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Your ref: Docket No. 52-006
Our ref: DCP/NRC2110

March 28, 2008

Subject: AP1000 COL Response to Request for Additional Information (SRP 5.3.1)

In support of Combined License application pre-application activities, Westinghouse is submitting a response to the NRC request for additional information (RAI) on SRP Section 5.3.1. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the response is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

A response is provided for RAI-SRP-5.3.1-CIB1-01 as sent in an email from Perry Buckberg to Don Lindgren dated February 19, 2008. This response completes all requests received to date for SRP section 5.3.1.

Pursuant to 10 CFR 50.30(b), the response to the request for additional information on SRP Section 5.3.1, is submitted as Enclosure 1 under the attached Oath of Affirmation.

Questions or requests for additional information related to the content and preparation of this response 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,

A handwritten signature in black ink, appearing to read 'Robert Sisk'.

Robert Sisk, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Attachment

1. "Oath of Affirmation," dated March 28, 2008

/Enclosure

1. Response to Request for Additional Information on SRP Section 5.3.1

cc:	P. Buckberg	- U.S. NRC	1E	1A
	E. McKenna	- U.S. NRC	1E	1A
	P. Ray	- TVA	1E	1A
	P. Hastings	- Duke Power	1E	1A
	R. Kitchen	- Progress Energy	1E	1A
	A. Monroe	- SCANA	1E	1A
	J. Wilkinson	- Florida Power & Light	1E	1A
	C. Pierce	- Southern Company	1E	1A
	G. Zinke	- NuStart/Entergy	1E	1A
	R. Grumbir	- NuStart	1E	1A
	E. Schmiech	- Westinghouse	1E	1A
	D. McDermott	- Westinghouse	1E	1A

ATTACHMENT 1

“Oath of Affirmation”

ATTACHMENT 1

UNITED STATES OF AMERICA
NUCLEAR REGULATORY COMMISSION

In the Matter of:)
AP1000 Design Certification Amendment Application)
NRC Docket Number 52-006)

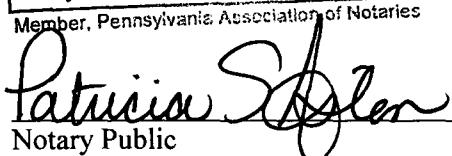
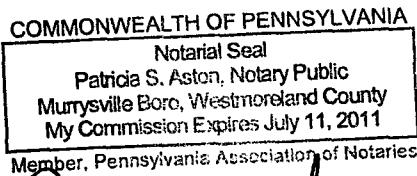
APPLICATION FOR REVIEW OF
"AP1000 GENERAL INFORMATION"
FOR DESIGN CERTIFICATION AMENDMENT APPLICATION REVIEW

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 28th day
of March 2008.



Notary Public

ENCLOSURE 1

Response to Request for Additional Information on SRP Section 5.3.1

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

RAI Response Number: RAI-SRP5.3.1-CIB1-01
Revision: 0

Question:

In a teleconference with Westinghouse on November 28, 2007, NRC staff discussed the need to include additional information in the AP1000 DCD. Specifically, Section 5.3.6.3 of AP1000 DCD, Revision 16 references Westinghouse technical report (TR) APP-GW-GLR-023, Revision 0, entitled, "Surveillance Capsule Lead Factor and Azimuthal Location Confirmation," in its entirety. Although the entire report can be referenced for additional information, NRC staff finds that for clarity and completeness of the DCD as a stand-alone document, portions of the technical report describing important design details should be included in the DCD.

Accordingly, the NRC staff's review of the TR (APP-GW-GLR-023, Rev. 0) finds, as a minimum, the following information currently in the TR should also be included in the AP1000 DCD:

- the azimuthal locations of the capsules (in degrees) and the basis for these locations (as described in APP-GW-GLR-023, Revision 0)
- the calculated lead factors (as described in APP-GW-GLR-023, Revision 0)
- Figure 1, "Surveillance Capsule Azimuthal Location," from APP-GW-GLR-023, Revision 0

Please provide a response describing the information (including the information described above) Westinghouse plans to include in TR134 for incorporation into the next revision to the AP1000 DCD.

