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

November 16, 2009
U7-C-STP-NRC-090203

U. S. Nuclear Regulatory Commission
Attention: Document Control Desk
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

South Texas Project
Units 3 and 4
Docket Nos. 52-012 and 52-013
Supplemental Response to Requests for Additional Information

Attached are supplemental responses to NRC staff questions included in Request for Additional Information (RAI) letter numbers 198 and 205, related to Combined License Application (COLA) Part 2, Tier 2, Sections 11.2 and 11.5. The original responses were submitted in letters U7-C-STP-NRC-090125, dated September 3, 2009 and U7-C-STP-NRC-090155, dated September 22, 2009.

Attachments 1 and 2 contain supplemental responses to the RAI questions listed below:

11.02-5 11.05-1

When a change to the COLA is indicated, the change will be incorporated into the next routine revision of the COLA following NRC acceptance of the RAI response.

There are no commitments in this letter.

If you have any questions regarding these responses, 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 11/16/09

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

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Attachments:

1. Question 11.02-5 Supplemental Response
2. Question 11.05-1 Supplemental Response

D091
NRO

STI 32574506

cc: w/o attachment except*
(paper copy)

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RAI 11.02-5

QUESTION:

NRC review of STP Candidate Change Number 2007011, STD DEP 11.2-1 found that STP did not adequately evaluate whether ABWR DCD Tier 2 Departure 11.2-1 (Liquid Waste Management System or LWMS) question 7 and 9 "could" either increase the consequences of a system malfunction, or cause a malfunction with a different result.

NRC Staff concluded that this departure "could" either impact system malfunctions due to the skid-mounted mobile liquid processing system and the additional potential for malfunction of the LWMS tanks and/or components in various locations of the radwaste building, or cause a malfunction with a different result due to increased retention of radionuclides in skid-mounted components due to increased decontamination factors. Applicant should consider the impact of these changes on the consequences on the analysis in FSAR sections 2.4.13 and 11.2.

STP should re-evaluate their initial departure evaluation and determine whether this departure "would" impact a system malfunction IAW 10 CFR52 Appendix A analysis. The evaluation results should either be provided to the staff, or the departure should be submitted for NRC review and approval.

SUPPLEMENTAL RESPONSE:

The NRC review of the original response to this RAI resulted in additional questions from the NRC. In a telephone conference call with the NRC on October 21, 2009, STP agreed to provide additional supporting information in the form of a supplement to the original response. The additional information has been inserted into the original response, which is repeated in its entirety below. The additional information is identified by change bars in the right margin of the response.

Re-evaluation of Question 7

Question 7 of the 10 CFR 52 Review is:

> "Could the proposed change result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD?"

The LWMS described in the COLA replaces the LWMS described in the DCD. The significant changes to the LWMS as described in the COLA are:

- Removal of the forced circulation concentrator, Low Conductivity Waste (LCW) filter, LCW demineralizer and High Conductivity Waste (HCW) filter.
- The number and size of tanks is changed, although the total tank volume is essentially the same.
- The existing processing equipment is replaced with a modular radwaste processing system that provides the same or better activity removal capability than the equipment

described in the DCD. This modular equipment is relocated from the basement to the ground floor of the radwaste building.

The DCD does not contain an evaluation of the consequences of a malfunction in the LWMS. The consequences of the limiting fault in the LWMS are evaluated in DCD Section 15.7.3 as a LWMS tank failure. The discussion in this section indicates that the consequences of all other faults, including equipment malfunctions, are bounded by the tank failure and are not evaluated. Since some components of the LWMS are replaced (filters and demineralizers are replaced with modular equipment) and since the capacities of some components are changed, the proposed change could affect the consequences of an equipment malfunction so that it is not bounded by the tank failure evaluated in the DCD. Therefore, an evaluation is required to determine if the change would affect the consequences of an equipment malfunction.

