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U.S. Nuclear Regulatory Commission
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Your ref: Project Number 740
Our ref: DCP/NRC1972

August 21, 2007

Subject: AP1000 COL Response to Request for Additional Information (TR #10)

In support of Combined License application pre-application activities, Westinghouse is submitting responses to NRC requests for additional information (RAI) on AP1000 Standard Combined License Technical Report 10, APP-GW-GLR-046, Revision 0, AP1000 Reactor Internals Expected and Acceptable Responses During Pre-Operational Vibration Measurement Program. These RAI responses are submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in the responses is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification.

The responses are provided for requests for additional information RAI-TR10-EMB1-01 and RAI-TR10-EMB1-02. These RAI responses complete all requests received to date for Technical Report 10.

Pursuant to 10 CFR 50.30(b), the responses to the requests for additional information on Technical Report 10 are submitted as Enclosure 1 under the attached Oath of Affirmation.

Questions or requests for additional information related to the content and preparation of these responses should be directed to Westinghouse. Please send copies of such questions or requests to the prospective applicants for combined licenses referencing the AP1000 Design Certification. A representative for each applicant is included on the cc: list of this letter.

Very truly yours,

Monte D Barley FOR

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

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NRO

/Attachment

1. "Oath of Affirmation," dated August 21, 2007

/Enclosure

1. Responses to Requests for Additional Information on Technical Report No. 10

cc:	D. Jaffe	-	U.S. NRC	1E	1A
	E. McKenna	-	U.S. NRC	1E	1A
	S. Adams	-	Westinghouse	1E	1A
	G. Curtis	-	TVA	1E	1A
	P. Grendys	-	Westinghouse	1E	1A
	P. Hastings	-	Duke Power	1E	1A
	C. Ionescu	-	Progress Energy	1E	1A
	D. Lindgren	-	Westinghouse	1E	1A
	A. Monroe	-	SCANA	1E	1A
	M. Moran	-	Florida Power & Light	1E	1A
	C. Pierce	-	Southern Company	1E	1A
	E. Schmiech	-	Westinghouse	1E	1A
	G. Zinke	-	NuStart/Entergy	1E	1A
	D. Forsyth	-	Westinghouse	1E	1A

ATTACHMENT 1

"Oath of Affirmation"

ATTACHMENT 1

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)
NuStart Bellefonte COL Project	)
NRC Project Number 740	)

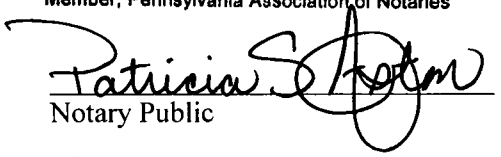
APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-APPLICATION REVIEW

W. E. Cummins, being duly sworn, states that he is Vice President, Regulatory Affairs & Standardization, for Westinghouse Electric Company; that he is authorized on the part of said company to sign and file with the Nuclear Regulatory Commission this document; that all statements made and matters set forth therein are true and correct to the best of his knowledge, information and belief.

W. E. Cummins
Vice President
Regulatory Affairs & Standardization

Subscribed and sworn to
before me this 21st day
of August 2007.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Patricia S. Aston, Notary Public
Murrysville Boro, Westmoreland County
My Commission Expires July 11, 2011
Member, Pennsylvania Association of Notaries



Notary Public

ENCLOSURE 1

Responses to Requests for Additional Information on Technical Report No. 10

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR10-EMB1-01

Revision: 0

Question:

In its letter dated March 29, 2007, Westinghouse proposes to modify AP1000 DCD, Tier 2, to reference Revision 2 to Regulatory Guide (RG) 1.20, "Comprehensive Vibration Assessment Program for Reactor Internals During Preoperational and Initial Startup Testing," instead of the current reference in the AP1000 DCD to RG 1.20 (without a revision number). In the Background section of WCAP-16687-P, Westinghouse states that several reactor internals design changes have occurred since the AP1000 reactor internals flow-induced vibration program report was prepared. Section 3.9.8.1, Reactor Internals Vibration Assessment and Predicted Response, of the AP1000 DCD, Tier 2, states in discussing "Combined License Information" that information including predicted vibration response and allowable response will be provided prior to the preoperational vibration testing of the first AP1000 consistent with the guidance of RG 1.20. In light of the AP1000 reactor internals design changes, discuss the basis for modifying the AP1000 DCD to allow a Combined License applicant to not apply the most recent revision to RG 1.20.

