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Subject: **Supplemental Response to Portion of NRC Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application - Fuel Storage and Handling - RAI Number 9.1-134**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) supplemental response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) 9.1-134, sent by NRC Letter No. 390 (Reference 1). This response is meant to replace the response to RAI 9.1-134 submitted via Reference 2. No other RAI response submitted via Reference 2 is affected by this letter.

The GEH response to RAI 9.1-134 is provided in Enclosure 1. Enclosure 2 contains the DCD markups associated with this Response.

If you have any questions or require additional information, please contact me.

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

References:

1. MFN 09-693, Letter from U.S. Nuclear Regulatory Commission to Jerald G. Head, *Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application*, November 2, 2009
2. MFN 09-726, Response to Portion of NRC Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application - Fuel Storage and Handling - RAI Numbers 9.1-130, 9.1-131, 9.1-132, 9.1-133, 9.1-134, 9.1-135, 9.1-136, 9.1-137, 9.1-138 and 9.1-139, November 20, 2009

Enclosures:

1. Supplemental Response to Portion of NRC Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application – Fuel Storage and Handling – RAI Number 9.1-134
2. Supplemental Response to Portion of NRC Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application – Fuel Storage and Handling – RAI Number 9.1-134 – DCD Markups

cc:	AE Cubbage	USNRC (with enclosures)
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	eDRF Section	0000-0119-2279

Enclosure 1

MFN 09-726, Supplement 2

Supplemental Response to Portion of NRC Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application

Fuel Storage and Handling

RAI Number 9.1-134

NRC RAI 9.1-134

In MFN 09-117, in response to RAI 14.3-444, a fourth bullet was added to the list of FAPCS safety-related items in DCD Tier 2, Section 9.1.3.1, to clarify that the Gravity Driven Cooling System (GDCS) interconnecting pipes are safety-related. In DCD Revision 6, the third and fourth bullets on the list were combined and the list is now unclear. Restore the list as identified in the RAI response and below.

- *Emergency water supply flow paths to the spent fuel pool and Isolation Condenser/Passive Containment Cooling System (IC/PCCS) pools, and*
- *Gravity Driven Cooling System (GDCS) interconnecting pipes.*

GEH Revised Response

GEH has restored the fourth item to its own bullet in DCD Tier 2, Subsection 9.1.3.1. In addition, GEH will make a corresponding change in DCD Tier 2, Subsection 9.1.3.2 to add “interconnection with GDCS” in the bulleted list after “The FAPCS is a nonsafety-related system with the exception of piping and components required for:”.

DCD Impact

DCD Tier 2, Subsection 9.1.3.1 has been revised in Revision 7 of the DCD as indicated in the attached markup.

DCD Tier 2, Subsection 9.1.3.2 will be revised in Revision 8 of the DCD as indicated in the attached markup.

Enclosure 2

MFN 09-726, Supplement 2

Supplemental Response to Portion of NRC Request for Additional Information Letter No. 390 Related to ESBWR Design Certification Application

Fuel Storage and Handling

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DCD Markups

below regulatory limits and in accordance with As Low As Reasonably Achievable (ALARA) principles. Further details of radiological considerations, including those for the spent fuel storage arrangement, are presented in Chapter 12.

9.1.3 Fuel and Auxiliary Pools Cooling System

9.1.3.1 Design Bases

Safety Design Basis

FAPCS is a nonsafety-related system, except for the following safety-related items:

- Containment isolation valves,
- High-pressure interface with the Reactor Water Cleanup / Shutdown Cooling System,
- Emergency water supply flow paths to the spent fuel pool and Isolation Condenser/Passive Containment Cooling System (IC/PCCS) pools; and
- Gravity Driven Cooling System (GDCS) interconnecting pipes.

Power Generation Design Basis

FAPCS provides continuous cooling and cleaning of the spent fuel storage pool during normal plant operation. It also provides occasional cooling and cleaning of various pools located inside the containment during normal plant operation and refueling outages.

9.1.3.2 System Description

System Description Summary

The FAPCS consists of two physically separated cooling and cleanup trains, each with 100% capacity during normal operation. Each train contains a pump, a heat exchanger and a water treatment unit for cooling and cleanup of various cooling and storage pools except for the IC/PCCS pools (refer to Figure 9.1-1). A separate subsystem with its own pump, heat exchanger and water treatment unit is dedicated for cooling and cleaning of the IC/PCCS pools independent of the FAPCS cooling and cleanup train operation during normal plant operation (refer to Figure 9.1-1).

The primary design function of FAPCS is to cool and clean pools located in the containment, RB and FB (refer to Table 9.1-1) during normal plant operation. FAPCS provides flow paths for filling and makeup of these pools during normal plant operation and during post-accident conditions, as necessary.

FAPCS is also designed to provide the following accident recovery functions in addition to the Spent Fuel Pool cooling function:

- Suppression pool cooling (SPC);
- Drywell spray;
- Low pressure coolant injection (LPCI) of suppression pool water into the Reactor Pressure Vessel (RPV); and
- Alternate Shutdown Cooling.

pools, the water levels and free volumes are sufficient to ensure that following a loss of active cooling without makeup that persists for 72 hours, the water levels in the pools remain above TAF. After 72 hours, post-accident makeup water can be provided through safety-related connections to the Fire Protection System (FPS) or another onsite or offsite water source.

All operating modes (refer to Table 9.1-2) are manually initiated and controlled from the Main Control Room (MCR), except the SPC mode, which is initiated either manually, or automatically on high suppression pool water temperature signal. Instruments are made for indication of operating conditions to aid the operator during the initiation and control of system operation. Provisions are provided to prevent inadvertent draining of the pools during FAPCS operation by including anti-siphon holes on all FAPCS piping that is normally submerged.

The FAPCS is designed to provide for the collection, monitoring, and drainage of pool liner leaks from the spent fuel pools, auxiliary pools, and IC/PCCS pools (refer to Table 9.1-1) to the Liquid Waste Management System.

Containment isolation valves are provided on the lines that penetrate the primary containment and are powered from independent safety-related sources.

The containment isolation valves are automatically closed upon receipt of a containment isolation signal from the Leakage Detection and Isolation System (LD&IS), with the exception of the containment isolation valves needed for post-accident recovery modes, which do not receive an isolation signal.

The FAPCS is a nonsafety-related system with the exception of piping and components required for:

- Containment isolation;
- Refilling of the IC/PCCS pools or the Spent Fuel Pool with post-accident water supplies from the Fire Protection System or another onsite or offsite source~~; and~~
- The high-pressure interface with the Reactor Water Cleanup/Shutdown Cooling system used for low pressure coolant injection;~~.~~ and
- Interconnection with GDCS.

The piping and components needed for the following functions are classified as Regulatory Treatment of Non-Safety Systems (RTNSS):

- Suppression pool cooling
- Low pressure coolant injection

This includes the suction line from the suppression pool, all of the piping and components in the cooling and cleaning trains except the water treatment units, and the discharge lines to the suppression pool and the LPCI interface up to the safety-related isolation valves.

The FAPCS piping and components that are required to support safety-related or accident recovery function have Quality Group B or C and Seismic I or II classification (Table 9.1-3). A Seismic I classification is required for all safety-related functions. The remaining nonsafety-related piping and components that support accident recovery functions are Seismic Category II. This classification satisfies the requirements of SRP 9.1.3 Section I.1.