

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

9/8/2008

US-APWR Design Certification

Mitsubishi Heavy Industries

Docket No. 52-021

SRP Section: 09.04.03 - Auxiliary and Radwaste Area Ventilation System

Application Section: Tier 2 FSAR Section 9.4.3

SPCV Branch

QUESTIONS

09.04.03-1

RAI 9.4.3-1 The US APWR in section 9.4.3 states that the auxiliary building ventilation system provides proper environmental conditions during normal plant operations throughout all areas of the A/B, R/B and PS/B. Section 9.4.3 goes on to list the systems included in the auxiliary building ventilation system including:

- Auxiliary building HVAC system
- Non-Class 1E electrical room HVAC system
- Main steam/feed water piping area HVAC system, and
- Technical support center (TSC) HVAC system.

The diagram shown in Figure 9.4.3-1, "Auxiliary Building HVAC System Flow Diagram," includes the Fuel Handling Area, the AC/B Controlled Area, and the AC/B Uncontrolled Area. These areas were not included in the list in section 9.4.3. The system description of section 9.4.3.2.1 includes a reference to Figure 9.4.3-1 and Table 9.4.3-1. Table 9.4.3-1 does not include the equipment for the Fuel Handling Area, the AC/B Controlled Area or the AC/B Uncontrolled Area. In addition, Table 9.4-1 provides a list of areas supplied by the Auxiliary Building HVAC system. The list in Table 9.4-1 is not consistent with the systems listed on the diagram in Figure 9.4.3-1. For example, Table 9.4-1 lists the Gas Turbine Area, the Sampling/Laboratory Room, and the Access Control Area that do not appear to be included on the diagram in Figure 9.4.3-1.

DCD Figure 9.4.3-3 "Main Steam/Feed water Piping Area HVAC System Flow Diagram" displays the wrong system. It displays the same system as shown on Figure 9.4.3-2 "Non-Class 1E Electrical Room HVAC System Flow Diagram". Figure 9.4.3-3 must be corrected to display the correct system flow diagram for the Main Steam/Feed water Piping Area HVAC System.

Figure 9.4.3-1 "Auxiliary Building HVAC System Flow Diagram" displays a system interface with the "Containment Ventilation System" (i.e.

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

Containment Low Volume Purge Exhaust Filtration Units). Figure 9.4.6-1 "Containment Ventilation System Flow Diagram (2 of 2)" displays this same system interface. Neither DCD Section 9.4.3 "Auxiliary Building Ventilation System" nor DCD Section 9.4.6 "Containment Ventilation System" provides discussion of the system interface. The staff requests that the DC applicant amend both DCD Section 9.4.3 and Section 9.4.6 with discussion as to the function/purpose of this system interface.

GDC 60 requirements control the quantities of radioactive materials in gaseous effluents released to the environment from normal ventilation systems. Consistent with SRP 9.4.3, the system description and P&IDs should show all of the auxiliary building ventilation systems to confirm that essential safety-related portions of the auxiliary building ventilation system are correctly identified and are isolable from nonessential portions of the system. Clarify the lists in section 9.4.3, the diagram in Figure 9.4.3-1, Table 9.4.3-1 and Table 9.4-1 to provide a consistent list of systems supplied by the auxiliary building ventilation system and the interfaces. Provide additional information for the inconsistencies to allow for verification that two automatically operated isolation dampers in series separate nonessential portions and components from essential portions.

RAI 9.4.3-2 Provide additional details for the following section 9.4.3 auxiliary building ventilation system calculation procedures and methods, including assumptions and margins. Identify any deviations from the recommended calculational procedures in SRP Section 9.4.3, Revision 3, March 2007:

- Auxiliary building HVAC system calculations supporting the normal and abnormal condition min max temperatures and min max relative humidity shown in Table 9.4-1 sheet 2 of 3.
- Auxiliary building spent fuel pool HVAC system calculations supporting the normal and abnormal condition min max temperatures and min max relative humidity shown in Table 9.4-1 sheet 2 of 3.
- Non-Class 1E Electrical Room HVAC system calculations supporting the normal and abnormal condition min max temperatures shown in Table 9.4-1 sheet 3 of 3 and maintaining the hydrogen concentration below 2% by volume for the battery room.
- Main steam/feed water piping area HVAC system calculations supporting the normal condition min max temperatures shown in Table 9.4-1 sheet 3 of 3.
- Technical support center HVAC system calculations supporting the normal and abnormal condition min max temperatures and min max relative humidity shown in Table 9.4-1 sheet 3 of 3.

