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Subject: **Response to Portion of NRC Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application – DCD Tier 1 – RAI Numbers 14.3-27 through 14.3-66**

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,

Kathy Sedney for

James C. Kinsey
Project Manager, ESBWR Licensing

D048

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 07-032 – Response to Portion of NRC Request for Additional Information Letter No. 70 Related to ESBWR Design Certification Application – DCD Tier 1 – RAI Numbers 14.3-27 through 14.3-66

cc: AE Cubbage USNRC (with enclosures)
GB Stramback GE/San Jose (with enclosures)
eDRF 0000-0061-8040/1

Enclosure 1

MFN 07-032

Response to Portion of NRC Request for

Additional Information Letter No. 70

Related to ESBWR Design Certification Application

DCD Tier 1

RAI Numbers 14.3-27 through 14.3-66

NRC RAI 14.3-27:

DCD Tier 1, Revision 1, Section 2.16.2: In order to meet the requirements of 10 CFR 52.47(a)(vi), 10 CFR 52.47(a)(ix), 10 CFR 52.47(a)(2), and 10 CFR 52.47(b)(2) and to depict the concise, clear, and applicable contents of the DCD Tier 2, Revision 1,Sections 6.4 and 9.4 into DCD Tier 1 sections, address each of the habitability and heating, ventilation and air conditioning (HVAC) systems separately as a stand alone system in numeral order in Tier 1 (e.g., 2.16.2.1, 2.16.2.2, 2.16.2.3, 2.16.2..X) with the following details:

Each DCD Tier 1 section of the habitability and HVAC systems should contain its Design Description, and tables for Inspections, Tests, Analyses and Acceptance Criteria (ITAAC), applicable system component, equipment, piping/ducting, and legible system flow diagrams showing major equipment and associated instrumentation with their Tag Numbers. The stand alone systems should include

(1) emergency breathing air system (EBAS),

(2) control room habitability area HVAC sub-system (CRHAHVS),

(3) control building general area HVAC sub-system (CBGAHVS),

(4) fuel building HVAC system,

(5) radwaste building HVAC system,

(6) turbine building HVAC system,

(7) reactor building HVAC system,

(8) electrical building HVAC system, and

(9) drywell cooling system.

GE Response:

Tier 1 information has been provided in Subsection 2.16.2 for the Control Building HVAC System (CBVS, including the CRHAVS and CBGAVS), the Fuel Building HVAC System, the Reactor Building HVAC System, Radwaste Building HVAC System, Electrical Building HVAC System, and the Turbine Building HVAC System. The remaining buildings were listed as "Other Building HVAC". The Drywell Cooling System is described in Subsection 2.15.6. Design descriptions are provided for the Radwaste Building HVAC System and Electrical Building HVAC systems. The remaining building HVAC systems listed under Other Building HVAC do not require Tier 1 information because their operation is not related to any safety function and their failure would not affect any safety function. Separate numbered subheadings will be provided for the individual HVAC systems. CRHAVS and CBGAVS are subsystems of the CBVS and their design descriptions are under one heading to match the Tier 2 heading arrangement. The content of each section will be consistent with the responses provided for

RAIs 14.3-27 through 14.3-66. The ITAAC tables are revised to be consistent with the subsection numbering. The additional details requested (P&ID and D&ID drawings with MPL (tag) numbers, etc.) will be developed at the detailed design phase, are not within the scope of the design certification, and are subject to change.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-28:

DCD Tier 1, Revision 1, Section 2.16.2:

Emergency Breathing Air System (EBAS) Design Description

Provide a Design Description for the EBAS that includes cross-referencing the associated figure, ITAAC table, and table(s) for equipment, piping, and main control room habitability area heat loads. Also, provide information on ASME Code classification and seismic classification for the design and construction of components (such as air storage tanks, valves, dampers, orifices), piping, and associated pressure boundary welds.

GE Response:

The EBAS is no longer applicable to the ESBWR design. Subsection 2.16.2 has been rewritten to describe the revised CRHAVS design.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-29:

DCD Tier 1, Revision 1, Section 2.16.2:

EBAS Component Table

Provide an equipment table for air storage tanks, valves (pressure regulating valves, air delivery isolation valves, and pressure relief isolation valves), air delivery line sensors and control room differential pressure sensors. The table(s) should include information for Tag Numbers, Equipment Location, ASME Code Section status, and Seismic Category I status, Class 1E/Qualification for Harsh Environment status, Active Function status, and Loss of Motive Power Position status.

GE Response:

The EBAS is no longer applicable to the ESBWR design. Subsection 2.16.2 has been rewritten to describe the revised CRHAVS design.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-30:

DCD Tier 1, Revision 1, Section 2.16.2:

EBAS Piping Table

Provide a table for EBAS piping (line) that includes Tag Numbers and ASME Code Section status, and indicate whether its functional capability is required.

GE Response:

The EBAS is no longer applicable to the ESBWR design. Subsection 2.16.2 has been rewritten to describe the revised CRHAVS design.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3..

NRC RAI 14.3-31:

DCD Tier 1, Revision 1, Section 2.16.2:

EBAS Room Heat Load Table

Provide a table for control room habitability area and associated rooms (such as instruments and control (I&C) rooms, and dc equipment rooms) that should include the information for their specific locations (such as Room Numbers) and heat loads for first 24 hours and heat loads 24-72 hours following a bounding hypothetical accident.

GE Response

The EBAS is no longer applicable to the ESBWR design and has been removed per DCD Rev 3. The EBAS was not credited to remove heat load in the control room habitability area (CRHA). ESBWR design is committed to limiting the temperature rise in the CRHA to $\leq 8.3^{\circ}C$ ($15^{\circ}F$) for 72hrs.