Westinghouse Response:

The azimuthal locations of the capsules are shown in Figure 1 (from APP-GW-GLR-023) which will be incorporated into DCD Figure 5.3-4. The basis for these locations will be included in DCD subsection 5.3.2.6.

The lead factors based on the reference neutron flux distribution (flux distribution which results in the maximum fluence on the reactor vessel inner surface) will be included in DCD subsection 5.3.2.6.

See the proposed changes to DCD Revision 16 shown below. These changes will be incorporated into a future revision of TR134.

Reference(s):

APP-GW-GLR-023 Revision 0, "Surveillance Capsule Lead Factor and Azimuthal Location Confirmation"

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

Design Control Document (DCD) Revision:

AP1000 DCD Revision 16, pages 5.3-6, 5.3-7, and 5.3-34:

5.3.2.6 Material Surveillance

In the surveillance program, the evaluation of radiation damage is based on pre-irradiation testing of Charpy V-notch and tensile specimens and postirradiation testing of Charpy V-notch, tensile, and 1/2-T compact tension (CT) fracture mechanics test specimens. The program is directed toward evaluation of the effect of radiation on the fracture toughness of reactor vessel steels based on the transition temperature approach and the fracture mechanics approach. The program conforms to ASTM E-185, (Reference 1) and 10 CFR 50, Appendix H.

The reactor vessel surveillance program incorporates eight specimen capsules. The capsules are located in guide baskets welded to the outside of the core barrel as shown in Figure 5.3-4 and positioned directly opposite the center portion of the core. The capsules can be removed when the vessel head is removed. To meet the guidelines of ASTM E 185 (lead factors less than three), the specimen guide baskets are located azimuthally near the lowest fluence locations at 135, 225, and 315 degrees. The 45 degree location is also a low fluence azimuthal location, however, there is a Roto-Lock insert for the internals lifting rig which would prevent access for removal of the capsules from the baskets. Therefore, there are no guide baskets at the 45 degree location. Eight specimen capsules are provided by including three guide baskets at the 135 and 315 degree azimuthal locations and two baskets at the 225 degree location.

The capsules contain reactor vessel weld metal, base metal, and heat-affected zone metal specimens. The base metal specimens are oriented both parallel and normal (longitudinal and transverse) to the principal rolling direction of the limiting base material located in the core region of the reactor vessel. The 8 capsules contain 72 tensile specimens, 480 Charpy V-notch specimens, and 48 compact tension specimens. Archive material sufficient for two additional capsules and heat-affected-zone (HAZ) materials is retained.

Dosimeters, as described below, are placed in filler blocks drilled to contain them. The dosimeters permit evaluation of the flux seen by the specimens and the vessel wall. In addition, thermal monitors made of low melting point alloys are included to monitor the maximum temperature of the specimens. The specimens are enclosed in a tight-fitting stainless steel sheath to prevent corrosion and ensure good thermal conductivity. The complete capsule is helium leak tested. As part of the surveillance program, a report of the residual elements in weight percent to the nearest 0.01 percent is made for surveillance material and as deposited weld metal. Each of the eight capsules contains the specimens shown in Table 5.3-4.

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

The following dosimeters and thermal monitors are included in each of the eight capsules:

- Dosimeters
 - Iron
 - Copper
 - Nickel
 - Cobalt-aluminum (0.15-percent cobalt)
 - Cobalt-aluminum (cadmium shielded)
 - Uranium-238 (cadmium shielded)
 - Neptunium-237 (cadmium shielded)

- Thermal Monitors
 - 97.5-percent lead, 2.5-percent silver, (579°F melting point)
 - 97.5-percent lead, 1.75-percent silver, 0.75-percent tin (590°F melting point)

The fast neutron exposure of the specimens occurs at a faster rate than that experienced by the vessel wall, with the specimens being located between the core and the vessel. Since these specimens experience accelerated exposure and are actual samples from the materials used in the vessel, the transition temperature shift measurements are representative of the vessel at a later time in life. The lead factors for the eight specimen capsule locations based on the reference neutron flux distribution (flux distribution that results in the maximum fluence on the reactor vessel inner surface) vary between approximately 1.8 and 2.3. These lead factors will change over the life of the plant due to changes in core design and operating parameters. Data from CT fracture toughness specimens are expected to provide additional information for use in determining allowable stresses for irradiated material.

