

PROPRIETARY



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

November 4, 2010  
U7-C-STP-NRC-100246

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  
Revised Responses to Request for Additional Information

Attached are revised responses to NRC staff questions included in Request for Additional Information (RAI) letter number 363 related to Combined License Application (COLA) Part 2, Tier 2, Section 3.9.2. These revisions were the result of discussion with the NRC Staff during our October 18-19, 2010 Flow Induced Vibration Audit. The attachments address the responses to the RAI questions listed below:

03.09.02-24	03.09.02-33
03.09.02-25	03.09.02-38
03.09.02-26	

Please note that the information contained in Attachments 2 through 5 is considered to be proprietary to Toshiba Corporation. Attachments 6 through 9 contain the redacted (non-proprietary) version of these responses. Attachment 1 provides the accompanying Toshiba Corporation affidavit. The affidavit sets forth the basis on which the information may be withheld from public disclosure by the Commission and addresses with specificity the considerations listed in paragraph (a)(4) of Section 2.390 of the Commission's regulations. To identify proprietary information which constitutes Toshiba Corporation's trade secrets and confidential and proprietary commercial information, the proprietary information in the attachments is indicated with brackets and superscript as follows: [ ]<sup>a</sup>. Accordingly, it is respectfully requested that the information which is proprietary to Toshiba Corporation be withheld from public disclosure in accordance with 10 CFR 2.390 of the Commission's regulations.

Finally, Attachment 10 contains an additional RAI response (non-proprietary) to a question included in RAI letter number 363.

If this letter becomes separated from the proprietary material in Attachments 2 through 5 it is no longer proprietary.

STI 32776908

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NRC

There are no commitments in this response.

If you have any questions regarding these responses, please contact Scott Head 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 11/4/2010



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

jep

Attachments:

1. Request for Withholding of Proprietary Information (Toshiba Corporation)
2. RAI 03.09.02-24 (Proprietary)
3. RAI 03.09.02-25 (Proprietary)
4. RAI 03.09.02-26 (Proprietary)
5. RAI 03.09.02-33 (Proprietary)
6. RAI 03.09.02-24 (Redacted Non-Proprietary)
7. RAI 03.09.02-25 (Redacted Non-Proprietary)
8. RAI 03.09.02-26 (Redacted Non-Proprietary)
9. RAI 03.09.02-33 (Redacted Non-Proprietary)
10. RAI 03.09.02-38 (Non-Proprietary)

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

Director, Office of New Reactors  
U. S. Nuclear Regulatory Commission  
One White Flint North  
11555 Rockville Pike  
Rockville, MD 20852-2738

Regional Administrator, Region IV  
U. S. Nuclear Regulatory Commission  
611 Ryan Plaza Drive, Suite 400  
Arlington, Texas 76011-8064

Kathy C. Perkins, RN, MBA  
Assistant Commissioner  
Division for Regulatory Services  
Texas Department of State Health Services  
P. O. Box 149347  
Austin, Texas 78714-9347

Alice Hamilton Rogers, P.E.  
Inspection Unit Manager  
Texas Department of State Health Services  
P. O. Box 149347  
Austin, Texas 78714-9347

\*Steven P. Frantz, Esquire  
A. H. Gutterman, Esquire  
Morgan, Lewis & Bockius LLP  
1111 Pennsylvania Ave. NW  
Washington D.C. 20004

\*Tom Tai  
Two White Flint North  
11545 Rockville Pike  
Rockville, MD 20852

(electronic copy)

\*George F. Wunder  
\*Tom Tai  
Loren R. Plisco  
U. S. Nuclear Regulatory Commission

Steve Winn  
Joseph Kiwak  
Eli Smith  
Nuclear Innovation North America

Peter G. Nemeth  
Crain, Caton & James, P.C.

Richard Peña  
Kevin Pollo  
L. D. Blaylock  
CPS Energy

## **Attachment 1**

# **Request for Withholding of Proprietary Information (Toshiba Corporation)**

Affidavit for Withholding Confidential and Proprietary Information from Public Disclosure  
under 10 CFR § 2.390

UNITED STATES OF AMERICA  
NUCLEAR REGULATORY COMMISSION

In the Matter of

STP Nuclear Operating Company

Docket Nos.52-012  
52-013

South Texas Project  
Units 3 and 4

AFFIDAVIT

I, Katsuhiko Naruse, being duly sworn, hereby depose and state that I am Senior Manager, Mechanical Technology & Design Department, Nuclear Energy Systems & Services Division, Power Systems Company, Toshiba Corporation; that I am duly authorized by Toshiba Corporation to sign and file with the Nuclear Regulatory Commission the following application for withholding Toshiba Corporation's confidential and proprietary information from public disclosure; that I am familiar with the content thereof; and that the matters set forth therein are true and correct to the best of my knowledge and belief.

