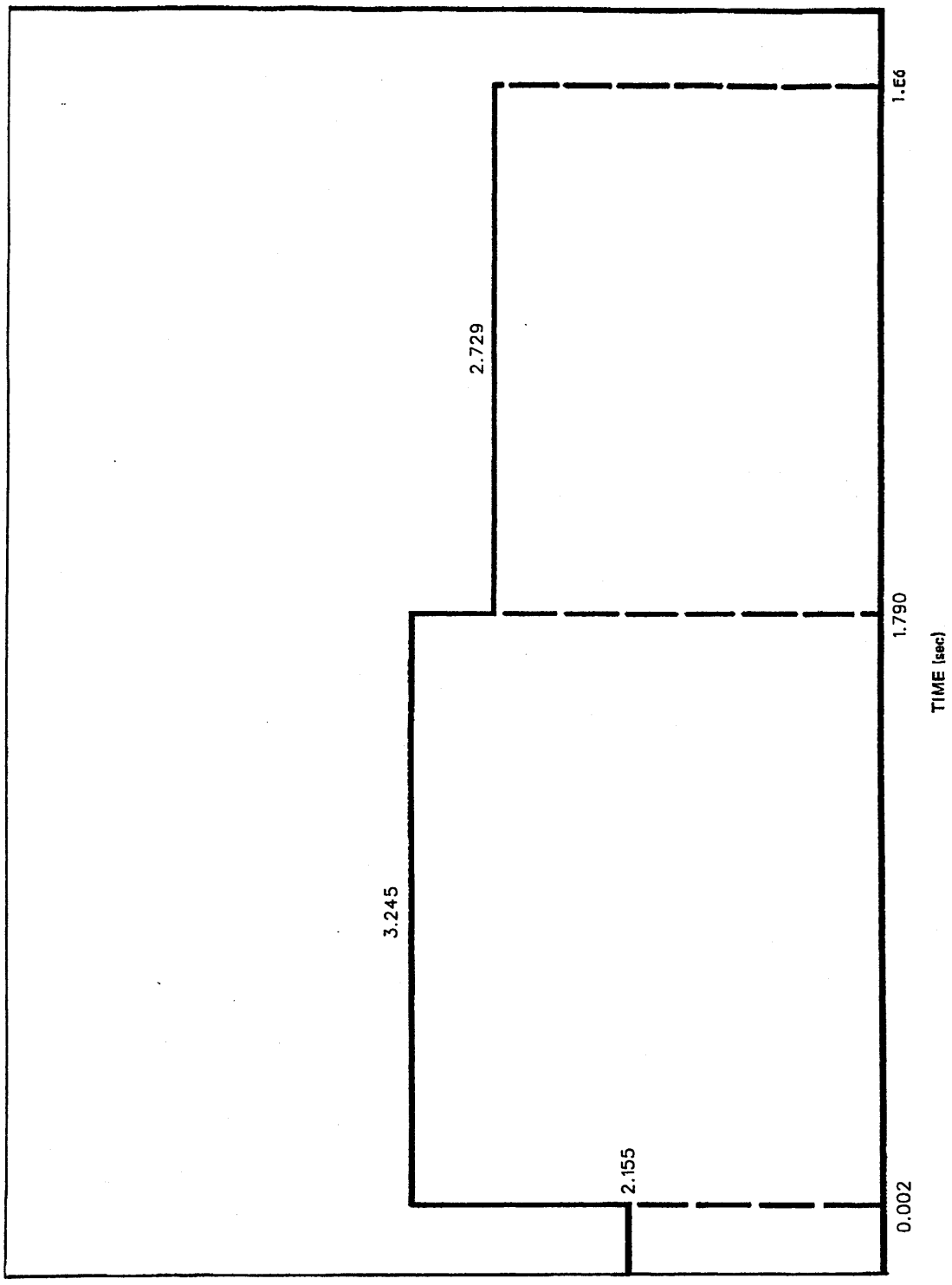
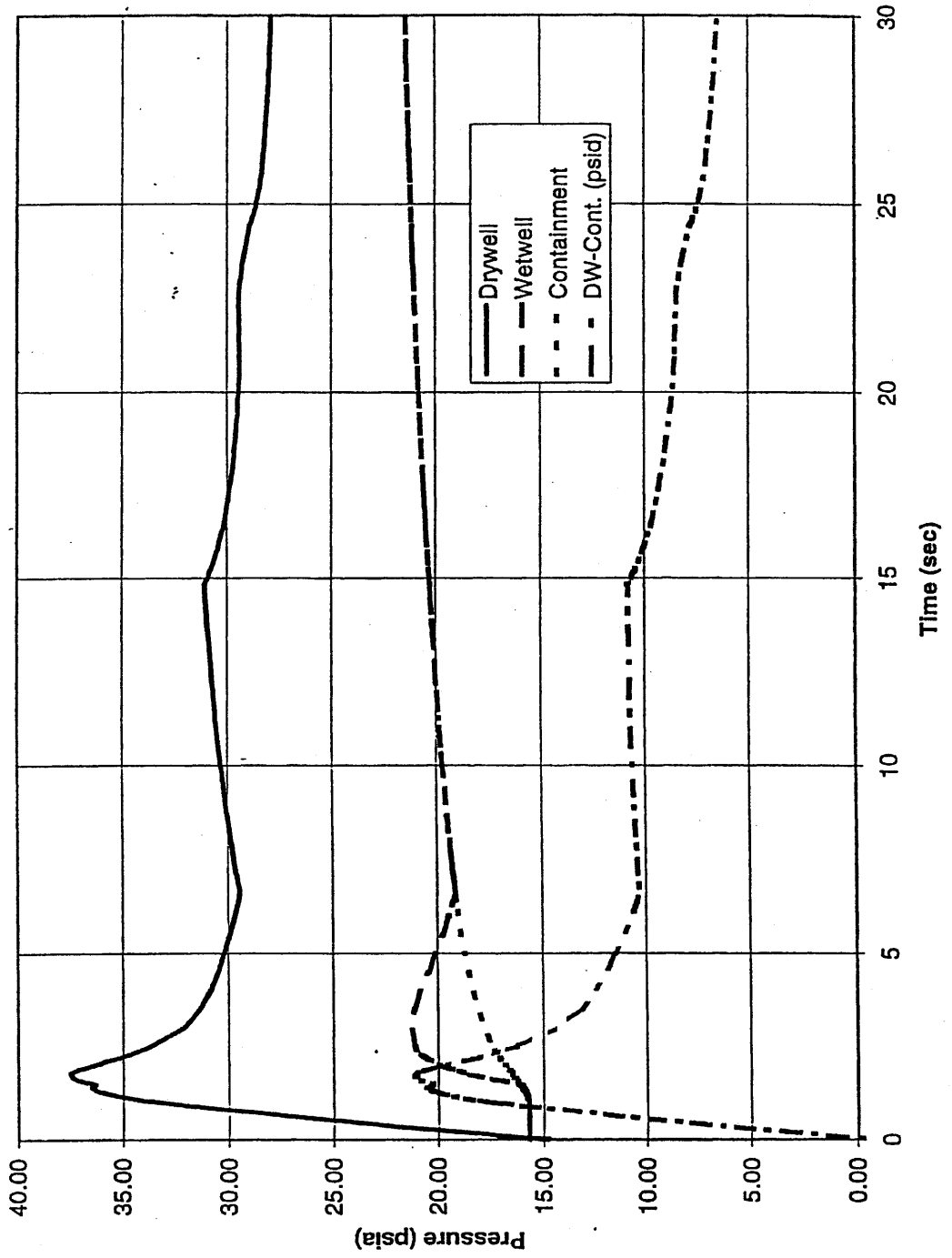


