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

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

Direct tel: 412-374-6306
Direct fax: 412-374-5005
e-mail: sterdia@westinghouse.com

Your ref: Project Number 740
Our ref: DCP/NRC1979

August 21, 2007

Subject: AP1000 Design Certification Amendment Piping Design Licensing Proposal

Dear Mr. Matthews:

Westinghouse has had several discussions with the NRC related to the AP1000 piping design, piping design acceptance criteria (DAC), and piping related COL Information Items. These discussions included a visit by the NRC staff to the Westinghouse office to assess the status of our current design deliverables. The NRC has summarized their position on piping as well as other issues in a letter from David Matthews to Andrea Sterdis dated August 20, 2007. This letter provides Westinghouse responses to the piping issues only (Piping DAC and COL Information Items related to the piping design). Westinghouse will address the other issues separately.

In lieu of resolving the piping DAC, Westinghouse proposes to utilize the revised 10CFR52 license amendment process by providing sufficient piping design information for the staff to make a reasonable assurance assessment on the piping design based on an intelligent sample of completed piping analysis packages. The intended result of the review is a favorable FSER with no need for a piping DAC. Therefore, Revision 16 of the AP1000 Design Control Document Westinghouse deleted the piping DAC included in Revision 15 of the DCD and applicable to the existing AP1000 Design Certification. Westinghouse recognizes that this result is contingent upon favorable NRC review of the selected sample.

Westinghouse believes that a consensus has developed that the NRC review of piping will be based on an intelligent sample of the total scope of piping design activities. The intelligent sample will include Class 1, 2, and 3 piping packages, LBB and non-LBB packages, large bore and small bore piping packages, packages with piping inside and outside of the containment, and packages requiring and not requiring fatigue analysis. For the selected sample, Westinghouse will provide a "complete" analysis package. In this letter Westinghouse has proposed an intelligent sample. Westinghouse has also identified what is included in a complete analysis package for the as-designed stage of completion. We understand than the NRC staff may wish to develop their own sample that is similar in size but include different lines than the Westinghouse proposed sample. Westinghouse will accept and work with an alternate NRC established sample if the sample is selected promptly. As in the case with the Westinghouse sample, the NRC sample should be selected from the list of safety-related packages identified in Table A.

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Westinghouse is proposing a selective sample of completed piping design and analysis packages for the NRC staff to complete its review in support of the AP1000 Design Certification amendment and COL applications referencing the AP1000 Design Certification. This letter summarizes the activities that Westinghouse has completed and is planning to complete for these sample packages. Upon the completion of these activities and the NRC review and inspection of the resulting documents, analyses, and calculations, NRC staff will have adequate information to determine the technical sufficiency for the ASME Code piping design and make a reasonable assurance determination on the AP1000 design for safety related piping.

The AP1000 Design Control Document (DCD) identifies the criteria, loading conditions, and methods used in the AP1000 design of safety related piping. Regulatory conformance for the piping design and analysis is provided in the DCD. Key commitments and descriptions in the DCD related to design and analysis of piping and components are designated as Tier 2* information. Tier 2* means that this information in the DCD may not be changed without NRC approval. In addition, ITAAC are provided in Tier 1 of the DCD to confirm as-built piping design for safety class piping on a system by system basis.

The NRC has approved the AP1000 DCD piping design methodology as part of the design certification. Remaining for the NRC is review of specifications, analyses, calculations and reports to verify that the criteria and commitments are being implemented in the AP1000 standard piping design. The activities that Westinghouse has completed and is planning to complete will provide verification that the design and analysis of the ASME piping are in compliance with DCD commitments. Review and inspection of design specifications, stress reports, design reports and supporting drawings, documents, and calculations provide assurance that the design and analysis of ASME Code piping is being performed in accordance with the DCD commitments.

The ASME Code piping in the AP1000 includes approximately 140 piping analysis packages. The ASME Code piping includes Code Class 1, 2, and 3 piping in small bore and large bore sizes. The piping packages are based on piping runs that, based on the design, will be subjected to common forces, that is, piping runs from anchor to anchor. This means that piping packages do not align, one-for-one with fluid system packages. For example, the Reactor Coolant System (RCS) fluid system is included in several piping packages. In addition, piping packages may include piping from more than one fluid system. Table A provides a listing of the AP1000 ASME Code piping analysis packages. Table A is split into three sections. Table A-1 contains Class 1 piping inside containment. Table A-2 contains Class 2 and Class 3 piping inside containment. Table A-3 contains Class 2 and Class 3 piping outside containment. Some piping analysis packages may be listed in more that one of these sections.

