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

Gentlemen:

Subject: Oyster Creek Nuclear Generating Station (OCNGS)
Docket No. 50-219
Facility Operating License No. DPR-16
Oyster Creek Containment Peak Pressure Analysis

As a result of the NRC staff review of Technical Specification Change Request (TSCR) No. 198, the staff verbally requested some additional information. In response are Attachments I and II which provide the requested comparisons of methods and computer codes used to support the TSCR proposed drywell design pressure change.

Attachment I compares the methods used in the recent Oyster Creek peak drywell pressure analyses with the NRC Standard Review Plan, Section 6.2.1.1.C, Rev. 6, "Pressure-Suppression Type BWR Containments".

Attachment II provides a comparison of CONTEMPT computer code versions LT-26 and EI-28C. Version EI-28C was used to evaluate the Oyster Creek peak drywell design pressure change. The attachment includes a source code review and a comparison of EI-28C results with NUREG/CR-1564, "Comparison of CONTEMPT-LT Containment Code Calculations with Marviken, Loft and Battelle-Frankfurt Blowdown Tests".

If you have any questions or comments on this submittal or require additional further assistance, please contact Mr. Michael Laggart, Manager, Corporate Nuclear Licensing at (201) 316-7968.

Very truly yours,

J. C. DeVine, Jr.
Vice President and Director
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ATTACHMENT 1

SRP COMPARISON FOR THE OYSTER CREEK PEAK DRYWELL PRESSURE ANALYSES

Section 6.2.1.1.C Pressure-Suppression Type BWR Containments
Rev. 6 - August 1984

I. Areas of Review

For Mark I, II and III pressure-suppression type boiling water reactor (BWR) plant containments, the CSB review covers the following areas:

1. The temperature and pressure conditions in the drywell and wetwell due to a spectrum (including break size and location) of postulated loss-of-coolant accidents.

Response The analyses which constitute the drywell design pressure change evaluation are specifically concerned with peak drywell pressure. The bounding break for this parameter is stated in the FSAR to be the double-ended failure of a recirculation loop. Furthermore, previous analyses performed by GPUN have demonstrated that smaller breaks at a variety of locations do not result in peak drywell pressures greater than the recirculation loop break.

2. The differential pressure across the operating deck for a spectrum of loss-of-coolant accidents including break size and location (Mark II containments only).

Response This area is not applicable since Oyster Creek's containment is a Mark I design.

3. Suppression pool dynamic effects during a loss-of-coolant accident or following the actuation of one or more reactor coolant system safety/relief valves, including vent clearing, vent interactions, pool swell, pool stratification and dynamic symmetrical and

asymmetrical loads on suppression pool and other containment structures.

Response These issues were all evaluated in a separate analysis (Mark I Containment Program). The drywell design pressure analyses results were not used to evaluate the dynamic structural issues. The containment pressure response was, however, compared with that used to assess the structural issues in order to demonstrate that the original work remained bounding.

4. The consequences of a loss-of-coolant accident occurring within the containment (wetwell); i.e., outside the drywell (Mark III containments only).

Response This area is not applicable since Oyster Creek's containment is a Mark I design.

5. The capability of the containment to withstand the effects of steam bypassing the suppression pool.

Response Suppression pool bypass was not considered in the original Tech Spec change submittal. For large break LOCAs, the pressure response is not expected to change significantly as a result of suppression pool bypass. However, as part of this SRP evaluation, we recalculated the containment response to the DBA LOCA using the same CONTEMPT-EI input and included the Tech Spec bypass leakage area of 10.5 in^2. The resulting peak drywell pressure was essentially unchanged.

In addition, Oyster Creek performs a quarterly surveillance on bypass leakage. The surveillance restricts the allowable bypass to 3.14 in^2 (2" dia. orifice). Plant experience with this surveillance is that the observed bypass is well below the 3.14 in^2 acceptance values.

6. The external pressure capability of the drywell and wetwell, and systems that may be provided to limit external pressures.

<u>Response</u> The drywell design pressure change has no impact on the containment's external pressure capability. Internal pressure requirements are the sole focus of the evaluation.

7. The effectiveness of static and active heat removal mechanisms.

<u>Response</u> The peak drywell pressure analysis did not take credit for any heat removal mechanisms. Both the containment structure's heat capacity and the containment spray atmospheric cooling capability were excluded from consideration.

8. The pressure conditions within subcompartments and acting on system components and supports due to high energy line breaks, e.g., the sacrificial shield structure.

<u>Response</u> The drywell design pressure evaluation is not a subcompartment analysis. The analysis is intended to evaluate the containment atmospheric pressure. The drywell design pressure change will not affect the containment's ability to withstand impingement forces caused by fluid from a pipe break.

