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Your ref: Project Number 740
Our ref: DCP/NRC1821

January 30, ~~2006~~ 2007

Subject: AP1000 COL Standard Technical Report Submittal of APP-GW-GLN-021, Revision 0

In support of Combined License application pre-application activities, Westinghouse is submitting AP1000 Standard Combined License Technical Report Number 92. This report identifies and justifies standard changes to the AP1000 Design Control Document (DCD). These changes impact DCD section 9.2.8.1.2 and Tables 10.4.1-1 and 10.4.5-1 and are related to changes to the condenser design. The changes to the DCD identified in Technical Report 92 are intended to be incorporated into FSARs referencing the AP1000 Design Certification or incorporated into the design certification by an amendment to 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 NRC.

Pursuant to 10 CFR 50.30(b), APP-GW-GLN-021, Revision 0, "AP1000 Optimized Condenser Design," (Technical Report Number 92), is submitted as Enclosure 1 under the attached Oath of Affirmation.

It is expected that when the NRC review of Technical Report Number 92 is complete, the changes to the DCD identified in Technical Report 92 will be considered approved generically for COL applicants referencing the AP1000 Design Certification.

Westinghouse is hereby requesting review and approval of the design changes associated with the condenser design.

Questions or requests for additional information related to content and preparation of this report should be directed to Westinghouse. Please send copies of such questions or requests for additional information 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.

D079

Very truly yours,

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

/Attachment

1. "Oath of Affirmation," dated January 30, 2007

/Enclosures

1. APP-GW-GLN-021, Revision 0, "AP1000 Optimized Condenser Design," Technical Report Number 92

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 30th day
of January 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

Debra McCarthy
Notary

ENCLOSURE 1

APP-GW-GLN-021, Revision 0

"AP1000 Optimized Condenser Design"

Technical Report 92

AP1000 DOCUMENT COVER SHEET

TDC: Permanent File: APY

RFS#: RFS ITEM #:

AP1000 DOCUMENT NO.	REVISION NO.		ASSIGNED TO
APP-GW-GLN-021	0	Page 1 of 10	W-Sterdis

ALTERNATE DOCUMENT NUMBER: TR 92 WORK BREAKDOWN #:

ORIGINATING ORGANIZATION: Westinghouse Electric Company

TITLE: **AP1000 Optimized Condenser Design**

ATTACHMENTS:	DCP #/REV. INCORPORATED IN THIS DOCUMENT REVISION:
N/A	
CALCULATION/ANALYSIS REFERENCE: N/A	

ELECTRONIC FILENAME	ELECTRONIC FILE FORMAT	ELECTRONIC FILE DESCRIPTION
APP-GW-GLN-021 R0	MicrosoftWord	

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☒ WESTINGHOUSE CLASS 3 (NON PROPRIETARY)

Class 3 Documents being transmitted to the NRC require the following two review signatures in lieu of a Form 36.

LEGAL REVIEW	SIGNATURE/DATE	1-30-07
PATENT REVIEW	SIGNATURE/DATE	1-26-07

☐ WESTINGHOUSE PROPRIETARY CLASS 2

ORIGINATOR J. F. Vanderhoff	SIGNATURE/DATE	01/26/07
REVIEWERS	SIGNATURE/DATE	
VERIFIER D. J. McDermott	SIGNATURE/DATE	VERIFICATION METHOD 1/26/07
AP1000 RESPONSIBLE MANAGER M. M. Corletti	SIGNATURE*	APPROVAL DATE 1-26-07

* 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.

Document Number: APP-GW-GLN-021 **Revision Number:** 0

Title: AP1000 Optimized Condenser Design

1.0 INTRODUCTION

Chapter 10 of the Design Control Document (DCD) describes the AP1000 main condenser design. Westinghouse has modified this design to better accommodate a broader range of conditions to encompass the potential sites for AP1000 plants. This report summarizes changes to the design, and includes the DCD (reference 1) mark up.

