



GE Energy

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MFN 07-065

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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. 70 Related to ESBWR Design Certification Application –  
Tier 1 and ITAAC Content – RAI Numbers 14.3-70, 14.3-71, 14.3-78,  
14.3-79 and 14.3-83**

Enclosure 1 contains GE's response to the subject NRC RAIs transmitted via the  
Reference 1 letter.

If you have any questions or require additional information regarding the information  
provided here, please contact me.

Sincerely,

A handwritten signature in cursive script that reads "James C. Kinsey for".

James C. Kinsey  
Project Manager, ESBWR Licensing

Reference:

1. MFN 06-382, Letter from U.S. Nuclear Regulatory Commission to David Hinds, *Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application*, October 10, 2006

Enclosure:

1. MFN 07-065 – Response to Portion of NRC Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application – Tier 1 and ITAAC Content – RAI Numbers 14.3-70, 14.3-71, 14.3-78, 14.3-79 and 14.3-83

cc: AE Cabbage USNRC (with enclosures)  
DH Hinds GE (with enclosures)  
RE Brown GE (w/o enclosures)  
eDRFs 0000-0063-5124 – RAIs 14.3-70, 71  
0000-0063-2725 – RAIs 14.3-78, 79  
0000-0062-3583 – RAI 14.3-83

**ENCLOSURE 1**

**MFN 07-065**

**Response to Portion of NRC Request for  
Additional Information Letter No. 70  
Related to ESBWR Design Certification Application  
Tier 1 and ITAAC Content  
RAI Numbers 14.3-70, 14.3-71, 14.3-78,  
14.3-79 and 14.3-83**

**NRC RAI 14.3-70**

*The "Design Description" section in DCD Tier 1 is the abstract of the system described in DCD Tier 2. The ITAAC Table listed design commitments are required to be verified by the NRC before the COL licensee can load the fuel. The staff needs to verify every item in the ITAAC table to assure that the essential portions of the system have been verified. It is suggested that the "Design Description" section has the same numbering system as the ITAAC table numbers.*

**GE Response**

Tier 1, Section 2 already meets the intent of this RAI request. The ITAAC tables are already numbered consistent with the Tier 1 subsections that include the Design Descriptions. This request would only add un-needed lower subsection numbers. For example, Subsection 2.2.7 (which contains the Design Description) is titled "Reactor Protection System," and the ITAAC table is Table 2.2.7-1, "ITAAC For The Reactor Protection System." There is nothing gained by having a Subsection 2.2.7.1, titled "Design Description," and this change could make Tier 1 more confusing.

No DCD change will be made as a result of this RAI.

**NRC RAI 14.3-71**

*In the ITAAC Table the "Design Commitment" column may contain many sub-numbered items. The "Acceptance Criteria" column should list all those sub-numbers corresponding to each Design Commitment item and discuss what type of document will be available for the staff to verify. It is not acceptable to state that "the certified design commitment is met." This type of blanket statement is difficult to verify under provision of 10 CFR 52.103(g). The acceptance criteria should be objective and unambiguous, in order to prevent misinterpretation.*

**GE Response**

GE agrees with this RAI, and has initiated the associated ITAAC table changes for Rev. 3 of Tier 1, and will have all changes completed for Rev. 4.

**NRC RAI 14.3-78**

*DCD Tier 1, Revision 1, Figure 2.1.2-4, Nuclear Boiler System Water Level Instrumentation should provide the number of level transmitters used for each range, number of transmitters used per division and which transmitters/ ranges are safety related.*

**GE Response**

Water level instrumentation on DCD Figure 2.1.2-4 will be updated to show the number of transmitters used for each range, the number of transmitters used per group (nonsafety-related) or division (safety-related) and which transmitters are safety-related. RPV water level ranges are also shown on Figure 7.7-1. Therefore, Figure 7.7-1 will be updated to show this information. In Tier 1 DCD, Section 2.1.2, the sentence that refers to description of the NBS on Figures 2.1.2-1 through 2.1.2-4 will be updated to clarify that the RPV level sensors are shown on Figure 2.1.2-4.