In accordance with 10 CFR § 2.390(b)(ii), I hereby state, depose, and apply as follows on behalf of Toshiba Corporation:

- (A) Toshiba Corporation seeks to withhold from public disclosure the responses to RAI 03.09.02-24 Rev.1, -25 Rev.1, -26 Rev.1 and -33 Rev.1, and all information identified as "Toshiba Proprietary Class 2" therein (collectively, "Confidential Information").
- (B) The Confidential Information is owned by Toshiba Corporation. In my position as Senior Manager, Mechanical Technology & Design Department, Nuclear Energy Systems & Services Division, Power System Company, Toshiba Corporation, I have been specifically delegated the function of reviewing the Confidential Information and have been authorized to apply for its withholding on behalf of Toshiba Corporation.
- (C) The RAI responses contain the information of Flow Induced Vibration (FIV) analysis for South Texas Project Units 3&4 Combined License Application to the Nuclear Regulatory Commission. The Confidential Information which is entirely confidential and proprietary to Toshiba Corporation is indicated in the document using brackets.
- (D) Consistent with the provisions of 10 CFR § 2.390(a)(4), the basis for proposing that the Confidential Information be withheld is that it constitutes Toshiba Corporation's trade secrets and confidential and proprietary commercial information.
- (E) Public disclosure of the Confidential Information is likely to cause substantial harm to

Toshiba Corporation's competitive position by (1) disclosing confidential and proprietary commercial information about the design, manufacture and operation systems for nuclear power reactors to other parties whose commercial interests may be adverse to those of Toshiba Corporation, and (2) giving such parties access to and use of such information at little or no cost, in contrast to the significant costs incurred by Toshiba Corporation to develop such information.

Toshiba Corporation has a rational basis for determining the types of information customarily held in confidence by it, and utilizes a system to determine when and whether to hold certain types of information in confidence.

The basis for claiming the information so designated as proprietary is as follows:

- (a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Toshiba Corporation's competitors without license from Toshiba Corporation constitutes a competitive economic advantage over other companies.
- (b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.
- (c) Its use by a competitor would reduce his expenditure of resources or improve his competitive position in the design, manufacture, shipment, installation, assurance of quality, or licensing a similar product.
- (d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Toshiba Corporation, its customers or suppliers.
- (e) It reveals aspects of past, present, or future Toshiba Corporation or customer funded development plans and programs of potential commercial value to Toshiba Corporation.
- (f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Toshiba Corporation system which include the following:

- (a) The use of such information by Toshiba Corporation gives Toshiba Corporation a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Toshiba Corporation competitive position.
- (b) It is information that is marketable in many ways. The extent to which such information is available to competitors diminishes the Toshiba Corporation ability to sell products and services involving the use of the information.
- (c) Use by our competitor would put Toshiba Corporation at a competitive disadvantage by reducing his expenditure of resources at our expense.

- (d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Toshiba Corporation of a competitive advantage.
- (e) Unrestricted disclosure would jeopardize the position of prominence of Toshiba Corporation in the world market, and thereby give a market advantage to the competition of those countries.
- (f) The Toshiba Corporation capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

Further, on behalf of Toshiba Corporation, I affirm that:

- (i) The Confidential Information is confidential and proprietary information of Toshiba Corporation.
- (ii) The Confidential Information is information of a type customarily held in confidence by Toshiba Corporation, and there is a rational basis for doing so given the sensitive and valuable nature of the Confidential Information as discussed above in paragraphs (D) and (E).
- (iii) The Confidential Information is being transmitted to the NRC in confidence.
- (iv) The Confidential Information is not available in public sources.
- (v) Public disclosure of the Confidential Document is likely to cause substantial harm to the competitive position of Toshiba Corporation, taking into account the value of the Confidential Information to Toshiba Corporation, the amount of money and effort expended by Toshiba Corporation in developing the Confidential Information, and the ease or difficulty with which the Confidential Information could be properly acquired or duplicated by others.

