



Callaway Plant

June 6, 2011

ATTN: Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, DC 20555-0001

ALNRC 00052

Subject: Ameren Missouri, Callaway Plant, Unit 2
(NRC Docket No. 52-037)
10 CFR 50.46(a)(3) ANNUAL REPORT

Reference: Sandra M. Sloan (AREVA NP Inc.) to Document Control Desk, USNRC, "10 CFR 50.46 Report for the U.S. EPR Design Certification," dated November 5, 2010

This letter provides a required report pursuant to 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors." AREVA NP Inc. (AREVA) submitted this required report pursuant to 10 CFR 50.46 (a)(3) for the U.S. EPR (Docket 52-020) via the referenced letter. This same regulation requires a similar report from a combined license (COL) applicant if the applicant is also affected by the change. AmerenUE, as the applicant for Callaway Plant, Unit 2, incorporates the U.S. EPR Design Certification Document by reference and therefore also utilizes the peak cladding temperature calculations performed by AREVA. As such, the referenced AREVA report is applicable to the Callaway Plant, Unit 2 COL application; Attachments A and B to that report provide the required information.

It should also be recognized that review of the Callaway Plant, Unit 2 COLA is currently suspended as described in our June 23, 2009 letter to NRC and NRC's June 29, 2009 letter to AmerenUE.

Should you have questions or need additional information, please contact the undersigned at (573) 676-8519 or Dave Shafer at (314) 225-1056.

Sincerely,

Scott Bond
Manager,
Nuclear Generation Development

DS/slk

cc: J. Colaccino (NRC)
S. Sloan (AREVA NP)
G. Gibson (UniStar)
R. Sgarro (PPL)
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November 5, 2010
NRC:10:101

Document Control Desk
U.S. Nuclear Regulatory Commission
Washington, D.C. 20555-0001

10 CFR 50.46 Report for the U.S. EPR Design Certification

- Ref. 1: Letter, Sandra M. Sloan (AREVA NP Inc.) to Document Control Desk (NRC), "Application for Standard Design Certification of the U.S. EPR (Project No. 733)", NRC:07:070, December 11, 2007.
- Ref. 2: Letter, Getachew Tesfaye (NRC) to Sandra M. Sloan (AREVA NP Inc.), "AREVA NP Inc. – Acceptance of the Application for Standard Design Certification of the U.S. EPR," February 25, 2008.
- Ref. 3: Letter, Sandra M. Sloan (AREVA NP Inc.) to Document Control Desk (NRC), "10 CFR 50.46 Report for the U.S. EPR Design Certification," NRC:09:114, November 24, 2009.
- Ref. 4: Letter, Ronnie L. Gardner (AREVA NP Inc.) to Document Control Desk (NRC), "Response to Sixth Request for Additional Information Regarding ANP-10278P, 'U.S. EPR Realistic Large Break Loss of Coolant Accident Topical Report' (TAC No. MD4978)," NRC:10:004, January 8, 2010.

AREVA NP Inc. (AREVA NP) submitted its application for a Standard Design Certification of the U.S. EPR in Reference 1. The NRC accepted the application for review in Reference 2 and assigned Docket Number 52-020 to the application.

In accordance with 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light Water Reactors," AREVA NP is submitting this report of the emergency core cooling system (ECCS) evaluation model changes and errors for the U.S. EPR Standard Design. This is the second annual report for the U.S. EPR Standard Design. The first annual report was submitted in Reference 3.

This report is made in accordance with 10 CFR 50.46 for the U.S. EPR (Docket 52-020). The report addresses two evaluation models, one for the small break loss of coolant accident (SBLOCA) and one for the large break loss of coolant accident (LBLOCA). The summary of the changes and errors made between October 1, 2009 and September 30, 2010 for the LBLOCA evaluation model is provided in Attachment A. The summary of the changes and errors made between October 1, 2009 and September 30, 2010 for the SBLOCA evaluation model is provided in Attachment B.

The change to the U.S. EPR LBLOCA model was previously reported to the NRC in Reference 4. This change is described in the topical report ANP-10278P Revision 1 transmitted to the NRC in

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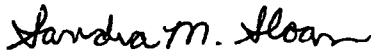
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Reference 4. A reanalysis to demonstrate compliance with 10 CFR 50.46 was also transmitted with the Reference 4 letter.

The information included in this letter is generic and applies to all COL applications referencing the U.S. EPR Design Certification as of the date of this letter. The COL applicants are hereby notified (by copy of this letter) of the changes and errors in the U.S. EPR evaluation models as required by 10 CFR 50.46(a)(3)(iii).

