

November 17, 2010

Mr. Mark McBurnett, Vice President
Regulatory Affairs
STP 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 3 – FLOW-INDUCED
VIBRATION PROGRAM

Dear Mr. McBurnett:

By letter dated September 20, 2007, South Texas Project Nuclear Operating Company (STPNOC) submitted to the U.S. Nuclear Regulatory Commission (NRC) a Combined License (COL) application to construct and operate two reactor units (Units 3 and 4) based on the U.S. Advanced Boiling Water Reactor (ABWR) Design Certification at the South Texas Project (STP) Nuclear Power Plant. The NRC Office of New Reactors (NRO) is reviewing the STP COL application that incorporates by reference the ABWR Design Control Document (DCD). As part of this review, the NRO Engineering Mechanics Branch 2 (EMB2) conducted an audit of the documentation supporting the STP COL application to develop the reactor internals comprehensive vibration assessment program in Chapter 3.9.2. The audit was conducted at the Continuum Dynamics, Inc. office in Ewing, New Jersey, on October 18-19, 2010. The NRC staff followed the guidance in NRO Office Instruction NRO-REG-108, "Regulatory Audits," in performing this audit. Enclosure 1 is the detailed results of the audit. Enclosure 2 is a list of the NRC and STPNOC team participating in the audit.

Please contact Tom Tai at (301) 415-8484 or Tom.Tai@nrc.gov if you have any questions related to the audit.

Sincerely,

/RA/

Mark Tonacci, Chief
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket Nos.: 52-012
52-013

cc: See next page

Mr. Mark McBurnett, Vice President
Regulatory Affairs
STP 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 3 AND 4 –
FLOW-INDUCED VIBRATION PROGRAM

Dear Mr. McBurnett:

By letter dated September 20, 2007, South Texas Project Nuclear Operating Company (STPNOC) submitted to the U.S. Nuclear Regulatory Commission (NRC) a Combined License (COL) application to construct and operate two reactor units (Units 3 and 4) based on the U.S. Advanced Boiling Water Reactor (ABWR) Design Certification at the South Texas Project (STP) Nuclear Power Plant. The NRC Office of New Reactors (NRO) is reviewing the STP COL application that incorporates by reference the ABWR Design Control Document (DCD). As part of this review, the NRO Engineering Mechanics Branch 2 (EMB2) conducted an audit of the documentation supporting the STP COL application to develop the reactor internals comprehensive vibration assessment program in Chapter 3.9.2. The audit was conducted at the Continuum Dynamics, Inc. office in Ewing, New Jersey, on October 18-19, 2010. The NRC staff followed the guidance in NRO Office Instruction NRO-REG-108, "Regulatory Audits," in performing this audit. Enclosure 1 is the detailed results of the audit. Enclosure 2 is a list of the NRC and STPNOC team participating in the audit.

Please contact Tom Tai at (301) 415-8484 or Tom.Tai@nrc.gov if you have any questions related to the audit.

Sincerely,
/RA/
Mark Tonacci, Chief
BWR Projects Branch
Division of New Reactor Licensing
Office of New Reactors

Docket Nos.: 52-012
52-013

DISTRIBUTION: See next page

ACCESSION NO. ML103070488

NRO-002

OFFICE	DNRL/BWR/PM	DNRL/BWR/LA	DE/EMB2	DE/EMB2/BC	DNRL/BWR/TL
NAME	TTai	BAbeywickrama	YWong	JDixon-Herrity	GWunder
DATE	11/4/10	11/9/10	11/8/10	11/9/10	11/17/2010

OFFICIAL RECORD COPY

Letter to M. McBurnett from M. Tonacci dated November 17, 2010

SUBJECT: REGULATORY AUDIT SUMMARY OF SOUTH TEXAS PROJECT, UNITS 3 AND 4 COMBINED LICENSE APPLICATION REVISION 3 AND 4 – FLOW-INDUCED VIBRATION PROGRAM

DISTRIBUTION:

PUBLIC

BWR R/F

RidsNroDnrlNge2

JDHerrity, NRO

AHsia, NRO

YWong, NRO

RidsNroDeEmb2

SKirkwood, OGC

RidsOgcMailCenter

MTonacci, NRO

TTai, NRO

BAbeywickrama, NRO

Gwunder, NRO

RidsNroDnrl

RidsRgn2MailCenter

**REGULATORY AUDIT SUMMARY OF SOUTH TEXAS PROJECT, UNITS 3 AND 4
COMBINED LICENSE APPLICATION REVISION 3 – FLOW-INDUCED VIBRATION
PROGRAM HELD OCTOBER 18 - 19, 2010**

1. Introduction

On September 20, 2007, STP Nuclear Operating Company (STPNOC) submitted to the U.S. Nuclear Regulatory Commission (NRC) a Combined License (COL) application to construct and operate two reactor units (Units 3 and 4) based on the U.S. Advanced Boiling Water Reactor (ABWR) Design Certification at the South Texas Project (STP) Nuclear Power Plant. The NRC Office of New Reactors (NRO) is reviewing the STP COL application that incorporates by reference the ABWR Design Control Document (DCD). As part of this review, the NRO Engineering Mechanics Branch 2 (EMB2) conducted audits of the analyses and testing supporting the reactor internals comprehensive vibration assessment program (CVAP) referenced in Chapter 3.9.2 of the STP Final Safety Analysis Report (FSAR). The first audit was conducted during August 23-25, 2010, and the audit report was issued in Reference 1. The second audit was conducted at the Continuum Dynamics office in Ewing, New Jersey on October 18-19, 2010. The main objective of the audit was to review the steam dryer subscale test methodology to obtain the acoustic loads. The NRC staff followed the guidance in NRO Office Instruction NRO-REG-108, "Regulatory Audits," in performing this audit. Enclosure 1 is a list of the NRC and STPNOC team participating in the October audit.

2. Audit Summary

During this audit, the applicant presented the steam dryer subscale test status, the approach to determine dryer load, Request for Additional Information (RAI) responses, and project schedule.

The applicant presented the steam dryer 1/8 scale tests conducted and the planned methodology to determine the dryer load. Previously, the applicant conducted steam dryer 1/8 scale tests to measure the pressure in the main steam lines and predict the acoustic loads on the subscale steam dryer. The subscale steam dryer acoustic loads could then be scaled up to the South Texas full scale steam dryer loads. After the scale model tests peer review, the approach was changed to measuring the acoustic load directly on the subscale steam dryer instead of indirectly from the pressure in the main steam lines per peer review comments. During the audit, the applicant presented the new test approach and stated that the subscale steam dryer acoustic loads will be compared to the Japanese ABWR K-6 data. The staff raised concern about validating the steam dryer subscale model tests with only one meaningful pressure data point from the K-6 steam dryer dome region. The subscale model has not been validated with sufficient actual plant steam dryer data. However, the applicant indicated that it is not commercially feasible to obtain other plant data beyond the K-6 plant data. The applicant believed that the test approach is appropriate based on the following:

- 1/8 scale model test has been used to scale steam dryer loads from current licensing thermal power to extended power.

- Five ABWR plants in Japan have 25 years combined operational experience. Inspection of K-6 steam dryer after 11 years of operation and H-5 steam dryer after three years of operation did not discover any cracking.
- STP Unit 3 steam dryer will be instrumented during initial startup testing.
- Safety relief valve stand pipe acoustic resonance will be eliminated by design.
- Steam dryer load definition will bound the K-6 data and include conservative estimates of bias and uncertainties.

The NRC staff agreed to evaluate the proposed new test approach and inform STPNOC of the decision.

The draft RAI responses were discussed and the NRC commented that some RAI responses will need to be revised to include the impact of the changes on calculation results due to the NRC comments from the August audit. Examples include draft responses to RAI 03.09.02-24 and 25 which do not include the results of the sensitivity analysis of grid sizes. The applicant agreed to revise the responses to include the sensitivity analysis results. The draft responses to 03.09.02-26 only listed laminar flow and a backward facing step model to validate the computational fluid dynamics model, and the response should include systems similar to the turbulent flow and complex geometry of the reactor internals. The draft response to RAI 03.09.02-21 stated that the computer Code ACSTIC2 will not be listed in Section 3.9.1.2 of the STP FSAR because it is not a major computer code. The staff will evaluate the criteria on listing computer codes in the FSAR, and inform STPNOC whether the RAI response is adequate.