RAI 9.4.3-3 The US APWR section 9.4.3.3 indicates that the penetration and safeguard component area envelope and auxiliary building HVAC system exhaust line duct isolation damper assemblies are the only components that are seismic Category I safety-related. GDC 2 requires that SSCs important to safety be designed to withstand the effects of a design basis earthquake. SRP 9.4.3 section III.2.A indicates that the P&IDs should clearly indicate the physical divisions between essential and nonessential

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

portions and indicate design classification changes. The flow diagrams shown in figures 9.4.3-1, 9.4.5-1, 9.4.5-3, and 9.4.6-1 do not appear to show the boundaries between seismic Category I safety-related components and nonessential components. Provide additional information and clarify if the seismic classification boundaries for the auxiliary building ventilation system safety related isolation dampers should be shown in the figures. Both the Auxiliary Building HVAC System and the Main Steam /Feed water Area HVAC System either contain Seismic Category I components or have components (e.g. AO valves, ducting etc) in areas where safety-related Seismic Category I components are located. This system attribute is important to plant safety. Neither of the preoperational tests for these two systems require verification as a Prerequisite that seismic II/I construction is complete and that design certification walk down is complete before executing the preoperational test. The staff requests the DC applicant add this requirement as a test "Prerequisite." In addition, given the importance to plant safety, the staff requests that a line item be added to ITACC Table 2.7.5.4-2 Auxiliary Building Ventilation System Inspections, Tests, Analyses, and Acceptance Criteria that seismic II/I construction is complete and that design certification II/I walk down is complete.

RAI 9.4.3-4 The US APWR figure 9.4.3-1 shows continuation symbols to the Charging Pump Areas and the Annulus Emergency Exhaust Filtration Unit Areas within the dotted line boundary designated the R/B Controlled Area. The Charging Pump Areas and the Annulus Emergency Exhaust Filtration Unit Areas are shown on figure 9.4.5-5, "Safety Related Component Area HVAC System Flow Diagram." GDC 60 requirements control the quantities of radioactive materials in gaseous effluents released to the environment from normal ventilation systems. The Charging Pump Areas and the Annulus Emergency Exhaust Filtration Unit Areas are both safety related component areas inside of the Reactor Building Controlled Area. These two areas do not have double isolation from the rest of the normal Auxiliary Building HVAC System. From DCD Section 9.4.3.1.1.1, "During a design basis accident the Penetration and the Safeguard component areas are isolated in order that operation of the Annulus Emergency Exhaust system maintains a negative pressure and mitigates the release of airborne fission products to the atmosphere". The Annulus Emergency Exhaust Filtration Unit Areas contain the Annulus Emergency Exhaust Filtration Units which will be running during a design basis accident. The charging pumps are safety related and in the reactor building controlled area. Provide additional information and clarify why the Annulus Emergency Exhaust Filtration Unit Areas and the Charging Pump Areas do not switch over to be exhausted through the Annulus Emergency Exhaust Filtration Units and do not have double isolation between these two controlled areas and the rest of the uncontrolled auxiliary building.

RAI 9.4.3-5 The US APWR Section 9.4.3.1 indicates that only specified isolation damper assemblies are safety related seismic Category I and that required ductwork will be supported to prevent adverse interaction with other safety-related systems during a seismic event. Section 9.4.3.1.1.3 indicates that the Main Steam/Feed water Piping Area HVAC System is

