

# CVCS

## Transient Analysis in CVCS during Performance Related Design Basis Events

150

CARD

CARD

CARD

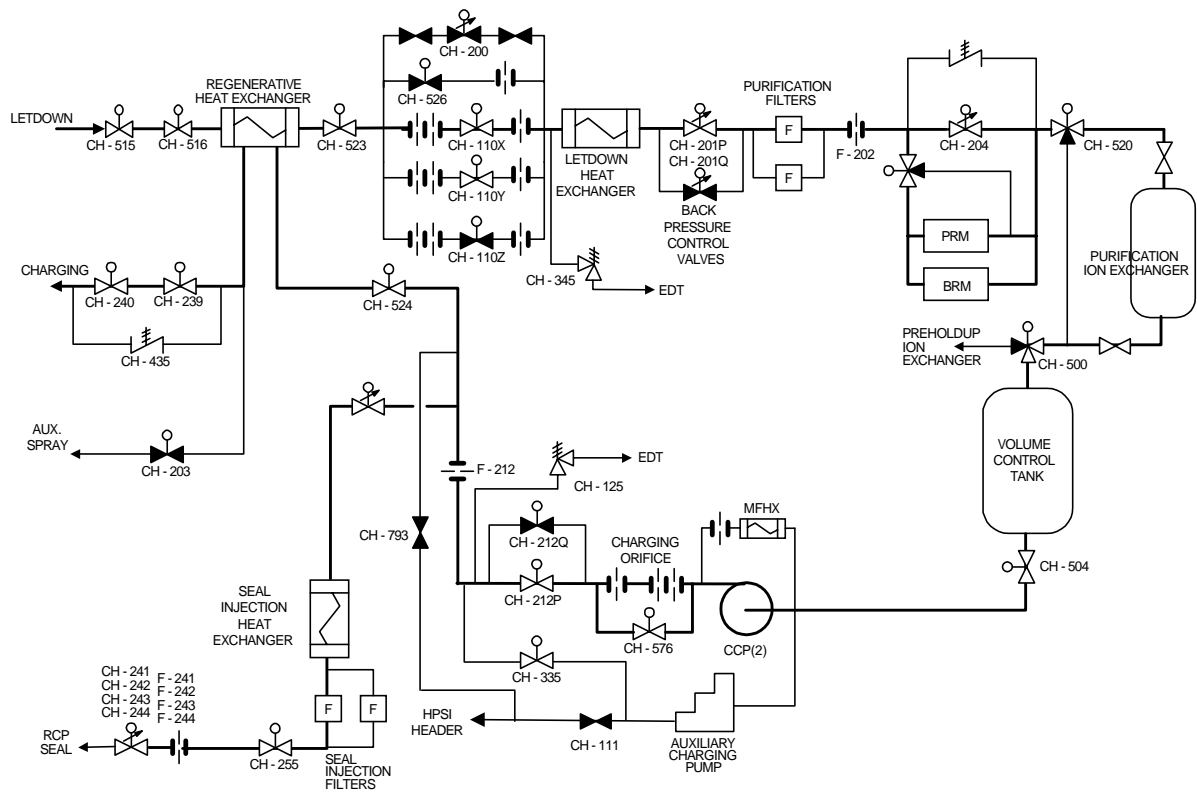
### ABSTRACT

In order to enhance system maintainability, control stability and availability, various design changes have been implemented in the Chemical and Volume Control System (CVCS) of the Korean Standard Nuclear Power Plant (KSNP). A CVCS simulation code, CARD, which models the letdown and charging system has been developed to demonstrate the performance of the CVCS. The code was preliminarily and partially verified by comparing its simulation results with the measured data during transient operation in the previous CVCS letdown system with flow control valves.

In this study, the integrated system performance is evaluated by simulating the CVCS transients during the performance related design basis events using the CARD code and comparing the simulated results with the field test results. The analysis results show that the CVCS can perform its functions without any unacceptable transients during the performance related design basis events and that the code can predict the actual plant test results well.

