



South Texas Project Electric Generating Station 4000 Avenue F - Suite A Bay City, Texas 77414

July 30, 2009
U7-C-STP-NRC-090088

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
Response to Request for Additional Information

Attached are the responses to the NRC staff questions included in Request for Additional Information (RAI) letter numbers 140 and 141 related to Combined License Application (COLA) Part 2, Tier 2, Sections 3.9.2 and 3.10 respectively. This submittal completes the responses to these RAI letters.

The attachments address the responses to the RAI questions listed below:

RAI 03.09.02-2	RAI 03.09.02-6
RAI 03.09.02-3	RAI 03.09.02-7
RAI 03.09.02-4	RAI 03.09.02-8
RAI 03.09.02-5	RAI 03.10-1

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

There are no commitments in this letter.

If you have any questions, 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 7/30/09



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

rhs

Attachments:

1. RAI 03.09.02-2
2. RAI 03.09.02-3
3. RAI 03.09.02-4
4. RAI 03.09.02-5
5. RAI 03.09.02-6
6. RAI 03.09.02-7
7. RAI 03.09.02-8
8. RAI 03.10-1

cc: w/o attachment except*
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RAI 03.09.02-2**QUESTION:**

In FSAR section 3.9.2.3, the applicant provided a brief summary of the valid prototype test and analysis results from the guidance of Regulatory Guide 1.206 Section C.I.3.9.2.3. The reactor internals design of the first ABWR plant, which has been in operation since 1995, is considered to be the 1350 MWe ABWR "Valid Prototype". Since the prototype comprehensive vibration assessment program was conducted on a reactor outside the United States, the Regulatory Guide 1.20 requires the detailed results of the program be included in the application related to the non-prototype submitted to the NRC for review and should address all of the provisions in the Regulatory Guide 1.20. Since the comprehensive report was not submitted with the application, the staff was unable to determine if the comprehensive vibration assessment program met the requirements of SRP 3.9.2. The applicant is requested to provide this report.

RESPONSE:

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 Toshiba documents contain proprietary information that is subject to export control, thus they were not submitted with the COL. These reports, however, are available for NRC review.

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

RAI 03.09.02-3**QUESTION:**

In FSAR section 3.9.2.4, for STP 3 and 4, the applicant states that an inspection program will be implemented in lieu of a vibration measurement program as discussed in paragraph C.3.1.3 of Regulatory Guide 1.20, Rev 3. The staff agrees with this approach, however, the inspection program discussed is brief and the staff was unable to determine if the applicant's inspection program met SRP 3.9.2 requirements. Additional details as discussed in Regulatory Guide 1.20, Rev 3, Section 2.3. are requested and described below:

- (1) A tabulation of all reactor internals components and local areas to be inspected. A description of the inspection procedure including the method of examination, method of documentation, provisions for access to the reactor internals, and the criteria which will be applied. The applicant should also discuss what actions will be taken as a result of these inspections.
- (2) In addition, the SRP recommends that walkdown inspections of the steam, feedwater, and condensate systems take place during hold points in the testing. The applicant should provide details of the planned walkdowns, what monitoring and testing equipment is required, and what actions will be taken as a result of these inspections.

RESPONSE:

- (1) Chapter I of Toshiba proprietary report RS-5126579, Rev.1, Table 4-1 provides the requested tabulation of reactor internal components and local areas to be inspected. As noted in the response to RAI 03.09.02-2, this report is available for NRC review. The inspection procedure for the tabulated inspection points will be prepared prior to the inspection.
- (2) STPNOC plans to perform the referenced walkdowns during the pre-operational testing phase, as recommended in the SRP. The detailed walkdown plan will be prepared prior to the walkdowns and will be available for NRC review at that time.

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

RAI 03.09.02-4**QUESTION:**

In FSAR section 3.9.2.4, the applicant addresses a difference in the main steam line configuration between STP 3 and 4 and the prototype plant, specifically with respect to the steam dryer loads. The applicant refers to Regulatory Guide 1.20, Rev 3, for guidance on performing analyses and scale model tests. The staff requests that the applicant provide a schedule for reviewing the results of the scale model test and analysis.

RESPONSE:

The Phase I report for the STP 3 & 4 reactor internals vibration assessment, which will include the results of the initial acoustic screening analysis and the confirmatory scale model testing, is currently planned to be completed in December 2010. This report will be available for NRC review upon completion.

