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Nuclear Power Plants
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USA

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

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Your ref: Docket No. 52-006
Our ref: DCP/NRC1637

October 14, 2003

SUBJECT: Transmittal of Responses to AP1000 DSER Open Items

This letter transmits the Westinghouse responses to Open Items in the AP1000 Design Safety Evaluation Report (DSER). A list of the DSER Open Item responses transmitted with this letter is Attachment 1. The proprietary responses are transmitted as Attachment 2. The non-proprietary responses are provided as Attachment 3 to this letter.

The Westinghouse Electric Company Copyright Notice, Proprietary Information Notice, Application for Withholding, and Affidavit are also enclosed with this submittal letter as Enclosure 1. Attachment 2 contains Westinghouse proprietary information consisting of trade secrets, commercial information or financial information which we consider privileged or confidential pursuant to 10 CFR 2.790. Therefore, it is requested that the Westinghouse proprietary information attached hereto be handled on a confidential basis and be withheld from public disclosures.

This material is for your internal use only and may be used for the purpose for which it is submitted. It should not be otherwise used, disclosed, duplicated, or disseminated, in whole or in part, to any other person or organization outside the Commission, the Office of Nuclear Reactor Regulation, the Office of Nuclear Regulatory Research and the necessary subcontractors that have signed a proprietary non-disclosure agreement with Westinghouse without the express written approval of Westinghouse.

D063

Correspondence with respect to the application for withholding should reference AW-03-1723, and should be addressed to Hank A. Sepp, Manager of Regulatory Compliance and Plant Licensing, Westinghouse Electric Company, P.O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

Please contact me at 412-374-4728 if you have any questions concerning this submittal.

Very truly yours,

R. P. Vijuk, Manager
Passive Plant Engineering
AP600 & AP1000 Projects

/Enclosure

1. Westinghouse Electric Company Copyright Notice, Proprietary Information Notice, Application for Withholding, and Affidavit AW-03-1723.

/Attachments

1. List of the AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses transmitted with letter DCP/NRC1637
2. Proprietary AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses dated October 14, 2003
3. Non-Proprietary AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Responses dated October 14, 2003

DCP/NRC1637
Docket No. 52-006

October 14, 2003

Enclosure 1

Westinghouse Electric Company
Application for Withholding and Affidavit

Westinghouse

Westinghouse Electric Company
Nuclear Power Plants
P.O. Box 355
Pittsburgh, Pennsylvania 15230-0355
USA

October 14, 2003

AW-03-1723

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTENTION: Mr. John Segala

APPLICATION FOR WITHHOLDING PROPRIETARY INFORMATION FROM PUBLIC DISCLOSURE

SUBJECT: Transmittal of Westinghouse Proprietary Class 2 Documents Related to AP1000 Design Certification Review Draft Safety Evaluation Report (DSER) Open Item Response

Dear Mr. Segala:

The application for withholding is submitted by Westinghouse Electric Company, LLC ("Westinghouse") pursuant to the provisions of paragraph (b)(1) of Section 2.790 of the Commission's regulations. It contains commercial strategic information proprietary to Westinghouse and customarily held in confidence.

The proprietary material for which withholding is being requested is identified in the proprietary version of the subject documents. In conformance with 10 CFR Section 2.790, Affidavit AW-03-1723 accompanies this application for withholding setting forth the basis on which the identified proprietary information may be withheld from public disclosure.

Accordingly, it is respectfully requested that the subject information which is proprietary to Westinghouse be withheld from public disclosure in accordance with 10 CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference AW-03-1723 and should be addressed to the undersigned.

Very truly yours,

R. P. Vijuk, Manager
Passive Plant Engineering
AP600 & AP1000 Projects

/Enclosures

AW-03-1723

COMMONWEALTH OF PENNSYLVANIA:

ss

COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared James W. Winters, who, being by me duly sworn according to law, deposes and says that he is authorized to execute this Affidavit on behalf of Westinghouse Electric Company, LLC ("Westinghouse"), and that the averments of fact set forth in this Affidavit are true and correct to the best of his knowledge, information, and belief.

KAY E. GONGAWARE
COMMONWEALTH OF PENNSYLVANIA
NOTARY PUBLIC

James W. Winters, Manager
Passive Plant Projects & Development
Nuclear Power Plants Business Unit

Sworn to and subscribed
before me this 14th day
of October, 2003

Notary Public

Notarial Seal
Kay E. Gongaware, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Feb. 7, 2005
Member, Pennsylvania Association of Notaries

(1) I am Manager, Passive Plant Projects & Development, of the Westinghouse Electric Company LLC ("Westinghouse"), and as such, I have been specifically delegated the function of reviewing the proprietary information sought to be withheld from public disclosure in connection with nuclear power plant licensing and rulemaking proceedings, and am authorized to apply for its withholding on behalf of the Westinghouse Electric Company, LLC.

(2) I am making this Affidavit in conformance with the provisions of 10 CFR Section 2.790 of the Commission's regulations and in conjunction with the Westinghouse application for withholding accompanying this Affidavit.

(3) I have personal knowledge of the criteria and procedures utilized by the Westinghouse Electric Company, LLC in designating information as a trade secret, privileged or as confidential commercial or financial information.

(4) Pursuant to the provisions of paragraph (b)(4) of Section 2.790 of the Commission's regulations, the following is furnished for consideration by the Commission in determining whether the information sought to be withheld from public disclosure should be withheld.

(i) The information sought to be withheld from public disclosure is owned and has been held in confidence by Westinghouse.

(ii) The information is of a type customarily held in confidence by Westinghouse and not customarily disclosed to the public. Westinghouse has a rational basis for determining the types of information customarily held in confidence by it and, in that connection, utilizes a system to determine when and whether to hold certain types of information in confidence. The application of that system and the substance of that system constitutes Westinghouse policy and provides the rational basis required.

