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SUBJECT: Provides notification of SBLOCA model changes or errors reported by Westinghouse that meet definition of significant as defined in 10CFR50.46.

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AEP:NRC:1118H
10 CFR 50.46(a)(3)(ii)

Donald C. Cook Nuclear Plant Units 1 and 2
Docket Nos. 50-315 and 50-316
License Nos. DPR-58 and DPR-74
REPORT OF LOCA EVALUATION MODEL CHANGES
PURSUANT TO 10 CFR 50.46(a)(3)(ii)

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

Attn: W. T. Russell

December 16, 1994

Dear Mr. Russell:

Pursuant to the requirements of 10CFR50.46(a)(3)(ii), this letter provides notification of small break loss of coolant accident (SBLOCA) model changes or errors reported to us by Westinghouse Electric Corporation (Westinghouse) that meet the definition of significant as defined in 10CFR50.46.

Attachment 1, which was provided to us by Westinghouse, describes errors discovered in their NOTRUMP computer code and changes to the code. NOTRUMP is used for small break LOCA analysis for Units 1 and 2 of Donald C. Cook Nuclear Plant. The code does not address ECCS switchover to recirculation which results from rapid draining of the refueling water storage tank due to automatic actuation of the containment spray system. Westinghouse concludes that this condition necessitates a peak clad temperature (PCT) penalty of 20°F for some plants. For Cook Nuclear Plant, this penalty is only applied to the high head safety injection (HHSI) Cross-Tie Valve Open case at 3588 MWt for both Unit 1 and Unit 2.

Attachment 2, which was provided by Westinghouse, also describes changes and errors in the NOTRUMP computer code. The errors involve the boiling heat transfer correlation, steam line isolation logic, and initialization of the cladding zirconium oxide thickness prior to creation of fuel zones analogous to the mixture and vapor regions for core nodes.

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The requirement for reporting LOCA model changes/errors under 10CFR50.46 are not applicable until the sum of the absolute values of the PCT penalties accumulate to a change greater than 50°F. Since none of the LOCA cases had a PCT summation greater than 50°F, a 10CFR50.46 report was not filed at the time of receipt of either Attachment 1 or Attachment 2.

Attachment 3, which was provided to us by Westinghouse, also describes changes and errors in small break LOCA codes. The issue concerns a deficiency in the amount of detail used for the axial nodalization of the fuel rod, as it affected the solution of the channel fluid equations. Further investigation by Westinghouse identified several additional related issues, as described in Attachment 3.

The absolute value of the sum of the changes and errors described in Attachments 1, 2, and 3 indicate PCT changes greater than 50°F. Since the changes in PCT are more than 50°F, the changes meet the definition of significant provided in 10CFR50.46. This report is being provided in response to the guidance in 10CFR50.46.

During the review of the peak clad temperatures displayed in Attachment 5, it was discovered that the Unit 1 SBLOCA PCT margin calculation for the 3250 MWt case with the HHSI cross-tie valves closed contains an assessment which should have been removed following the reanalysis of this case in December 1993. The assessment of -13°F for drift flux flow regime errors should no longer be tracked because the version of the NOTRUMP code used for that reanalysis includes the corrected drift flux flow regime map. Further discussion of this item is provided in the Westinghouse letter, which is given as Attachment 4.

The corrected Attachment 5 contains the peak clad temperatures calculated specifically for Donald C. Cook Nuclear Plant Units 1 and 2. In all cases, the calculated peak clad temperatures remain within the 10 CFR 50.46 limit of 2200°F.

This 10 CFR 50.46 report has been prepared based on analyses performed for the MSSV setpoint tolerance relaxation. These analyses were recently reviewed and approved in conjunction with Amendment 182 to Facility Operating License DPR-58 and Amendment 167 to Facility Operating License DPR-74.

