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U.S. Nuclear Regulatory Commission
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Your ref: Project Number 740
Our ref: DCP/NRC1864

April 13, 2007

Subject: AP1000 COL Standard Technical Report Submittal of APP-GW-GLR-053, Revision 0

In support of Combined License application pre-application activities, Westinghouse is submitting Revision 0 of AP1000 Standard Combined License Technical Report Number 11f. This report completes and documents, on a generic basis, activities required for partial closure of COL Information Item 3.9-2 in the AP1000 Design Control Document. Changes to the Design Control Document identified in Technical Report Number 11f are intended to be incorporated into FSARs referencing the AP1000 design certification or incorporated into the design certification when Part 52 is revised to permit amendment of the design certification. This report is submitted as part of the NuStart Bellefonte COL Project (NRC Project Number 740). The information included in this report is generic and is expected to apply to all COL applications referencing the AP1000 Design Certification.

The purpose for submittal of this report was explained in a March 8, 2006 letter from NuStart to the U.S. Nuclear Regulatory Commission.

Pursuant to 10 CFR 50.30(b), APP-GW-GLR-053, Revision 0, "Passive RHR Heat Exchanger Design Specification and Reports Summary," Technical Report Number 11f, is submitted as Enclosure 1 under the attached Oath of Affirmation.

It is expected that when the NRC review of Technical Report Number 11f is complete, COL Information Item 3.9-2 will be considered partially complete for COL applicants referencing the AP1000 Design Certification. The enclosed technical report is one of several reports that include modifications to COL Information Items 3.9-2. These reports include some that have been sent and a few that are scheduled to be sent. Attachment 2 provides a tabulation of the reports that impact the information item write-up and the report references. When the NRC review and audit of these reports and supporting analyses are complete, Westinghouse accepts that the activities required by the COL item, except for the as-built reconciliation, will be considered complete.

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Questions or requests for additional information related to the content and preparation of this report 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.

Westinghouse requests the NRC to provide a schedule for review of this Technical Report within two weeks of its submittal.

Very truly yours,

D. F. Hutchings for

A. Sterdis, Manager
Licensing and Customer Interface
Regulatory Affairs and Standardization

/Attachments

1. "Oath of Affirmation," dated April 13, 2007
2. Reports That Impact the COL Information Item 3.9-2 Write-Up

/Enclosure

1. APP-GW-GLR-053, Revision 0, "Passive RHR Heat Exchanger Design Specification and Reports Summary," Technical Report Number 11f, dated March 2007.

cc:	S. Bloom	-	U.S. NRC	1E	1A
	S. Coffin	-	U.S. NRC	1E	1A
	G. Curtis	-	TVA	1E	1A
	P. Grendys	-	Westinghouse	1E	1A
	P. Hastings	-	Duke Power	1E	1A
	C. Ionescu	-	Progress Energy	1E	1A
	D. Lindgren	-	Westinghouse	1E	1A
	A. Monroe	-	SCANA	1E	1A
	M. Moran	-	Florida Power & Light	1E	1A
	C. Pierce	-	Southern Company	1E	1A
	E. Schmiech	-	Westinghouse	1E	1A
	G. Zinke	-	NuStart/Entergy	1E	1A

ATTACHMENT 1

"Oath of Affirmation"

ATTACHMENT 1

UNITED STATES OF AMERICA

NUCLEAR REGULATORY COMMISSION

In the Matter of:	)
NuStart Bellefonte COL Project	)
NRC Project Number 740	)

APPLICATION FOR REVIEW OF
"AP1000 GENERAL COMBINED LICENSE INFORMATION"
FOR COL APPLICATION PRE-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 13th day
of April 2007.

