

## FOIA Resource

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**From:** TSAI Jenny (AREVA) [Jenny.Tsai@areva.com]  
**Sent:** Wednesday, October 17, 2012 3:11 PM  
**To:** FOIA Resource  
**Subject:** FOIA request  
**Attachments:** 2012092609134745.pdf

**FOI/PA REQUEST**  
**Case No.:** 2013-0019  
**Date Rec'd:** 10/18/12  
**Specialist:** Blaney  
**Related Case:** \_\_\_\_\_

Dear Sir/Madam

Under the FOIA, I would like to request a letter that was a communication from Bechtel Corp to NRC on October 1, 1973. The letter is titled "Additional Information Requested by the Atomic Energy Commission on BC-TOP-1, Revision 1, Containment Building Liner Plate Design Report".

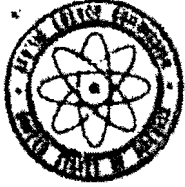
This letter is an supplement information on Bechtel Corp's Topical Report, BC-TOP-1 (Revision 1) as explained in the attached document.

Thank you very much.

*Kind regards / Mit freundlichen Grüßen / Meilleures salutations*

Jenny Tsai  
Civil/Structural Engineer  
Civil & Layout Department (PECY6-A)  
Engineering & Projects Organization  
**AREVA NP Inc.**  
Building 204 - Mail Code 2D  
7207 IBM Drive, Charlotte, NC 28262  
Phone: 704-805-2481  
Fax: 434-382-6719  
E-Mail: [jenny.tsai@areva.com](mailto:jenny.tsai@areva.com)

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UNITED STATES  
ATOMIC ENERGY COMMISSION  
WASHINGTON, D.C. 20545

FEB 7 1974

Mr. R. M. Collins  
Vice President - Engineering  
Bechtel Corporation  
Fifty Beale Street  
San Francisco, California 94119

Dear Mr. Collins:

The Regulatory staff has completed its review of Bechtel Corporation's Topical Report, BC-TOP-1, Revision 1, December 1972 entitled "Containment Building Liner Plate Design Report" and the supplemental information regarding this report which you provided with your letter of October 1, 1973 and which was entitled "Additional Information Requested by the Atomic Energy Commission on BC-TOP-1, Revision 1, Containment Building Liner Plate Design Report".

We conclude that the additional information provided with your October 1, 1973 letter is a necessary supplement to BC-TOP-1, Revision 1 and together they are acceptable by reference in applications for construction permits and operating licenses. A summary of our review is enclosed for your information.

In order to facilitate future referencing and use of BC-TOP-1 and the supplementary information, we recommend that the information provided with your October, 1973 letter be appended to the present BC-TOP-1, Rev. 1, and both reissued as a single document designated BC-TOP-1, Revision 2. If this procedure is acceptable to you, please provide us with 125 copies of Revision 2 and include in your transmittal letter, a statement to the effect that you have combined these documents and that there are no substantive changes in the material which we have reviewed.

Sincerely,

R. W. Klecker, Technical Coordinator  
for Light Water Reactors Group 1  
Directorate of Licensing

Enclosure:  
Summary of Review

## TOPICAL REPORT EVALUATION

REPORT NO: BC-TOP-1

REPORT TITLE: Containment Building Liner Plate Design Report

REPORT DATE: December, 1972 with additional information dated September, 1973

ORIGINATING ORGANIZATION: Bechtel Corporation

REVIEWED BY: Structural Engineering Branch, Directorate of Licensing, January, 1974

### SUMMARY OF REPORT

Part I of the report presents a description of the liner plate utilized by Bechtel in reinforced and prestressed concrete containments for pressurized water reactors. Design and analysis procedures are discussed including the effect on the behavior of the liner plate and its anchorage system of possible variation in the following parameters:

- Anchor spacing,
- Liner plate curvature and thickness,
- Liner plate yield strength, modulus of elasticity and poisson's ratio,
- concrete modulus of elasticity, and
- anchor stiffness.

Furthermore, other factors influencing the behavior of the liner plate and its anchorage system were investigated including any cracking or crushing of the concrete in the anchor zone and the effects of erection tolerances.

The individual loads considered in the analysis and design and that were discussed in the report include creep and shrinkage, prestressing forces, dead loads, seismic loads, wind and tornado loads, hydrostatic loads, external (vacuum) pressure loads, and internal accident pressure and temperature loads.

The various load combinations that were utilized in the design and presented in the report are in accordance with criteria specified in the ACI/ASME- ACI 359 proposed "Code for Concrete Reactor Vessels and Containments." This Code was reviewed by the Structural Engineering Branch and the design criteria specified for the liner plate were found adequate and acceptable.

The analysis performed on the liner plate and its anchorage system essentially checks their capability to absorb all the strains imposed by the various loads and combinations thereof. The analysis adequately demonstrates the conservatism of the design and the ability of the liner plate to maintain its leaktight integrity at all credible loading conditions. The analysis partly relies on tests performed on samples of the liner plate and its anchorage system.

Part II of the report deals with the design and analysis performed for a typical main steam line penetration assembly. Essentially the penetration assembly is designed to withstand the various loads transmitted to the penetration through the steam pipe. This is accomplished by designing the penetration to withstand all possible loads, moments and shears as limited by the structural capacity of the pipe.

In Part III of the report, the design of the structural steel brackets that are utilized to support the polar crane on the containment shell is discussed, and various analytical techniques, load combinations, allowable stresses --- etc., are presented. The information presented demonstrates the capability of these brackets to perform their intended function of supporting the polar crane under all credible loading combinations.

#### SUMMARY OF REGULATORY EVALUATION

We have reviewed the subject report, including the mathematical models, analytical procedures and methods, allowable stress and strain criteria and load resistance capability of the liner plate and its anchors, as demonstrated by actual sample testing, and of the main steam penetration and crane brackets. The report has adequately demonstrated that the liner plate and its anchorage system, the main steam line penetration assembly and the polar crane brackets may be expected to withstand all credible loading conditions and remain within design limits established by various applicable codes. These design limits provide reasonable assurance that the structural and leaktight integrity of these elements will be maintained under such conditions.

However, the analytical approaches described in the report can only be considered generally acceptable when considered in conjunction with specific design requirements of individual applications. Specific areas which will require evaluation on an individual case basis since they are not covered by the report although they are related to the liner plate design, include:

- a. Equipment Hatches,
- b. Personnel Locks,
- c. Electrical Penetrations, and
- d. Miscellaneous pipe penetrations.

REGULATORY POSITION

The subject report provides an acceptable analytical basis for demonstrating the structural and leaktight capability of the containment liner plate and its anchorage system, of the main steam line penetration assembly and of the polar crane brackets. This report is therefore acceptable and may be referenced in future case applications provided the various conditions and parameters affecting the design are similar and equivalent to those delineated in the report.

The overall leak-tightness specification limits of the containment structure should, however, be demonstrated in accordance with Appendix J of 10 CFR Part 50.