Response to

Request for Additional Information No. 396 (4679), Revision 1,
Question 19-337 - DRAFT

4/29/2010

U. S. EPR Standard Design Certification
Alternate Energy Holdings
Docket No. 52-020
SRP Section: 19 - Probabilistic Risk Assessment and Severe Accident Evaluation
Application Section: FSAR Ch 19

QUESTIONS for Structural Engineering Branch 2 (ESBWR/ABWR Projects) (SEB2)

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Question 19-337:

PHASE 4 RAI

Follow-up to Open Item RAI 234, Question 19-306

During the April 26-30, 2010, Chapter 3 audit, AREVA informed the NRC staff that Figures 19-306-1 thru 19-306-4 submitted in RAI 234, Supplement 1 response have been revised. The staff requests that these revised figures be submitted in order to complete the review of the response to the open item.

Response to Question 19-337:

Figure 19-337-1 shows the revised temperature curves cited by this question. The temperature effects considered in the Response to RAI 234, Supplement 1, Question 19-306 are conservatively based on the maximum input temperature for each controlling accident scenario. The loss of balance of plant (LBOP) analysis is based on a temperature of 331°F, while the loss of offsite power with a high pressure end state (LOOP TR) analysis is based on a peak temperature of 434°F. The new temperature inputs do not exceed 331°F. Because temperature effects are only considered in terms of the peak temperature, analyses described in the Response to RAI 234, Supplement 1, Question 19-306 are conservative with respect to temperature effects when compared with the revised inputs.

Figure 19-337-2 shows the revised pressure curves. The LBOP accident scenario (shown in blue) is has the largest peak pressure and will control. Figure 19-337-3 compares the revised and original LBOP input pressure time histories. The two time histories have the same qualitative shape, but the original time history has a higher peak pressure and is time shifted. Because temperature effects are held constant throughout the analysis and creep effects are neglected, time shifting will affect the results.

Figure 19-337-4 shows a time shifted comparison of the two input histories. The two time histories are similar, with the original input being generally conservative. In particular, the original pressure is higher at the two largest peaks. The original pressure becomes significantly less than the revised pressure only after the peak pressure. During this time frame, the pressure is significantly lower than the peak pressure, will not cause additional cracking, and will not have an adverse effect on the ultimate demand nor capacity of the structure. This is a pre-stressed concrete structure and so some of the internal pressure will relieve stress in the concrete. Because maximum and minimum pressures in the original curve envelope those in the revised curve, results using the original curve will envelope results based on the new curve.

Original input time histories are conservative when compared to the revised input time histories. Original analyses are therefore conservative and there is no need for re-analysis.

FSAR Impact:

The U.S. EPR FSAR will not be changed as a result of this question.

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Figure19-337-1—Revised Temperature Inputs

