

March 4, 2008

U.S. Nuclear Regulatory Commission
Attn: Document Control Desk
Mail Stop P1-137
Washington, DC 20555-0001

ULNRC-05475

Ladies and Gentlemen:

**DOCKET NUMBER 50-483
CALLAWAY PLANT
UNION ELECTRIC COMPANY
10 CFR 50.46 ANNUAL REPORT
ECCS EVALUATION MODEL REVISIONS**



Attachment 1 to this letter describes changes to the Westinghouse ECCS Large Break and Small Break Loss of Coolant Accident (LOCA) Evaluation Models which have been implemented for Callaway during the time period from March 2007 to March 2008. Attachment 2 provides an ECCS Evaluation Model Margin Assessment which accounts for all peak cladding temperature (PCT) changes resulting from the resolution of prior issues as they apply to Callaway. References 1 and 2 below provided annual 10 CFR 50.46 reports that were issued after the LOCA analyses were revised to reflect the installation of the replacement steam generators in 2005.

The PCT values determined in the Large Break and Small Break LOCA analyses of record, when combined with all PCT margin allocations, remain below the 2200°F regulatory limit. As such, no reanalysis is planned by AmerenUE.

This letter does not contain any new commitments. If you have any questions on this report, please contact Mr. Scott Maglio at (573) 676-8719.

Sincerely,

A handwritten signature in black ink, appearing to read "Luke H. Graessle".

Luke H. Graessle
Manager - Regulatory Affairs

A002
NRR

ULNRC-05475

March 4, 2008

Page 2

GGY/nls

Attachments

- References:
- 1) ULNRC-05260 dated 3-9-06
 - 2) ULNRC-05378 dated 3-7-07

ULNRC-05475

March 4, 2008

Page 3

cc:

Mr. Elmo E. Collins, Jr.
Regional Administrator
U.S. Nuclear Regulatory Commission
Region IV
611 Ryan Plaza Drive, Suite 400
Arlington, TX 76011-4005

Senior Resident Inspector
Callaway Resident Office
U.S. Nuclear Regulatory Commission
8201 NRC Road
Steedman, MO 65077

Mr. Jack N. Donohew
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-8B1
Washington, DC 20555-2738

Mr. Mohan C. Thadani (2 copies)
Licensing Project Manager, Callaway Plant
Office of Nuclear Reactor Regulation
U. S. Nuclear Regulatory Commission
Mail Stop O-8G14
Washington, DC 20555-2738

Missouri Public Service Commission
Governor Office Building
200 Madison Street
P.O. Box 360
Jefferson City, MO 65102-0360

Deputy Director
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

ULNRC-05475

March 4, 2008

Page 4

Index and send hardcopy to QA File A160.0761

Hardcopy:

Certrec Corporation
4200 South Hulen, Suite 630
Fort Worth, TX 76109

(Certrec receives ALL attachments as long as they are non-safeguards and may be publicly disclosed).

**Electronic distribution for the following can be made via Responses and Reports
ULNRC Distribution:**

C. D. Naslund
A. C. Heflin
Mr. Ron Reynolds, Director (SEMA)
Mr. Edward Gray, Senior REP Planner (SEMA)
Mr. John Campbell, REP Planner (SEMA)
L. H. Graessle
G. A. Hughes
S. A. Maglio
S. L. Gallagher
L. M. Belsky (NSRB)
T. B. Elwood

Ms. Diane M. Hooper
Supervisor, Licensing
WCNOC
P.O. Box 411
Burlington, KS 66839

Mr. Dennis Buschbaum
TXU Power
Comanche Peak SES
P.O. Box 1002
Glen Rose, TX 76043

Mr. Scott Bauer
Regulatory Affairs
Palo Verde NGS
P.O. Box 52034,
Mail Station 7636
Phoenix, AZ 85072-2034

Mr. Stan Ketelsen
Manager, Regulatory Services
Pacific Gas & Electric
Mail Stop 104/5/536
P.O. Box 56
Avila Beach, CA 93424