The plan for revising the Unit 1 cross-ties open SBLOCA run, discussed in our letter designated AEP:NRC:1118G, is being delayed several months to ensure that the calculation is made

with planned code revisions. Current plans also include both LBLOCA and SBLOCA reanalyses in conjunction with evaluations and analyses to support an increase in allowable steam generator tube plugging (SGTP) for Unit 1. This work is tentatively planned to be complete and submitted to the staff by June 1995. Plans for new LBLOCA and SBLOCA analyses of record for Unit 2 remain tentative at this time.

Sincerely,

for E. E. Fitzpatrick
Vice President

slc

Attachments

cc: A. A. Blind - Bridgman
G. Charnoff
J. B. Martin - Region III
NFEM Section Chief
NRC Resident Inspector - Bridgman
J. R. Padgett

ATTACHMENT 1 TO AEP:NRC:1118H

WESTINGHOUSE ELECTRIC CORPORATION

DESCRIPTION OF LOCA MODEL CHANGES

Background

A potential issue has been identified related to automatic actuation of the containment spray system during certain small break LOCAs. Through analyses it has been found that breaks as small as two inches or less may actuate the containment spray system within several minutes of break initiation for some plants. As a result of the high containment spray flow rate and the prolonged nature of the small break LOCA, switchover to sump recirculation may be required before the event is completely resolved (ECCS injection flow exceeds break flow, RCS mass is increasing and peak clad temperature is decreasing or the core is fully quenched). The current small break licensing basis does not address several issues related to ECCS switchover and long term recirculation.

Issue Description

Section D of 10 CFR 50, Appendix K requires that the containment pressure used in the ECCS evaluation models account for the effects of all installed containment heat removal equipment. The current Westinghouse small break ECCS evaluation model is not considered to be sensitive to containment pressure effects because the calculated break flow is critically limited throughout the transient. As such, the small break ECCS evaluation model does not account for actuation and operation of the containment spray system. Furthermore, since the small break ECCS evaluation model does not account for operation of the containment spray system, the ECCS evaluation model does not include switchover to ECCS recirculation. This approach may no longer be bounding with respect to maximum PCT.

The current Westinghouse small break evaluation model assumes a continuous supply of ECCS water at injection mode flow rates and the enthalpy of the injection fluid throughout the transient. At the time of switchover to recirculation during a small break LOCA, the ECCS pumps may be shut down for realignment resulting in a period of no SI delivery for some plants. In addition, some plants may have less available ECCS recirculation flow than ECCS injection flow due to closure of the safety injection pump discharge cross-tie valves. Furthermore, the current small break licensing basis analysis does not account for the change in enthalpy due to recirculation since it had been assumed that the event would be resolved before recirculation.

This issue also has the potential to effect the limiting single failure assumption used in the small break ECCS evaluation model. The current single failure assumption is the failure of an emergency diesel generator and loss of one entire safeguards train. If both emergency diesel generators start and supply power to the containment spray pumps, the RWST would drain earlier in the transient. The loss of a single intermediate head pump or charging pump could conceivably be more limiting than the loss of a complete train of safeguards systems.

The modeling of these effects could potentially lead to worse results than those predicted in the current analyses, challenging the 10 CFR 50.46 acceptance criteria.

Technical Evaluation

In support of this issue, a number of plant specific and bounding generic evaluations were performed. First, all plants for which Westinghouse performs the small break ECCS analysis and known to have either interrupted or reduced ECCS flow as a result of switchover to ECCS recirculation were identified:

D. C. Cook 1 & 2	Point Beach 1 & 2
Ginna	Prairie Island 1 & 2
Kewaunee	Turkey Point 3 & 4
Kori 2	

For these plants, it was shown that even with an alternate single failure which would more rapidly drain the RWST, the current small break analyses of record would remain the most limiting analysis with respect to maximum calculated PCT. Thus, for these plants with interrupted or reduced ECCS flow as a result of switchover to ECCS recirculation, the acceptance criteria of 10 CFR 50.46 is met and does not represent any defect, deviation or failure to comply with respect to 10 CFR 21. Furthermore, no PCT penalty or benefit assessment is required as a result of interrupted or reduced ECCS flow.