### 1.0

1  
2 가  
가  
(CH-110Y CH-110Z) 가 (CH-212P CH-212Q) 가  
[1] 1



1.

가

CARD 가 . [2] CARD

가

, CARD

CARD 가

2.0

CARD

(node)

(flow path)

가

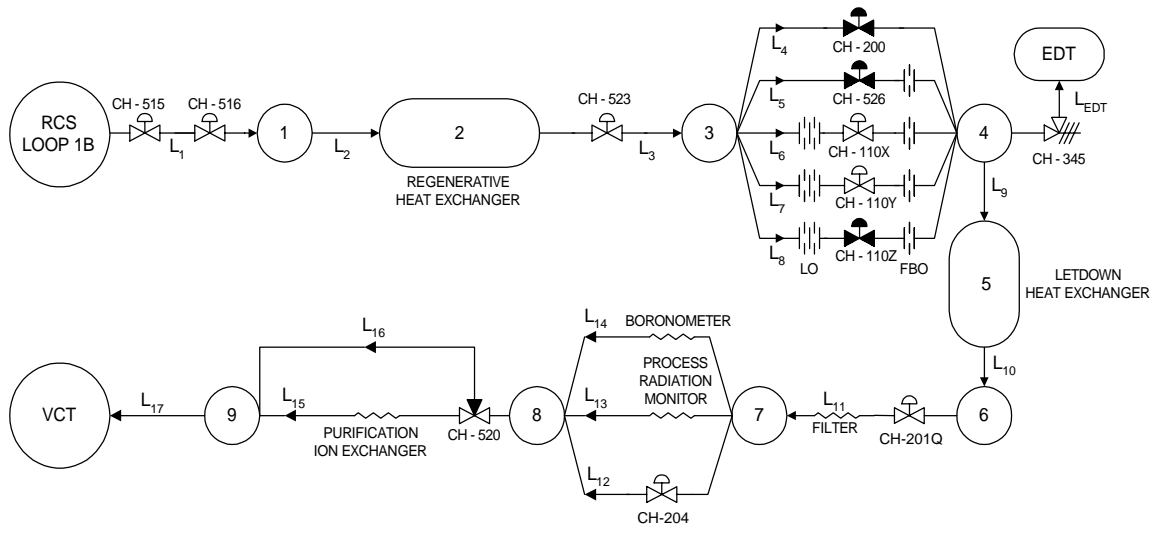
가

2

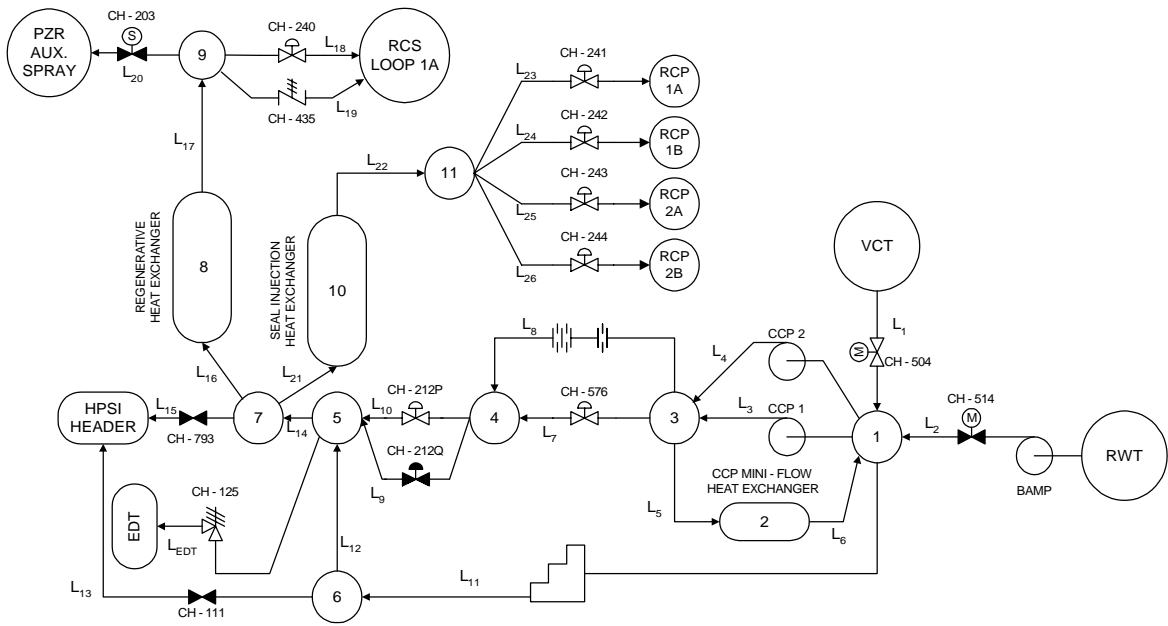
(pipe header)