Under that system, information is held in confidence if it falls in one or more of several types, the release of which might result in the loss of an existing or potential competitive advantage, as follows:

(a) The information reveals the distinguishing aspects of a process (or component, structure, tool, method, etc.) where prevention of its use by any of Westinghouse's competitors without license from Westinghouse constitutes a competitive economic advantage over other companies.

(b) It consists of supporting data, including test data, relative to a process (or component, structure, tool, method, etc.), the application of which data secures a competitive economic advantage, e.g., by optimization or improved marketability.

(c) Its use 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 a similar product.

(d) It reveals cost or price information, production capacities, budget levels, or commercial strategies of Westinghouse, its customers or suppliers.

(e) It reveals aspects of past, present, or future Westinghouse or customer funded development plans and programs of potential commercial value to Westinghouse.

(f) It contains patentable ideas, for which patent protection may be desirable.

There are sound policy reasons behind the Westinghouse system which include the following:

(a) The use of such information by Westinghouse gives Westinghouse a competitive advantage over its competitors. It is, therefore, withheld from disclosure to protect the Westinghouse competitive position.

(b) It is information which is marketable in many ways. The extent to which such information is available to competitors diminishes the Westinghouse ability to sell products and services involving the use of the information.

(c) Use by our competitor would put Westinghouse at a competitive disadvantage by reducing his expenditure of resources at our expense.

(d) Each component of proprietary information pertinent to a particular competitive advantage is potentially as valuable as the total competitive advantage. If competitors acquire components of proprietary information, any one component may be the key to the entire puzzle, thereby depriving Westinghouse of a competitive advantage.

(e) Unrestricted disclosure would jeopardize the position of prominence of Westinghouse in the world market, and thereby give a market advantage to the competition of those countries.

(f) The Westinghouse capacity to invest corporate assets in research and development depends upon the success in obtaining and maintaining a competitive advantage.

(iii) The information is being transmitted to the Commission in confidence and, under the provisions of 10 CFR Section 2.790, it is to be received in confidence by the Commission.

(iv) The information sought to be protected is not available in public sources or available information has not been previously employed in the same original manner or method to the best of our knowledge and belief.

(v) The proprietary information sought to be withheld in this submittal is that which is appropriately marked in Attachment 2 as Proprietary Class 2 in the Westinghouse Electric Co., LLC document: (1) "AP1000 Design Certification Review, Draft Safety Evaluation Report Open Item Response."

This information is being transmitted by Westinghouse's letter and Application for Withholding Proprietary Information from Public Disclosure, being transmitted by Westinghouse Electric Company letter AW-03-1723 to the Document Control Desk, Attention: John Segala, CIPM/NRLPO, MS O-4D9A.

This information is part of that which will enable Westinghouse to:

(a) Provide documentation supporting determination of APP-GW-GL-700, "AP1000 Design Control Document," analysis on a plant specific basis

(b) Provide the applicable engineering evaluation which establishes the Tier 2 requirements as identified in APP-GW-GL-700.

Further this information has substantial commercial value as follows:

(a) Westinghouse plans to sell the use of similar information to its customers for purposes of meeting NRC requirements for Licensing Documentation.

(b) Westinghouse can sell support and defense of AP1000 Design Certification.

Public disclosure of this proprietary information is likely to cause substantial harm to the competitive position of Westinghouse because it would enhance the ability of competitors to provide similar methodologies and licensing defense services for commercial power reactors without commensurate expenses. Also, public disclosure of the information would enable others to use the information to meet NRC requirements for licensing documentation without purchasing the right to use the information.

The development of the technology described in part by the information is the result of applying the results of many years of experience in an intensive Westinghouse effort and the expenditure of a considerable sum of money.

In order for competitors of Westinghouse to duplicate this information, similar technical programs would have to be performed and a significant manpower effort, having the requisite talent and experience, would have to be expended for performing and analyzing tests.

Further the deponent sayeth not.

October 14, 2003

Copyright Notice

The documents transmitted herewith each bear a Westinghouse copyright notice. The NRC is permitted to make the number of copies for the information contained in these reports which are necessary for its internal use in connection with generic and plant-specific reviews and approvals as well as the issuance, denial, amendment, transfer, renewal, modification, suspension, revocation, or violation of a license, permit, order, or regulation subject to the requirements of 10 CFR 2.790 regarding restrictions on public disclosure to the extent such information has been identified as proprietary by Westinghouse, copyright protection not withstanding. With respect to the non-proprietary versions of these reports, the NRC is permitted to make the number of copies beyond these necessary for its internal use which are necessary in order to have one copy available for public viewing in the appropriate docket files in the public document room in Washington, DC and in local public document rooms as may be required by NRC regulations if the number of copies submitted is insufficient for this purpose. Copies made by the NRC must include the copyright notice in all instances and the proprietary notice if the original was identified as proprietary.

DCP/NRC1637
Docket No. 52-006

October 14, 2003

PROPRIETARY INFORMATION NOTICE

Transmitted herewith are proprietary and/or non-proprietary versions of documents furnished to the NRC in connection with requests for generic and/or plant-specific review and approval.

In order to conform to the requirements of 10 CFR 2.790 of the Commission's regulations concerning the protection of proprietary information so submitted to the NRC, the information which is proprietary in the proprietary versions is contained within brackets, and where the proprietary information has been deleted in the non-proprietary versions, only the brackets remain (the information that was contained within the brackets in the proprietary versions having been deleted). The justification for claiming the information so designated as proprietary is indicated in both versions by means of lower case letters (a) through (f) located as a superscript immediately following the brackets enclosing each item of information being identified as proprietary or in the margin opposite such information. These lower case letters refer to the types of information Westinghouse customarily holds in confidence identified in Sections (4)(ii)(a) through (4)(ii)(f) of the affidavit accompanying this transmittal pursuant to 10 CFR 2.790(b)(1).