  
\_\_\_\_\_  
Katsuhiko Naruse  
Senior Manager  
Mechanical Technology & Design Department  
Nuclear Energy Systems & Services Division  
POWER SYSTEMS COMPANY  
TOSHIBA CORPORATION

Nov. 4, 2010  
Date

Request for Withholding of Proprietary Information (Toshiba Corporation)

囑託人株式会社東芝部長成瀬克彦は、公証人の面前で、添付書面に署名した。

よって、これを認証する。

平成22年 11月 4日、本公証人役場において  
横浜市中区羽衣町2丁目7番10号

横浜地方法務局所属

公 証 人

Notary



KENJI TERANISHI

証 明



上記署名は、横浜地方法務局所属公証人の署名に相違ないものであり、かつ、その押印は、  
真実のものであることを証明する。

平成22年 11月 4日

横浜地方法務局長

椿 栄



APOSTILLE

(Convention de La Haye du 5 octobre 1961)

1. Country : JAPAN  
This public document
2. has been signed by KENJI TERANISHI
3. acting in the capacity of Notary of the Yokohama District  
Legal Affairs Bureau
4. bears the seal/stamp of KENJI TERANISHI , Notary

Certified

5. at Tokyo
6. NOV. -4 2010
7. by the Ministry of Foreign Affairs
8. 10- No 300561
9. Seal/stamp :
10. Signature :



Kazutoyo OYABE

For the Minister for Foreign Affairs

Registered No. 150 of 2010.

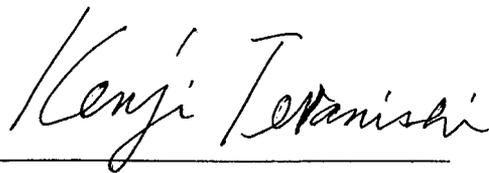
Certificate of Acknowledgment of Notary

On this 4<sup>th</sup> day of November, 2010, before me, KENJI TERANISHI, a notary in and for YOKOHAMA District Legal Affairs Bureau, appeared Katsuhiko NARUSE, Senior Manager of TOSHIBA Corporation, who is personally known to me, affixed his signature to the attached document.

Witness, I set my hand and official seal.

Notary

Notary's official seal





KENJI TERANISHI

Kannai-odori Notary office

2-7-10, Hagoromocho, Naka-ku, Yokohama-city, Japan.

Attached to the Yokohama District Legal Affairs Bureau.

**RAI 03.09.02-24 (Redacted Non-Proprietary)****QUESTION:**

In Toshiba Document Number 7B11-D001-3809-01, Revision 0, "CFD Analysis Report for Lower Plenum," the flow within the lower plenum is simulated by means of CFD. The applicant is requested to address the sensitivity analysis performed to ensure that the grid size of the model is sufficiently small such that further grid refinement would not affect the CFD results.

**REVISED RESPONSE:**

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100236, dated October 25, 2010. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

An additional sensitivity analysis computer run at the Case 4 condition, which used a refined grid model with approximately a uniform refinement rate, was performed. The resultant effective refinement ratio in length to the original grid model was [      ]<sup>a</sup>. The streamlines between the original analysis results and the sensitivity analysis results were compared, and it was found that the flow structure is not changed.

For a quantitative comparison, [

which indicates that the grid model used for the original analysis is sufficiently fine. ]<sup>a</sup>,

Toshiba Document 7B11-D001-3809-01, "CFD Analysis Report for Lower Plenum," will be revised to address grid refinement analysis and is currently scheduled to be available for NRC review by November 10, 2010.

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

**RAI 03.09.02-25 (Redacted Non-Proprietary)****QUESTION:**

In Toshiba Document Number 7B11-D001-3809-01, Revision 0, "CFD Analysis Report for Lower Plenum," the flow within the lower plenum is simulated by means of CFD. The applicant is requested to address the sensitivity analysis performed to ensure that the CFD results are not strongly dependent on the assumed turbulence level and scale at the pump outlets.

**REVISED RESPONSE:**

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100236, dated October 25, 2010. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

See Appendix B of Toshiba Document Number 7B11-D001-3809-01, Revision 0, "CFD Analysis Report for Lower Plenum," for evaluation of the turbulence intensity and the turbulence length scale used in the analyses.