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

RAI 03.09.02-5**QUESTION:**

In FSAR section 3.9.2.6, the applicant discussed the Acoustic Circuit Methodology to analytically predict the steam dryer flow-induced vibration loads. However, no details or a reference document relative to the Acoustic Circuit Methodology were provided. The staff requests that the applicant provide a detailed discussion of the methodology or a reference document for staff review and approval in accordance with SRP Section 3.9.2. requirements.

RESPONSE:

Chapter III of Toshiba proprietary report RS-5126579, Rev.1, "STP-3 and 4 Reactor Internals Flow Induced Vibration Assessment Program" describes the vibration assessment program for the steam dryer and the main steam system components. As noted in the response to RAI 03.09.02-2, this report is available for NRC review.

Note that this evaluation methodology is in accordance with BWRVIP-194, which EPRI has submitted to NRC, and is now under review by NRC.

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

RAI 03.09.02-6**QUESTION:**

In FSAR section 3.9.2.5, the applicant states that the main steam lines in STP 3 and 4 will be instrumented with strain gages to provide measurements of pressure and fluctuations due to flow-induced vibrations. The measurements will be used by the Acoustic Circuit Methodology to analytically predict the steam dryer flow-induced vibration loads. The predicted loads will then be used with a finite-element model of the dryer to confirm the acceptability of the flow-induced vibration loads. Based on this review, the staff cannot determine if the steam dryer is adversely impacted by the predicted loads. The staff requests that the applicant instrument the dryer to verify the analytically predicted loads and compare them to the measured results. Regulatory Guide 1.20, Rev 3, lists the requirements for the vibration assessment testing of components, which the staff finds acceptable.

RESPONSE:

STPNOC believes that the approach for assessment for reactor internals for flow induced vibration (FIV) effects, as described in Toshiba proprietary report RS-5126579, Rev.1, "STP-3 and 4 Reactor Internals Flow Induced Vibration Assessment Program," provides an acceptable basis for the STP 3 & 4 FIV program without the instrumentation of the steam dryer. As noted in the response to RAI 03.09.02-2, this report is available for NRC review.

In addition, STPNOC does not believe that measurement of the steam dryer itself is necessary. The Valid Prototype plant (K-6) has been operated more than 10 years without any failure of steam dryer and main steam line components. As discussed in the response to RAI 03.09.02-1 (letter U7-C-STP-NRC-090087), the configuration of steam dryer and main steam line components for STP 3 & 4 are substantially the same as those of the Prototype plant. The methodology that is being used to evaluate the difference in the main steam line and the effects of that difference on FIV is in accordance with BWRVIP-194. This methodology does not require instrumentation of the steam dryer. STPNOC is instrumenting the main steam line, and the measurement of the steam line will be performed to reinforce the results of scale model test and analysis

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

RAI 03.09.02-7**QUESTION:**

In NUREG-1503, Volume 1, Section 3.9.7 Reactor Internals Vibration Analysis, Measurement and Inspection Program, ABWR states that the first COL applicant will provide, at the time of the application, the results of the vibration assessment program for the ABWR prototype internals. NRC review and approval of the results, as specified in Regulatory Guide 1.20, will complete the vibration assessment program requirements for prototype reactor internals. In addition to this information, the first COL applicant will provide the information on the schedule in accordance with position C.3 of Regulatory Guide 1.20. The staff's review of the FSAR section 3.9.3 and 3.9.4 did not include information on the schedule. In accordance with Regulatory Guide 1.20, the staff requests the applicant to provide a comprehensive schedule which includes the prototype test report and testing of the steam dryer.

RESPONSE:

As noted in the response to RAI 03.09.02-2, the following Toshiba proprietary reports are currently available for review:

- RS-5126954, Rev.1, "Prototype ABWR Reactor Internals Flow Induced Vibration Test Report"
- RS-5126579, Rev.1, "STP-3 and 4 Reactor Internals Flow Induced Vibration Assessment Program"

It is noted that report RS-5126954 includes information on the testing of the steam dryer.

As noted in the response to RAI 03.09.02-4, the results of the initial acoustic screening analysis and the confirmatory scale model testing, is currently planned to be completed in December 2010. As stated in the response to RAI 03.09.02-3, the reactor internals inspection procedure and walkdown plan will be prepared prior to the inspection and walkdowns.