Attachment 1

List of

Proprietary and Non-Proprietary Responses

Table 1

"List of Westinghouse's Responses to DSER Open Items Transmitted in DCP/NRC1637"

15.2.7-1 Item 8 Revision 1 *15.2.7-1P Item 8 Revision 1 15.2.7-1 Item 10 Revision 1 *Proprietary	

DCP/NRC1637
Docket No. 52-006

October 14, 2003

Attachment 3

AP1000 Design Certification Review
Draft Safety Evaluation Report Open Item Non-Proprietary Responses

AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

DSER Open Item Number: 15.2.7-1 Item 8 Revision 1

Original RAI Number(s): None

Summary of Issue:

The revised DCD Section 15.6.5.4C.1 (DSER OI 15.2.7-1P Page 13) states that Reference 24 [WCAP-15644, "AP1000 Code Applicability Report."] provides details of the AP1000 WCOBRA/TRAC modeling. The coarse reactor vessel modeling used for AP600 has been replaced with a detailed noding like that applied in the large-break LOCA analysis described in subsection 15.6.5.4A. Also, in the revised DCD Section 15.6.5.4C.3 (Westinghouse letter DCP/NRC1617, dated September 8, 2003), it is stated that in WCOBRA/TRAC analysis, the core is nodalized as described in Reference 24. However, neither WCAP-15644 nor DCD Subsection 15.6.5.4A provides detailed AP1000 WCOBRA/TRAC modeling.

A. Please clarify where the core nodalization is described for the LTC analysis.

B. Clarify whether the core nodalization is the same as that described in your Summary of the response to Open Item 15.2.7-1, which states that for the AP1000 LTC model, the core region was subdivided axially into 17 nodes.

Westinghouse Response:

A. The revised AP1000 WCOBRA/TRAC modeling is described in Section 2.3.3 of WCAP-15644-P Revision 1 that was submitted by Westinghouse letter DCP/NRC1627 dated September 19, 2003.

B. The revised AP1000 WCOBRA/TRAC model divides the active core region into 17 axial nodes.

C. In response to a request made at the October 2, 2003 meeting of Westinghouse and NRC staff personnel, please find attached the detailed WCOBRA/TRAC LTC analysis nodalizations of the following AP1000 passive safety systems: ADS-4 East, ADS-4 West, and DVI "A". To analyze the limiting DEDVI break in the PXS "B" room, the reactor vessel downcomer is directly connected by a PIPE component to the BREAK component that provides the boundary conditions for that room. The individual TRAC cell centers and cell lengths are shown on the attached figures, and the numbers of the junctions that join together adjacent TRAC components are shown inside small circles in the flow paths.

Design Control Document (DCD) Revision:

None

PRA Revision:

None

Figure 1

a,c

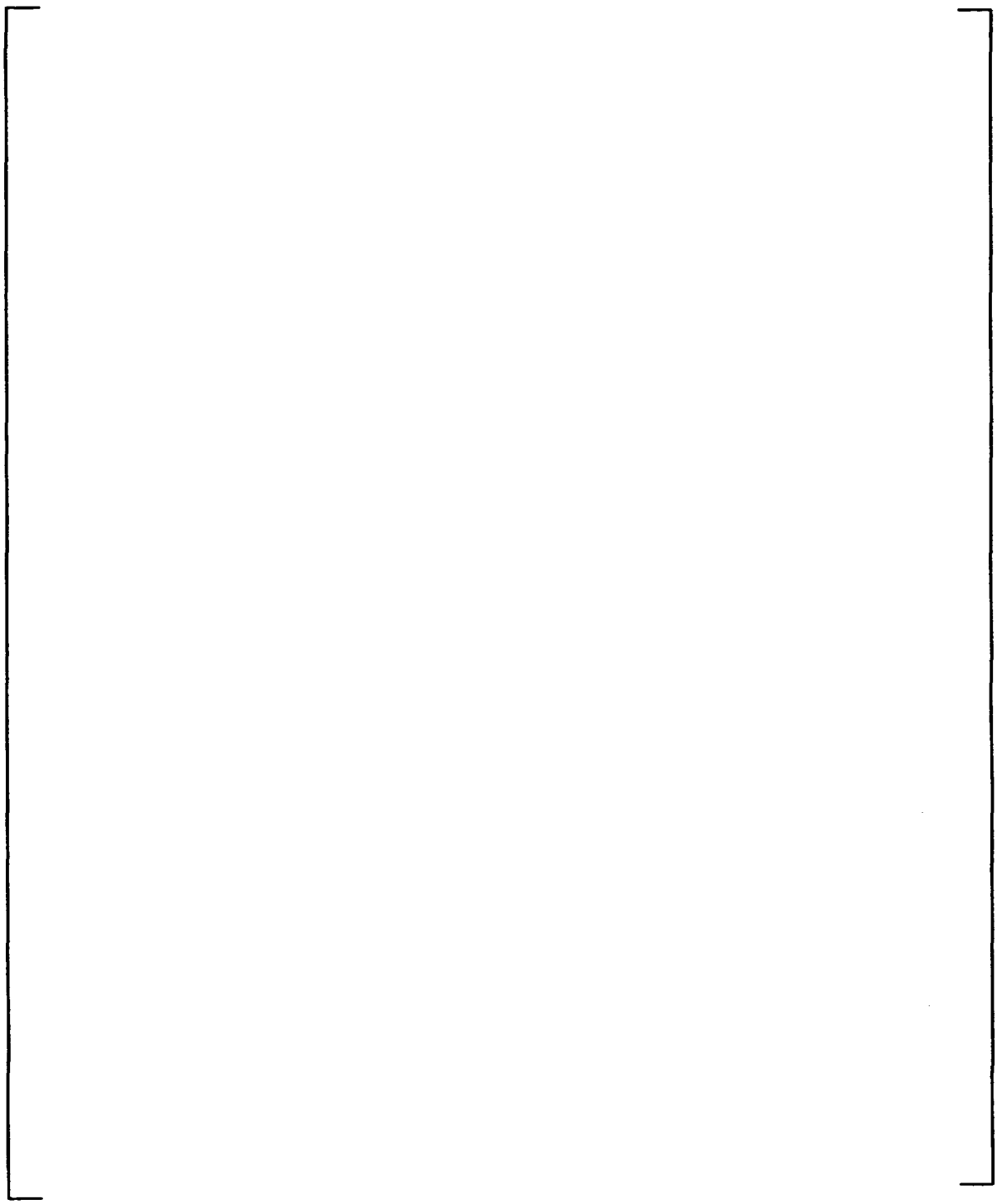


Figure 2

a,c

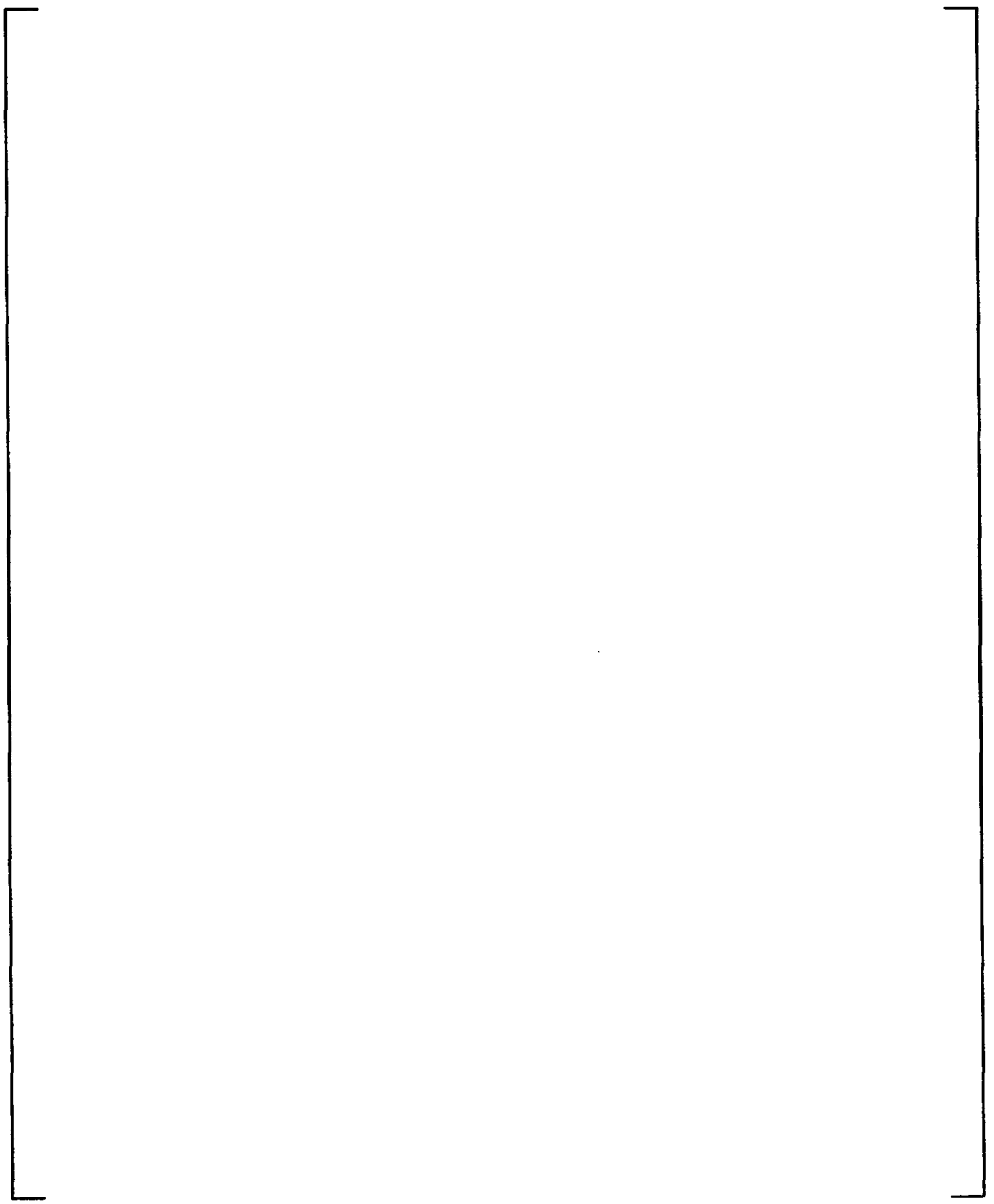


Figure 3

[a,c]