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

neither safety-related nor seismic Category 1 qualified but does have required ductwork that will be supported to prevent adverse interaction with other safety-related systems during a seismic event. GDC 2 acceptance is based on guidance of Regulatory Guide 1.29 Position C.1 and C.2. These Regulatory Positions address seismic Category I and non-seismic over seismic Category I requirements respectively. There is no specific reference to Regulatory Guide 1.29 Positions C.1 and C.2 in section 9.4.3. Figure 9.4.3-1 appears to show Auxiliary Building Ventilation System Ducting that continues into safety-related areas such as the Safety Related Component area shown on Figure 9.4.5-5. Provide additional information to clarify compliance with Regulatory Guide 1.29 and if there are additional locations where duct work will have to be supported to prevent adverse interactions with safety related equipment. Provide references to appropriate sections of the DCD that address seismic design. Also, provide additional information on nonessential portions of the Auxiliary Building Ventilation System or if there are other systems or structures not designed to seismic Category I standards and located close to the safety-related seismic Category I isolation dampers that could preclude their operation.

Specifically regarding the spent fuel storage area; from DCD Section 9.1.2.2.2 spent fuel storage *“The spent fuel storage pit is located within the seismic Category I reactor building fuel handling area. The walls of the spent fuel storage pit are an integral part of the seismic Category I reactor building structure. The facility is protected from the effects of natural phenomena such as earthquakes (Section 3.7), wind and tornados (Section 3.3), floods (Section 3.4), and external missiles (Section 3.5). The facility is designed to maintain its structural integrity following a safe shutdown earthquake and to perform its intended function following a postulated event such as a fire. Refer to Subsection 1.2.4.1 for further discussions of the reactor building fuel handling area.”*

The following are excerpts from Regulatory Guide 1.29 are applicable

Regulatory Position C.1 *“The following SSCs of a nuclear power plant, including their foundations and supports, are designated as Seismic Category I and must be designed to withstand the effects of the SSE and remain functional. The titles and functions of these Seismic Category I SSCs for LWR designs are based on existing technology... k. systems or portions thereof that are required for (1) monitoring and (2) actuating systems important to safety 1. the spent fuel storage pool structure, including the fuel racks”*

Regulatory Position C.2 *“Those portions of SSCs of which continued function is not required but of which failure could reduce the functioning of any plant feature included in items 1.a through 1.q above to an unacceptable safety level or could result in incapacitating injury to occupants of the control room should be designed and constructed so that the SSE would not cause such failure.”*

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

Regulatory Position C.3 reads “3. *At the interface between Seismic Category I and non-Seismic Category I SSCs, the Seismic Category I dynamic analysis requirements should be extended to either the first anchor point in the non-seismic system or a sufficient distance into the non-Seismic Category I system so that the Seismic Category I analysis remains valid.*”

DCD Table 3.3-2 “Classification of Mechanical and Fluid Systems, Components, and Equipment (Sheets 44 & 45 of 50)” indicates that the components of the Auxiliary Building HVAC System are all “NS” (i.e. non seismic). This conflicts with the information contained in the first bullet DCD Section 9.4.3.1.1.1 “*Auxiliary Building HVAC system*” which reads “*The auxiliary building HVAC system has the capability to close the safety-related, seismic Category I isolation dampers during a design basis accident.*” In addition to resolving this conflict, the staff requests that the DC applicant provide additional information as to how the Auxiliary Building HVACs system components (e.g. ductwork) within the Fuel Handling Area satisfies the requirements of Regulatory Positions C.2 and C.3 of DCD Section 3.2.1.1.2 Seismic Category II.

- RAI 9.4.3-6 SRP 9.4.3 section III.1 requires a review to verify that the system description and temperature limits for the areas serviced are properly shown. The US APWR DCD section 9.4.3.2.2 indicates the Non-Class 1E Electrical Room HVAC System has a smoke purge mode of operation. However, this smoke mode is not shown in Table 9.4-1, sheet 3 as an abnormal condition like LOOP or SBO. Clarify if Table 9.4-1 sheet 3 should include an additional smoke purge mode under abnormal conditions. Also provide additional information and clarify the operation of the HVAC system supplying the non-Class 1E battery spaces during an abnormal condition like LOOP or SBO event.
- RAI 9.4.3-7 US APWR DCD section 9.4.3.4 invokes the use of several industry standards listed below for test purposes, but does not list the specific standards. 10CFR52.47 “Contents of Applications” is the basis for this request. Section 9.4.8 “References” does not list these standards. Provide the specific standards for this testing and include them in the Reference section 9.4.8.
- Air Movement and Control Association Standards in regard to factory-testing of air handling units.
 - American Society of Heating, Refrigerating and Air-Conditioning Engineers Standards in regard to testing air filters.
 - Air Conditioning and Refrigeration Institute Standards in regard to performance ratings for cooling coils.
 - Sheet Metal Air-Conditioning Contractors’ National Association in regard to leak testing air distribution ductwork.
 - Add the section 9.4.8 reference for RG 1.140 cited in section 9.4.3.4.4 “Technical Support Center (TSC) HVAC System.”
- RAI 9.4.3-8 The US APWR Table 9.4.3-1 Equipment Design Data does not list all of the components in the air handling units shown in DCD Figures 9.4.3-1,