가

3



가.



2.

가

(fine control)

3

(coarse control)

가

가

가

PI

가

(demand)

(demand signal)

'air-to-close'

가

가

가

(position demand)

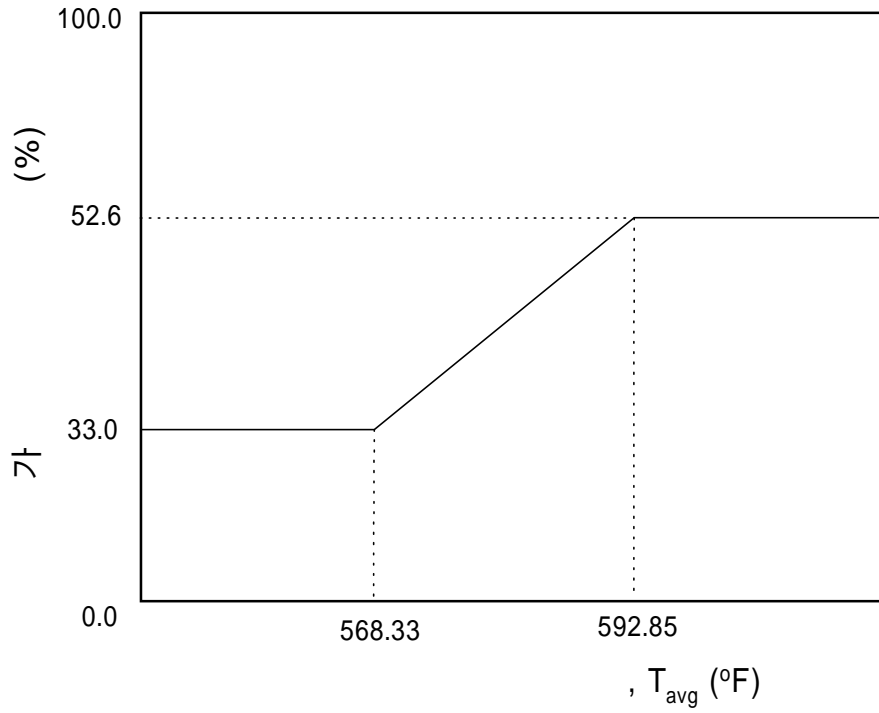


가

가 4

(T<sub>avg</sub>,

)



4. 가

3.0

CARD

가, 가 (LBPC), 가 (CBPC), 가 (SIFC) 가, 가 [3][4]

가 5% 30 gpm 가가 75 gpm 가,

가.

.

.