Table B defines the Westinghouse proposed sample of piping packages proposed for NRC design certification amendment review. The analysis packages selected represent a significant sample of the design packages. The packages include examples of ASME Code Class 1, 2, and 3 piping and both small bore and large bore lines. The packages are selected to demonstrate the implementation of the Tier 2* designated methods and criteria used in the AP1000 piping design. The selected sample concept is similar in size and in concept to the buildings and structures critical sections sample previously accepted and reviewed by the, structural branch of NRC during AP1000 Design Certification.

The information in the design packages will include design specifications, stress analyses, seismic analysis, support design, fatigue analysis, applicable thermal analyses, bounding equipment parameters, postulated pipe break locations, and pipe break protection features. The packages will be developed for the as-designed piping. The as-designed piping includes material selection, pipe sizing, final layout and equipment location, and support and hanger location and design. The spectra used in the seismic analysis will be an updated version that includes multiple soil conditions included in the extension to soil sites and the building enhancements described in Revision 16 of the AP1000 DCD. Table C provides a list of analyses and reports included in the design packages.

The design specifications include the requirements for methods, criteria, and codes from the design control document, design transients, material requirements, seismic requirements, and other requirements. The design specifications will be complete and include the information required for design, analysis and fabrication of the piping and include the appropriate professional engineer certification.

As part of the design packages Westinghouse will prepare design reports that summarize the analysis results that meet the various stress equations in the ASME Code and the piping design specification. The design report will provide results for the highest stress location. Results at other locations will be available in the back-up calculations. The design reports will include fatigue analysis results. The sample packages include a sufficient number of different geometries for a sufficient number of different transients to substantiate the methodology, which will yield similar results for additional analysis packages. As-procured information for items like valves will not be included in the design reports at this time. Bounding information will be used for valves. The P.E. stamp on the design reports generated in the near term ("as-designed" reports) will be a confirmation that the design meets the requirements of the design specification, except that the design does not include deviations due to construction or due to as procured equipment variations.

Westinghouse proposes to have an NRC audit of one completed analysis package selected from the sample list by Westinghouse by January 2008. This line is identified in the Westinghouse sample list in Table B. The audit will confirm our mutual understanding of the scope of review and the analysis process. Westinghouse plans to have the complete sample of analysis packages available for NRC audit by July 2008.

Westinghouse requests that the NRC confirm that this proposed process (assuming satisfactory audit results) will result in a reasonable assurance conclusion for the AP1000 piping design without the need for a piping DAC. Westinghouse recognizes that the ultimate piping acceptability by the NRC is achieved only when the as-built piping items in the system ITAAC are satisfied. Westinghouse would appreciate prompt comments, adjustments or revisions to our proposed intelligent sample of piping analysis packages.

Very truly yours,

W. E. Cummins
Vice President
Regulatory Affairs and Standardization

/Attachment

1. Table A, B, & C - ASME Pipe Inside Containment

cc: D. Jaffe - U.S. NRC 1A
E. McKenna - U.S. NRC 1A
M. Mayfield - U.S. NRC 1A

ATTACHMENT 1

"Tables A, B, & C – ASME Class Pipe Inside Containment"

Table A

TABLE A-1 ASME CLASS 1 PIPE INSIDE CONTAINMENT		
Pipe Stress Analysis Report	Description	Diameter (in)
APP-PXS-PLR-010	Direct Vessel Injection, Core Makeup Tank Discharge, Normal Residual Heat Removal Discharge, In-Containment Refueling Water Storage Tank Gravity Injection, and Containment Recirculation Lines Train A	8, 6, 1
APP-PXS-PLR-020	Direct Vessel Injection, Core Makeup Tank Discharge, Normal Residual Heat Removal Discharge, In-Containment Refueling Water Storage Tank Gravity Injection, and Containment Recirculation Lines Train B	8, 6, 1
APP-PXS-PLR-030	ADS Stage 4 Loop 1 and PRHR HX Inlet Isolation	18, 14, 12
APP-PXS-PLR-040	PRHR HX Return Loop 1	14
APP-PXS-PLR-050	Core Makeup Tank Supply Train A	8
APP-PXS-PLR-060	Core Makeup Tank Supply Train B	8
APP-RCS-PLR-010	ADS Stage 1, 2, and 3 and Pressurizer Safety Valve Inlets	14, 8, 6, 4
APP-RCS-PLR-020	Pressurizer Spray, Auxiliary Spray, CVS Letdown, CVS Charging	4, 3, 2
APP-RCS-PLR-030	ADS Stage 4 Loop 2	18, 14
APP-RCS-PLR-040	Pressurizer Surge line Loop 1	18
APP-RCS-PLR-050	Primary Loop	22, 31
APP-RNS-PLR-010	Normal Residual Heat Removal Suction Loop 2	20, 12, 10
APP-RCS-PLR-230	Reactor Vessel Head Vent	1

