PMSTPCOL PEmails

From: Tai, Tom
Sent: Thursday, May 06, 2010 4:05 PM
To: Wong, Yuken
Cc: Dixon-Herrity, Jennifer; STPCOL
Subject: FW: Presentation Slides - Pre-Decisional
Attachments: Westinghouse Letter LTR-NRC-10-30.pdf

THE PROPRIETARY ATTACHMENT HAS BEEN REMOVED AND REPLACED WITH THE ADAMS ACCESSION NUMBER.

Yuken,

Attached are the proprietary slides (ADAMS Accession No. ML101380356) from the FIV meeting on April 20, 2010.

Password to open these files will be sent in a separate e-mail.

Regards

Tom Tai
DNRL/NRO
(301) 415-8484
Tom.Tai@NRC.GOV

From: Maurer, Bradley F. [mailto:maurerbf@westinghouse.com]
Sent: Thursday, May 06, 2010 3:17 PM
To: Tai, Tom
Subject: [WARNING: MESSAGE ENCRYPTED]Presentation Slides

Tom,

The attached files contain the presentation slides that we used at the FIV meeting between STPNOC and the NRC Staff. The proprietary file is encrypted. A password will be provided to you separately.

Brad

Bradley F. Maurer
Manager, ABWR Licensing
Westinghouse Electric Company
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Hearing Identifier: SouthTexas34Public_EX
Email Number: 2231

Mail Envelope Properties (0A64B42AAA8FD4418CE1EB5240A6FED11293D2BD07)

Subject: FW: Presentation Slides - Pre-Decisional
Sent Date: 5/6/2010 4:04:38 PM
Received Date: 5/6/2010 4:04:42 PM
From: Tai, Tom

Created By: Tom.Tai@nrc.gov

Recipients:
"Dixon-Herrity, Jennifer" <Jennifer.Dixon-Herrity@nrc.gov>
Tracking Status: None
"STPCOL" <STP.COL@nrc.gov>
Tracking Status: None
"Wong, Yuken" <Yuken.Wong@nrc.gov>
Tracking Status: None

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Our ref LTR-NRC-10-30

Date April 30, 2010

Subject: "South Texas Project Units 3 & 4 NRC Meeting on STP Approach for Reactor Internals FIV Program" (Non-Proprietary)

Enclosed is a copy of the presentation slides, "South Texas Project Units 3 & 4 NRC Meeting on STP Approach for Reactor Internals FIV Program" that were used in a meeting held with the NRC in the Two White Flint offices on April 20, 2010.

This information is being submitted by Westinghouse Electric Company LLC to formally document the presentation material that was used for the meeting with the NRC regarding the STP 3&4 reactor internals flow induced vibration program. This material is being provided in support of the STP 3&4 COL Application (Docket Nos. 52-012 and 52-013).

This submittal contains no proprietary information.

Correspondence with respect to this submittal should reference LTR-NRC-10-30 and be addressed to B. F. Maurer, Manager, ABWR Licensing, Westinghouse Electric Company LLC, P.O. Box 355, Pittsburgh, Pennsylvania 15230-0355.

Very truly yours,

B. F. Maurer, Manager
ABWR Licensing

Enclosures

cc: T. Tai (NRC TWFN 6 D38M)

bcc: B. F. Maurer 1L
C. B. Brinkman 1L
S. Head (STPNOC) 1L
J. Tomkins (STPNOC) 1L, 1A
R. Quinn 1L, 1A
N. Jain 1L, 1A
R. Schwirian 1L, 1A
R. Sero 1L
E. Blackburn 1L, 1A
K. Matsunaga (Toshiba IEC)

LTR-NRC-10-30 NP-Enclosure

South Texas Project Units 3 & 4 NRC Meeting on STP Approach for Reactor Internals FIV Program

April 2010

Westinghouse Electric Company LLC
P.O. Box 355
Pittsburgh, PA 15230-0355

South Texas Project Units 3 & 4 NRC Meeting on STP Approach for Reactor Internals FIV Program

Westinghouse Electric Company
P.O. Box 355
Pittsburgh, PA 15230-0355

STP Presentation Overview

- STP opening remarks and desired outcomes (Head)
- STP 3&4 Comprehensive Vibrations Assessment Program (CVAP) Overview
  - Background (Chandra)
  - Stress and vibration analysis plan overview (Chandra)
  - Stress and vibration measurement plan overview (Chandra)
  - Inspection plan overview (Chandra)
- Deliverables and Schedule (Head)
- Status of RAI 4218 (Quinn)
- FSAR update including COL Item 3.9.7.1 (Quinn)

- Additional technical discussions
  (if needed – separate proprietary discussion material)

STPNOC Meeting Attendees

STPNOC
- Scott Head
- Steve Thomas
- John Price
- Tom Daley

Toshiba
- Keiji Matsunaga
- Ken Uchida

TANE
- Dale Wuokko

Westinghouse
- Subhash Chandra
- Dick Schwirian
- Nirmal Jain
- Venkat Ramani
- Brad Maurer
- Bob Quinn
- Sam Ranganath (XGEN)

Morgan Lewis
- Steve Frantz

Opening Remarks

- STP Unit 3 is designated as a prototype plant in accordance with the guidance of RG 1.20, Rev. 3
  - STP-specific predictive analysis
  - Using K-6 test results to inform scope of STP-3 program

Desired Outcomes

- Provide NRC a clear understanding of STP's plan for addressing FIV for STP 3&4, especially the deliverables and schedule for pre-COL activities
  - Stress and Vibration predictive analysis results, level of detail comparable to AP1000™ FIV WCAP report
  - Measurement Plan
  - Inspection Plan
- Provide an overview of the approach to developing the pre-COL deliverable and obtain any staff feedback
- Leave the meeting with a shared understanding of the STP 3&4 COLA FIV plan

