

January 26, 2006

Mr. David Hinds, Manager, ESBWR
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P.O. Box 780, M/C L60
Wilmington, NC 28402-0780

SUBJECT: REQUEST FOR ADDITIONAL INFORMATION LETTER NO. 7 RELATED TO
ESBWR DESIGN CERTIFICATION APPLICATION

Dear Mr. Hinds:

By letter dated August 24, 2005, General Electric Company (GE) submitted an application for final design approval and standard design certification of the economic simplified boiling water reactor (ESBWR) standard plant design pursuant to 10 CFR Part 52. The Nuclear Regulatory Commission (NRC) staff is performing a detailed review of this application to enable the staff to reach a conclusion on the safety of the proposed design.

The NRC staff has identified that additional information is needed to continue portions of the review. The staff's request for additional information (RAI) is contained in the enclosure to this letter. This RAI concerns the process radiation monitoring system (PRMS), Chapters 7 and 11, of the ESBWR design control document (DCD). This RAI was sent to you via electronic mail on December 7, 2005, and January 4, 2006, and was discussed with you during a telecon on January 10, 2006. On January 17, 2006, you agreed to respond to these RAIs on February 28, 2006.

If you have any questions or comments concerning this matter, you may contact me at (301) 415-4125 or jsk@nrc.gov or you may contact Amy Cubbage at (301) 415-2875 or aec@nrc.gov.

Sincerely,

/RA/

James Kim, Project Manager
New Reactor Licensing Branch
Division of New Reactor Licensing
Office of Nuclear Reactor Regulation

Docket No. 52-0010

Enclosure: As stated

cc: See next page

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*See previous concurrence
ACCESSION NO. ML060200053

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NAME	JKim	TFrye	LDudes
DATE	01/20/2006	01/23/2006	01/25/2006

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Distribution for DCD RAI Letter No. 7 dated January 26, 2006

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RAIs Regarding ESBWR Design Control Document (DCD) Section 11.5

RAI Number	Reviewer	Question Summary	Full Text
11.5-4	J-C. Dehmel	The Process Radiation Monitoring System (PRMS) subsystems listed on page 11.5-2 of the DCD are not consistent with those shown in Table 11.5-3 of the DCD.	The PRMS subsystems listed on page 11.5-2 of the DCD are not consistent with those listed in Table 11.5-3 of the DCD. Confirm whether the Containment Overpressure Protection System Discharge RMS is a relevant system. Update text accordingly.
11.5-5	J-C. Dehmel	The list of applicable design bases criteria provided in DCD Section 11.5.2 is not consistent with Section 11.5.II of the Standard Review Plan (SRP).	The list of applicable design bases criteria provided in DCD Section 11.5.2 is not consistent with Section 11.5.II of the SRP. The design bases fail to identify design criteria to monitor non-radioactive systems for potential cross-contamination through interfaces with radioactive systems. The text omits references to Regulatory Guide 4.15, and Part 50.34a and Part 50.36a, and App. B to Part 20. Also, note that throughout Section 11.5, the text either lacks references for or improperly refers to App. B, Table 2 (Col. 1 and Col. 2) criteria. For example, citations to Table 2 (including Col. 1 and Col. 2) are omitted or are inconsistent with the topics being discussed in the text or with the current Part 20. Update text accordingly.
11.5-6	J-C. Dehmel	The PRMS subsystems described in Section 11.5.3 of the DCD are not consistent with those listed in Table 11.5-3 of the DCD.	The listing of PRMS subsystems described in Section 11.5.3 of the DCD is not consistent with those listed in Table 11.5-3 of the DCD. Descriptions of the following subsystems are not included in this section: Plant Stack; and Fuel Building Ventilation Stack. Update text accordingly.