TABLE A-2 ASME CLASS 2/3 PIPE INSIDE CONTAINMENT			
Pipe Stress Analysis Report	Description	Diameter (in)	Large Bore
APP-CAS-PLR-700	Service Air from Penetration C03 IRC	2, 1	
APP-CAS-PLR-800	Instrument Air from Penetration C02 IRC	2, 1	
APP-CCS-PLR-040	Component Cooling from Penetration C01 IRC	10	*
APP-CCS-PLR-050	Component Cooling from Penetration C02 IRC	10, 1	*
APP-CVS-PLR-090	CVS Makeup from Penetration C03 IRC	3, 1	*
APP-CVS-PLR-100	CVS Letdown from Penetration C02 IRC	2	
APP-CVS-PLR-110	CVS Spent Resin from Penetration C01 IRC	2	
APP-CVS-PLR-280	CVS Hydrogen Supply from Penetration C04 IRC	1, 0.5	
APP-CVS-PLR-290	CVS Hydrogen Supply from Anchor IRC	0.5	
APP-DWS-PLR-700	Demineralized Water from Penetration C01 IRC	2	
APP-FPS-PLR-500	Supply from Penetration C01	6	*
APP-PSS-PLR-610	Primary Sample from Penetration C01 to Delay Coils	0.25	
APP-PSS-PLR-620	Containment Atmosphere Sample To Penetration C02	0.375	
APP-PSS-PLR-630	Return to Containment From Penetration C03	1	
APP-PSS-PLR-650	Pressurizer/Hot Leg 1A Sample Lines from anchors to Delay Coil	0.25	
APP-PSS-PLR-660	Hot Leg 1B Sample Lines from anchor to Delay Coil	1, 0.25	
APP-PXS-PLR-010	DVI-A	10, 8, 6, 3, 2, 1	
APP-PXS-PLR-020	DVI-B	10, 8, 6, 3, 2, 1	
APP-PXS-PLR-030	ADS Stage 4 Loop 1 and PRHR HX Inlet Isolation	1	
APP-PXS-PLR-050	Core Makeup Tank Supply Train A	1	
APP-PXS-PLR-060	Core Makeup Tank Supply Train B	1	
APP-PXS-PLR-070	Depressurization line to Sparger A/B	16	*
APP-PXS-PLR-290	Containment Gutter Drain Areas 1 and 2	2	
APP-PXS-PLR-500	CMT-A/B Upper and Lower Sample Lines	1, 0.25	
APP-PXS-PLR-620	ACC-A/B Makeup	1	
APP-PXS-PLR-660	PXS Test Panel	1	
APP-PXS-PLR-670	ACC-A/B Nitrogen Supply	1	
APP-PXS-PLR-690	ACC-A/B Relief	1	

