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MFN 08-333

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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application - Containment Systems - RAI Numbers 6.2-136 S02 and 6.2-137 S02**

Enclosure 1 contains the GE Hitachi Nuclear Energy (GEH) responses to the subject NRC RAIs originally transmitted via the Reference 1 letter and supplemented by NRC requests for clarification in Reference 2. DCD Markups related to this response are provided in Enclosure 2.

Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

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

Sincerely,

James C. Kinsey

James C. Kinsey
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 06-393, Letter from U.S. Nuclear Regulatory Commission to David H. Hinds, *Request for Additional Information Letter No. 79 Related to ESBWR Design Certification Application*, October 11, 2006
2. MFN 08-161, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application*, February 21, 2008

Enclosures:

1. MFN 08-333 - Response to Portion of NRC Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application - Containment Systems - RAI Number2 6.2-136 S02 and 6.2-137 S02
2. MFN 08-333 - Response to Portion of NRC Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application - Containment Systems - RAI Number2 6.2-136 S02 and 6.2-137 S02 - DCD Markups

cc:	AE Cubbage	USNRC (with enclosures)
	DH Hinds	GEH/Wilmington (with enclosures)
	GB Stramback	GEH/San Jose (with enclosures)
	RE Brown	GEH/Wilmington (with enclosures)
	eDRF	RAI 6.2-136 S02: 0000-0083-0220, 0000-0083-0222
		RAI 6.2-137 S02: 0000-0083-0229, 0000-0083-0231

Enclosure 1

MFN 08-333

Response to Portion of NRC Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application

Containment Systems

RAI Numbers 6.2-136 S02 and 6.2-137 S02

NRC RAI 6.2-136 S02:

GEH's original response to RAI 6.2-136, MFN 07-270 dated May 16, 2007, concerning the hydrogen monitor range states, "The instrument range will be dual and encompasses 0 to 10 percent and 0 to 30 percent hydrogen. This range will be met under the specified pressure conditions for the ESBWR design." Staff accepted this range and requested in Supplemental No. 1, that this information be incorporated in the DCD, Tier 2.

GEH's response to this request is "specific values for instrument ranges will be determined during the Human Factors Engineering (HFE) design process in accordance with the Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) . . ."

What is the reason for the change in the hydrogen monitor ranges from the original response to the supplemental response? Clearly explain why the hydrogen monitor ranges cannot be determined now and incorporated into Tier 2. What are the criteria that HFE will use to determine the hydrogen monitor ranges?

Unless the above can be demonstrated, the hydrogen monitor ranges should be included in DCD, Tier 2.

GEH Response:

In accordance with Regulatory Guide 1.97, Revision 3, Table 2, the required instrument range for this Type C variable is 0 to 30% volume for hydrogen in inerted containments. Therefore, DCD Tier 2, Subsection 7.5.2.1 will be revised, and a new Table 7.5-5 will be added, to indicate this required instrument range.

DCD Impact:

DCD Tier 2, Subsection 7.5.2.1 will be revised, and a new Table 7.5-5 will be added, as shown in the attached markup.

NRC RAI 6.2-137 S02:

GEH's original response to RAI 6.2-137, MFN 07-270 dated May 16, 2007, concerning the oxygen monitor range states, "The instrument range will be dual and encompasses 0 to 10 percent and 0 to 30 percent oxygen. This range will be met under the specified pressure conditions for the ESBWR design." Staff accepted this range and requested in Supplemental No. 1, that this information be incorporated in the DCD, Tier 2.

GEH's response to this request is "specific values for instrument ranges will be determined during the Human Factors Engineering (HFE) design process in accordance with the Inspections, Tests, Analyses and Acceptance Criteria (ITAAC) . . ."

What is the reason for the change in the oxygen monitor ranges from the original response? Clearly explain why the oxygen monitor ranges cannot be determined now and incorporated into Tier 2. What are the criteria HFE will use to determine the oxygen monitor ranges?

