October 16, 2009

Mr. Mark McBurnett, Vice President
Regulatory Affairs
South Texas Project Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

SUBJECT: REGULATORY AUDIT SUMMARY OF SOUTH TEXAS PROJECT, UNITS 3 AND 4 COMBINED LICENSE APPLICATION REVISION 2, CHAPTER 11 RADIOACTIVE WASTE MANAGEMENT SYSTEM DESIGN CONTROL DOCUMENT DEPARTURE AUDIT

Dear Mr. McBurnett:

By letter dated September 24, 2008, South Texas Project Nuclear Operating Company (STPNOC) submitted South Texas Project (STP) Units 3 and 4 Combined License Application (COLA), Revision 2. To support the review of STP Units 3 and 4 COLA, the U. S. Nuclear Regulatory Commission staff participated in an on-site audit to review and evaluate whether the applicant processed Chapter 11 departures from the approved Advanced Boiling Water Reactor (ABWR) Design Control Document (DCD) in accordance with the requirements of Appendix A to Title10 *Code of Federal Regulations* (CFR) Part 52. The audit occurred at the STPNOC Offices in Bay City, Texas on July 29-30, 2009. The detailed results of the audit are provided in the attached audit summary.

Should you have any questions, please contact Raj Anand, Project Manager for the STP COLA at (301) 415-1146 or Raj.Anand@nrc.gov.

Sincerely,

/RA/

Belkys Sosa, Chief
ESBWR/ABWR Projects Branch 2
Division of New Reactor Licensing
Office of New Reactors

Docket Nos.: 52-012
52-013

cc: See next page

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Should you have any questions, please contact Raj Anand, Project Manager for the STP COLA at (301) 415-1146 or Raj.Anand@nrc.gov.

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ACCESSION NO. ML092510426 **NRO-002**

OFFICE	NRO/DNRL/NGE2	NRO/DNRL/NGE2	NRO/DCIP/CHPB	NRO/DCIP/CHPB	NRO/DNRL/NGE2
NAME	RAnand	BAbeywickrama	SWilliams	TFrye	BSosa
DATE	09/09/09	09/22/09	09/29/09	10/7/09	

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STP UNITS 3 AND 4 COLA, REVISION 2

CHAPTER 11 RADIOACTIVE WASTE MANAGEMENT ABWR DCD DEPARTURES

AUDIT SUMMARY

1. Background

South Texas Project Nuclear Operating Company, LLC (STPNOC) has submitted to the U.S. Nuclear Regulatory Commission (NRC), a Combined License Application (COLA) to construct and operate two additional units (Units 3 & 4) based on the U.S. Advanced Boiling Water Reactor (ABWR) Design Control Document (DCD) at the STPNOC site located in the county of Matagorda near the City of Bay City, Texas. The NRC staff has initiated review of the STPNOC Units 3 & 4 COLA.

A review of South Texas Project Final Safety Analysis Report (FSAR) Chapter 11 (Tier 2, Rev. 2) and applicant's response to a Request for Additional Information (RAI) 11.04-1 (STP Letter ABR-AE-08000046, June 26, 2008) indicated that specific changes are proposed for the radioactive waste management systems, including the Liquid Waste Management System (LWMS), Gaseous Waste Management System (GWMS), and Solid Waste Management System (SWMS), described in FSAR Sections 11.2, 11.3, and 11.4, respectively. The Departures (DEP) Report indicates that the departures have been evaluated and determined to comply with the requirements of Title 10 *Code of Federal Regulations* Part 52, Appendix A, Section VIII.B.5. The staff reviewed the applicant's evaluation process and the basis for the applicant's determination that prior NRC approval is not required to ensure that the process results in changes that are consistent with the requirements of Part 52, Appendix A, Section VIII.B.5.

This report summarizes the NRC staff's audit during the time period of July 29-30, 2009, to conduct a review of the radioactive waste management system changes. The NRC staff assembled an interdisciplinary audit team to facilitate and expedite the work. NRC staff provided a list of Information Needs (Enclosure 1) to the applicant prior to the audit. Representatives from STPNOC provided supporting documents and technical evidence to the reviewers. The results are documented in this audit report.

The audit team consisted of the NRC staff members identified in Table 1. The applicant's staff that participated in various audit discussions over the course of the two days at Bay City, Texas is identified in Table 2.

