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JUL 28 2006

LR-N06-0331

10 CFR 50.46

PSEG
*Nuclear LLC*

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

Salem Nuclear Generating Station Units 1 and 2
Facility Operating License Nos. DPR-70 and 75
NRC Docket Nos. 50-272 and 50-311

Subject: Annual Report of the Emergency Core Cooling System Evaluation Model Changes end Errors required by 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors."

In accordance with 10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors," paragraph (a)(3)(ii), PSEG Nuclear LLC (PSEG) is submitting the annual report of the Emergency Core Cooling System (ECCS) Evaluation Model changes and errors for Salem Units 1 and 2.

Attachment 1, "Peak Cladding Temperature Rack-Up Sheets," provides updated information regarding the Peak Cladding Temperature for the limiting small break and large break loss-of-coolant accident (LOCA) evaluations for Salem Units 1 and 2. The peak clad temperature (PCT) for Salem Units 1 and 2 small break LOCA remains unchanged from the value of 1729°F reported in 2005. The Salem Unit 1 PCT for large break decreased by 50°F from 2088°F in 2005 to 2038°F in 2006. The Salem Unit 2 PCT for large break remains unchanged from the value of 2038°F reported in 2005.

Attachment 2, "Assessment Notes," contains a detailed description for each change or error reported.

If you have any questions concerning this report, please contact E. H. Villar at (856) 339 - 5456.

Sincerely,

Thomas P. Joyce

Thomas P. Joyce
Site Vice President - Salem Station
PSEG Nuclear, LLC
Attachments (2)

A002

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JUL 2 8 2006



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**ATTACHMENT 1**
**LR-N06-0331**

SALEM UNITS 1 AND 2

Docket Nos. 50-272 and 50-311
License Nos. DPR 70 and DPR 75

10 CFR 50.46, "Acceptance Criteria for Emergency Core Cooling Systems for Light-Water Nuclear Power Reactors"

Report of the Emergency Core Cooling System Evaluation Model Changes and Errors Assessments

**Peak Cladding Temperature Rack-Up Sheets**

## Peak Cladding Temperature Rack-Up Sheets

PLANT NAME: Salem Unit 1
ECCS EVALUATION MODEL: Small Break Loss of Coolant Accident (SBLOCA)
REPORT REVISION DATE: 6/30/2006
CURRENT OPERATING CYCLE: 18

### ANALYSIS OF RECORD (AOR)

Evaluation Model: NOTRUMP
Calculation: Westinghouse PSE-93-568, March 1993
Fuel: RFA 17 x 17
Limiting Fuel Type: RFA 17x17
Heat Flux Hot Channel Factor ($F_Q$) = 2.4
Nuclear Enthalpy Rise Hot Channel Factor ($F_{\Delta H}$) = 1.65
Steam Generator Tube Plugging = 10%
Limiting Break Size: 2 inches
Notes: ZIRLO Clad Fuel

Reference Peak Cladding Temperature (PCT) PCT = 1580°F

### MARGIN ALLOCATION

### A. PRIOR LOSS OF COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS

| | |
|---|---|
| 10 CFR 50.46 report dated October 29, 1993 (See Note 1) | ΔPCT = -13°F |
| 10 CFR 50.46 report dated July 27, 1994 (See Note 2) | ΔPCT = -16°F |
| 10 CFR 50.46 report dated December 8, 1994 (See Note 3) | ΔPCT = +109°F |
| 10 CFR 50.46 report dated January 18, 1995 (See Note 4) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated December 7, 1995 (See Note 5) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 2, 1996 (See Note 6) | ΔPCT = -8°F |
| 10 CFR 50.46 report dated July 11, 1997 (See Note 7) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated June 10, 1998 (See Note 8) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated April 27, 1999 (See Note 9) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated October 18, 1999 (See Note 10) | ΔPCT = +10°F |
| 10 CFR 50.46 report dated September 21, 2000 (See Note 11) | ΔPCT = +27°F |
| 10 CFR 50.46 report dated August 27, 2001 (See Note 12) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 27, 2002 (See Note 13) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 08, 2003 (See Note 14) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated July 29, 2004 (See Note 15) | ΔPCT = +40°F |
| 10 CFR 50.46 report dated July 28, 2005 (See Note 16) | ΔPCT = 0°F |