9. The range and accuracy of instrumentation that is provided to monitor and record containment conditions during and following an accident.

Response The drywell design pressure change has no impact upon the range and accuracy of instrumentation provided to monitor and record containment conditions. The containment accident conditions fall within the range of said instrumentation. In addition, the instrumentation's environmental conditions are based upon a bounding steam line break.

10. The suppression pool temperature limit during reactor coolant system safety/relief valve operation, including the events considered in analyzing suppression pool temperature response, assumptions used for the analyses, and suppression pool temperature monitoring system.

Response The torus pool temperature response to a DB LOCA is dependent upon the integrated blowdown mass and energy and the decay heat removed by core spray. The primary concern regarding the torus pool temperature response is the peak pool temperature. It is this temperature which will be used to evaluate the core spray pump NPSH available.

Neither the integrated blowdown mass and energy nor the decay heat removed by the core spray is changed as a result of this evaluation. Both of these are dependent upon the initial conditions of the reactor and not the rate of blowdown. The only significant change to the large break LOCA analysis is the rate at which the mass and energy exits the reactor vessel in the first 30 seconds. This will not affect the peak torus pool temperature since the amount of mass and energy which enters the pool has not changed. Moreover, the peak torus pool temperature occurs long after the blowdown is completed. Therefore, no change to the torus pool temperature response presently in the FSAR occurs as a result of this evaluation.

It is important to note that the two cases used to evaluate the peak drywell pressure employed a direct multiplier on the blowdown instead of a break discharge coefficient multiplier. This is a conservative assumption used to evaluate the drywell pressure response. It has the affect of artificially increasing the integrated reactor vessel blowdown mass and energy. The use of any multiplier on the blowdown is inappropriate when evaluating the torus pool temperature response.

11. The reactor coolant system safety/relief valve in-plant confirmatory test program.

Response The drywell design pressure change will not affect reactor coolant system safety/relief valve operation or in-plant confirmatory tests.

12. The evaluation of analytical models used for containment analysis.

Response The containment model used (CONTEMPT EI) was compared with the GE containment model M3CPT. This comparison demonstrated reasonable agreement between the codes.

CONTEMPT VERSIONS EI AND LT

DISCUSSION OF DIFFERENCES

In order to assess the difference between the two versions of the code, a review of the EI 28C source code was conducted, and a comparison of EI 28C results and NUREG/CR-1564 analysis results with LT 26 were performed. The source code review revealed the following:

A. Source Code Review

a. Input output changes to EI 28C

- Condensed heat structure table printout
- Additional parameter plot files
- Summary table of peak compartment conditions
- Improved plot capability using RETRAN plot routines

b. Various error corrections that had previously resulted in code execution problems

- Vent clearing
- Integer overflow

c. Code enhancements incorporated in EI 28C

- Generalized mass/energy addition/removal to/from any compartment
- Numerous additional heat structure wall heat transfer correlation options were added while preserving original options
- Automatic time step control logic

d. Machine dependent changes

- Changes necessary to run under IBM mainframe (NOS/BE)
- Changes to run on an IBM/PC (all FORTRAN version)

None of these changes will have an affect on the peak pressure analysis

B. NUREG/CR-1564* Comparison

The NUREG evaluates CONTEMPT-LT 26 calculations of the Marviken, LOFT and Battelle-Frankfurt blowdown tests.

A number of sensitivity studies on CONTEMPT-LT options were performed in NUREG/CR-1564. These options are the same as those available in the EI version of the CONTEMPT code. A complete list is provided in Table XI of NUREG/CR-1564. In order to benchmark the EI version, the base case (Case 1) of Marviken Blowdown 14 was run using CONTEMPT EI-28C. This is the version of CONTEMPT used to evaluate the Oyster Creek peak drywell design pressure change. The table and figures which follow compare CONTEMPT-LT and EI versions for Marviken Blowdown 14.

As can be seen in the table and in Figures 1 and 2, the calculated drywell and wetwell pressures for the two code versions agree extremely well. This confirms that no changes were made to EI 28C which would impact the Oyster Creek peak pressure analysis in a non-conservative manner. A comparison of all of the other key parameters shown in the attached table and in Figures 3 through 6 are similarly in excellent agreement between both code versions.

* NUREG/CR-1564, 'Comparison of CONTEMPT-LT Containment Code Calculations with Marviken, LOFT and Battelle-Frankfurt Blowdown Tests'.

