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A Study for the Replacement of Blowdown Loads Analysis Code of Korea Standard Nuclear Plants

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493

CEFLASH-4B

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2007

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SATAN-VI

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Abstract

The purpose of this study is to investigate the possibility to replace the CEFASH-4B code used in the blowdown loads analysis of Korea Standard Nuclear Plants. Since the application of CEFASH-4B is restricted after 2007 by U.S. Government, an alternative code to CEFASH-4B is necessary. The SATAN-VI code was selected as an alternative choice to the CEFASH-4B code since it was widely used in LOCA analyses to Westinghouse plants without any further charge. The SATAN-VI code was evaluated for the application to the blowdown loads analysis. With a few

problems fixed and/or improved, SATAN-VI code is reasonably applicable to blowdown loads analysis in KSNP plants.

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CEFLASH-4B 2007
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CEFLASH-4A [2,3] ,
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가 .
CEFLASH-4B CEFFLASH-4A
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SATAN-VI
CEFLASH-4A [4,5].
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2.1 CEFFLASH-4B

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CEFLASH-4B

CEFLASH-4A

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CEFLASH-4B

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2.2 CEFASH-4B

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CEFLASH-4A

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2.3 SATAN-VI

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CEFLASH-4A

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SATAN-VI

CEFLASH-4A

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[4,5].

가 CEFLASH-4B SATAN-VI 가

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One-Dimensional Homogenous Equation , Critical

Flow Model Flow Regime Map . CEFLASH-4B 가 Sub-cooled

Critical Flow Modified Henry-Fauske Model SATAN-VI

Modified Zaloudeck Model SATAN-VI 가

Bubble Rise Model Drift Flux Model

SATAN-VI

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SATAN-VI

CEFLASH-4B

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. SATAN-VI

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post-processing

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, CEFLASH-4B

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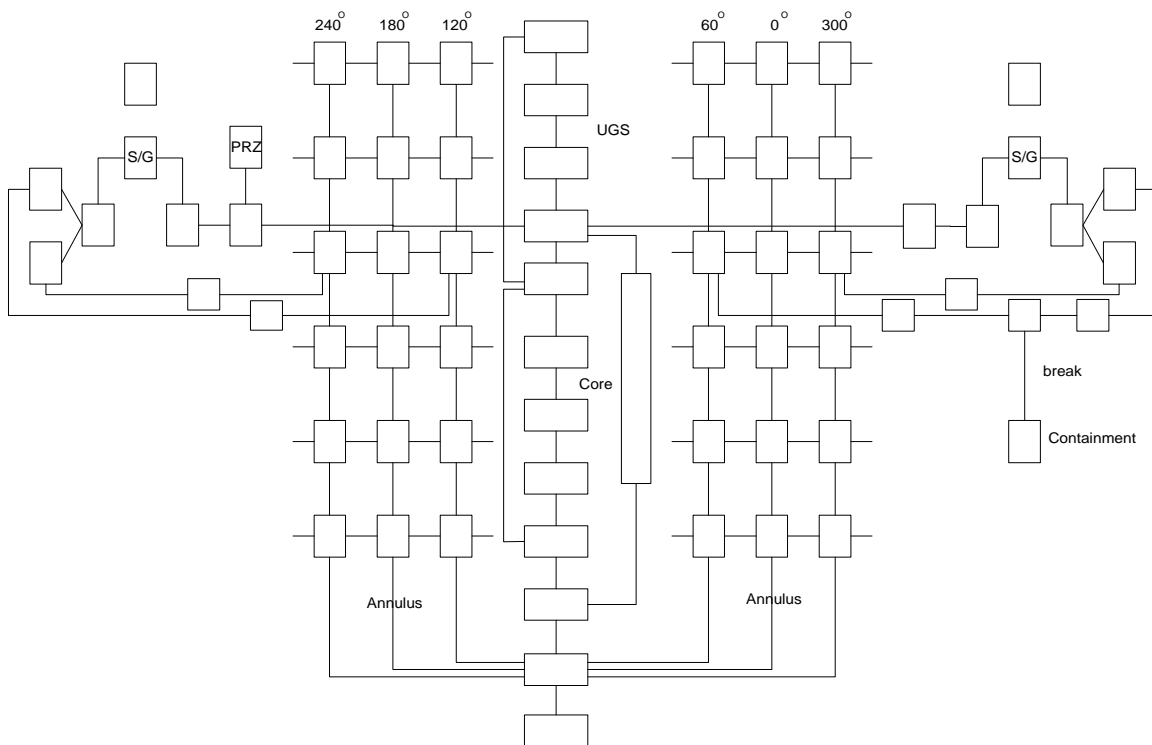
SATAN-VI

