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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application ESBWR RAI Numbers 14.3-205 and 14.3-321**

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 NRC letter dated December 20, 2007 (Reference 1).

Enclosure 1 contains the GEH response to each of the subject RAIs. The enclosed changes will be incorporated in the upcoming DCD Revision 5 submittal.

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

Reference:

1. MFN 07-718, Letter from U.S. Nuclear Regulatory Commission to Robert E. Brown, GEH, *Request For Additional Information Letter No. 126 Related To ESBWR Design Certification Application*, dated December 20, 2007.

Enclosure:

1. Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application DCD Tier 1 RAI Numbers 14.3-205 and 14.3-321

   Enclosure 1, Attachment 1 DCD Tier 1, Revision 5 Markups

cc:		
	AE Cubbage	USNRC (with enclosure)
	GB Stramback	GEH/San Jose (with enclosure)
	RE Brown	GEH/Wilmington (with enclosure)
	DH Hinds	GEH/Wilmington (with enclosure)
	eDRF	0000-0082-6186 (RAI) 14.3-205
		0000-0083-4415 (RAI) 14.3-321

Enclosure 1

MFN 08-086, Supplement 32

Response to Portion of NRC Request for Additional Information Letter No. 126 Related to ESBWR Design Certification Application DCD Tier 1 RAI Numbers 14.3-205 and 14.3-321

***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.**

NRC RAI 14.3-205

NRC Summary:

TRACG analyses input parameters for AOOs and IE analyses

NRC Full Text:

DCD Tier 2, Revision 4, Table 15.2-1 lists the input parameters, initial conditions and assumptions used in AOO and infrequent event analyses. Please describe how the following parameters are verified in Tier 1:

a. Total Delay Time from TSV or TCV to the start of BPV Main Disc Motion (0.02s)

b. Total Delay Time from TSV or TCV to 80% of Total Capacity (0.17)

c. TSV Closure Scram Position of 2 or more TSV, % open (85%)Trip Time delay (0.06s)

d. TCV fast closure scram trip (0.08s)

e. Assumed slow closure analysis value 2.5s

f. APRM simulated thermal power trip time constant 7 s

GEH Response

As requested, a listing of the parameters that are confirmed by DCD Tier 1 ITAAC will ensure that the response time requirements for these parameters are met.

	Table / Item
a) Time Delay from TSV/TCV closure to start of TBV disc motion	N/A
b) Time Delay from TSV/TCV closure to 80% Total Bypass Capacity	T 2.11.6-1 / 7
c) TSV Closure Scram Position (2 or more), % Open / Trip TD	T 2.2.7-4 / 3
d) TCV Fast Closure Scram Trip Delay Time	T 2.11.4-1 / 3
e) Assumed Slow TCV Closure Time	T 2.11.4-1 / 3
f) APRM Simulated Thermal Power Trip Time Constant	N/A

Refer to RAI 14.3-322 (MFN 08-086 Supplement 17 dated March 26, 2008) to see the revision 5 markup of Table 2.11.6-1 RAI and to RAI 14.3-319 (MFN 08-086 Supplement 26 dated April 2, 2008) to see the revision 5 markup of Table 2.11.4-1.

The time delay associated with the TSV/TCV closure to start of TBV disc motion is included in the Item b time delay of TSV/TCV closure to 80% Total Bypass Capacity. The time delay from TSV/TCV closure to start bypass valve disc motion and continuing until the bypass valves achieve 80% of rated capacity is a more limiting requirement. Therefore, the 0.02 seconds delay to the start of bypass valve motion is included in the Item b ITAAC requirement and separate time delay verification in ITAAC is not required.

The TSV Closure Scram Position is considered a setpoint for the required function identified in DCD Tier 1, Table 2.2.7-2. The requirement for setpoint development is stated in DCD Tier 1, Table 2.2.15-2 Item 10. The analysis value for this setpoint and associated response time is shown in DCD, Tier 2 Table 15.2-1.

The value for the Simulated Thermal Power (STP) time constant is directly related to the nuclear fuel thermal time constant. The APRMs sense instantaneous neutron flux, which results in a RPS trip on a Neutron Flux – High setpoint. The APRM STP simulates the core thermal power and accounts for the delay associated with the thermal lag between an increase in neutron flux to an actual increase in the thermal power. Thus, this is a maximum time lag rather than a minimum response time requirement.