MARVIKEN BLOWDOWN 14

CASE 1 - NUREG/CR-1564

		CONTEMPT-LT	CONTEMPT-EI	MARVIKEN
Drywell Pressure (psia)*	0 sec	14.79	14.79	14.79
(Refer to Figure 1)	1 sec	23.47	23.47	20.6
	10 sec	35.23	35.82	31.47
	78 sec	40.25	41.[illegible]	44.09
	100 sec	36.39	36.65	39.02
	180 sec	36.06	36.32	38.87
Wetwell Pressure (psia)	0 sec	14.65	14.65	14.65
(Refer to Figure 2)	1 sec	14.65	14.65	14.65
	10 sec	27.75	27.49	23.79
	78 sec	32.47	32.46	34.08
	100 sec	32.47	32.46	34.23
	180 sec	32.48	32.47	34.23
DW to WW ΔP (psi)*	0 sec	0.14	0.14	0.14
(Refer to Figure 3)	1 sec	8.82	8.82	5.95
	10 sec	7.48	8.33	7.69
	78 sec	7.78	8.81	10.01
	100 sec	3.92	4.19	4.79
	180 sec	3.58	3.85	4.64
Vent Flow Rates (lbm/s)	0 sec	0	0	0
(Refer to Figure 4)	1 sec	0	0	0
	10 sec	858	866.2	464
	78 sec	961	960.2	1022
	>100 sec	* **		

* Marviken breakroom values listed.

** Oscillating conditions after about 100 sec.

DW-NRC.PNH

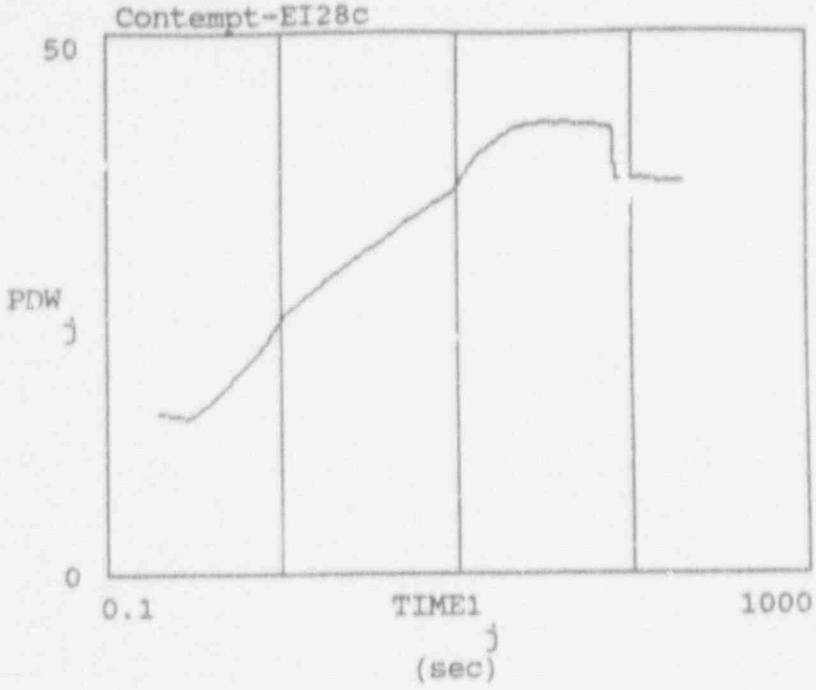
MARVIKEN BLOWDOWN 14

CASE 1 - NUREG/CR-1564 (Cont'd)

		CONTEMPT-LT	CONTEMPT-EI	MARVIKEN
Drywell Atmosphere Temp (°F)*	0 sec	112.3	112.3	116.6
(Refer to Figure 5)	1 sec	178.71	178.71	222.8
	10 sec	251.31	251.93	251.6
	78 sec	267.56	269.14	268.79
	100 sec	261.59	262.0	262.4
	180 sec	261.05	261.47	263.3
Wetwell Pool Temp (°F)	0 sec	114.40	114.4	114.4
	1 sec	114.4	114.4	114.4
	10 sec	118.91	118.8	115.97
	78 sec	168.50	168.12	153.21
	100 sec	173.22	172.91	160.7
	180 sec	184.49	184.17	170.20
Wetwell Atmosphere Temp (°F)	0 sec	89.2	89.2	89.2
(Refer to Figure 6)	1 sec	89.2	89.2	89.2
	10 sec	101.39	101.27	109.22
	78 sec	104.55	104.62	137.30
	100 sec	104.57	104.63	140.72
	180 sec	104.62	104.68	137.84
Peak DW Pressure (psia)*		40.71	41.93	44.09
Peak WW Pressure (psia)		32.48	32.47	34.23
Max DW to WW Press Diff (psi)*		10.15	10.94	11.17
Initial Vent Clearing Time (s)		1.0836	1.0836	1.2
Peak Vent Flow Rate (lbm/s)		1067	1054	1022

* Marviken breakroom values listed.

