



Commonwealth Edison
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December 22, 1992

Dr. Thomas E. Murley, Director
Office of Nuclear Reactor Regulation
U.S. Nuclear Regulatory Commission
Washington, DC 20555

ATTN: Document Control Desk

Subject: Byron Nuclear Power Station Units 1 and 2
Braidwood Nuclear Power Station Units 1 and 2
ECCS Evaluation Model Changes
NRC Docket Nos. 50-454, 50-455, 50-456 and 50-457

- Reference: 1. Byron Station Units 1 and 2, Braidwood Station Units 1 and 2 Updated Final Safety Analysis Report updated to December, 1991.
2. Letter, M. A. Jackson to T. E. Murley (NRC) dated July 25, 1992.
3. Letter, B. S. Humphries (Westinghouse) to Dr. T. A. Rieck, "Commonwealth Edison Companies, Byron/Braidwood Stations Small Break LOCA SI Spilling Line Assumption Error," November 23, 1992, Westinghouse Letter Number ET-NSL-OPL-I-92-588

Dr. Murley:

This letter fulfills the 30 day reporting requirement of 10CFR50.46(a)(3)(ii) for the Small Break Loss of Coolant Accident (SBLOCA) analysis for Byron and Braidwood Nuclear Power stations. In Reference 3, Westinghouse notified Commonwealth Edison that an error in the Byron/Braidwood NOTRUMP SBLOCA analysis for VANTAGE 5 fuel (Reference 1) had been identified. Incorrect safety injection data for the Centrifugal Charging Pump (CCP) was inadvertently used. The Westinghouse standard SBLOCA methodology assumes that the SI line attached to the broken loop cold leg spills (no credit for injection flow). For break sizes which are smaller than the SI line diameter, the SI is assumed to spill to RCS pressure; however, if the break size is greater than or equal to the SI line size, the SI is postulated to spill to containment pressure. The Byron/Braidwood SBLOCA analysis includes break sizes ranging from 2 inches to 6 inches in diameter. Since these breaks are larger than the CCP SI line (1.5 inch diameter), the analysis should have used CCP data with one line spilling to containment pressure; however, the analysis used CCP data with one line spilling to RCS pressure.

An evaluation has been completed to estimate the effect of this error. The change in Peak Cladding Temperature (PCT) due to the error is estimated to be 166.5°F for the 3-inch limiting break. This penalty is in addition to the 20°F penalty assigned for the CCP Technical Specification change evaluation reported in Reference 2. Furthermore, an evaluation was performed which demonstrated that the 3-inch break would remain the limiting break.

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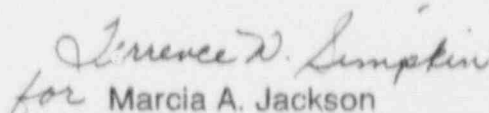
Additionally, a 5°F penalty has been assigned to SBLOCA as a result of the increased uncertainty of the pressurizer pressure initial condition during Economic Generation Control (EGC) operation. Westinghouse has performed plant specific evaluations for Byron and Braidwood and have quantified the variability of automatic reactor control systems parameters. Pressurizer pressure and level and reactor average temperature experience wider variations than were assumed in the original SBLOCA analysis. The 5°F penalty conservatively bounds the effects of EGC operation.

A 0.1°F penalty has been assigned to the SBLOCA results for Braidwood Unit 2 due to the reconstitution of fuel assembly T48X (Braidwood Unit 2 Cycle 3). One fuel rodlet has been removed, and has been replaced by a stainless steel rod.

The net SBLOCA PCT for the Byron/Braidwood Stations remains below 1700°F, including the effects of all previous evaluations and the evaluation of the effect of Economic Generation Control. Since continued compliance with the 10CFR50.46(b) criteria has been shown, this is not considered to be a potential safety issue, nor is it reportable under 10CFR21. The Δ PCT penalties for the charging pump flow reduction are based on results from the NOTRUMP model for Byron/Braidwood. Since the flow reductions have been explicitly modeled using an NRC reviewed model, Commonwealth Edison does not plan to re-perform SBLOCA analysis. Commonwealth Edison does not plan to issue another report pursuant to 10CFR50.46 until the next annual report or until another 50°F Δ PCT penalty is accumulated.

Please direct any questions to this office.

