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MFN 08-675

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**Subject: Response to Portion of NRC Request for Additional Information
Letter No. 208 - Related To NEDE-33338P, "ESBWR Feedwater
Temperature Operating Domain For Transient And Accident
Analysis" – RAI Numbers 4.3-20, 4.3-26 and 4.3-30**

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 Numbers 4.3-20, 4.3-26 and 4.3-30 is addressed in Enclosure 1.

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

Sincerely,

Richard E. Kingston
Vice President, ESBWR Licensing

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LKR

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 08-675 – Response to Portion of NRC Request for Additional Information Letter No. 208 - Related to NEDE-33338P, "ESBWR Feedwater Temperature Operating Domain For Transient And Accident Analysis" – RAI Numbers 4.3-20, 4.3-26 and 4.3-30

cc: AE Cubbage USNRC (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0089-9528, 0000-0089-8486 and 0000-0090-2453

Enclosure 1

MFN 08-675

Response to Portion of NRC Request for

Additional Information Letter No. 208

**Related to NEDE-33338P, "ESBWR Feedwater Temperature
Operating Domain For Transient And Accident Analysis"**

RAI Numbers 4.3-20, 4.3-26 and 4.3-30

NRC RAI 4.3-20

Define Middle of Cycle.

The calculations in NEDO-33338 and NEDO-33337 refer to the MOC exposure point. Please, explain how the MOC exposure is defined.

GEH Response

In the initial core analyses, MOC is defined as the exposure point that corresponds to the maximum excess reactivity point. This point is also referred to as peak hot excess.

Hot excess reactivity evaluation for the initial core is located in Section 3.6 of Global Nuclear Fuel, "ESBWR Initial Core Nuclear Design Report", NEDC-33326-P, Class III (Proprietary), Revision 0, July 2007, NEDO-33326, Class I (Non-proprietary), Revision 0, July 2007.

DCD Impact

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

No changes to the subject LTRs will be made in response to this RAI.

NRC RAI 4.3-26

Request information of operating point at SP2.

Is it possible to operate at point SP2 for extended periods of time to improve the end-of-cycle isotopics (e.g. increased Pu production to stretch the cycle time)? Would long term operation at SP2 require tech spec changes? Long term operation at SP2 would change the isotopics and safety-related parameters like the void reactivity coefficient, which would affect the results of limiting transient analyses at SP0. Evaluate the impact of possible long-term operation at SP2 during the cycle on the transient DCPR for the limiting end of cycle (EOC) transients.

GEH Response

The ESBWR will be operated primarily at SP0, with the power - feedwater temperature domain used as operational and control rod maneuvering flexibility. Section 1.1 of NEDO-33338 states that the ESBWR is expected to take advantage of this additional power maneuvering during startup and control rod sequence exchanges.

Extended operation at SP2 is not intended. Because main steam is directly extracted for the 7th feedwater heater without first producing useful work in the turbine, there is no plant thermal efficiency benefit of long term operation at SP2. Should a utility conclude that long term operation at SP2 would improve end-of-cycle isotopics and fuel cycle cost, specific analyses for that cycle operation accounting for the cycle conditions are required.

DCD Impact

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

No changes to the subject LTR will be made in response to this RAI.

NRC RAI 4.3-30

Demonstrate transient thermal mechanical fuel performance is acceptable.

Please describe how acceptable transient thermal mechanical fuel performance is demonstrated in the expanded operating domain.

GEH Response

Acceptable transient thermal mechanical fuel performance will be demonstrated for the expanded operating domain using the same methodology used in Section 8.3 of Reference 1. These calculations will be performed or validated for each fuel cycle and the results will be documented in the COLR per ESBWR Technical Specification 5.6.3. These methods are described in Reference 1 Section 7.2 and the results for the analysis are in Section 8.3.

References

1. GE Hitachi Nuclear Energy, "TRACG Application for ESBWR Transient Analysis," NEDE-33083P Supplement 3, Class III, Revision 0, December 2007, NEDO-33083 Supplement 3, Class I, Revision 0, December 2007.

DCD Impact

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

No changes to the subject LTR will be made in response to this RAI.