Figure 4

a,c

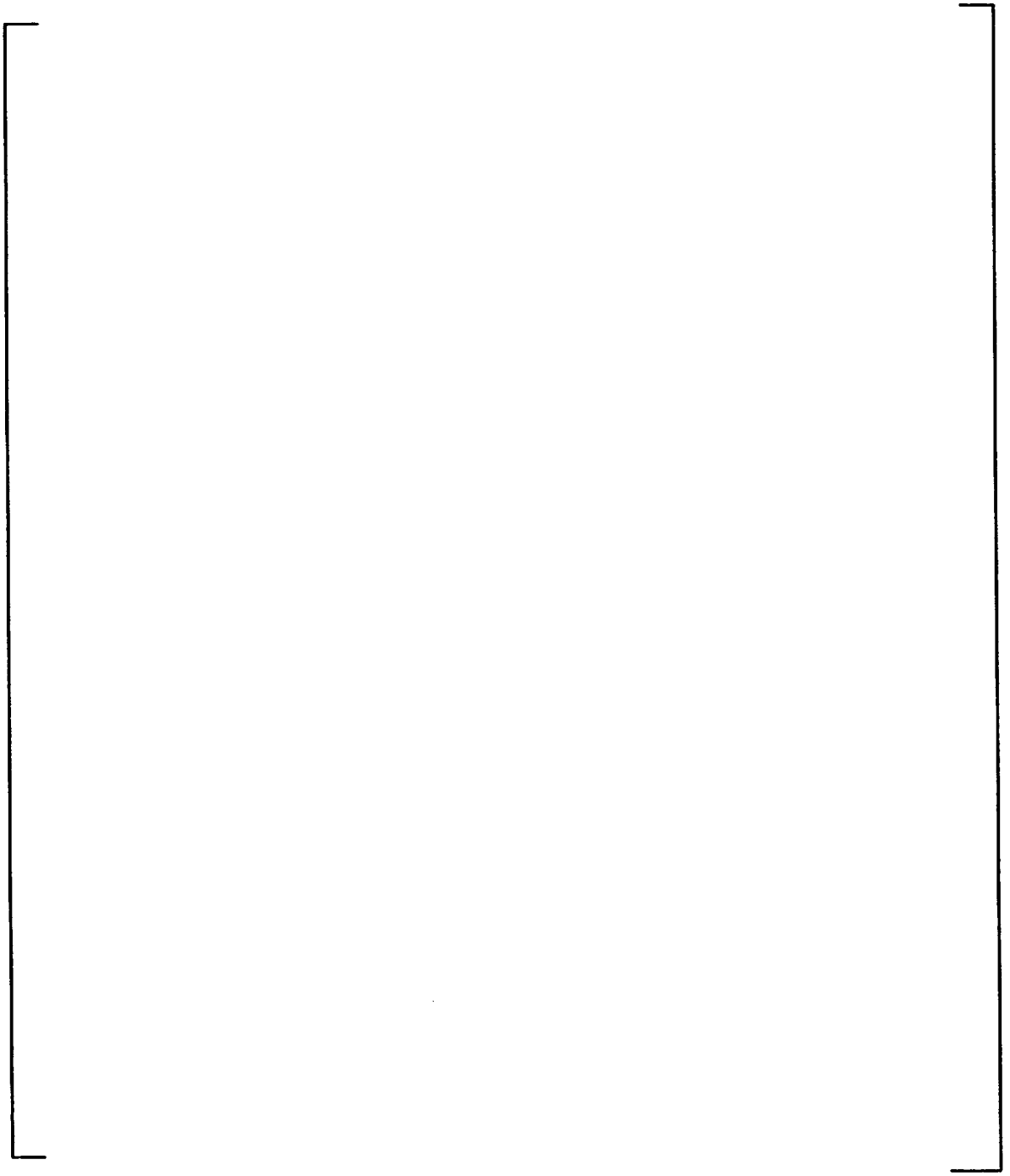
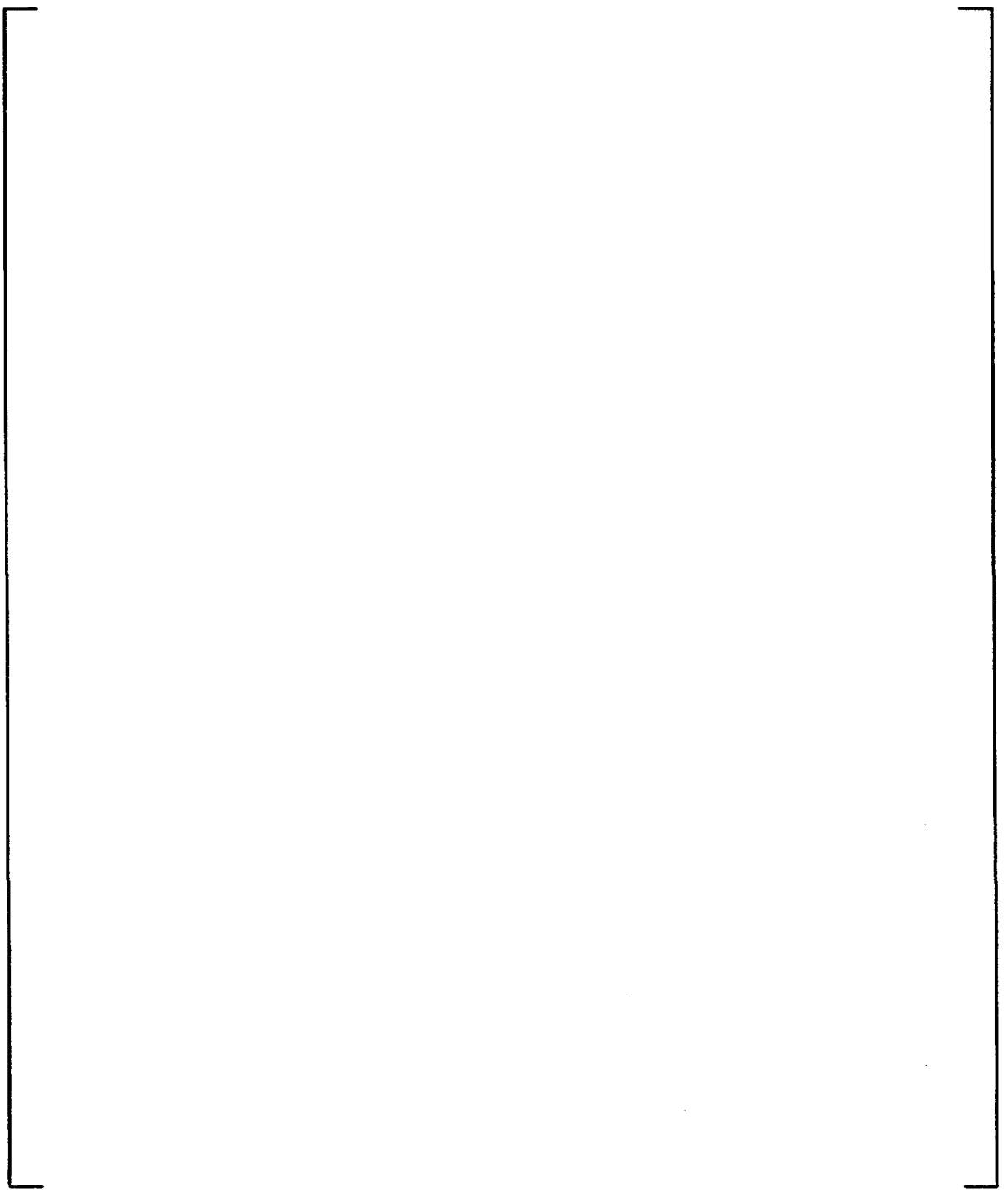