The portions of the AP1000 DCD affected are Chapter 10 - Tables 10.4.1-1 and 10.4.5-1.

2.0 APPLICABILITY DETERMINATION

This evaluation is prepared to document that the change described above is a departure from Tier 2 information of the AP1000 Design Control Document (DCD) that may be included in plant specific FSARs without prior NRC approval.

A.	Does the proposed change include a change to:		
	1. Tier 1 of the AP1000 Design Control Document APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a report for NRC review of the changes)
	2. Tier 2* of the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a report for NRC review of the changes)
	3. Technical Specification in Chapter 16 of the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a report for NRC review of the changes)
B.	Does the proposed change involve:		
	1. Closure of a Combined License Information Item identified in the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare a COL item closure report for NRC review.)
	2. Completion of an ITAAC item identified in Tier 1 of the AP1000 Design Control Document, APP-GW-GL-700	☒ NO ☐ YES	(If YES prepare an ITAAC completion report for NRC review.)

☒ The questions above are answered no, therefore the departure from the DCD in a COL application does not require prior NRC review unless review is required by the criteria of 10 CFR Part 52 Appendix D Section VIII B.5.b. or B.5c

3.0 TECHNICAL BACKGROUND

The most significant differences between the current design and the new design of the Main Condenser are identified in the list below. See Reference 2 for a detailed discussion of these changes.

DCD, Tier 2, Paragraph 9.2.8.1.2
This paragraph states that....

"During power operation, the turbine building closed cooling water system provides a continuous supply of cooling water to turbine building equipment at a temperature of 95°F or less assuming a circulating water temperature of 90°F or less."

In the above paragraph, 95 will be changed to 96°F and 90 changed to 91°F

DCD, Tier 2, Table 10.4.1-1:

- Change design operating pressure from 2.7 to 2.9 "HgA.
- Change water box pressure (design) from 60 to 90 psig.
- Change tube-side inlet temperature from 87 to 91°F.
- Change Condenser outlet temperature from 116.8 to 116.2 °F (116.8 was an incorrect value and should have been 112.2°F similar to Table 10.4.5-1).
- Change tube size from 1-3/8" OD to 1" OD.
- Change tube thickness from 0.5 mm/0.7 mm to 23 BWG for all tubes.
- Add note at the bottom of table regarding tube material substitutions that may be permitted for fresh water plants.

DCD, Tier 2, Table 10.4.5-1:

- Change outlet temperature from 87 to 91°F.
- Change Inlet temperature from 112.2 to 116.2 °F.
- Remove the row titled: "predicted performance during limiting site conditions: Outlet temp @ wet bulb temp of 80°F (1% exceedance)".

There is no affect on nuclear safety due to the new condenser design. The new design conforms to the present reactor interface requirements and does not require a change to be made to the Nuclear Island.

4.0 DCD MARK-UP

9.2.8.1.2 Power Generation Design Basis

The turbine building closed cooling water system provides corrosion-inhibited, demineralized cooling water to the equipment shown in Table 9.2.8-1 during normal plant operation. During power operation, the turbine building closed cooling water system provides a continuous supply of cooling water to turbine building equipment at a temperature of ~~95~~ **96**°F or less assuming a circulating water temperature of ~~90~~ **91**°F or less.

Table 10.4.1-1 MAIN CONDENSER DESIGN DATA	
Condenser Data	
Condenser type	Multipressure, Single pass
Hotwell storage capacity	3 min
Heat transfer	7,540 x 10^6 Btu/hr
Design operating pressure (average of all shells)	~~2.7~~ **2.9** in.-Hg
Shell pressure (design)	0 in.-Hg absolute to 15 psig
Circulating water flow	[600,000 gpm]
Water box pressure (design)	~~60~~ **90** psig
Tube-side inlet temperature	~~87~~ **91**°F
Approximate Tube-side temperature rise	25.2°F
Condenser **tube side** outlet temperature	~~116.8~~ **116.2**°F
Waterbox material	Carbon Steel
Condenser Tube Data	
Tube material (main section)	Titanium*
Tube size	~~1 3/8~~ 1" O.D. – ~~.5 mm~~ **23 BWG**
Tube material (periphery)	Titanium*
Tube size	~~1 3/8~~ 1" O.D. – ~~.7 mm~~ **23 BWG**
Tube sheet material	Titanium or Titanium Clad Carbon Steel
Support plates	Modular Design/Carbon Steel

