Westinghouse Electric Company, LLC

Nuclear Systems & Projects

Box 355
Pittsburgh, Pennsylvania 15230-0355

DCP/NRC1476
Project 711

April 16, 2001

Document Control Desk
U. S. Nuclear Regulatory Commission
One White Flint North
11555 Rockville Pike
Rockville, MD 20852-2738

ATTENTION: Jerry N. Wilson

SUBJECT: Response to NRC Letter "Request for Additional Information for the AP1000 Pre-Application Review" dated January 30, 2001

Dear Mr. Wilson:

Attached please find the supporting AP1000 documentation you requested in the Subject letter (items P1 and P2 in your letter). This letter provides the information requested in item P1. The information provided in our letter of February 16, 2001 addressed most of the requested information requested in item P2. The supplemental steam generator and fuel rod information requested will be supplied in a separate transmittal.

The Westinghouse Electric Company proprietary information notice, application for withholding, and affidavit are also attached.

This submittal contains Westinghouse proprietary information consisting of trade secrets, commercial information or financial information which we consider privileged or confidential pursuant to 10CFR2.790. 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.

Correspondence with respect to the application for withholding should reference AW-01-1447, and should be addressed to Hank A. Sepp, Manager of Regulatory and Licensing Engineering, Westinghouse Electric Company, P.O. Box 355, Pittsburgh, Pennsylvania, 15230-0355.

Very truly yours,

Michael M. Corletti

M. M. Corletti
AP600 Engineering
Passive Plant Projects

EP04

/Attachments

cc: H. A. Sepp, Westinghouse (w/o Attachment)

Westinghouse Electric Company, LLC

Box 355
Pittsburgh Pennsylvania 15230-0355

AW-01-1447

April 16, 2001

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

ATTENTION: Mr. Samuel J. Collins

APPLICATION FOR WITHHOLDING PROPRIETARY
INFORMATION FROM PUBLIC DISCLOSURE

SUBJECT: Response to NRC Letter "Request for Additional Information for the AP1000 Pre-Application Review" dated January 30, 2001

Dear Mr. Collins:

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 report. In conformance with 10CFR Section 2.790, Affidavit AW-01-1447 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 10CFR Section 2.790 of the Commission's regulations.

Correspondence with respect to this application for withholding or the accompanying affidavit should reference AW-01-1447 and should be addressed to the undersigned.

Very truly yours,

Hank A. Sepp, Manager
Regulatory and Licensing Engineering

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COMMONWEALTH OF PENNSYLVANIA:

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COUNTY OF ALLEGHENY:

Before me, the undersigned authority, personally appeared Henry A. Sepp, 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:

Henry A. Sepp, Manager
Regulatory and Licensing Engineering

Sworn to and subscribed
before me this 19th day
of April, 2001

Notary Public
Lorraine M. Piplica

LORRAINE M. PIPLICA
COMMONWEALTH OF PENNSYLVANIA
NOTARY PUBLIC

Notarial Seal
Lorraine M. Piplica, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Dec. 14, 2003
Member, Pennsylvania Association of Notaries

2698aff.doc

(1) I am Manager, Regulatory and Licensing Engineering, in the Nuclear Services Division, 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 10CFR 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 10CFR 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.

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

(a) Develop and verify Analytical Models for Small Break LOCA

(b) Validate computer codes used to analyze postulated accident conditions.

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 AP600 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.

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) contained within parentheses 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).

Response to Request for Additional Information P1

a) A tabularized comparison of the AP600 WGOTHIC evaluation model to the AP1000 WGOTHIC model listing changes to volumes, heat structures and junction properties. A listing of the AP1000 WGOTHIC model input file(s)

For the AP1000 feasibility studies done to date, the WGOTHIC model uses a single volume above the operating deck. This model was developed from an AP600 model that was used to determine the noding sensitivity. The results of this study showed no significant differences for the peak pressure calculation. The remainder of the model is identical to the evaluation model. SSAR calculations will be performed with a WGOTHIC model with multiple nodes above the operating deck similar to the AP600 evaluation model.

