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U.S. Nuclear Regulatory Commission  
ATTENTION: Document Control Desk  
Washington, D.C. 20555

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Your ref: Docket No. 52-006  
Our ref: DCP/NRC2124

April 21, 2008

Subject: AP1000 COL Response to Request for Additional Information (TR #54)

Westinghouse is submitting a revised response to NRC request for additional information (RAI) on AP1000 Standard Combined License Technical Report 54, APP-GW-GLR-033, Rev. 0, Spent Fuel Racks Design and Structural Analysis. This RAI response is submitted in support of the AP1000 Design Certification Amendment Application (Docket No. 52-006). The information included in the responses is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification and the AP1000 Design Certification Amendment Application.

Revised response is provided for request for additional information TR54-08, originally transmitted in NRC letter dated March 29, 2007 from Steven D. Bloom to Andrea Sterdis, Subject: Westinghouse AP1000 Combined License (COL) Pre-application Technical Report 54 – Request for Additional Information (TAC NO. MD2551). The original response was transmitted in Westinghouse letter number DCP/NRC1861 dated April 10, 2007.

Pursuant to 10 CFR 50.30(b), the response to request for additional information on Technical Report 54 is submitted as Enclosure 2 under the attached Oath of Affirmation.

It is expected that when the RAIs on Technical Report 54 are complete, the technical report will be revised as indicated in the responses and submitted to the NRC. The RAI responses will be included in the document.

Also enclosed is one copy of the Affidavit Pursuant to 10 CFR 2.390.

This submittal contains proprietary information of Holtec International. In conformance with the requirements of 10 CFR Section 2.390, as amended, of the Commission's regulations, we are enclosing with this submittal an affidavit. The affidavit sets forth the basis on which the information identified as proprietary may be withheld from public disclosure by the Commission.

Correspondence with respect to the affidavit or Application for Withholding should be addressed to Evan Rosenbaum, Project Manager, AP1000 Spent Fuel Storage Racks Project, Holtec International, 555 Lincoln Drive, Marlton, New Jersey, 08053.

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,



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

/Attachment

1. "Oath of Affirmation," dated April 21, 2008

/Enclosures

1. Affidavit Pursuant to 10 CFR 2.390, dated April 15, 2008
2. Response to Request for Additional Information on Technical Report No. 54

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
	J. Iacovino	- 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 )

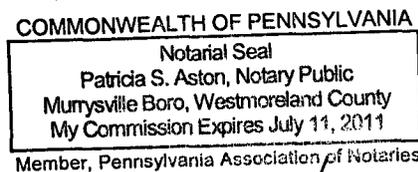
APPLICATION FOR REVIEW OF  
"AP1000 GENERAL INFORMATION"  
FOR DESIGN CERTIFICATION AMENDMENT APPLICATION REVIEW

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 21<sup>st</sup> day  
of April 2008.



Notary Public

ENCLOSURE 1

Affidavit Pursuant to 10 CFR 2.390

**AFFIDAVIT PURSUANT TO 10 CFR 2.390**

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I, Evan Rosenbaum, being duly sworn, depose and state as follows:

- (1) I am the Holtec International Project Manager for the AP1000 Spent Fuel Storage Racks Project and have reviewed the information described in paragraph (2) which is sought to be withheld, and am authorized to apply for its withholding.
- (2) The information sought to be withheld is Holtec International Position Paper DS-240, containing Holtec Proprietary information.
- (3) In making this application for withholding of proprietary information of which it is the owner, Holtec International relies upon the exemption from disclosure set forth in the Freedom of Information Act ("FOIA"), 5 USC Sec. 552(b)(4) and the Trade Secrets Act, 18 USC Sec. 1905, and NRC regulations 10CFR Part 9.17(a)(4), 2.390(a)(4), and 2.390(b)(1) for "trade secrets and commercial or financial information obtained from a person and privileged or confidential" (Exemption 4). The material for which exemption from disclosure is here sought is all "confidential commercial information", and some portions also qualify under the narrower definition of "trade secret", within the meanings assigned to those terms for purposes of FOIA Exemption 4 in, respectively, Critical Mass Energy Project v. Nuclear Regulatory Commission, 975F2d871 (DC Cir. 1992), and Public Citizen Health Research Group v. FDA, 704F2d1280 (DC Cir. 1983).