Table 1

NAME	AFFILIATION
Tim Frye	NRC Audit Team Leader
Stephen Williams	NRC Health Physics
Robert Kellner	NRC Health Physics
Raj Anand	NRC Project Manager
Douglas Dodson	NRC Balance of Plant

Table 2

Name	Affliliation	Name	Affiliation
Koichi Kondo	TANE	Fred Puleo	STP Licensing
W. J. Johnson	S&L	David Dujke	STP Engineering
Masahiro Okawa	TSB	Mark McBurnett	STP VP O&RA
Milton Rejcek	STPNOC	Tim Walker	STP Quality
K. C. Prasad	TANE	Dan Poole	TANE
Fred Rippee	Westinghouse	Toru Karasawa	TANE
Mike Sekulic	STP Mechanical	K. D. Richards	STP Sr VP
Dick Scheide	STPNOC	Scot Stephens	STP Licensing
J. D. Blossom	STP Construction		

2. Objective

The initial objective of this audit was to review additional documents related to the basis for STPNOC's evaluations. The evaluations by the applicant concluded that the departures in Chapter 11 of the FSAR have been evaluated and determined to comply with the requirements of 10 CFR 52, Appendix A, Section VIII.B.5. A second objective of this audit was to assess the validity of the applicants' conclusion that these departures did not require prior NRC approval.

3. Regulatory Basis

The audit supports the NRC staff's review of the 10 CFR 52, Appendix A, Section VIII.B.5 process as specified by the Standard Review Plan (SRP) (NUREG-0800) utilized by STP for determination that these departures did not require prior NRC approval.

4. Audit Activities

The staff reviewed the 10 CFR 52, Appendix A, Section VIII.B.5 evaluations for STD DEP 11.2-1, of Liquid Radwaste Process Equipment," STD DEP 11.3-1, "Gaseous Waste Management System," STD DEP 11.4-1, "Radioactive Solid Waste Update," STD DEP 10.4-3, "Main Condenser Evacuation System," and STD DEP 10.4-5, "Condensate and Feedwater System."

The staff evaluated how each of these departures addressed the following system malfunctions:

- LWMS Failure and its impact on the site and environment as evaluated per SRP Sections 2.4.13 and 11.2, and BTP 11-6,
- GWMS Failure as evaluated per SRP 11.3 and BTP 11-5,
- GWMS combustible gas control and resistance to explosion as evaluated per SRP 11.3,
- SWMS failure and its impact on the site and the environment as evaluated per SRP 11.4.

Additional items evaluated related to the audit were:

- Determination of whether the Radwaste Building is identified as a Vital Area requiring post-accident operator access per TMI Action Item II.B.2.

- Shielding calculations performed for components and structures in the Radwaste Building.

5. Observations

The NRC staff made the following observations during the audit:

- The ABWR DCD Tier 2 change process described in 10 CFR Part 52 Appendix A requires NRC approval if the departure "would" impact malfunctions previously analyzed. STP DCD departure procedure U7-P-LI02-0001, "10 CFR 52 Review of Proposed COLA Changes," requires the applicant to assess whether the departure "could" impact systems previously analyzed.

- STP DCD departure procedure U7-P-LI02-0001 states that any "Yes" answer to the "could" impact questions requires a full evaluation to determine and document whether NRC approval is required.

- The NRC reviewed STD DEP 10.4-5 and noted that the documentation was not clear. STP identified a change in Technical Specification basis for the Feedwater pump design, therefore requiring NRC approval. Per U7-P-LI02-0001, no further evaluation was required. However, in the "Detailed Evaluation" section, STP staff evaluated the remaining Tier 2 departure evaluation criteria, and concluded that STD DEP 10.4-5 did not require NRC approval. NRC staff concluded that the applicant's conclusions in the departure evaluation were not consistent.

- The NRC verified that post-accident operator vital area access was not impacted by any of these departures.

- During the audit, NRC staff identified a question regarding the use of alternate shielding codes to verify the original radwaste building shielding calculations.

6. Conclusions

- After review of STD DEP 11.2-1, STD DEP 11.4-1, and their corresponding evaluations, the staff concluded that the LWMS and SWMS changes could potentially result in an increase in the consequences of a malfunction or potentially result in a malfunction with a different result due to (1) the location of skid-mounted waste processing equipment in the truck bay or (2) increased retention of radionuclides in skid-mounted components due to increased decontamination factors (DF) increasing radionuclide removal. Therefore, the NRC concluded that Question 7 and Question 9 of the STD DEP 11.2-1 and STD DEP 11.4-1 evaluations should have been answered "Yes." These departures "could" create the possibility for a malfunction of a Structure, System and component (SSC) important to safety with a different result than any evaluated previously, and they "could" result in more than a minimal increase in the consequences of a malfunction of a SSC important to safety. Thus, further evaluation by STP is necessary.

- While preparing for the audit, STP staff identified an error associated with the STD DEP 11.4-1 evaluation. The Backwash Receiving Tank added to the LWMS, which is used to collect backwash from the filter/demineralizer module and the reject from the reverse osmosis, could have higher activity than the Low Conductivity Waste (LCW) tank. Therefore, the NRC staff concluded that Question 7 and Question 9 of the STD DEP

11.4-1 evaluation should have been answered "Yes," because there could be an impact on a malfunction. Additionally, an evaluation needed to be performed by STP to determine if it would impact the consequences. Subsequent evaluation by STP using the correct source term concluded that the LCW tank still contains the highest activity. This error will be corrected by STP in a future COLA revision.