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

2, 3, and 4. For example the Technical Support Center Emergency Filtration Unit in Table 9.4.3-1 lists the After-Filters but none of the filters shown on Air Handling Units for any of the other areas are listed. Also, Table 1.9.2-9, "US-APWR Conformance with Standard Review Plan Chapter 9 Auxiliary Systems" lists an exception for section 9.4.3 in regard to GDC 60 acceptance which is based on the guidance of Regulatory Guides 1.52 and 1.140. The exception states, "*With exception of TSC HVAC system, not provided air clean up function.*" Regulatory Guide 1.140 for normal atmosphere cleanup systems Position C.3.1 states that typical systems should have HEPA filters and carbon adsorbers and goes on to state that whenever a normal atmosphere cleanup system is designed to remove only particulate matter, a component for iodine adsorption need not be included. Regulatory Guide 1.52 for ESF atmosphere cleanup systems Position C.3.1 also states HEPA filters and carbon adsorbers should be used. DCD section 9.4.3.1.2.1 states the Auxiliary Building HVAC system maintains dose levels due to airborne radioactivity below the allowable values set by 10 CFR 20 by supplying and exhausting sufficient air flow (see also RAI 9.4.3-9). Provide additional information or references to the appropriate DCD sections regarding how the Auxiliary Building HVAC systems with no HEPA filters or carbon adsorbers during normal operation and only HEPA filters, no carbon adsorbers, in the Annulus Emergency Exhaust Filtration Unit during the ESF mode meets the limits specified in 10 CFR Part 20.

RAI 9.4.3-9 DCD section 11.3.1.4 for the Gaseous Waste Management System (GWMS) states, "to dilute this gas further, it is mixed with the A/B ventilation flow before it is discharged to the environment." DCD section 11.3.1.4 goes on to state the GWMS is designed so that releases of radioactive gases are below the concentration limits of 10 CFR 20. The HVAC ventilation flow provides dilution for the GWMS release in the vent stack and discharge isolation valves close on low ventilation system exhaust flow rate. DCD section 11.3.4 also states that the ventilation system is designed in accordance with Regulatory Guide 1.140 and is described in Chapter 9, Section 9.4. No reference to or description of the GWMS and its interface points with the A/B ventilation system could be found in DCD section 9.4 or 9.4.3. This system interface should also be identified as an attribute in the Interface Requirements section of Tier 1 Section 2.7.5.4 Auxiliary Building Ventilation System (ABVS). Provide additional information and clarification in DCD section 9.4.3 and Tier 1 Section 2.7.5.4 on where and how the GWMS interfaces with the A/B ventilation system.

RAI 9.4.3-10 SRP 9.4.3 sections III.1, III.3 and III.4 make reference to use of a failure modes and effects analysis, as appropriate, to confirm that the essential safety-related portions of the system are capable of functioning in spite of the failure of any active component, in the event of an earthquake, during loss of offsite power, or a concurrent single active failure. DCD section 9.4.3 does not contain any references to or COL items for a failure modes and effects analysis for the Auxiliary Building Ventilation System. Provide additional information and clarify if a failure modes and effects analysis is necessary for the Auxiliary Building Ventilation System.