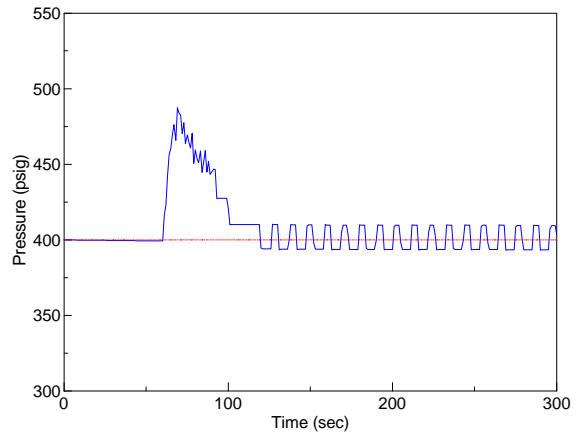
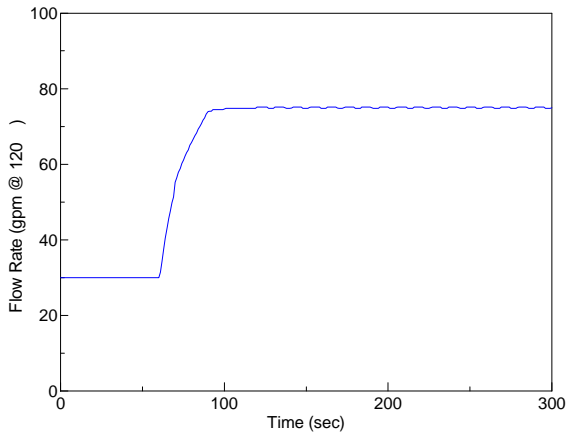
: 30  
 : Linear  
 : Equal Percentage

2.

PI

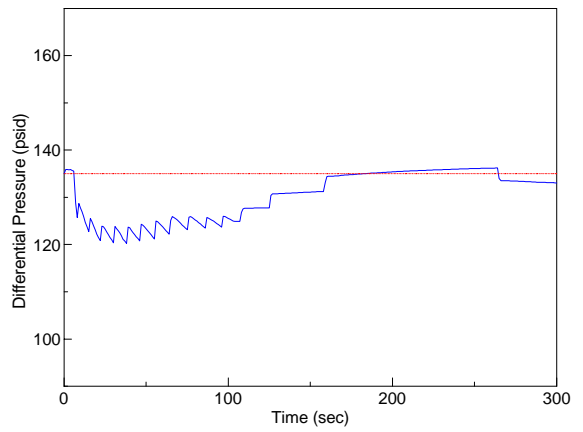
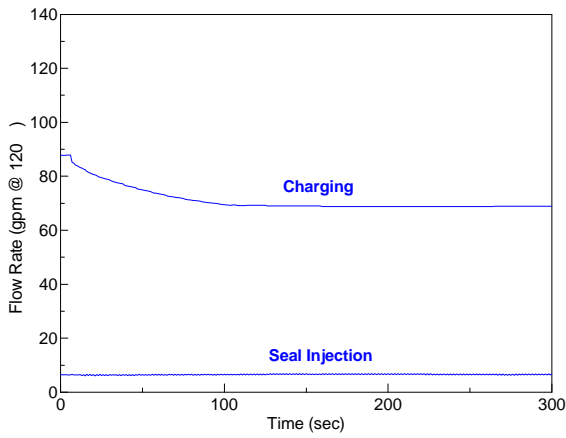
Parameter		
	0.25	4.8
	0.2	10
	1.0	20

5 6



가.

5.



가.

6.

4.0

4.1

3 가

:

- 
- 
- 

10%

가

( )

4.2

가

CARD

가

가

가

가  
가

2.0

가  
7.가, 7. , 8.가, 8. , 9.가, 9.

. CARD

가

4.3

700

가

가

가

가

( 7. ).

( 7. ),

, 가

( 1)

( 7. 7. ),

( 7. ).

7

CARD

**4.4 10%**

0 10% 가 ,  
10% 가 가 가 가 ,  
( 1) ( 8. 8. ),  
( 8. ).