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Effective Blowdown Area
for Recirculation Line Break

Figure 6.2-1

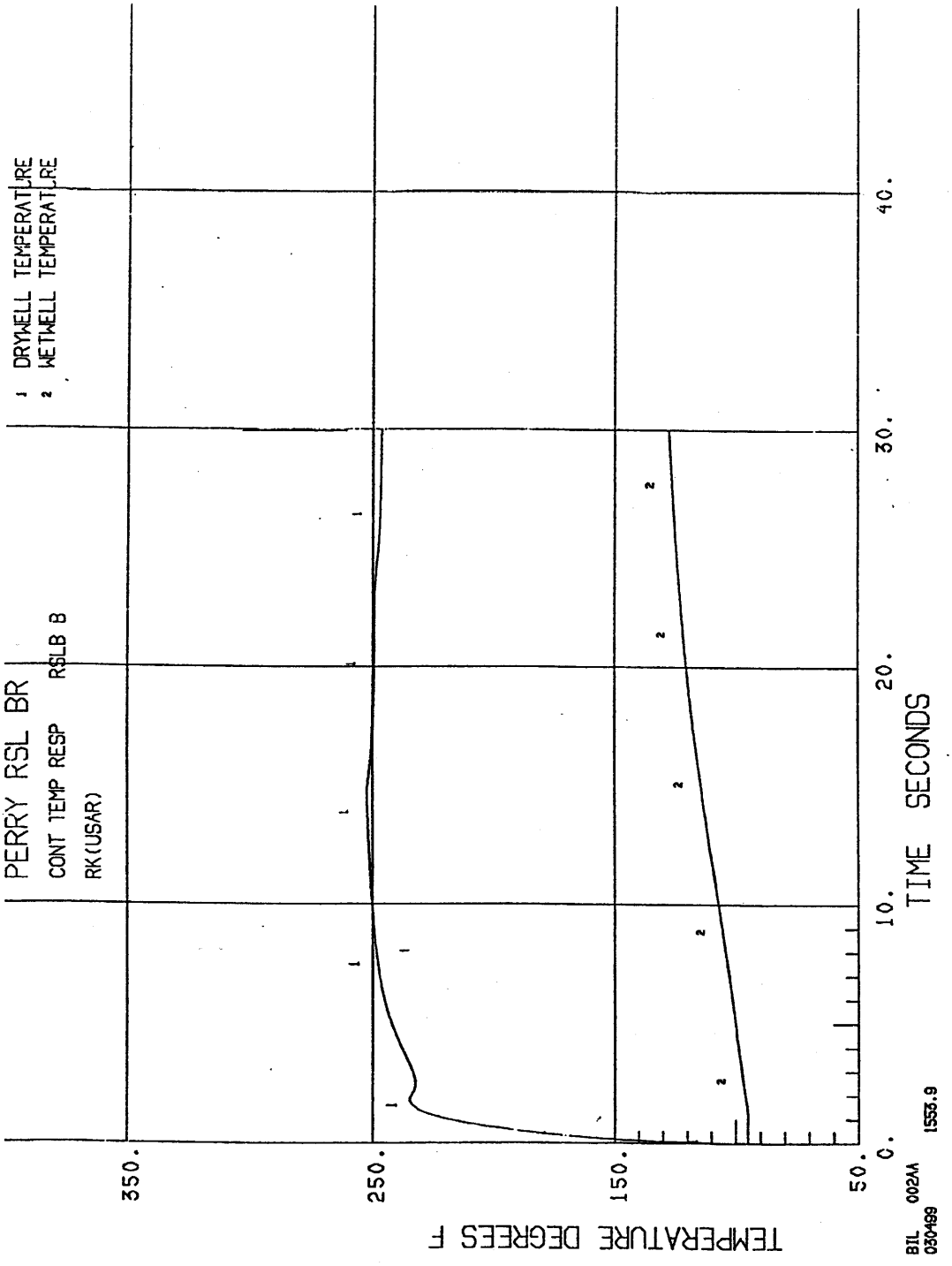


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Short Term Pressure Response
Following a Recirculation
Line Break