DCD Impact:

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

NRC RAI 14.3-32:

DCD Tier 1, Revision 1, Section 2.16.2:

EBAS ITAAC Table

Provide a table for a system based design description and ITAAC. The table should include ITAAC table Design Commitments, Inspection, Test, Analyses and Acceptance Criteria columns as follows: (in addition to the Items 3 and 4 identified in Table 2.16.2-2):

A. Provide line items in the Design Commitment column to state that EBAS components and piping including piping boundary welds as identified in EBAS component tables (provide EBAS table numbers) are designed and constructed in accordance with the applicable codes (i.e., ASME Code Section). Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

B. Provide line items in the Design Commitment column to state that EBAS components and piping including piping boundary welds as identified in EBAS component tables (provide EBAS table numbers) retain their pressure boundary integrity at their design pressure in accordance with the requirements of the applicable codes (i.e., ASME Code Section). Also provide the related inspection/testing (e.g., hydrostatic testing) and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

C. Provide line items in the Design Commitment column to state that the seismic Category I EBAS equipment can withstand seismic design basis loads without loss of safety function. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

D. Provide line items in the Design Commitment column to state that the identified EBAS piping is designed to combine normal and seismic design basis loads without a loss of functional capability. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

E. Provide line item(s) in the Design Commitment column to state that separation is provided between EBAS Class 1E divisions, and between Class 1E divisions and non-Class 1E cable. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

F. Provide line item(s) in the Design Commitment column to state that the EBAS provides a 72-hour supply of breathable quality air at a rate of 9.5 liter/second (100 standard cubic feet per minute (scfm)) air for the five control room pressure boundary occupants. Also provide the related inspection/testing and verification information (i.e., testing and verification of the required amount of air flow, analyses of storage capacity, and control room boundary sampling

for breathable air quality) for Inspection, Test, Analyses" and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

G. Provide line item(s) in the Design Commitment column to state that the EBAS maintains control room habitability area at a positive pressure of 31 Pascals (0.125 inch of water gauge (W.G.)) with respect to surrounding areas. Also provide the related inspection/testing and verification information (i.e., testing and verification of the required range of air flow to confirm that the control room habitability area is capable of maintaining the positive pressurization and air leakage into the control room habitability area will be measured using tracer gas testing) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

H. Provide line item(s) in the Design Commitment column to state that the EBAS heat loads within the control room habitability area and other areas (such as I&C equipment rooms and the Class 1E dc equipment rooms) are within design basis assumptions to limit the heatup of these areas. Also provide the related inspection/testing and verification information (i.e., analysis and verification to determine the as-built heat loads within these rooms are less than or equal to the design basis information and Reviewer Question Summary Full Text - 13 -14.3-32 (cont.) that the corresponding report concludes that (1) the temperature and humidity in the main control room pressure boundary remain within limits for human performance for the 72-hour period, (2) the maximum temperature for the 72-hour period for the I&C rooms is less than or equal to 1200 F, and (3) the maximum temperature for the 72-hour period for the Class 1E dc equipment rooms is less than or equal to 1200 F) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

I. Provide line item(s) in the Design Commitment column to state that the EBAS safety-related displays and display parameters can be retrieved from the control room. Also provide the related inspection/testing and verification information (i.e., inspections and verification for retrievability) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

J. Provide line item(s) in the Design Commitment column to state that the EBAS controls exist for the remotely operated valves from the control room to perform their active functions. Also provide the related inspection/testing and verification information (i.e., stroke testing using controls in the main control room) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

K. Provide line item(s) in the Design Commitment column to state that the EBAS valves identified as having Distributed Control and Information System (DCIS) control their active functions. Also provide the related inspection/testing and verification information (i.e., testing using real or simulated signal) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

L. Provide line item(s) in the Design Commitment column to state that after loss of motive power, the remotely operated EBAS valves assume the indicated loss of motive power position. Also provide the related inspection/testing and verification information (i.e., testing and verification

of the valves under conditions of loss of motive power) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

GE Response:

The EBAS is no longer applicable to the ESBWR design. Subsection 2.16.2 has been rewritten to describe the revised CRHAVS design.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-33:

DCD Tier 1, Revision 1, Section 2.16.2:

EBAS ITAAC Figure

Provide revised Figure 2.16.2-5, "EBAS System Diagram," that consists of major components and piping, located inside and outside the CRHA envelope (as listed in the above tables) with their associated instrumentation. Also provide the equipment and instrumentation Tag Numbers, and sizing and flow data. Accordingly, revise DCD Tier 2, Figure 9.4-2, "EBAS System Diagram."

GE Response:

The EBAS is no longer applicable to the ESBWR design. Subsection 2.16.2 has been rewritten to describe the revised CRHAVS design.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-34:

DCD Tier 1, Revision 1, Section 2.16.2:

Control Room Habitability Area HVAC System (CRHAHVS) Design Description

Provide Design Description for CRHAHVS that include cross-referencing the associated figure, ITAAC table, and table(s) for system equipment and ducting (piping). Also, provide the information on ASME Code classification and seismic classification for the design and construction of the components (such as control room habitability area (CRHA) supply, return and exhaust isolation valves/dampers, main control room supply and exhaust lines, main control room toilet exhaust line, etc.)

GE Response:

Tier 1 Subsection 2.16.2.2, Control Building HVAC System, has been provided to include cross-referencing the associated figures and ITAAC table. Table 2.16.2-3 listing ASME Code classification and Seismic classification of the safety-related components that make up the CRHAVS is provided. Subsection 2.16.2.3 is provided to discuss the CRHAVS EFUs, and Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements. The additional details requested (sizing, flows, MPL (tag) numbers, etc.) will be developed at the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

DCD Tier 1, Subsection 2.16.2 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-35:

DCD Tier 1, Revision 1, Section 2.16.2:

CRHAHVS Component Table

Provide a component table for safety-related CRHA supply, return and exhaust isolation dampers that include the information for Tag Numbers, ASME Code Section status, Seismic Category I classification, Remotely Operated Valve status, Class 1E/Qualification for Harsh Environment status, Safety Related Display valve position status, Control status, Active Function status, and Loss of Motive Power Position status.

GE Response:

Tier 1, Subsection 2.16.2, Control Building HVAC, has been revised to better describe the different safety-related components and subsystems. MPL (tag) numbers, details of the damper position indication, Class 1E/qualification for harsh environment status, remotely operated valve status, control status and active function status for these dampers will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

Table 2.16.2-3 is provided as reflected in DCD Revision 3 to indicate the safety-related, ASME Section and seismic category for the CRHA isolation dampers. Subsection 2.16.2.2, Control Building HVAC System has been created to better describe the CBVS safety-related components and subsystems as reflected in DCD Revision 3. Subsection 2.16.2.3 is provided to discuss the CRHAVS EFUs, and Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements as reflected in DCD Revision 3.