DW-NRC.PNH



Marviken Blowdown 14 Drywell Pressure (psia)

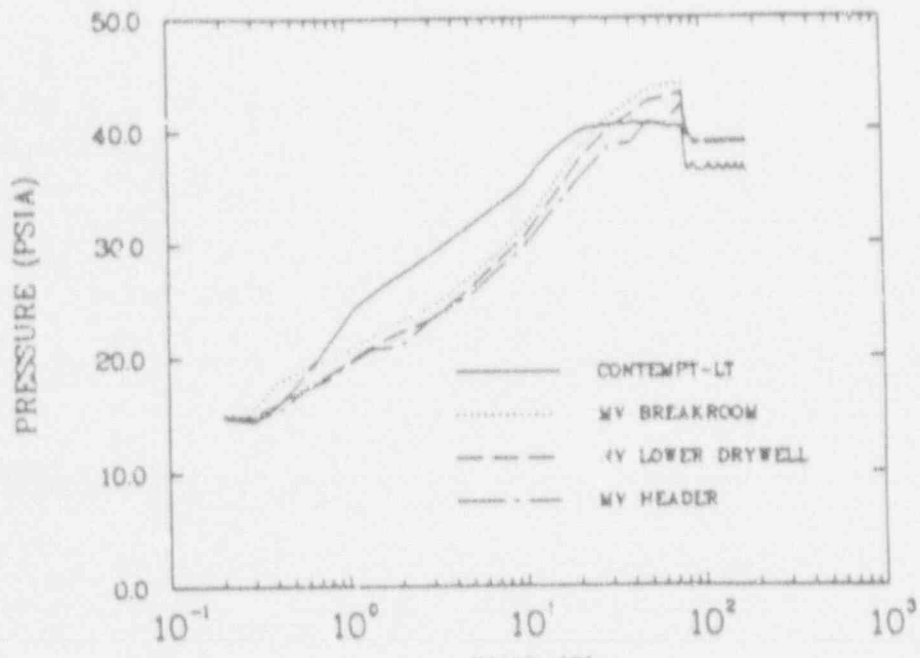
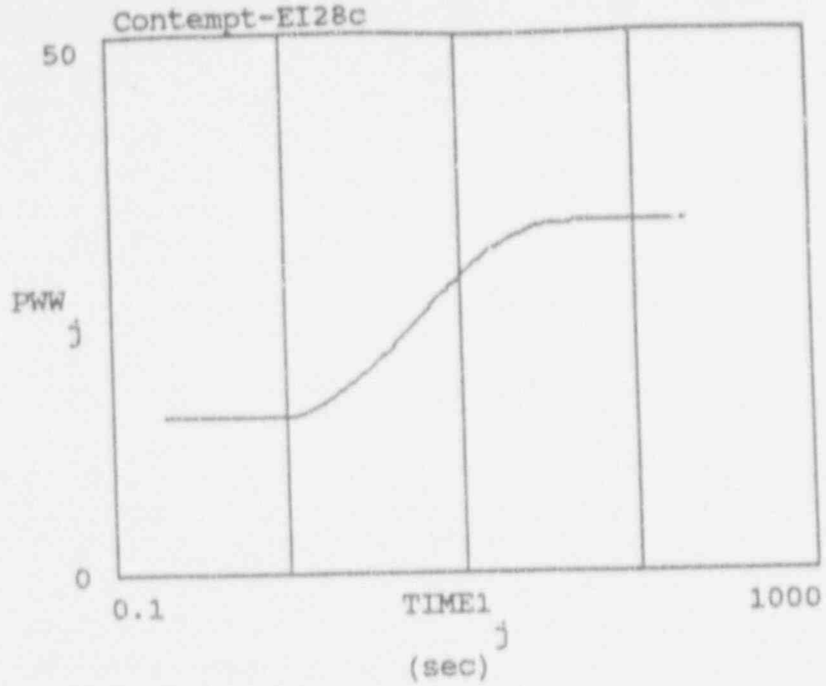


Fig. C-3. Marviken Blowdown 14 drywell pressures.

