


NRC FORM 699 (9-2003)		U.S. NUCLEAR REGULATORY COMMISSION		DATE 07/31/2007
CONVERSATION RECORD				TIME 4:15pm
NAME OF PERSON(S) CONTACTED OR IN CONTACT WITH YOU Alan Soler, Kris Singh, Evan Rosenbaum, Lius Hinojosa		TELEPHONE NO. 856-797-0900	TYPE OF CONVERSATION <input type="checkbox"/> VISIT <input type="checkbox"/> CONFERENCE <input checked="" type="checkbox"/> TELEPHONE <input type="checkbox"/> INCOMING <input checked="" type="checkbox"/> OUTGOING	
ORGANIZATION Holtec International				
SUBJECT HI-STORM 100 Emergent Structural Fuel Buckling Analysis Issue				
SUMMARY (Continue on Page 2)				
NRC Attendees: Christopher Regan, William Brach, Ed Hackett, Robert Nelson, Gordon Bjorkman				
NRC called Holtec International to inform them of an emergent issues the staff had identified associated with the fuel rod buckling analysis described in the Holtec HI-STORM 100 FSAR.				
<p>During review of crane handling operations in the fuel building and what might happen to fuel in the event of a drop incident the staff had looked at the HI-STORM 100 FSAR for the Indian Point, Unit 1, (IP1) Certificate of Compliance amendment request submitted to the NRC by Holtec. The staff reviewed section 3.5 of the FSAR and noted that the IP1 had SS clad fuel and the analysis in section 3.5 indicated zircaloy clad fuel. The staff observed the material properties of SS are quite different than those of zircaloy. The staff considered Holtec's analysis a two step approach. In the first step Holtec performed an Euler buckling analysis following a methodology documented in a LLNL report. The buckling analysis was performed for all fuel assemblies noted in the tables in Chapter 3 of the FSAR. The staff noted that the tables did include some SS fuel clad assemblies. The objective of the analysis was to determine the worst case for buckling load. Holtec's analysis indicated this would be for a zircaloy clad fuel rod. The staff, following Holtec analysis, noted that the zircaloy clad fuel rod is then used in the second step of the analysis (an imposed displacement problem). The displacement gap distance was observed to be roughly 2". Once the fuel is displaced the full 2 inches additional load is then imposed (causing the rod to flatten against the basket wall) until the yield stress of the (zircaloy) material is reached and failure occurs. This yield stress is then related to a vertical load which can consequently be related to an imparted "g" load.</p> <p>The staff considered that if the "imposed displacement problem" were to consider the SS clad fuel used by IP1 the "g" loads to reach the yield stress of the SS would drop significantly from those of the zircaloy clad fuel. Additionally, the staff observed that Holtec's buckling analysis would result in a fuel pin that was the most flexible (the lowest buckling load). However, the fuel pin with the lowest buckling load would not be the fuel pin that results in highest stresses in the imposed displacement problems.</p>				
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ACTION REQUIRED None				
NAME OF PERSON DOCUMENTING CONVERSATION C. Regan		SIGNATURE 		DATE 08/01/2007
ACTION TAKEN None				
TITLE OF PERSON TAKING ACTION		SIGNATURE OF PERSON TAKING ACTION		DATE

CONVERSATION RECORD (Continued)

SUMMARY (Continue on Page 3)

The staff indicated that although the issue was identified when reviewing the IP1 HI-STORM 100 amendment application the underlying issue with the analysis is potentially applicable to all of the HI-STORM 100 currently approved CoC's together with the 3 applications in house for review.

The staff noted that the general methods used for each part of the analysis are appropriate for that part but that Holtec should not be using the results from the first step as the input to the imposed displacement analysis in the second step. The staff also mentioned that there is more recent data available (PATRAM, 2004, "Fuel Rod Buckling Under Inertial loading") since publication of the noted LLNL report that Holtec should consider using in their buckling analysis in the first step.

Holtec responded by thanking the staff for bringing this issue to their attention and that they would require a few days to research the issue. Holtec requested a follow-up conference call Thursday (8/2) afternoon.

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