Figure 6.2-2

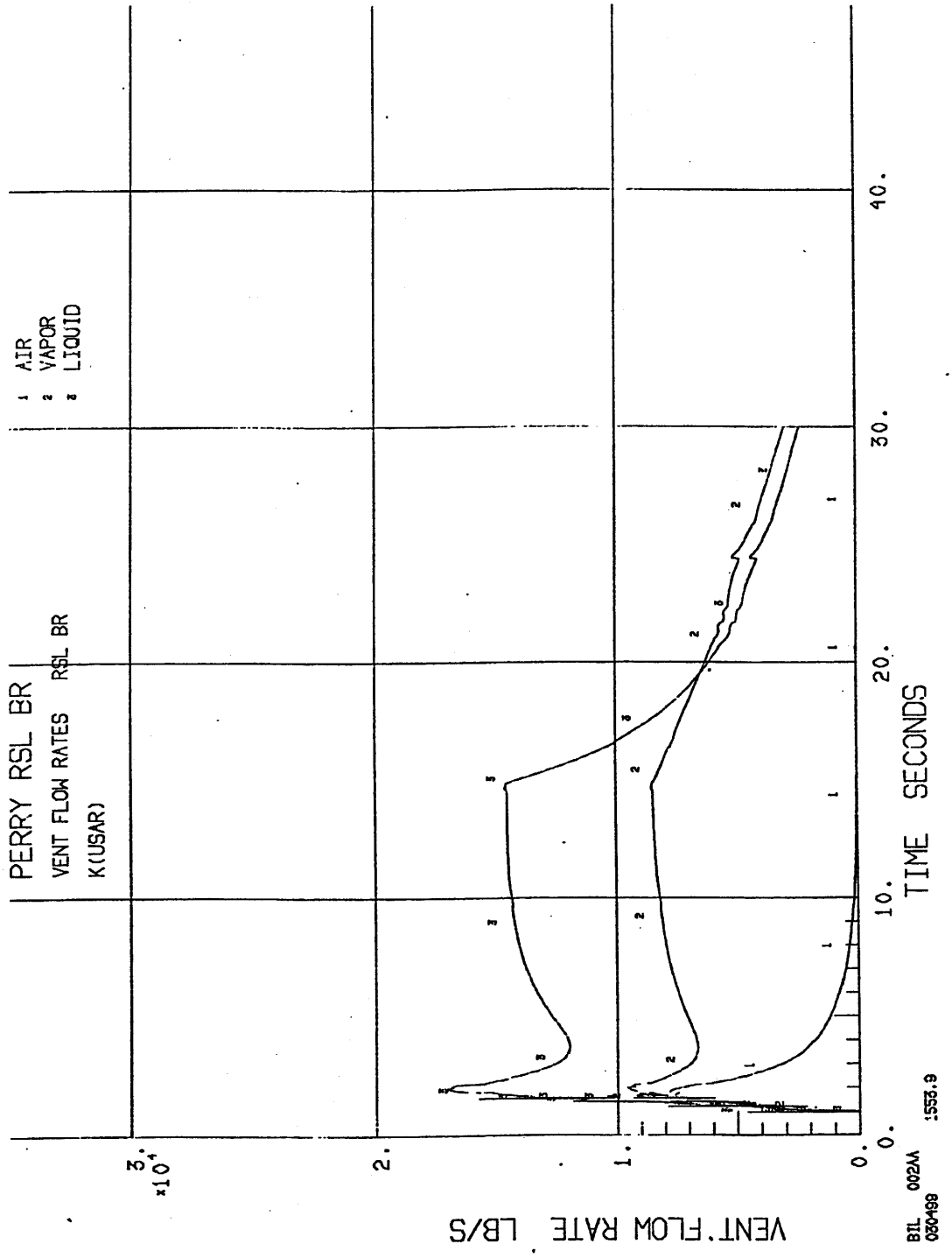


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Short Term Temperature Response
Following a Recirculation
Line Break

Figure 6.2-3



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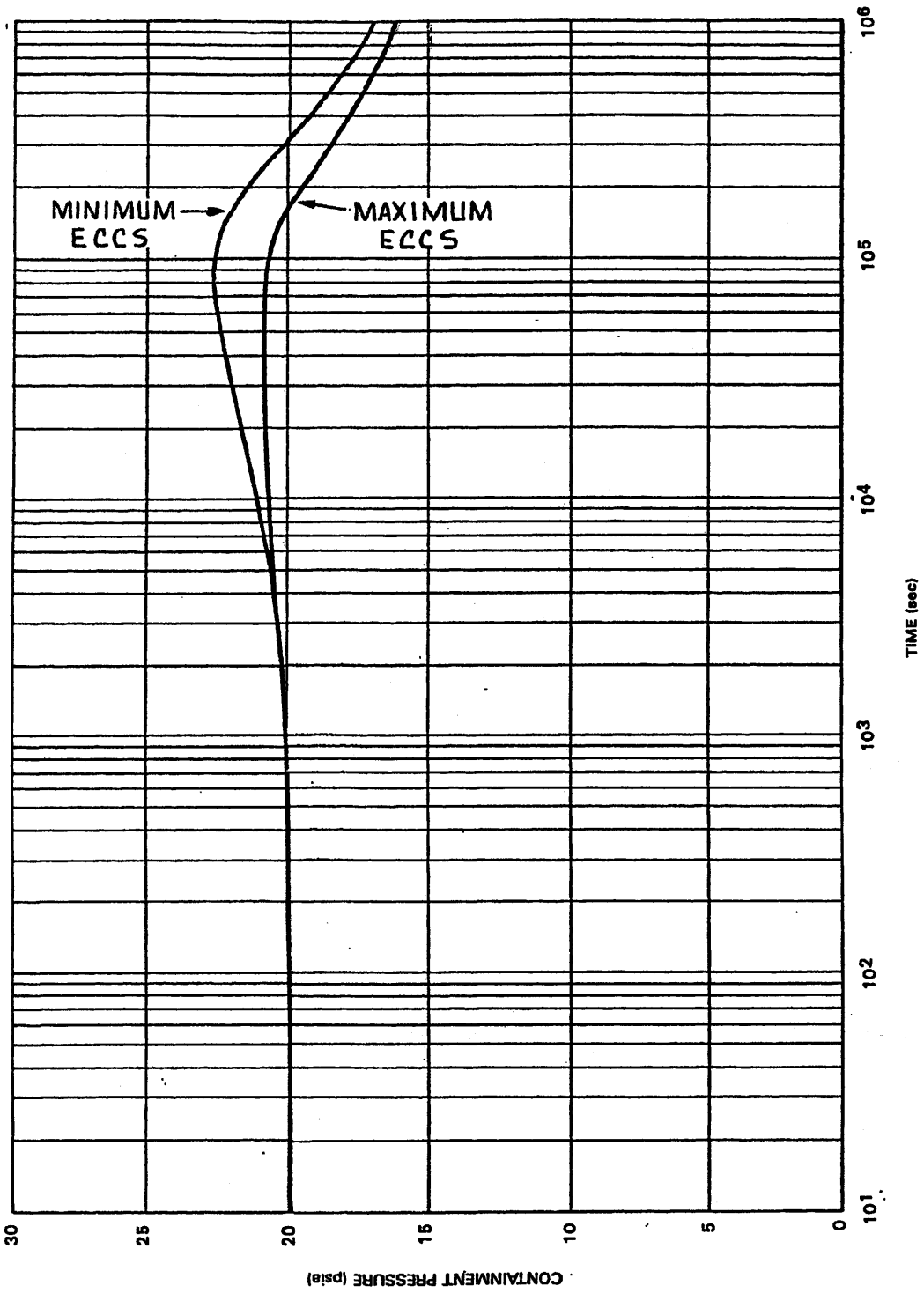
PERRY NUCLEAR POWER PLANT