In the schedule discussion, the applicant anticipates the dryer subscale test report will be available to the NRC by November 2, 2010. (The report will not include dryer load definition, and the load definition will be available on November 18). The original completion date of the dryer subscale test report was September 30, 2010. The reactor internals (except the stream dryer) components stress analyses will be available by November 10, 2010. The dryer stress analysis will be delayed to November 30, 2010. The measurement and inspection plan will be available by November 26, 2010 and the vibration assessment program report will be available by December 15, 2010, as originally scheduled.

3. Exit Meeting/Actions

In the exit meeting, the staff summarized the following actions:

- a. The staff will inform the applicant of the decision on the revised subscale test approach to predict the South Texas full scale dryer acoustic loads based on the dryer subscale test.
- b. The staff will inform the applicant whether the computer Code ACSTIC2 should be included in South Texas FSAR Section 3.9.1.2.
- c. The applicant will revise the RAI responses to include sensitivities study results. The applicant will also submit a summary of the calculation note changes to the NRC by November 15, 2010.
- d. The applicant will inform the NRC of the approach to determine the factor of safety for the steam dryer design.

Reference:

1. NRC Audit Report, "REGULATORY AUDIT SUMMARY OF SOUTH TEXAS PROJECT, UNITS 3 AND 4 COMBINED LICENSE APPLICATION REVISION 3 – FLOW-INDUCED VIBRATION PROGRAM," October 6, 2010 (ADAMS Accession Number ML1025605351)

**REGULATORY AUDIT SUMMARY OF SOUTH TEXAS PROJECT, UNITS 3 AND 4
COMBINED LICENSE APPLICATION REVISION 3 – FLOW-INDUCED VIBRATION
PROGRAM HELD OCTOBER 18 - 19, 2010
AUDIT PARTICIPANTS**

Name	Organization
Brad Maurer	Westinghouse
Subhash Chandra	Westinghouse
Nirmal Jain	Westinghouse
Richard Schwirian	Westinghouse
Karen Fujikawa	Westinghouse
Jeff Bibby	Westinghouse
Kevin Ramsden	Westinghouse - Fauske
Tom Daly	STPNOC Engineering
Ken Uchida (Note 1)	Toshiba
Keiji Matsunaga	Toshiba
Dale Wuokko	TANE – Licensing
Alan Bilanin	Continuum Dynamics
Milt Teske	Continuum Dynamics
Alex Boschitsch	Continuum Dynamics
Tom Tai	NRC
Yuken Wong	NRC
Samir Ziada	McMaster University/Argonne
David Ma (Note 1)	Argonne National Laboratory

Notes:

1. Participated by telephone

Enclosure 2

COL - STP Nuclear - South Texas Mailing List
cc:

(Revised 09/30/2010)

Certrec Corporation
4200 South Hulen, Suite 422
Fort Worth, TX 76109

Mr. Brian Almon
Public Utility Commission
William B. Travis Building
PO Box 13326
1701 North Congress Avenue
Austin, TX 78701-3326

Ms. Michele Boyd
Legislative Director
Energy Program
Public Citizens Critical Mass Energy
and Environmental Program
215 Pennsylvania Avenue, SE
Washington, DC 20003

Mr. Ted Enos
4200 South Hulen
Suite 422
Ft. Worth, TX 76109

Mr. Ed Halpin
President & CEO
STP Nuclear Operating Company
P.O. Box 289
Wadsworth, TX 77483

Ms. Susan M. Jablonski
Office of Permitting, Remediation
and Registration
Texas Comm. on Env. Quality
MC-122
P.O. Box 13087
Austin, TX 78711-3087

Judge
Matagorda County
Matagorda County Courthouse
1700 Seventh Street
Bay City, TX 77414

M. A. McBurnett
VP, Oversight/Regulatory Affairs
STP Nuclear Operating Company
4000 Avenue F, Suite A
Bay City, TX 77414

Bill Mookhoek
Licensing Supervisor
STP Units 3 and 4
Project Electric Generating Station
P.O. Box 289
Wadsworth, TX 77483

