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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 77 Related to ESBWR Design Certification Application, Spent Fuel Storage Rack, RAI 14.3-92 S01**

Enclosure 1 contains GEH's response to Supplement 1 to the original NRC RAI transmitted via the Reference 1 letter.

If you have any questions or require additional information regarding the information provided here, please contact me.

Sincerely,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D068

NRO

Reference:

1. MFN 06-391, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 77 Related to ESBWR Design Certification Application,* October 11, 2006

Enclosure:

1. MFN 07-188, Supplement 1, Response to a Portion of NRC Request for Additional Information Letter No. 77, Related to ESBWR Design Certification Application, Spent Fuel Storage Rack, RAI 14.3-92 S01.

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GEH (with enclosures)
	RE Brown	GEH (w/o enclosures)
	eDRF	0000-0069-3400, R1

Enclosure 1

MFN 07-188, Supplement 1

Response to a Portion of NRC Request for

Additional Information Letter No. 77

Related to ESBWR Design Certification Application,

Spent Fuel Storage Rack

RAI 14.3-92 S01

NRC RAI 14.3-92

Provide boundary conditions and the basis for the acceptance criterion for peak spent fuel rack temperature.

Full Text: DCD Tier 1, Revision 1, Table 2.5.6-1, Item Number 2, states that calculations will be performed to determine the maximum temperature of the spent fuel racks. However, neither the boundary conditions for the calculations nor the basis for acceptance are specified in Tier 1 or DCD Tier 2, Section 9.1.2. Provide boundary conditions (e.g., bulk pool temperature and fuel decay heat rate) and the basis for the acceptance criterion for peak spent fuel rack temperature (e.g., no nucleate boiling (voiding) to ensure validity of criticality analysis and/or temperature used to establish rack thermal stress for structural analysis).

GE Response

The final boundary conditions will be documented in the COL response to COL Item 9.1.6 in Chapter 9.

The response will consist of 2 parts.

Part 1 will discuss the spent fuel storage rack thermal analysis based on normal [120°F] and accident conditions [140°F]. The purpose of the calculations will be to establish the maximum temperature and that no nucleate boiling occurs under these conditions.

Part 2 will cover boiling in the spent fuel storage racks during the post accident 72-hour period. See Chapter 9, Section 9.1.2.7.

The structural acceptance criteria for the fuel storage racks is that the storage rack design shall not exceed the allowable stress levels given in the ASME B&PV Code, Section III, Subsection NF.

No DCD changes will be made in response to this RAI.

NRC RAI 14.3-92 S01

The response provided on March 27, 2007, (MFN-07-188) is not sufficient. Please provide the following information:

1) The referenced COL items should be COL applicant items rather than COL Holder items.

2) The response states that Part 1 of the COL item "will discuss the spent fuel storage rack thermal analysis based on normal [120°F] and accident conditions [140°F]." Clarify what is meant by accident conditions. DCD Tier 2, Section 9.1.3.2 states that water temperature is kept below 120°F under normal heat load conditions and below 140°F during the maximum heat load conditions of a full core off-load plus irradiated fuel resulting from 20 years of operations. During a loss of the Fuel and Auxiliary Pools Cooling System trains, the cooling is accomplished by allowing the water to heat and boil.

GE Response

1) The referenced COL items will be changed to COL applicant items.

2) In the original response to the RAI, the phrase "accident conditions" was incorrect and should be replaced with "maximum heat load". The maximum heat load occurs when a full core offload is added to a spent fuel pool that already contains 20 years of spent fuel, and under these conditions the pool temperature is allowed to reach 140°F.

   The second part of the analysis will consider a failure of both FAPCS cooling trains that results in pool boiling.

DCD Impact

Tier 2 Subsection 9.1.6 is to be updated for Revision 4 as shown in the attached DCD markup.

~~9.1.6~~ 9.1.6 COL Information

Dynamic and Impact Analyses of Fuel Storage Racks

The COL ~~Holder~~ Applicant shall provide the NRC confirmatory dynamic and impact analyses of the fuel storage racks. Refer to Subsections 9.1.1.1, and 9.1.2.4, under subheading Dynamic and Impact Analysis.

The COL ~~Holder~~ Applicant shall confirm the fuel storage racks are designed to provide sufficient natural convection coolant flow through the rack and fuel to remove decay heat without reaching excessive water temperatures (100°C; 212°F), refer to Subsections 9.1.1.1 and 9.1.2.5.

Fuel Storage Racks Criticality Analysis

The COL ~~Holder~~ Applicant shall provide the NRC confirmatory criticality analysis as required by *Criticality Control* refer to Subsections 9.1.1.1 and 9.1.1.2).

Fuel Racks Load Drop Analysis

The COL Holder shall provide the NRC confirmatory load drop analysis as required by Subsection 9.1.2.4.

Handling of Light Loads (Fuel Handling)

The COL Holder shall provide the NRC the following for confirmatory review:

- Fuel handling procedures.
- Maintenance manuals and procedures for equipment used to move fuel.
- Equipment inspection and test plans for equipment used to move fuel.
- Personnel qualifications, training, and control programs for fuel handling personnel.
- QA programs to monitor, implement, and assure compliance to fuel handling operations.

Handling of Heavy Loads

The COL Holder shall provide the NRC the following for confirmatory review:

- A listing of all heavy loads, heavy load handling equipment, and their associated heavy load attributes;
- Heavy load handling safe load paths and routing plans including descriptions of automatic and manual interlocks and safety devices and procedures to assure safe load path compliance;
- Heavy load handling equipment maintenance manuals and procedures;
- Heavy load handling equipment inspection and test plans;
- Heavy load personnel qualifications, training, and control programs; and
- QA programs to monitor, implement, and assure compliance to heavy load handling operations.