Second, it was determined that all plants currently licensed with the Westinghouse small break ECCS evaluation model were potentially impacted by the increase in ECCS water enthalpy when the ECCS is switched over from the injection mode to the recirculation mode of operation. Through the use of engineering analysis including an alternate single failure which would more rapidly drain the RWST, it was determined that a number of plants were not affected by this issue in terms of peak clad temperature (PCT). However, a limited number of plants are impacted by the increase in ECCS water enthalpy during recirculation:

Beaver Valley 1 & 2	Shearon Harris
D. C. Cook 1 & 2	Yonggwang 2
Indian Point 2	Surry 1 & 2
Indian Point 3	V. C. Summer
J. M. Farley 1 & 2	Kori 3 & 4
North Anna 1 & 2	

For these plants it was determined that a 20°F PCT penalty assessment is sufficient to account for the increase in ECCS water enthalpy during recirculation. For these plants only, plant specific Small Break PCT Margin Utilization Summary sheets are provided.

Recommendation

For those plants for which Westinghouse performs the licensed SBLOCA analyses, Westinghouse has determined that this issue is not a substantial safety hazard pursuant to 10 CFR 21 because the PCT penalty does not result in a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety. However, for those plants assessed a 20°F PCT penalty, the plant licensees should review their reporting obligations under 10 CFR 50.46. To facilitate this, the updated Small Break PCT Margin Utilization Summary sheets are attached to this letter for those plants.

ATTACHMENT 2 TO AEP:NRC:1118H

WESTINGHOUSE ELECTRIC CORPORATION

DESCRIPTION OF LOCA MODEL CHANGES

BOILING HEAT TRANSFER CORRELATION ERRORS

Background

This closely related set of errors deals with how the mixture velocity is defined for use in various boiling heat transfer regime correlations. The previous definition for mixture velocity did not properly account for drift and slip effects calculated in NOTRUMP. This error particularly affected NOTRUMP calculations of heat transfer coefficient when using the Westinghouse Transition Boiling Correlation and the Dougall-Rohsenow Saturated Film Boiling Correlation.

In addition, a minor typographical error was also corrected in the Westinghouse Transition Boiling Correlation.

This was determined to be a Non-Discretionary Change as described in Section 4.1.2 of WCAP-13451 and was corrected in accordance with Section 4.1.3 of WCAP-13451.

Affected Evaluation Model

1985 Small Break LOCA Evaluation Model

Estimated Effect

Representative plant calculations for this issue resulted in the estimated PCT effect documented in the attached Margin Utilization Sheet.

STEAM LINE ISOLATION LOGIC ERRORS

Background

This error consists of two portions: a possible plant specific effect which only applies to analyses which assumed Main Feedwater Isolation (FWI) to occur on S-signal, and a generic effect applying to all previous analyses.

The possible plant specific effect was the result of incorrect logic which caused the main steam line isolation to occur on the same signal as FWI. Therefore, when the S-signal was chosen through user input to be the appropriate signal for FWI, it also caused the steam line isolation to occur on S-signal. This is inconsistent with the standard conservative assumption of steam line isolation on Loss of Offsite Power coincident with the earlier Reactor Trip signal.

The generic effect was the result of incorrect logic which always led to the isolation functions occurring at a slightly later time than when the appropriate signal was generated.

This was determined to be a Non-Discretionary Change as described in Section 4.1.2 of WCAP-13451 and was corrected in accordance with Section 4.1.3 of WCAP-13451.

Affected Evaluation Model

1985 Small Break LOCA Evaluation Model

Estimated Effect

Representative plant calculations for this issue resulted in the estimated PCT effect (+12°F for the plant specific portion, if applicable, and +18°F for the generic portion) documented in the attached Margin Utilization Sheet.

CORE NODE ZIRC OXIDE INITIALIZATION ERROR

Background

NOTRUMP models two regions for each core node analogous to the two (mixture and vapor) regions in adjoining fluid nodes. During the course of a transient, NOTRUMP tracks region specific quantities for each core node. Erroneous logic caused incorrect initialization of the region specific, fuel cladding zirc oxide thickness at times prior to the actual creation of the relevant region during the core boiliff transient.