8 CARD

**4.5**

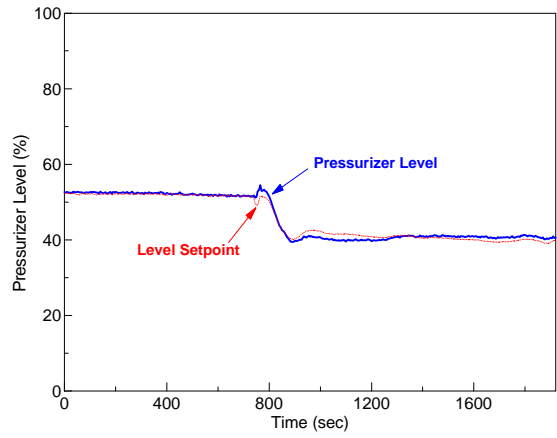
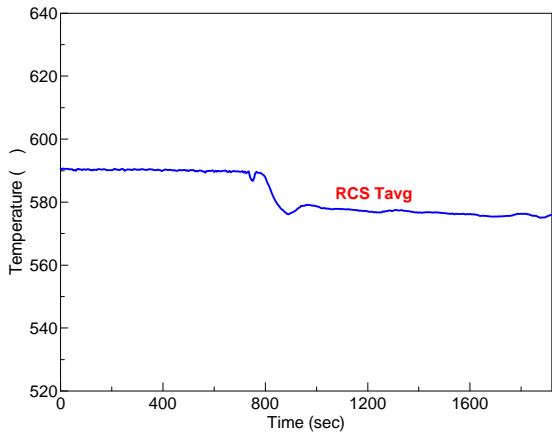
450 가 가 ,  
가 가 가 가 ,  
( 1) CH-110Y ( 9. 9. ),  
( 9. ).

9 CARD

**5.0**

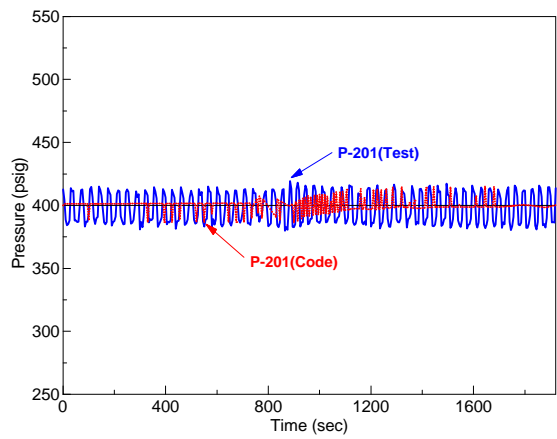
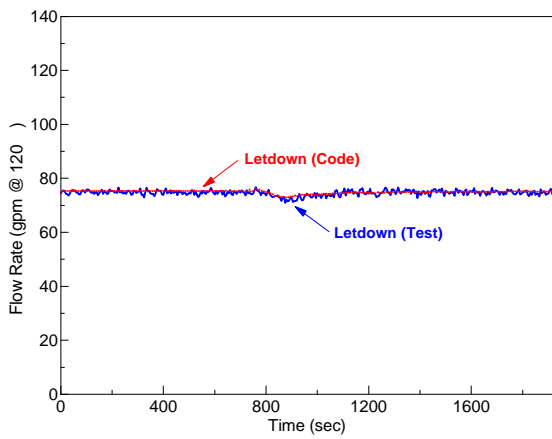
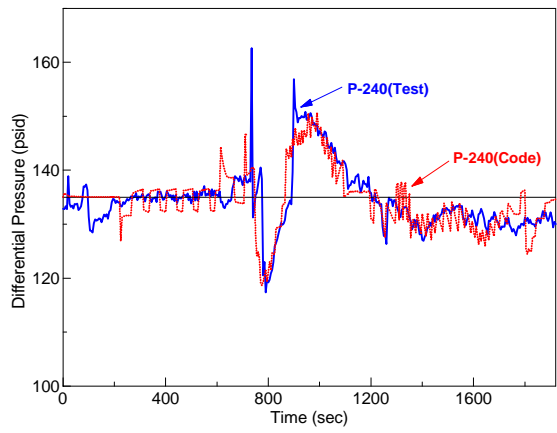
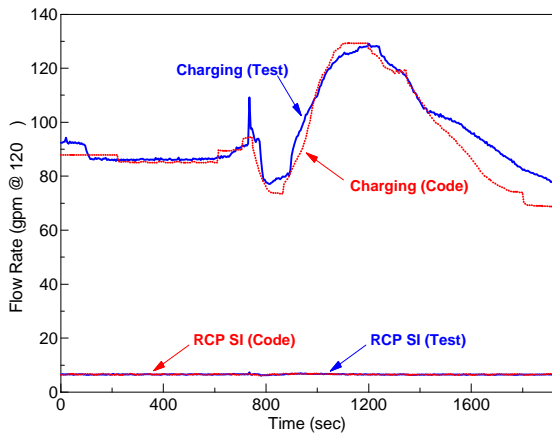
CARD 가 CARD 가  
CARD , 10%  
CARD  
CARD