Mr. Scott Head
Supervisor, Licensing
South Texas Project NOC
Mail Code N5014
P.O. Box 289
Wadsworth, TX 77483

Mr. John O'Neill
Pillsbury Winthrop Shaw Pittman LLP
2300 N. Street N.W.
Washington, DC 20037

Floyd Gilzow
Deputy Director
Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102

ATTACHMENT ONE

CHANGES TO THE WESTINGHOUSE

ECCS EVALUATION MODEL

AND PCT PENALTY ASSESSMENTS

TABLE OF CONTENTS

1. LOCBART Pellet Volumetric Heat Generation Rate
2. BASH Pellet Volumetric Heat Generation Rate
3. Errors in Reactor Vessel Nozzle Data Collections
4. LOCBART Specific Heat Model for Optimized ZIRLO™ Cladding
5. Pump Weir Resistance Modeling
6. LOCBART Oxide-to-Metal Ratio
7. Large Break LOCA Evaluation for Increased Sump Screen Metal Mass
8. General Code Maintenance

1. LOCBART PELLET VOLUMETRIC HEAT GENERATION RATE

The LOCBART code has been modified to correct an inverted term in the calculation of the pellet volumetric heat generation rate. This change affects the steady-state and transient heat generation for all three rods and could result in either an increase or decrease in peak cladding temperature for a given calculation. This change represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

The LOCBART Pellet Volumetric Heat Generation Rate assessment for Callaway was estimated to result in a +14°F PCT penalty for Large Break LOCA (LBLOCA) using the difference between the PCTs from LOCBART calculations with and without the error correction.

2. BASH PELLET VOLUMETRIC HEAT GENERATION RATE

The BASH code has been modified to correct an inverted term in the calculation of the pellet volumetric heat generation rate. This change affects the steady-state and transient heat generation for the core average rod prior to bottom-of-core recovery and could result in either an increase or decrease in the cladding temperatures at the beginning of reflood. This change represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Sensitivity calculations using BASH and SMUUTH indicate a negligible effect on the core inlet flooding rate during reflood, leading to an estimated LBLOCA PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

3. ERRORS IN REACTOR VESSEL NOZZLE DATA COLLECTIONS

Some minor errors were discovered in the reactor vessel nozzle data collections that potentially affect the vessel inlet and outlet nozzle fluid volume, metal mass, and surface area. The corrected values have been evaluated for impact on current licensing-basis analysis results and will be incorporated into the plant-specific input databases on a forward-fit basis. These changes represent a closely-related group of Non-Discretionary Changes in accordance with Section 4.1.2 of WCAP-13451.

The differences in the vessel inlet and outlet nozzle fluid volume, metal mass, and surface area are relatively minor and would be expected to produce a negligible effect on large break and small break LOCA analysis results, leading to estimated LBLOCA and Small Break LOCA (SBLOCA) PCT impacts of 0°F for 10 CFR 50.46 reporting purposes.

4. LOCBART SPECIFIC HEAT MODEL FOR OPTIMIZED ZIRLO™ CLADDING

An option has been added to the LOCBART code to model the specific heat of Optimized ZIRLO™ cladding. The model is described in the response to Request for Additional Information (RAI) #21 in Section D of WCAP-12610-P-A and CENPD-404-P-A, Addendum

1-A, "Optimized ZIRLO™," July 2006, and will facilitate compliance with Condition and Limitation #9 of the Safety Evaluation Report for plants with a peak cladding temperature that occurs during blowdown or early reflood. Note that the extrapolation algorithm described in the RAI response was replaced with an error message and code abort for temperatures below 73°F or above 2400°F. This change represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

No domestic plant with a BASH-EM analysis maintained by Westinghouse has both Optimized ZIRLO™ cladding and a peak cladding temperature that occurs during blowdown or early reflood, so there is no impact on any existing LBLOCA analysis results.