This was determined to be a Non-Discretionary Change as described in Section 4.1.2 of WCAP-13451 and was corrected in accordance with Section 4.1.3 of WCAP-13451.

Affected Evaluation Model

1985 Small Break LOCA Evaluation Model

Estimated Effect

Representative plant calculations led to an estimated generic PCT effect of 0°F for this effect.

ATTACHMENT 3 TO AEP:NRC:1118H

WESTINGHOUSE ELECTRIC CORPORATION

DESCRIPTION OF LOCA MODEL CHANGES

Background

10CFR50.46, Appendix K prescribes the acceptable features and required documentation for ECCS Evaluation Models. More specifically, Section II.3 requires that documentation be in place to verify that sensitivity studies have demonstrated the adequacy of nodalization schemes used in the analysis models. A study was recently undertaken with the Westinghouse small break LOCA Evaluation Model to examine the sensitivity of predicted results to the nodalization used for the hot rod model. The results of that study raised concerns regarding the adequacy of the standard axial nodalization prescribed for use in the SBLOCTA code for licensing basis analyses. As a result of this concern, Westinghouse investigated this as a Potential Issue per 10 CFR 21.

Issue Description

The standard rod model (developed in the 1970's) used in performing SBLOCTA calculations has 19 axial nodes with a finer distribution in the top elevations. However, sensitivity studies to justify the number and distribution of these nodes can not be documented. A series of calculations were performed using increasingly finer axial nodalizations than prescribed for the 19 node model and indicated that the standard SBLOCTA 19 node model was not conservative. Nearly all cases demonstrated a significantly non-conservative behavior with respect to PCT. The penalty is attributed to a net increase in single-phase steam enthalpy rise as these nodes uncover sooner and heat up more than coarser nodes partially covered by the mixture level. Thus, it was concluded that a revised model that included a much finer axial nodalization could potentially lead to less favorable results than those predicted in the current analyses, possibly challenging the 10 CFR 50.46 acceptance criteria.

As a result of further investigation into the SBLOCTA code, several additional related issues associated with nodalization and the overall solution of the fluid conservation equations were subsequently identified and corrected. As a separate, but related issue, Westinghouse has implemented a revised model for calculating transient fuel rod internal pressure in the SBLOCTA code. Fuel rod pressure is a governing factor in defining the clad creep, burst and blockage behavior for small break LOCA transients. The NRC was informed of this modeling change per Westinghouse letter NTD-NRC-94-4253, "Revision to the Rod Internal Pressure Model in the Westinghouse SBLOCTA Code (Proprietary)". The letter also informed the NRC that Westinghouse has validated and instituted the model as a methodology improvement to the small break LOCA model for standard implementation on a forward-fit basis in accordance with WCAP-13451, Westinghouse Methodology for Implementation of 10 CFR 50.46 Reporting, October, 1992.

Technical Evaluation

At this time Westinghouse has completed the generic technical evaluation of the fuel rod axial nodalization methodology. A revised standard for rod nodalization has been established which insures an adequate solution to the hot channel calculation by specifying a fine nodalization of 0.25 ft nodes for all elevations that are predicted to uncover during the transient.

Since the improved axial nodalization methodology and revised fuel rod internal pressure model can have significant synergistic effects on the predicted peak clad temperature, the SBLOCTA calculation

from the limiting small break LOCA transient has been rerun with the revised code and methodology in order to obtain an accurate estimation of the net effect of these changes on the analysis of record. Several recent code revisions and error corrections of lesser magnitude have also been incorporated in the code version used to conduct this calculation. Normally these items would have been reported in the 10CFR50.46 year-end reporting summary along with estimates of effects. As a consequence of using the revised code to obtain results for this evaluation, these items have been implicitly addressed in the results provided. Since this portion of the ECCS Small Break Evaluation Model has already been reanalyzed, Westinghouse believes that no additional reanalysis is necessary to satisfy 10 CFR 50.46 even for those plants that have a significant PCT change as a result of this issue.