Short Term Vent Flow Rates
Following a Recirculation Line
Break (Minimum ECCS)

Figure 6.2-5

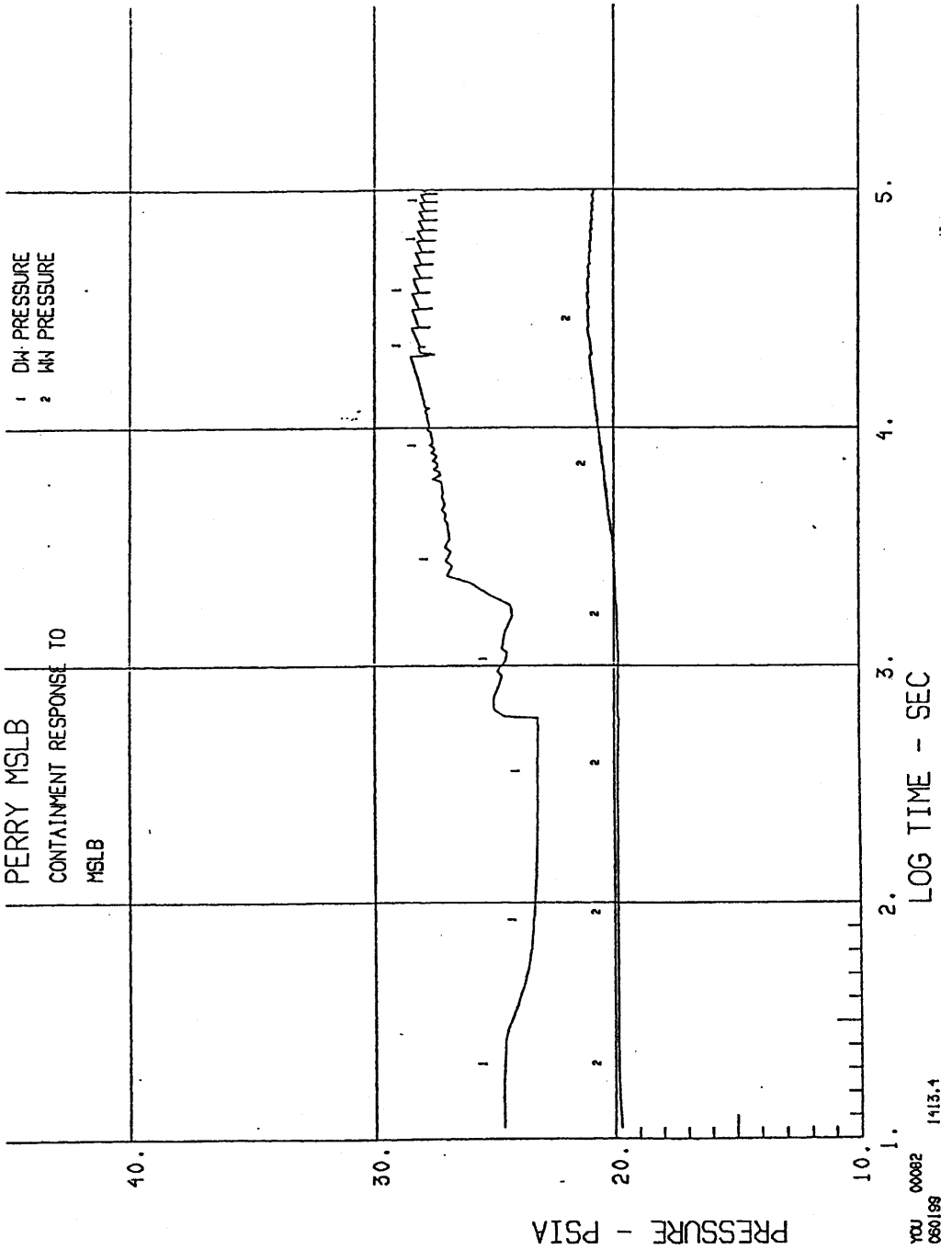


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Long Term Pressure Response Following a Main Steam Line Break (at 3729 MWt)