NRC RAI 14.3-36:

DCD Tier 1, Revision 1, Section 2.16.2:

CRHAHVS Piping/Ducting Table

Provide a table for CRHAHVS supply lines, exhaust lines, and the main control room toilet exhaust line that includes the information for Tag Numbers, ASME Code Section status, Functional Capability Required status.

GE Response:

Table 2.16.2-3 is provided to describe the requirements for safety-related CRHA isolation dampers. The CRHAVS normal outside air supply and bathroom exhaust ducts outside the isolation dampers are nonsafety-related and Seismic Category II components and are not described in detail in Tier 1 documents. MPL (tag) numbers, and Functional Capability Required status (if any) will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1. Subsection 2.16.2.3 is provided to discuss the CRHAVS EFUs, and Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements.

DCD Impact:

DCD Tier 1, Subsection 2.16.2.2, Control Building HVAC System, has been created to better describe the CBVS safety-related components and subsystems as reflected in DCD Revision 3. Table 2.16.2-3 is provided to describe the requirements for safety-related CRHA isolation dampers. Subsection 2.16.2.3 is provided to discuss the CRHAVS EFUs, and Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements as reflected in DCD Revision 3.

NRC RAI 14.3-37:

DCD Tier 1, Revision 1, Section 2.16.2:

CRHAHVS Equipment Table

Provide a table for CRHA air filtration unit fans, main control room recirculation air handling unit (AHU) fans, CRHAHVS return/exhaust fans, and bathroom exhaust fans that include Tag Numbers, Display run status, and Control Function indicating Start or Run status, as appropriate.

GE Response:

The recirculation AHUs and return/exhaust fans are no longer applicable to the ESBWR design as reflected in DCD Revision 3. MPL (tag) numbers, display run status and control functions of the nonsafety-related CRHAVS AHUs and bathroom exhaust fans will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

Table 2.16.2-3 is provided to describe the requirements for safety-related CRHA isolation dampers and the CRHA EFUs. Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements. Subsection 2.16.2.3 is provided to discuss the CRHAVS EFUs. Figure 2.16.2-4 is provided to show the redundant system arrangement and the normal and emergency operation status of the associated fans.

DCD Impact:

DCD Tier 1, Subsection 2.16.2 has been revised as noted above as reflected in DCD Revision 3.

NRC RAI 14.3-38:

DCD Tier 1, Revision 1, Section 2.16.2:

CRHAHVS ITAAC Table

Provide ITAAC table that includes information for Design Commitments, Inspection, Test, Analyses and Acceptance Criteria columns as follows (in addition to the Items 1 through 5 identified in Table 2.16.2-2):

A. Provide line item(s) in the Design Commitment column to state that the CRHAHVS components, as identified in component table (provide table number), piping and/ducting, as identified in component table (provide table number) and piping/ducting pressure boundary welds for these components and piping/ducting are designed and constructed in accordance with the applicable code (i.e., ASME Code Section or equivalent). Also provide the related inspection/testing and verification information (i.e., as-built inspections, ASME Section I design reports, and non-destructive examinations for the welds) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment. Reviewer Question Summary Full Text - 16 -14.3-38 (cont.)

B. Provide line item(s) in the Design Commitment column to state that the system components and piping/ducting, as identified in component and piping/ducting tables (provide table numbers), are ASME Code Section or equivalent, and retain their pressure boundary integrity at their design pressure. Also provide the related inspection/testing and verification information (i.e., hydrostatic tests and corresponding reports conforming to ASME Section or equivalent) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

C. Provide line item(s) in the Design Commitment column to state that separation is provided between CRHAHVS Class 1E divisions, and between Class 1E divisions and non-Class 1E cable. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

D. Provide line item(s) in the Design Commitment column to state that CRHA envelope maintains habitability when radioactivity is detected. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

E. Provide line item(s) in the Design Commitment column to state that safety-related and normal displays for components and equipment are identified in component and equipment tables (provide table numbers) that can be retrieved in the main control room. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

F. Provide line item(s) in the Design Commitment column to state that controls exist in the main control room to cause the remotely operated components and equipment identified in component

and equipment tables (provide table numbers) to perform their active functions. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

GE Response:

Tier 1 Subsection 2.16.2.2, Control Building HVAC System, has been provided to better describe the differentiation of the independent CBVS subsystems and their safety-related and nonsafety-related components. The habitability of the CRHAVS is described in other Tier 1 documents that leave the CRHA isolation dampers and controls as the only safety-related component subject to evaluation in this subsection. Subsection 2.16.2.3 is provided to discuss the CRHAVS EFUs, and Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements.

The reviewer summary text responses are as follows:

A. Table 2.16.2-3 is provided to identify the CRHA isolation dampers and their applicable design information. Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements. ITAAC Table 2.16.2-4 has been revised to better describe the ITAAC requirements. Note that ASME Codes do not apply to the CRHA isolation dampers. ITAAC Table 2.16.2-6 is provided to describe the EFU ITAAC requirements.

B. Table 2.16.2-3 is provided to identify the CRHA isolation dampers and their applicable Tier 1 qualifications. Table 2.16.2-5 is provided to list the EFU Seismic and ASME Code requirements. ITAAC Table 2.16.2-4 has been revised to better describe the ITAAC requirements. ITAAC Table 2.16.2-6 is provided to describe the EFU ITAAC requirements. The CRHAVS and EFU ductwork details will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

C. Line item 5 was added to ITAAC Table 2.16.2-4 to describe the requirements for separation of the CRHA isolation damper and EFU control and instrumentation Class1E cables from non-Class 1E cables. ITAAC Table 2.16.2-6 is provided to describe the EFU ITAAC requirements.

D. Line item 2 on Table 2.16.2-4 was revised to better describe the requirements for the CRHA isolation dampers and the EFUs with respect to the isolation of the CRHA envelope under design conditions. ITAAC Table 2.16.2-6 is provided to describe the EFU ITAAC requirements. Additional requirements for habitability are included in the new Subsection 2.16.2.3, Emergency Filter Units.

