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MFN 08-846

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U.S. Nuclear Regulatory Commission
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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 208 - Related To NEDO-33338, "ESBWR Feedwater Temperature Operating Domain For Transient And Accident Analysis" – RAI Number 4.3-23**

The purpose of this letter is to submit the GE Hitachi Nuclear Energy (GEH) response to the U.S. Nuclear Regulatory Commission (NRC) Request for Additional Information (RAI) sent by the Reference 1 NRC letter. GEH response to RAI Number 4.3-23 is addressed in Enclosure 1.

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

Sincerely,

Richard E. Kingston

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Vice President, ESBWR Licensing

D068
NRO

Reference:

1. MFN 08-508, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, Request For Additional Information Letter No. 208 Related To NEDE-33338P, "ESBWR Feedwater Temperature Operating Domain For Transient And Accident Analysis", dated June 3, 2008.

Enclosure:

1. MFN 08-846 – Response to Portion of NRC Request for Additional Information Letter No. 208 - Related to NEDO-33338, "ESBWR Feedwater Temperature Operating Domain For Transient And Accident Analysis" – RAI Number 4.3-23

cc: AE Cubbage USNRC (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0091-2794

Enclosure 1

MFN 08-846

Response to Portion of NRC Request for Additional Information Letter No. 208 Related to NEDO-33338, "ESBWR Feedwater Temperature Operating Domain For Transient And Accident Analysis"

RAI Number 4.3-23

NRC RAI 4.3-23

Provide the applicable rod motion limits.

In between control rod pattern changes, the excess reactivity can be controlled by either feedwater temperature changes or fine control rod motion. For the fuel temperature and conditions in a representative point in the cycle (e.g. middle of cycle (MOC)), provide the applicable rod motion limits (e.g. allowable withdrawal velocity). Using this data, explain why is possible to move control rods at full power to maintain constant core reactivity after peak reactivity is achieved and rod withdrawal is required.

GEH Response

The ESBWR does not have rod velocity motion limits for the fine motion control rod drives. The control rod drive has a nominal speed of 28 $\pm$ 5 mm/sec set by the drive motors.

However, the control rod withdrawal distance can be limited by the Automated Thermal Limit Monitor (ATLM) to ensure that control rod movement will not cause thermal limits to be exceeded. The ATLM stops rod movements before the Minimum Critical Power Ratio or Maximum Linear Heat Generation Rate operating limits are exceeded. A detailed description of the ATLM subsystem is presented in DCD Tier 2 Subsection 7.7.2.

It is possible to maintain constant core power by maneuvering rods while complying with established operating guidelines. As with the current operating BWR fleet, control rod withdrawal in low power control cells can be performed at rated power within established operating guidelines. The ESBWR core and fuel design is similar to the current fleet and control rod withdrawal will be bounded by the same constraints. Also, if the nominal control rod movements become limited by challenges to the thermal or established operating limits, it is possible to maintain constant core power by an adjustment in the control rod pattern, a shift in the control rod withdrawal order, changes in feedwater temperature or a combination there of. Once thermal limits or established operating limits are no longer challenged by control rod withdrawal, the feedwater temperature can be returned to nominal conditions.

DCD Impact

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