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1. CENPD-252-P-A, "Blowdown analysis method for the analysis of blowdown induced forces in a reactor vessel", July 1979.
2. CENPD-132-P, "Calculative methods for the C-E large break LOCA evaluation model vol. 1.", August 1974.
3. CENPD-133-P, "CEFLASH-4A, A Fortran digital computer program for reactor blowdown analysis group", August 1974.
4. KNF-TR-SGA-01001, "Westinghouse Evaluation Model for LOCA Analysis of Korea Standard Nuclear Plants", December 2001., "CE LBLOCA EM", 1998
5. 1998, "CE LBLOCA EM",
6. Y56ICD-SGA-CN-99005, Rev. 0, "YGN 5&6 FSAR LB LOCA Blowdown Analysis Using CEFLASH-4A", July 1999.

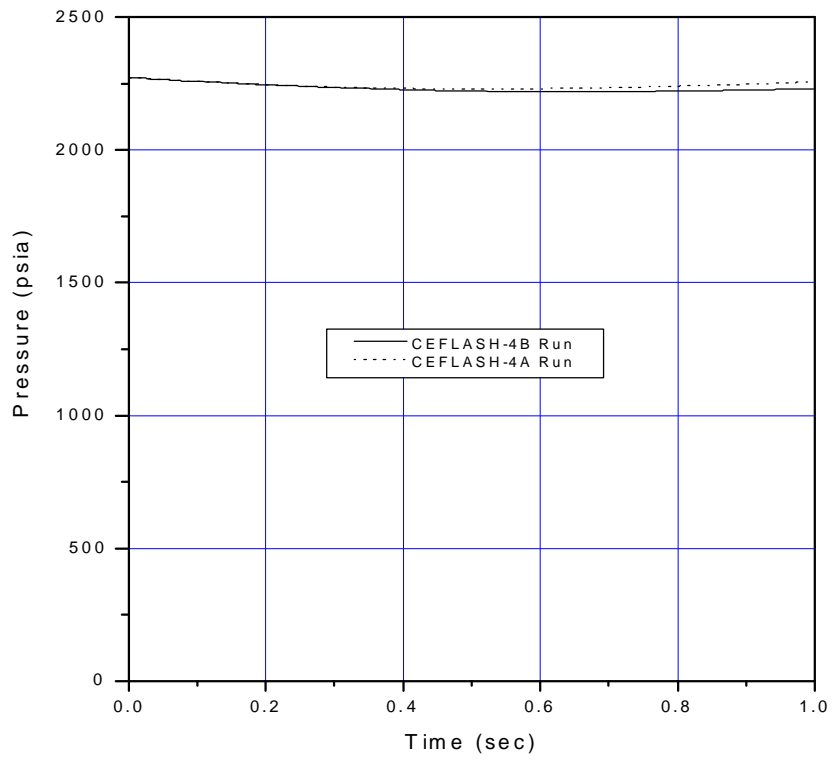
1.	
(102 %)	<p>2871 MWt</p> <p>Top Skewed Shape</p> <p>2250 psia</p> <p>121.5×10^6 lbm/hr</p> <p>117.9×10^6 lbm/hr</p> <p>564.5 °F</p> <p>622.0 °F</p> <p>8 %</p>