E. Line item 6 on Table 2.16.2-4 was added to provide ITAAC requirements for the display of the operational status of the safety-related CRHA isolation dampers and EFUs that are listed in Tables 2.16.2-3 and 2.16.2-5. ITAAC Table 2.16.2-6 is provided to describe the EFU ITAAC requirements. All other normal equipment nonsafety-related display requirements will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

F. Same comment as E.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-39:

DCD Tier 1, Revision 1, Section 2.16.2: CRHAHVS ITAAC Figure

Provide revised Figure 2.16.2-4, "CRHAHVS Simplified System Diagram," that consists of major components, piping/ducting, and equipment, located inside and outside the CRHA envelope (as listed in the above tables) with their associated instrumentation. Also provide the equipment and instrumentation Tag Numbers, and flow and sizing data. Accordingly, revise DCD Tier 2 Figure 9.4-1, "CRHAHVS Simplified System Diagram."

GE Response:

Tier 1 Subsection 2.16.2.2 Control Building HVAC System has been provided to better describe the differentiation of the independent CBVS subsystems and their safety-related and nonsafety-related components. Figure 2.16.2-4 "CRHAVS Simplified System Diagram" has been revised to show greater detail of the major system components. Nominal system flows are provided for air flows into and out of the CRHA. Detailed system sizing, instrumentation, MPL (tag) numbers, airflow rates and duct sizing will be developed during detail design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-40:

DCD Tier 1, Revision 1, Section 2.16.2: Control Building General Area HVAC system (CBGAHVS) Design Description

Provide Design Description for CBGAHVS serving outside the CRHA that include cross referencing the associated Figure, ITAAC Table, and table for the system equipment.

GE Response:

The nonsafety-related CBGAVS components are all located outside the CRHA as shown by Tier 2 documentation. Tier 1 Subsection 2.16.2.2, Control Building HVAC System, design descriptions have been provided to better differentiate between the independent CRHAVS and CBGAVS and to include cross referencing the associated figures. The detailed design description of the nonsafety-related CBGAVS will be developed during detailed design phase, and is not within the scope of the design certification, and is subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-41:

DCD Tier 1, Revision 1, Section 2.16.2:

CBGAHVS Component Table

Provide component table for non-CRHA supply, return and exhaust isolation dampers or valves that include the information for Tag Numbers, ASME Code Section status, Seismic Category I classification, Remotely Operated Valve status, Class 1E/Qualification for Harsh Environment status, Display for valve position status, Control status, Active Function status, and Loss of Motive Power Position status.

GE Response:

The CBGAVS is a nonsafety-related system. Remotely operated valve status, control status and active function status for these dampers will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1. Tier 1, Subsection 2.16.2.2, Control Building HVAC, has been provided to better describe the differentiation between the safety-related and the nonsafety-related components and subsystems.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-42:

DCD Tier 1, Revision 1, Section 2.16.2:

CBGAHVS Equipment Table

Provide equipment table for non-CRHA supply fans and return/exhaust fans. The AHU supply fans and return/exhaust fans that include the information for Tag Numbers, Display status (i.e., Run status), and Control Function status (i.e., Start status).

GE Response:

Component Information for the non-CRHA supply fans and return/exhaust fans are provided in tabular form in Tier 2, Table 9.4-2.

New Tier 1 Table 2.16.2-3 lists the safety-related CRHA isolation dampers. Subsection 2.16.2.2 has been provided to better differentiate between the independent CRHAVS and CBGAVS and their components.

MPL (tag) numbers, display run status and control functions of nonsafety-related CBGAVS equipment and components will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-43:

DCD Tier 1, Revision 1, Section 2.16.2:

CBGAHVS ITAAC Table

Provide ITAAC table consisting of Design Commitments and their associated Inspection, Test, Analyses and Acceptance Criteria as follows in addition to the Items identified in Table 2.16.2-2. Reviewer Question Summary Full Text - 18 -14.3-43 (cont.)

A. Provide line item(s) in the Design Commitment column to state that the basic configuration of the CBGAHVS is as described in the Design Description (provide DCD Tier 1 Section number). Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

B. Provide line item(s) in the Design Commitment column to state that the Set A serves Division I/VI DCIS room, non-1E distributed control and information system (DCIS) East Room A, HVAC room, and corridor areas and Set B serves Division II/III DCIS,non-1E DCIS Room B, and CRHA corridor area by providing conditioned air. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

C. Provide line item(s) in the Design Commitment column to state that controls exist in the main control room to cause the components and equipment identified in tables (provide table numbers) to perform their active functions. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

D. Provide line item(s) in the Design Commitment column to state that displays exist in the main control room and display parameters can be retrieved from the control room. Also provide the related inspection/testing and verification information for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment.

E. Provide line item(s) in the Design Commitment column to state that the CBGAHVS provides cooling to the Division I, II, III, and IV DCIS rooms and CRHA corridor. Also provide the related inspection/testing information (i.e., equipment testing will be performed using controls in the main control room) and verification information (i.e., the equipment displays can be retrieved in the main control room) for Inspection, Test, Analyses and Acceptance Criteria columns in order to meet the intent of the Design Commitment column.

GE Response:

The independent CBGAVS components are outside the CRHA and are nonsafety-related. Tier 1 Subsection 2.16.2.2 has been provided to better differentiate between safety-related and nonsafety-related subsystems and components. Because the nonsafety-related CBGAVS only

serves the areas outside of the CRHA and has no safety significance, an ITAAC table is not required per SRP 14.3 – 14.3.11 and DG-1145.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-44:

DCD Tier 1, Revision 1, Section 2.16.2:

CBGAHVS ITAAC Figure

Provide revised Figures 2.16.2-6, "CBGAHVS (Set A) Simplified System Diagram," and Figures 2.16.2-7, "CBGAHVS (Set B) Simplified System Diagram," that consist of major components, piping/ducting, and equipment, located inside and/or outside the CRHA envelope (as listed in the above tables) with their associated instrumentation. Also provide the equipment and instrumentation Tag numbers, and sizing and flow data. Accordingly, revise DCD Tier 2, Figures 9.4-3, "CBGAHVS (Set A) Simplified System Diagram," and Figures 9.4-4, "CBGAHVS (Set B) Simplified System Diagram."

