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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 Number 6.2-166 S01**

Enclosure 1 contains the GE Hitachi Nuclear Energy (GEH) response to the subject NRC RAI originally transmitted via the Reference 1 letter and supplemented by an NRC request for clarification in Reference 2.

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

Sincerely,

Lee F. Dougherty for

Richard E. Kingston
Vice President, ESBWR Licensing

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NRO

References:

1. MFN 07-327, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, *Request for Additional Information Letter No. 100 Related to ESBWR Design Certification Application*, May 30, 2007
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

Enclosure:

1. MFN 08-805 - Response to Portion of NRC Request for Additional Information Letter No. 159 Related to ESBWR Design Certification Application - Containment Systems - RAI Number 6.2-166 S01

cc:	AE Cubbage	USNRC (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	eDRF	0000-0085-6538R1

Enclosure 1

MFN 08-805

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

Containment Systems

RAI Number 6.2-166 S01

NRC RAI 6.2-166 S01:

Standard Review Plan Section 6.2.3, Revision 3, March 2007 establishes compliance with General Design Criterion 43, "testing of atmospheric clean up systems." DCD, Revision 4 states that an atmospheric clean up system is not required. Because there is no atmospheric clean up system in the reactor building and only part of the primary containment leakage is being released to the environment, the curie content of the air in the reactor building increases post accident.

Please discuss the maximum radiation levels that would develop and its impact on operator entry post-accident. Please provide the maximum dose an operator would receive for a post accident entry in the 30 days following an accident.

Note that reductions in exfiltration flow from the reactor building could significantly increase the curie content of the air increasing the dose rate. Incorporate in the DCD, Tier 2, Section 6.2.3 the results of the radiation evaluation and conditions it depends upon to support not providing an atmospheric clean up system.

Please coordinate the response with RAI 3.11-20 which request radiation environmental conditions inside reactor building and control building during accident conditions. The control building should be evaluated with the non-safety CBGAVS operation in a RTNSS mode after 72 hours which would draw unfiltered air into the control building. Also, coordinate the response with RAI 12.4-31 which addresses radiation zone maps and compliance with TMI Action Item 11.B.2.

GEH Response:

Post-accident radiation levels were addressed in the response to RAI 12.4-31 (MFN 08-227, dated May 9, 2008) and incorporated into DCD Tier 2, Revision 5, Chapter 12, Table 12.3-14. Except for the alignment of the reactor water cleanup (RWCU) cross-tie, the doses provided in Table 12.3-14 are based on missions at 72 hours.

GEH agrees that the effect of reactor building leakage less than the leak rate used in the accident dose calculations would increase the radiation dose inside the reactor building following the accident. However, the only operator action outside the control room currently credited is refilling of the Isolation Condenser (IC)/Passive Containment Cooling (PCC) pools at 72 hours, which takes place outside the reactor building. The reactor building areas assessed for access in DCD Tier 2, Revision 5, Chapter 12 are the Divisional Electrical Equipment Rooms, the Remote Shutdown Panels, the Standby Liquid Control System (SLCS) Tank Room, and the A-train RWCU Valve Room. Only the RWCU Valve Room is described in the design basis, in DCD Tier 2, Revision 5, Subsection 1.2.2.6.1, Subsection 6.2.1.1.2, and Subsection 5.4.8.2.1, and the timing of the operator action is not specified in any of these descriptions.

DCD Tier 2, Revision 5, Subsection 12.3.6 evaluates radiological dose to operators implementing actions to align the RWCU cross-tie to ensure that the evolution can be performed within 30 days. This analysis took no credit for filtered ventilation. Post-accident reactor building entries will be conducted in accordance with the

emergency preparedness program utilizing symptomatic emergency operating procedures to confirm radiation levels are within pre-established task-specific guidelines prior to reactor building entry. Increased radiation levels resulting from lower exfiltration rates would be addressed through use of radiation control techniques such as delaying implementation of the RWCU cross-tie evolution or operation of Reactor Building Purge Filter Units.

For actions in the reactor building not specifically described in the design basis including actions taken prior to 72 hours, actions taken once power is restored, actions to re-fill the SLCS Tank, and other ad hoc actions, the emergency preparedness program (TMI Action Item I.C.1) used in coordination with symptomatic emergency operating procedures will address post-accident reactor building re-entry. While assumptions used in the calculation of the radiation mission doses as described in the response to RAI 12.4-31 do not assume the lower exfiltration rate, emergency preparedness procedures will ensure radiation dose to operators who enter the reactor building post-accident, is controlled below Environmental Protection Agency (EPA) Protective Action Guidelines as required by 10CFR50.47(b)(11). The intent of this position has been reflected in DCD Tier 2, Revision 5, Subsection 6.2.3.

Reactor building leakage rate less than the maximum leak rate will also affect the radiation dose to equipment in the reactor building. The response to RAI 3.11-20 S01 (MFN 08-830 dated October 31, 2008) addresses the Environmental Qualification program.

There is no Regulatory Treatment of Non-Safety Systems (RTNSS) function associated with Control Building General Area HVAC Subsystem (CBGAVS). DCD Tier 2, Revision 5, Subsections 9.4.1 and 19A.3.1.4, describe the Control Room Habitability Area HVAC Subsystem (CRHAVS) RTNSS functions associated with the control room emergency filter units (EFUs) and recirculation air handling units (AHUs) to provide filtered air and area cooling to the control area after 72 hours. After an accident, the ESBWR design provides filtered air intake to the control room through the EFUs for the duration of the event powered by either the safety-related batteries or the ancillary diesel generators. The recirculation AHUs take suction and discharge to the control room area, and are powered by non-safety uninterruptible power supply for the first two hours and later by the ancillary diesel generators. CBGAVS, if available, would only be used for supplemental fresh air, and only if the dose rates at the intake were within prescribed procedural limits.

This response has used information from DCD Tier 2, Revision 5, Chapter 12, which has been revised in the response to RAI 12.4-31.

DCD Impact:

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