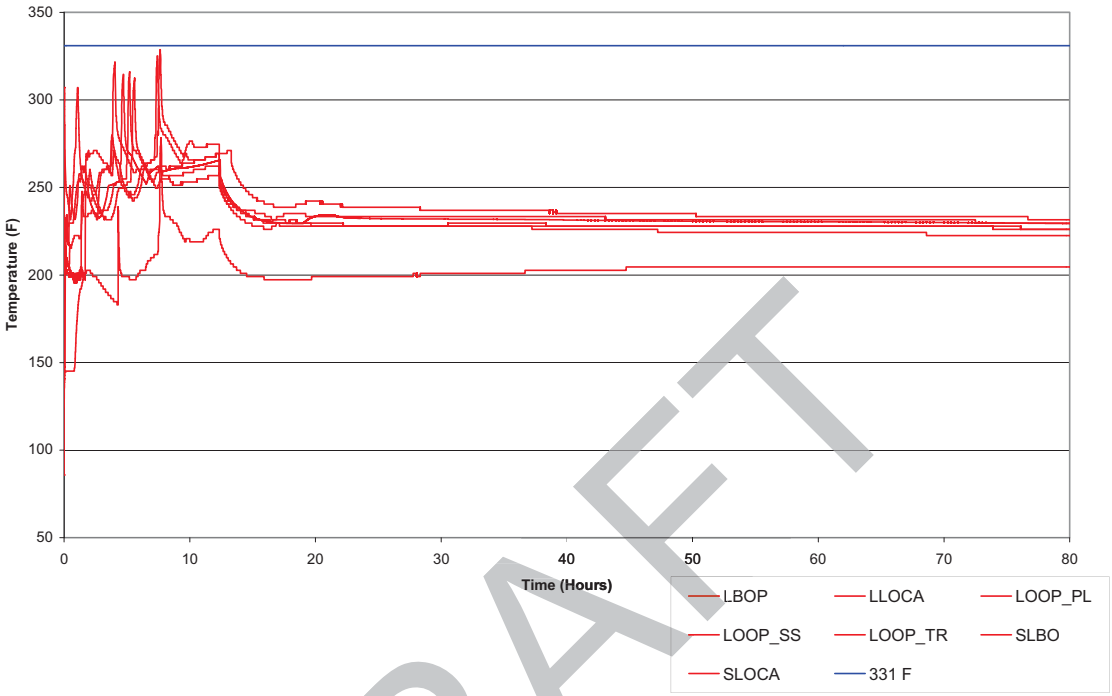

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Figure 19-337-2—Revised Pressure Inputs

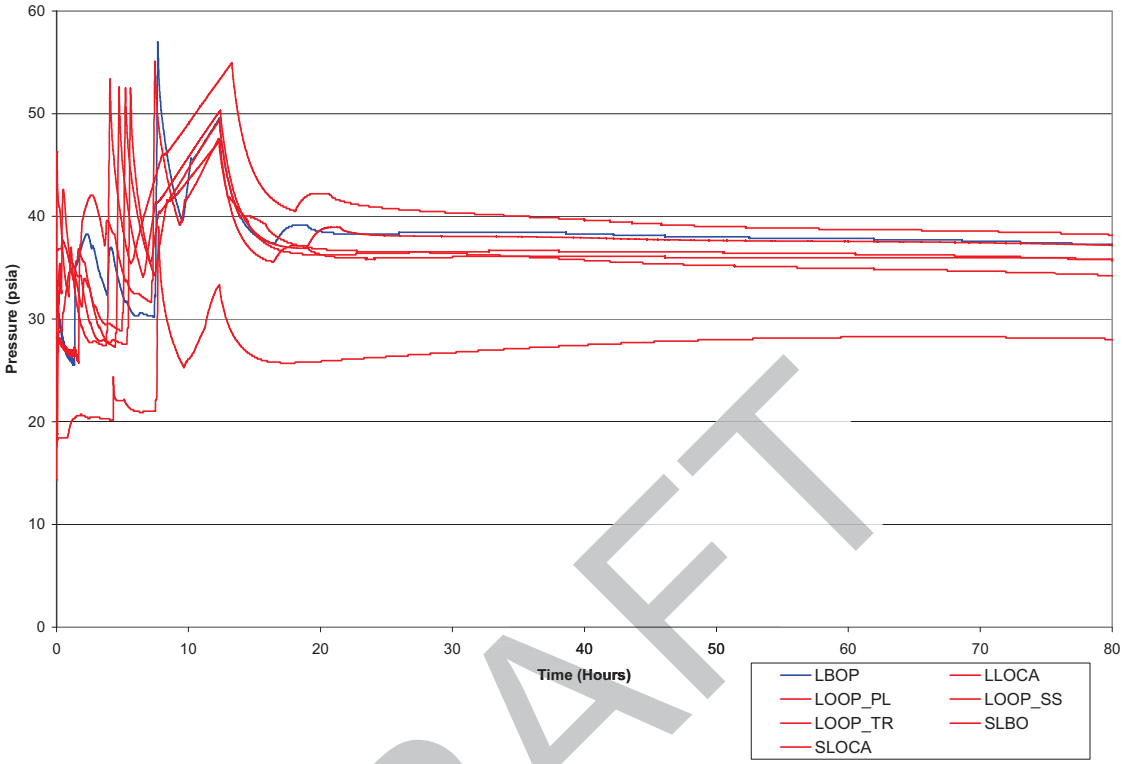

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Figure 19-337-3—Comparison of LBOP Input Pressure Time Histories