COMMONWEALTH OF PENNSYLVANIA
Notarial Seal
Debra McCarthy, Notary Public
Monroeville Boro, Allegheny County
My Commission Expires Aug. 31, 2009
Member, Pennsylvania Association of Notaries

Notary Public

ATTACHMENT 2

"Reports That Impact the COL Information Item 3.9-2 Write-Up"

Attachment 2
Reports That Impact the COL Information Item 3.9-2Write-Up

Document Number	DCD Reference Number	Report Title	TR #
APP-GW-GLR-013	32	Safety Class Piping Design Specifications and Design Reports Summary	13
APP-GW-GLR-021	33	AP1000 As-Built COL Information Items	6
APP-GW-GLR-035	21	Consistency of Reactor Vessel Core Support Materials Relative to Known Issues of Irradiation-Assisted Stress Corrosion Cracking or Void Swelling	12
APP-GW-GLR-048	23	Core Makeup Tank Design Specification and Design Report Summary	11a
APP-GW-GLR-049	22	Accumulator Design Specification and Design Report Summary	11b
APP-GW-GLR-050	27*	Reactor Internals Design Specification and Design Report Summary	11c
APP-GW-GLR-051	26	Pressurizer Design Specification and Design Report Summary	11d
APP-GW-GLR-052	28	Reactor Coolant Pump Design Specification and Design Report Summary	11e
APP-GW-GLR-053	29	Passive RHR Heat Exchanger Design Specification and Design Report Summary	11f
APP-GW-GLR-054	25	In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary	11g
APP-GW-GLR-055	30	Reactor Vessel Design Specification and Design Report Summary	11h
APP-GW-GLR-056	31	Steam Generator Design Specification and Design Report Summary	11i
APP-GW-GLR-057	24	Control Rod Drive Mechanism Design Specification and Design Report Summary	11j

* Was identified as Reference 22 in Revision 0 of Report APP-GW-GLR-050

ENCLOSURE 1

APP-GW-GLR-053, Revision 0

Passive RHR Heat Exchanger Design Specification and Reports Summary

Technical Report Number 11f

AP1000 DOCUMENT COVER SHEET

TDC: _____ Permanent File: _____ APY _____

RFS#: _____ RFS ITEM #: _____

AP1000 DOCUMENT NO.	REVISION NO.		ASSIGNED TO
APP-GW-GLR-053	0	Page 1 of ~~5~~ 42 4-5	W-Quinn

ALTERNATE DOCUMENT NUMBER: TR 11f WORK BREAKDOWN #:

ORIGINATING ORGANIZATION: Westinghouse

TITLE: **Passive RHR Heat Exchanger Design Specification and Reports Summary**

ATTACHMENTS:	DCP #/REV. INCORPORATED IN THIS DOCUMENT REVISION:
NONE	APP-GW-GEE-038, Rev 1
CALCULATION/ANALYSIS REFERENCE: APP-ME02-Z0R-101	

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
APP-GW-GLR-053.doc	MS Word	TEXT

LEGAL REVIEW	SIGNATURE/DATE	4/5/07
PATENT REVIEW Mike Corletti	SIGNATURE/DATE	9/3/07

ORIGINATOR Michael McCullough	SIGNATURE/DATE Michael C McCully	April 3, 2007
REVIEWERS D. Wiseman	SIGNATURE/DATE Dale A. Wiseman	4/3/07

VERIFIER M. Weis	SIGNATURE/DATE 4/3/2007	VERIFICATION METHOD Page by Page
AP1000 RESPONSIBLE MANAGER K. Quinn	SIGNATURE* Dale A. Wiseman for K. Quinn	APPROVAL DATE saw 4/5/07 4/5/07

* Approval of the responsible manager signifies that document is complete, all required reviews are complete, electronic file is attached and document is released for use.

APP-GW-GLR-053
Revision 0

March 2007

AP1000 Standard Combined License Technical Report

Passive RHR Heat Exchanger Design Specification And Reports Summary

Revision 0

Westinghouse Electric Company LLC
Nuclear Power Plants
Post Office Box 355
Pittsburgh, PA 15230-0355

INTRODUCTION

This report provides partial closure of a Combined Operating License (COL) information item by completing the passive RHR heat exchanger design requirements and design report, and making them available for audit.

The completion of the passive RHR heat exchanger design requirements and design report for audit is identified as COL Information Item 3.9-2 in AP1000 Design Control Document (DCD) Subsection 3.9.8.2 to be completed by the Combined License applicant.

The COL item from the DCD reads:

> "Combined License applicants referencing the AP1000 design will have available for NRC audit the design specifications and design reports prepared for ASME Section III components."

Because there are several American Society of Mechanical Engineers (ASME) Section III components, the design specifications and design reports are being made available for audit as each individual component is completed. This will facilitate the review process.