Figure 6.2-6



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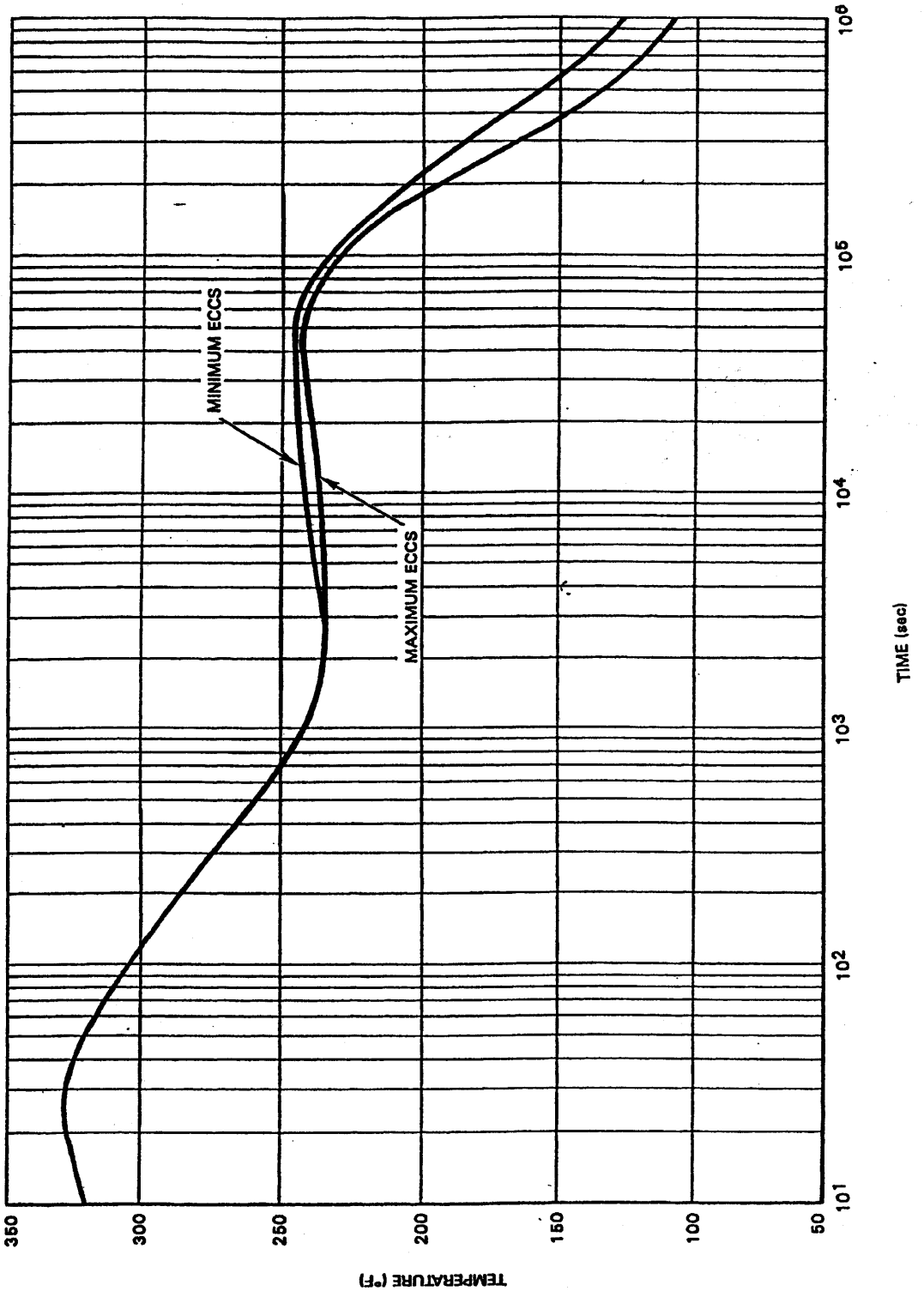
PERRY NUCLEAR POWER PLANT

Long Term Pressure Response Following a Main Steam Line Break (at 3833 MWt)

Figure 6.2-6a



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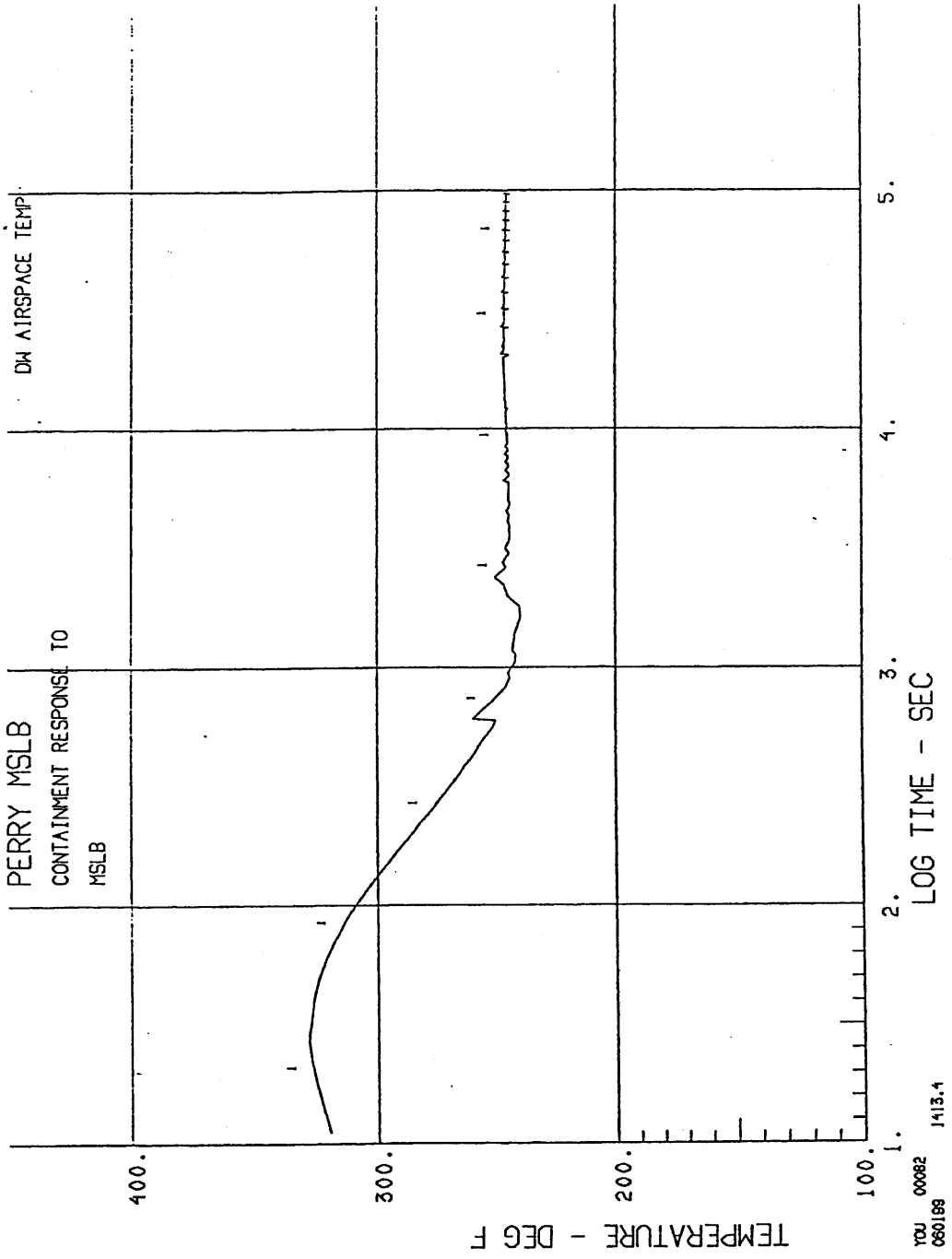
PERRY NUCLEAR POWER PLANT