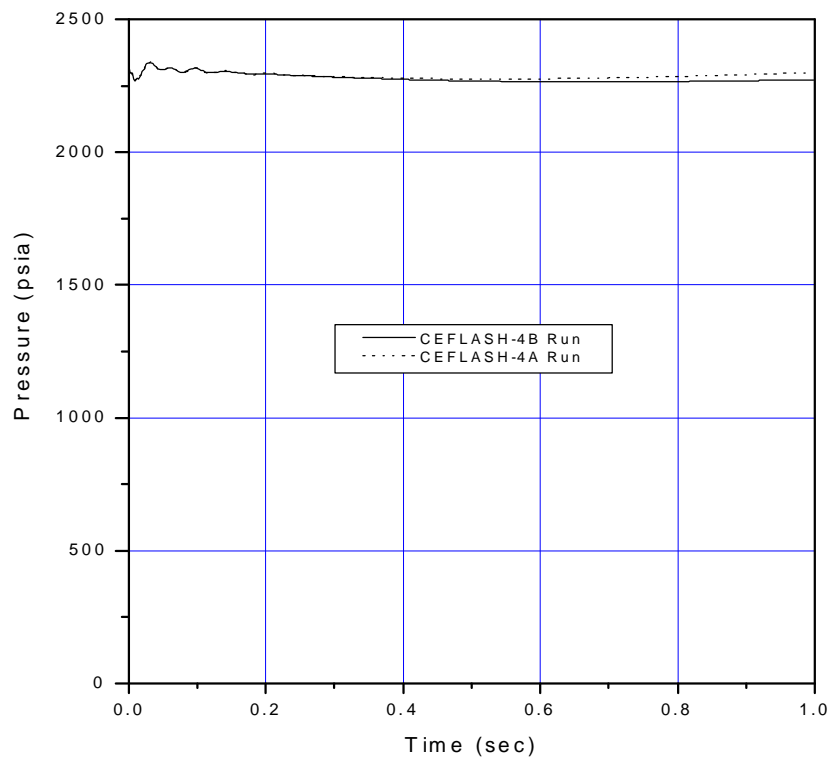
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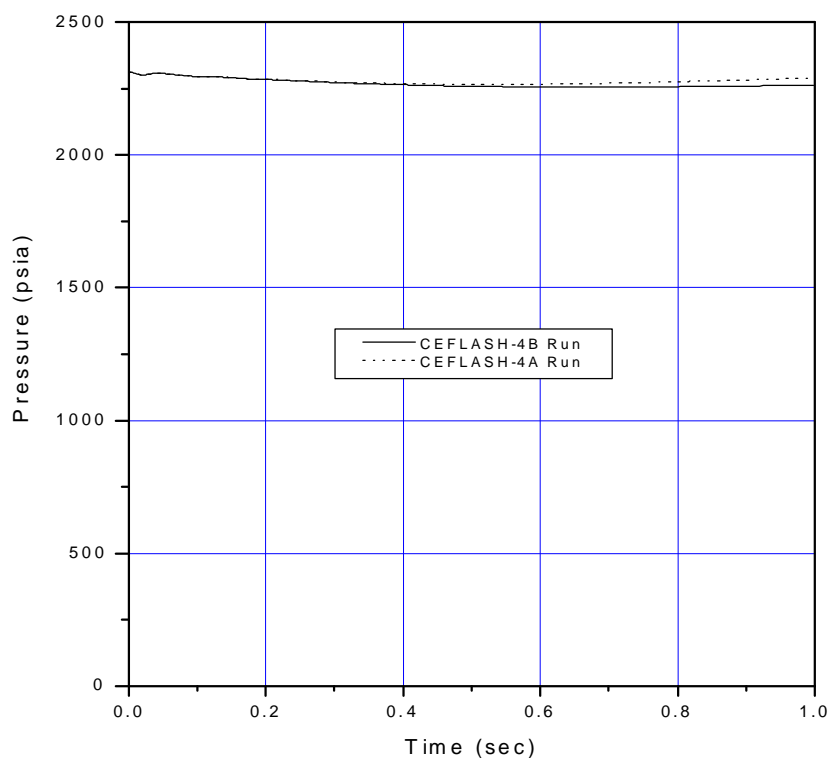
Nodalization



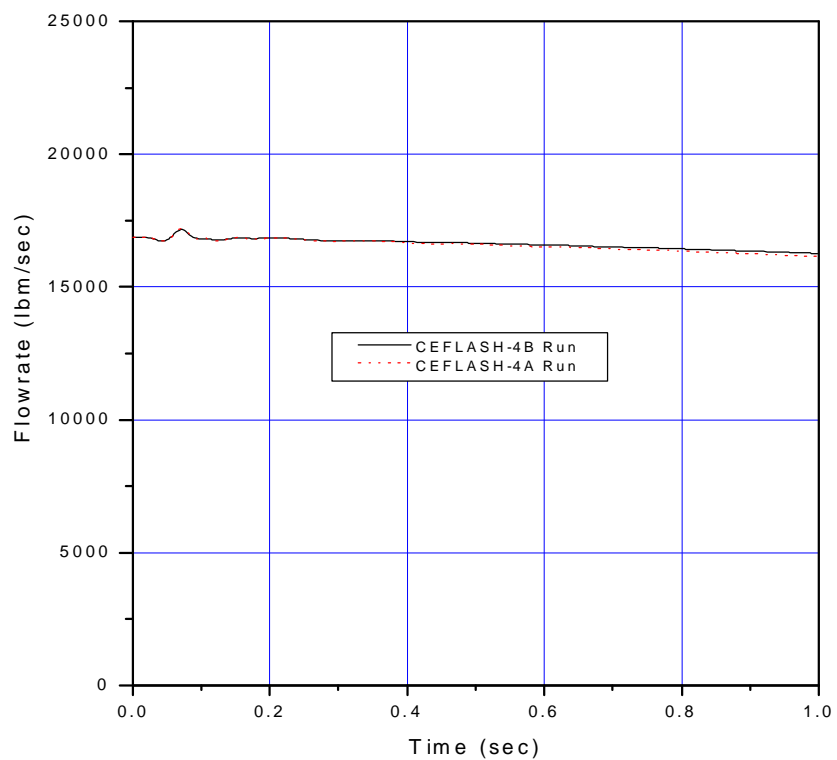
2. Pressure transient of outlet plenum for CEFLASH-4A/4B Run