GE Response:

The CBGAVS (Set A and Set B) and all associated components are nonsafety-related and are located outside the CRHA. Tier 1 Subsection 2.16.2.2 has been provided to better differentiate between the safety-related and nonsafety-related HVAC components and subsystems in the Control Building. MPL (tag) numbers, duct sizing and airflow rates will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-45:

DCD Tier 1, Revision 1, Section 2.16.2:

Fuel Building HVAC System (FBHVS) Design Description

Revise the Design Description to state that the FBHVS maintains the fuel building at a minimum negative pressure of 62 Pa (-1/4 inch W.G.) relative to surrounding areas to minimize exfiltration of potentially contaminated air to reflect the text of DCD Tier 2 Section 9.4.2.

GE Response:

Subsection 2.16.2.5 has been revised to indicate the FBVS maintains the Fuel Building at a minimum negative pressure of 62 Pa (-1/4 inch W.G.) relative to surrounding areas.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-46:

DCD Tier 1, Revision 1, Section 2.16.2:

FBHVS Component Table

Provide a component table for fuel building pressure differential indicators that include information for the Tag Numbers, Display status, and Control Function status.

GE Response:

The MPL (tag) numbers, display status and control function status for the fuel building pressure differential indicators will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-47:

DCD Tier 1, Revision 1, Section 2.16.2:

FBHVS Component Table

Provide an FBHVS equipment table that includes specified information DCD Tier 1, Revision 1, Section 2.16.2: FBHVS Equipment Table Provide an equipment table for FBHV system supply, return/exhaust and standby exhaust fans that include the information for Tag Numbers and Component Location.

GE Response:

Component information for the FBVS supply, return/exhaust and standby exhaust fans are provided in tabular form in Tier 2, Tables 9.4-4 and 9.4-5. MPL (tag) numbers and component locations will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1. Table 2.16.2-7, "Fuel Building HVAC System Safety-Related Components" has been added to list safety-related components, their seismic category, their ASME Code classification and their fail safe position.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-48:

DCD Tier 1, Revision 1, Section 2.16.2:

FBHVS ITAAC Table

Provide an ITAAC table consisting of Design Commitments and their associated Inspection, Test, Analyses and Acceptance Criteria as follows in addition to the line Items identified in Table 2.16.2-3:

A. Provide a line item in the Design Commitment column to state that FBHVS maintains fuel building at a minimum negative pressure of 62 Pa (-1/4 inch W.G.) relative to surrounding areas.

B. Provide a line item(s) in the Inspection, Test, Analyses column; it should state as follows: i) Testing will be performed to confirm that the FBHVS maintains a minimum negative pressure of 62 Pa (-1/4 inch W.G.) when operating all FBHVS supply AHUs and all FBHVS exhaust fans. ii) Testing will be performed to confirm the ventilation flow rate through the fuel building area when operating all FBHVS supply AHUs and all FBHVS exhaust fans.

C. Provide a line item(s) in the Acceptance Criteria column. It should state as follows: i) The time average pressure differential in the served areas of the fuel building as measured by the pressure differential indicators (provide Equipment Table Number where these indicators are shown) is a minimum of 62 Pa (-1/4 inch W.G.). ii) A report exists and concludes that the calculated exhaust flow rate based on the measured flow rate is greater than or equal to the FBHVS supply flow rate (provide data).

GE Response:

A. Line item 4 will be added to the Design Commitment column of Table 2.16.2-8 to state the FBVS maintains the Fuel Building at a minimum negative pressure of 62 Pa (-1/4 inch W.G.) relative to surroundings.

B. Line items 4.a and 4.b will be added to the Inspection, Tests, Analysis column of Table 2.16.2-8, which includes the statement requested in item B above. The statement was modified to state "when operating FBVS supply and exhaust AHUs in the normal system fan lineup" versus "when operating all supply and exhaust AHUs".

C. Line items 4.a and 4.b will be added to the Acceptance Criteria column of Table 2.16.2-8.

   a. The time average pressure differential in the served areas of the fuel building as measured by the pressure differential indicators is a minimum negative pressure of 62 Pa (-1/4 inch W.G.).

   b. Test report indicating the exhaust flow rate is greater than or equal to the FBVS supply flow rate.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-49:

DCD Tier 1, Revision 1, Section 2.16.2:

FBHVS ITAAC Figure

Provide revised system flow diagrams that consist of major components and equipment, as described in the above FBHVS tables including major instrument details with Tag Numbers, and flow and sizing data. Also, clarify why DCD Tier 1 Figure 2.16.2-7, "CBGAHVS (Set B) Simplified System Diagram," and Figure 2.16.2-8, "FBGAHVS Simplified System Diagram," show identical areas being served by two different unrelated HVAC systems. And, revise FBGAHVS figure, as needed.

GE Response:

System flow diagrams are currently provided that include major components and equipment. Major instrument details with MPL (tag) numbers, flow and sizing data will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1. Figure 2.16.2-7, "FBGAVS Simplified System Diagram" will be replaced with the updated figure.

DCD Impact:

Figure 2.16.2-7, "FBGAVS Simplified System Diagram" was replaced with the correct figure, as noted above, in DCD Tier 1 Rev. 3.

NRC RAI 14.3-50:

DCD Tier 1, Revision 1, Section 2.16.2:

Radwaste Building HVAC (RWBHVAC) System

The RWBHVACS is a stand-alone system as described in DCD Tier 2 Section 9.4.3. Provide a concise general Design Description describing the function of radwaste building HVAC system as described in DCD Tier 2, Revision 1, Section 9.4.3. Also address the following system functions

- Radwaste building is maintained at a slight negative pressure relative to adjacent areas and outside atmosphere to prevent the exfiltration of air to adjacent areas;

- The radwaste building exhaust is monitored prior to discharging it through the plant vent stack.

Also, address radiation monitoring in the text and figure of I.e., Tier 2, Revision 1, Section 9.4.3, as needed.

GE Response:

A discussion specific to Radwaste Building HVAC has been added to the new Tier 1 Subsection 2.16.2.6. This discussion describes Radwaste Building ventilation general concepts and include the two bulleted items above.

Radiation monitoring is addressed in Revision 3 of the Tier 2 document as follows:

- Subsection 9.4.3.1 states: The exhaust air is monitored for radiation prior to discharge to atmosphere.
- Subsection 9.4.3.5 states that instrumentation exists for high radiation in the exhaust air duct.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-51:

DCD Tier 1, Revision 1, Section 2.16.2:

Turbine Building HVAC (TBHV) System

The TBHV system is a stand-alone system as described in DCD Tier 2 Section 9.4.4. Revise the Design Description to state (In addition to the existing description under DCD Tier 1 Section 2.16.2) as follows:

- Turbine building exhaust is directed to the plant vent stack where it is monitored for radiation prior to being discharged to the atmosphere, as described in DCD Tier 2,Revision 1, Section 9.4.4.