EVALUATION

Although some of the components of the LWMS described in the COLA are different from the components described in the DCD, no fundamentally different processes or equipment are being introduced by the changes to the LWMS. Specifically, the filters and demineralizers described in the DCD are replaced with modular processing equipment that uses similar filters and demineralizers. A component which contains concentrated radionuclides at high temperatures (i.e., forced recirculation evaporator) is removed as part of these changes and replaced with equipment that does not operate at the elevated temperatures (e.g., filter/demineralizers or reverse osmosis systems). The capacities of the components are comparable, with the total tank capacity remaining essentially the same and the processing capacities similar. Other changes use components that are comparable to the design described in the DCD.

The current bounding consequence analysis in the DCD for failures in the radwaste system (Section 15.7.3) is a complete failure of a radwaste system component that leads to a release of liquid containing radioactivity from the component. Two pathways to the environment are addressed: liquid and gaseous. The effect of the changes to the LWMS on equipment malfunctions are evaluated to determine if the consequences of the malfunctions are bounded by the bounding analysis in the DCD.

Liquid Releases from the LWMS

No liquid releases from the radwaste building are considered in the DCD because the radwaste building as described in the DCD is a Seismic Category I building and because all compartments containing liquid radwaste tanks are steel lined. The radwaste building, as described in the COLA, is no longer a Seismic Category I building but is still designed to meet the requirements of Regulatory Guide 1.143, which specifies the design criteria for the foundations and walls of radwaste storage facilities, and the compartments containing radwaste tanks are steel lined. Releases to the groundwater are evaluated in COLA FSAR Section 2.4S.13 to support the evaluation of the hydrological properties of the site. The activity concentrations used in the Section 2.4S.13 analysis are based on the highest activity concentration in the liquid in a LWMS tank or process fluid (reactor coolant).

The changes to the LWMS are evaluated for the effect of equipment malfunctions on liquid releases from the radwaste building using the guidance provided in Branch Technical Position (BTP) 11.6, "Postulated Radioactive Releases Due to Liquid-Containing Tank Failures." BTP 11.6 states that the malfunction of a tank and its components, a valve misalignment, tank overflow, or an operator error are more likely than a gross failure of the LWMS and are types of failures warranting an evaluation of their consequences. The BTP then provides a recommended approach to evaluating a "representative" failure, which includes a postulated failure of a tank or a pipe rupture located outside containment.

BTP 11.6, Section B.3, provides the acceptable design features for mitigating the effect of a postulated tank failure, which includes the use of steel-lined compartments. FSAR Section 11.2.1.2.4 provides the design features provided to minimize contamination, which also includes the use of steel lined compartments. The mitigating design features considered in this evaluation are consistent with the BTP 11.6 guidance. The compartments containing components with large liquid inventories are located below grade and are lined with stainless steel, so liquid releases from the radwaste building due to failure of these components do not need to be considered.

The modular processing equipment (filter/demineralizer and reverse osmosis (RO) modules) are located in the operating bay at grade level in the radwaste building. The potential for release to the surface waters due to postulated failures of modular equipment in the operating bay through doors and open penetrations of the radwaste building was evaluated. The most probable failure that would lead to liquid releases from the modular equipment is the failure of a hose or hose connection in the lines used to transfer the process fluid to the modular equipment. If this type of event occurs, there are a number of design features that ensure that the liquid release is limited and controlled to retain the liquid in the radwaste building:

- The permanently installed equipment (pumps) and the modular equipment are provided with alarms that will alert the operator in the event of a failure in the system that may lead to the release of liquid from the equipment (COLA Section 11.2.7). This will allow the operator to take actions necessary to limit the amount of liquid released from the equipment following a component failure. Operator action is not required to prevent releases from the Radwaste Building. The curbs and drains described below provide a passive means to collect leakage and prevent any release from the Radwaste Building.
- Each module is provided with design features to collect any leakage that occurs from the module. These features include curbs, drip pans, and leak-offs that are routed to floor drains (COLA Section 11.2.1.2.4, first bullet, and Section 11.2.1.2.4.1, ninth and thirteenth bullets).
- The modules are located in shielded enclosures that would reduce the amount of the liquid release from the enclosure. The drains and curbs in the processing area are designed to accommodate the largest potential flow from a process tank without overflow out of the radwaste building. The processing capacity of the LCW and HCW skids is 150 gpm (COLA Table 11.2-2). The floor drain collection system will be designed so the capacity of the drain system will be adequate to handle a continuous leak from the LWMS. Leakage from the enclosures to the processing area would be retained by curbs provided at entrances to the radwaste building and would enter the floor drain system via drains in the truck bay outside the processing area.

- The processing area is equipped with trenches to hold process hoses. These trenches have multiple drains to route leakage from failed hoses to sumps and back to process tanks. The trenches are sized to accommodate the process hoses without impeding full flow from complete failure of a modular processing vessel. Plugging or partial plugging of a single trench drain is considered in the design.
- The floor drains are routed to collection tanks or sumps in the radwaste building that will transfer the leakage to the radwaste collection tanks, located in steel lined rooms (COLA Section 9.3.8). The use of floor drains, sumps and steel lined rooms are consistent with the mitigating design features identified in BTP 11-6.

These design features ensure any liquid releases due to a component failure will be routed to the areas of the radwaste building that are protected against releases to the groundwater. These design features also prevent releases to the surface water through open doors and penetrations above ground level. The components located in the operating bay are filters and demineralizer vessels and similar components, which contain only a small amount of liquid. Although these components may be more effective at removing activity from the liquid than the components they replace, most of the activity is retained on the filter media and ion exchange resin and is essentially immobile. Therefore, the airborne releases due to a failure of the modular processing equipment are bounded by the airborne releases discussed below. The design features described above preclude releases to the surface water, and releases to the groundwater are bounded by the tank failure in COLA FSAR Section 2.4S.13. Liquid releases due to a failure of the modular processing equipment are also bounded since the modular equipment has a smaller volume than the tank failure described in COLA FSAR Section 2.4S-13.

Airborne Releases from the LWMS

Potential airborne releases are based on 10% of the iodine activity in the liquid contained in a failed component. The conservative assumption is that all of the contents of a failed component are released to the radwaste building. Since it is assumed that all of the airborne activity is released to the environment, the location of the failure has no effect on the consequences. Instead, the magnitude of the consequences is determined by the amount of iodine activity in the failed component. The components containing the largest amount of activity are the tanks. The LCW collection tanks have the largest total iodine activity compared to the HCW, Hot Shower Drain (HSD) or Chemical Drain (CD) collection tanks. The LCW collection tanks in the COLA have a significantly smaller volume than the LCW collection tanks in the DCD, so the activity released from the failure of a LCW tank in the DCD is larger than the activity released from the failure of the LCW tank in the COLA. The total activity released in the DCD analysis is the activity in all the tanks. Since the total activity in the radwaste system is not affected by this change, the total activity available for release is the same. The other components of the LWMS containing radioiodine that could become airborne include the filter/demineralizer vessels and the RO units. Although the filter/demineralizers will accumulate radioiodine, the activity will be bound to the resin and will not become airborne if failure of this component occurs. The liquid volume in the filter/demineralizer and RO units is much smaller (about a factor of 100) than the LCW collector tanks so the activity available for release from these components is bounded by the LCW collector tanks.

Based on this evaluation, the proposed change does not result in an increase in the consequences of a malfunction that would exceed the consequences of the failure in the LWMS previously evaluated in the DCD.

As described in Section 15.7.3.1 of the DCD, a liquid radwaste release caused by operator error is considered a remote possibility. The proposed change reduces the capacity of the sample tanks which would be emptied during an inadvertent release. The administrative and physical controls for the release system are not changed. This will reduce the consequences of an inadvertent release.