11.5-7	J-C. Dehmel	The descriptions of the isokinetic sampling design in DCD Section 11.5.3 are inconsistently presented among four PRMS subsystems.	The descriptions of isokinetic sampling systems in DCD Section 11.5.3 are inconsistent among the Turbine Building Ventilation Stack and Radwaste Building Ventilation Exhaust, and missing for the Plant Stack and Fuel Building Ventilation Stack. Given that a new approach is used in the revised ANSI/HPS N13.1-1999 standard, confirm that the design bases for all relevant sampling systems used to monitor effluent releases will comply with the performance-based approach of the standard. For example, the standard no longer relies on prescriptive rules used for selecting sampling locations, but relies on criteria defining locations with acceptable flow mixing from which representative samples can be extracted. Update text and design bases accordingly.
11.5-8	J-C. Dehmel	The dynamic detection ranges listed in DCD Table 11.5-2 for gaseous effluent instrumentation should be qualified given the competing objectives of Regulatory Guides 1.21 and 1.97.	The dynamic detection ranges listed in DCD Table 11.5-2 for gaseous effluent instrumentation should be qualified given the competing objectives of Regulatory Guides 1.21 and 1.97. For example, the reported dynamic range for the Plant Stack is stated to cover 13 orders of magnitude. This instrumentation is required to confirm compliance as well with airborne effluent limits of App. B to Part 20. As is stated in Regulatory Guide 1.97, it is recognized that a single instrument is not expected to cover the entire expected response range, but nevertheless the accuracy of the system must still be adequate in demonstrating compliance with regulatory limits. Accordingly, confirm how instrumentation selected to routinely monitor gaseous effluent releases will provide the appropriate level of accuracy in demonstrating compliance with 10 CFR Part 20 App. B limits over the stated operational ranges. Update text and DCD Tables 11.5-1 and 11.5-2 accordingly.

11.5-9	J-C. Dehmel	The presentation of the data in DCD Table 11.5-2 is inconsistent and incomplete.	The data presentation in DCD Table 11.5-2 is inconsistent and incomplete. In describing instrument detection ranges and expected activity concentrations, the table applies inconsistent use of exponential notations. For example, mixed notations are used for the detection range of the Turbine Building HVAC Exhaust and Turbine Building Compartment Area Exhaust. Also, it is not clear as whether the lower values of the cited range are expressed as a negative or positive exponents. The concentrations reported as "Expected Activity" are expressed as "0" and "negligible" in several instances. It is not clear if such designations refer to undefined lower limits of detection or other undefined instrument threshold values. The footnotes (* and **) for the "Dynamic Detection Range" and "Expected Activity" headers qualify the entries as being "typical," "estimated," or "will be updated on a plant specific basis." Given that Chapter 12 of the DCD presents expected gaseous source terms and process and effluent stream concentrations, there is a need to reconcile "Expected Activity" levels with those presented in DCD Section 12.2.2 for the nuclides listed in DCD Table 11.5-2. There is a need to provide a legend for each descriptor listed under the "Alarms and Trips" column. Provide legends and criteria defining "DNSC," "High," "High-High," "INOP," and "Abnormal Flow." Update table and text accordingly.
11.5-10	J-C. Dehmel	In light of these comments, update DCD Table 11.5-3 accordingly.	Update DCD Table 11.5-3 appropriately given the specific resolution of each applicable comment noted in the above RAI.

11.5-11	J-C. Dehmel	The presentation of the data in DCD Table 11.5-4 is inconsistent and incomplete.	The data presentation in DCD Table 11.5-4 is inconsistent and incomplete. In describing instrument detection ranges and expected activity concentrations, the table applies inconsistent use of exponential notations. For example, mixed notations are used for the detection range of the Liquid Radwaste Discharge subsystem. Also, it is not clear as to whether the lower value of the cited range is expressed as a negative or positive exponent. The footnotes (* and **) for the "Dynamic Detection Range" and "Expected Activity" headers qualify the entries as being "typical," "estimated," or "will be updated on a plant specific basis." Given that Section 12 presents expected gaseous source terms and process and effluent stream concentrations, there is a need to reconcile "Expected Activity" levels with those presented in Section 12.2.2 for radionuclides listed in Table 11.5-4. There is a need to provide a legend for each descriptor listed under the "Alarms and Trips" column. Provide legends and criteria defining "DNSC," "High," "High-High," "INOP," and "Abnormal Flow." Update table and text accordingly.
11.5-12	J-C. Dehmel	DCD Table 11.5-5 lists a liquid waste processing system sample stream that is not described in DCD Section 11.2.2 or consistent with DCD Table 11.5-7.	DCD Table 11.5-5 lists "evaporator bottoms" as a liquid sample processing stream, however, the use of an evaporator is not described in DCD Section 11.2.2. The footnote (*) defining the frequency of daily grab sample collection should be revised from "5 times per week" to 7 times per week. A comparison of the types of analyses listed in DCD Table 11.5-5 is not consistent with that shown in DCD Table 11.5-7, e.g., , gross alpha, Sr-89, Sr-90, tritium, and fission gases are not included. Update text accordingly.

