REQUEST FOR ADDITIONAL INFORMATION
Volume 2 – Preclosure
Chapter 2.1.1.4, Set 4 – Identification of Event Sequences
(RAI #1 and #2)

The following questions pertain to DOE's active systems reliability for the surface heating, ventilation, and air-conditioning (HVAC) important-to-safety (ITS) systems for the original license application submittal. These systems are described in SAR Section 1.2.2.3, Section 1.2.4.4 for the Canister Receipt and Closure Facility (CRCF), Section 1.2.5.5 for the Wet Handling Facility (WHF), and Section 1.2.8.3 for the Emergency Diesel Generator Facility (EDGF). For the event sequences in the CRCF and WHF involving a filtered radionuclide release, DOE identifies the CONFINEMENT pivotal event in terms of loss of HVAC confinement and associates it with delta pressure not maintained in the facilities (e.g., page A-57 of BSC, 2008ac for the CRCF). This information is required to determine compliance with 10 CFR 63.21(c)(5), 10 CFR 63.112(b), and §63.111(a) and (b).

RAI #1

Provide the following information for the surface nuclear confinement HVAC system in the CRCF and WHF in terms of quantifying the CONFINEMENT pivotal event for event sequences involving a filtered radionuclide release:

a) Explain how failure of the backdraft damper to close on transfer to the standby train would affect the HVAC system failure probability.

b) Explain how DOE determined that differential pressure would be lost for a period of time not to exceed 7 minutes per event and how this value is conservative (i.e., basic event, "060-VCTO-DRS0000-DRS-OPN," in Table 6.3-11 of BSC, 2008ac on page 208 for the CRCF).

c) Explain why the degraded state is not easily detectable involving operators opening two or more vestibule doors. Refer to page E-50 of BSC, 2008ac for basic event, "060-VCTO-DR00001-HFI-NOD" and Figure B7.4-3 of BSC, 2008ac.

d) Explain how operation or failure of the Non-ITS supply fans affects the HVAC system failure probability. Clarify the following:

    i. For the CRCF and WHF, explain how the system responds to failure of just one supply fan and explain how the adjustable speed drives respond.

    ii. For the WHF, explain how many supply fans are needed for normal operations versus the, "Off-Nominal Operations" described in Section B7.2.6 of BSC, 2008bq on page B7-6 and how these operations are accounted for in Figure B7.4-5 of BSC, 2008bq.

e) Explain how the mean failure probability and error factor were determined for basic event, “050-EXCESSIVE-WIND-SPEED” shown in Figure B7.4-3 of BSC, 2008ac on page B7-19 and shown in Table B7.4-3 of BSC, 2008ac on page B7-14.

f) Explain what failures DOE has included in the common cause failures identified for running air handling units, standby air handling units, running exhaust fans, and standby exhaust fans in Figures B8.4-7 and B8.4-8 of BSC, 2008ac on pages B8-47 and B8-48, respectively.

g) Provide the following information for duct failure (i.e., basic event, “060-VCTO-DTC0A-DTC-RUP”):

   i. Provide the reference source and page number showing the 10 feet of duct that DOE is referring to in Table 6.3-1 of BSC, 2008ac when it refers to, “Duct Fails between HEPA and Exhaust Fan (10 feet).”

   ii. Explain how DOE considers duct failures in locations other than between the HEPA filters and exhaust fans.

   iii. Explain how DOE accounts for failure modes other than rupture. For example, explain if leakage is considered since DOE refers to a design to minimize leakage on pages 1.2.4-58 and 1.2.4-59 of the SAR.

h) Explain what DOE is accounting for in basic event, “060-VCTO—B-FAIL-START,” described as, “Train B Fails to Start” in Table B7.4-3 of BSC, 2008ac.

   i. Explain what this basic event physically represents. Explain what component failures or human errors DOE is accounting for.

   ii. Explain how DOE determined the failure distribution for this basic event.

i) For the component failure data applied to the following components as described in the Generic Data Source column for, “YMP Active Comp Database.xls” included in Attachment H to BSC, 2008ac provide the following:

   i. Air handling unit failure to run (i.e., AHU-FTR). Explain why DOE used data for standby units failure to run greater than 1 hour regardless of the unit being in the standby train or operating train.

   ii. Diesel generator failure to run (i.e., DG-FTR). Provide Umatilla Chemical Agent Disposal Facility Quantitative Risk Assessment.

iii. Exhaust fan failure to run (i.e., FAN-FTR). Provide N-Reactor Plant Specific Data Base.

RAI #2

Explain the SAPHIRE analyses to support the HVAC system failure probabilities identified on page 136 of BSC, 2008bq. The following are examples of areas needing clarification:

a) Verify the SAPHIRE model produces the results shown in Figure B7.4-1 of BSC, 2008bq on page B7-13.

b) Justify the parameters (i.e., cutoff value) and type of analysis (i.e., Latin Hypercube or Monte Carlo) used to obtain the results displayed in Figure B7.4-1 of BSC, 2008bq.

c) Provide the technical basis for the selection of a sample size of 10000 in the uncertainty analysis results for the loss of delta pressure and provide the convergence criterion used (Figure B7.4-1 of BSC 2008bq and Figure B7.4-1 of BSC 2008ac).

d) Verify the SAPHIRE models for ITS HVAC systems in the surface facilities include all relevant files. For example, in the WHF 24-hour version identified in folder, "Loss of Delta Pressure in WHF – 24HR VERSION.zip" included in attachment H to BSC, 2008bq, on solving fault tree, "050-DP-LOSS-WHF," a bad event map error is received.

e) The SAPHIRE model included in, "WHF – Vol II FINAL with uncertainties.zip" identified in attachment H to BSC, 2008bq associates basic event, "HVAC" with the CONFINEMENT pivotal event and assigns a mean failure probability of 3.5×10^{-2} and error factor of 6.84. Explain how these values relate to the results shown in Figure B7.4-1 and page 136 of BSC, 2008bq.

References:

BSC. 2008ac. "Canister Receipt and Closure Facility Reliability and Event Sequence Categorization Analysis." 060–PSA–CR00–00200–000. Rev. 00A CACN 001. Las Vegas, Nevada: Bechtel SAIC Company, LLC.

BSC. 2008bq. "Wet Handling Facility Reliability and Event Sequence Categorization Analysis." 050–PSA–WH00–00200–000. Rev. 00A. CACN 001. Las Vegas, Nevada: Bechtel SAIC Company, LLC.