**NET PCT** **PCT = 1729°F**

## B. CURRENT LOCA MODEL ASSESSMENTS

| | |
|---|---|
| Pressurizer Fluid Volume (See Note 18) | $\Delta$PCT = 0°F |
| Lower Guide Tube Assembly Weight (See Note 19) | $\Delta$PCT = 0°F |
| NOTRUMP RWST Draindown Calculation (See Note 20) | $\Delta$PCT = 0°F |
| General Code Maintenance (NOTRUMP) (See Note 17) | $\Delta$PCT = 0°F |

**NET PCT** **PCT = 1729°F**

## Peak Cladding Temperature Rack-Up Sheets

PLANT NAME: Salem Unit 1
ECCS EVALUATION MODEL: Large Break Loss of Coolant Accident (LBLOCA)
REPORT REVISION DATE: 6/30/2006
CURRENT OPERATING CYCLE: 18

**ANALYSIS OF RECORD (AOR)**

Evaluation Model: BASH
Calculation: Westinghouse 93-PSE-G-0080, September 1993
Fuel: RFA 17 x 17
Limiting Fuel Type: RFA 17x17
Heat Flux Hot Channel Factor ($F_Q$) = 2.4
Nuclear Enthalpy Rise Hot Channel Factor ($F_{\Delta H}$) = 1.65
Steam Generator Tube Plugging = 10%
Limiting Break Size: Cd = 0.4

Notes: ZIRLO Clad Fuel

Reference Peak Cladding Temperature (PCT) PCT = 1978°F

**MARGIN ALLOCATION**

**A. PRIOR LOSS OF COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS**

| | |
|---|---|
| 10 CFR 50.46 report dated January 18, 1995 (See Note 4) | ΔPCT = +36°F |
| 10 CFR 50.46 report dated December 7, 1995 (See Note 5) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 2, 1996 (See Note 6) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated July 11, 1997 (See Note 7) | ΔPCT = +15°F |
| 10 CFR 50.46 report dated June 10, 1998 (See Note 8) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated April 27, 1999 (See Note 9) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated October 18, 1999 (See Note 10) | ΔPCT = +12°F |
| 10 CFR 50.46 report dated September 21, 2000 (See Note 11) | ΔPCT = +9°F |
| 10 CFR 50.46 report dated August 27, 2001 (See Note 12) | ΔPCT = +6°F |
| 10 CFR 50.46 report dated August 27, 2002 (See Note 13) | ΔPCT = +20°F |
| 10 CFR 50.46 report dated August 08, 2003 (See Note 14) | ΔPCT = +7°F |
| 10 CFR 50.46 report dated July 29, 2004 (See Note 15) | ΔPCT = +5°F |
| 10 CFR 50.46 report dated July 28, 2005 (See Note 16) | ΔPCT = 0 °F |

**NET PCT** **PCT = 2088°F**

## B. CURRENT LOCA MODEL ASSESSMENTS

| | |
|---|---|
| Pressurizer Fluid Volume (See Note 18) | ΔPCT = 0°F |
| Lower Guide Tube Assembly Weight (See Note 19) | ΔPCT = 0°F |
| General Code Maintenance (BASH Code) (Note 17) | ΔPCT = 0°F |
| Removal of Transition Core Penalty (Note 21) | ΔPCT = -50°F |

**NET PCT** **PCT = 2038°F**

## Peak Cladding Temperature Rack-Up Sheets

PLANT NAME: Salem Unit 2
ECCS EVALUATION MODEL: Small Break Loss of Coolant Accident (SBLOCA)
REPORT REVISION DATE: 6/30/2006
CURRENT OPERATING CYCLE: 15

### ANALYSIS OF RECORD (AOR)

Evaluation Model: NOTRUMP
Calculation: Westinghouse PSE-93-568, March 1993
Fuel: RFA 17 x 17
Limiting Fuel Type: RFA 17x17
Heat Flux Hot Channel Factor ($F_Q$) = 2.4
Nuclear Enthalpy Rise Hot Channel Factor ($F_{\Delta H}$) = 1.65
Steam Generator Tube Plugging = 25%
Limiting Break Size: 2 inches
Notes: ZIRLO Clad Fuel