Respectively,


for Marcia A. Jackson
Generic Issues Administrator

Attachment

cc: A. B. Davis - Regional Administrator, Region III
J. E. Dyer - PDIII-2 Director, NRR
R. Elliott - Braidwood Project Manager, NRR
J. Hickman - Byron Project Manager, NRR
Senior Resident Inspector - Byron
Senior Resident Inspector - Braidwood

ATTACHMENT 1

10CFR50.46

SMALL BREAK LOCA

MARGIN UTILIZATION

BYRON AND BRAIDWOOD STATION

UNITS 1 and 2

ATTACHMENT 1

BYRON 1, 2
SMALL BREAK LOCA
10CFR50.46 MARGIN UTILIZATION

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PLANT NAME: BYRON STATION UNITS 1 & 2
UTILITY NAME: COMMONWEALTH EDISON

- A. ANALYSIS OF RECORD PCT = 1453.1°F
(Comments: Calc-Note No. SEC-SAIL-3173-C0
Evaluation Model: NOTRUMP, FQT = 2.50, FdH = 1.65,
SGTP = 15 %, Other:)
- B. PRIOR LOCA MODEL ASSESSMENTS - 1989 Δ PCT = + 0°F
(Permanent Assessment of PCT Margin - Letter #: CAE-90-314/CCE-90-309)
- C. PRIOR LOCA MODEL ASSESSMENTS - 1990 Δ PCT = + 0°F
(Permanent Assessment of PCT Margin - Letter #: CAE-91-135/CCE-91-136)
- D. CURRENT LOCA MODEL ASSESSMENTS - 06/1991
(Permanent Assessment of PCT Margin)
1. FUEL ROD INITIAL CONDITION INCONSISTENCY Δ PCT = + 37°F
- E. 10CFR50.59 SAFETY EVALUATIONS - (Permanent Assessment of PCT Margin)
None.
- F. OTHER MARGIN ALLOCATIONS (Temporary Use of PCT Margin):
- | | |
|--|---------------------------------|
| 1. PLANT MARGINS USED: <u>HHSI SURV. (NOTE 1)</u> | Δ PCT = + <u>20°F</u> |
| 2. PLANT MARGINS USED: <u>HHSI SPILL FLOW (NOTE 2)</u> | Δ PCT = + <u>166.5°F</u> |
| 3. PLANT MARGINS USED: <u>EGC OPERATION (NOTE 3)</u> | Δ PCT = + <u>5°F</u> |
- LICENSING BASIS PCT + MARGIN ALLOCATION Net PCT = 1681.6°F

Notes:

1. A temporary PCT penalty of no more than 20°F was assessed by Westinghouse (SECL-90-015) in support of a potential change to the charging pump surveillance acceptance limit. This proposed change is still under review and has not yet been submitted for NRC approval. The SBLOCA penalty would result from a slight reduction in delivered SI under spilling line conditions between 1400 psia and 1000 psia RCS pressure.
2. A 166.5°F penalty has been assigned to the limiting break as a result of a modeling error related to the back pressure on the high pressure safety injection branch line associated with the ruptured cold leg.
3. A 5°F penalty has been assigned to small break LOCA as a result of the increased uncertainty of the pressurizer pressure initial condition during Economic Generation Control (EGC) operation.

ATTACHMENT 1

BRAIDWOOD 1
 SMALL BREAK LOCA
 10CFR50.46 MARGIN UTILIZATION

Page 2 of 3

PLANT NAME: BRAIDWOOD STATION UNIT 1
 UTILITY NAME: COMMONWEALTH EDISON

A. ANALYSIS OF RECORD

 $\Delta PCT = 1453.1^{\circ}F$

(Comments: Calc-Note No. SEC-SAIL-3173-C0
 Evaluation Model: NOTRUMP, FQT=2.50, FdH=1.65,
SGTP = 15 %, Other: _____)

B. PRIOR LOCA MODEL ASSESSMENTS - 1989

 $\Delta PCT = + 0^{\circ}F$

(Permanent Assessment of PCT Margin - Letter #: CCE-90-309)

C. PRIOR LOCA MODEL ASSESSMENTS - 1990

 $\Delta PCT = + 5^{\circ}F$

(Permanent Assessment of PCT Margin - Letter #: CCE-91-136)

D. CURRENT LOCA MODEL ASSESSMENTS - 06/1991

(Permanent Assessment of PCT Margin)