TABLE A-2 ASME CLASS 2/3 PIPE INSIDE CONTAINMENT			
Pipe Stress Analysis Report	Description	Diameter (in)	Large Bore
APP-PXS-PLR-720	ACC-A/B Pressure Tap Lines	1	
APP-PXS-PLR-740	ACC-A/B Sample	1, 0.25	
APP-PXS-PLR-900	Nitrogen Makeup and Relief from Penetration C01	1	
APP-PXS-PLR-***	CMT A/B Level Instrument Lines	1	
APP-PXS-PLR-***	PRHR Hx Vent and Drain - Upper/Lower Head	1	
APP-PXS-PLR-***	Cross Connection for Containment Recirculation Screens A/B	6	*
APP-RCS-PLR-010	ADS Stage 1, 2, and 3 and Pressurizer Safety Valve Inlets	3, 1	
APP-RCS-PLR-020	Pressurizer Spray, Auxiliary Spray, CVS Letdown, CVS Charging	3, 2, 0.5	
APP-RCS-PLR-210	I&C Lines to Hot Leg B	1	
APP-RCS-PLR-230	Reactor Vessel Head Vent	2, 1	
APP-RCS-PLR-260	I&C Lines to Hot Leg A	1	
APP-RCS-PLR-460	Hot Leg 1A Sample Lines	1, 0.25	
APP-RCS-PLR-470	Hot Leg 1B Sample Lines	1	
APP-RCS-PLR-480	Pressurizer Sample Lines	1, 0.25	
APP-RCS-PLR-510	I&C Lines to Pressurizer	1	
APP-RCS-PLR-***	I&C Lines to Cold Legs	1	
APP-RNS-PLR-010	Normal Residual Heat Removal Suction Loop 2	10, 3, 1	
APP-SFS-PLR-600	SFS from Penetration C01	4	*
APP-SFS-PLR-790	Spent Fuel Pool Drain	2	
APP-SGS-PLR-010	Feedwater to SG 01	20	*
APP-SGS-PLR-020	Feedwater to SG 02	20	*
APP-SGS-PLR-030	Main Steam to SG 01	38, 1	*
APP-SGS-PLR-040	Main Steam to SG 02	38, 1	*
APP-SGS-PLR-070	SG 01 Blowdown to Penetration C03A	4, 1	*
APP-SGS-PLR-080	SG 02 Blowdown to Penetration C03B	4, 1	*
APP-SGS-PLR-170	SG 02 Test Lines	1	
APP-SGS-PLR-270	SG 01 Test Lines	1	

TABLE A-2 ASME CLASS 2/3 PIPE INSIDE CONTAINMENT			
Pipe Stress Analysis Report	Description	Diameter (in)	Large Bore
APP-SGS-PLR-310	SG 01 Startup Feed Water from Penetration C05A	6	*
APP-SGS-PLR-320	SG 02 Startup Feed Water from Penetration C05B	6	*
APP-SGS-PLR-***	SG 01 Shell Line	2	
APP-SGS-PLR-***	SG 02 Shell Line	2	
APP-VFS-PLR-020	VFS Supply from Containment Penetration C01	36, 16, 1	*
APP-VFS-PLR-040	VFS Return to Containment Penetration C02	36, 16, 1	*
APP-VWS-PLR-500	VWS Supply from Containment Penetration C02	8, 1	*
APP-VWS-PLR-530	VWS Return to Containment Penetration C01	8	*
APP-WLS- PLR-010	WLS from Containment Sump from Penetration C03, IRC	2	
APP-WLS- PLR-020	WLS from RCDT from Penetration C02, IRC	1	
APP-WLS- PLR-730	DVI-A Floor Drain	4, 1	*
APP-WLS- PLR-740	DVI-B Floor Drain	4, 1	*
APP-WLS- PLR-750	CVS Compartment Floor Drain	4, 1	*

Note: *** indicates that the analysis package number has not been assigned

TABLE A-3 ASME CLASS 2/3 PIPE OUTSIDE CONTAINMENT			
Pipe Stress Analysis Report	Description	Diameter (in)	Large Bore
APP-CAS-PLR-810	Service Air from Penetration C03 ORC	3, 2	*
APP-CAS-PLR-820	Instrument Air from Penetration C02 ORC	3, 2	*
APP-CCS-PLR-810	Component Cooling from Penetration C01 ORC	10, 1	*
APP-CCS-PLR-820	Component Cooling from Penetration C02 ORC	10	*
APP-CVS- PLR-520	CVS Letdown from Penetration C02, WLS from Containment Sump from Penetration C03, CVS Spent Resin from Penetration C01– ORC	2, 1	
APP-CVS-PLR-530	CVS Makeup from Penetration C03 ORC	3	*
APP-CVS-PLR-580	CVS from Demineralizer ORC	3	*
APP-CVS-PLR-700	CVS Hydrogen Supply from Penetration C04 ORC	1	
APP-DWS-PLR-510	Demineralized Water from Penetration C01 ORC	3, 2, 1	*
APP-PCS-PLR-010	From PCCWST to Distribution Bucket and Embedded Pipe	6, 4, 2, 1	*
APP-PCS-PLR-030	Recirculation Line Middle Annulus	4	*
APP-PCS-PLR-050	Recirculation Heater Supply to Distribution Bucket Embedded Pipe	3	*
APP-PCS-PLR-060	Recirculation Line Makeup Inside Tank	4	*
APP-PCS-PLR-070	Recirculation Line Suction Inside Tank	2	
APP-PCS-PLR-100	PCS Recirculation, DWS Supply, and FPS Supply	6, 4, 3, 2, 1	*
APP-PCS-PLR-200	Overflow Line Inside Tank	3	*
APP-PCS-PLR-210	Vent Line A Inside Tank	2	
APP-PCS-PLR-220	Vent Line A Outside Tank	2	
APP-PCS-PLR-230	Vent Line B Inside Tank	2	
APP-PCS-PLR-240	Vent Line B Outside Tank	2	
APP-PCS-PLR-250	Discharge Line Inside Tank From Screen Y02	2	
APP-PCS-PLR-270	Discharge Line Inside Tank From Screen Y03	2	
APP-PCS-PLR-290	Discharge Line Inside Tank From Screen Y04	4	*
APP-PCS-PLR-300	PCCWST Instrumentation Line V031A	1	
APP-PCS-PLR-310	PCCWST Instrumentation Line V031B	1	
APP-PCS-PLR-400	Recirculation, Fill and Drain from PCCWST to Embedded Pipe	4	*
APP-PCS-PLR-430	Recirculation Heater Supply to Distribution Bucket from Embedded Pipe	3	*
APP-PCS-PLR-450	Makeup to Spent Fuel Pool	2	