DCD Impact

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

RAI 14.3-321

In Table 2.11.6-1, for clarity in ITAAC #2, because of the use of the term "signal(s)", the staff requests the applicant to discuss whether there are multiple signals or multiple valves or both that will be tested. If there are multiple signals, the applicant should identify all the signals in the DC, ITA, and AC.

GEH RESPONSE:

The Steam Bypass and Pressure Control System (SB&PC) controls the Bypass valves to discharge reactor steam directly to the main condenser in order to regulate reactor pressure whenever the turbine cannot use all of the steam generated by the reactor.

The SB&PC system has no safety setpoints because it is not a safety-related system. Actual operational setpoints are determined during startup testing.

The use of "signals" in the ITAAC is incorrect and will be corrected. There is only one signal to the BPVs and that comes from the SB&PC.

The SB&PC system is further described in DCD Tier 2, Section 7.7.5, "Steam Bypass and Pressure Control System."

DCD Impact

DCD Tier 1, Section 2.11.6 and Table 2.11.6-1, will be revised to remove the term "signal(s)" to clarify the ITAAC.

Attachment 1

DCD Tier 1, Revision 5 Markups

RAI 14.3-321

Section 2.11.6 Turbine Bypass System
Table 2.11.6-1 ITAAC For The Turbine Bypass System

2.11.6 Turbine Bypass System

Design Description

The TBS consists of hydraulically operated TBVs that are connected to the main steam header via TMSS piping. The TBS also includes the piping down stream of the TBVs to the main condenser. The Turbine Bypass System (TBS) passes steam to the main condenser in conjunction with the Turbine Main Steam System (TMSS) under the control of the Steam Bypass and Pressure Control (SB&PC) system. The TBS is classified as nonsafety-related. The TBS is used to mitigate abnormal events. The TBS is located in the Turbine Building.

(1) The functional arrangement for the TBS is as described in Subsection 2.11.6.

(2) The TBVs are controlled by ~~signal(s) from~~ the SB&PC System.

(3) The TBS steam pressure retaining and structural components are analyzed to demonstrate structural integrity under SSE loading conditions.

(4) The TBS accommodates steam flow to mitigate Abnormal Events.

(5) The TBS maintains sufficient capacity to mitigate Abnormal Events with a single active failure.

(6) The TBS design limits the capacity of individual TBVs.

(7) The TBS design allows the TBVs to open rapidly to support Abnormal Event mitigation.

Inspections, Tests, Analyses and Acceptance Criteria

Table 2.11.6-1 provides a definition of the inspections, tests, and/or analyses, together with associated acceptance criteria for the TBS.

Table 2.11.6-1

ITAAC For The Turbine Bypass System

Design Commitment	Inspections, Tests, Analyses	Acceptance Criteria
1. The functional arrangement for the TBS is described in Subsection 2.11.6.	Inspections of the as-built TBS will be conducted.	A report exists and concludes that the as-built TBS conforms to the functional arrangement described in ~~Subsection 2.11.6.~~
2. The TBVs are controlled by ~~signal(s) from~~ the SB&PC System.	Tests will be conducted using a simulated signal~~(s)~~.	A test report exists and confirms that the TBVs operate upon receipt of a simulated signal~~(s)~~ from the SB&PC System.
3. The TBS steam pressure retaining and structural components are analyzed to demonstrate structural integrity under SSE loading conditions.	An inspection of the as-built TBS will be performed to verify that it conforms with the seismic analysis.	An inspection report exists and concludes that the as-built TBS can withstand a SSE without loss of structural integrity.
4. The TBS accommodates steam flow to mitigate Abnormal Events.	An inspection will be performed to confirm that the as-built TBS accommodates steam flow to mitigate Abnormal Events.	An inspection report exists and concludes that the TBS accommodates at least ~~[~~110%~~]~~ of rated main steam flow.
5. The TBS maintains sufficient capacity to mitigate Abnormal Events with a single active failure.	An inspection will be performed to confirm that the as-built TBS maintains sufficient capacity to mitigate Abnormal Events with a single active failure.	An inspection report exists and confirms that the TBS maintains capacity greater than or equal to ~~[~~50%~~]~~ of the maximum capacity for a period greater than or equal to ~~[~~6 seconds~~]~~ with a single active failure.
6. The TBS design limits the capacity of individual TBVs.	A design analysis of the TBS will be performed to confirm that the TBS design limits the capacity of individual TBVs.	An analysis report and test data exists and concludes that no single TBV has a capacity greater than ~~[~~15%~~]~~ of rated steam flow.