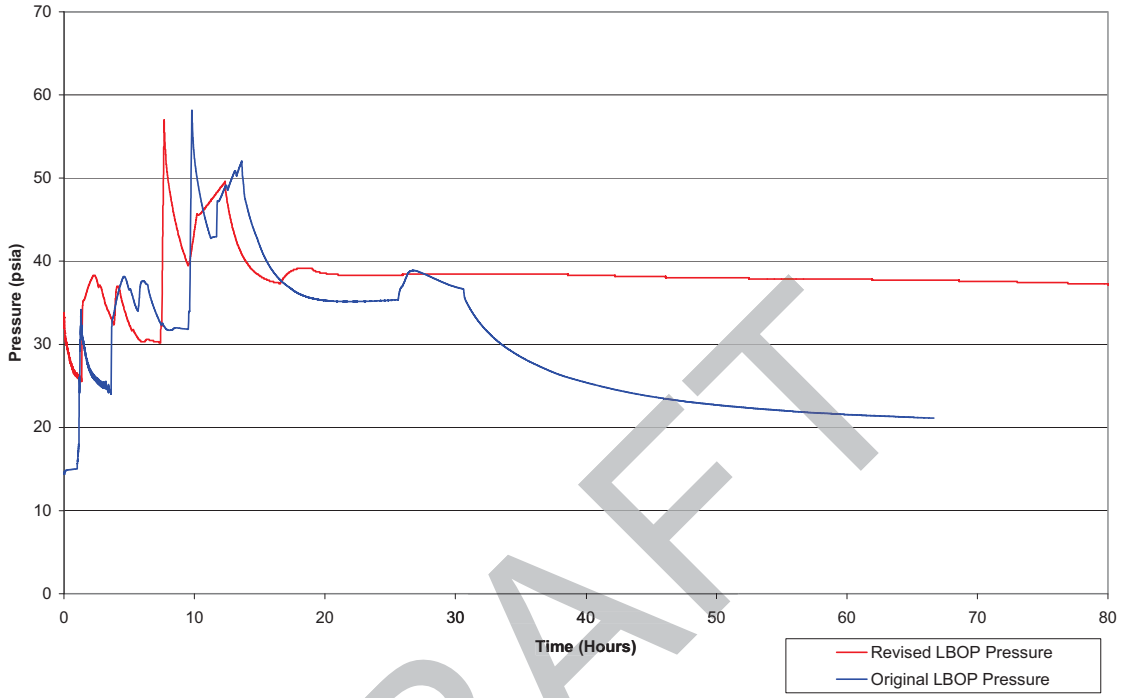

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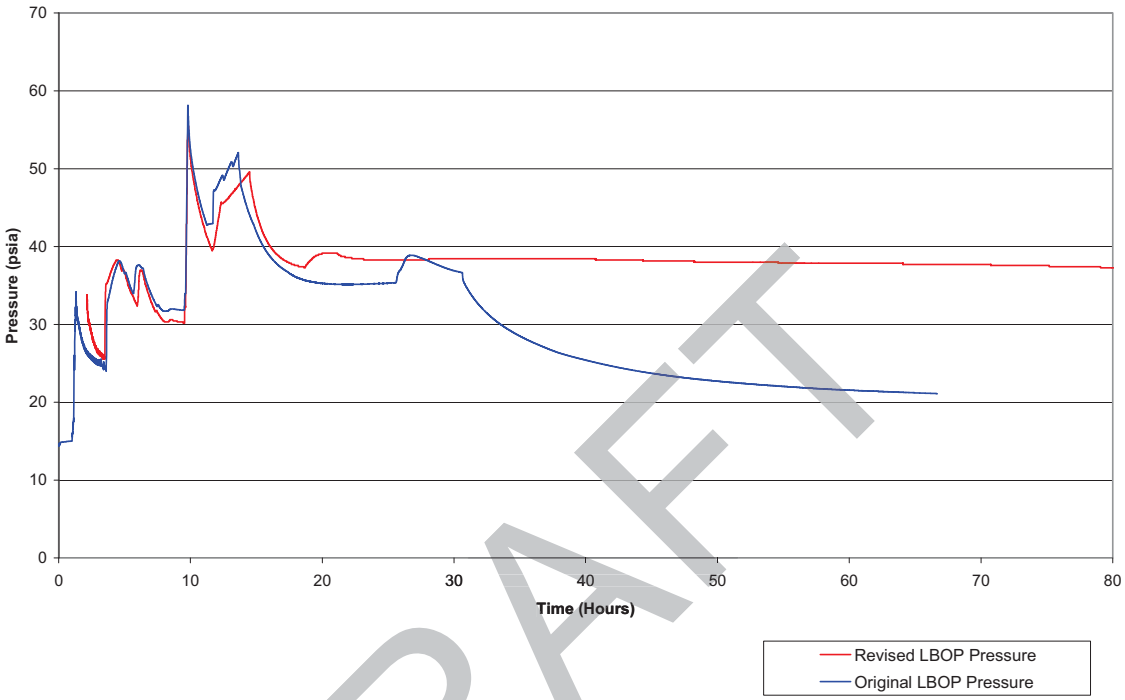
Figure 19-337-4—Time Shifted Comparison of LBOP Input Pressure Time Histories



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