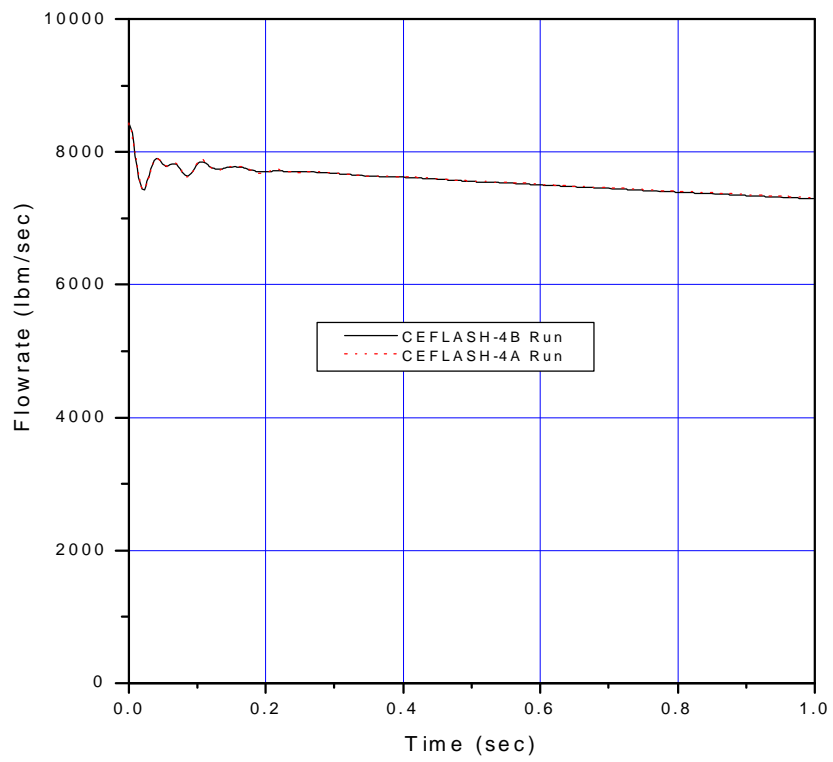
3. Pressure transient of broken node for CEFLASH-4A/4B Run



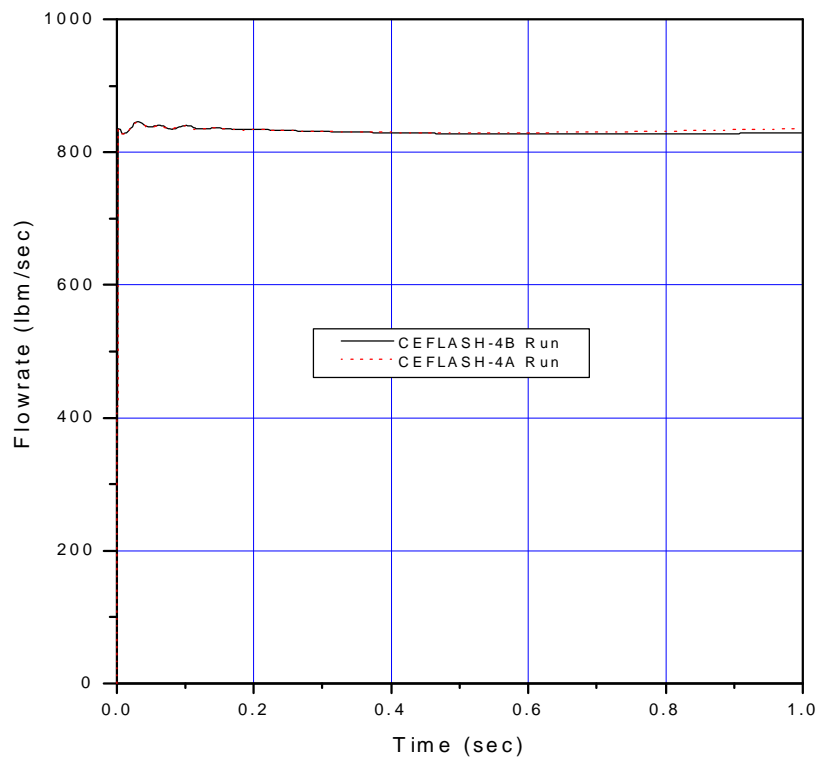
4. Pressure transient of upper annuls for CEFLASH-4A/4B Run



