RESPONSE TO REQUEST FOR ADDITIONAL INFORMATION

12/27/2013

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

RAI NO.:	**NO. 1044-7140 REVISION 3**
SRP SECTION:	**03.08.04 – Other Seismic Category I Structures**
APPLICATION SECTION:	**3.8.4**
DATE OF RAI ISSUE:	**07/08/2013**

QUESTION NO. 03.08.04-55:

On April 3, 2013, the applicant submitted a markup of DCD Tier 2 Section 3.8 to provide updated information related to a seismic design change.

In Subsection 3.8.4.4.1, "R/B [reactor building]," the second paragraph (page 3.8-75) states, "The fuel handling area is a reinforced concrete structure supported by structural steel framing. The new fuel is stored in racks in a dry, unlined pit. The spent fuel pit is lined with stainless steel and is normally flooded to an elevation 1 ft, 2 in. below the operating floor deck."

The applicant is requested to provide figures depicting the design for the areas of the fuel handling, the new and spent fuel storages, and the structural steel framing supporting system to the areas; and describe how the loads from these areas are transferred down to the basemat during an earthquake.

ANSWER:

This answer replaces the previous MHI answer that was transmitted by letter UAP-HF-13193 (ML13228A271) dated August 2, 2013.

Loads were applied to the fuel handling area pits in the ANSYS model in two ways: (1) loads from water, and (2) loads from equipment. The water weight in the pits was applied to slabs using MASS21 elements. Static and dynamic pressure from the water was applied to the surrounding walls of each pit. Loads from equipment inside the pits were applied by changing the density of the slab elements in the locations of those pieces of equipment. These loads include pumps, fuel storage racks (new fuel, damaged fuel, and spent fuel), structural steel to support fuel racks, spent fuel, damaged fuel, damaged fuel container, fuel transfer system, new fuel elevator, and pit gates. For the fuel storage racks, in the ANSYS model, an evenly distributed load was applied over the slab area where all the individual racks reside. Figure 1 shows the layout of the fuel handling area pits in the ANSYS model.

Figure 2 gives the location of Section A-A and shows a plan view of the fuel handling area at EL. 76'-5". Figure 3 shows the structural steel framing of the fuel handling area. This framing

supports the fuel handling area roof, walls, and the fuel handling area crane along with the crane hook load. The hook load was estimated as the crane lift capacity. During a seismic event, motion in the NS direction will be resisted by a composite action of the steel framing and concrete shear walls; while motion in the EW direction is resisted by the concrete shear walls. These loads are transferred from the walls and steel framing to the fuel handling area slabs and from those slabs to connected shear walls below. The connected shear walls carry the load down to the basemat. In a similar fashion, loads from the fuel handling area pits are transferred from those slabs to the same connected shear walls which carry that load down to the basemat.