11.5-13	J-C. Dehmel	Based on a review of DCD Table 11.5-7 footnotes qualifying conditions for sampling and analysis, it is not clear if liquid waste releases will always be conducted on a batch basis and the possibility of continuous releases is implicitly excluded.	Based on a review of DCD Table 11.5-7 footnotes qualifying conditions for liquid waste sampling and analysis, it is not clear if releases will always be conducted on a batch basis and, as a result, continuous releases are excluded from the design basis. Confirm whether this is the intent of the design bases and, if so, state that the related provisions of Regulatory Guide 1.21 and Section 11.5.II of the SRP do not apply. Update text in this table and DCD Section 11.5.1 accordingly.
11.5-14	J-C. Dehmel	DCD Table 11.5-7 provides an incomplete listing of sources of liquid waste streams as compared to that described in DCD Section 11.2.2 and is inconsistent with Section 11.5.II of the SRP.	DCD Table 11.5-7 provides an incomplete listing of sources of liquid waste streams as compared to that described in DCD Section 11.2.2. The following streams are not listed: Chemical Drains, Equipment Drains, Floor Drains, and DW Sump LCW/HCW Discharge. The nomenclature of the "Liquid Radwaste Effluent" is different than that given in DCD Section 11.2.2. The types of analyses listed in DCD Table 11.5-7 are not consistent with that shown in DCD Table 11.5-5 - see prior comment. Provide a description of the proportional composite sampling system footnoted (**) in this table. Confirm that all tank liquid waste samples used for analysis will be taken as representative samples and that each tank volume will be re-circulated in accordance with the guidance of Section 11.5.II of the SRP. Update text accordingly.

11.5-15	J-C. Dehmel	DCD Table 11.5-8 provides an incomplete listing of sources of gaseous waste streams as compared to that described in DCD Section 11.5.3.	DCD Table 11.5-8 provides an incomplete listing of sources of gaseous waste streams as compared to that described in DCD Section 11.5.3. The following streams are not listed: Reactor Building HVAC Exhaust Vent, Fuel Building Ventilation Stack, Refueling Handling Area Air Exhaust, and Plant Stack. The nomenclature of the "Offgas Exhaust Discharge" system is different than that shown in DCD Section 11.5.3. Confirm whether the single asterisk (*) footnote correctly describes the "Control Building" as one source of gaseous radiological effluents. Update text accordingly.
11.5-16	J-C. Dehmel	DCD Table 11.5-8 is inconsistent with Regulatory Guide 1.21 guidance for gaseous effluents.	DCD Table 11.5-8 is inconsistent with Regulatory Guide 1.21 guidance for gaseous effluents as it does not differentiate between batch and continuous releases, nor address principal fission and activation gases. Also, this table does not provide the basis for the listed analytical sensitivities given the threshold levels cited in the regulatory guide. Update text accordingly and ensure consistency with the parallel information presented in DCD Table 11.5-6.
11.5-17	J-C. Dehmel	The operational sensitivities listed in DCD Table 11.5-8 for instrumentation monitoring gaseous effluents should be qualified given the competing objectives of Regulatory Guides 1.21 and 1.97.	This comment is related to the RAI for DCD Table 11.5-2 (see RAI 11.5.3-6 above). This RAI addresses the same concerns in ensuring that operational ranges and levels of accuracy of such instrumentation are adequate in confirm compliance with airborne effluent concentration limits of App. B to Part 20. Accordingly, the information presented in DCD Table 11.5-8 should be consistent with any revisions made to DCD Table 11.5-2 for instrumentation used to monitor continuous gaseous effluent releases.