Figure 5

[a,c



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AP1000 DESIGN CERTIFICATION REVIEW

Draft Safety Evaluation Report Open Item Response

DSER Open Item Number: 15.2.7-1 Item 10 Revision 1

Original RAI Number(s): None

Summary of Issue:

The NRC staff is attempting to modify the RELAP5 AP1000 model to evaluate LTC. The current model does not model sump recirculation into the DVI lines. Please provide the following information to enable the staff to perform LTC confirmatory analyses with RELAP5 for a postulated double DVI line break.

A. Containment temperature, pressure, water level and boric acid concentration versus time for 30 days.

B. Recirculation line lengths, areas, elevations and resistances. All elevations including containment water levels should be given relative to the reactor vessel DVI nozzle elevation.

C. Recirculation valve actuation setpoints and the WCOBRA/TRAC calculated time for sump recirculation following a double ended DVI line break.

D. Sump screen resistance as a function of flow blockage.

Westinghouse Response:

A. The limiting LTC accident is a DVI LOCA in PXS room B. This accident is limiting because it results in the earliest initiation of recirc operation and has the lowest recirc water level. The containment pressure, water temperature and water level for this accident vary as follows:

Time	Pres (psia)	Temp. (F) [1]	Level (ft) [2]
2.6 hr	25.0	198/142 (240)	8.22 (107.8)
14.0 days	19.5	205 (226)	3.72 (103.3)
28.5 days	18.9	205 (225)	3.72 (103.3)

Notes:

[1] This column shows the temperature used in AP1000 LTC analysis and in parenthesis the saturation temperature at the total containment pressure. The containment water temperature at the start of recirc is subcooled at 198 F in the loop compartments and is 142 F in the PXS B room (WGOTHIC analysis). The subcooling is primarily due to the spill of a large portion of the IRWST directly into the containment through the PXS-B room. For the 14 day LTC analysis performed for the

DCD, we have used a containment water temperature of 205 F (WGOTHIC analysis).

[2] The containment water level is shown relative to the centerline of the reactor vessel DVI nozzle and in parenthesis in absolute containment elevations. The containment water level is for the level in the loop compartments, where the recirc screens are located. The level in the PXS B room is maintained by flow from the PXS-A recirc line. The PXS-A recirc line feeds flow to both the DVI-A connection and back through the bottom of the IRWST to the DVI-B line. The level in the PXS-B room will be somewhat lower; how much lower depends on exactly where the break in the DVI line is located. In order to simplify the LTC analysis, Westinghouse does not input a boundary condition into WCOBRA-TRAC for the water level in this room, but adds flow resistance to the DVI-B line to model the break by adding a pipe exit loss (out the break) and a pipe entrance loss (back into the DVI line on the reactor side); these exit / entrance losses account for the pressure losses associated with the recirculation flow exiting the DVI line into the PXS room and returning back into the DVI line.

B. The IRWST recirc line flow resistances, inside diameters and volumes are listed in Table 1. Figure 1 shows a sketch of the PXS IRWST / Containment Recirc lines.

C. The recirculation valves are calculated to open at about 2.6 hours after a DVI LOCA. This time would be greater for a non-DVI LOCA because none of the IRWST would spill into the containment. The recirculation valves open when the IRWST level drops to 7.0 feet above the tank floor.

D. The flow resistances of the recirculation and IRWST screens are included in the resistances provided in the response to item B. The flow resistance of these screens are negligible with up to 90% of the flow area blocked. Note that there is no fibrous material (such as fiberglass insulation) used in the AP1000 that will enter the recirculation water as a result of a LOCA and become trapped on the recirc screens. The impact of potential "resident" fibers / particles (pre-existing dust / dirt) has been evaluated for the AP1000 in response to RAI / DSER OI's and shown to be small.

Design Control Document (DCD) Revision:

None

PRA Revision:

None

TABLE 1 - IRWST SAFEGUARDS DATA

The AP1000 has one IRWST with two injection lines. Each injection line is connected individually through separate direct vessel injection lines to the reactor vessel. These injection lines are shared with the CMT and Accumulator. The safeguards data for the IRWST and each injection/recirculation line is given below. The pipe routing is based on AP1000 line routings.