- TBHV system is designed to minimize exfiltration of air to adjacent areas by maintaining a slightly negative pressure in the turbine building (by exhausting more air than is supplied to the turbine building) relative to adjacent areas.

GE Response

The two items requested above have been added to the Turbine Building HVAC discussion in new Tier 1 Subsection 2.16.2.4.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-52:

DCD Tier 1, Revision 1, Section 2.16.2:

Reactor Building HVAC System (RBHVS) Design Description

Revise Tier 1 materials for RBHVS to provide additional information concerning the Design Description, equipment tables, ITAAC table, and system figure with the related system details (in addition to the existing materials under DCD Tier 1, Revision 1, Section 2.16.2). Address the following information in the "Design Description" for RBHVS in order for the staff to complete its review:

A. Include cross-referencing the associated ITAAC Table and tables for system equipment, ducting, piping, and associated controls, as identified in RAIs 14.3-53,14.3-54, and 14.3-55.

B. Provide the information on ASME Code classification and seismic classification, for the design and construction of components (such as safety-related building isolation dampers and ducting (piping)) penetrating the reactor building boundary.

C. Provide system functions to (1) maintain the reactor building at a minimum negative pressure with respect to the adjacent areas to minimize the exfiltration of potentially contaminated air and (2) maintain hydrogen concentration levels in the battery rooms below 1% by volume, and (3) monitor the reactor building exhaust for radiological contamination prior to discharge to the plant vent stack.

GE Response:

A. Tier 2, Tables 9.4-10 and 9.4-11 provide component information for the Reactor Building HVAC System safety-related equipment (building supply and exhaust air isolation dampers). The cross-referencing of the ITAAC Table, system equipment tables, ducting, piping, and associated controls will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

B. Tier 1, Table 2.16.2-1, "Reactor Building HVAC System Safety-Related Components" have been added to list the safety-related components, their seismic category, their ASME Code classification and their fail safe position.

C. The RBVS Design Description has been revised to include the functions required to maintain the reactor building potentially contaminated areas at a minimum negative pressure relative to adjacent areas; the functions required to maintain hydrogen concentration levels in the battery rooms below 2% by volume; and the functions to monitor the reactor building exhaust for radiological contamination prior to discharge to the plant vent stack.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-53:

DCD Tier 1, Revision 1, Section 2.16.2:

RBHVS Component Tables

Provide information in a tabulated format concerning the associated instrumentation and controls that provide the reactor building isolation based upon isolation signals, maintain reactor building at a minimum negative pressure with respect to the adjacent areas to minimize exfiltration of outside air based upon the differential pressure indicators, and detect radiation activity prior to release to plant vent stack based upon the radiation monitors. Reviewer Question Summary Full Text - 23 -14.3-53 (cont.) Provide a table for isolation dampers (valves) for reactor building contaminated area HVAC subsystem (CONAVS), refueling and pool area HVAC subsystem (REPAVS), and reactor building clean area HVAC subsystem (CLAVS), that include the information for Tag Numbers, ASME Code Section status, Seismic Category I classification, Remotely Operated Valve status, Class 1E/Qualification for Harsh Environment status, Safety Related Display valve position status, Control status, Active Function status, and Loss of Motive Power Position status.

GE Response:

Component information for safety-related isolation dampers for REPAVS and CONAVS is provided in tabular form in Tier 2, Tables 9.4-10 and 9.4-11. Table 2.16.2-1, "Reactor Building HVAC System Safety-Related Components" has been added in response to RAI 14.3-52 to Tier 1 Subsection 2.16.2. A table for associated instrumentation and controls including MPL (tag) numbers, remotely operated valve status, Class 1E/Qualification, safety-related display damper (valve) position status, control status, active function status and Loss of Motive Power Position status will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-54:

DCD Tier 1, Revision 1, Section 2.16.2:

RBHVS Equipment Table

Provide a table for supply and exhaust air ducting/piping for CONAVS and REPAVS (RBHVS subsystems) that include information for Tag Numbers, ASME code section status, and "Functional Capability Required" status.

Also provide a table for CONAVS air handling units (AHUs) and exhaust fans, RBHVS purge exhaust filter units and exhaust fans, REPAVS AHUs and exhaust fans that include information for Tag Numbers, Display run status, and Control Function indicating Start or Run status, as appropriate.

GE Response:

A Table for CONAVS and REPAVS supply and exhaust air ducting/piping to include MPL (tag) numbers, ASME code section status and "Functional Capability Required" status will be developed during the detailed design phase and is subject to change. Therefore, this information is not within the scope of the ESBWR design certification, and thus, is not available for inclusion into Tier 1.

Component information for REPAVS and CONAVS air handling units, exhaust fans and RBVS purge exhaust filter units and exhaust fans is provided in Tier 2, Tables 9.4-10 and 9.4-11. A table to include MPL (tag) numbers, display run status and control function indicating Start or Run status for this equipment will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-55:

DCD Tier 1, Revision 1, Section 2.16.2:

RBHVS ITAAC Table

Revise the ITAAC table consisting of "Design Commitments" and their associated "Inspection, Test, Analyses" and "Acceptance Criteria" as follows in addition to the items identified in Table 2.16.2-1:

A. Provide line item(s) in the Design Commitment column to state that the CONAVS and REPAVS maintain served areas the of reactor building at a minimum negative pressure (e.g., 62 Pa (-1/4 inch W.G.)) relative to surrounding clean areas to minimize the exfiltration of potentially contaminated air.

B. Provide line item(s) in Inspection, Test, Analyses column for CONAVS to state as follows: Reviewer Question Summary Full Text - 24 -14.3-55 (cont.) i) Testing will be performed to confirm that the contaminated areas of reactor building served by CONVAS maintain a minimum negative pressure of (e.g., 62 Pa (-1/4-inch W.G.)) when operating all CONAVS supply and exhaust fans. ii) Testing will be performed to confirm the ventilation flow rate through the contaminated areas of reactor building served by CONVAS when operating all CONAVS supply and exhaust fan(s).

