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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 4.3-25 and 4.3-31**

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 4.3-25 and 4.3-31 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

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 08-653 – 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 4.3-25 and 4.3-31

cc: AE Cubbage USNRC (with enclosure)
RE Brown GEH/Wilmington (with enclosure)
DH Hinds GEH/Wilmington (with enclosure)
eDRF 0000-0089-5598/1 and 0000-0085-7381

Enclosure 1

MFN 08-653

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 4.3-25 and 4.3-31

NRC RAI 4.3-25

Request information related to an end-of-cycle stretch.

Is it possible to use the region between SP0 and SP1M to provide an end-of-cycle stretch? Would technical specification changes be required similar to the end-of-cycle low feedwater temperature stretch in operating reactors? The end of cycle (EOC) conditions would be different at this point, which is typically called the end of rated life (EOR). If the stretch is allowed, justify why the EOC transient analysis are not also performed at SP1M with cross-section sets compatible with the cycle stretch time.

GEH Response

The ESBWR power – feedwater temperature operating domain (P-FWTOD) shown in Figure 4.2-1 of NEDO-33338 (Reference 4.3-25-1) assumes that the reactor is operated primarily at the nominal operating state of SP0 (100% rated power and feedwater temperature of 215.6°C (420°F)).

It is explained in Section 1.1 of Reference 4.3-25-1 that to provide operational and control blade maneuvering flexibility, the plant (ESBWR) is designed and analyses are performed at the lower end of the nominal feedwater temperature of 215.6°C (420°F). So the region between SP0 and SP1M (100% rated power and feedwater temperature of 187.8°C (370°F)) is to be used for operational and control blade maneuvering flexibility. If a future licensee or applicant intends to use the region between SP0 and SP1M for an end-of-cycle stretch, additional analyses similar to those required for end-of-cycle stretch for operating BWR will be performed.

Reference:

4.3-25-1 GE Hitachi Nuclear Energy, "ESBWR Feedwater Temperature Operating Domain Transient and Accident Analysis," NEDO-33338, Class I, October 2007.

DCD Impact

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

No changes to the subject LTR (NEDO-33338) will be made in response to this RAI.

NRC RAI 4.3-31

Describe plant response to a steam line break near 7th FWH.

Please qualitatively describe the response of the plant to a break in the line from the mainsteam line to the 7th FWH. In particular, how is a break in this line detected and what signal will actuate ESF?

GEH Response

The 7th Feedwater Heater (FWH) is located in the turbine building. A high ambient temperature in the turbine building provides an indication of a break in the line from the main steam line to the 7th FWH. Detail description of the ambient temperature monitoring in the turbine building is provided in DCD Subsection 5.2.5.2.2. The ambient air temperature in the steam line area is monitored by four divisional channels using thermocouples located at different places along the steam line. A high ambient temperature is annunciated in the main control room and initiates isolation of the steam lines. All thermocouples are located away from the main steam lines and are shielded to be only sensitive to ambient air temperatures and not to the radiated heat from the steam lines. Isolation of the main steam lines is accomplished through simultaneous closure of all the Main Steam Isolation Valves (MSIVs) and the steam drain line valves.

As discussed in the DCD Subsection 15.4.5, a break spectrum analysis for the complete range of reactor conditions indicates that the limiting event for breaks outside the containment is a complete severance of one of the main steam lines. The sequence of events for a main steam line break outside containment is given in the DCD Table 15.4-10.

A break in the steam line to the 7th FWH falls under the category of a line break outside containment. The plant response to a break in the steam line to the 7th FWH is expected to be similar to the plant response to the main steam line break outside containment scenario described in the DCD Subsection 15.4.5. The actuation of Engineered Safety Features (ESF) is expected to be similar to the sequence of events for a main steam line break outside containment as listed in the DCD Table 15.4-10.

DCD Impact

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