STP 3&4 Comprehensive Vibrations Assessment Program (CVAP) Overview

Subhash Chandra

STP 3&4 Comprehensive Vibration Assessment Program (CVAP) Overview

- STP-3 designated as Prototype per Regulatory Guide 1.20, Revision 3
  - STP-4 will be “Category 1, non-prototype”
- Stress and vibration analysis program / predictive analysis
  - All reactor internal components will be evaluated
    - Steam dryer
    - Lower plenum components
    - Other components
- Stress and vibration measurement program
- Inspection program

STP FIV Analysis Program Overview

- K-6 experience is used as a guide in developing STP program
  - Selection of test and analysis conditions
  - Verification of STP analytical models
  - Selection of measurement locations

STP FIV Analysis Program
Steam Dryer

- Approach similar to dryer qualifications for EPUs at operating BWR plants
- Predictive analysis approach
  - 1/8-scale 4-line model testing
  - Acoustic circuit methodology
  - FEM will be developed
    - Stress ratios will be calculated

STP FIV Analysis Program
Lower Plenum Components

- CFD analysis for forcing functions
  - Application of CFD methodology will be validated
- Predictive stress analysis using finite element models

STP FIV Analysis Program
Other Components

- Forcing functions calculated based upon industry practice, open literature, and Westinghouse proprietary information
- Predictive stress analysis for selected components
  - Qualitative evaluation of remaining components

Measurement Plan

The Measurement Plan for STP-3 is based on the following considerations

- Meet the guidance of RG 1.20 Rev. 3
- Meet DCD commitments
- Measurement locations identified by
  - STP-specific predictive analysis
  - Results of the K-6 vibration assessment program
    - Include components where the K-6 vibration program showed higher stresses
  - Include components with higher FIV susceptibility based on operating BWR field experience

Measurement Plan *(continued)*

Vibration Sensor Selection and Installation

- Types of sensors: Strain gages, dynamic pressure transducers, and accelerometers
- Selection based upon prior application in reactor environment and proven reliability
- Sensor installation to be similar to K-6 approach
  - Extremely low failure rate

Measurement Plan *(continued)*

Vibration Data Acquisition and Analysis

- The Data Acquisition System will include signal conditioning equipment, data collection, storage and analysis software to perform FFT and time-domain analyses
- Data will be collected and analyzed on-line and off-line during pre-operational and start-up test conditions as well as transient conditions outlined in test plan
- The vibration response as measured will be compared to the acceptance criteria generated based on analytical model

Pre-op Test Inspection Plan

- Inspection of major internal components prior to and after pre-operational test completion and several hours high flow test
- Inspection for structural integrity to withstand FIV; inspection for wear, cracks, displaced/failed components, loosening of bolts, evidence of loose part and foreign material

Pre-op Test Inspection Plan

(continued)

- Major components and locations for inspection will be identified
- Inspection methods will be identified
- All inspection results will be documented
- Inspection summary reports will be submitted to NRC in accordance with RG 1.20 Rev. 3 schedule

Inspection Plan After Operation

- Steam Dryer inspection will be performed during first re-fueling outage
- Results documented in separate report

Deliverables and Schedule

Scott Head

Deliverables and Schedule

- Deliverables in support of COL will be reports that summarize the analytical models, validation, and predictive analysis results for the steam dryer and the remaining reactor internals, including a summary of the instrumentation and inspection plans
  - Activities to be performed post-COL through testing at power will be described

Deliverables and Schedule *(continued)*

	Available for Review	Submittal
• Steam Dryer		
– Initial Acoustic Screening report		31-May
– 1/8-scale model test plan	31-May	
– Performance of 1/8-scale test	~June	
– MSL /Dryer subscale testing report		30-Sep
• Non-steam dryer components		
– Other component acoustics FF calc		21-Jul
– Other component modal analysis	21-Jul	
– Lower plenum CFD FF calc	18-Aug	
– Lower plenum modal analysis	18-Aug	
– Predictive stress analyses	10-Nov	
– Measurement, test, inspection plan		26-Nov
• FIV assessment program report		15-Dec

Status of RAI 4218

Bob Quinn

Status of RAI 4218

- RAI responses are pending
- Based on approach described today, will prepare and submit responses
- Response will include:
  - Identification of STP-3 as US ABWR prototype
  - Schedule for submittal of FIV plan deliverables in support of COL review
  - FSAR and COL item changes (next topic)

FSAR update including COL Item in COLA Section 3.9.7.1

Bob Quinn

FSAR Update / COL Item 3.27

- COL Item 3.27 (COLA Section 3.9.7.1) requires “results of vibration assessment program to be provided in the application”
  - Current COL item was based on a presumption that adequate prototype information is already available
  - Need to provide updated COLA section 3.9.7.1 based on STP-3 as prototype plant

    “The COL applicant will prepare and submit an FIV program plan document which includes the summary results of reactor internals predictive analysis, and a summary description of the instrumentation plan and inspection plan for the prototype plant.”

FSAR Update / COL Item 3.27 *(continued)*

- FSAR Sections 3.9.2.3, 3.9.2.4, and 3.9.2.6 also to be updated to address the change to STP-3 as prototype plant
- Proposed changes to COL Item and FSAR will be included in responses to current RAIs

Questions?

Additional Discussion (if needed – Proprietary Material)

- *Detailed technical discussions (separate Proprietary material as required)*
  - *Steam dryer & main steam line (Schwirian)*
  - *Lower plenum (Matsunaga)*
  - *Remaining reactor internals (Schwirian)*