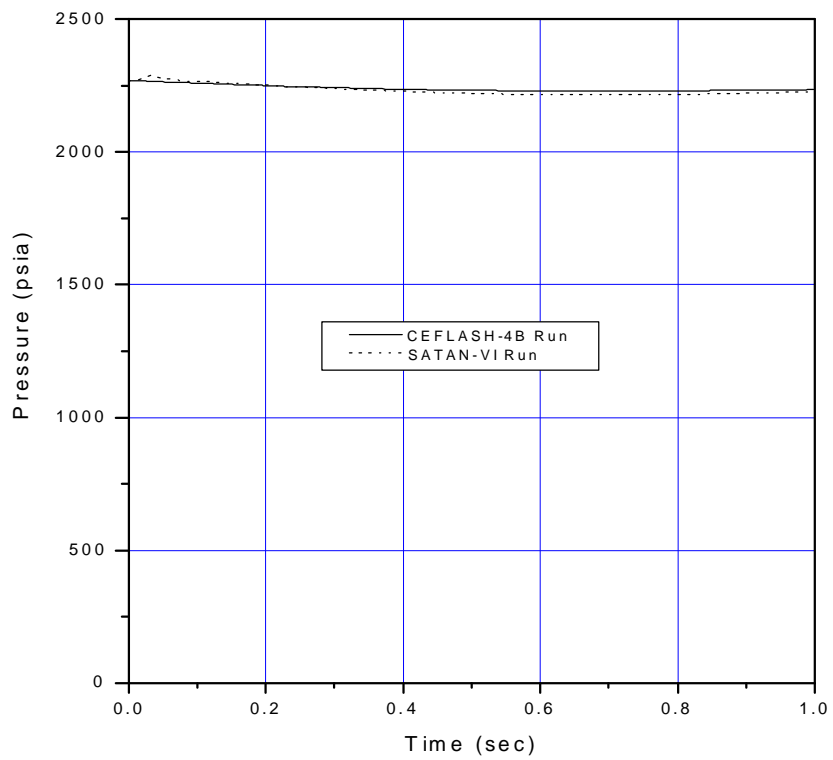
5. Hot leg flow transient for CEFLASH-4A/CEFLASH-4B Run



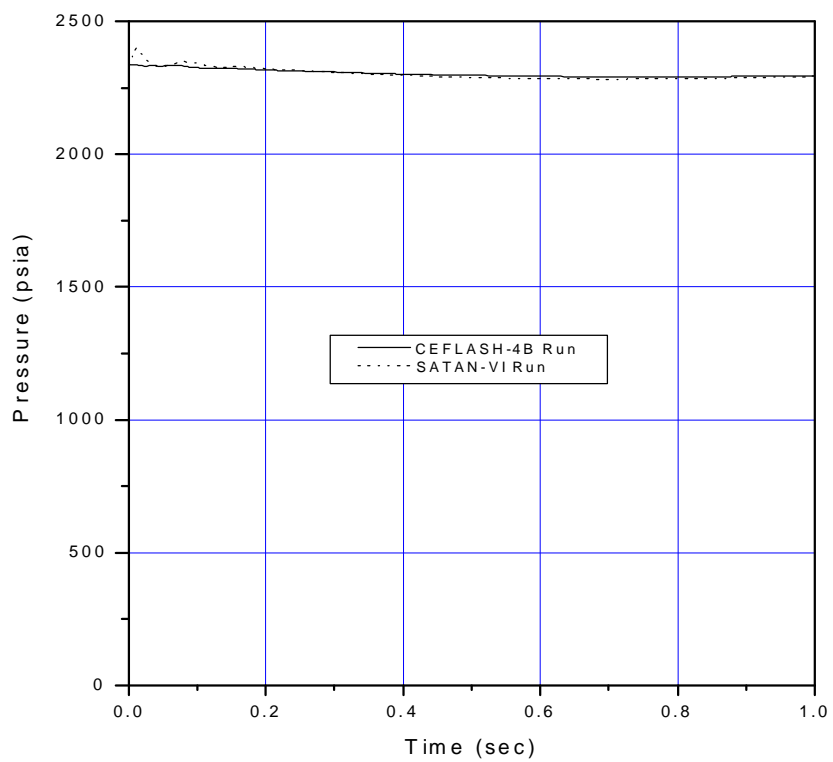
6. Cold leg flow transient for CEFLASH-4A/CEFLASH-4B Run