C. Provide line items in the Acceptance Criteria column for CONAVS to state as follows: i) The time average pressure differential in the CONVAS served areas of the reactor building as measured by each of the pressure differential indicators (provide Equipment Table Number where these indicators are shown) is negative. ii) A report exists and concludes that the calculated exhaust flow rate based on the measured flow rate is greater than or equal to CONVAS supply flow rate (provide flow rate data).

D. Provide line item in the Design Commitment column to state that the REPAVS maintains served areas of reactor building at a minimum negative pressure (e.g., 62 Pa (-1/4 inch W.G.)) relative to surrounding clean areas to minimize the exfiltration of potentially contaminated air.

E. Provide line item(s) in the "Inspection, Test, Analyses" column should include a line item for REPAVS to state as follows: i) Testing will be performed to confirm that the refueling area of the reactor building served by REPAVS maintains a minimum negative pressure of (e.g., 62 Pa (-1/4 inch W.G.)) when operating all REPAVS supply and exhaust fans. ii) Testing will be performed to confirm the ventilation flow rate through the refueling area of reactor building served by REPAVS when operating all REPAVS supply and exhaust fans. Reviewer Question Summary Full Text - 25 -14.3-55 (cont.)

F. Provide line item(s) in the Acceptance Criteria column for REPAVS to state as follows:

i) The time average pressure differential in the REPAVS served areas of the reactor building as measured by each of the pressure differential indicators (provide Equipment Table Number where these indicators are shown) is negative.

ii) A report exists and concludes that the calculated exhaust flow rate based on the measured flow rate is greater than or equal to REPAVS supply flow rate (provide flow rate data).

DCD Tier 1, Revision 1, Section 2.16.2 states that REPAVS serves the refueling area of the reactor building while the same DCD Section implies that FBFPHV serves the spent fuel pool area. Clarify the differences of the areas being served by FBHVS as shown in Tier 1, Figure 2.16.2-9, "FBFPHV Simplified System Diagram" (Tier 2, Figure 9.4-6) and areas served by REPAVS as shown in Tier 1, Figure 2.16.2-3, "REPAVS Simplified System Diagram" (Tier 2, Figure 9.4-11).

GE Response:

A. Line item 5 was added to the Design Commitment column of Table 2.16.2-2 to state that CONAVS maintains served areas of the reactor building at a minimum negative pressure of 62 Pa (-1/4 inch W.G.) relative to surrounding clean areas.

B. Line items 5.a and 5.b was added to the Inspection, Tests, Analysis column of Table 2.16.2-2 which includes the statement requested in item B above, when operating the CONAVS fans in the normal system lineup.

C. Line items 5.a and 5.b was added to the Acceptance Criteria column of Table 2.16.2-2

   a. The time average pressure differential in the CONAVS served areas of the reactor building as measured by each of the pressure differential indicators is minimum negative pressure of 62 Pa (-1/4 inch W.G.).

   b. Test report indicating the exhaust flow rate is greater than or equal to the CONAVS supply flow rate.

D. Line item 6 was added to the Design Commitment column of Table 2.16.2-2 to state that REPAVS maintains served areas of the reactor building at a minimum negative pressure of 62 Pa (-1/4 inch W.G.) relative to surrounding clean areas.

E. Line items 6.a and 6.b was added to the Inspection, Tests, Analysis column of Table 2.16.2-2 for REPAVS which includes the statement requested in item E above, when operating the REPAVS fans in the normal system lineup.

F. i) Line items 6.a and 6.b was added to the Acceptance Criteria column of Table 2.16.2-2

   a. The time average pressure differential in the REPAVS served areas of the reactor building as measured by each of the pressure differential indicators is minimum negative pressure of 62 Pa (-1/4 inch W.G.).

   b. Test report indicating the exhaust flow rate is greater than or equal to the REPAVS supply flow rate.

F. ii) The Fuel Building HVAC description of Subsection of 2.16.2 will be revised for clarification. Figure 2.16.2-3, "REPAVS Simplified System Diagram" will be revised to indicate REPAVS serves the Reactor Building refueling area. Figure 2.16.2-8, "FBFPVS Simplified System Diagram" has been revised to indicate FBFPVS serves the Fuel Building spent fuel storage pool and equipment areas.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-56:

DCD Tier 1, Revision 1, Section 2.16.2:

RBHVS ITAAC Figure

Provide revised system flow diagrams that consists of major components and equipment with their Tag Numbers, as described in the above RBHVS tables including major instrument details and flow and sizing data.

GE Response:

System flow diagrams are currently provided that include major components and equipment. Major instrument details with MPL (tag) numbers, flow and sizing data will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-57:

DCD Tier 1, Revision 1, Section 2.16.2:

Electrical Building HVAC System (EBHVS) Design Description

Address additional information concerning the Design Description, equipment tables, including ITAAC table, and system figure with the related details.

Address the following information in the Design Description for EBHVS in order for the staff to complete its review:

- Provide cross-referencing of the associated EBHVS figures and tables including equipment and ITAAC tables for TSC HVAC subsystem and DG HVAC subsystem equipment, as identified in RAIs 14.3-58, 14.3-59, 14.3-60, 14.3-61, and 14.3-62.

- Address the system functions to maintain the TSC at a positive pressure with respect to the adjacent rooms and outside environment to minimize the infiltration of potentially contaminated air and to maintain hydrogen concentration levels in the battery rooms to less than 2 percent by volume.

The reactor building HVAC system maintains the hydrogen concentration level in the battery rooms below 1% by volume (as discussed in DCD Tier 2, Revision 1, Section 9.4.6). The electric and electronic rooms served by (EER) HVAC subsystem maintain the hydrogen concentration level to less than 2% by volume (as stated in Section 9.4.7). Provide justification for the variance in design criteria for hydrogen concentration levels in the above rooms citing the appropriate Code or Standard requirements (e.g., OSHA or others) and revise DCD Tier 2, Section 9.4.7.1 accordingly.

GE Response:

New Subsection 2.16.2.7, Electrical Building HVAC System, has been provided to include additional system function information, including maintaining the TSC at positive pressure, and limiting hydrogen concentration levels in the battery rooms. To be consistent with other systems without safety design bases, a schematic diagram will not be provided, as it is available in the Tier 2 document as Figure 9.4-12. MPL (tag) numbers, display run status, component locations, and other types of data will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

The hydrogen concentration for battery rooms was reviewed. Per RG 1.128, which endorses IEEE 484-2002: "The ventilation system shall limit hydrogen accumulation to less than 2% of the total volume of the battery area".