Attachment A is a tabularized comparison of the AP600 WGOTHIC model with a single node above the operating deck and the AP1000 WGOTHIC model with a single node above the operating deck.

b) A time-dependent table of the Passive Containment Cooling System (PCCS) water flow, providing (1) the actual PCS flow rate from the storage tank, (2) the evaporation-limited flow rate used in WGOTHIC, and (3) the wetted surface area fraction for the first 72 hours following accident initiation. The table should identify the delay time from the initial start of the PCS flow to the time the exterior shell of the containment is considered to be covered and credited in the analysis.

For the AP1000 feasibility studies done to date, the peak pressure is all that was evaluated for the cold leg break LOCA and main steam line break accidents. For the steam line break, the peak pressure is reached in approximately 650 sec. At this time, the mass and energy release ends and the pressure is reduced by the absorption of heat largely by the internal heat sinks including the steel containment shell. Figure 1 shows that even without the PCS, the peak pressure is within the design limit and is turned around by the heat sinks.

The LOCA calculation requires the PCS to be operational to keep the pressure within the design limit. However, the PCS flow rates through the first and second pressure peak is sufficient to assure coverage and no iterative process is necessary. The assumed PCS flow rate is shown in Table 1. Also shown in this table is the delay time of 337 seconds for taking credit of the PCS. For the SSAR analysis, a long-term (72 hour) calculation will be performed that will require iteration similar to what was done for AP600.

c) Time-dependent tables (with, or, an electronically readable version) of the limiting SATAN-based LOCA and the limiting LOFTRAN-based MSLB mass and energy releases for the AP1000 licensing analyses.

The LOCA mass and energy release rate tables are divided into two flow paths. The mass flow and corresponding enthalpy are shown in Table 2, and will be provided electronically.

The MSLB mass and energy release rate tables are shown in Tables are shown in Table 3, and will be provided electronically.

Function 3 PCS Film Flow Ind. Var.: Dep. Var.:			
Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	0.	336.9	0.
337.	65.2	14400.	62.6
14400.1	31.4	39600.	30.3
39600.1	24.5	82800.	23.1
82800.1	20.	280800.	14.
10000000.	14.	20000000.	14.

Table 1: PCS Flow for AP1000

Table 2

**AP1000 LONG-TERM DECLG BREAK
POST-BLOWDOWN MASS AND ENTHALPY RELEASES**

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
0	0	1167	0	228.78
0.05016	11385.13732	1167	23922.13368	228.78
0.10001	16276.54509	1167	34274.99291	228.78
0.15019	16760.12619	1167	35275.36381	228.78
0.20008	17381.13691	1167	36466.87309	228.78
0.25007	17769.77219	1167	37250.05181	228.78
0.30014	17425.41761	1167	36470.09639	228.78
0.35	18093.87447	1167	37832.75853	228.78
0.40016	17334.6806	1167	36243.6784	228.78
0.45	18926.32573	1167	39566.37327	228.78
0.50004	17846.56363	1167	37265.85037	228.78
0.55008	19458.78526	1167	40559.75874	228.78
0.6	19604.6023	1167	40839.5057	228.78
0.65009	21877.2229	1167	45464.0741	228.78
0.70014	18202.4177	1167	37871.9973	228.78
0.75011	19447.53621	1167	40411.68479	228.78
0.80003	19316.30698	1167	40110.87402	228.78
0.8501	19238.98045	1167	39931.67155	228.78
0.90018	19372.05229	1167	40161.73171	228.78
0.95	19480.30232	1167	40340.73868	228.78
1.00004	18119.76881	1167	37519.49819	228.78
1.10011	19446.2316	1167	40111.3634	228.78
1.20016	18080.97525	1167	37189.01075	228.78
1.30007	19199.65481	1167	39248.47819	228.78
1.40017	18967.74115	1167	38512.31785	228.78
1.5	18733.59857	1167	37721.23643	228.78
1.60005	18528.99819	1167	36955.80081	228.78
1.70004	18492.65858	1167	36481.92342	228.78
1.80019	18038.69581	1167	35148.36519	228.78
1.90003	18231.34631	1167	35120.76169	228.78
2.00009	17790.86257	1167	33837.52243	228.78
2.10004	17547.06835	1167	32962.44965	228.78
2.20012	17274.83247	1167	32084.06553	228.78
2.3002	16761.11824	1167	30815.39476	228.78
2.40013	16650.6739	1167	30366.3981	228.78
2.50035	16056.93082	1167	28996.17418	228.78