If you have any questions related to this submittal, please contact me by telephone at 434-832-2369 or by e-mail at sandra.sloan@areva.com.

Sincerely,



Sandra M. Sloan, Manager
New Plants Regulatory Affairs
AREVA NP Inc.

Enclosures

cc: G. Tesfaye
Docket No. 52-020

Attachment A

Large Break Loss of Coolant Accident (LBLOCA) Evaluation Model

A report of changes and errors in the LBLOCA evaluation model for the period of October 1, 2009 to September 30, 2010 is presented below.

The LBLOCA evaluation model for the U.S. EPR™ plant is described in the topical report ANP-10278P, Revision 1, which is currently under NRC review.

In January, 2010, AREVA NP submitted ANP-10278P, Revision 1. Details of the evaluation model change relative to ANP-10278P, Revision 0 can be found in ANP-10278, Revision 1, Section 4.1. The effect of the evaluation model change on PCT relative to the previous analysis of record is estimated to be 195°F.

Table 1 LBLOCA Margin Summary Sheet – Annual Report

Plant Name: U.S. EPR Standard Design Certification

Evaluation Model: RLBLOCA (ANP-10278P)

Analysis of Record Peak Cladding Temperature (PCT) = 1531 °F
(Based on ANP-10278P, Rev. 0)

		<u>Net PCT Effect</u>	<u>Absolute PCT Effect</u>
A.	Prior 10 CFR 50.46 Changes or Error Corrections – Previous Years	$\Delta PCT = -31^{\circ}F$	$+45^{\circ}F$
B.	Current 10 CFR 50.46 Changes: - This Report		
	1 Evaluation Model change in ANP-10278P, Revision 1	$\Delta PCT = +195^{\circ}F$	$+195^{\circ}F$

Absolute Effect of 10 CFR 50.46 Changes $\Delta PCT = +240^{\circ}F$

Estimate of PCT including changes and errors = 1695°F, This value is based on a complete reanalysis of the LBLOCA using ANP-10278P Revision 1 and resets the base PCT value.

The sum of the PCT from the most recent analysis using an acceptable evaluation model and the estimates of PCT impact for changes and errors identified since this analysis is less than 2200°F.

Attachment B

Small Break Loss of Coolant Accident (SBLOCA) Evaluation Model

A report of changes and errors in the LBLOCA evaluation model for the period of October 1, 2009 to September 30, 2010 is presented below.

The SBLOCA evaluation model for the U.S EPR is described in the topical report ANP-10263PA and in the topical report EMF-2328PA. The primary computer code in the SBLOCA evaluation model is S-RELAP5.

1. RODEX2 thermal conductivity

An issue with the RODEX2 code was identified wherein burnup dependent thermal conductivity is not accounted for. The code may under-predict the fuel pellet temperatures at burnup beyond approximately 20 GWd/MTU and therefore may underpredict the stored energy initial condition for LOCA analyses. PWR small break LOCA analyses are insensitive to initial stored energy because sufficient excess cooling capacity exists during the blowdown phase of the transient to effectively remove any excess initial stored energy prior to the extended heatup period when PCT occurs; thus, the estimated small break LOCA PCT impact is 0 °F

2. Point kinetics model

Previously, INL announced an error in the coding of the point kinetics model. Corrections provided by INL were installed into S-RELAP5. Recently, INL announced that the previous error corrections were incorrect and that the recommended convergence criteria supplied with those corrections should be retained. The estimated change in S-RELAP5 based small break LOCA PCT is +4°F.

Table 2 SBLOCA Margin Summary Sheet – Annual Report

Plant Name: U.S. EPR Standard Design Certification

Evaluation Model: SLBLOCA (ANP-10263PA and EMF-2638PA)

Analysis of Record Peak Cladding Temperature (PCT) = 1638°F

		<u>Net PCT Effect</u>	<u>Absolute PCT Effect</u>
A.	Prior 10 CFR 50.46 Changes or Error Corrections – Previous Years	$\Delta PCT =$ - 22°F	+ 22°F
B.	Current 10 CFR 50.46 Changes: - This Report		
1.	RODEX2 thermal conductivity	$\Delta PCT =$ 0°F	0°F
2.	Point kinetics model	$\Delta PCT =$ + 4°F	+ 4°F
	Absolute Sum of 10 CFR 50.46 Changes	$\Delta PCT =$	+ 26°F

Estimate of PCT including changes and errors
= 1620°F

The sum of the PCT from the most recent analysis using an acceptable evaluation model and the estimates of PCT impact for changes and errors identified since this analysis is less than 2200°F.