* For fresh water plants, an equivalent tube material such as 304L, 316L, 904L or AL-6X may be substituted.

Table 10.4.5-1

[[DESIGN PARAMETERS FOR MAJOR CIRCULATING WATER SYSTEM COMPONENTS]]

(Conceptual Design)

Circulating Water Pump	
Quantity	Three per unit
Flow rate (gal/min)	200,000
Natural Draft Cooling Tower	
Quantity	One per unit
Approach temperature (°F)	10
Inlet temperature (°F)	~~112.2~~ **116.2**
Outlet temperature (°F)	~~87~~ **91**
Approximate Temperature range (°F)	25.2
Flow rate (gal/min)	600,000
Heat transfer (Btu/hr)	$7{,}540 \times 10^6$
Wind velocity design (mph) Seismic design criteria per Uniform Building Code	110
~~Predicted performance during limiting site conditions:~~ ~~Outlet temp @ wet bulb temp of 80°F (1% exceedance)~~	~~90°F~~

5.0 REGULATORY IMPACT

A. FSER IMPACT

There is no impact on the FSER. The changes to the condenser design have no effect on design function of the condenser. This change has no effect on Tier 1 information.

B. SCREENING QUESTIONS (Check correct response and provide justification for that determination under each response)

1. Does the proposed change involve a change to an SSC that adversely affects a DCD described design function? ☐ YES ☒ NO

   There is no change to a design function of any safety related equipment.

2. Does the proposed change involve a change to a procedure that adversely affects how DCD described SSC design functions are performed or controlled? ☐ YES ☒ NO

   The condenser design change has no effect on any SSC.

3. Does the proposed activity involve revising or replacing a DCD described evaluation methodology that is used in establishing the design bases or used in the safety analyses? ☐ YES ☒ NO

   The condenser design change does not require changes to the evaluation of the response to any postulated accident conditions. The changes to the design do not require changes to the structural or safety analysis of any safety related equipment.

4. Does the proposed activity involve a test or experiment not described in the DCD, where an SSC is utilized or controlled in a manner that is outside the reference bounds of the design for that SSC or is inconsistent with analyses or descriptions in the DCD? ☐ YES ☒ NO

   The condenser design change does not require an additional test or experiment or changes to testing.

C. EVALUATION OF DEPARTURE FROM TIER 2 INFORMATION (Check correct response and provide justification for that determination under each response)

10 CFR Part 52, Appendix D, Section VIII. B.5.a. provides that an applicant for a combined licensee who references the AP1000 design certification may depart from Tier 2 information, without prior NRC approval, if it does not require a license amendment under paragraph B.5.b. The questions below address the criteria of B.5.b.