Table 2

AP1000 LONG-TERM DECLG BREAK POST-BLOWDOWN MASS AND ENTHALPY RELEASES

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
2.60006	14925.41848	1167	26915.63352	228.78
2.70015	13750.8886	1167	24635.3484	228.78
2.80019	14684.71529	1167	26521.41471	228.78
2.90003	13797.0273	1167	24767.9917	228.78
3.00011	12970.24964	1167	23126.38636	228.78
3.10008	12884.08755	1167	22938.14945	228.78
3.20003	12839.19258	1167	22818.71342	228.78
3.30005	12737.72982	1167	22615.76318	228.78
3.40002	12632.49874	1167	22410.52526	228.78
3.50069	12510.6701	1167	22160.6259	228.78
3.6003	12354.85247	1167	21828.01453	228.78
3.70038	12154.67706	1167	21398.08494	228.78
3.80101	11920.05363	1167	20894.03537	228.78
3.90086	11682.81865	1167	20375.66935	228.78
4.00003	11464.06198	1167	19891.12102	228.78
4.10011	11889.49581	1167	20319.62319	228.78
4.20001	11683.19414	1167	19653.20586	228.78
4.30032	11261.65446	1167	18644.95254	228.78
4.40026	10929.27529	1167	18027.97771	228.78
4.50017	10866.50159	1167	18065.53741	228.78
4.60041	10232.3525	1167	16990.9985	228.78
4.70052	9700.915591	1167	16129.64641	228.78
4.80069	9909.300982	1167	16683.45902	228.78
4.90021	9402.722934	1167	15872.49907	228.78
5.0002	9135.631614	1167	15555.42839	228.78
5.2502	8810.351496	1167	14729.4685	228.78
5.50039	7655.79528	1167	11734.66172	228.78
5.75015	6702.329371	1167	9885.451629	228.78
6.00006	6254.1846	1167	8909.4264	228.78
6.25001	6249.306923	1167	7461.112077	228.78
6.50031	6146.033706	1167	8200.813294	228.78
6.7501	5819.592268	1167	8529.512732	228.78
7.00016	5567.096707	1167	8228.651293	228.78
7.25026	5370.433243	1167	7685.293757	228.78
7.50014	5169.986383	1167	7475.992617	228.78
7.7503	5044.544926	1167	7293.480074	228.78
8.0002	4951.290758	1167	7176.992242	228.78