**AFFIDAVIT PURSUANT TO 10 CFR 2.390**

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- (4) Some examples of categories of information which fit into the definition of proprietary information are:
- a. Information that discloses a process, method, or apparatus, including supporting data and analyses, where prevention of its use by Holtec's competitors without license from Holtec International constitutes a competitive economic advantage over other companies;
  - b. Information which, if used 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 of a similar product.
  - c. Information which reveals cost or price information, production, capacities, budget levels, or commercial strategies of Holtec International, its customers, or its suppliers;
  - d. Information which reveals aspects of past, present, or future Holtec International customer-funded development plans and programs of potential commercial value to Holtec International;
  - e. Information which discloses patentable subject matter for which it may be desirable to obtain patent protection.

The information sought to be withheld is considered to be proprietary for the reasons set forth in paragraphs 4.a and 4.b, above.

- (5) The information sought to be withheld is being submitted to the NRC in confidence. The information (including that compiled from many sources) is of a sort customarily held in confidence by Holtec International, and is in fact so held. The information sought to be withheld has, to the best of my knowledge and belief, consistently been held in confidence by Holtec International. No public disclosure has been made, and it is not available in public sources. All disclosures to third parties, including any required transmittals to the NRC, have

**AFFIDAVIT PURSUANT TO 10 CFR 2.390**

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been made, or must be made, pursuant to regulatory provisions or proprietary agreements which provide for maintenance of the information in confidence. Its initial designation as proprietary information, and the subsequent steps taken to prevent its unauthorized disclosure, are as set forth in paragraphs (6) and (7) following.

- (6) Initial approval of proprietary treatment of a document is made by the manager of the originating component, the person most likely to be acquainted with the value and sensitivity of the information in relation to industry knowledge. Access to such documents within Holtec International is limited on a "need to know" basis.
- (7) The procedure for approval of external release of such a document typically requires review by the staff manager, project manager, principal scientist or other equivalent authority, by the manager of the cognizant marketing function (or his designee), and by the Legal Operation, for technical content, competitive effect, and determination of the accuracy of the proprietary designation. Disclosures outside Holtec International are limited to regulatory bodies, customers, and potential customers, and their agents, suppliers, and licensees, and others with a legitimate need for the information, and then only in accordance with appropriate regulatory provisions or proprietary agreements.
- (8) The information classified as proprietary was developed and compiled by Holtec International at a significant cost to Holtec International. This information is classified as proprietary because it contains detailed descriptions of analytical approaches and methodologies not available elsewhere. This information would provide other parties, including competitors, with information from Holtec International's technical database and the results of evaluations performed by Holtec International. A substantial effort has been expended by Holtec International to develop this information. Release of this information would improve a competitor's position because it would enable Holtec's competitor to copy our technology and offer it for sale in competition with our company, causing us financial injury.

**AFFIDAVIT PURSUANT TO 10 CFR 2.390**

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- (9) Public disclosure of the information sought to be withheld is likely to cause substantial harm to Holtec International's competitive position and foreclose or reduce the availability of profit-making opportunities. The information is part of Holtec International's comprehensive spent fuel storage technology base, and its commercial value extends beyond the original development cost. The value of the technology base goes beyond the extensive physical database and analytical methodology, and includes development of the expertise to determine and apply the appropriate evaluation process.

The research, development, engineering, and analytical costs comprise a substantial investment of time and money by Holtec International.

The precise value of the expertise to devise an evaluation process and apply the correct analytical methodology is difficult to quantify, but it clearly is substantial.

Holtec International's competitive advantage will be lost if its competitors are able to use the results of the Holtec International experience to normalize or verify their own process or if they are able to claim an equivalent understanding by demonstrating that they can arrive at the same or similar conclusions.

The value of this information to Holtec International would be lost if the information were disclosed to the public. Making such information available to competitors without their having been required to undertake a similar expenditure of resources would unfairly provide competitors with a windfall, and deprive Holtec International of the opportunity to exercise its competitive advantage to seek an adequate return on its large investment in developing these very valuable analytical tools.



