



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

July 29, 2009

U7-C-STP-NRC-090089

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.
Response to Request for Additional Information

Attached are the responses to NRC staff questions included in Request for Additional Information (RAI) letter numbers 142, 144 and 147 related to Combined License Application (COLA) Part 2, Tier 2, Section 14.02 (Standard Review Plan Section 14.2). This submittal completes the response to RAI letters 142 and 144.

Attachments 1 through 4 provide the responses to the RAI questions listed below:

- RAI Question 14.02-5
- RAI Question 14.02-6
- RAI Question 14.02-7
- RAI Question 14.02-8

There are no commitments in this letter.

If you have any questions regarding this response, please contact me at (361) 972-7206, or Bill Mookhoek at (361) 972-7274.

DOF11
NRW

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

Executed on 7/29/2009



Mark McBurnett
Vice President, Oversight and Regulatory Affairs
South Texas Project Units 3 & 4

gsc

Attachments:

1. RAI Question 14.02-5
2. RAI Question 14.02-6
3. RAI Question 14.02-7
4. RAI Question 14.02-8

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

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RAI 14.02-5**QUESTION:**

FSAR Section 14.2S.12.1.81 describes the preoperational test for personnel monitors and radiation survey instruments. Please provide the following amplifying information:

- a) Describe the general types of personnel monitors and radiation survey instruments that are covered by this test.
- b) The stated purpose of the test is “To verify the ability of the personnel monitors and radiation survey equipment to indicate and alarm normal and abnormal radiation levels.” Will all of the monitors and instruments have alarm capabilities? If not, what other criteria will be used to ensure the proper operation of the equipment?
- c) Under the heading “Prerequisites”, the text states that “High radiation alarm setpoints shall be properly established based on sensor location, background radiation level, expected radiation level and low occupation dose prior to the test.” Explain how the specification “low occupation dose” is used as an input in establishing radiation alarm setpoints for the personnel monitors and radiation survey instruments covered by this preoperational test.
- d) Under the heading “General Test Methods and Acceptance Criteria”, the text identifies various criteria, many of which appear to be focused on installed AC powered equipment with external interface(s) for alarms, annunciators, and recorders as well as interlock and bypass functions. How will the criteria be applied to simple portable or semi-portable AC/DC monitors and instruments that do not have all of the listed functions and capabilities?
- e) The staff notes that RG 1.68 (Appendix A, Section 1.k (Preoperational Testing-Radiation Protection Systems)) includes “laboratory equipment used to analyze or measure radiation levels and radioactivity concentrations” as one of the system types that should receive pre-operational testing to demonstrate proper operation. Please include site-specific pre-operational test for laboratory equipment in FSAR Section 14.2S.12.1.81, or justify the absence of such testing.

RESPONSE:

FSAR section 14.2S.12.1.81 is intended to describe the purpose, prerequisites, and general test methods and acceptance criteria for the preoperational testing of the personnel monitors and radiation survey instruments used at STP 3&4. However, information in the section is incorrect. To correct the description and present amplifying information for use during review, the following is provided.

- a) The equipment has not been procured at this time. Personnel monitors for contamination are typically fixed, AC powered, microprocessor controlled devices that detect beta and/or gamma radiation. Some personnel monitors also detect alpha radiation. The microprocessor controller continuously checks the monitor for proper operation. Radiation survey instruments are typically battery-powered, hand-carried items in a variety of configurations and ranges. Survey instrumentation will include instruments to detect and quantify all types and levels of radiation necessary for personnel radiation protection.
- b) Fixed personnel contamination monitors will have alarm capabilities. Survey instruments typically do not have alarm functions, although some specific instruments do incorporate alarms. Proper operation of portable radiation survey equipment is typically ensured by performing response (source) checks with sources.
- c) Under Prerequisites and General Test Methods and Acceptance Criteria, FSAR Subsection 12.3.4, Area Radiation and Airborne Radioactivity Monitoring Instrumentation was incorrectly used for text and referenced. This text will be corrected and the reference will be removed.
- d) See c) above.
- e) In accordance with RG 1.68, pre-operational testing of laboratory equipment used to analyze or measure radiation levels or radioactivity concentrations will be added to FSAR Subsection 14.2S.12.1.81.

COLA Tier 2, Subsection 14.2S.12.1.81 will be revised as shown below.