The referenced ANSYS User's Guide indicates that turbulence intensity of 1% or less is generally considered low, and greater than 10% is considered high. The turbulence intensity used in the original analysis of the Case 4 condition is much closer to 1% than 10%. An additional sensitivity analysis was performed on turbulence intensity at the inlet boundary in which the turbulence intensity was changed to 10%. The turbulence length scale is greater than zero and cannot be larger than the sectional size of the duct. The turbulence length scale used in the analyses is much closer to zero than the hydraulic diameter of the one blade-to-blade passage of the diffuser of the pump. An additional sensitivity analysis was performed on the turbulence length scale at the inlet boundary in which the turbulence length scale was changed to the hydraulic diameter.

The results from both the turbulence intensity sensitivity analysis and the turbulence length scale sensitivity analysis show that the flow structures from these two analyses are not essentially different from the original analysis. The evaluation index from the turbulence intensity sensitivity analysis is [ ]<sup>a</sup> smaller and the evaluation index from the turbulence length scale sensitivity analysis is [ ]<sup>a</sup> smaller than that from the original analysis. By using Error Propagation analysis, the combination of these two uncertainty components for turbulence intensity and turbulence length scale is evaluated at [ ]<sup>f</sup>, which is deemed sufficiently small. The results confirm that the computational fluid dynamics (CFD) results are not strongly dependent on the turbulence intensity and turbulence length scale specified at the pump outlets.

Toshiba Document 7B11-D001-3809-01, "CFD Analysis Report for Lower Plenum," will be revised to address the sensitivity analyses results and is currently scheduled to be available for NRC review by November 10, 2010.

Reference: ANSYS FLUENT 12.0 User's Guide, Section 7.3.2, April 2009.

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

**RAI 03.09.02-26 (Redacted Non-Proprietary)****QUESTION:**

In Toshiba Document Number 7B11-D001-3809-01, Revision 0, "CFD Analysis Report for Lower Plenum," the flow within the lower plenum is simulated by means of CFD. The applicant is requested to address the procedure used to validate the CFD model on a system reflecting the degree of complexity of the STP lower plenum.

**REVISED RESPONSE:**

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100236, dated October 25, 2010. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

The validation process of the computational fluid dynamics (CFD) model includes four test analyses that include attached flow, separated flow, rotating flow, branched flow, laminar flow, and turbulent flow. These validation process tests reflect the complex flow field that exists in the STP lower plenum region. A description of these test analyses are:

1. Laminar flow between two cylinders (The inner cylinder rotates, the outer one is stationary)
2. Flow in laminar range of Reynolds numbers in a planar junction at 90 degrees
3. Laminar flow in triangular cavities with a moving wall
4. Turbulent flow past a backward facing step with fully developed velocity profile at inlet

The results from the test analyses have been compared with theoretical or measured results, and it was confirmed that the differences between analytical results and theoretical or measured results are sufficiently small. This validation testing is controlled under the Toshiba quality assurance program. The turbulence model used in Case No. 4 and the computer used to run all test analyses are the same as used in the analyses reported in 7B11-D001-3809-01, Revision 0, "CFD Analysis Report for Lower Plenum." These test analyses are reported in 7B11-D001-3704-01, Revision 0, "Software Validation Report FLUENT".

[

J<sup>a</sup>

Toshiba Document 7B11-D001-3809-01, "CFD Analysis Report for Lower Plenum" will be revised to address the validation of the lower plenum portion of the CFD model and is currently scheduled to be available for NRC review by November 10, 2010.

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

**RAI 03.09.02-33 (Redacted Non-Proprietary)**

**QUESTION:**

In Section 3.2 of SES 10-161, Rev. 0, "RG 1.20 Assessment for Natural Frequencies & Mode Shapes for CP DP lines & RIP DP lines," the report states that the translation degrees of freedom (DOFs) perpendicular to the pipes are assumed to be fixed. However there is a gap between the pipe and support for the CP DP line and for the RIP DP line. Please provide more details to justify the assumption in fixing the translational DOFs perpendicular to the pipe. If the CP DP lines and RIP DP lines are installed in a preloaded condition for preventing FIV motions as described by the applicant during the audit of August 23 - 25, 2010, please provide details of the preload conditions and installation procedure.