1. FUEL ROD INITIAL CONDITION INCONSISTENCY

 $\Delta PCT = + 37^{\circ}F$

E. 10CFR50.59 SAFETY EVALUATIONS - (Permanent Assessment of PCT Margin)

1. Letter: SECL-91-188D Issue: MISSING GRID PIECE $\Delta PCT = + 17^{\circ}F$

F. OTHER MARGIN ALLOCATIONS (Temporary Use of PCT Margin):

1. PLANT MARGINS USED: HHSI SURV. (NOTE 1) $\Delta PCT = + 20^{\circ}F$

2. PLANT MARGINS USED: HHSI SPILL FLOW $\Delta PCT = + 166.5^{\circ}F$

3. FUEL MARGINS USED: N/A $\Delta PCT = \text{ }^{\circ}F$

4. PLANT MARGINS USED: EGC OPERATION (NOTE 3) $\Delta PCT = + 5^{\circ}F$

LICENSING BASIS PCT + MARGIN ALLOCATION Net PCT = 1698.6^{\circ}F

Notes:

1. A temporary PCT penalty of no more than $20^{\circ}F$ was assessed by Westinghouse (SECL-90-015) in support of a potential change to the charging pump surveillance acceptance limit. This proposed change is still under review and has not yet been submitted for NRC approval. The SBLOCA penalty would result from a slight reduction in delivered SI under spilling line conditions between 1400 psia and 1000 psia RCS pressure.
2. A $166.5^{\circ}F$ penalty has been assigned to the limiting break as a result of a modeling error related to the back pressure on the high pressure safety injection branch line associated with the ruptured cold leg.
3. A $5^{\circ}F$ penalty has been assigned to small break LOCA as a result of the increased uncertainty of the pressurizer pressure initial condition during Economic Load Control (EGC) operation.

BRAIDWOOD 2
SMALL BREAK LOCA
10CFR50.46 MARGIN UTILIZATION

PLANT NAME: BRAIDWOOD STATION UNIT 2
UTILITY NAME: COMMONWEALTH EDISON

A. ANALYSIS OF RECORD

PCT= 1453.1°F

(Comments: Calc-Note No. SEC-SAI-3173-C0
Evaluation Model: NOTRUMP, FQT=2.50, FdH=1.65,
SGTP = 15 %, Other: _____)

B. PRIOR LOCA MODEL ASSESSMENTS - 1989

 Δ PCT= + 0°F(Permanent Assessment of PCT Margin - Letter #: CAE-90-314/CCE-90-309)

C. PRIOR LOCA MODEL ASSESSMENTS - 1990

 Δ PCT= + 0°F(Permanent Assessment of PCT Margin - Letter #: CAE-91-135/CCE-91-136)

D. CURRENT LOCA MODEL ASSESSMENTS - 06/1991

(Permanent Assessment of PCT Margin)

1. FUEL ROD INITIAL CONDITION INCONSISTENCY

 Δ PCT= + 37°FE. 10CFR50.59 SAFETY EVALUATIONS - (Permanent Assessment of PCT Margin)
None.

F. OTHER MARGIN ALLOCATIONS (Temporary Use of PCT Margin):

1. PLANT MARGINS USED: HHSI SURV. (NOTE 1) Δ PCT= + 20°F2. PLANT MARGINS USED: HHSI SPILL FLOW (NOTE 2) Δ PCT= + 166.5°F3. FUEL MARGINS USED: RECONSTITUTION (NOTE 4) Δ PCT= + 0.1°F4. PLANT MARGINS USED: EGC OPERATION (NOTE 3) Δ PCT= + 5°FLICENSING BASIS PCT + MARGIN ALLOCATION Net PCT= 1681.7°F

Notes:

1. A temporary PCT penalty of no more than 20°F was assessed by Westinghouse (SECL-90-015) in support of a potential change to the charging pump surveillance acceptance limit. This proposed change is still under review and has not yet been submitted for NRC approval. The SBLOCA penalty would result from a slight reduction in delivered SI under spilling line conditions between 1400 psia and 1000 psia RCS pressure.
2. A 166.5°F penalty has been assigned to the limiting break as a result of a modeling error related to the back pressure on the high pressure safety injection branch line associated with the ruptured cold leg.
3. A 5°F penalty has been assigned to small break LOCA as a result of the increased uncertainty of the pressurizer pressure initial condition during Economic Generation Control (EGC) operation.
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