Table 2

**AP1000 LONG-TERM DECLG BREAK
POST-BLOWDOWN MASS AND ENTHALPY RELEASES**

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
8.25022	5117.457352	1167	6841.203648	228.78
8.50006	5023.907918	1167	5496.704082	228.78
8.7501	4740.16024	1167	6698.06976	228.78
9.00011	4546.493303	1167	7117.667697	228.78
9.25031	4560.93513	1167	6931.93987	228.78
9.5004	4476.987037	1167	6086.748963	228.78
9.75009	4461.908599	1167	5380.857001	228.78
10.00062	4405.640662	1167	5330.707438	228.78
10.25029	4409.88903	1167	4771.90577	228.78
10.50002	4846.892492	1167	3319.370408	228.78
10.75022	4482.447462	1167	4193.617938	228.78
11.00044	4231.800758	1167	4779.343542	228.78
11.25033	4133.413843	1167	5000.494557	228.78
11.5004	4113.055909	1167	4760.764291	228.78
11.75011	4111.714538	1167	4687.437862	228.78
12.00009	4131.97403	1167	4459.38197	228.78
12.2502	4127.239194	1167	4396.010406	228.78
12.50003	4424.930074	1167	3821.029826	228.78
12.7506	4257.721605	1167	4062.504095	228.78
13.00076	4113.191513	1167	4545.680587	228.78
13.25051	4009.112905	1167	4836.498995	228.78
13.50028	3837.924015	1167	5101.936685	228.78
13.75031	3803.228974	1167	5318.091126	228.78
14.00051	3755.570891	1167	5274.641009	228.78
14.25043	3716.898886	1167	5188.164614	228.78
14.50006	3873.49691	1167	5120.09269	228.78
14.75007	3607.142263	1167	4393.255437	228.78
15.00036	3465.963907	1167	4567.022993	228.78
15.25058	3379.202781	1167	4758.389519	228.78
15.50088	3351.187834	1167	5051.640866	228.78
15.75129	3369.156019	1167	5240.568781	228.78
16.00086	3395.849374	1167	5276.068626	228.78
16.25065	3421.758806	1167	5241.370194	228.78
16.5003	3460.009907	1167	5198.084793	228.78
16.75035	3645.102675	1167	5023.772525	228.78
17.00094	3517.736933	1167	4744.362267	228.78
17.25049	3401.934367	1167	4673.317133	228.78

Table 2

**AP1000 LONG-TERM DECLG BREAK
POST-BLOWDOWN MASS AND ENTHALPY RELEASES**

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
17.50076	2711.325225	1167	4072.641675	228.78
17.75107	2921.840023	1167	4478.898477	228.78
18.00025	3058.330684	1167	4640.791116	228.78
18.25047	3117.723126	1167	4583.935274	228.78
18.50106	3127.786042	1167	4461.323058	228.78
18.75017	3125.771278	1167	4373.570322	228.78
19.00018	3125.054891	1167	4330.795709	228.78
19.25077	3200.607495	1167	4204.374305	228.78
19.5005	3069.816021	1167	4035.629879	228.78
19.75054	2978.488486	1167	4104.310414	228.78
20.00062	2926.387964	1167	4239.946436	228.78
20.25105	2884.92822	1167	4327.09838	228.78
20.50081	2854.32712	1167	4379.89488	228.78
20.75022	2814.841363	1167	4396.029937	228.78
21.00097	2776.517664	1167	4386.318236	228.78
21.25032	2747.321598	1167	4361.990102	228.78
21.50008	2711.920293	1167	4310.707307	228.78
21.75021	2828.681634	1167	4356.209166	228.78
22.0009	2747.856157	1167	4084.059643	228.78
22.25086	2670.201365	1167	4038.735935	228.78
22.50072	2646.120586	1167	4057.156114	228.78
22.75062	2622.580652	1167	4046.133748	228.78
23.00078	2601.228867	1167	4010.542933	228.78
23.25167	2584.309807	1167	3963.149993	228.78
23.50096	2550.141936	1167	3887.904364	228.78
23.75106	2551.032391	1167	3835.264009	228.78
24.00057	2552.054582	1167	3785.035418	228.78
24.25002	2637.93353	1167	3688.05477	228.78
24.50014	2566.355578	1167	3515.867822	228.78
24.75058	2522.723994	1167	3476.002706	228.78
25.0004	2494.912224	1167	3427.686576	228.78
25.25091	2468.26779	1167	3362.18371	228.78
25.50049	2487.010638	1167	3329.739862	228.78
25.75014	2518.21734	1167	3248.88436	228.78
26.0002	2504.394806	1167	3148.243994	228.78
26.25089	2475.13283	1167	3050.17697	228.78
26.50089	2460.280818	1167	2967.948182	228.78