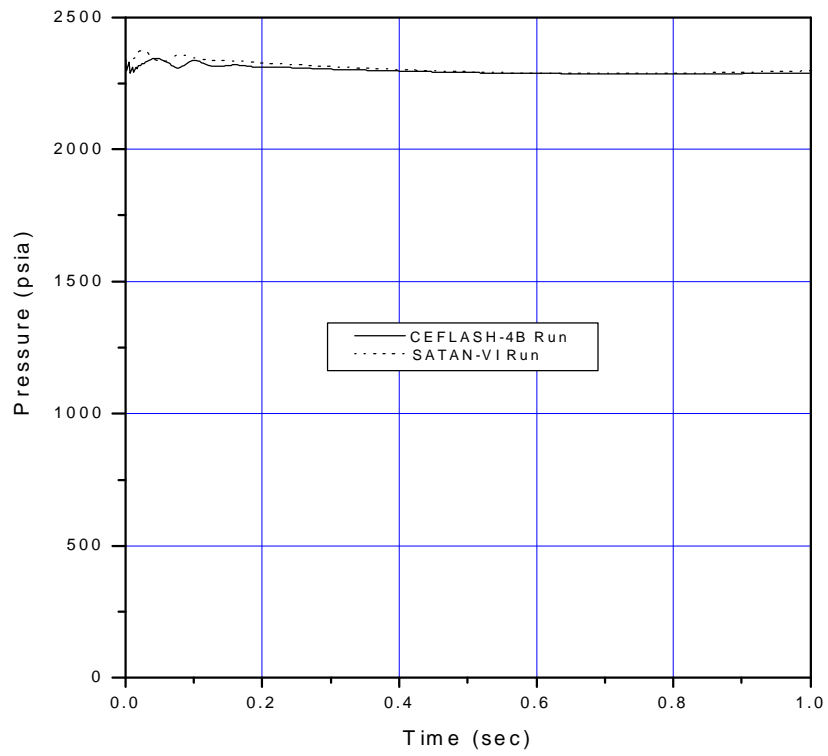
7. Break flow transient for CEFLASH-4A/CEFLASH-4B Run



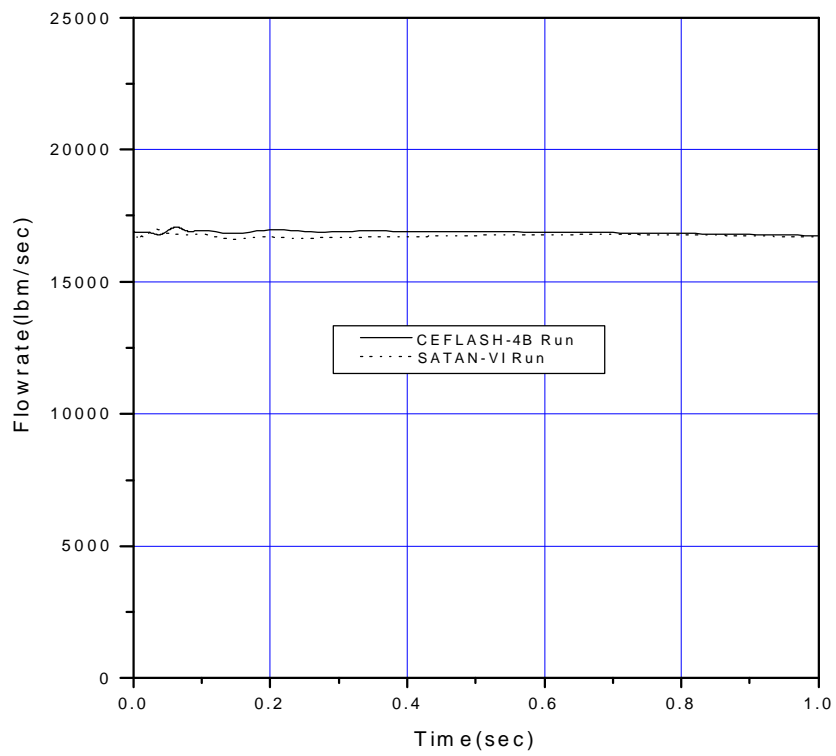
8. Pressure transient of outlet plenum for SATAN-VI/CEFLASH-4B Run