FIGURE 1

DW-NRC.PNH



Marviken Blowdown 14 Wetwell Pressure (psia)

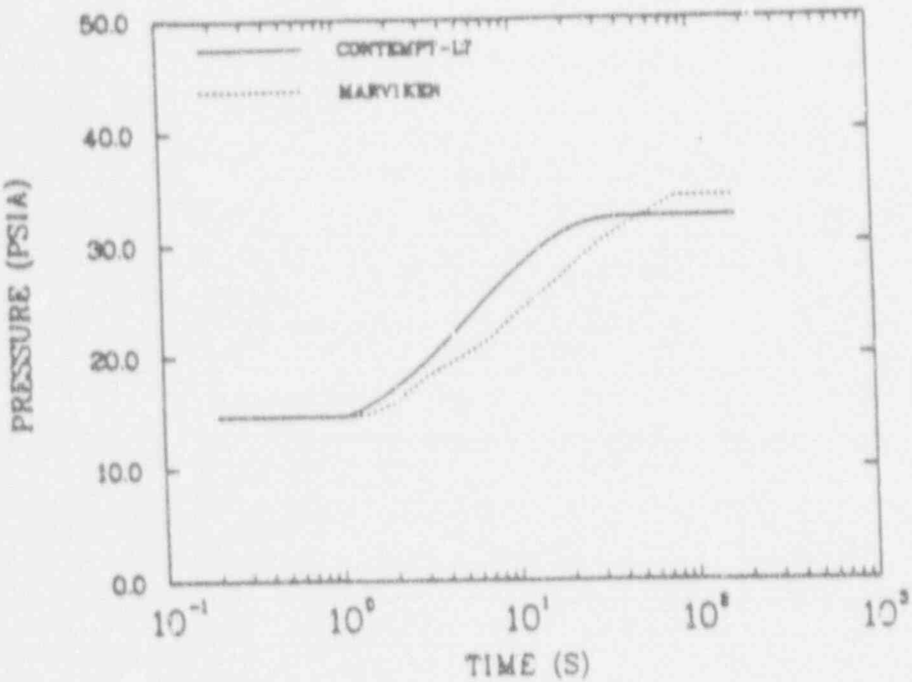
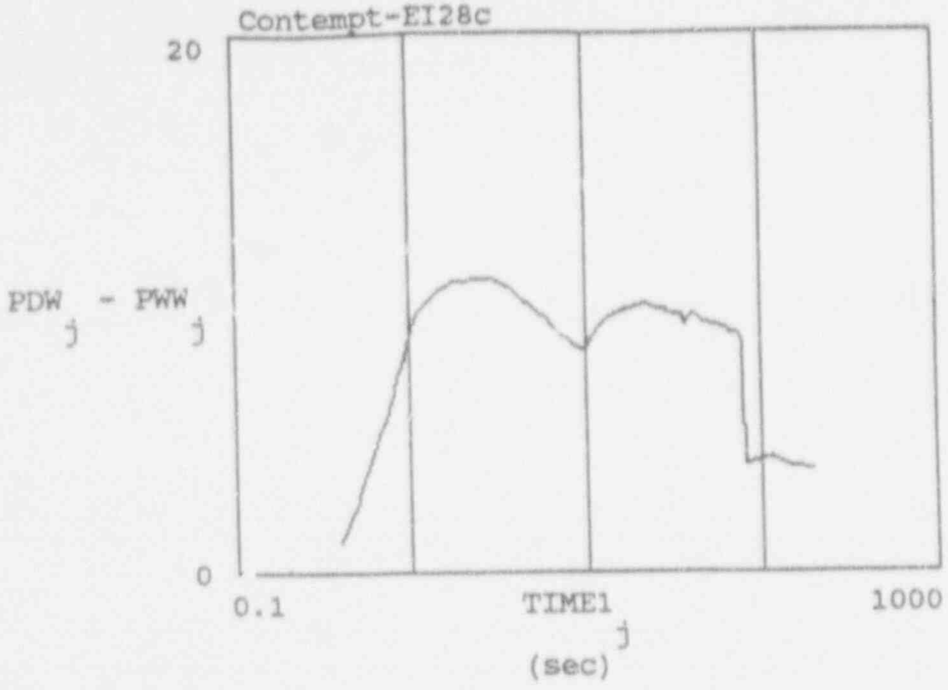


Fig. C-6. Marviken Blowdown 14 wetwell atmospheric pressures.

