Nuclear Operating Company

South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

June 1, 2010
U7-C-STP-NRC-100113

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
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South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Revised Response to Request for Additional Information

Attached is a revised response to an NRC staff question included in Request for Additional Information (RAI) letter number 201 related to Combined License Application (COLA) Part 2, Tier 2, Chapter 13. This completes the response to this letter.

The attachment addresses the response to the RAI question listed below:

RAI 13.03-73 Revision 1

The COLA changes in this response will be implemented at the first routine COLA update following NRC acceptance of this response.

There are no commitments in this letter.

If you have any questions regarding this response, please contact me at (361) 972-7136, or Bill Mookhoek at (361) 972-7274.

I declare under penalty of perjury that the foregoing is true and correct.

Executed on 6/1/10

Scott Head
Manager, Regulatory Affairs
South Texas Project Units 3 & 4

jet

Attachment:
RAI 13.03-73 Revision 1

D091
NRO

STI 32679744

cc: w/o attachment except*
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RAI 13.03-73 Revision 1

QUESTION:

Subject: Emergency facilities and equipment

Basis: 10 CFR 50, Appendix E.IV.E.8; 10 CFR 50, 10 CFR 50.47(b)(8); Evaluation Criterion H.1; Supplement 1 to NUREG-0737

SRP ACCEPTANCE CRITERIA: Requirements A and B; Acceptance Criteria 1 and 2

Section G.3, "Technical Support Center," of the STP 3 & 4 Emergency Plan states:

> "Each Technical support Center is provided sufficient radiological protection and monitoring equipment to assure that radiation exposure to any person working in the activated Technical support Center will not exceed five (5) rem TEDE or twenty-five (25) rem thyroid CDE during the duration of a declared accident."

In accordance with Acceptance Criterion 3, "Technical Support Center Radiological Habitability," in SRP Section 15.0.3, "Design Basis Accident Radiological Consequence Analyses for Advanced Water Reactors," the staff reviews whether the total calculated radiological consequences in the TSC for the postulated fission product releases fall within the exposure acceptance criteria specified in GDC 19 of 5 rem TEDE (0.05 Sv) for the duration of the design basis accidents (DBAs). Provide the radiological consequence analyses that were performed for the South Texas Project TSCs for units 3 and 4 for the postulated DBAs. The DBAs are listed and evaluated in Chapter 15 of the certified ABWR DCD. The radiological analyses should include, but are not limited to, the following parameters:

1. TSC ventilation air inlet and recirculation flow rates
2. HEPA filter and charcoal adsorber fission product removal efficiencies
3. TSC unfiltered air in-leakage rate
4. Atmospheric dispersion factors (χ/Q values) at TSC air intake
5. TSC occupancy factors
6. TSC free air volume
7. Occupant breathing rate
8. Description of the ventilation design

REVISED RESPONSE:

The previous response to RAI 13.03-73 (U7-C-STP-NRC-090171, dated October 7, 2009) stated that a radiological consequence analysis for the Technical Support Center (TSC) would be completed and provided to NRC in a supplemental response to this RAI by May 31, 2010. This response provides the radiological consequence analysis results. It also revises the previous response to clarify the basis for the radiological consequence analyses and identifies two additional changes to the Service Building HVAC system, which changes STD DEP 9.4-3, Service Building HVAC System, to add design upgrades for automatic start of the emergency filter train and a 99% efficiency charcoal filter instead of the 95% efficiency filter. A 10.2 cm (4 inch) charcoal filter for 99% efficiency is consistent with USNRC Regulatory Guide 1.140, Revision 2. When the design upgrades are complete, COLA Part 2, Tier 2, Chapter 21, Figure 9.4-11, Service Building HVAC P&ID, will be revised and a markup will be provided in a supplement to this response. This supplement will be provided by July 1, 2010. This response replaces the previous response in its entirety.

Radiological consequence analyses for the TSC under postulated Design Basis Accidents (DBAs) were performed for the STP 3&4 units. These DBAs are listed in the certified ABWR DCD, Chapter 15. Determination of TSC doses was made using the activity releases reported in ABWR DCD Tier 2 Chapter 15 tables. These tables are:

DBA	Activity Releases in ABWR DCD
Loss of Coolant Accident (LOCA)	Tables 15.6-10 and 15.6-12
Main Steamline Break (MSLB) Accident	Table 15.6-6
Instrument Line Break (ILB) Accident	Table 15.6-2
Cleanup Water (CUW) Line Break Accident	Table 15.6-17
Fuel Handling Accident (FHA)	Tables 15.7-9 and 15.7-10
Cask Drop Accident	Table 15.7-13
Gas Waste System Failure	Table 15.7-2
Liquid Waste System Failure	Table 15.7-6
Closure of All MSIVs	Table 15.2-11