Long Term Drywell Temperature Response Following a Main Steam Line Break (at 3729 MWt)

Figure 6.2-7

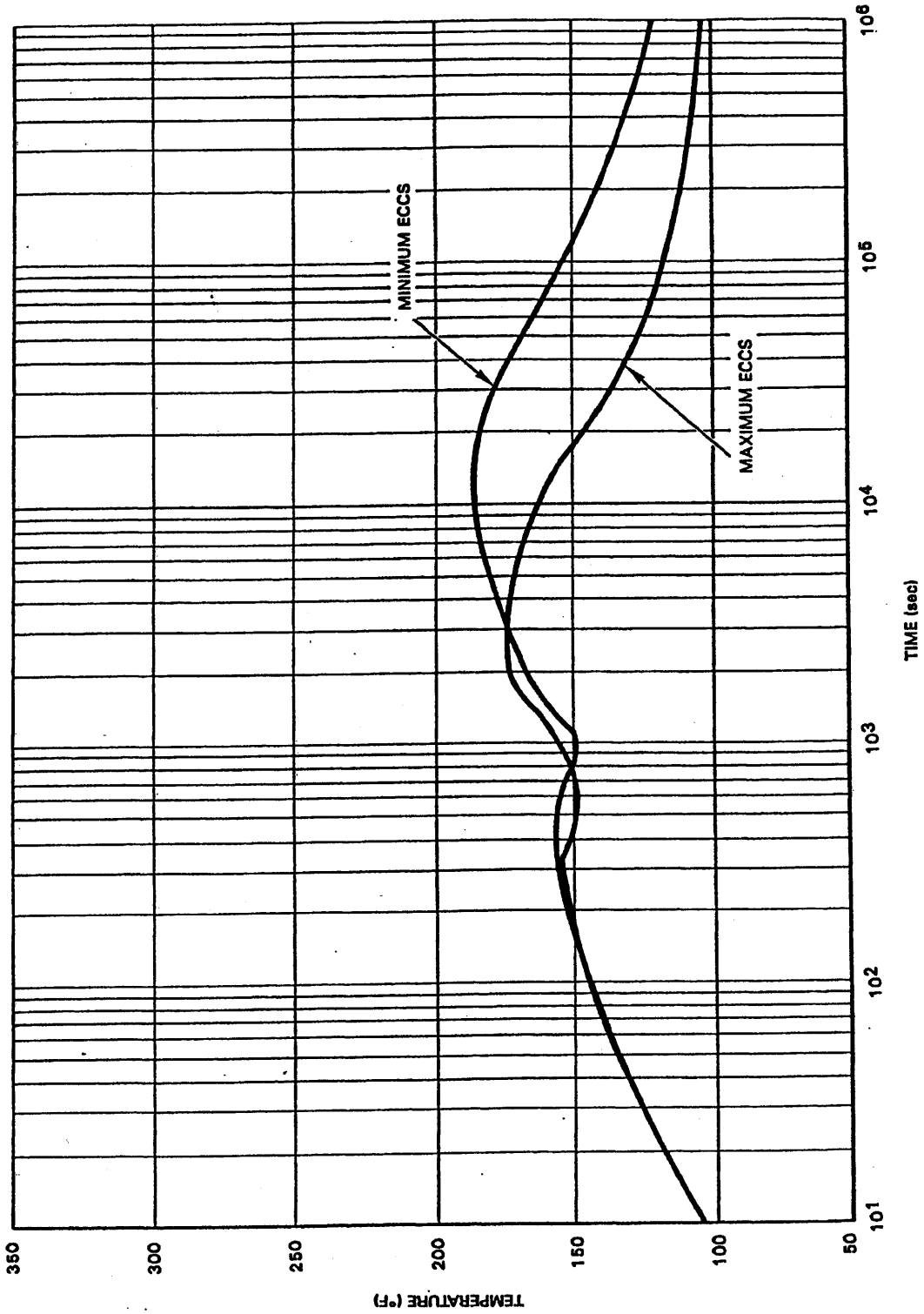


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Long Term Drywell Temperature Response Following a Main Steam Line Break (at 3833 MWt)