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

RAI 03.09.02-8**QUESTION:**

In NUREG-1503, Volume 1, Table 2.1.1d Reactor Pressure Vessel System, Inspections, Test, Analyses and Acceptance Criteria, ABWR states in ITAAC #7 that a vibration type test will be conducted on the prototype RPV internals of an ABWR. A flow test and post-test inspection will be conducted on the as-built RPV internals. Since the prototype unit has been identified as the 1350 MWe ABWR, the staff requested the prototype vibration assessment report be made available to be reviewed by the staff. If the report is acceptable, a portion of the ITAAC #7 can be considered complete. The staff requests the applicant to explain how the remaining portion of the ITAAC will be resolved given that the modification of the steam lines in STP 3 and 4 would impact the loading on the steam dryers. It should be noted that a COL applicant should submit the results from the vibration assessment program results for the RPV internals in accordance with Regulatory Guide 1.20.

RESPONSE:

As noted in the response to RAI 03.09.02-2, Toshiba proprietary reports RS-5126954, Rev.1, "Prototype ABWR Reactor Internals Flow Induced Vibration Test Report," and RS-5126579, Rev.1, "STP-3 and 4 Reactor Internals Flow Induced Vibration Assessment Program" are available for NRC review.

The testing and analysis to address the differences in the main steam line are provided in the STP 3 & 4 flow induced vibration program report RS-5126579. The approach to address these differences will provide an adequate basis to complete the remaining portions of the ITAAC.

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

RAI 03.10-1**QUESTION:**

In Section 3.10.5 of the STP 3&4 FSAR, descriptions for COL License Information Items 3.37 and 3.38 are not totally acceptable. The applicant is requested to provide an implementation program for seismic qualification of mechanical and electrical equipment, including milestones and completion dates for the dynamic qualification report (DQR).

Section C.I.3.10.4 of RG 1.206 calls for this to be done prior to installation of equipment, not prior to fuel loading. The applicant is requested to either provide an implementation program that meets Reg Guide 1.206 or justify an alternative approach that allow the staff enough time to audit the DQR.

RESPONSE:

FSAR Subsection 3.10.5.1 addresses COL License Information Item 3.37, Equipment Qualification. This COLA Tier 2 subsection will be revised to indicate that the equipment dynamic qualification records, including the reports, will be available prior to installation of equipment. Such records and reports will be tracked for satisfying ITAAC requirements in response to the reference ABWR DCD, Tier 1, Section 1.2, verification for basic configuration for systems. Item (2) of this section includes inspection for tests and analyses used for qualifying the Seismic Category I mechanical and electrical equipment. Therefore, (1) the ITAAC closure schedule covers the implementation schedule for dynamic qualification records and reports, and (2) the ITAAC closure activity covers for the NRC's audit of the records and reports. The records and reports will be available during NRC's audit of ITAAC closures. The ITAAC schedule will be provided periodically to the Staff.

FSAR Subsection 3.10.5.2 addresses COL License Information Item 3.38, Dynamic Qualification Report (DQR). The DQR consists of a summary table or file of dynamic qualification for each system, as described in ABWR DCD, Tier 2, Subsection 3.10.5.2. It also includes information for the mode of safety-related operation of instrumentation and equipment. This information can be developed after acceptable qualification is established and all necessary information is gathered. Therefore, as stated in COLA Tier 2 Subsection 3.10.5.2, the DQR will be prepared following procurement of qualified equipment but prior to fuel load. (COM 3.10-2). However, as noted above, the NRC's audit requirement will be satisfied by inspection of records and reports during the ITAAC closure activity.

The changes to COLA Rev. 2 text in Tier 2 Subsection 3.10.5.1 will be provided in a future COLA update. The changes to COLA Rev. 2 text are shown below with gray highlighting.

3.10.5 COL License Information

3.10.5.1 Equipment Qualification

The following site-specific supplement addresses COL License Information Item 3.37.

The plant-specific seismic and hydrodynamic spectra are bounded by spectra shown in the reference ABWR DCD Appendix 3A and 3G respectively. The equipment qualification records including the reports will be prepared following procurement of available prior to installation of qualified equipment but prior to fuel load, and will be maintained in a permanent file and readily available for audit. (COM 3.10-1)