ENCLOSURE 2

Response to Request for Additional Information on Technical Report No. 54

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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RAI Response Number: RAI-TR54-08  
Revision: 1

### **Question:**

For the drop case in which the impact occurs directly above a rack pedestal, Section 2.8.5 provides the concrete strength of the pool floor and the thickness of the stainless steel liner, but does not provide the thickness of the pool floor. There is a possibility that the impact could also cause damage to the concrete floor, and pose a more severe consequence than yield of the liner. The maximum Von Mises stress in the spent fuel pool liner is reported as 23.4 ksi, which is much larger than the concrete strength of 4 ksi; the concrete may crush and crack locally at this level of stress. Therefore, provide additional details on the modeling of the concrete floor (including a figure of the concrete model, element type, boundary conditions, material properties, etc.) and the analysis results for the concrete floor (in addition to Figure 2-11).

October 8-12, 2007 Audit "The staff still needs confirmation that the concrete compressive strength in NUREG/CR-6608 is 4,000 psi.

### **Westinghouse Response:**

The spent fuel pool concrete floor is modeled only in the vicinity of the impacted rack pedestal with an assumed thickness of two feet and compressive strength of 4,000 psi. The pool liner and rack pedestal bearing pad are also modeled as shown in Figure TR54-8.1. The periphery surface nodes of the SFP pool liner and the underlying concrete slab in the LSDYNA model are restrained from moving in the vertical direction and in the horizontal direction normal to the periphery surface to simulate the confining effect of the surrounding structure.

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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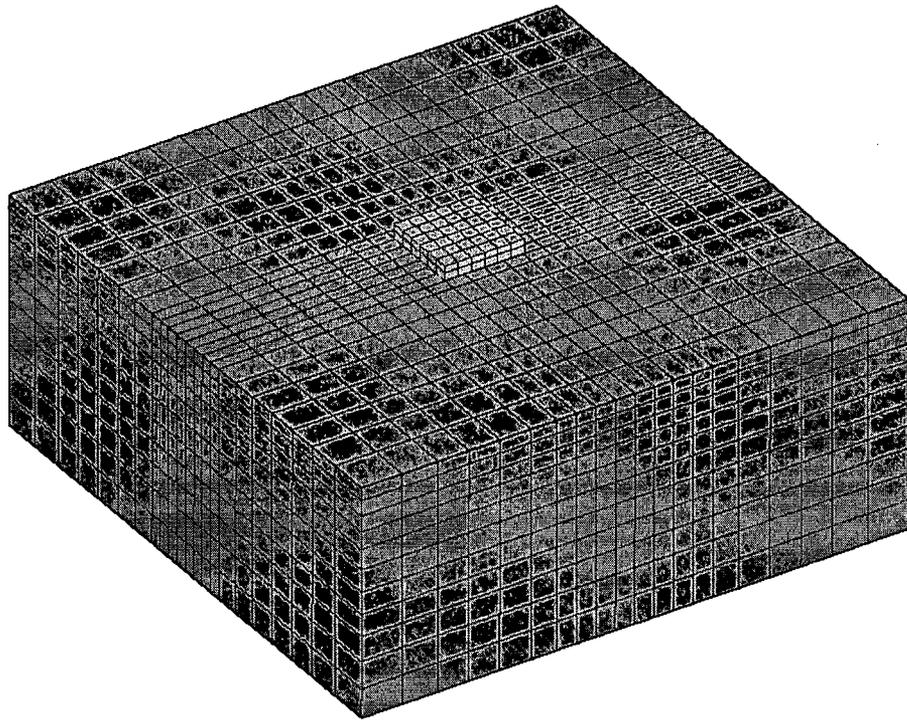