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

RAI 9.4.3-11 GDC 2 requires addressing the effects of earthquakes and SRP 9.4.3 section III.2.B review addresses proper seismic classification. DCD Table 3.2-2 "Classification of Mechanical and Fluid Systems, Components, and Equipment" (sheet 45 of 50) lists Equipment Class 3 and "NS" (i.e. Non-seismic) for the Isolation Dampers of the Auxiliary Building Heating Ventilation and Air Conditioning System. The fourth paragraph of DCD Section 9.4.3.2.1 "Auxiliary Building HVAC System" reads "*The penetration of the penetration and safeguard component area and the discharge duct of the auxiliary building HVAC system are provided with safety-related isolation dampers that automatically close upon receipt of the ECCS actuation signal. The penetration and safeguard component area supply and exhaust line isolation damper assemblies are equipment class 2, seismic Category I and the auxiliary building HVAC system exhaust line isolation damper assemblies are equipment class 3, seismic I.*" The staff requests that the applicant amend Table 3.2-2 to reflect the existence of Class 2 and Class 3 Seismic I Isolation Dampers.

RAI 9.4.3-12 SRP 9.4.3 sections III.1 & III.2.A address reviews to ensure the P&IDs show the equipment used, divisions between essential and nonessential portions of the system and the temperature limits for the areas serviced. The second paragraph of DCD Section 9.4.3.2.1 Auxiliary Building HVAC System reads "*The cooling coil of each air handling unit is supplied with chilled water from the non-essential chilled water system (Section 9.2.7).*" The following deficiencies/discrepancies were noted by the staff during its review of DCD Section 9.2.7:

- There is no flow diagram (i.e. Figure) of the Non-Essential Chilled Water System contained in DCD Section 9.0. This missing Figure should display all the heat loads (i.e. number of cooling coils/per AHU) that the Non-Essential Chilled Water System supplies with chilled water (e.g. Auxiliary Building AHUs VAS-AAH-201A/B of Figure 9.4.3-1). The staff requests that this flow diagram be added to the DCD.
- The last paragraph of DCD Section 9.2.7 "Chilled Water System" for the "Non-Essential Chilled Water System" reads "*The function of the non-essential chilled water system is to provide, during plant normal operation and LOOP, chilled water for the plant air cooling and ventilation systems serving the non safety-related areas.*" Table 8.3.1-5 "Electrical Load Distribution-AAC GTG Loading (LOOP Condition)" does not list any of the Auxiliary Building Ventilation Systems as a LOOP load. Do any of the MCCs listed on Table 8.3.1-5 (i.e. P11, P12, P21 & P22) supply power during a LOOP to any other Auxiliary Building Ventilation System besides the Non-class 1E Electrical Room HVAC System and the TSC HVAC System? If so, the staff requests that the DC applicant revise Table 9.4-1 "Area Design Temperature and Relative Humidity (sheet 2 of 3)" to include Abnormal Conditions "Min" and "Max" LOOP temperatures for all Areas served by the Auxiliary Building HVAC System and powered during a LOOP event.

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

RAI 9.4.3-13 GDC 60 requires provisions to be included in the design to ensure suitable controls on the release of radioactive materials in gaseous effluents during normal reactor operation, including anticipated operational occurrences. DCD Section 9.4.3.1.2.1 contains the following three design bases:

- Keep dose levels due to the airborne radioactivity below the allowable values set by 10 CFR 20 by supplying and exhausting sufficient airflow.
- Control exhaust fan airflow continuously and automatically at a predetermined value to maintain a slightly negative pressure in the controlled areas relative to the outside atmosphere and minimize exfiltration from the radiological controlled areas during normal plant operation.
- Maintain airflow from areas of low radioactivity to areas of potentially higher radioactivity.

The difference of the Unit Air Flow Capacities for the Auxiliary Building Air Handling Unit(s) and the Auxiliary Building Exhaust Fan(s) listed in Table 9.4.3-1 ensures a 12,000 cfm differential. This differential thereby ensures a negative building pressure. What is the design value for this negative building pressure? Without a detailed flow diagram of the supply flows and exhaust flows to and from the controlled areas of Figure 9.4.3-1, there is nothing contained within Tier 1 or Tier 2 of the DCD that ensures the above three design bases. The staff requests the addition of a detailed flow diagram to the DCD that ensures the COL applicant satisfies the intent of the three above design basis.