- At this time, the staff does not have any additional questions related to STD DEP 11.3-1 or STD DEP 10.4-3 as they relate to FSAR Section 11.3.

- Given the documentation issues identified for STD DEP 11.2-1, STD DEP 11.4-1 and STD DEP 10.4-5, the NRC concluded that the guidance in U7-P-LI02-001 on evaluating departures could be improved and clarified. In particular, the NRC noted that (1) additional guidance could be provided on attributes of accidents and malfunctions that should be considered, (2) additional guidance could be provided on documenting the basis of any evaluation criteria answered "No", (3) additional guidance could be provided on the rationale for the "could" consideration, (4) additional guidance could be provided on the acceptable levels of evaluation to determine whether a departure "would" impact a malfunction or accident.

Request for Additional Information RAIs

- RAIs related to STD DEP 11.2-1 and STD DEP 11.4-1 were developed and submitted. These RAIs request STP re-evaluate their initial departure evaluations and determine whether STD DEP 11.2-1 and STD DEP 11.4-1 "would" impact a system malfunction in accordance with 10 CFR 52, Appendix A.

- The NRC staff developed an RAI to obtain additional information on the radiation shielding codes being used to support the STP COLA.

- The NRC staff developed an RAI to capture the STP identified error associated with the STD DEP 11.4-1 evaluation. The error concerned the radioactivity content calculated for Backwash Receiving Tank, which the departure added to the LWMS. This Backwash Receiving Tank is used to collect backwash from the filter/demineralizer module and the reject from the reverse osmosis process. The departure indicated in error that this tank could have higher activity than the Low Conductivity Waste (LCW) tank. This discrepancy was found in FSAR tables 12.2-15A and Table 12.2-15L

Enclosures:

Enclosure 1 - Information Needs presented to STP prior to the audit.
Enclosure 2 – List of Documents Audited at STP, July 28-29, 2009.

Information Needs
South Texas Nuclear Power Plant (STPNPP), Units 3 and 4 COL
Health Physics (HP) Safety Site Audit

July 29-30, 2009

ID No.	Statement of Information Needed
Health Physics (HP)	
HP-01	LWMS, GWMS, and SWMS - The response contained in STP Letter ABR-AE-08000046 (June 26, 2008) indicates that the Part 52 Appendix A "screening evaluations were recreated" because previous documents were not available. The applicant is requested to describe the process and procedures that STP developed and used in documenting all DCD departures. In addition to the requested description of the process and procedures, provide copies of the documentation packages generated in screening the design changes of the LWMS, GWMS, and SWMS.
HP-02	LWMS - The response contained in STP Letter ABR-AE-08000046 (June 26, 2008) indicates that the failure of the Low Conductivity Collector Tank remains the limiting accident and, consequently, the proposed change does not result in an increase in the frequency of the limiting accident previously evaluated in the DCD. However, it is not clear if the evaluation considered the use of a skid mounted LWMS system setup and operated in a truck bay located near a loading dock, which affords greater opportunities for spills and leaks to impact the environment. Accordingly, the applicant is requested to provide documentation showing whether the screening process did consider the failure of components from the skid-mounted LWMS system, and that if it were to fail, the resulting release of liquid waste would comply with the effluent concentration limits and unity-rule of Appendix B (Table 2) to Part 20 and dose limits to members of the public under Parts 20.1301 and 20.1302, and criteria of radwaste tank failure consequence analysis of SRP Section 11.2 and BTP 11-6 (NUREG-0800, March 2007).
HP-03	GWMS and OGS - A review of the Departures Report indicates that the number of charcoal adsorber vessels and their configuration have been changed when compared to the DCD. The Departures Report also states that there is no impact on the probability or consequence of an accident or system or component malfunction. However, it is not clear if the evaluation considered that changes in the configuration of charcoal vessels and changes in operating temperatures of the charcoal beds negatively affected the holdup times of noble gases and removal efficiencies of iodines in charcoal delay beds. Accordingly, the applicant is requested to provide documentation showing that the screening process did consider such system parameters in confirming that gaseous effluent releases will comply with the effluent concentration limits and unity-rule of Appendix B (Table 2) to Part 20 and dose limits to members of the public under Parts 20.1301 and 20.1302.