Mr. Peter G. Nemeth
Crain, Caton & James, P.C.
P.O. Box 289
Mail Code: N5005
Wadsworth, TX 77483

Mr. Terry Parks
Chief Inspector
Texas Department of Licensing
and Regulation
Boiler Division
P.O. Box 12157
Austin, TX 78711

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

Policy Director
Environmental and Natural Resources
P. O. Box 12428
Austin, TX 78711-3189

Mr. Frank M. Quinn
8 Oak Avenue
Gaithersburg, MD 20877-2705

COL - STP Nuclear - South Texas Mailing List

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

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

Mr. Robert E. Sweeney
IBEX ESI
4641 Montgomery Avenue
Suite 350
Bethesda, MD 20814

Mr. Steve Winn
STP Nuclear Operating Company
1301 McKinney, Suite 2300
Houston, TX 77010

COL - STP Nuclear - South Texas Mailing List

Email

APH@NEI.org (Adrian Heymer)
awc@nei.org (Anne W. Cottingham)
BrinkmCB@westinghouse.com (Charles Brinkman)
chris.maslak@ge.com (Chris Maslak)
cindyrae_52@yahoo.com
cwaltman@roe.com (C. Waltman)
david.lewis@pillsburylaw.com (David Lewis)
Derlinda.Bailey@chguernsey.com (Derinda Bailey)
donald.woodlan@luminant.com (Donald Woodlan)
dwstillwell@stpegs.com (Bill Stillwell)
ed.burns@earthlink.net (Ed Burns)
eliza.seedcoalition@gmail.com (Elza Brown)
erg-xl@cox.net (Eddie R. Grant)
gzinke@entergy.com (George Alan Zinke)
jerald.head@ge.com (Jerald G. Head)
jgutierrez@morganlewis.com (Jay M. Gutierrez)
jim.riccio@wdc.greenpeace.org (James Riccio)
Joseph_Hegner@dom.com (Joseph Hegner)
junichi_uchiyama@mnes-us.com (Junichi Uchiyama)
karen@seedcoalition.org (Karen Hadden)
kdrichards@stpegs.com (Kevin Richards)
KSutton@morganlewis.com (Kathryn M. Sutton)
kwaugh@impact-net.org (Kenneth O. Waugh)
lchandler@morganlewis.com (Lawrence J. Chandler)
ldblaylock@cpsenergy.com (Larry Blaylock)
louis.eichenberger@ge.com (Louis Eichenberger)
mamcburnett@stpegs.com (Mark McBurnett)
Marc.Brooks@dhs.gov (Marc Brooks)
maria.webb@pillsburylaw.com (Maria Webb)
mark.beaumont@wsms.com (Mark Beaumont)
Mark.Crisp@chguernsey.com (Mark Crisp)
matias.travieso-diaz@pillsburylaw.com (Matias Travieso-Diaz)
maurerbf@westinghouse.com (Brad Maurer)
media@nei.org (Scott Peterson)
MSF@nei.org (Marvin Fertel)
nirsnet@nirs.org (Michael Mariotte)
Nuclaw@mindspring.com (Robert Temple)
patriciaL.campbell@ge.com (Patricia L. Campbell)
Paul@beyondnuclear.org (Paul Gunter)
pshastings@duke-energy.com (Peter Hastings)
RJB@NEI.org (Russell Bell)
sabinski@suddenlink.net (Steve A. Bennett)
sandra.sloan@areva.com (Sandra Sloan)
sfrantz@morganlewis.com (Stephen P. Frantz)

COL - STP Nuclear - South Texas Mailing List

smhead@stpegs.com (Scott Head)
stephan.moen@ge.com (Stephan Moen)
Tansel.Selekler@nuclear.energy.gov (Tansel Seleker)
tom.miller@hq.doe.gov (Tom Miller)
Vanessa.quinn@dhs.gov (Vanessa Quinn)
Wanda.K.Marshall@dom.com (Wanda K. Marshall)
wayne.marquino@ge.com (Wayne Marquino)
wemookhoek@stpegs.com (Bill Mookhoek)
william.maher@fpl.com (William Maher)