DCD Section 9.4.3.4 "Inspection and Testing Requirements" reads *"Preoperational testing of the auxiliary building ventilation system is performed as described in Chapter 14, Verification Programs, to verify that system is installed in accordance with plans and specifications. All HVAC system airflows are balanced in conformance with the design flow, path flow capacity, proper air mixing temperature throughout the A/B, R/B and PS/B."*

There is nothing within DCD Section 14.2.12.1.99 "Auxiliary Building HVAC System Preoperational Test" that reflects the above passage about "Preoperational Testing" and that ensures that the COL applicant will satisfy the three above design bases. The staff requests that the DC applicant amend Section 14.2.12.1.99 to address this deficiency.

RAI 9.4.3-14 SRP 9.4.3 sections III.1 & III.2.A address reviews to ensure the P&IDs show the equipment used and divisions between essential and nonessential portions of the system are shown. The 6th paragraph of DCD Section 9.4.3.2.1 "Auxiliary Building HVAC System" reads *"In summer, the outside supply airflow is cooled by the air handling unit's chilled water cooling coil. Upon supply air temperature rise, as sensed by thermostats located in the supply air duct, the air handling unit's cooling coil flow control valves allow for an increase in the chilled water flow through the cooling coils."* Figure 9.4.3-1 does not display these thermostatically

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

controlled temperature control valves providing non-essential chilled water to the Auxiliary Building Air Handling Units. This system interface with the Non-essential Chilled Water System is fundamental to the performance design basis of the Auxiliary Building HVAC System. The staff requests that the DC applicant amend all figures for the Auxiliary Building Ventilation System (i.e. Figures 9.4.3-1 through 9.4.3-4) to display this system interface.

The 6th paragraph of DCD Section 9.4.3.2.1 “Auxiliary Building HVAC System” reads *“In winter, the supply air is heated by the air handling unit heating coil to maintain the supply air temperature at the design set point. Supplemental heating with local unit heaters is provided in areas with higher heat loss, due to their proximity to exterior walls.”* Table 9.4.3-1 does not reflect the site specific existence of these area heaters. The sizing of these in-duct heaters defaults to the COL applicant in accordance with COL item 9.4(5). Eventually, these site-specific area heaters will be added to Table 9.4.3-1. A “place holder” for these in-duct heaters with a COL item 9.4(5) in Table 9.4.3-1 seems appropriate to help ensure that COL applicants address this need.

RAI 9.4.3-15 Fire protection requirements in 10 CFR 50.48, “Fire Protection” and associated NRC regulatory guide 1.189 Revision 1 address preventing smoke from migrating from one fire area to another so that safe shutdown capability is not adversely affected. DCD Section 9.4.3.2.1 last paragraph reads, *“Smoke detectors located in the supply and exhaust air ducts detect the presence of smoke and activate an alarm in the MCR. If the smoke is detected in the supply or exhaust ducts, the auxiliary building HVAC system is manually shutdown.”* DCD Section 9.5.1.2.7 reads *“Ventilation system fire dampers close automatically against full airflow, if required, on high temperature to limit the spread of fire and combustion products. Fire dampers serving certain safety-related, smoke-sensitive areas are also closed in response to an initiation signal from the fire detection system. In selected areas, the fire alarm system will provide interface with the HVAC systems such as to shut down HVAC operation upon a fire alarm signal. Where continued HVAC system operation is deemed necessary for radiological control, the HVAC system incorporates design features to allow operation under fire conditions.”*

DCD Section 9.4.3 “Auxiliary Building Ventilation System” does not indicate the fire protection attributes (e.g. fire dampers) installed in the ductwork for the areas served (i.e. Figure 9.4.3-1) by the Auxiliary Building HVAC System. This system interface with the Fire Protection System is fundamental to plant operations response to instances of smoke or fire within the areas served by Auxiliary Building HVAC System.