With the completion of the design specification (APP-ME02-Z0-101) and design report (APP-ME02-Z0R-101) as outlined in this report, the United State Nuclear Regulatory Commission (NRC) should consider the COL item to make the design specifications and design reports for ASME Section III components available for audit to be closed relative to the passive RHR heat exchanger.

TECHNICAL BACKGROUND

The passive RHR (PRHR) heat exchanger is a component in the passive core cooling system (PXS) that provides emergency core decay heat removal. The PRHR heat exchanger is immersed inside the In-Containment Refueling Water Storage Tank (IRWST) which provides the heat sink for the heat exchanger. The heat exchanger consists of a bank of C-shaped tubes, connected to the top and bottom channel heads. The heat exchanger is mounted to the inside walls for the IRWST for support.

The PRHR heat exchanger inlet is connected to the reactor coolant system through a normally open inlet line from one reactor coolant system hot leg which maintains the heat exchanger full of reactor coolant at RCS pressure and temperature and prevents water hammer upon initiation of flow through the heat exchanger. The outlet line is connected to the respective steam generator inlet plenum which contains two normally shut air operated isolation valves that open upon a safeguards actuation signal or a loss of air. The water in the heat exchanger is normally stagnant which creates a thermal gradient between the inlet of the heat exchanger and the outlet as the IRWST cools the RCS water. The arrangement of the inlet piping and the thermal gradient in the heat exchanger provides the thermal driving head during normal plant standby conditions which provides for the initial PRHR heat exchanger start up operation.

The design requirements for the passive RHR heat exchanger are contained in the design specification. The design pressure and temperature for the primary side of the passive RHR heat exchanger are 2500 psia and 650 ^{0}F, respectively. The secondary side of the passive RHR heat exchanger is exposed to the conditions in the IRWST which has a design pressure and temperature of 5 psig and 150 ^{0}F, respectively

The passive RHR heat exchanger is an AP1000 Equipment Class A component, which is designed to meet seismic Category I requirements and analyzed to meet the applicable criteria of the ASME Boiler and Pressure Vessel Code, Section III, 1998 Edition with 2000 Addenda.

A detailed stress analysis was completed for the passive RHR heat exchanger. The result of the analysis shows compliance with the structural requirements of the design specification and the allowable stresses as given in the appropriate ASME Code subsection. The analytical work documented in the design report is sufficient to conclude that the final margins of safety will comply with the applicable requirements of the ASME Code, as well as the additional structural requirements of the design specification.

The final, complete ASME Code stress report will be made available to the NRC for audit as required by DCD Tier 1 Inspections, Tests, Analyses, and Acceptance Criteria 2a in Table 2.2.1-3, after the fabrication of the passive RHR heat exchanger is completed.

REGULATORY IMPACT

The completion of ASME Section III component design specifications and design reports for audit are discussed in Subsection 3.9.8.2 Tier 2 of the DCD. Making the passive RHR heat exchanger design specification and design report available for audit is part of COL action item 3.9-2 (3.9.2.4-1 as identified in the FSER). The completion of the passive RHR heat exchanger design specification and design report for audit does not alter the conclusions in the FSER.

DCD MARKUP

Because of the completion of the passive RHR heat exchanger design specification and design report for audit, the text in DCD Tier 2, subsection 3.9.8.2 is modified and Reference 29 is added to DCD Section 3.9.9. See below for changes to these two subsections.

3.9.8.2 Design Specifications and Reports

The Combined License information requested in this subsection has been addressed in several technical reports, and the applicable changes are incorporated into the DCD. No additional work is required by the Combined Operating License Applicant to address the aspects of the Combined License information requested in this subsection as delineated in the two following paragraphs:

The design specification and design report for ASME Section III components and piping are available for NRC audit via the reports listed in Table 3.9-19.

The consistency of the reactor vessel core support materials relative to known issues of irradiation-assisted stress corrosion cracking or void swelling has been evaluated and addressed in APP-GW-GLR-035, (Reference 21).

COL Holder Activities

After a Combined License is issued, the following information must be provided by the COL Holder:

Reconciliation of the as-built piping (verification of the thermal cycling and stratification loadings are considered in the stress analysis discussed in subsection 3.9.3.1.2) are completed by the COL holder after the construction of the piping systems and prior to fuel load (Reference 33).