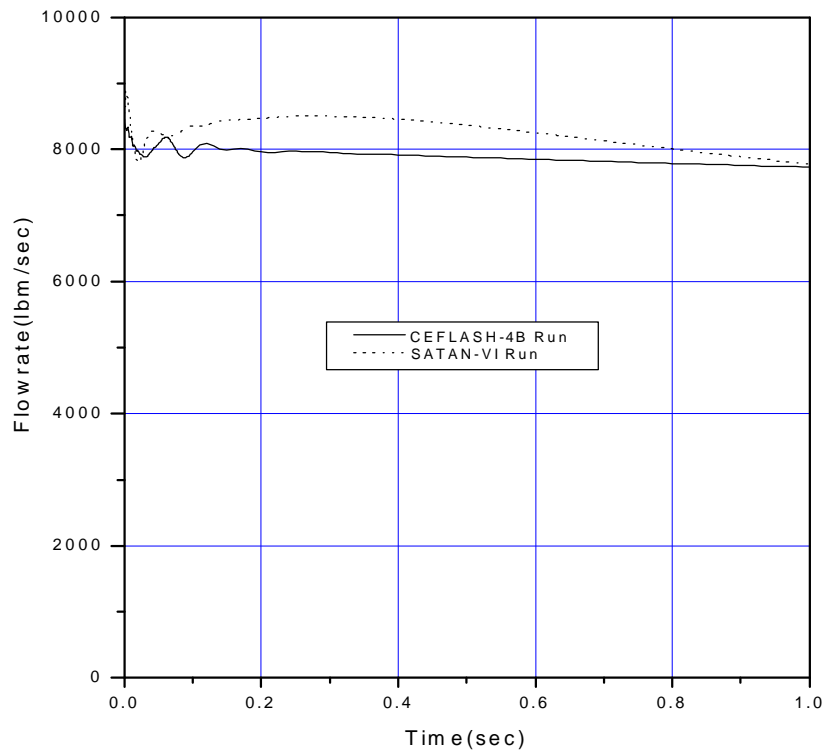
9. Pressure transient of annulus for SATAN-VI/CEFLASH4B Run



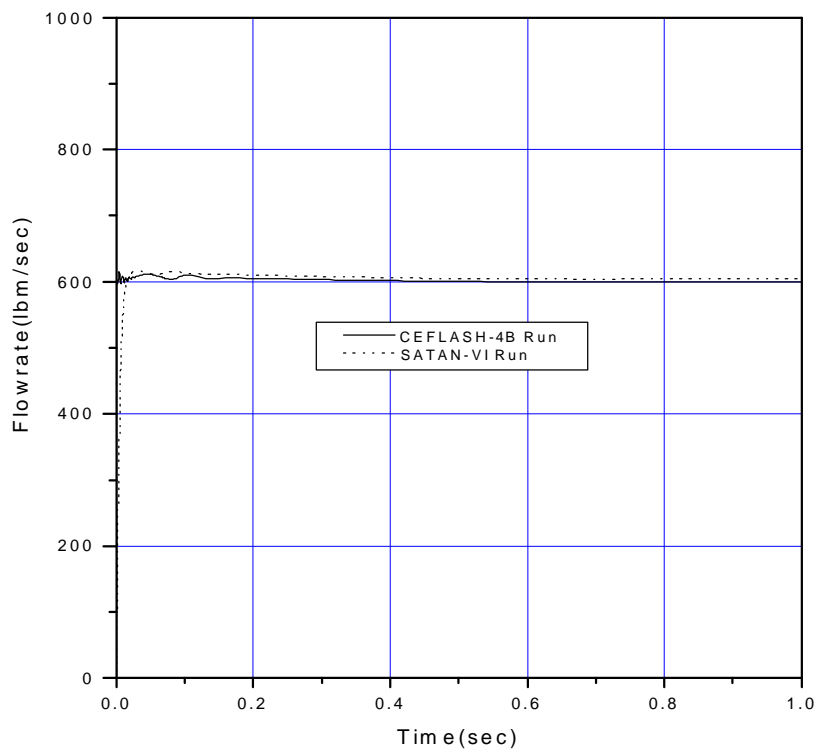
10. Pressure transient of broken node for SATAN-VI/CEFLASH-4B Run