Figure TR54-8.1 LSDYNA Model of Pool Liner and Rack Pedestal Bearing

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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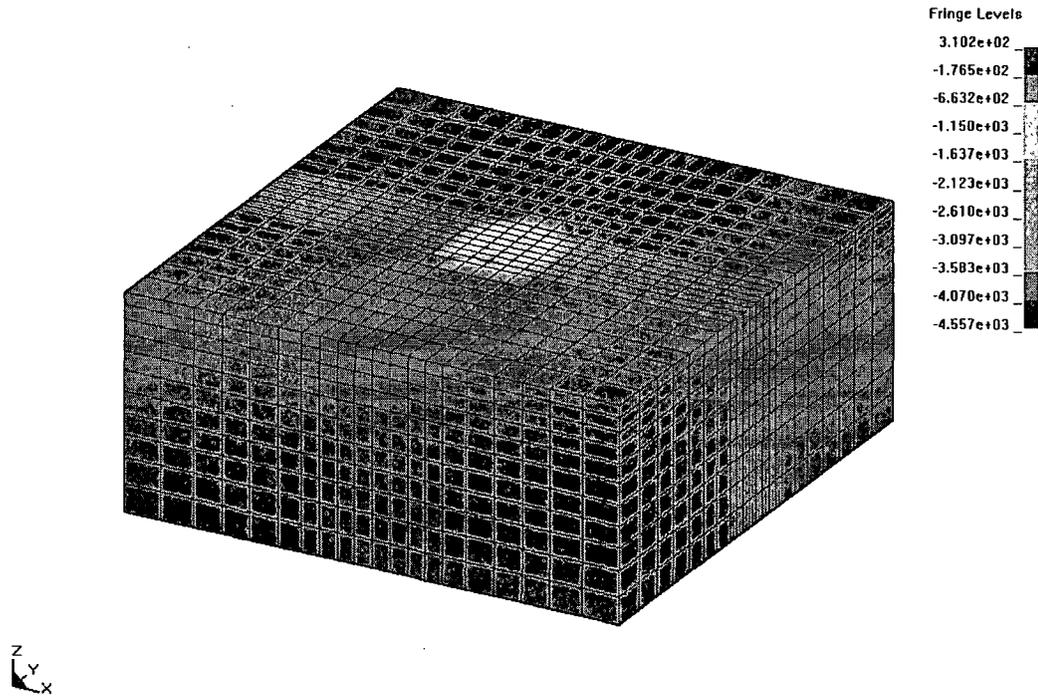


Figure TR54-8.2 LSDYNA Fuel Assembly Deep Drop Scenario 2

## AP1000 TECHNICAL REPORT REVIEW

### Response to Request For Additional Information (RAI)

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The maximum compressive stress in the concrete floor, resulting from the fuel assembly deep drop event in which the impact occurs directly above a rack pedestal, is predicted to be 4,557 psi as shown in the Figure TR54-8.2. This maximum compressive stress slightly exceeds the assumed concrete compressive strength and is limited to the top surface of the concrete near the bearing pad edge. The very limited local damage to the concrete floor surface is acceptable since the acceptance criterion for the fuel deep drop accident is no gross failure of the SFP floor leading to an uncontrolled loss of SFP water.

#### October 8-12, 2007 Audit:

The concrete pad that is modeled in NUREG/CR-6608 has a compressive strength of 4,200 psi, which is slightly greater than the compressive strength of the AP1000 SFP slab (4,000 psi). In order to account for the difference in strength, the input parameters specified in Appendix C of NUREG/CR-6608, for use with LS-DYNA Material Model 16, have been modified in accordance with Holtec Position Paper DS-240 (see Attachment 1 to TR54-8, Reference 3) for a compressive strength of 4,000 psi.

# AP1000 TECHNICAL REPORT REVIEW

## Response to Request For Additional Information (RAI)

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### References:

1. APP-GW-GLR-033, Revision 0, "Spent Fuel Storage Rack Structural/Seismic Analysis," (Technical Report Number 54)
2. APP-FS02-Z0C-001, Revision 0, "Analysis of AP1000 Fuel Storage Racks Subjected to Fuel Drop Accidents"
3. Holtec International Position Paper DS-240, "Modeling of ISFSI Concrete Slab of Variable Compressive Strength in LS-DYNA3D Cask Impact Simulation", Revision 1, Holtec International, August 2000, (Holtec International Proprietary)

### Design Control Document (DCD) Revision:

None

### PRA Revision:

None

### Technical Report (TR) Revision:

None