FIGURE 2

DW-NRC.PNH



Marviken Blowdown 14 Containment Pressure Difference (psi)

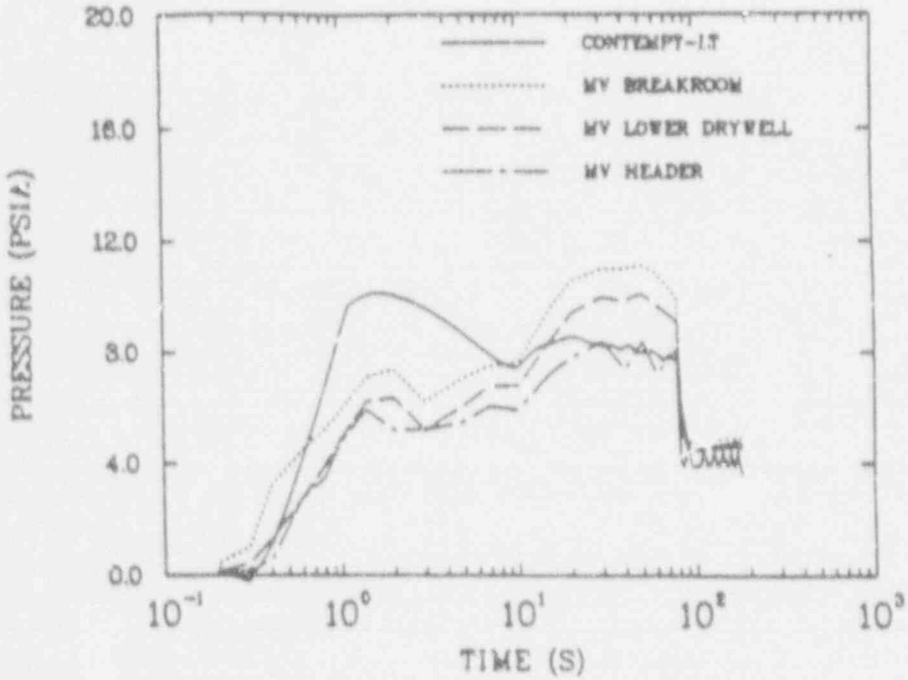
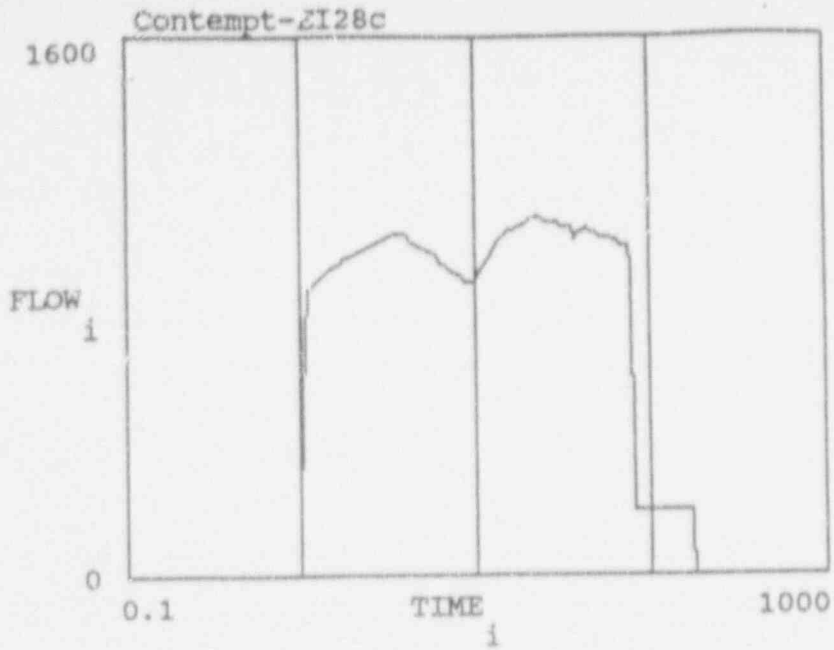


Fig. C-8. Marviken B down 14 pressure differences between drywell and wetwell.

FIGURE 3

DW-NRC.PNH



(sec)

Marviken Blowdown 14 Vent Flow Rate (lb/sec)