The reactor building HVAC system descriptions (Tier 1 and 2) have been changed to state the 2% hydrogen concentration limit.

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

DCD Tier 2 Section 9.4.6.1 has been changed to state "Maintains the hydrogen concentration levels in the battery rooms below 2% by volume".

NRC RAI 14.3-58:

DCD Tier 1, Revision 1, Section 2.16.2:

ERR HVAC Subsystem Equipment Table

Provide an equipment table for the battery room exhaust fans that include information for Tag Numbers, Display run status, Control Function indicating Start or Run status, and component locations.

GE Response:

MPL (tag) numbers, display run status, control function indicating Start or Run status, and component locations will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-59:

DCD Tier 1, Revision 1, Section 2.16.2:

TSC HVAC Subsystem Equipment Table

Provide an equipment table for filtration units with supply fans (radiological mode of operation), air conditioning units (normal operation), kitchen exhaust fans, and pressure differential indicators that include information for Tag Numbers, Display run status, Control Function indicating Start or Run status, and component locations.

GE Response:

MPL (tag) numbers, display run status, pressure differential indicator specifics, control function indicating Start or Run status, and component locations will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-60:

DCD Tier 1, Revision 1, Section 2.16.2:

DG HVAC Subsystem Equipment Table

Provide an equipment table for normal engine room AHUs, roof-mounted exhaust fans for supplementary ventilation, and electronic area AHUs that include information for Tag Numbers, Display run status, Control Function indicating Start or Run status, and component locations.

GE Response:

MPL (tag) numbers, display run status, control function indicating Start or Run status, and component locations will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-61:

DCD Tier 1, Revision 1, Section 2.16.2:

EBHVS ITAAC Table

Provide ITAAC table consisting of "Design Commitments" and their associated "Inspection, Test, Analyses" and "Acceptance Criteria" columns as follows:

A. - Provide the Design Commitment stating that the basic configuration of the EBHVS is as described in the Section (provide DCD Tier 1, Section Number). Also provide corresponding Inspection, test, Analyses column description stating that the inspections of the EBHVS configuration will be conducted. Also provide corresponding Acceptance Criteria column description stating that the as-built EBHVS conforms with the description in Section (provide DCD Tier 1, Section number).

B. Provide a Design Commitment for maintaining positive pressure inside TSC areas. Provide details such as: the TSC HVAC subsystem maintains TSC at a slightly positive pressure (provide specific pressure differential data in English as well as in Metric Units) with respect to the adjacent rooms and outside environment to minimize the infiltration of contaminated air. Also provide corresponding "Inspection, Test, Analyses" detail stating that testing will be conducted (such as differential pressure testing and tracer gas testing in accordance with ASTM E741). Also provide corresponding Acceptance Criteria column details such as the time average pressure differential in the TSC areas is positive as measured by each of the pressure differential indicators (provide DCD Tier 1 equipment table number).

C. Provide a concise description in the Design Commitment that describes the major areas served by the EER HVAC, TSC HVAC and DG HVAC subsystems to provide ventilation and/or cooling functions. Also provide corresponding details for the Inspection, Test, Analyses and Acceptance Criteria.

GE Response:

Consistent with other systems without safety design bases (i.e., no safety significance), an ITAAC will not be provided for EBVS. However, a concise description of major areas served by the EERVS, TSCVS, and DGVS have been added to new Tier 1, Subsection 2.16.2.7.

DCD Impact:

DCD Tier 1 has bee revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-62:

DCD Tier 1, Revision 1, Section 2.16.2: EBHVS Figure

Provide a system flow diagram that consists of major equipment (as described in the above equipment tables) and corresponding instrument details with their Tag Numbers and flow and sizing data.

GE Response:

MPL (tag) numbers, instrument details, and flow and sizing data will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-63:

DCD Tier 1, Revision 1, Section 2.16.2:

Drywell Cooling System (DCS) Design Description

Provide cross-referencing of the component tables for DSC equipment (e.g., fan coil units (FCUs), drywell temperature sensors, air or motor-operated dampers (if any), and associated controls), as identified in RAIs 14.3-64 and 14.3-65).

GE Response:

The DCS is described in DCD Tier 1, Subsection 2.15.6. The use of temperature sensors and possible use of air or motor-operated dampers will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-64:

DCD Tier 1, Revision 1, Section 2.16.2:

DCS Equipment Table

Provide an equipment table for drywell temperature sensors that include information for Tag Numbers and Display status. Also provide an equipment table for DCS recirculation fan coil units that include Tag Numbers and Component Location.

GE Response:

The DCS is described in DCD Tier 1, Subsection 2.15.6. MPL (tag) numbers, display status information, and component locations for FCUs and temperature sensors will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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

NRC RAI 14.3-65:

DCD Tier 1, Revision 1, Section 2.16.2:

DCS ITAAC Table

Add an item as follows in addition to the line Item 1 in ITAAC Table 2.15.6-1:

Provide a Design Commitment that states that displays of the parameters identified in tabulated form for the drywell temperature sensors (specify equipment table number) can be retrieved in the main control room. Also provide the corresponding details in Inspection, Test, Analyses and Acceptance Criteria stating that inspection will be conducted for retrievability of the parameters in the main control room and verifications will be made.

GE Response:

DCD Tier 2, Revision 2, Subsection 7.7.7.5.3 states that drywell temperatures are provided in the main control room. The commitment requested above has been added to the Tier 1 document, ITAAC Table 2.15.6-1

DCD Impact:

DCD Tier 1 has been revised as noted above and as reflected in DCD Revision 3.

NRC RAI 14.3-66:

DCD Tier 1, Revision 1, Section 2.16.2:

DCS ITAAC Figure

Revise DCD Tier 1, Figure 2.15.6-1 to show DCS temperature sensors with their Tag Numbers and FCU Tag Numbers and flow and sizing data.

GE Response:

MPL (tag) numbers and flow and sizing data will be developed during the detailed design phase, are not within the scope of the design certification, and are subject to change. Therefore, this information is not available in Tier 2, and thus, cannot be included in Tier 1.

DCD Impact:

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