Figure 6.2-7a



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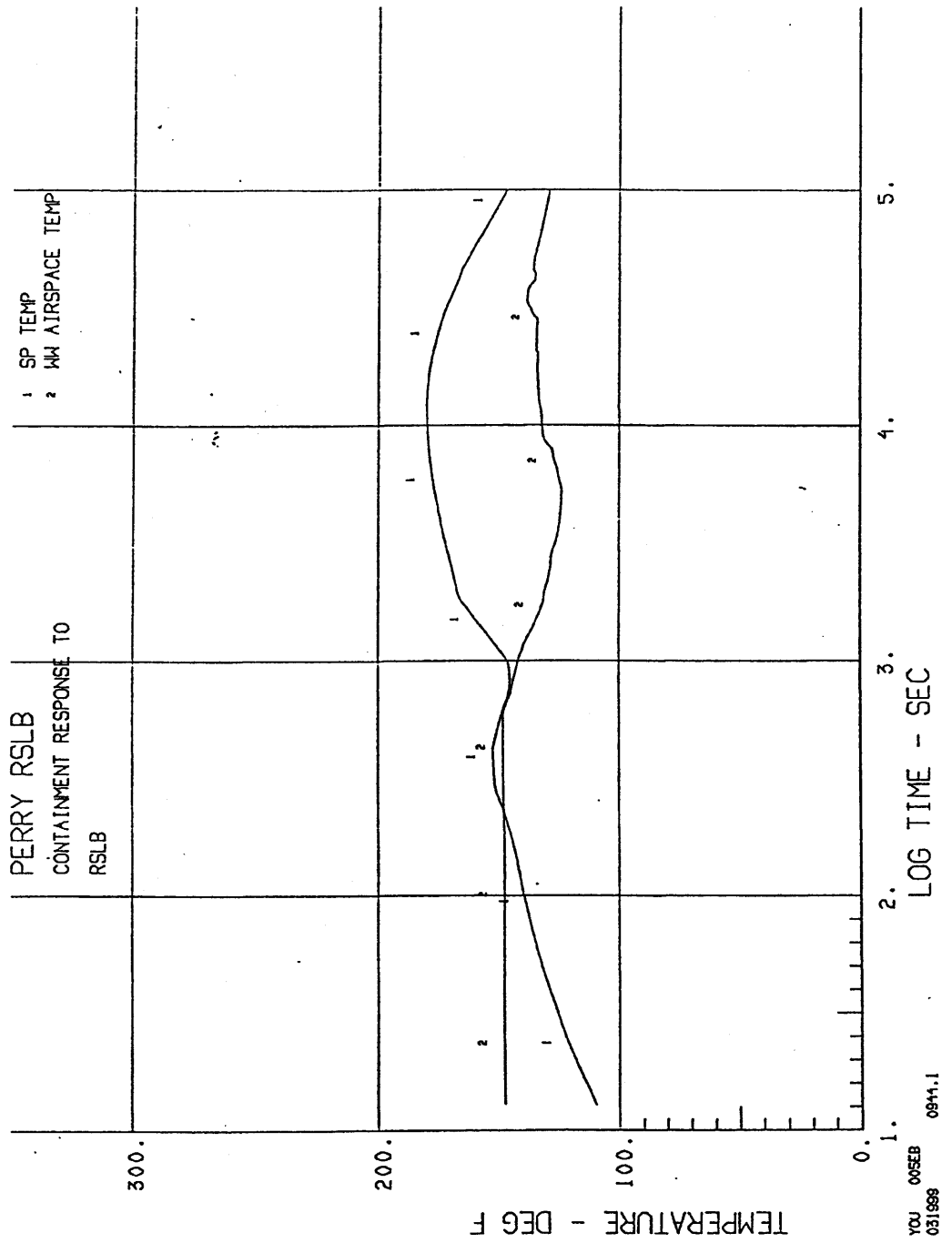
PERRY NUCLEAR POWER PLANT

Long Term Suppression Pool
Temperature Response Following a
Recirculation Line Break
(at 3729 MWt)

Figure 6.2-8



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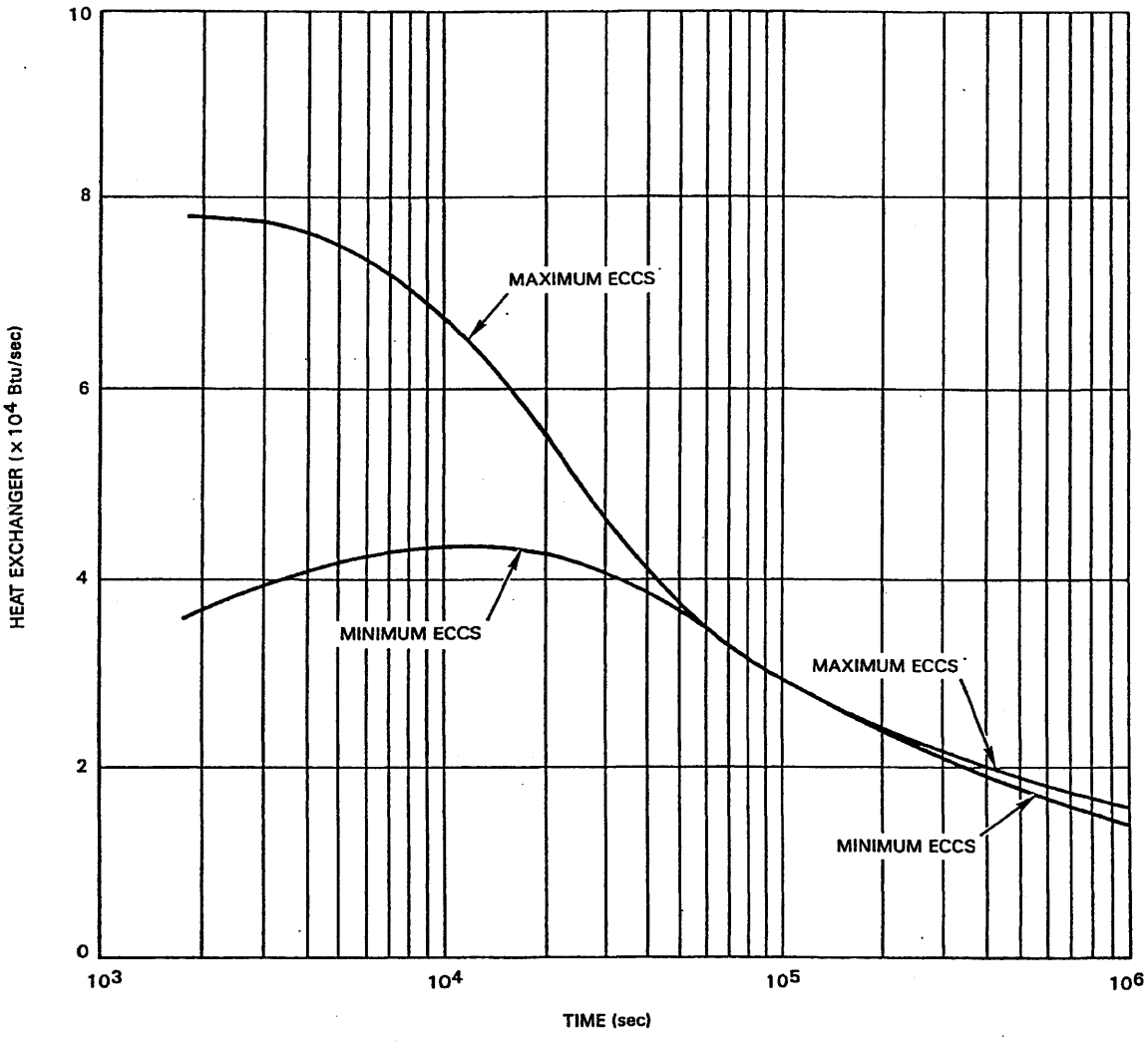
PERRY NUCLEAR POWER PLANT