Since all of the issues relate to portions of the SBLOCTA code and/or its associated input methodology, they may be reported as a single closely-related group of changes. Attached to this letter is a revised Small Break LOCA Margin Utilization Summary table which contains a compilation of the net effect of this evaluation, as item "Axial Nodalization, RIP Model Revision and SBLOCTA Error Corrections". Where necessary, Westinghouse has provided notes as an attachment to explain which items have been affected.

Power Margin Utilization

During the process of reviewing the analysis of record for D. C. Cook Unit 1 as part of addressing the above issues, conservatism was noted in the core power axial offset limit and the hot assembly peaking factors assumed in the Unit 1 analysis. The overall current licensing basis analyses restrict the axial offset to a maximum full power positive skew of 13%, and a maximum hot assembly peaking factor of 1.38. Additional conservatism had been incorporated into the small break LOCA analysis to provide margin above and beyond the present core design limits. Following consultation with cognizant core design and utility personal, it was concluded that this margin is not being utilized and could be made available to offset the penalty associated with resolution of the present issues. The revised calculation was therefore performed with an axial offset limit of 20% and hot assembly peaking factor of 1.38 which supports the same RSAC core design limits as previously supported by the analysis of record, and therefore there are no changes to plant Tech Specs from incorporating this revision.

Recommendation

For those plants for which Westinghouse performs the licensed SBLOCA analyses, Westinghouse has determined that this issue is not a substantial safety hazard pursuant to 10 CFR 21 because the PCT penalty does not result in a loss of safety function to the extent that there is a major reduction in the degree of protection provided to public health and safety. However, for those plants that have been assessed either a PCT penalty or benefit, the plant licensees should review their reporting obligations under 10 CFR 50.46. To facilitate this, the updated Small Break PCT Margin Utilization Summary sheets are attached to this letter for those plants.

ATTACHMENT 4 TO AEP:NRC:1118H

WESTINGHOUSE ELECTRIC CORPORATION

DESCRIPTION OF LOCA MODEL CHANGES

Revised PCT Margin Utilization Sheets for D. C. Cook Units 1 and 2

It has been noted that the D. C. Cook Unit 1 Small Break LOCA PCT Margin Utilization Sheet for the 3250 MWt case with HHSI cross-tie valves closed contains an assessment which should have been removed following the reanalysis of this case last December (SECL-91-429, Rev.2, AEP-93-252). The assessment of -13°F for Drift Flux Flow Regime Errors should no longer be tracked because the version of the NOTRUMP code used for the reanalysis includes the corrected drift flux flow regime map. The corrected current PCT Margin Utilization Sheets are attached.

Note that the original transmittal of the reanalysis results contained only the analysis PCT (1951°F) and the corresponding Burst and Blockage/Time in Life assessment of 117°F. No additional assessments were considered in the Burst and Blockage/Time in Life calculation. Therefore the total PCT given in AEP-93-252 was not affected by the Drift Flux Flow Regime Error assessment.

The Burst and Blockage/Time in Life assessment has been recalculated for all of the previous PCT Margin Utilization Sheets for the reanalysis case (with the -13°F assessment removed). Note that the Burst and Blockage/Time in Life assessments given here decreased (rather than increased) because a later version of the SPIKE code was used here, incorporating modifications to the cladding burst strain model.

NSAL-94-022A, October 25, 1994 (Transmitted in AEP-94-253, 10/27/94)

Adjusted Burst and Blockage/Time in Life assessment: 15°F (No Change)

NSAL-94-018A, August 17, 1994 (Transmitted in AEP-94-247, 8/18/94)

Adjusted Burst and Blockage/Time in Life assessment: 90°F

NSAL-94-010A, May 16, 1994 (Transmitted in AEP-94-234, 5/17/94)

Adjusted Burst and Blockage/Time in Life assessment: 79°F

NSAL-94-004A, February 8, 1994 (Transmitted in AEP-94-214, 2/8/94)

Adjusted Burst and Blockage/Time in Life assessment: 79°F

At no time since the reanalysis has the total PCT (without the -13°F assessment and with any resulting incremental Burst and Blockage/Time in Life penalty) exceeded the 2200°F acceptance criterion of 10 CFR 50.46.