Number IRWSTs		1			
Number injection lines		2			
IRWST	- Floor Surface Area	2588.3	ft² (min) to	2645.4	ft² (max)
	- Height (floor / roof)	30.25	ft		
	- Elev Inside Bottom	103.00	ft		

FLOW CASES:	Min Flow	Nominal Flow	Max Flow	
Water Volume (ft³) (11)	73900	75300	76800	
Water Height (ft)	28.58	28.79	29.00	
Initial Water Temp (°F) (2)	120	85	50	
Boron Concentration (ppm)	2600	2700	2900	
Calc Injection Flow (lb/sec for line A/B, all valves open, assuming 2.30 psi net driving pres.)	105.0 / 99.0	-	-	
Calc Cont. Recirc. Flow (lb/sec for line A/B, all valves open, assuming 0.20 psi net driving pres.)	27.8 / 28.9	-	-	
Line Resistance: (3)				
- IRWST to Sump tee (points 61-63) (9)				
- pipe size / sch pipe ID 10.02 in.	7.981 in.			
- minimum ID 10.02 in, in a pipe	7.981 in, in a pipe			
- friction factor 0.01343 (4)	0.01407 (4)			
- resistance (ft/gpm²)				
Line A	5.876E-07	4.701E-07	3.525E-07	ft/gpm2
Line B	1.054E-06	8.428E-07	6.321E-07	
- volume (ft³)				
Line A	21.08	20.12	19.17	ft3
Line B	29.57	28.22	26.88	

Sump tee to MOV Isol Valve (points 63-64)

- pipe size / sch	8 in	sch. 40	(8)			
- pipe ID	7.981	in.				
- minimum ID	7.981	in, pipe				
- friction factor	0.01407	(4)				
- resistance (ft/gpm²)						
Line A			1.617E-08	1.294E-08	9.702E-09	ft/gpm2
Line B			2.291E-08	1.833E-08	1.374E-08	
- volume (ft³)						
Line A			0.42	0.40	0.38	ft3
Line B			0.59	0.56	0.54	

- MOV Isol Valve to Check/Squib Valve parallel paths (points 64-65)

- pipe size / sch	8 in	sch. 160	(8)			
- pipe ID	6.813	in.				
- minimum ID	5.110	in, gate valve				
- friction factor	0.01454	(4)				
- resistance (ft/gpm²)						
Line A			9.531E-07	7.625E-07	5.718E-07	ft/gpm2
Line B			1.739E-06	1.392E-06	1.044E-06	
- volume (ft³)						
Line A			2.84	2.71	2.59	ft3
Line B			6.44	6.15	5.85	

- Check/Squib Valves parallel paths (points 65-66)

- pipe size / sch	8 in	sch. 160	(8)			
- pipe ID	6.813	in.				
- minimum ID	5.110	in, squib valve				
- friction factor	0.01454	(4)				
- resistance (ft/gpm²)						
Line A			8.384E-07	6.707E-07	5.030E-07	ft/gpm2
Line B			8.674E-07	6.939E-07	5.205E-07	
- resistance with single failure (ft/gpm²)		(5)				
Line A			4.159E-06	n/a	n/a	ft/gpm2
Line B			3.470E-06	n/a	n/a	
- volume (ft³)						
Line A			8.97	8.56	8.15	ft3
Line B			9.12	8.71	8.29	
- volume with single failure (ft³)		(5)				
Line A			4.49	n/a	n/a	ft3
Line B			4.56	n/a	n/a	

- Check/Squib Valves parallel paths to DVI injection line tee (points 66-67)

- pipe size / sch	8 in	sch. 160 (8)				
- pipe ID	6.813	in.				
- minimum ID	6.813	in, pipe				
- friction factor	0.01454	(4)				
- resistance (ft/gpm²)						
Line A			2.076E-06	1.661E-06	1.246E-06	ft/gpm2
Line B			1.387E-06	1.109E-06	8.320E-07	
- volume (ft³)						
Line A			4.16	3.97	3.78	ft3
Line B			2.08	1.99	1.89	

- IRWST injection line tee to DVI nozzle (points 67-68)

- pipe size / sch	8 in	sch. 160 (8)				
- pipe ID	6.813	in.				
- minimum ID	4.000	in, DVI venturi				
- friction factor	0.01454	(4)				
- resistance (ft/gpm²)						
Line A			4.735E-06	3.788E-06	2.841E-06	ft/gpm2
Line B			5.279E-06	4.223E-06	3.167E-06	
- volume (ft³)						
Line A			10.97	10.47	9.97	ft3
Line B			13.73	13.11	12.48	

- Sump recirculation paths to IRWST injection line tee (points 100/101-63) (9)

- pipe size / sch (8)	8 in	sch. 40 (ck)	8 in	sch. 40 (MOV)		
- pipe ID	7.981	in.	7.981	in.		
- minimum ID	5.986	in, squib	5.986	in, squib valve		
- friction factor	0.01407	(4)	0.01407	(4)		
- resistance (ft/gpm²)						
Line A			2.543E-06	2.035E-06	1.526E-06	ft/gpm2
Line B			1.040E-06	8.319E-07	6.239E-07	
- resistance with single failure (ft/gpm²) (5)						
Line A			4.098E-06	n/a	n/a	ft/gpm2
Line B			2.584E-06	n/a	n/a	
- volume (ft³)						
Line A			34.03	32.49	30.94	ft3
Line B			20.30	19.38	18.45	
- volume with single failure (ft³) (5)						
Line A			25.51	n/a	n/a	ft3
Line B			12.16	n/a	n/a	

- **IRWST Drain to Containment (points 61-100)**

- pipe size / sch (8)		10 in	sch. 40	8 in	sch. 40		
- pipe ID		10.02	in.	7.981	in.		
- minimum ID		10.02	in, pipe	5.99	in, squib valve		
- friction factor		0.01343	(4)	0.01407	(4)		
- resistance (ft/gpm^2)							
	Line A	(10)		4.071E-06	3.257E-06	2.442E-06	ft/gpm2
- volume (ft^3)							
	Line A	(10)		45.14	43.09	41.04	ft3

Notes for the IRWST safeguards data:

(1) Deleted

(2) These temperature values are those expected inside the IRWST and in its injection lines up to the tee connecting them to the DVI lines. The IRWST injection lines and the other injection lines from the CMT, Accumulator, are cold trapped. Inside the DVI lines the water temperature ranges between the downcomer temperature at the DVI nozzle to the environmental temperature (50 - 120 °F) in the cold traps.