Document Number: APP-GW-GLN-021 **Revision Number:** 0

Title: AP1000 Optimized Condenser Design

1. Does the proposed activity result in more than a minimal increase in the frequency of occurrence of an accident previously evaluated in the plant-specific DCD?	☐ YES ☒ NO
Since there is no change in the condenser design that could affect the plant design or operations, there are no new accident initiators and no effect on the frequency of evaluated accidents.	
2. Does the proposed activity result in more than a minimal increase in the likelihood of occurrence of a malfunction of a structure, system, or component (SSC) important to safety and previously evaluated in the plant-specific DCD?	☐ YES ☒ NO
Since there is no change in the condenser design that could affect the plant design or operations, there is no effect on malfunctions of structures, systems, or components.	
3. Does the proposed activity result in more than a minimal increase in the consequences of an accident previously evaluated in the plant-specific DCD?	☐ YES ☒ NO
The condenser design change has no effect on the operation, performance, and pressure boundary integrity of the safety related equipment. Therefore, there is no increase in the calculated release of radioactive material during postulated accident conditions.	
4. Does the proposed activity result in more than a minimal increase in the consequences of a malfunction of an SSC important to safety previously evaluated in the plant-specific DCD?	☐ YES ☒ NO
The condenser design change has no effect on the design functions or reliability of the safety related systems, structures or components. Therefore, there is no increase in the calculated consequences due to a malfunction of an SSC.	
5. Does the proposed activity create a possibility for an accident of a different type than any evaluated previously in the plant-specific DCD?	☐ YES ☒ NO
The design changes do not introduce any additional failure modes; therefore, there is no possibility of an accident of a different type than any evaluated previously in the DCD.	
6. Does the proposed activity create a possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously in the plant-specific DCD?	☐ YES ☒ NO
The design changes have no effect on the design functions of the safety related systems, structures or components. There are no additional failure modes or the possibility for a malfunction of an SSC important to safety with a different result than any evaluated previously.	
7. Does the proposed activity result in a design basis limit for a fission product barrier as described in the plant-specific DCD being exceeded or altered?	☐ YES ☒ NO
There is no change to the design function of the safety related equipment or fission product barrier.	
8. Does the proposed activity result in a departure from a method of evaluation described in the plant-specific DCD used in establishing the design bases or in the safety analyses?	☐ YES ☒ NO
There is no change to any methodologies used within the DCD.	

☒ The answers to the evaluation questions above are "NO" and the proposed departure from Tier 2 does not require prior NRC review to be included in plant specific FSARs as provided in 10 CFR Part 52, Appendix D, Section VIII. B.5.b
☐ One or more of the answers to the evaluation questions above are "YES" and the proposed change requires NRC review.

D. IMPACT ON RESOLUTION OF A SEVERE ACCIDENT ISSUE

10 CFR Part 52, Appendix D, Section VIII. B.5.a. provides that an applicant for a combined licensee who references the AP1000 design certification may depart from Tier 2 information, without prior NRC approval, if it does not require a license amendment under paragraph B.5.c. The questions below address the criteria of B.5.c.

1. Does the proposed activity result in an impact features that mitigate severe accidents. If the answer is Yes answer Questions 2 and 3 below.	☐ YES ☒ NO
The systems and components identified in the DCD Subsection 1.9.5 and Appendix 19 B that mitigate severe accidents are not impacted by the condenser design change.	
2. Is there is a substantial increase in the probability of a severe accident such that a particular severe accident previously reviewed and determined to be not credible could become credible?	☐ YES ☐ NO ☒ N/A
3. Is there is a substantial increase in the consequences to the public of a particular severe accident previously reviewed?	☐ YES ☐ NO ☒ N/A
☒ The answers to the evaluation questions above are "NO" or are not applicable and the proposed departure from Tier 2 does not require prior NRC review to be included in plant specific FSARs as provided in 10 CFR Part 52, Appendix D, Section VIII. B.5.c	
☐ One or more of the he answers to the evaluation questions above are "YES" and the proposed change requires NRC review.	

E. SECURITY ASSESSMENT

1. Does the proposed change have an adverse impact on the security assessment of the AP1000. ☐ YES ☒ NO

The condenser design change will not alter barriers or alarms that control access to protected areas of the plant. The design changes will not alter requirements for security personnel; therefore, the condenser design change does not have an adverse impact on the security assessment of the AP1000.

6.0 REFERENCES

1. APP-GW-GL-700, AP1000 Design Control Document, Revision 15.

2. APP-CDS-M1R-001, "Circulating Water System & Condenser Optimization for AP1000 Standard Plant", Rev 0