



South Texas Project Electric Generating Station P.O. Box 289 Wadsworth, Texas 77483

April 15, 2014
NOC-AE-14003120
File No.: G25
10 CFR 50.46
STI:33852592

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

South Texas Project
Units 1 & 2
Docket Nos. STN 50-498, STN 50-499
10 CFR 50.46 Annual Report of ECCS Model Revisions

- References:
1. Letter from Roland Dunn to NRC Document Control Desk, "10 CFR 50.46 ECCS Evaluation Model Significant Change/Error Report," dated October 17, 2012 (NOC-AE-12002912) (ML12310A383)
 2. Letter from D.A Leazar to NRC Control Desk, "10CFR50.46 Annual Report of ECCS Model Revisions," dated May 3, 2004, (NOC-AE-04001722) (ML041450310)

Pursuant to 10 CFR 50.46(a)(3)(ii), STP Nuclear Operating Company submits this report to address errors to the accepted Emergency Core Cooling System (ECCS) evaluation model for the South Texas Project (STP) Units 1 and 2. The following summarize these errors and impact on the calculated Peak Clad Temperature (PCT) for the limiting ECCS analysis.

An error in the LOCBART code that impacts the calculation of the rod-to-rod radiation heat transfer coefficient resulted in 0°F change in PCT. The error was corrected and test cases were performed to determine the potential impact on the results. The test case results demonstrated that correcting the code error had a negligible impact on calculated results. Validation testing showed a negligible impact on calculated results, leading to an estimated PCT impact of 0°F.

Two errors in the SATAN6 calculation of the radiation term of the fuel rod gap heat transfer coefficient resulted in 0°F change in PCT. First, an incorrect temperature is used in the cladding emissivity calculation; second, a geometrical term is missing from the radiation heat transfer coefficient calculation. A set of hand calculations was completed showing a negligible impact on the fuel rod gap heat transfer coefficient in SATAN6, leading to an estimated effect of 0°F on PCT.

A condition in calculations completed with the BASH computer code relating to an isotherm indexing variable in the quench front model that results in oscillatory quench front behavior above the peak power elevation for select cases resulted in 0°F change in PCT. An updated version of the BASH computer code was used to estimate the effect of the quench front oscillations on the resulting core inlet flooding rate used by LOCBART for calculating the PCT.

A002
NRR

An updated version of the BASH computer code was developed to assess the impact of the oscillations for all impacted analyses. The validation results show a negligible impact on the resulting core inlet flooding rate, leading to an estimated effect of 0°F on PCT.

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. The nature of these changes leads to an estimated PCT impact of 0°F.

A change in the methodology used to calculate grid blockage ratio and porosity for Westinghouse fuel resulted in a change to the grid inputs used in the 1981 Appendix K Large Break Loss of Coolant Accident (LOCA) Evaluation Model with BASH (BASH-EM), which affects the grid heat transfer in the LOCBART fuel rod heatup calculation. The change in methodology does not affect the BASH-EM methodology. The impact of the recalculated grid blockage ratio and porosity for 17x17 RFA and 17x17 RFA-2 fuel, used as input in the BASH-EM LOCBART model, was qualitatively evaluated as having a negligible impact on reported results, leading to an estimated PCT effect of 0°F.

An error in the minimum local strain required for burst for ZIRLO® cladding in the SBLOCTA code resulted in 0°F change in PCT. The coding does not enforce reaching the minimum percent local strain threshold prior to calculating fuel rod burst. However, a review of licensing basis analyses revealed no instances of this error impacting calculated results. Based on a review of current licensing basis analyses, and the phenomena and physics of a small break LOCA transient, it is concluded that this error has a negligible effect on small break LOCA analysis results, leading to an estimated PCT impact of 0°F.

STP Unit 1 and Unit 2 large break LOCA peak clad temperatures have not changed since submittal in Reference 1. STP Unit 1 and Unit 2 small break LOCA peak clad temperatures have not changed since submittal in Reference 2.

There are no commitments in this letter.

If there are any questions, please contact either Mr. Charles Albury at (361) 972-8901 or me at (361) 972-7743.



Roland Dunn
Manager,
Nuclear Fuel & Analysis

cc:

(paper copy)

Regional Administrator, Region IV
U. S. Nuclear Regulatory Commission
1600 East Lamar Boulevard
Arlington, TX 76011-4511

Balwant K. Singal
Senior Project Manager
U.S. Nuclear Regulatory Commission
One White Flint North (MS 8 B1)
11555 Rockville Pike
Rockville, MD 20852

NRC Resident Inspector
U. S. Nuclear Regulatory Commission
P. O. Box 289, Mail Code: MN116
Wadsworth, TX 77483

Jim Collins
City of Austin
Electric Utility Department
721 Barton Springs Road
Austin, TX 78704

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

(electronic copy)

A. H. Gutterman, Esquire
Morgan, Lewis & Bockius LLP

Balwant K. Singal
U. S. Nuclear Regulatory Commission

John Ragan
Chris O'Hara
Jim von Suskil
NRG South Texas LP

Kevin Pollo
Cris Eugster
L. D. Blaylock
City Public Service

Peter Nemeth
Crain Caton & James, P.C.

C. Mele
City of Austin

Richard A. Ratliff
Texas Department of State Health
Services

Robert Free
Texas Department of State Health
Services