TABLE A-3 ASME CLASS 2/3 PIPE OUTSIDE CONTAINMENT			
Pipe Stress Analysis Report	Description	Diameter (in)	Large Bore
APP-PCS-PLR-***	Recirculation Line Embedded Pipe	4	*
APP-PCS-PLR-***	PCCWST Drain Embedded Pipe	2	
APP-PSS-PLR-510	Primary Sample From Penetration C01 to Sample Cooler Rack	0.25	
APP-PSS-PLR-520	Containment Atmosphere Sample From Penetration C02 to Grab Sample Panel	0.375	
APP-PSS-PLR-530	Return to Containment From Grab Sample Panel to Penetration C03	1	
APP-PWS-PLR-930	Potable Water Tank to Main Control Room	1	
APP-PWS-PLR-***	PWS VALVE V420 IN MCR	1	
APP-PXS-PLR-810	Nitrogen Makeup and Relief to Penetration C01	1	
APP-RNS-PLR-100	From Spent Fuel to RNS and PCCWST Drain	8, 2, 1	*
APP-RNS-PLR-170	Normal RHR to Heat Exchangers and Pumps from Containment Penetrations C01 and C02	10, 8, 6, 4, 3, 1	*
APP-RNS-PLR-240	RNS Hx-A/B Drain	1	
APP-RNS-PLR-***	RNS Pump-A/B Drain	1	
APP-SFS-PLR-110	RNS Return to Spent Fuel Pool	6	*
APP-SFS-PLR-350	Spent Fuel Cooling Module R3-65	6, 4, 2, 1	*
APP-SFS-PLR-510	From Containment Penetration C02 to SFS Pumps	6, 1	*
APP-SFS-PLR-520	From SFS Pumps to Containment Penetration C01	4, 1	*
APP-SFS-PLR-***	From SFS Strainer S02 to anchor	8	*
APP-SFS-PLR-***	Embedded pipe from SFS Strainer S02	8	*
APP-SFS-PLR-***	Embedded pipe from RNS Return	6	*
APP-SFS-PLR-***	RNS Return in Spent Fule Pool	6	*
APP-SFS-PLR-***	RNS Suction from Cask Loading Pit	8	*
APP-SFS-PLR-***	I&C to Spent Fuel Pool	1	
APP-SGS-PLR-010	Feedwater to SG 01	20, 1	