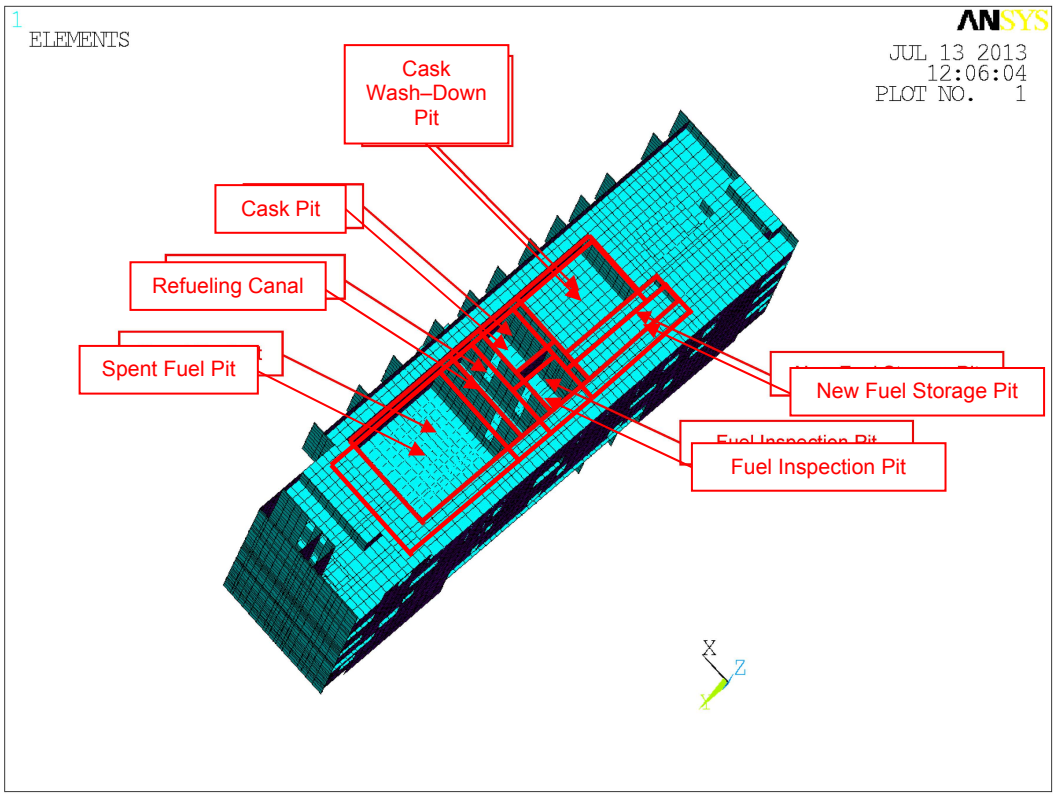

Figure 1. Fuel Handling Area Pits

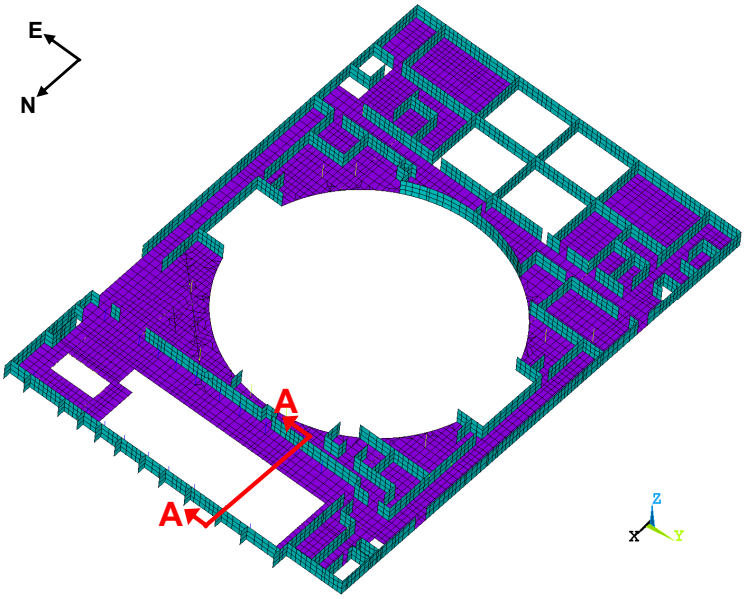

Figure 2. Location of Section Cut A-A

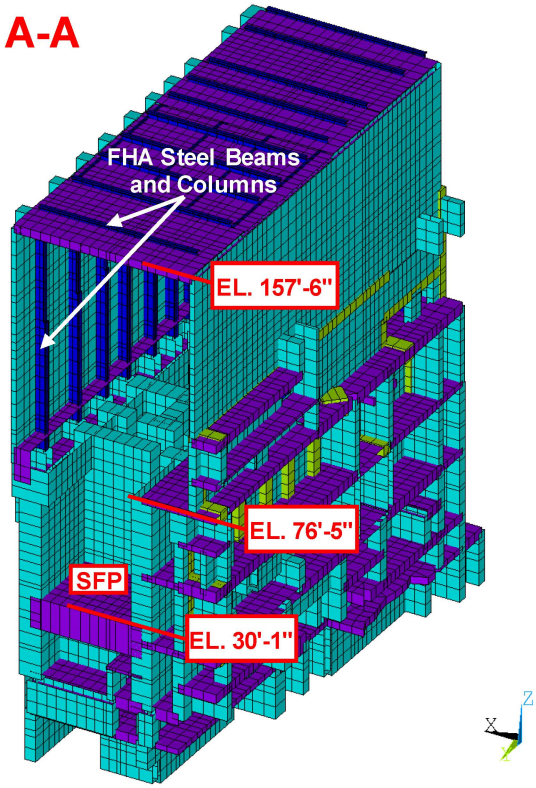

Figure 3. Section Cut A-A: Fuel Handling Area Including Structural Steel Framing

Impact on DCD

There is no impact on the DCD.

Impact on R-COLA

There is no impact on the R-COLA.

Impact on PRA

There is no impact on the PRA.

Impact on Technical/Topical Report

There is no impact on the Technical/Topical Report.

This completes MHI's response to the NRC's question.