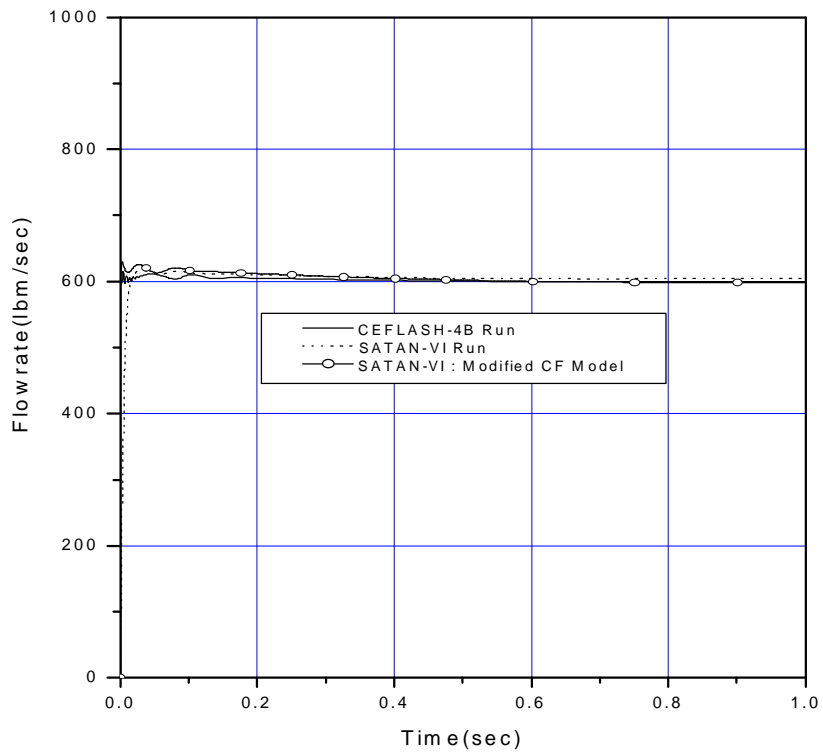
11. Hot leg flow transient for SATAN-VI/CEFLASH-4B Run



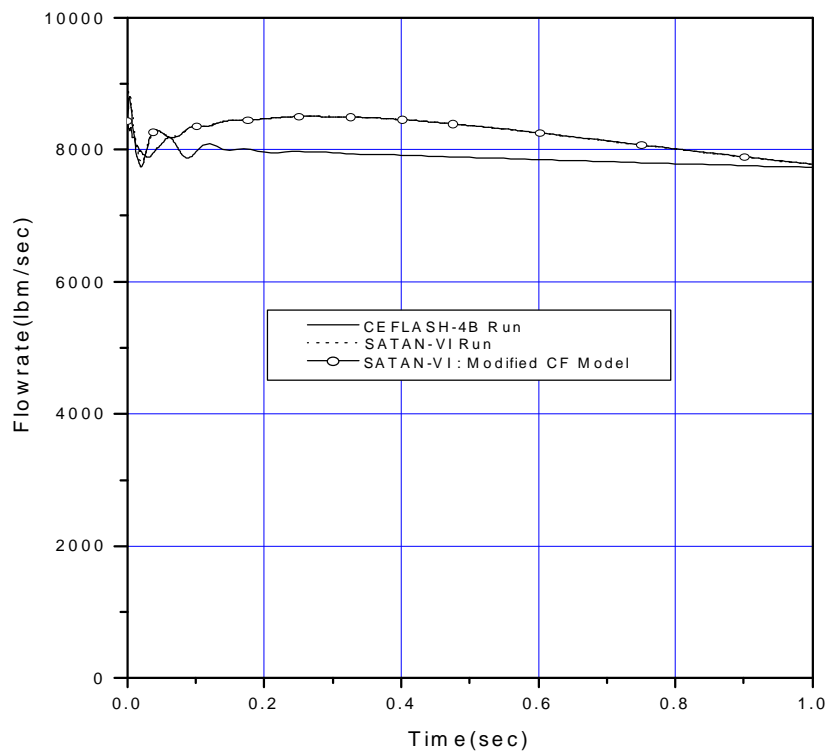
12. Cold leg flow transient for SATAN-VI/CEFLASH-4B Run



13. Break flow transient for SATAN-VI/CEFLASH-4B Run



14. Break flow transient for SATAN-VI/CEFLASH-4B Run (Modified Critical Flow Model)



15. Cold leg flow transient for SATAN-VI/CEFLASH-4B Run (Modified Critical Flow Model)