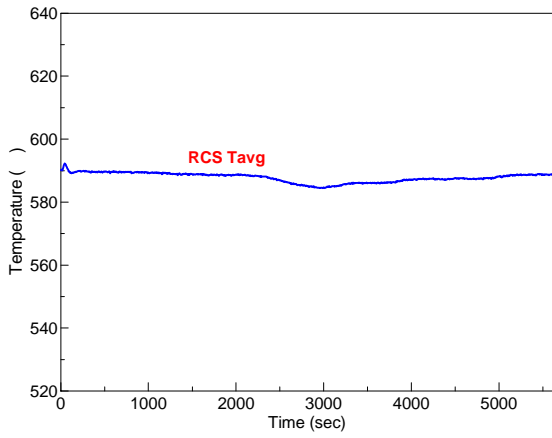




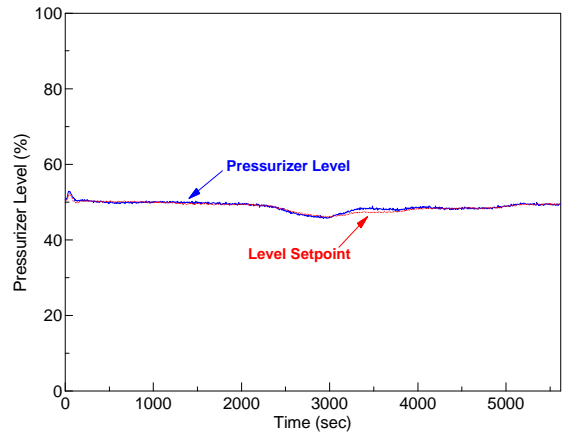
가.