Table 2

**AP1000 LONG-TERM DECLG BREAK
POST-BLOWDOWN MASS AND ENTHALPY RELEASES**

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
26.75065	2463.91555	1167	2893.15785	228.78
27.00004	2501.324387	1167	2809.919313	228.78
27.25019	2517.73183	1167	2707.18487	228.78
27.50035	2523.61469	1167	2595.90461	228.78
27.75134	2545.449815	1167	2485.522185	228.78
28.00101	2551.19925	1167	2340.45885	228.78
28.25058	2482.323037	1167	2182.114763	228.78
28.50032	2461.499391	1167	2054.013509	228.78
28.75037	2359.549517	1167	1969.426583	228.78
29.00059	2187.180335	1167	1923.698965	228.78
29.25054	2029.501663	1167	1892.967737	228.78
29.50026	1871.069498	1167	1870.033202	228.78
29.75051	1706.027881	1167	1847.635119	228.78
30.00025	1550.527763	1167	1824.702337	228.78
30.2501	1391.761321	1167	1808.520579	228.78
30.50048	1280.873036	1167	1809.648864	228.78
30.75042	1177.471235	1167	1804.779565	228.78
31.00048	1080.83689	1167	1791.41861	228.78
31.25016	986.0937935	1167	1769.596307	228.78
31.50043	893.0850832	1167	1739.499117	228.78
31.75038	802.459972	1167	1709.358828	228.78
32.00045	714.4536044	1167	1674.652696	228.78
32.25053	631.5857897	1167	1634.58031	228.78
32.50017	554.6902884	1167	1585.270712	228.78
32.75047	486.1725351	1167	1524.360965	228.78
33.00033	451.0595763	1167	1455.645924	228.78
33.25027	427.4058462	1167	1382.846654	228.78
33.50061	384.1814244	1167	1283.680076	228.78
33.75047	351.2045406	1167	1178.638959	228.78
34.00075	324.1356846	1167	1058.662715	228.78
34.25083	285.0249893	1167	927.9008107	228.78
34.50004	269.1011992	1167	784.2686008	228.78
34.75045	146.3416103	1167	629.5463797	228.78
35.00012	98.5486296	1167	471.8631404	228.78
35.25008	104.051256	1167	302.429514	228.78
35.50034	9.894447251	1167	137.8609627	228.78
35.75056	0	1167	0	228.78

Table 2

AP1000 LONG-TERM DECLG BREAK POST-BLOWDOWN MASS AND ENTHALPY RELEASES

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
41.3609	0	1167.4	0	1167.4
45.6066	0	1167.4	0	1167.4
51.7212	0	1167.4	0	1167.4
55.8966	0	1167.4	0	1167.4
60.0377	0	1167.4	0	1167.4
64.2054	0	1167.4	0	1167.4
70.6198	85.02271981	1167.4	0	1167.4
74.7622	134.9817357	1167.4	6.15406166	297.2
81.0963	133.5980932	1167.4	78.56612952	297.2002756
85.4112	172.9199389	1167.4	79.45567823	297.3206207
89.5494	172.0591739	1167.4	113.2470819	273.5160242
95.7713	170.7415014	1167.4	155.3972493	259.6244208
99.9074	169.8568385	1167.4	178.3269256	255.530563
102.029	169.6183129	1167.4	188.675266	254.2288413
112.045	168.5942961	1167.4	223.9587461	252.7565339
122.199	167.549778	1167.4	245.3675871	254.291146
132.255	166.4850328	1167.4	256.8777109	257.0170537
142.31	165.3449512	1167.4	262.4904765	260.0085365
152.484	164.194877	1167.4	262.6401045	263.6162729
162.529	163.574469	1167.4	259.2979803	267.3685689
172.769	162.9371468	1167.4	253.3007511	271.4316622
182.903	162.281564	1167.4	245.959916	275.4901701
193.027	161.4826032	1167.4	239.5886782	278.6898357
203.208	160.1204876	1167.4	240.4927359	278.0333837
223.497	158.4905137	1167.4	238.8294661	277.2114524
243.755	157.0000929	1167.4	233.1716177	277.572475
264.174	155.5240167	1167.4	226.1556371	278.2424846
284.415	154.0809916	1167.4	218.5337329	279.1302133
304.415	152.6403965	1167.4	211.1272587	279.9445671
324.415	151.3632725	1167.4	201.5208364	282.0733584
344.415	150.1023976	1167.4	191.927626	284.4055936
364.64	173.5666372	1167.4	14.48866574	749.0441008
384.64	170.6820024	1167.4	16.30257316	699.7742302
404.64	167.8596136	1167.4	18.03700605	660.6617907
424.64	165.7475778	1167.4	19.04282744	638.8158186
444.64	163.6819509	1167.4	20.00276109	619.3219908
464.64	161.6632398	1167.4	20.91035017	601.8576762