TABLE A-3 ASME CLASS 2/3 PIPE OUTSIDE CONTAINMENT			
Pipe Stress Analysis Report	Description	Diameter (in)	Large Bore
APP-SGS-PLR-020	Feedwater to SG 02	20, 1	
APP-SGS-PLR-030	Main Steam to SG 01	38, 24, 12, 10, 8, 6, 3, 2, 1	
APP-SGS-PLR-040	Main Steam to SG 02	38, 24, 12, 10, 8, 6, 3, 2, 1	
APP-SGS-PLR-090	SG 02 Blowdown from Penetration C03B	4	*
APP-SGS-PLR-100	SG 01 Blowdown from Penetration C03A	4	*
APP-SGS-PLR-110	SG 01 Startup Feed Water to Penetration C05A	6	*
APP-SGS-PLR-120	SG 02 Startup Feed Water to Penetration C05B	6	*
APP-VBS-PLR-***	Nonradioactive Vent Return from Main Control Room	28, 1	*
APP-VBS-PLR-***	Nonradioactive Vent Supply to Main Control Room	28, 16, 1	*
APP-VBS-PLR-***	Nonradioactive Vent Return from Main Control Room Toilet	6, 1	*
APP-VES-PLR-020	VES Supply in Main Control Room	1	
APP-VES-PLR-030	VES from Storage Tanks to Main Control Room Wall	1, 0.375	
APP-VES-PLR-100	VES Main Control Room Relief Valves	4	*
APP-VES-PLR-***	VES Main Control Room Pressure Differential Lines	0.375	
APP-VFS-PLR-010	VFS Supply to Containment Penetration C01	36, 16, 1	*
APP-VFS-PLR-030	VFS Return from Containment Penetration C02	36, 16, 1	*
APP-VUS-PLR-***	Containment Leak Rate Test 1" lines	1	
APP-VUS-PLR-***	Containment Leak Rate Test 0.375" lines	0.375	
APP-VWS-PLR-910	VWS Supply to Containment Penetration C02	8	*
APP-VWS-PLR-920	VWS Return from Containment Penetration C01	8, 1	*
APP-WLS- PLR-520	WLS from RCDT from Penetration C02, ORC	1	

Note: *** indicates that the analysis package number has not been assigned

Table B

Analysis Package	Description	Comments
	Class 1	
APP-PXS PLR-010	Direct Vessel Injection, Core Makeup Tank Discharge, Normal Residual Heat Removal Discharge, In-Containment Refueling Water Storage Tank Gravity Injection, and Containment Recirculation Lines Train A	LBB, LB Prototype
APP-RCS-PLR-010	ADS Stage 1, 2, and 3 and Pressurizer Safety Valve Inlets	LBB, LB
APP-RCS-PLR-020	Pressurizer Spray, Auxiliary Spray, CVS Letdown, CVS Charging	SB, LB
APP-RCS-PLR-030	ADS Stage 4 Loop 2	LBB, LB
APP-RNS-PLR-050	Primary Loop	LBB, LB
	Class 2/3 Inside Containment (IRC)	
APP-CCS-PLR-040	Component Cooling from Penetration C01 IRC	LB
APP-CVS-PLR-090	CVS Makeup from Penetration C03 IRC	SB, LB
APP-SGS-PLR-070	SG 01 Blowdown to Penetration C03A	SB, LB
APP-SGS-PLR-310	SG 01 Startup Feed Water from Penetration C05A	LB
APP-WLS- PLR-020	WLS from RCDT from Penetration C02, IRC	SB
	Class 2/3 Outside Containment (ORC)	
APP-CCS-PLR-820	Component Cooling from Penetration C02 ORC	LB
APP-RNS-PLR-100	From Spent Fuel to RNS and PCCWST Drain	SB, LB
APP-RNS-PLR-170	Normal RHR to Heat Exchangers and Pumps from Containment Penetrations C01 and C02	SB, LB
APP-VWS-PLR-910	VWS Supply to Containment Penetration C02	LB
APP-WLS- PLR-520	WLS from RCDT from Penetration C02, ORC	SB

Notes:
LBB – Leak-Before-Break
LB – Large Bore (> 2" nominal OD)
SB – Small Bore (≤ 2" nominal OD)
Prototype – Line selected for review in January 2008 to verify review process.

Table C

Documents available at time of audit:

Class 1 ASME Piping Design Specification (420A06)

Class 2/3 ASME Piping Design Specification

ASME Safety Class Pipe Support Design Specification

ASME Class 1 Piping As-Designed Design Report (summary results for selected lines)
Fatigue Analysis for selected lines

ASME Class 2/3 Piping As-Designed Design Report (summary results for selected lines)

ASME Safety Class Pipe Support As-Designed Design Report (summary report for pipe supports in each of the defined analysis packages)

Safety Class Pipe Support Fabrication Drawing (for each pipe support in the defined analysis packages)

P&IDs and isometric drawings for the defined analysis packages

Supporting calculation notes for the piping analysis and pipe support analysis

Pipe Break Hazard Evaluation (for the high energy piping in the nuclear island)

Pipe whip restraint designs for restraints needed for the defined analysis packages