**REVISED RESPONSE:**

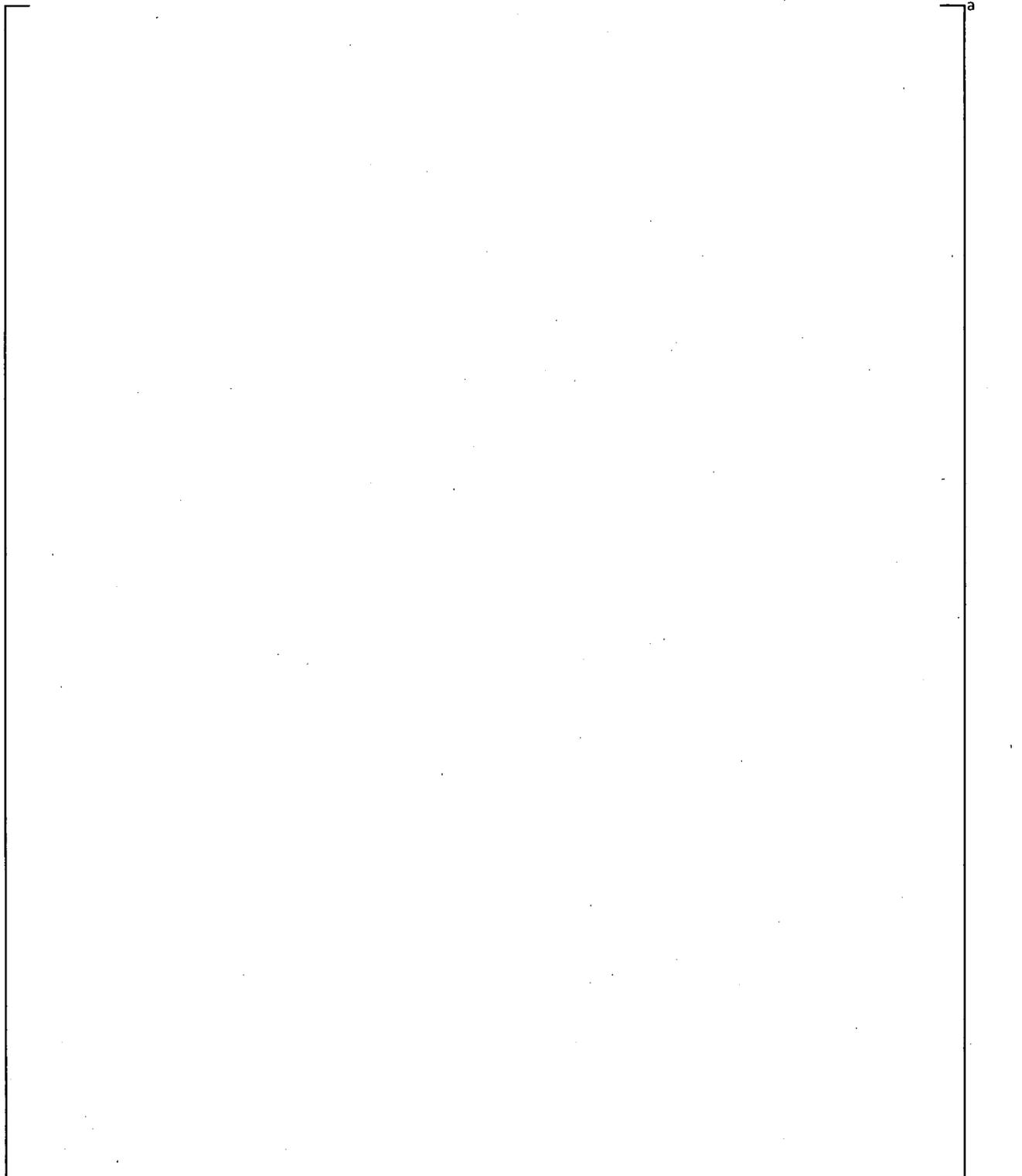
The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100229, dated October 18, 2010. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