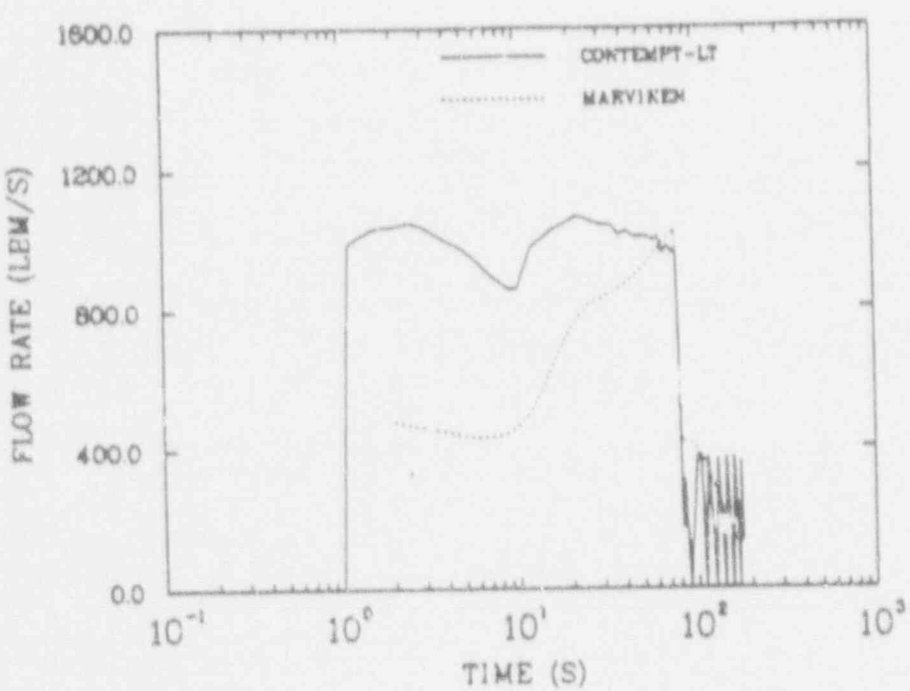
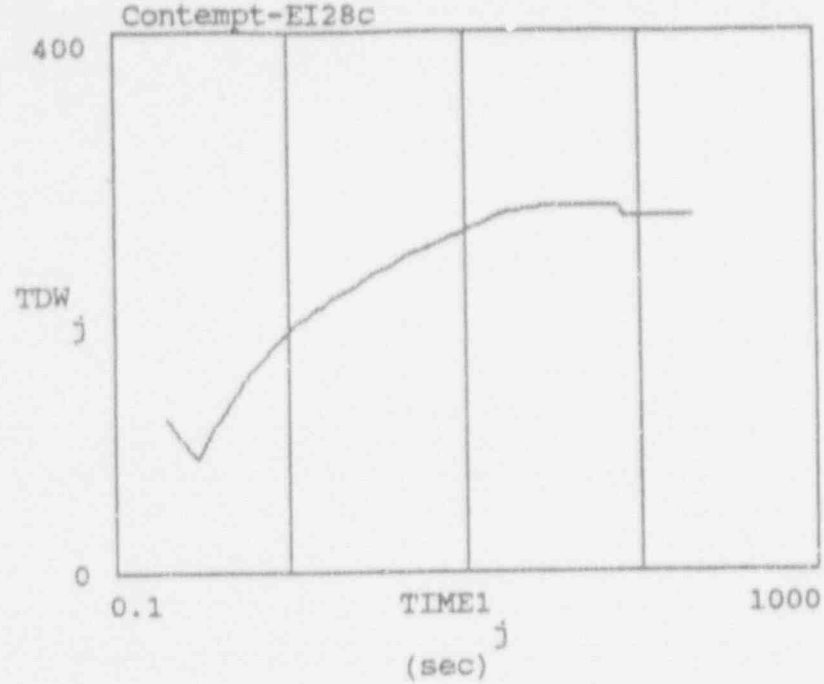


Fig. C-10. Marviken Blowdown 14 vent flow rates.