Table 2

**AP1000 LONG-TERM DECLG BREAK
POST-BLOWDOWN MASS AND ENTHALPY RELEASES**

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
484.64	159.6891311	1167.4	21.77001959	586.040815
504.64	140.3328745	1167.4	40.01512261	457.6798952
524.64	138.5391854	1167.4	40.69227069	450.500889
544.64	136.7812919	1167.4	41.33341314	443.5828819
564.64	135.0572856	1167.4	41.94255446	436.8978504
584.64	133.3658344	1167.4	42.52107888	430.4295506
604.64	131.7063283	1167.4	43.06662466	424.1757148
654.64	128.2365184	1167.4	43.74547142	411.0658041
704.64	124.9249973	1167.4	44.27600049	398.8145791
754.64	121.7618206	1167.4	44.6451789	387.4155321
804.64	118.728956	1167.4	44.89904387	376.6916867
854.64	116.0869736	1167.4	44.75402634	367.4323553
904.64	113.5507443	1167.4	44.50825574	358.7507928
954.64	111.1105331	1167.4	44.17946691	350.5844756
1004.64	108.762888	1167.4	43.74111199	343.000174
1504.75	86.00987023	1167.4	184.3282298	159.5248906
2004.75	76.56277556	1167.4	172.7804244	137.543389
3504.75	60.3452097	1167.4	123.452167	115.9101366
4004.75	55.8652541	1167.4	126.2452904	111.0358858
6004.84	45.44821166	1167.4	129.8416336	104.5919475
7504.95	40.89998369	1167.4	114.1941012	105.5080611
8004.95	39.2354957	1167.4	112.6552969	105.2116425
10005	35.1434364	1167.4	112.1415636	104.1900019
15005	29.59358218	1167.4	117.2344178	101.8810331
20005.8	26.80768158	1167.4	103.1903184	102.603497
26007.3	25.31482876	1167.4	84.11217124	105.0535379
30007.9	15.00013764	1167.4	0	1167.4
36008.1	26.52537729	1167.4	0	1168.3
40000	25.45082245	1167.4	0	1168.3
60000	22.76765526	1167.4	0	1168.3
80000	21.02032443	1167.4	0	1168.3
100000	19.70164592	1167.4	0	1168.3
150000	17.41768166	1167.4	0	1168.3
200000	15.86013582	1167.4	0	1168.3
400000	12.33602477	1167.4	0	1168.3
600000	10.47416851	1167.4	0	1168.3
800000	9.273287585	1167.4	0	1168.3

Table 2

AP1000 LONG-TERM DECLG BREAK
POST-BLOWDOWN MASS AND ENTHALPY RELEASES

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
1000000	8.442160187	1167.4	0	1168.3
1500000	7.094032281	1167.4	0	1168.3
2000000	6.246544107	1167.4	0	1168.3
4000000	4.433770176	1167.4	0	1168.3