HP-04	OGS - A review of the Departures Report indicates that the number of charcoal adsorber vessels and their configuration have been changed when compared to the DCD. The Departures Report also states that there is no impact on the probability or consequence of an accident or system or component malfunction. However, it is not clear if the evaluation considered that changing the configuration of the OGS from an integrated unit to a recombiner train would change the vulnerability of the system to withstand internal effects of H_2/O_2 detonations, whether the revised design includes instrumentation and analyzers to preclude the formation of explosive gas mixtures, and assessed the radiological impact of an OGS leak or component failure at the EAB given the new design. Accordingly, the applicant is requested to provide information showing whether the screening process did consider such considerations for the OGS, and that if it were to fail, the resulting release of gaseous waste would comply with the effluent concentration limits and unity-rule of Appendix B (Table 2) to Part 20 and dose limits to members of the public under Parts 20.1301 and 20.1302, and criteria of radwaste tank failure consequence analysis of SRP Section 11.3 and BTP 11-5 (NUREG-0800, March 2007).
HP-05	Review of the Departures Report indicates significant changes in the radwaste building design, building layout, component shielding, and system configurations of the LWMS, GWMS, and SWMS when compared to the DCD. a) Please provide documentation showing that the screening process evaluated the potential for post accident operator access to equipment and systems located in the radwaste building as described in Section II.B.2 of NUREG 0737. b) It is not clear if the screening process evaluation included review of the calculations to ensure the DCD design fission product source term offgas release rate was used in the departure process. Please provide documentation showing that the screening process evaluated the radwaste system source term inventories and shielding using the same fission product release rate as the DCD. c) In addition to the requested description of the process and procedures, provide copies of the radwaste system dose rate, source term, and shielding documentation packages generated in evaluating the design changes of the LWMS, GWMS, and SWMS.
HP-06	The applicant is requested to describe the results of the screening evaluations conducted for each technical and regulatory aspect identified above and provide supporting documentation in each applicable FSAR Section, i.e., Sections 11.2, 11.3, 11.4, 12.2, and 12.3. The applicant is requested to include in its response supporting information at a level of detail that is adequate for the staff to conduct its own independent evaluation.

List of Documents Audited at STP
July 28-29, 2009

1. "10 CFR 52 Review of Proposed COLA Changes," Candidate Change Number 2007011, STD DEP 11.2-1, COLA Sections Part 2 (FSAR) Tier 2: Section 11.2, 12.2, and Part 7 (Departure Report): Section 3.0, July 7, 2008.
2. "10 CFR 52 Review of Proposed COLA Changes," Candidate Change Number 2008013 DEP 11.3-1, COLA Section 10.1, 10.4, 11.3, Table 11.3-2, 3, 4, Fig 11.3-1, 2, 15.7, Fig 15.7-2, Revision 2, July 10, 2009.
3. "10 CFR 52 Review of Proposed COLA Changes," Candidate Change Number 2008013 DEP 11.3-1, COLA Section 10.1, 10.4, 11.3, Table 11.3-2, 3, 4, Fig 11.3-1, 2, 15.7, Fig 15.7-2, August 11, 2008.
4. "10 CFR 52 Review of Proposed COLA Changes," Candidate Change Number 2007011 STD DEP 11.4-1, COLA Sections Part 2 (FSAR) Tier 2: Section 11.4, 12.2 and Part 7 (Departure Report): Section 3.0, June 26, 2008
5. "10 CFR 52 Review of Proposed COLA Changes," Candidate Change Number STP DEP 10.4-3, COLA Section Tier 2 10.3, 10.4, 11.3, June 16, 2008.
6. "10 CFR 52 Review of Proposed COLA Changes," Candidate Change Number STD DEP 10.4-5, COLA Section 7.7, 10.1, 10.4, 16B 3.3.4.2, 19.1, 19.3, 19L, 19Q, August 14, 2008.
7. STP calculation for STP COLA Table 12.2-15A & L problem, LW Backwash Tank Source Term analysis.
8. Current ODCM in use at STP½.
9. STP license procedure, U7-P-LI02-001, "10 CFR 52 Review of Proposed COLA Changes," Revision 0, 12/12/2007.
10. STP license procedure, U7-P-LI02-0004, "Revisions to the COLA," 11/12/2008.
11. Presentation to NRC, Power Point.
12. "COLA Change Validation Package," Departure Number STD DEP 11.2-1, Revision 2, September 10, 2008.
13. "COLA Change Validation Package," Departure Number STD DEP 11.3-1.
14. "COLA Change Validation Package," Departure Number STD DEP 11.4-1, Revision 1, September 4, 2008.
15. "COLA Change Validation Package," Departure Number STD DEP 10.4-5, Revision 2, August 6, 2008.

Enclosure 2

16. STP Response document, "Issue: The response to Question 7 in evaluation for Dep. 11.2-1 is "No…," 1 page.
17. STP Response document, "Issue: The response to Question 9 in the 10 CFR 52 evaluation for Dep. 11.2-1 is "No…," 2 pages.