(3) Line resistances are shown for both lines (A & B). Note that both lines have a 10" connection to the IRWST which changes to a 8" line before the sump tee. An orifice is not provided in these lines. The appropriate line resistance should be selected depending the case being analyzed.

(4) This friction factor is the fully turbulent friction factor. It may be slightly unconservative for
the Min flow case, however this effect is bounded by the 30% margin added to the line lengths and number of elbows.

(5) For the min flow case a single failure can be assumed to maximize the line resistance. The single failure could occur in one of the IRWST injection paths or in one of the sump recirculation paths. No single failure is assumed in the max and best estimate cases. The appropriate line resistance should be selected based on the single failure that is selected.

(6) Deleted

(7) Deleted

(8) Deleted

(9) The resistance of the IRWST and Containment Recirc screens is included in these resistances. The resistances of these screens are essentially zero even with up to 90% screen blockage.

(10) Line B has lower resistance, the resistance from line A is used to bound both lines.

(11) The Min Flow IRWST volume is based on the min surface area and min water height and is rounded down. The Max Flow IRWST volume is based on the max surface area and max water height and is rounded up.
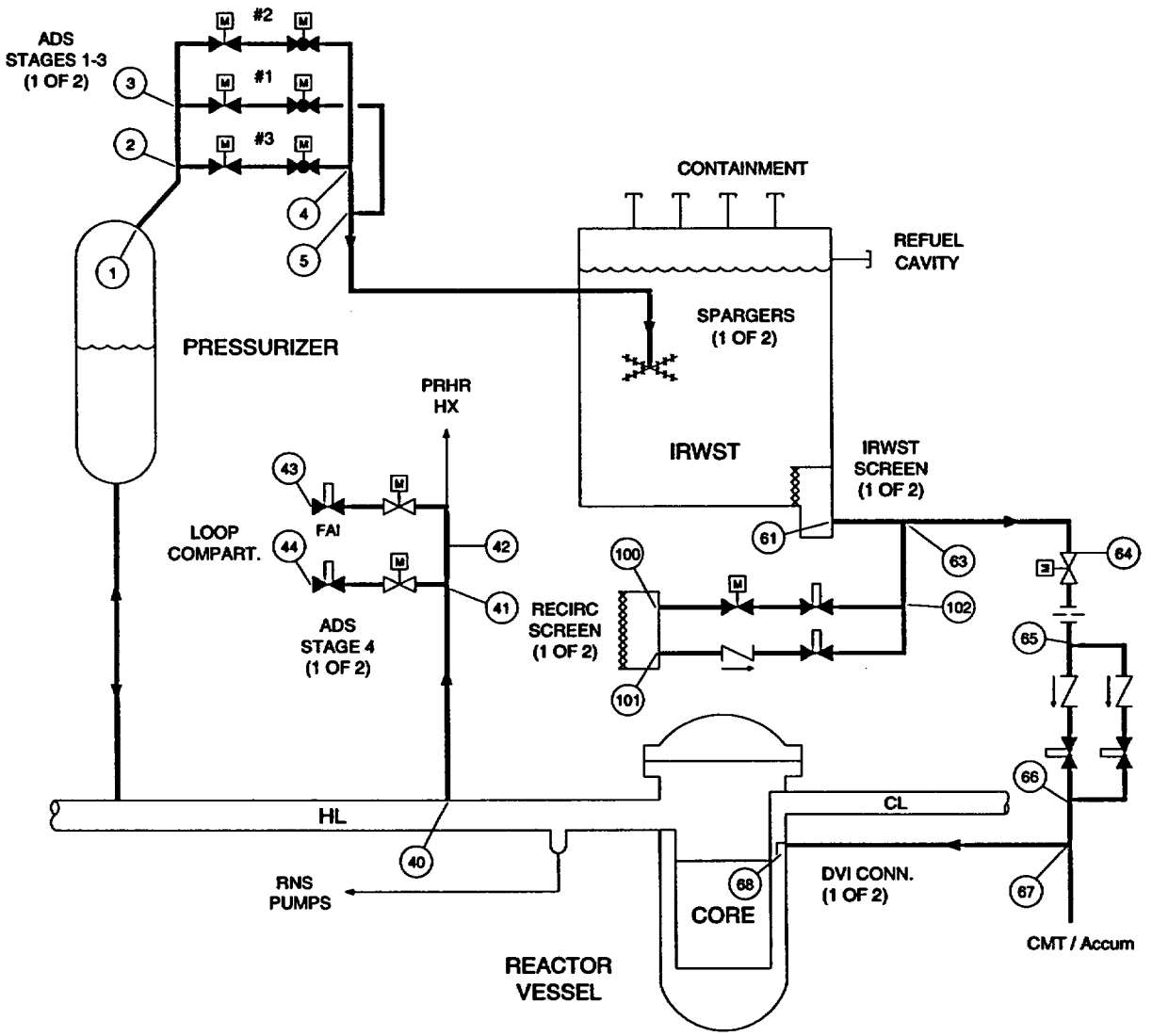
Figure 1 – IRWST / Containment Recirc Sketch