The RADTRAD code was used to model the intake of activity into the TSC and the removal of activity from TSC due to decay and purge (the TSC HVAC design does not include recirculation cleanup). This code was also used to calculate the resulting doses to individuals in the TSC. Selection of RADTRAD modeling inputs maintained conservatism. As noted in the table above, the Liquid Waste System failure DBA used the DCD releases from Table 15.7-6 in the calculation. This resulted in a very conservative dose to the TSC because these releases significantly exceed the total tanks inventory presented in DCD Tables 12.2-13a, 12.2-13d, and 12.2-13e. The DBA radiological consequence analyses calculation is available for NRC review. The analyses for DBAs assumed the following:

1. The TSC is located within the Service Building (S/B) Clean Area. As described in Section 9.4.8.1.2 of the STP 3&4 FSAR, the S/B HVAC serves both the Clean Area and the Controlled Area portions of the S/B and an automatic damper in the supply system ductwork regulates the flow of air to maintain the S/B Clean Area at a positive pressure with respect to the atmosphere. As shown on Figure 9.4-11 of the STP 3&4 FSAR, there is no recirculation back to the air handling unit from the Controlled Area; thus, there is no mixing of the air from the Controlled Area into the air recirculating from the Clean Area. Based on Table 9.4-7b of the STP 3&4 FSAR:

   - Total air supply flow to the combined Clean Area and Controlled Area is 55,200 m^3/hr.
   - Exhaust flow from the Controlled Area is 23,800 m^3/hr.
   - Exhaust flow from the Clean Area is 2400 m^3/hr.
   - The rate associated with emergency filtration unit fans is 5300 m^3/hr. Because the S/B Clean Area is pressurized during normal operation as well as during the emergency (or high radiation) mode, it was assumed that there is an inflow to the S/B Clean Area during normal operation that is equal to the inflow associated with the emergency filtration fans – this flow must also be balanced by an equal amount of outleakage. This pressurization flow is assumed to be in addition to the inflow required to balance the Clean Area exhaust flow identified above.
   - It was assumed that the total outside air flow rate into the S/B HVAC is equal to the sum of the Controlled Area exhaust flow, the Clean Area exhaust flow, and the flow rate associated with operation of the emergency filtration unit fans (this latter flow is assumed to be the flow rate that is required to maintain pressurization of the Clean Area volume). The flow of outside air to the S/B HVAC during normal operation thus is 23,800 m^3/hr + 2400 m^3/hr + 5300 m^3/hr = 31,500 m^3/hr and the recirculation flow rate from the Clean Area is 55,200 m^3/hr - 31,500 m^3/hr = 23,700 m^3/hr.

2. The filter efficiency for particulates is 99%, consistent with HEPA efficiency. For elemental and organic iodine, the charcoal filter efficiency was increased to 99% as previously discussed.

3. An unfiltered inleakage rate of 10 cfm was used in the analysis, consistent with the NRC's assumption for Control Room unfiltered inleakage in its confirmatory dose analysis discussed in NUREG-1503, Table 15.9 and Appendix L.

4. The atmospheric dispersion factor (χ/Q) values at the TSC air intake are identified in STPNOC's response to RAI 15.00.03-1, Revision 1 (U7-C-STP-NRC-090169). These values are provided below and are to be included in COLA Part 2, Tier 2, Table 2.3S-25, as stated in that response.

ARCON96 χ/Q Values at the Technical Support Center Air Intake (sec/m^3)					
Release Point	**0 – 2 hours**	**2 – 8 hours**	**8 – 24 hours**	**1 – 4 days**	**4 – 30 days**
Reactor Building Plant Stack	5.89E-04	4.50E-04	1.91E-04	1.27E-04	9.39E-05
Turbine Building Truck Doors	3.28E-04	2.26E-04	1.06E-04	5.67E-05	4.99E-05

5. The TSC occupancy factors are assumed to be the same as those used in the CR dose modeling. These are 1.0 for 0-24 hours, 0.6 for 1-4 days, and 0.4 for times beyond 4 days.

6. The S/B Clean Area volume will be approximately 380,000 ft^3. To assure that the volume is bounded, the analyses considered a range of 380,000 ±50,000 ft^3. This S/B Clean Area volume was used in the analyses in place of the TSC volume. This provides an approach to modeling the activity concentration in the air and it is a conservative assumption for the calculation of the whole body dose in the TSC.

7. The occupant breathing rate of 3.47E-04 m^3/sec was used for all time periods.

8. As noted in item 1 above, the STP 3&4 TSC HVAC design is described in FSAR Subsections 9.4.8 and 9.4.10.1 with respect to flow rates and filtration as shown in COLA Part 2, Tier 2, Figure 9.4-11 and Table 9.4-7b. As discussed above, the design and STD DEP 9.4-3 are revised by this response to provide emergency filter train automatic start on a high radiation signal and to increase the charcoal filter efficiency from 95% to 99%.

The calculated doses to personnel in the TSC due to the activity releases reported in the ABWR DCD for the design basis accidents are provided below.