Table 3

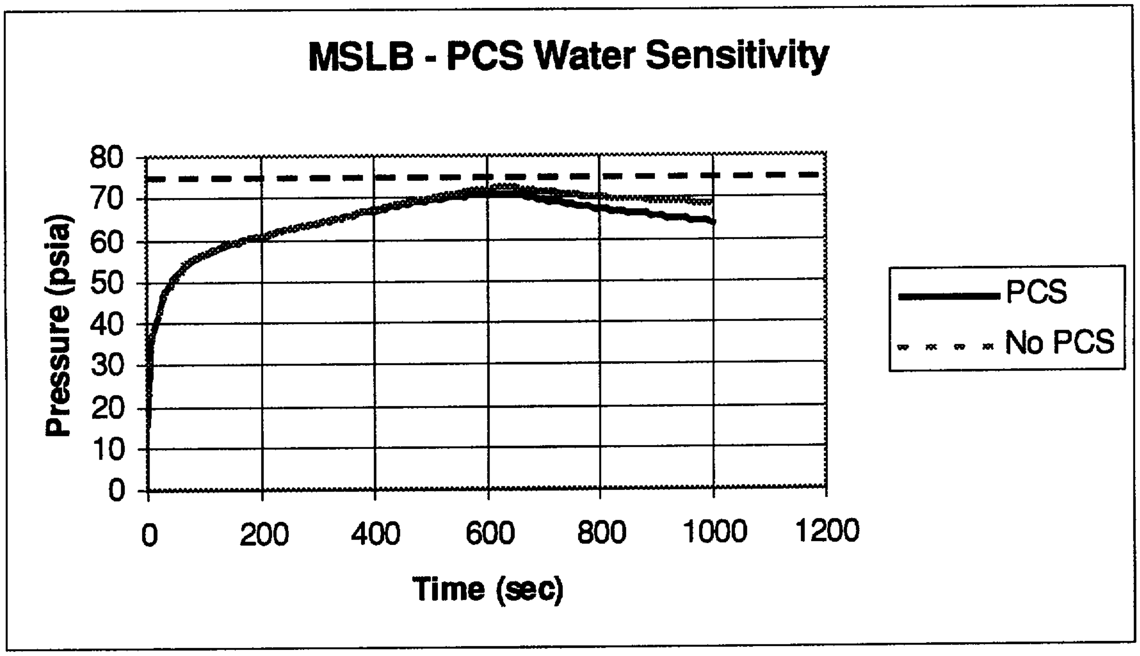
AP1000 MASS AND ENTHALPY RELEASE DATA FOR THE CASE OF MAIN STEAM LINE FULL DOUBLE ENDED RUPTURE FROM 102% POWER LEVEL WITH FAULTED LOOP MAIN STEAM LINE ISOLATION VALVE FAILURE THAT PRODUCES HIGHEST CONTAINMENT PRESSURE

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
0	14290	1189
1.5	14060	1189
1.6	6330	1190
2.8	6003	1192
5.1	5515	1195
8.7	4967	1198
10.1	4840	1198
10.2	2311	1199
17.1	2057	1202
30.5	1471	1204
33.8	1359	1204
40.4	1175	1204
43.7	1101	1204
50.4	981	1203
55	912.4	1203
59.3	857.3	1202
67.8	769.3	1201
76.1	703.3	1200
85	648.5	1199
94.8	601.7	1198
105.9	560.4	1197
118.3	523.5	1196
131.8	490.5	1195
147.6	461.3	1194
188	411.5	1192
232	367.7	1190
274.4	334.3	1189
277.1	329.3	1188
382.4	271	1185
488.1	219.5	1181
497	211.2	1180
528.7	197.5	1179
551.9	183.4	1179
558.5	177.9	1179
564	175.7	1179

Table 3

AP1000 MASS AND ENTHALPY RELEASE DATA FOR THE CASE OF MAIN STEAM LINE FULL DOUBLE ENDED RUPTURE FROM 102% POWER LEVEL WITH FAULTED LOOP MAIN STEAM LINE ISOLATION VALVE FAILURE THAT PRODUCES HIGHEST CONTAINMENT PRESSURE

Time (sec)	Mass Flow (lbm/s)	Enthalpy (Btu/lbm)
588.7	160.1	1182
603.2	147.2	1186
615.1	133.6	1192
619	121.3	1193
626.4	101.5	1195
628.1	96.05	1196
643.9	66.42	1202
646.5	61.14	1203
649.5	53.99	1205
652.7	45.28	1208
655.6	36.49	1211
657.5	29.76	1212
658.1	27.23	1213
658.6	24.73	1214
658.9	22.8	1214
659	21.97	1214
659.1	20.86	1214
659.2	0	1150


MSLB - PCS Water Sensitivity
Pressure (psia)
80
70
60
50
40
30
20
10
0
0
200
400
600
800
1000
1200
Time (sec)
PCS
No PCS