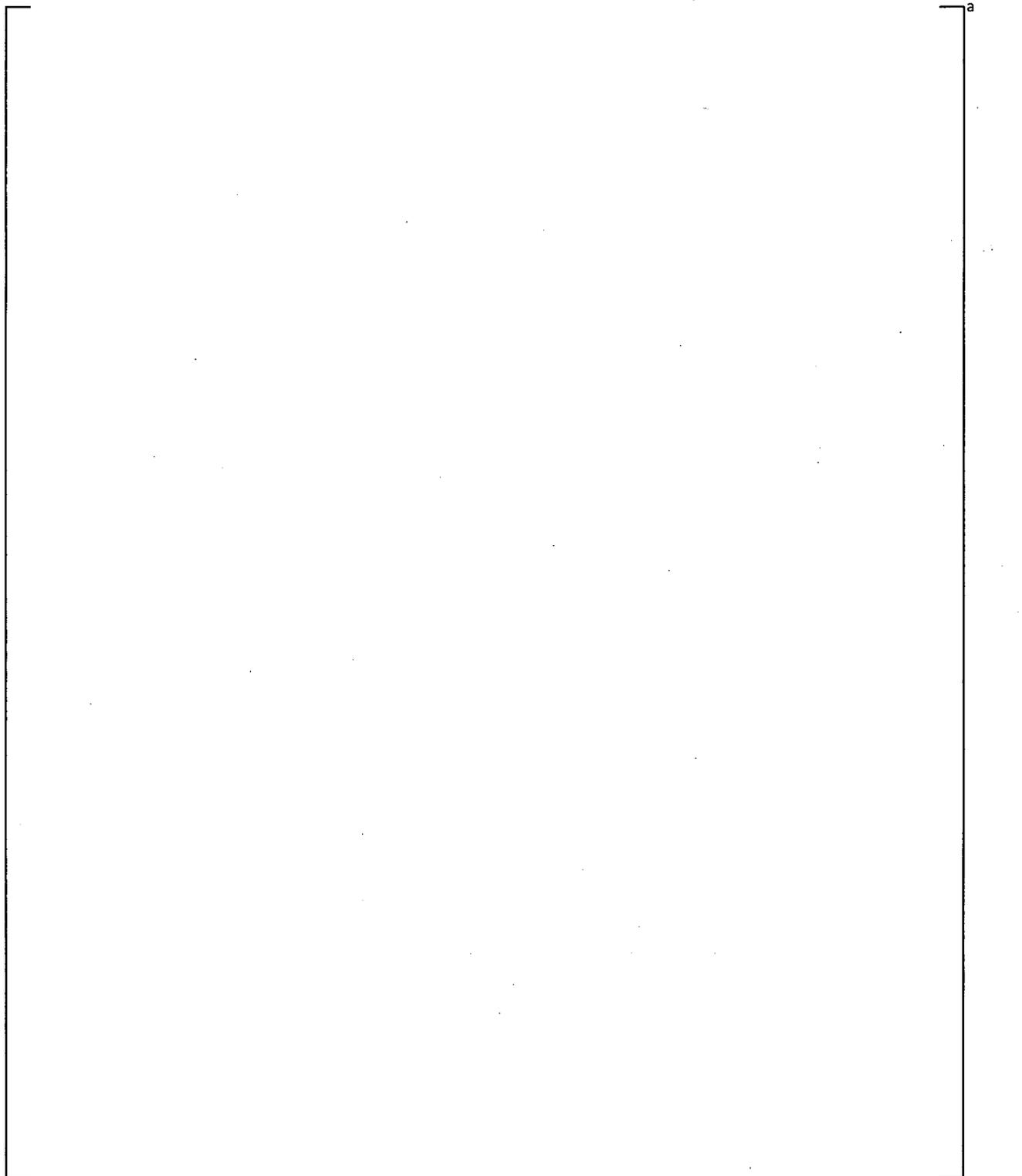
The installation procedure and support offsets are provided below.

The support offsets create contact between the pipes and (intermediate) supports. The support offsets eliminate the possibility for pipe translations perpendicular to the pipe relative to their supports.

The calculation SES 10-161, Rev. 0, "RG 1.20 Assessment for Natural Frequencies & Mode Shapes for CP DP lines & RIP DP lines," will be revised to document the installation procedure as provided in this response, and the revised calculation is currently scheduled to be available for NRC review by November 30, 2010.

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





**RAI 03.09.02-38 (Non-Proprietary)**

**QUESTION:**

The shroud head structure in Calculation SES-10-165, Revision 0, is a complex model, and there is no K-6 data to compare and validate. Please advise if there is any measurement plan and what parameters are being considered.

**REVISED RESPONSE:**

The original response to this RAI was submitted with STPNOC letter U7-C-STP-NRC-100229, dated October 18, 2010. The original response is completely superseded by this revised response. The revisions are indicated by revision bars in the margin.

The need for a measurement plan for the shroud head structure has not yet been determined. This will be determined based on the results of the final stress analysis, which is currently scheduled to be completed by November 10, 2010. NRC will be informed as to whether a measurement plan is needed in a supplementary response to this RAI by November 30, 2010.

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