11.5-18	J-C. Dehmel	The PRMS subsystems listed in DCD Sections 11.5.5.2, 11.5.5.3, and 11.5.5.4 are not consistent with those shown in Sections 11.5.3 and Table 11.5-3 of the DCD.	The PRMS subsystems listed in DCD Sections 11.5.5.2, 11.5.5.3, and 11.5.5.4 are not consistent with those shown in Section 11.5.3 and Table 11.5-3 of the DCD. For example, Section 11.5.5.4 refers to the Containment Overpressure Protection Systems, which is not listed in Section 11.5.3, nor in Table 11.5-3. Also, the text uses different nomenclatures for the same subsystems. Update text accordingly. Note: These comments also apply to Tables 11.5-1 to 11.5-8.
11.5-19	J-C. Dehmel	The PRMS subsystems listed in Section 11.5.6.1 are not consistent with those shown in Section 11.5.3 and Table 11.5-3.	The PRMS subsystems listed in Section 11.5.6.1 are not consistent with those shown in Section 11.5.3 and Table 11.5-3. For example, the section refers to the Containment Overpressure Protection Systems, which is not listed in Section 11.5.3, nor in Table 11.5-3. Also, the text uses different nomenclatures for the same subsystems. Update text accordingly. Note: These comments also apply to Tables 11.5-1 to 11.5-8.
11.5-20	J-C. Dehmel	The discussions of applicable PRMS calibration and quality assurance criteria in DCD Section 11.5.6.2 are not consistent with SRP Section 11.5.II.	The discussions of applicable PRMS calibration and quality assurance criteria in DCD Section 11.5.6.2 are not fully consistent with SRP Section 11.5.II. The discussions fail to refer to calibration and quality assurance criteria of Regulatory Guides 1.21 and 4.15. Update text accordingly and assess whether DCD Section 11.5.2 needs to be updated as well.
11.5-21	J-C. Dehmel	Although numerous references are cited in the text, their full citations are missing in DCD Section 11.5.8.	Although numerous references are cited in the text, their full citations are missing in DCD Section 11.5.8. Among others, references are missing for ANSI N42.18-1980, ANSI/HPS N13.1-1999, NUREG-0737, General Design Criteria 60 and 64, and Regulatory Guides 1.21, 1.97, and 4.15. Update list of references accordingly.

RAIs Regarding ESBWR Design Control Document (DCD) Section 7.5.3

RAI Number	Reviewer	Question Summary	Full Text
7.5-1	Dehmel, J	The listing and designations of radiation monitoring systems and their respective ID codes shown in Fig. 7.5-2 are inconsistent with that presented in Table 11.5-3 of Chapter 11.5.3.	This section refers to Chapter 11.5 and Fig. 7.5-2 for descriptions and information on the designations and ID codes of radiation monitoring systems. The numbering designations shown in Fig. 7.5-2 are inconsistent for ID No. 21, 22, and 23. The system identified as No. 21 on Fig. 7.5-2 is not listed in Table 11.5-3 and its designation (“#21, COPS”) and functions are not described in Chapter 11.5.3. As a result, ID codes No. 21 and 22 presented in Fig. 7.5-2 are not consistent with those shown in Table 11.5-3. Also, instrument ID code No. 23 is included in Fig. 7.5-2 but is not listed in Table 11.5-3. Provide an updated listing and designations of instrumentation systems that are consistent with Chapter 11.5 of the DCD.
7.5-2	Dehmel, J	The listing of radiation monitoring systems shown on page 7.5-14 is inconsistent with that presented in Fig. 7.5-2 and Chapter 11.5.3 and Table 11.5-3.	This section refers to Table 11.5 and Fig. 7.5-2 for descriptions and information of the radiation monitoring systems. A review of instrumentation systems listed on page 7.5-14 and those shown in Fig. 7.5-2 indicates that the listing of instrument systems shown on this page is incomplete with that presented in Chapter 11.5.3 and Table 11.5-3. For example, the systems listed on page 7.5-14 is a partial listing (7 of 22 systems). Update the listing of instrumentation systems on page 7.5-14 and ensure consistency with those listed in Chapter 11.5 of the DCD.

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