Conclusion

Based on this evaluation, the proposed change would not result in more than a minimal increase in the consequences of a malfunction of a SSC important to safety, and therefore a license amendment is not required.

Re-evaluation of Question 9

Question 9 of the 10 CFR 52 Review is:

"Could the proposed change create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD?"

The proposed change to the LWMS involves the replacement of the filters, demineralizers and forced recirculation evaporator in the LCW and HCW subsystems with modular systems for the treatment of the liquid radioactive waste. In addition, the modular systems are located in the operating bay on grade level in the radwaste building.

The DCD does not contain an evaluation of the consequences of a malfunction in the LWMS. The consequences of the limiting fault in the LWMS are evaluated in DCD Section 15.7.3 as a LWMS tank failure. The discussion in this section indicates that the consequences of all other faults, including equipment malfunctions, are bounded by the tank failure and are not evaluated. Since the change results in the installation of different equipment and since the equipment is relocated in the radwaste building, the change could result in a malfunction with a different result from a tank failure previously evaluated in the plant-specific DCD. Therefore, an evaluation is required to determine if the change would result in a malfunction with a different result.

EVALUATION

The current bounding analysis in the DCD for failures in the liquid radwaste system (Section 15.7.3) is a complete failure of a radwaste system component that leads to a release of liquid containing radioactivity from the component. Releases to the environment are limited to airborne activity consisting of 10% of the iodine in the liquid. No liquid releases are anticipated since the radwaste building is constructed such that all liquid releases will be retained in the building.

The limiting fault evaluated in the DCD is the complete failure of a component that causes the release of all the contaminated liquid in the component. The mechanism for the failure is not specified. The new components that are added to the radwaste system due to this change all contain contaminated liquid, filter media or ion removal media. These components (filter and demineralizers) are similar to the components that are replaced, so no fundamentally new processes or equipment are being introduced by the changes to the LWMS. Since no new failure mechanisms are introduced by the proposed change, the limiting fault (or malfunction) for the new equipment would also be a complete failure that causes the release of all the contaminated liquid or media in the component. Therefore, this change does not lead to the possibility of a malfunction that is different from malfunctions that have already been considered.

The result of the radwaste system malfunctions evaluated in the DCD is the airborne release of 10% of the iodine activity in the liquid in the failed component. Liquid releases are not considered because the liquid will be contained in the radwaste building. The modular processing equipment (filter/demineralizer and RO modules) is located in the operating bay at grade level in the radwaste building. Although the new component locations could create a potential pathway for liquid release to the surface water, the following design features are incorporated into the radwaste building and radwaste system to preclude such an event.

- Each module is provided with design features to collect any leakage that occurs from the module. These features include curbs, drip pans, and leak-offs that are routed to floor drains.
- The modules are located in shielded enclosures that would reduce the amount of the liquid release from the enclosure. The drains and curbs in the processing area are designed to accommodate the largest potential flow from a process tank without overflow out of the radwaste building. Leakage from the enclosures to the processing area would be retained by curbs provided at entrances to the radwaste building and would enter the floor drain system via drains in the truck bay outside the processing area.
- The processing area is equipped with trenches to hold process hoses. These trenches have multiple drains to route leakage from failed hoses to sumps and back to process tanks. The trenches are sized to accommodate the process hoses without impeding full flow from complete failure of a modular processing vessel. Plugging or partial plugging of a single trench drain is considered in the design.
- The floor drains are routed to collection sumps in the radwaste building that will transfer the leakage to the radwaste collection tanks located in steel lined rooms. The use of floor drains, sumps and steel lined rooms are consistent with the mitigating design features identified in BTP 11-6.

These design features ensure the liquid releases due to a component failure will be routed to areas of the radwaste building that are protected against releases to the groundwater. These design features also prevent releases to the surface water through open doors and penetrations above ground level. Therefore, liquid releases from the radwaste building due to a malfunction of the modular processing equipment are not expected to occur.