**DCD Impact**

DCD Tier #1, Figure 2.1.2-4, DCD Tier #2, Figure 7.7-1, and DCD Tier #1, Section 2.1.2 have been revised as noted.

**NRC RAI 14.3-79**

*DCD Tier 1, Revision 1, Section 2.1.2, the Nuclear Boiler System description does not identify the numbers, locations and safety related status of these sensors:*

- *Reactor Pressure Vessel Pressure*
- *Reactor Pressure Vessel Temperature (and metal temperature)*
- *Drywell Pressure*
- *Main Condenser Vacuum*
- *Turbine Inlet Pressure*

**GE Response**

Text will be added to DCD Section 2.1.2 to describe the numbers, locations and safety-related status of the reactor pressure, RPV metal temperature, drywell pressure, main condenser vacuum and turbine inlet pressure sensors.

**DCD Impact**

DCD Tier #1, Section 2.1.2 has been revised as noted.

**NRC RAI 14.3-83**

*Neither the Standby Liquid Control System design description, nor the P&ID for the system, Figure 2.2.4.1, provides the necessary information which ITAACs No.1, basic configuration of SLC System, and No. 8, Control Room alarms, indications and controls, require. Some of the information is provided in Section 7.4.1.2. The information in Tier 1 should include the following:*

- *The redundancy and logic numbers of the level, pressure and alarm indications*
- *A description of how the alarms, such as the low level alarms, are set to provide adequate time for recharging nitrogen and sodium pentaborate solution supply systems.*
- *Other parameters which are monitored such as nitrogen gas and poison solution makeup (not shown on Figure 2.2.4.1)*
- *Status indications for pumps, injection valves and suction valves*
- *Controls such as for the pumps, injection and suction valves and the manual initiation switches for the system.*

**GE Response**

Note that the RAI refers to "suction valves;" however, this terminology is applicable to a pumping system. The corresponding terminology for the accumulator-based ESBWR SLC system design (used below) is "injection shut-off valves."

The quadruple redundant level instrumentation on each accumulator is currently shown on Figure 2.2.4-1. The pressure instrumentation is dual redundant on each accumulator and will be added to Figure 2.2.4-1 as shown on the attached markup. The logic configuration for the alarms is a level of detail to be established during the COL detailed design engineering.

DCD Tier 2 Subsection 7.4.1.5 describes that the low level alarms (accumulator pressure and level) are set to provide adequate time for recharging the accumulator with the manually operated nitrogen and sodium pentaborate solution supply subsystems. The Design Description in Tier 1 Subsection 2.2.4 will be revised per the attached markup to add this description.

Parameters for the nitrogen and poison solution makeup subsystems are not included on Figure 2.2.2-4 because these provide only manual readiness functions, and thus are nonsafety-related. All readiness functions are maintained via routine surveillances, regardless of the existence of ITAAC. The makeup subsystems are operated manually to restore the accumulator pressure or level conditions when needed. They have no automatic functions. No change to the DCD Tier 1 Subsection 2.2.4 will be made for this item.

Status indications for the injection valves and injection shut-off valves will be added to DCD Tier 1 Subsection 2.2.4 as noted in the attached markup. The status indications for the pumps in the nitrogen and sodium pentaborate solution supply subsystems are not added because these are manually operated nonsafety-related components.

Controls for the injection valves and injection shut-off valves and manual initiation switches will be added to DCD Tier 1 Subsection 2.2.4 as noted in the attached markup. The controls for the pumps in the nitrogen and sodium pentaborate solution supply subsystems are not added because these are manually operated nonsafety-related components.

**DCD Impact**

DCD Tier 1, Subsection 2.2.4 (including Table 2.2.4-2 and Figure 2.2.4-1) and DCD Tier 2, Figure 9.3-1 have been revised as noted.