Westinghouse Response:

One of the key principles for the AP1000 Design Certification amendment is that the regulatory basis is not changed from the basis for the Design Certification approved in December 2005. Therefore, the criteria, standards and guidance documents applicable to the current AP1000 Design Certification remain the same for the amendment. The revision of Regulatory Guide 1.20 used for the amendment is Revision 2, the same revision that was used for the Design Certification. DCD Revision 16 and the supporting technical reports were prepared in support of the Design Certification amendment.

The technical report that provided the vibration assessment for the internals (WCAP-16687-P) in response to COL Information Item 3.9-1 was transmitted to the NRC on March 29, 2007. This is reflected in DCD Revision 16, Subsection 3.9.8.1.

References:

None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Technical Report (TR) Revision:

None

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-TR10-EMB1-02
Revision: 0

Question:

Flow-excited acoustic resonances in main steam lines can play a significant role in producing mid to high frequency pressure fluctuations and vibrations that can damage main steam line components such as relief valves and potentially reactor pressure vessel internals. Since adverse flow effects in reactors caused by flow-excited acoustic and structural resonances are sensitive to minor changes in arrangement, design, size, and operating conditions even applications submitted for non-prototypes must include assessments of the potential for such adverse flow effects to appear. Discuss how these potential adverse flow effects would be monitored and assessed during the preoperational and startup testing of the reactor internal by the AP 1000 COL applicants.

Also, discuss how these potential adverse flow effects would be monitored and assessed during the power operations for the main steam lines and the other vulnerable RCL branch lines such as shutdown cooling suction line (Event occurred in Palo Verde Nuclear Generating Station).

Westinghouse Response:

As noted in DCD Subsection 3.9.2.1, a preoperational test program is required by the ASME Code to verify that the piping and piping restraints will withstand dynamic effects due to transients, such as pump trips and valve trips, and that piping vibrations are within acceptable levels. The requirements for the pre-operational testing program are identified in DCD Section 14.2. No additional pipe vibration requirements are needed as part of the reactor internals dynamic testing. WCAP-16687, Rev. 1, "AP1000 Reactor Internals Expected and Acceptable Responses During Preoperational Measurement Program," is concerned only with reactor pressure vessel internals. While acoustic excitation in the reactor vessel of a PWR is possible, the type of resonant condition observed at Palo Verde Generating Station is unlikely to occur for the following reasons:

1. The type of acoustic resonance that occurred at Palo Verde is referred to as a "Helmholtz Resonator" or side branch resonance. This type of resonance requires a large volume connected to an excitation mechanism by a single long flow path. There are no obvious "Helmholtz Resonator" geometries in the reactor internals.

2. For a "Helmholtz Resonator" configuration to generate significant pressure pulsations, two conditions are needed: a) an excitation mechanism whose fluctuation frequency matches the mode frequency of the resonator, and b) low damping. The turbulence in typical PWR internals like those of AP1000 is not of a discrete frequency nature and the high fluid velocities therein produce a substantial amount of damping.

3. Non-resonant amplification of turbulent fluctuations could conceivably occur for Helmholtz Resonator-like geometries. The only such possibility is the upper head/guide tube interaction. However, the guide tube flow paths are well-damped and the existence of multiple guide tube flow paths means that the turbulent excitations driving these flow paths would not be correlated. The resulting upper head pressure amplitudes would, therefore, be small.

4. The AP1000 upper plenum and upper head regions are quite similar to those of a three-loop or 3XL Westinghouse plant with an inverted top hat upper support plate. No evidence of unusually large pressure fluctuations has been observed in plants of this general configuration.

For these reasons, it can be concluded that acoustic resonances within the AP1000 reactor vessel internals are unlikely to occur and that, even if they do occur, they will be substantially dampened. No instrumentation program beyond that planned for hot functional testing is necessary.

Design Control Document (DCD) Revision:
None

PRA Revision:
None

Technical Report (TR) Revision:
None