The following words represent the original Combined Operating License Information Item commitment, which has been addressed as discussed above.

Combined License applicants referencing the AP1000 design will have available for NRC audit the design specifications and design reports prepared for ASME Section III components. Combined License applicants will address consistency of the reactor vessel core support materials relative to known issues of irradiation-assisted stress corrosion cracking or void swelling (see subsection 4.5.2.1). [*The design report for the ASME Class 1, 2, and 3 piping will include the reconciliation of the as-built piping as outlined in subsection 3.9.3. This reconciliation includes verification of the thermal cycling and stratification loadings considered in the stress analysis discussed in subsection 3.9.3.1.2.*]*

3.9.9 References

21. **APP-GW-GLR-035, "Consistency of Reactor Vessel Core Support Materials Relative to Known Issues of Irradiation-Assisted Stress Corrosion Cracking (IASCC) and Void Swelling for the AP1000 Plant," Westinghouse Electric Company LLC, July 2006.**
22. **APP-GW-GLR-049, "Accumulator Design Specification and Design Report Summary," Westinghouse Electric Company LLC, October 2006.**
23. **APP-GW-GLR-048, "Core Makeup Tank Design Specification and Design Report Summary," Westinghouse Electric Company LLC, October 2006.**
24. **APP-GW-GLR-057, "Control Rod Drive Mechanism Design Specification and Design Report Summary," Westinghouse Electric Company LLC, February 2007.**
25. **APP-GW-GLR-054, "In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary," Westinghouse Electric Company LLC, March 2007.**
26. **APP-GW-GLR-051, "Pressurizer Design Specification and Design Report Summary," Westinghouse Electric Company LLC, February 2007.**
27. **APP-GW-GLR-050, "Reactor Internals Design Specification and Design Report Summary," Westinghouse Electric Company LLC, January 2007.**
28. **APP-GW-GLR-052, "Reactor Coolant Pump Design Specification and Design Report Summary," Westinghouse Electric Company LLC, 2007.**
29. **APP-GW-GLR-053, "Passive RHR Heat Exchanger Design Specification and Design Report Summary," Westinghouse Electric Company, LLC, 2007.**
30. **APP-GW-GLR-055, "Reactor Vessel Design Specification and Design Report Summary," Westinghouse Electric Company LLC, 2007.**
31. **APP-GW-GLR-056, "Steam generator Design Specification and Design Report Summary," Westinghouse Electric Company LLC, 2007.**
32. **APP-GW-GLR-013, "Safety Class Piping Design Specifications and Design Reports Summary," Westinghouse Electric Company LLC, February, 2007.**
33. **APP-GW-GLR-021, "AP1000 As-Built COL Information Items," Westinghouse Electric Company LLC, June, 2007.**

Add Table 3.9-19 to the DCD as follows:

Table 3.9-19
Technical Reports Summarizing Design Specification and Design Reports for ASME Section III Components and Piping.

Document Number	Document Title
APP-GW-GLR-013, Reference 32	Safety Class Piping Design Specifications and Design Reports Summary
APP-GW-GLR-048, Reference 23	Core Makeup Tank Design Specification and Design Report Summary
APP-GW-GLR-049, Reference 22	Accumulator Design Specification and Design Report Summary
APP-GW-GLR-050, Reference 27	Reactor Internals Design Specification and Design Report Summary
APP-GW-GLR-051, Reference 26	Pressurizer Design Specification and Design Report Summary
APP-GW-GLR-052, Reference 28	Reactor Coolant Pump Design Specification and Design Report Summary
APP-GW-GLR-053, Reference 29	Passive RHR Heat Exchanger Design Specification and Design Report Summary
APP-GW-GLR-054, Reference 25	In-Core Instrumentation Guide Tube Design Requirements and Design Report Summary
APP-GW-GLR-055, Reference 30	Reactor Vessel Design Specification and Design Report Summary
APP-GW-GLR-056, Reference 31	Steam Generator Design Specification and Design Report Summary
APP-GW-GLR-057, Reference 24	Control Rod Drive Mechanism Design Specification and Design Report Summary