FIGURE 4

DW-NRC.PNH



Marviken Blowdown 14 Drywell Atmosphere Temperature

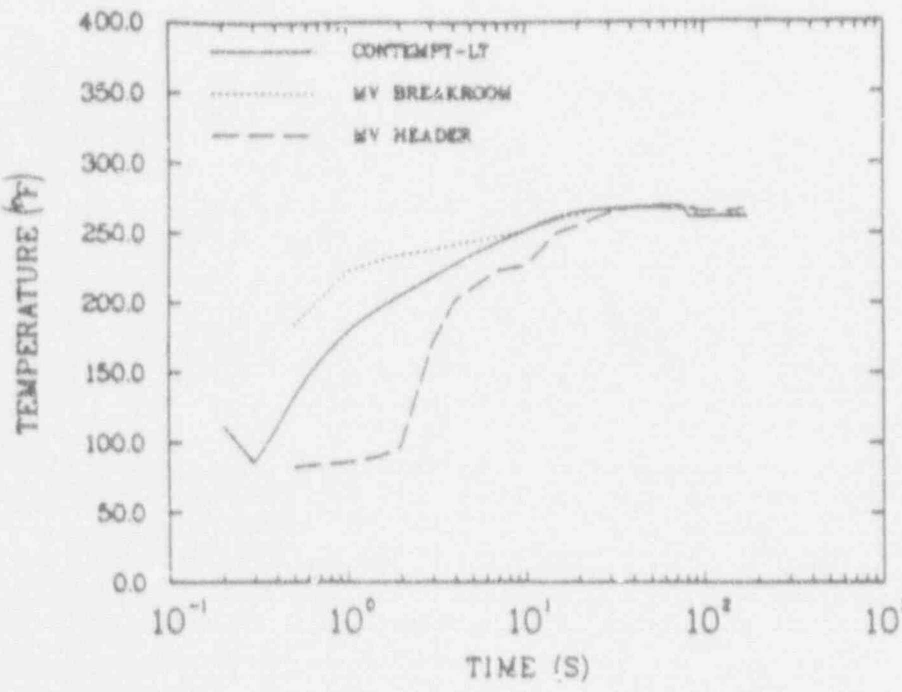
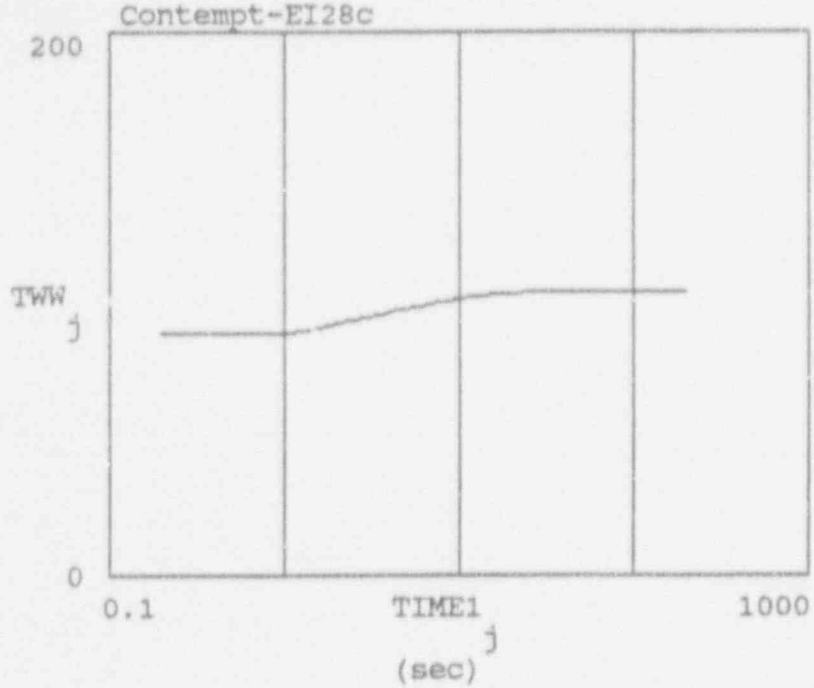


Fig. C-12. Marviken Blowdown 14 drywell atmospheric temperatures.

FIGURE 5



Marviken Blowdown 14 Wetwell Atmosphere Temperature

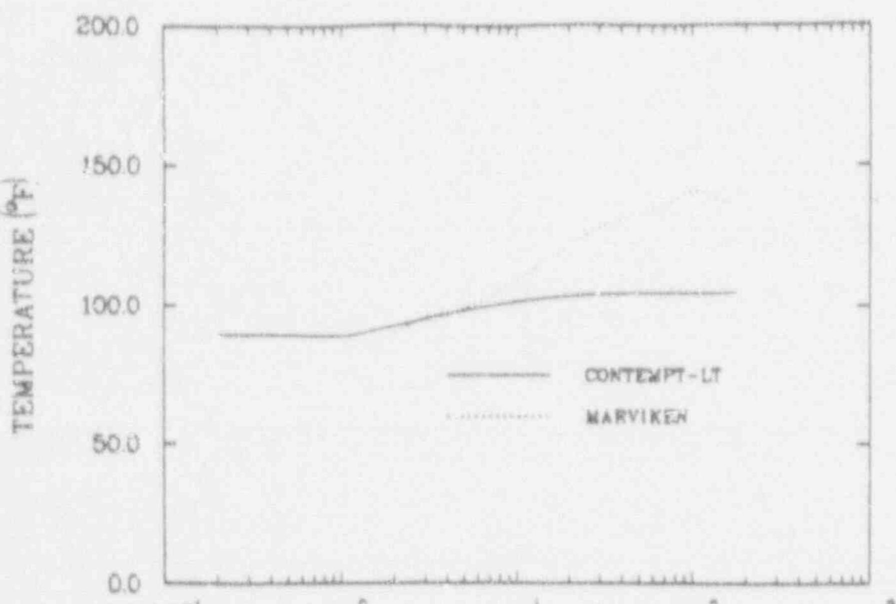


Fig. C-16. Marviken Blowdown 14 wetwell atmospheric temperatures.

FIGURE 6