This detailed information could neither be located in DCD Appendix 9A nor in DCD Section 9A.3.89. For example, Table 9A-3 “Fire Hazard Analysis Summary (Sheet 235 of 263)” provides the following information for Access Building Fire Zone FA5-101-01 with respect to “Fire Barrier Description”: *“A 3 hour rated fire wall exists between this building and the adjacent auxiliary building. All opening in this wall are protected to 3-hour*

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

fire rating. Other building walls are exterior and not assigned a fire rating.”

The staff requests that the applicant add information to DCD Section 9.4.3 that reflects the existence of these fire protection system interfaces for the four systems that comprise the Auxiliary Building Ventilation System and the above passage from DCD Section 9.5.1.2.7.

- RAI 9.4.3-16 Technical specifications are required by 10 CFR 50.36 for operating reactors. SRP 9.4.3 Section I addresses the review interface for the proposed technical specifications. The auxiliary building HVAC system: (1) has the capability to close the safety-related, seismic Category I isolation dampers of the penetration and safeguard component areas during a design basis accident; and (2) has the capability to close safety-related, seismic Category I isolation dampers to prevent the back flow from the annulus emergency exhaust system during a design basis accident. These two functions are essential to the performance of the Annulus Emergency Exhaust System.

DCD Chapter 16 “Technical Specifications” does not address the operability and surveillance testing requirements of these isolation valves. The staff requests that the DC applicant provide the basis for not including operability and surveillance testing requirements for these isolation valves within the technical specifications. If the DC applicant determines that operability and surveillance testing should be part of the plant’s technical specifications, the staff requests that the DC applicant amend DCD Section 9.4.3.4 “Inspection and Testing Requirements” to reflect this.

- RAI 9.4.3-17 SRP 9.4.3 section III.2.A address reviews to ensure the component descriptions address the equipment used and divisions between essential and nonessential portions of the system. The last sentence of the second paragraph of DCD Section 9.4.3.2.2 “Non-Class 1E Electrical Room HVAC System” reads *“Return air from the electrical room is drawn through the return air ductwork by the system’s return air fans. Both air handling units are connected to a common air distribution ductwork through their discharge air isolation dampers.”* Clarify if this sentence should read *“Return air from the Non-Class 1E Electrical Room, Non-Class 1E I&C Room and Computer Room is drawn through the return air ductwork by the system’s return air fans. Both air handling units are connected to a common air distribution ductwork through their discharge air isolation dampers.”* Reference Figure 9.4.3-2.

- RAI 9.4.3-18 SRP 9.4.3 Section I “Review Interfaces” #7 reads *“...review to determine the adequacy of the design, installation, inspection, and testing of all essential electrical components (sensing, control, and power) required for proper operation.”*

The first bullet of DCD Section 9.4.3.1.2.3 “Main Steam/Feed water Piping Area HVAC System” reads: *“Provide and maintain proper environmental conditions within the required temperature range (Table 9.4-1) suitable to*

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

support the operation and provide assurance of the electrical and mechanical components reliability.”

DCD Section 9.4.3.1.2.3 “Main Steam/Feed water Piping Area HVAC System” reads: “*There are no safety design bases for the main steam/feed water piping area HVAC system. However, required ductwork will be supported to prevent adverse interaction with other safety-related systems during a seismic event.*” This indicates that safety-related electrical and mechanical components may be located within the Main Steam/Feed water Piping Areas cooled by the Main Steam/Feed water Piping Area HVAC System as displayed on Figure 9.4.3-3.

If this is so, please provide additional information and clarification for the following:

- What safety-related systems and safety-related electrical and mechanical components are located within these areas?
- Would non-essential chilled water system provide cooling to these areas during a LOOP or other abnormal condition?
- Would the Main Steam/Feed water Piping Areas AHUs the system instrumentation and system AOV’s have electrical power and motive air during a LOOP or other abnormal condition?
- What are the Min and Max expected temperatures within these areas beyond the “Normal conditions” (e.g. LOOP, SBO etc) of Table 9.4-1 “Area Design Temperature and Relative Humidity (Sheet 3 of 3)” for the Main Steam / Feed water Piping Areas?
- If there are safety related components within the vicinity of the two Main Steam/Feed water Piping Areas Air Handling Units, are the AHUs designed to preclude internally generated missiles from the AHU fans?

