTAINMENT
FOR BG&E CALVERT CLIFFS STATION
UNITS I AND II

(REFERENCE 5.1)

APPENDIX B

QUALITY ASSURANCE FORMS