Reference Peak Cladding Temperature (PCT) PCT = 1580°F

### MARGIN ALLOCATION

### A. PRIOR LOSS OF COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS

| | |
|---|---|
| 10 CFR 50.46 report dated October 29, 1993 (See Note 1) | ΔPCT = -13°F |
| 10 CFR 50.46 report dated July 27, 1994 (See Note 2) | ΔPCT = -16°F |
| 10 CFR 50.46 report dated December 8, 1994 (See Note 3) | ΔPCT = +109°F |
| 10 CFR 50.46 report dated January 18, 1995 (See Note 4) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated December 7, 1995 (See Note 5) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 2, 1996 (See Note 6) | ΔPCT = -8°F |
| 10 CFR 50.46 report dated July 11, 1997 (See Note 7) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated June 10, 1998 (See Note 8) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated April 27, 1999 (See Note 9) | ΔPCT = +10°F |
| 10 CFR 50.46 report dated October 18, 1999 (See Note 10) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated September 21, 2000 (See Note 11) | ΔPCT = +27°F |
| 10 CFR 50.46 report dated August 27, 2001 (See Note 12) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 27, 2002 (See Note 13) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 08, 2003 (See Note 14) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated July 29, 2004 (See Note 15) | ΔPCT = +40°F |
| 10 CFR 50.46 report dated July 28, 2005 (See Note 16) | ΔPCT = 0°F |

**NET PCT** **PCT = 1729°F**

## B. CURRENT LOCA MODEL ASSESSMENTS

| | |
|---|---|
| Pressurizer Fluid Volume (See Note 18) | ΔPCT = 0°F |
| Lower Guide Tube Assembly Weight (See Note 19) | ΔPCT = 0°F |
| NOTRUMP RWST Draindown Calculation (See Note 20) | ΔPCT = 0°F |
| General Code Maintenance (NOTRUMP) (See Note 17) | ΔPCT = 0°F |

**NET PCT** **PCT = 1729°F**

## Peak Cladding Temperature Rack-Up Sheets

PLANT NAME: Salem Unit 2
ECCS EVALUATION MODEL: Large Break Loss of Coolant Accident (LBLOCA)
REPORT REVISION DATE: 6/30/2006
CURRENT OPERATING CYCLE: 15

### ANALYSIS OF RECORD (AOR)

Evaluation Model: BASH
Calculation: Westinghouse 93-PSE-G-0080, September 1993
Fuel: RFA 17 x 17
Limiting Fuel Type: RFA 17x17
Heat Flux Hot Channel Factor ($F_Q$) = 2.4
Nuclear Enthalpy Rise Hot Channel Factor ($F_{\Delta H}$) = 1.65
Steam Generator Tube Plugging = 25%
Limiting Break Size: Cd = 0.4

Notes: ZIRLO Clad Fuel

Reference Peak Cladding Temperature (PCT) PCT = 1978°F

### MARGIN ALLOCATION

### A. PRIOR LOSS OF COOLANT ACCIDENT (LOCA) MODEL ASSESSMENTS

| | |
|---|---|
| 10 CFR 50.46 report dated January 18, 1995 (See Note 4) | ΔPCT = +36°F |
| 10 CFR 50.46 report dated December 7, 1995 (See Note 5) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated August 2, 1996 (See Note 6) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated July 11, 1997 (See Note 7) | ΔPCT = +15°F |
| 10 CFR 50.46 report dated June 10, 1998 (See Note 8) | ΔPCT = 0°F |
| 10 CFR 50.46 report dated April 27, 1999 (See Note 9) | ΔPCT = +24°F |
| 10 CFR 50.46 report dated October 18, 1999 (See Note 10) | ΔPCT = -12°F |
| 10 CFR 50.46 report dated September 21, 2000 (See Note 11) | ΔPCT = +9°F |
| 10 CFR 50.46 report dated August 27, 2001 (See Note 12) | ΔPCT = +6°F |
| 10 CFR 50.46 report dated August 27, 2002 (See Note 13) | ΔPCT = +20°F |
| 10 CFR 50.46 report dated August 08, 2003 (See Note 14) | ΔPCT = +7°F |
| 10 CFR 50.46 report dated July 29, 2004 (See Note 15) | ΔPCT = -45°F |
| 10 CFR 50.46 report dated July 28, 2005 (See Note 16) | ΔPCT = 0°F |