Correlations between the calculations and measurements of the irradiated samples in the capsules, assuming the same neutron spectrum at the samples and the vessel inner wall, are described in subsection 5.3.2.6.1. The anticipated degree to which the specimens perturb the fast neutron flux and energy distribution is considered in the evaluation of the surveillance specimen data. Verification and possible readjustment of the calculated wall exposure is made by the use of data on capsules withdrawn. The recommended program schedule for removal of the capsules for post-irradiation testing includes five capsules to be withdrawn instead of four as specified in ASTM E-185 (Reference 1) and Appendix H of 10 CFR 50. The following is the recommended withdrawal schedule of capsules for AP1000.

AP1000 TECHNICAL REPORT REVIEW

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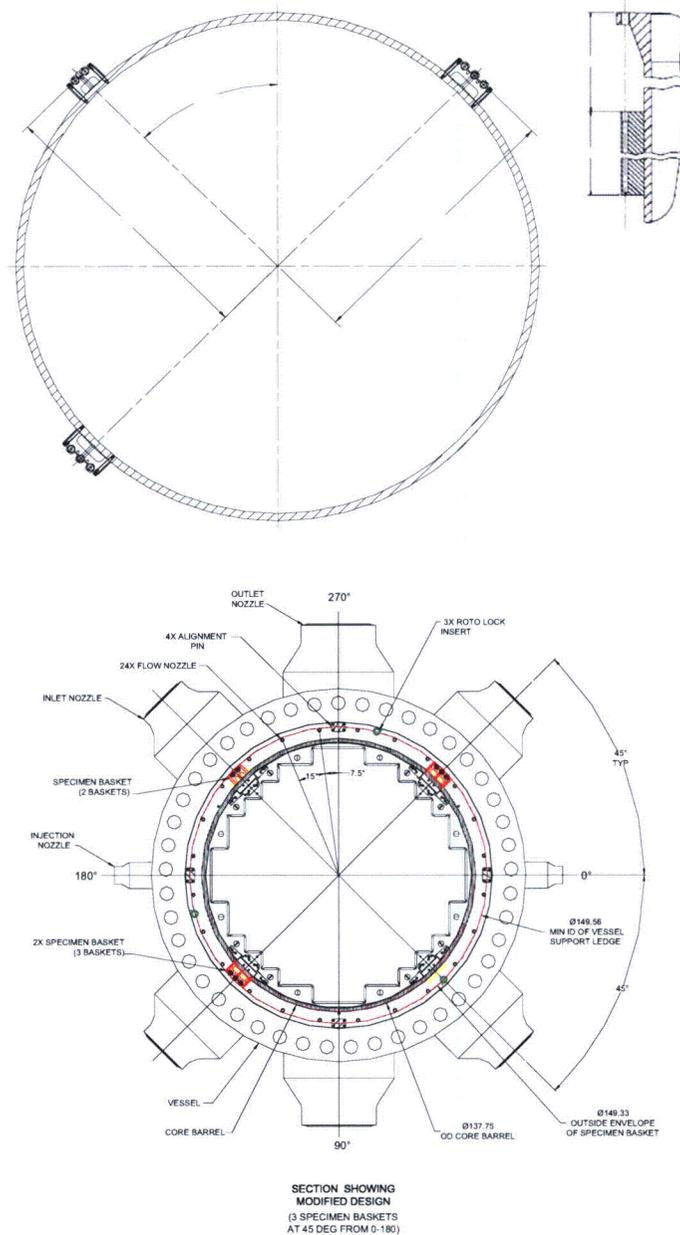


Figure 5.3-4
AP1000 Reactor Vessel Surveillance Capsules Locations

AP1000 TECHNICAL REPORT REVIEW

Response to Request For Additional Information (RAI)

PRA Revision:

None

Technical Report (TR) Revision:

None