Purpose

To verify the ability of the personnel monitors and radiation survey equipment to indicate and alarm normal and abnormal radiation levels. Personnel contamination monitor and radiation survey instrument testing verifies that the devices operate in accordance with their intended function in support of the radiation protection program, as described in Chapter 12.

1. Prerequisites

The construction tests have been successfully completed and the SCG has reviewed the test procedure and approved the initiation of testing. High radiation alarm setpoints shall be properly established based on sensor location, background radiation level, expected radiation level and low occupation dose prior to the test. Indicator and trip units, power supplies, and sensor/converters have been calibrated according to vendor instructions. Personnel contamination monitors, radiation survey instruments, and appropriate sources are on-site.

2. General Test Methods and Acceptance Criteria

Performance shall be observed and recorded during a series of individual component and integrated subsystem tests. This test shall demonstrate that each monitor or survey instrument operates as specified in Subsection 12.3.4 and the appropriate manufacturer's technical instruction manuals through the following testing: The personnel contamination monitors and radiation survey instruments are source checked, tested, maintained, and calibrated in accordance with the manufacturers' recommendations or industry standards. The contamination monitor and instrument tests include:

- (a) Proper calibration of detector assemblies and associated equipment using a standard radiation source or portable calibration unit. Proper function of the monitors and instruments to respond to radiation is verified, as required.
- (b) Proper functioning of indicators, recorders, annunciators, and audible alarms. Proper operation of instrumentation controls, battery, and alarms, if applicable.
- (c) Proper system trips at correct prescribed setpoints in response to high radiation and downscale/inoperative conditions. Proper functioning of laboratory equipment used to analyze or measure radiation levels and radioactive concentrations.
- (d) Proper operation of permissive, prohibit, interlock, and bypass functions.
- (e) Proper functioning and operation of the self test feature for gross failure and loss of power detection.

RAI 14.02-6**QUESTION:**

The COL applicant supplemented FSAR Subsections 14.2.12.1.2 and 14.2.12.1.52 by deleting NEDO 33316, "Advanced Boiling Water Reactor (ABWR) Vibration Assessment Program in compliance with RG 1.20," and replacing it with a reference to Subsections 3.9.2.3 and 3.9.2.4 in the STP Units 3 and 4 FSAR. The information in STP FSAR Subsections 3.9.2.3 and 3.9.2.4 is not sufficient to provide reasonable confidence that these two preoperational tests for the Reactor Recirculation System and the Reactor Vessel Flow-Induced Vibration System will satisfy the NRC regulations.

For example, Criterion XI of Appendix B to 10 CFR Part 50 requires that a test program be established to ensure that all testing required to demonstrate that structures, systems, and components (SSCs) will perform satisfactorily in service is identified and performed in accordance with written test procedures that incorporate the requirements and acceptance limits in applicable design documents. The test program should include, as appropriate, proof tests before installation, preoperational tests, and operational tests during plant operation of SSCs. Test procedures should include provisions for ensuring that all prerequisites for the given test have been met, adequate test instrumentation is available and used, and the test is performed under suitable environmental conditions. Test results should be documented and evaluated to ensure that test requirements have been satisfied. The staff requests a comprehensive test program for these two test abstracts be submitted to the NRC for review.

RESPONSE:

As noted in the response to RAI 03.09.02-2, the ABWR prototype comprehensive vibration assessment program is provided in Toshiba report RS-5126954 Rev.1 "Prototype ABWR Reactor Internals Flow Induced Vibration Test Report." In addition, the application of the prototype vibration assessment program, and the additional testing and analyses for a complete vibration assessment for STP 3&4, is provided in Toshiba report RS-5126579 Rev.1 "STP-3 and 4 Reactor Internals Flow Induced Vibration Assessment Program." These reports provide the detailed information associated with STP FSAR Subsections 3.9.2.3 and 3.9.2.4.

As also noted in the response to RAI 03.09.02-2, these Toshiba documents contain proprietary information that is subject to export control, thus they were not submitted with the COL. These reports are available for NRC review.

No COLA revision is required as a result of this RAI response.