	TEDE	
	rem	**mSv**
LOCA	1.1	11
Main Steamline Break		
Case 1 (Equilibrium Iodine Levels)	6.6E-2	6.6E-1
Case 2 (Pre-accident Iodine Spike)	1.4	14
Instrument Line Break	8.5E-4	8.5E-3
Cleanup Water Line Break	4.4E-2	4.4E-1
Fuel Handling	2.1E-1	2.1
Cask Drop	3.3E-3	3.3E-2
Gas Waste System Failure	6.7E-3	6.7E-2
Liquid Waste System Failure	4.7E-1	4.7
Closure of All Main Steam Isolation Valves	1.5E-3	1.5E-2

In accordance with NUREG-0696, "Functional Criteria for Emergency Response Facilities," the dose acceptance criteria for the TSC are consistent with those for the Control Room, which are in the SRP, NUREG-0800 Section 6.4, "Control Room Habitability," Revision 3, March 2007. Acceptance Criteria 6.B is applicable, specifically the radiation exposures shall not exceed 0.05 Sv (5 rem) total effective dose equivalent (TEDE). This is also consistent with GDC 19. This TSC dose limit is met for all events.

The following changes to STP 3 & 4 COLA Part 7, Section 3.0 will be included in the next COLA revision. Gray shading highlights the changes from COLA Revision 3.

STD DEP 9.4-3, Service Building HVAC System

Description

The Service Building HVAC System described in the reference ABWR DCD had two subsystems, the Clean Area HVAC System and the Controlled Area HVAC System. This standard departure described in STP FSAR Subsection 9.4.8 deletes the subsystems and consolidates the Service Building HVAC System to supply air to both the Clean Area and the Controlled Area. The Service Building HVAC System is included as a load powered by the Combustion Turbine Generator that can be manually loaded by the operator. This allows the Technical Support Center and Operations Support Center to be habitable under accident conditions.

Additionally, design upgrades are made to provide automatic start of the emergency filter train and increase efficiency of the charcoal filters from 95% to 99%.

Evaluation Summary

This departure has been evaluated pursuant to the requirements in 10 CFR 52, Appendix A, Section VIII.B.5.

There is no impact on any Tier 1, Tier 2*, technical specifications, basis for technical specifications or operational requirements as a result of this change.

The proposed changes to the Service Building HVAC System include descriptive changes from two HVAC subsystems to one HVAC system that are consistent with the functional description of the system currently described by the ABWR DCD. An additional provision is included with the proposed change under this departure to make it possible for operation of Service Building HVAC using power from the Combustion Turbine Generator during loss of offsite power conditions. The basic function of the Service Building HVAC System and Combustion Turbine Generator as described by the DCD is not significantly changed by this departure and this change does not affect interactions with previously designated equipment important to safety. The design changes to increase filter efficiency and provide an automatic start of the emergency filter train are upgrades to the subsystem. These changes do not affect a previously described accident or malfunction of equipment important to safety. The proposed changes ~~are an~~ enhance~~ment~~ the emergency filter train and ~~to~~ the ability to operate the Service Building HVAC System using power supplied by the Combustion Turbine Generator during a loss of offsite power event. Changes associated with this departure do not affect fission product barriers. These changes do not affect the probability of occurrence of a severe accident as described by the DCD, nor do they increase the consequences of a severe accident.

Based on this evaluation, prior NRC approval of the change is not required.

The following changes to STP COLA Part 2, Tier 2, Subsections 9.4.8.1.2 and 9.4.8.2 are shown below. Gray shading highlights the changes from COLA Revision 3.

9.4.8.1.2 Power Generation Design Bases

STD DEP 9.4-3

(5) The clean areas served by the Service Building ~~*clean area*~~ *HVAC System has an emergency filter train. It is* automatically or *manually operated. In an emergency it supplies filtered air for the TSC, OSC, lunch room, offices, health physics lab, security offices, and other normally clean areas.*

9.4.8.2 System Description

STD DEP 9.4-3

(6) The Service Building ~~*clean area*~~ *HVAC System is provided with an emergency filter train consisting of a heater/demister, prefilter, HEPA filter,* ~~5.1~~ 10.2 *cm charcoal filter bed, a second HEPA filter, and two fans.*

(7) Controls and Instrumentation

STP DEP 9.4-1

STD DEP 9.4-3

(c) Radiation monitors ~~*and provisions for toxic gas monitors*~~ *at the supply air inlet with alarms to TSC* and signal for automatic start of the emergency filter train.

STD DEP 9.4-3

(d) On manual or automatic *initiation, the* Service Building ~~*clean area*~~ *HVAC System can be put into high radiation mode. On switch over,* the normal air intake damper closes, the minimum outside air intake damper opens, the *exhaust fans stop and* the ventilation air for the clean area is routed through the *emergency filter train* ~~*starts*~~*. System pressurizes clean areas of the service building.*