ATTACHMENT 5 TO AEP:NRC:1118H

WESTINGHOUSE ELECTRIC CORPORATION

DETERMINATION OF EFFECT OF LOCA MODEL CHANGES ON

COOK NUCLEAR PLANT LOCA ANALYSES

SMALL BREAK LOCA

PLANT NAME: DONALD C. COOK NUCLEAR PLANT UNIT 1

Comments: Evaluation Model: NOTRUMP, FQ=2.32, $F_{\Delta H}$=1.55, SGTP=15%
Other: HHSI Cross Tie Valve Closed, 3250 MWt Reactor Power

A.	ANALYSIS OF RECORD	PCT= 1951°F
B.	PRIOR LOCA MODEL ASSESSMENTS - 1992	ΔPCT= + 3°F[1]
C.	PRIOR LOCA MODEL ASSESSMENTS - March 1994	ΔPCT= -16°F
D.	1994 10 CFR 50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)	
	1. Boiling Heat Transfer Correlation Error	ΔPCT= -6°F
	2. Steam Line Isolation Logic Error	ΔPCT= + 18°F
	3. Axial Nodalization, RIP Model Revision, and SBLOCTA Error Corrections Analysis	ΔPCT= -235°F[2]
	4. Burst and Blockage/Time in Life	ΔPCT= + 15°F[3]
E.	LICENSING BASIS PCT + PERMANENT ASSESSMENTS	PCT= 1730°F

1. The 1992 assessment for 15x15 hydraulic test results was not included in the new analysis of record. However, the drift flux flow regime error was incorporated. The drift flux flow regime assessment was erroneously reported as -13°F in our previous two reports of January 12, 1994 (AEP:NRC:1118G) and March 25, 1994 (AEP:NRC:1118E). In both cases, the total PCT did not exceed the 2200°F acceptance criterion of 10CFR50.46.

2. Based on limiting case reanalysis with reduced axial offset (20%) and core radial peaking factor (1.38).

3. It should be noted that the burst and blockage assessment is subject to change as other model assessments are made because the magnitude of the burst and blockage assessments depends on the PCT without burst and blockage.

SMALL BREAK LOCA

PLANT NAME: DONALD C. COOK NUCLEAR PLANT UNIT 1

Comments: Evaluation Model:NOTRUMP, FQ-2.32, $F_{\Delta H}$-1.55, SGTP-15%
Other: HHSI Cross Tie Valve Open, 3588 MWt Reactor Power

A.	ANALYSIS OF RECORD	PCT- 1570°F
B.	PRIOR LOCA MODEL ASSESSMENTS - October 1993	ΔPCT- -13°F
C.	PRIOR LOCA MODEL ASSESSMENTS - January 1994	ΔPCT- + 97°F
D.	PRIOR LOCA MODEL ASSESSMENTS - January 1994	ΔPCT- -16°F
E.	1994 10 CFR 50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)	
	1. Containment Spray during SBLOCA	ΔPCT- + 20°F
	2. Boiling Heat Transfer Correlation Error	ΔPCT- -6°F
	3. Steam Line Isolation Logic Error	ΔPCT- + 18°F
	4. Axial Nodalization, RIP Model Revision, and SBLOCTA Error Corrections Analysis	ΔPCT- -118°F[1]
F.	LICENSING BASIS PCT + PERMANENT ASSESSMENTS	PCT- 1552°F

1. Based on limiting case reanalysis with reduced axial offset (20%) and core radial peaking factor (1.38).

SMALL BREAK LOCA

PLANT NAME: DONALD C. COOK NUCLEAR PLANT UNIT 2

Comments: Evaluation Model:NOTRUMP, FQ=2.45[1], FΔH=1.666, SGTP=15%
Other: HHSI Cross Tie Valve Closed, 3250 MWt Reactor Power