가

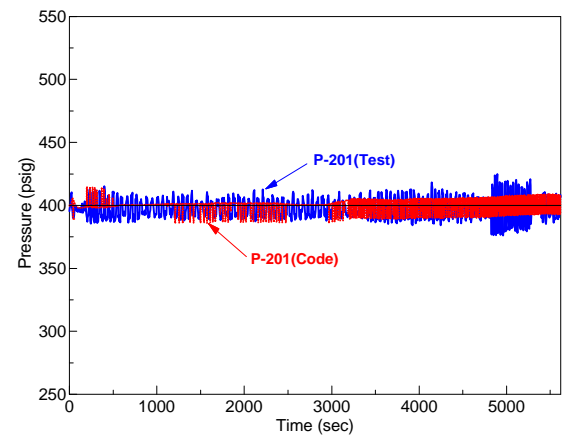
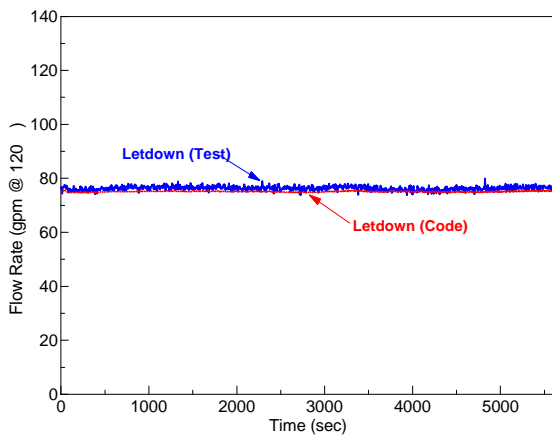
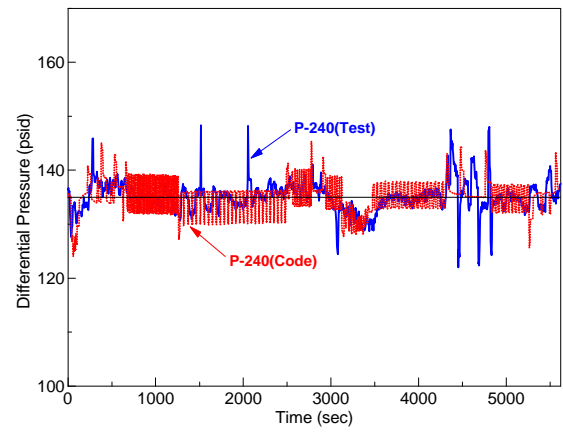
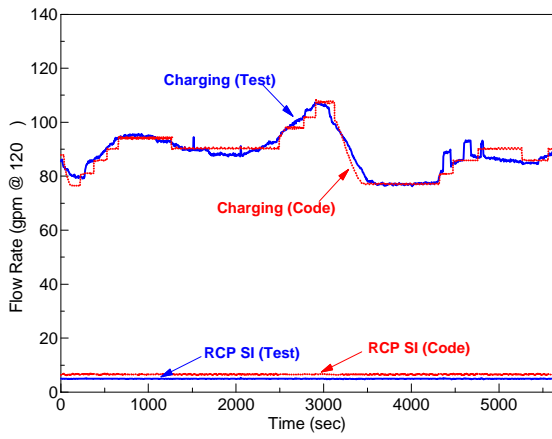


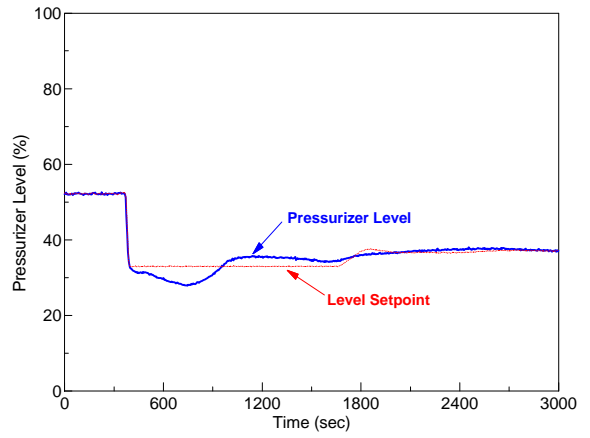
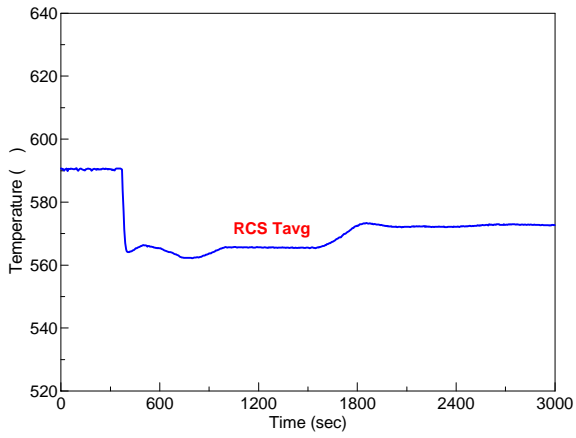