Unless the above can be demonstrated, the oxygen monitor ranges should be included in DCD, Tier 2.

GEH Response:

In accordance with Regulatory Guide 1.97, Revision 3, Table 2, the required instrument range for this Type C variable is 0 to 10% volume for oxygen in inerted containments. Therefore, DCD Tier 2, Subsection 7.5.2.1 will be revised, and a new Table 7.5-5 will be added, to indicate this required instrument range.

DCD Impact:

DCD Tier 2, Subsection 7.5.2.1 will be revised, and a new Table 7.5-5 will be added, as shown in the attached markup.

Enclosure 2

MFN 08-333

Response to Portion of NRC Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application

Containment Systems

RAI Numbers 6.2-136 S02 and 6.2-137 S02

DCD Markups

Verified DCD changes associated with this RAI response are identified in the enclosed DCD markups by enclosing the text within a black box. The marked-up pages may contain unverified changes in addition to the verified changes resulting from this RAI response. Other changes shown in the markup(s) may not be fully developed and approved for inclusion in DCD Revision 5.

- Containment area radiation.

These parameters are monitored during both normal reactor operations and post-accident conditions to evaluate the integrity and safe conditions of the containment. Abnormal measurements and indications initiate alarms in the MCR.

7.5.2.1 System Design Bases

The CMS design ~~is in conformance with~~conforms to the following system design criteria:

CMS is classified as safety-related and Seismic Category 1 except as noted, and conforms ~~with~~ to the relevant codes and standards specified in Table 7.1-1 for this system. IEEE Std. 603, Sections 4.5 and 5.8, apply to the safety-related portions of the CMS.

The safety-related Hydrogen/Oxygen (H_2/O_2) analyzers are active during normal operation. Additional sampling capacity is automatically initiated by a LOCA signal for post-accident monitoring of oxygen and hydrogen content in the containment.

Each CMS gas sampling subsystem monitors the atmospheric oxygen and hydrogen contents in the drywell and the wetwell, and provides measurements in the MCR in percent by volume for each of the sampled gases. Table 7.5-5 provides the instrument ranges for these parameters. Sampling of the drywell or the wetwell is initiated either manually (locally) or automatically.

Dual redundant divisions of gas sampling and radiation monitoring are provided.

Nonsafety-related radiation monitoring consists of two channels per division. Each radiation monitoring channel portion consists of a gamma sensitive Radiation Detection Assembly and a digital Signal Conditioning Unit. The Radiation Detection Assemblies are installed at widely separated locations to provide comprehensive coverage of the containment volume. The channels measure gross gamma radiation in the drywell and wetwell. The gross gamma radiation signals are provided to the MCR where they are continuously displayed. The channels are equipped with upscale alarms to indicate high radiation and an alarm to indicate channel malfunction.

MCR alarms are provided for indications of high radiation dose rates, inoperative radiation monitors, high oxygen levels, high hydrogen levels, and abnormal samples for each subsystem.

Each gas sampling rack is provided with its own gas calibration sources of known concentration levels to calibrate periodically the oxygen and hydrogen analyzers and the sensors.

The lower drywell water level is monitored to indicate any boiloff from the Isolation Condenser/Passive Containment Cooling System (IC/PCCS) that may accumulate in the lower drywell following a LOCA condition.

The upper drywell water level is also monitored and compared with the RPV nozzle elevations.

The drywell and wetwell pressure instrumentation is located throughout the containment and provides safety-related and nonsafety-related functions for both normal and post-accident monitoring. In addition, pressure signals are provided to the Diverse Protection System (DPS) for diverse scram protection monitoring.

Table 7.5-5

Instrument Ranges for Hydrogen/Oxygen Analyzers

Variable	Range
Drywell/Wetwell Hydrogen Concentration	0 to 30 Vol%
Drywell/Wetwell Oxygen Concentration	0 to 10 Vol%