<u>Conclusion</u>

Based on this evaluation and the design of the radwaste building, the proposed change would not create the possibility for a malfunction of an SSC important to safety with a different result than evaluated previously in the DCD, and therefore a license amendment is not required.

There are no changes to the COLA required for this response.

RAI 11.05-1

QUESTION:

STP 3 and 4 COL FSAR Section 11.5.7S, Additional Information, states "An offsite dose calculation manual (ODCM) for STP 1 and 2 has been reviewed and approved by the NRC. It contains descriptions of the methodology and parameters used for calculation of offsite doses resulting from gaseous and liquid effluents. It also describes how liquid and gaseous effluent release rates are derived and parameters used in setting instrumentation alarm setpoints to control or terminate effluent releases. The ODCM also contains the radiological environmental monitoring program which samples and analyzes radiation and radionuclides in the environs of the existing plant, using local land use census data in identifying all potential radiation exposure pathways associated with radioactive materials present in liquid and gaseous effluents and direct external radiation from the plant. The ODCM for STP 3 and 4 will be integrated into the 1 and 2 ODCM, taking into account the appropriate differences between the existing and new units."

Therefore, the ODCM will be common to all four units. In keeping with that policy of utilizing a site ODCM, please answer the following:

1. Verify that STP has reviewed Nuclear Energy Institute (NEI) document NEI 07-09A, "Generic FSAR Template Guidance for the Offsite Dose Calculation Manual (ODCM) Program Description" for applicability and possible incorporation into the STP 3 and 4 COL.

2. NEI 07-09A "provides a complete generic program description for use in developing construction and operating license (COL) applications. The document reflects contemporary Nuclear Regulatory Commission (NRC) guidance, including Regulatory Guide 1.206, "Combined License Applications for Nuclear Power Plants," and industry-NRC discussions regarding the applicable standard review plan section. A main objective of this program description is to assist in expediting NRC review and issuance of the combined license." If STP has reviewed NEI 07-09A and determined that it will not be incorporated into the FSAR, then the applicant should modify all applicable FSAR Sections to fully describe all elements of the ODCM program, or justify an alternative. Otherwise, the applicant should reference NEI 07-09A in the STP FSAR and provide any additional supplemental or site-specific information as needed.

SUPPLEMENTAL RESPONSE:

STP Units 3 & 4 will develop a separate ODCM that will incorporate NEI 07-09A, using the references for a Boiling Water Reactor Plant. Site-specific information which will be used to develop the Units 3 & 4 ODCM is contained in Part B, Section 4 of the STP 1 & 2 ODCM. This document was last submitted in the "South Texas Project Units 1 & 2 Radioactive Effluents Release Report for 2007", dated April 30, 2008, ADAMS ML #ML081300023.

COLA Part 2 Tier 2, Section 11.5.7S will be revised as shown below. Change to the COLA is shown in gray highlighting.

11.5.7S Additional Information

~~An offsite dose calculation manual (ODCM) for STP 1 & 2 has been reviewed and approved by the NRC. It contains descriptions of the methodology and parameters used for calculation of offsite doses resulting from gaseous and liquid effluents. It also describes how liquid and gaseous effluents release rates are derived and parameters used in setting instrumentation alarm setpoints to control or terminate effluent releases. The ODCM also contains the radiological environmental monitoring program which samples and analyzes radiation and radionuclides in the environs of the existing plant, using local land use census data in identifying all potential radiation exposure pathways associated with radioactive materials present in liquid and gaseous effluents and direct external radiation from the plant. The ODCM for STP 3 & 4 will be integrated into the 1 & 2 ODCM, taking into account the appropriate differences between the existing and new units. Where possible, t~~The ODCM for STP 3 & 4 will ~~align with~~ incorporate NEI 07.09A (Revision 0), "Generic FSAR Template Guidance for Offsite Dose Calculation Manual (ODCM) Program Description," March 2009.