5. PUMP WEIR RESISTANCE MODELING

A review of the reactor coolant pump data collections identified instances of either including a weir resistance for a design without a weir or double-counting the weir resistance for a design with a weir. The corrected resistances have been evaluated for impact on existing analysis results and will be incorporated into the plant-specific input databases on a forward-fit basis. This change represents a Non-Discretionary Change in accordance with Section 4.1.2 of WCAP-13451.

Resolving the identified discrepancies has been evaluated as having a negligible effect on existing results, leading to estimated LBLOCA and SBLOCA PCT impacts of 0°F for 10 CFR 50.46 reporting purposes.

6. LOCBART OXIDE-TO-METAL RATIO

An option has been added to the LOCBART code to convert the user-specified zirconium-oxide thickness to equivalent cladding reacted. This adjustment is made during problem initialization, and the cladding outside diameter is modified accordingly. This change represents a Discretionary Change that will be implemented on a forward-fit basis in accordance with Section 4.1.1 of WCAP-13451.

This change is expected to produce a minimal effect on the limiting peak cladding temperature, leading to an estimated LBLOCA PCT impact of 0°F for 10 CFR 50.46 reporting purposes.

7. LARGE BREAK LOCA EVALUATION FOR INCREASED SUMP SCREEN METAL MASS

The containment sump screens were changed during Refuel 15 (spring 2007) from carbon steel to stainless steel, which resulted in an increase in containment metal mass. This change affects the LBLOCA analysis performed in support of the replacement steam generators approved via Callaway License Amendment 168. SBLOCA, post-LOCA, and LOCA hydraulic forces

calculations do not model containment parameters of this detail and are, therefore, unaffected by this change.

The sump screen modification resulted in an increase in containment metal mass. Westinghouse was asked to evaluate the effects of an increase of approximately 35,000 lbm. A LBLOCA PCT penalty of +3°F was calculated for an 82,500 lbm increase in containment metal mass that will be conservatively applied to this scenario. This change is small enough that it has negligible effects on maximum local oxidation and core-wide oxidation as calculated in WCAP-16265, the RSG topical report submitted to NRC in September 2004 to support Callaway License Amendment 168.

8. GENERAL CODE MAINTENANCE

Various changes have been made to enhance the usability of the codes and to help preclude errors in analyses. This includes items such as modifying input variable definitions, units, and defaults; improving the input diagnostic checks; enhancing the code output; optimizing active coding; and eliminating inactive coding. These changes represent Discretionary Changes that will be implemented on a forward-fit basis in accordance with Section 4.1.1 of WCAP-13451.

The nature of these changes leads to an estimated PCT impact of 0°F on the LBLOCA and SBLOCA analyses of record for Callaway.

ATTACHMENT TWO

ECCS EVALUATION MODEL

MARGIN ASSESSMENT FOR CALLAWAY

LARGE BREAK LOCA

A.	ANALYSIS OF RECORD (AOR)	PCT = 1939°F
B.	PRIOR ECCS MODEL ASSESSMENTS	+ 0°F
C.	CURRENT LOCA MODEL ASSESSMENTS - March 2008 (see items 1 and 7 of Attachment 1)	+ 17°F

LICENSING BASIS PCT + MARGIN ALLOCATIONS 1956°F

ABSOLUTE MAGNITUDE OF MARGIN ALLOCATIONS 17°F
SINCE LAST LBLOCA 30-DAY REPORT

SMALL BREAK LOCA

- | | | |
|----|----------------------------------|--------------|
| A. | ANALYSIS OF RECORD (AOR) | PCT = 1043°F |
| B. | PRIOR ECCS MODEL ASSESSMENTS | + 0°F |
| C. | CURRENT ECCS MODEL ASSESSMENTS - | + 0°F |

March 2008

LICENSING BASIS PCT + MARGIN ALLOCATIONS	1043°F
--	--------

ABSOLUTE MAGNITUDE OF MARGIN ALLOCATIONS SINCE LAST SBLOCA 30-DAY REPORT	0°F
---	-----