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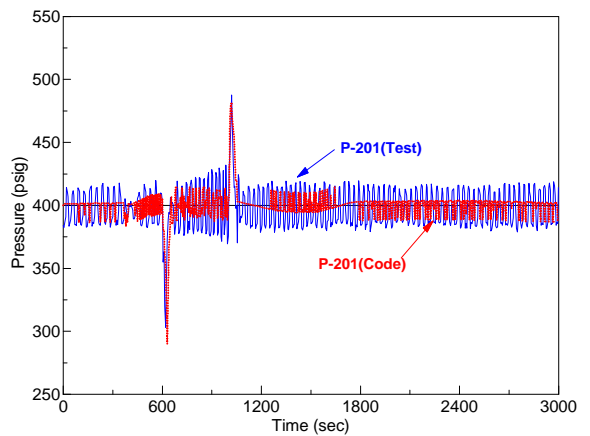
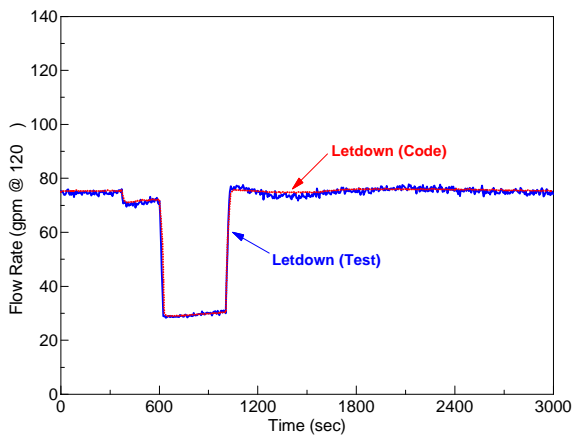
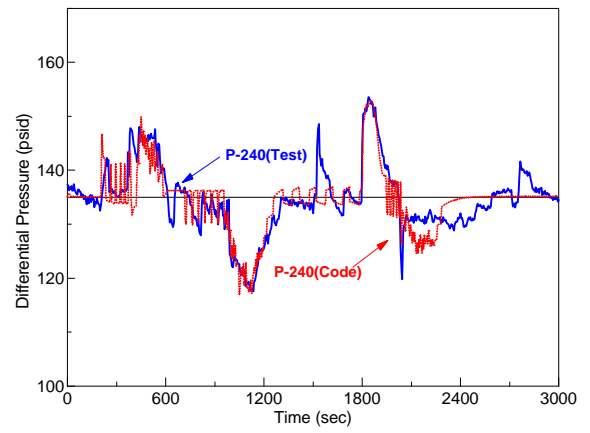
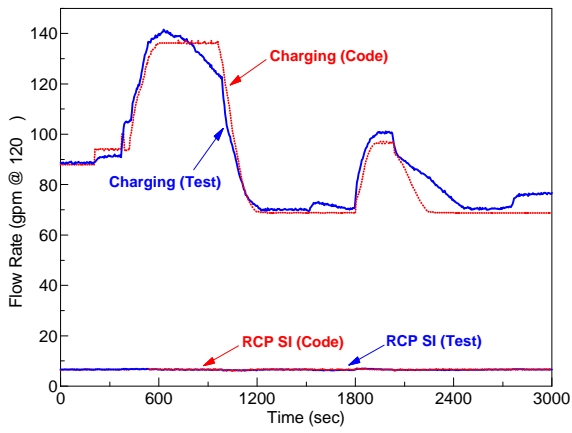
나.





가.

가



## 6.0

1. C. K. Chung, et al, "Performance Evaluation of the Improved Chemical and Volume Control System," Proceedings of the 12th PBNC, October 2000.
2. S. W. Kim and J. S. Ahn, "Development of the CARD Computer Code for the Application to the Design of the CVCS in YGN 5&6," KOPEC, February 1998.
3. H. S. Park, et al, "Transient Analysis of Charging System with Centrifugal Charging Pumps," Proceedings of the Korean Nuclear Society Autumn Meeting, October 1998.
4. J. S. Ahn, et al, "Transient Analysis of Letdown System with Letdown Orifices," Proceedings of the Korean Nuclear Society Spring Meeting, May 1999.