RAI 9.4.3-19 Section IV.4 “Standard Design Certification” of SRP 13.3 “Emergency Planning” reads “*The desired evaluation findings at the standard design certification stage should be substantially equivalent to the following:*

b. General Description of Facilities

The staff concludes that the information provided in the application pertaining to the [TSC, OSC, decontamination room, etc.] is consistent with the guidance identified in RG 1.101 and NUREG-0696. As such, the staff finds this information meets the applicable requirements of 10 CFR 50.47(b)(8), 10 CFR 50.47(b)(11), and Subsections IV.E.3 and IV.E.8 of Appendix E to 10 CFR Part 50, and if applicable 10 CFR 50.34(f)(2)(xxv).

c. Technical Support Center Size

The staff concludes that the information provided in the application pertaining to TSC size is consistent with guidance identified in RG 1.101. Specifically, the size conforms with the specifications of NUREG-0696 and is sufficient to accommodate and support NRC and licensee pre-designated personnel, equipment, and documentation, in

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

conformance with Supplement 1 to NUREG-0737. As such, the staff finds that this information meets the applicable requirements of 10 CFR 50.47(b)(8) and Subsection IV.E.8 of Appendix E to 10 CFR Part 50.

d. Technical Support Center Habitability

The staff concludes that the information provided in the application pertaining to the habitability of the TSC is consistent with the guidance identified in RG 1.101. As such, the staff finds that the DCD meets the applicable requirements of 10 CFR 50.47(b)(8) and (b)(11), Subsection IV.E.8 to 10 CFR Part 50, Appendix E, and if applicable 10 CFR 50.34(f)(2)(xxv)."

In consideration of the references detailed in the above SRP 13.3 excerpt, describe Technical Support Center (TSC) ventilation system design, in sufficient detail (i.e. a calculation summary), to demonstrate the ventilation system ensures TSC habitability. Specifically provide details of the analysis that supports the regulatory need that the TSC ventilation system design maintains exposures at or below 0.05 Sv (5rem) TEDE for the duration of an accident. Include input conditions and assumptions. These details should include the concentration of radioactivity which is assumed to surround the TSC, the normal flow rates (infiltration/exfiltration) of the TSC ventilation system, filter performance capabilities, the size of the technical support center and the technical support center in-leakage rate, at a minimum.

The third paragraph of Regulatory Position 2.3 "Staffing and Training" in NUREG-0696 reads "*The level of staffing of the TSC may vary according to the severity of the emergency condition. The staffing for each emergency class shall be fully detailed in the licensee's emergency plan.*"

The last paragraph of Regulatory Position 2.4 "Size" in NUREG-0696 reads: "*The TSC working space shall be sized for a minimum of 25 persons, including 20 persons designated by the licensee and five NRC personnel. This minimum size shall be increased if the maximum staffing level specified by the licensee's emergency plan exceeds 20 persons.*"

The level of staffing and TSC size could be site specific. Both of these variables could impact the sizing of ventilation components that comprise the Technical Support Center HVAC System. Due to these site specific variables the staff requests that the DC applicant create a COL item in DCD Section 9.4.7 "Combined Licensee Information" that captures the impact of these variables.

The first paragraph of Regulatory Position 2.6 "Habitability" in NUREG-0696 reads "*Since the TSC is to provide direct management and technical support to the control room during an accident, it shall have the same radiological habitability as the control room under accident conditions. TSC personnel shall be protected from radiological hazards,*

REQUEST FOR ADDITIONAL INFORMATION NO. 68-841 REVISION 0

including direct radiation and airborne radioactivity from in plant sources under accident conditions, to the same degree as control room personnel. Applicable criteria are specified in General Design Criterion 19; Standard Review Plan 6.4; and NUREG-0737, "Clarification of TMI Action Plan Requirements," Item II.B.2."

TSC in-leakage testing, filter train testing and AHU testing should be described. DCD Section 9.4.3.4 "Inspection and Testing Requirements" does not reflect this testing. The staff requests that the DC applicant amend Section 9.4.3.4 to capture these testing.