**NET PCT** **PCT = 2038°F**

## B. CURRENT LOCA MODEL ASSESSMENTS

| | |
|---|---|
| Pressurizer Fluid Volume (See Note 18) | ΔPCT = 0°F |
| Lower Guide Tube Assembly Weight (See Note 19) | ΔPCT = 0°F |
| General Code Maintenance (BASH) (See Note 17) | ΔPCT = 0°F |

**NET PCT** **PCT = 2038°F**

**ATTACHMENT 2**
**LR-N06-0331**

SALEM UNITS 1 AND 2

Docket Nos. 50-272 and 50-311
License Nos. DPR 70 and DPR 75

10 CFR 50.46, "Acceptance criteria for emergency core cooling systems for light-water nuclear power reactors"

Report of the Emergency Core Cooling System Evaluation Model Changes and Errors Assessments

**Assessment Notes**

## Assessment Notes

1. Prior Loss-of-Coolant Accident (LOCA) Model Assessment

The 10 CFR 50.46 report dated October 29, 1993, implemented the current Analysis of Record for the SBLOCA evaluation model (PCT = 1580°F), in support of the Fuel Upgrade / Margin Recovery Program. However, three PCT assessments were also included, resulting in a PCT benefit of -13°F. The first assessment entailed a +150°F penalty that resulted from explicitly modeling safety injection into the broken loop in the NOTRUMP model. The second assessment entailed a -150°F benefit that resulted from the implementation of an improved condensation model. The third assessment entailed a -13°F benefit that resulted from the correction of drift flux flow regime errors.

2. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated July 27, 1994, reported an assessment to the SBLOCA model, which resulted in a -16°F PCT benefit. This PCT benefit was a result of corrections made to the reactor vessel and steam generator geometric and mass calculations in the VESCAL subroutine if the LUCIFER code.

3. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated December 8, 1994, reported evaluations for the SBLOCA model due to three errors, for a penalty of +109°F. The first assessment entailed a +85°F PCT penalty that was a result of correcting nodalization and overall fluid conservation errors in the SBLOCTA code and implementing a revised transient fuel rod internal pressure model. The second assessment entailed a -6°F PCT benefit that was a result of error corrections made to the boiling heat transfer regime correlations in NOTRUMP. The third assessment entailed a +30°F PCT penalty as a result of errors affecting the steam line isolation logic in the SBLOCA evaluation model.

4. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated January 18, 1995, reported no changes in the SBLOCA model, which caused the PCT to remain unchanged. The current Analysis of Record for the LBLOCA evaluation model (PCT = 1978°F) was implemented in support of the Fuel Upgrade / Margin Recovery Program. However, three PCT assessments were also included, resulting in a PCT penalty of +36°F. The first assessment entailed a +94°F PCT penalty that resulted from the absence of Intermediate Flow Mixers (IFMs) in the core. The second assessment was a PCT benefit of -52°F that resulted from four changes to the LOCBART code; including modifications made to convert the LOCBART code from a Cray to a Unix platform, corrections made to the rod heat-up code, the addition of a new model used to determine zircaloy cladding burst behavior above 1742°F, and the implementation of a revised burst strain limit model for the rod heat-up codes. The third assessment entailed a PCT benefit of -6°F that resulted from corrections made to the LUCIFER code.

5. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated December 7, 1995, reported no changes in the SBLOCA and LBLOCA models for both Salem Units 1 and 2, which caused the PCTs to remain unchanged.

6. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated August 2, 1996, reported no changes in the LBLOCA model, which caused the PCT to remain unchanged. The SBLOCA model was assessed an -8°F PCT benefit as a result of three assessments. The first assessment was a +20°F PCT penalty due to an error in the specific enthalpy equation in NOTRUMP. The second assessment was a +10°F PCT penalty due to an error in the Fuel Rod Initialization algorithm of the SBLOCTA code, as well as several changes in the fuel rod creep and strain model. The third assessment was a -38°F PCT benefit as a result of an error in the relative loop seal elevation of the crossover leg.

7. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated July 11, 1997, reported no changes in the SBLOCA model, which caused the PCT to remain unchanged. The LBLOCA model was assessed a +15°F PCT penalty as a result of translating the fluid conditions used for subchannel analysis of the fuel rods from one computer code (SATAN) to another computer code (LOCTA).

8. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated June 10, 1998, reported no changes in the SBLOCA and LBLOCA models for both Salem Units 1 and 2, which caused the PCTs to remain unchanged.

9. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated April 27, 1999, reported no changes in the Salem Unit 1 SBLOCA and LBLOCA models, which caused the PCTs to remain unchanged. However, unit- and cycle-specific PCT assessments were applied to Salem Unit 2. For the Salem Unit 2 SBLOCA evaluation model, a generic PCT penalty of +10°F was assessed due to the impact of fully enriched annular pellets. For the Salem Unit 2 LBLOCA evaluation model, a partial re-analysis was performed that incorporated the effects of Intermediate Flow Mixers (IFMs), features of the Robust Fuel Assembly (RFA), and other model updates. The cumulative impact of these PCT changes resulted in an increase in the Salem Unit 2 LBLOCA PCT of +24°F.

10. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated October 18, 1999, reported evaluations for the SBLOCA and LBLOCA models for both Salem Units due to three errors. The first error resulted from the use of incorrect geometric data related to the accumulator lines and the pressurizer surge line. The second error was discovered in the length-averaging logic for heat transfer coefficient calculations in the LOCBART code. The third error was found in the Baker-Just metal-water reaction calculation in the LOCBART code. These errors were assessed together on a plant-specific basis and resulted in a -12°F PCT benefit for LBLOCA and no change (0°F) in the PCT for SBLOCA for both Salem Units. Thus, the Salem Unit 2 SBLOCA PCT remained unchanged, while the Salem Unit 2 LBLOCA PCT decreased by -12°F. In addition to the assessment above, further unit- and cycle-specific PCT assessments were applied to Salem Unit 1. For the Salem Unit 1 SBLOCA evaluation model, a generic PCT penalty of +10°F was assessed due to the impact of fully enriched annular pellets. For the Salem Unit 1 LBLOCA evaluation model, a partial re-analysis was performed that incorporated the effects of the Robust Fuel Assembly (RFA) features, Intermediate Flow Mixers (IFMs), and other model updates. In addition, a generic transition core PCT penalty was assessed to account for the effects of mixed fuel types (RFA and V5H) in the core. The cumulative impact of all of these PCT changes resulted in an increase in the Salem Unit 1 LBLOCA PCT of +12°F.

11. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated September 21, 2000, reported evaluations for SBLOCA model changes, which resulted in a +27°F PCT increase. This increase consisted of a +14°F PCT assessment due to an error in the feedwater line volume calculation and a +13°F PCT assessment due to the discovery of several closely related errors dealing with mixture level tracking and region depletion errors in NOTRUMP. The LBLOCA model was assessed a +9°F PCT penalty as a result of an error in the LOCBART vapor film flow regime heat transfer correlation.

12. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated August 27, 2001, reported no changes in the SBLOCA model, which caused the PCT to remain unchanged. The LBLOCA model was assessed a +6°F PCT penalty as a result of using non-conservative cladding surface emissivity values in LOCBART.

13. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated August 27, 2002, reported no changes in the SBLOCA model, which caused the PCT to remain unchanged. The LBLOCA model was assessed a +20°F PCT penalty as a result of using a non-conservative assumption for accumulator water temperature.

14. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated August 8, 2003, reported no changes in the SBLOCA model, which caused the PCT to remain unchanged. A partial re-analysis was performed for the LBLOCA transient using the latest BASH-EM code version that incorporated the "LOCBART transient extension method," that ensured adequate termination of the fuel rod cladding temperature and oxidation transients predicted by LOCBART. This partial re-analysis allowed several prior PCT "generic evaluation" assessments (Accumulator Line / Pressurizer Surge Line Data Error, LOCBART Spacer Grid Single Phase Heat Transfer Error, LOCBART Zirc-Water Oxidation Error, LOCBART Vapor Film Flow Regime Heat Transfer Error, LOCBART Cladding Emissivity Error, Changes due to RFA Fuel Features, and Non-Conservative Accumulator Water Temperature Evaluation) to be replaced with a plant-specific analytical estimation. In addition, a +15°F PCT penalty was assessed to the LBLOCA model that resulted from corrections to the LOCBART ZIRLO Cladding Specific Heat Model. As a result of this penalty and the partial re-analysis, the LBLOCA PCT increased by +7°F.

15. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated July 29, 2004, reported a +40°F increase in the PCT of the SBLOCA evaluation model as a result of inconsistency corrections made to the NOTRUMP Bubble Rise and Drift Flux models and burst and blockage and time in life. The Salem Unit 1 LBLOCA model was assessed a +5°F PCT penalty as a result of the correction of discrepancies in the LOCBART Fluid Property Logic. The Salem Unit 2 LBLOCA model was also assessed this +5°F penalty, in addition to the removal of a +50°F Transition Core Penalty that resulted from operating with a mixed core of V5H and RFA fuel types, for a decrease in the PCT of -45°F.

16. Prior LOCA Model Assessment

The 10 CFR 50.46 report dated July 28, 2005, reported a 0°F increase in the PCT of the SBLOCA evaluation model due to the SBLOCA model assessment. The model assessment for SBLOCA was performed for reactor coolant pump reference conditions and general code maintenance (NOTRUMP). The report also reported a 0°F increase in the PCT of the LBLOCA evaluation model due to the LBLOCA model assessment. The model assessment for LBLOCA was performed for reactor coolant pump reference conditions, LOCBART fluid property logic, steam generator inlet/outlet plenum flow areas, initial containment relative humidity assumption and general code maintenance (BASH).

17. General Code Maintenance (BASH / NOTRUMP)

Various changes in code input and output format have been made to enhance usability and help preclude errors in analyses. This includes both input changes (e.g., more relevant input variables defined and more common input values used as defaults) and input diagnostics designed to preclude unreasonable values from being used, as well as various changes to code output which have no effect on calculated results. In addition, various updates were made to eliminate inactive coding, improve active coding, and enhance commenting, both for enhanced usability and to facilitate code debugging when necessary. 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.

18. Pressurizer Fluid Volumes

The Westinghouse Systems and Equipment Engineering group has recommended that the previously transmitted pressurizer fluid volumes be replaced with nominal cold values. This change resolves a discrepancy in the prior calculations while providing a close approximation of the actual as-built values. The revised values have been evaluated for impact on current licensing-basis analyses 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. The differences between the previously-transmitted and revised volumes are very small and would be expected to produce a negligible effect on large and small break LOCA analysis results, leading to an estimated PCT impact of 0°F.

19. Lower Guide Tube Assembly Weight

An error was discovered in the lower guide tube assembly weight for three units that resulted in a small over-estimation of the upper plenum metal mass. The corrected values have been evaluated for impact on current licensing-basis analyses 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. The differences in upper plenum mass are very small and would be expected to produce a negligible effect on large and small break LOCA analysis results, leading to an estimated PCT impact of 0°F.

20. Discrepancy in NOTRUMP RWST Draindown Calculation

For small break LOCA calculations where the break size is greater than the safety injection (SI) line diameter, and where the SI line is connected directly to the reactor coolant system (RCS), it is assumed that the broken loop safety injection flows do not inject to the RCS, but rather spill to containment. Typically, this is modeled in NOTRUMP-EM analyses by setting the flows injected to the broken loop equal to zero, which neglects the continued depletion of the refueling water storage tank (RWST) inventory. As a result, the RWST draindown time is incorrectly calculated, potentially resulting in an inaccurate modeling of enthalpy changes and/or SI interruptions that can occur at switchover to sump recirculation. Therefore, the SI spilling flows need to be explicitly modeled in order to correctly calculate the RWST draindown time. For Westinghouse plants using the NOTRUMP-EM the larger small breaks are typically non-limiting and the transients are of short duration. Therefore, correct modeling of the spilling flows in the RWST draindown calculation for these breaks would be expected to produce a negligible effect on SBLOCA results, leading to an estimated PCT impact of 0°F.

21. Removal of Transition Core Penalty

The Cycle 18 reload core does not contain any V5H fuel assemblies. Since a mixed core condition does not exist for Salem Unit 1 Cycle 18, the 50°F PCT penalty is not applicable to the analysis of record PCT assessments.