A.	ANALYSIS OF RECORD	PCT= 1956°F
B.	PRIOR LOCA MODEL ASSESSMENTS - October 1993	ΔPCT= -13°F
C.	PRIOR LOCA MODEL ASSESSMENTS - March 1994	ΔPCT= -16°F
D.	1994 10CFR50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)	
	1. Boiling Heat Transfer Correlation Error	ΔPCT= -6°F
	2. Steam Line Isolation Logic Error	ΔPCT= + 18°F
	3. Axial Nodalization, RIP Model Revision, and SBLOCTA Error Corrections Analysis	ΔPCT= + 57°F[2]
	4. Burst and Blockage/Time in Life	ΔPCT= + 0°F[2,3]
E.	LICENSING BASIS PCT + PERMANENT ASSESSMENTS	PCT= 1996°F

1. The F_Q supported was previously reported incorrectly as 2.357.

2. The evaluation case used to determine this assessment also predicted rod burst at the beginning of fuel life. Therefore, burst and blockage effects are included here and the Burst and Blockage/Time in Life assessment is zero. It is possible for a non-burst case, in combination with possible future permanent model assessments and associated Burst and Blockage/Time in Life penalty, to become limiting. If such a case becomes limiting, this assessment will change to reflect the non-burst case, and burst and blockage effects will be accounted for below.

3. It should be noted that the burst and blockage assessment is subject to change as other model assessments are made because the magnitude of the burst and blockage assessments depends on the PCT without burst and blockage.

SMALL BREAK LOCA

PLANT NAME: DONALD C. COOK NUCLEAR PLANT UNIT 2

Comments: Evaluation Model:NOTRUMP, FQ-2.44[1], FΔH-1.644, SGTP-15%
Other: HHSI Cross Tie Valve Closed, 3413 MWt Reactor Power

A.	ANALYSIS OF RECORD	PCT- 1947°F
B.	PRIOR LOCA MODEL ASSESSMENTS - October 1993	ΔPCT- -13°F
C.	PRIOR LOCA MODEL ASSESSMENTS - March 1994	ΔPCT- -16°F
D.	1993 10CFR50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)	
	1. Boiling Heat Transfer Correlation Error	ΔPCT- -6°F
	2. Steam Line Isolation Logic Error	ΔPCT- + 18°F
	3. Axial Nodalization, RIP Model Revision, and SBLOCTA Error Corrections Analysis	ΔPCT- -45°F
	4. Burst and Blockage/Time in Life	ΔPCT- + 58°F[2]
E.	LICENSING BASIS PCT + PERMANENT ASSESSMENTS	PCT- 1943°F

1. The FQ supported was previously reported incorrectly as 2.34

2. It should be noted that the burst and blockage assessment is subject to change as other model assessments are made because the magnitude of the burst and blockage assessments depends on the PCT without burst and blockage.

SMALL BREAK LOCA

PLANT NAME: DONALD C. COOK NUCLEAR PLANT UNIT 2

Comments: Evaluation Model:NOTRUMP, FQ=2.32, $F_{\Delta H}$=1.62,SGTP=15%,
Other: HHSI Cross Tie Valve Open, 3588 MWt Reactor Power

A.	ANALYSIS OF RECORD	PCT= 1531°F
B.	PRIOR LOCA MODEL ASSESSMENTS - October 1993	ΔPCT= -13°F
C.	PRIOR LOCA MODEL ASSESSMENTS - March 1994	ΔPCT= -16°F
D.	1993 CFR 50.46 MODEL ASSESSMENTS (Permanent Assessment of PCT Margin)	
	1. Containment Spray During SBLOCA	ΔPCT= + 20°F
	2. Boiling Heat Transfer Correlation Error	ΔPCT= -6°F
	3. Steam Line Isolation Logic Error	ΔPCT= + 18°F
	4. Axial Nodalization, RIP Model Revision, and SBLOCTA Error Corrections Analysis	ΔPCT= + 3°F
E.	LICENSING BASIS PCT + PERMANENT ASSESSMENTS	PCT= 1537°F