RAI 14.02-7**QUESTION:**

In Subsection 14.2S.12.1.80, "Electrical Switchyard System Preoperational Test," under paragraph (3), "General Test Methods and Acceptance Criteria," the applicant provided a list of preoperational tests ((a) through (g)) that will be conducted to demonstrate the capability of the switchyard system to provide power to plant loads under various plant operating conditions. Please indicate that the list will also include (1) Capability to transfer between normal offsite and alternate offsite sources in accordance with testing requirements of General Design Criteria (GDC) 18; (2) Verification that the measured voltages at the various AC buses are consistent with the analytically derived values in accordance with Branch Technical Position (BTP) 8-6; and (3) Verification that adequate voltage is provided to safety-related loads under degraded voltage setpoints in accordance with BTP 8-6. Otherwise indicate why they are not required.

RESPONSE:

The response to all three items is contained in Chapter 14.2.12.1.45.4 as described below.

- (1) FSAR Tier 2 Section 14.2.12.1.45.4, Electric Power Distribution System Preoperational Test, item 3(e) states that the proper operation and load carrying capability of breakers, switchgear, transformers, and cables will be tested to demonstrate the proper operation of the EPDS. The capability to transfer between the normal preferred offsite source (that is, the UATs) and the alternate preferred offsite source (the RATs) is verified through testing the equipment described in 14.2.12.1.45.4 3(e). Specifically, this capability is demonstrated in the ability of the source breakers for each medium voltage bus to properly operate, and the ability of the UATs, RATs, and distribution system cables and switchgear to transfer power to their loads, in accordance with GDC 18.
- (2) Verification that measured voltages at various AC buses are consistent with analytical values will be accomplished under test item 3(h) of section 14.2.12.1.45.4, which tests to verify that adequate voltage is provided between no load and full load conditions. The results of this test will be compared to analytical values to verify the system design, in accordance with BTP PSB 1. It is important to note that DCD, Rev. 4, Tier 1, Table 1.8-19 references BTP PSB 1, dated July 1981, not BTP 8-6. The requirements as applicable to this request from both documents are the same.
- (3) The system performance under degraded voltage conditions will be developed by analysis, with the analytical results compared to the preoperational test described in 14.2.12.1.45.4 3(h). Verification of the acceptability of the results will be in accordance with BTP PSB 1. The degraded voltage setpoints will be selected based on the results of the analysis.

No COLA revision is required as a result of this RAI response.

RAI 14.02-8**QUESTION:**

The COL applicant supplemented FSAR Subsection 14.2.12.2.12 by deleting NEDO 33316, "Advanced Boiling Water Reactor (ABWR) Vibration Assessment Program in compliance with RG 1.20," and replacing it with a reference to Subsections 3.9.2.3, 3.9.2.4 and 3.9.2.6 in the STP Units 3&4 FSAR. The information in STP Unit 3&4 FSAR Subsections 3.9.2.3, 3.9.2.4 and 3.9.2.6 is not sufficient to provide reasonable assurance that startup testing for Reactor Internal Vibration will satisfy the NRC regulations. For example, Criterion XI of Appendix B to 10 CFR Part 50 requires, in part, that a test program be established to ensure that all testing required to demonstrate that structures, systems, and components (SSCs) will perform satisfactorily in service is identified and performed in accordance with written test procedures that incorporate the requirements and acceptance limits in applicable design documents. The test program should include, as appropriate, operational tests during plant operation of SSCs. Test procedures should include provisions for ensuring that all prerequisites for the given test have been met, adequate test instrumentation is available and used, and the test is performed under suitable environmental conditions. Test results should be documented and evaluated to ensure that test requirements have been satisfied. The staff requests a comprehensive startup test program be submitted to the NRC for review.

RESPONSE:

As noted in the responses to RAI 03.09.02-2 and RAI 14.02-6, the ABWR prototype comprehensive vibration assessment program is provided in Toshiba report RS-5126954 Rev.1 "Prototype ABWR Reactor Internals Flow Induced Vibration Test Report." In addition, the application of the prototype vibration assessment program, and the additional testing and analyses for a complete vibration assessment for STP 3&4, is provided in Toshiba report RS-5126579 Rev.1 "STP-3 and 4 Reactor Internals Flow Induced Vibration Assessment Program." These reports provide the detailed information associated with STP FSAR Subsections 3.9.2.3, 3.9.2.4, and 3.9.2.6.

As also noted in the previous response, these Toshiba documents contain proprietary information that is subject to export control, thus they were not submitted with the COLA. These reports are available for NRC review.

No COLA revision is required as a result of this RAI response.