Long Term Suppression Pool
Temperature Response Following a
Recirculation Line Break
(at 3833 MWt)

Figure 6.2-8a



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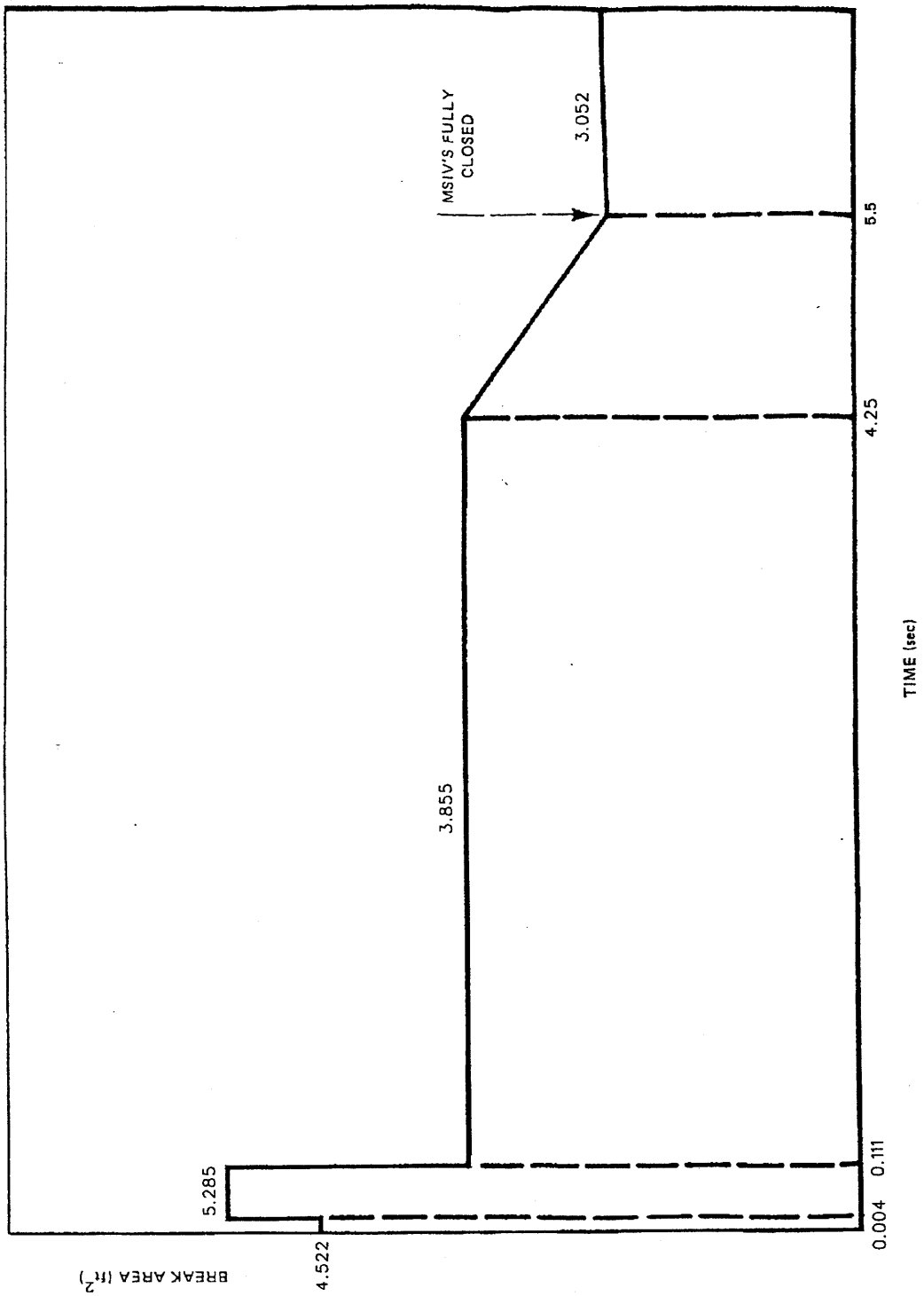
PERRY NUCLEAR POWER PLANT

RHR Heat Removal Rate Following
a Recirculation Line Break
(at 3729 MWt)

Figure 6.2-9



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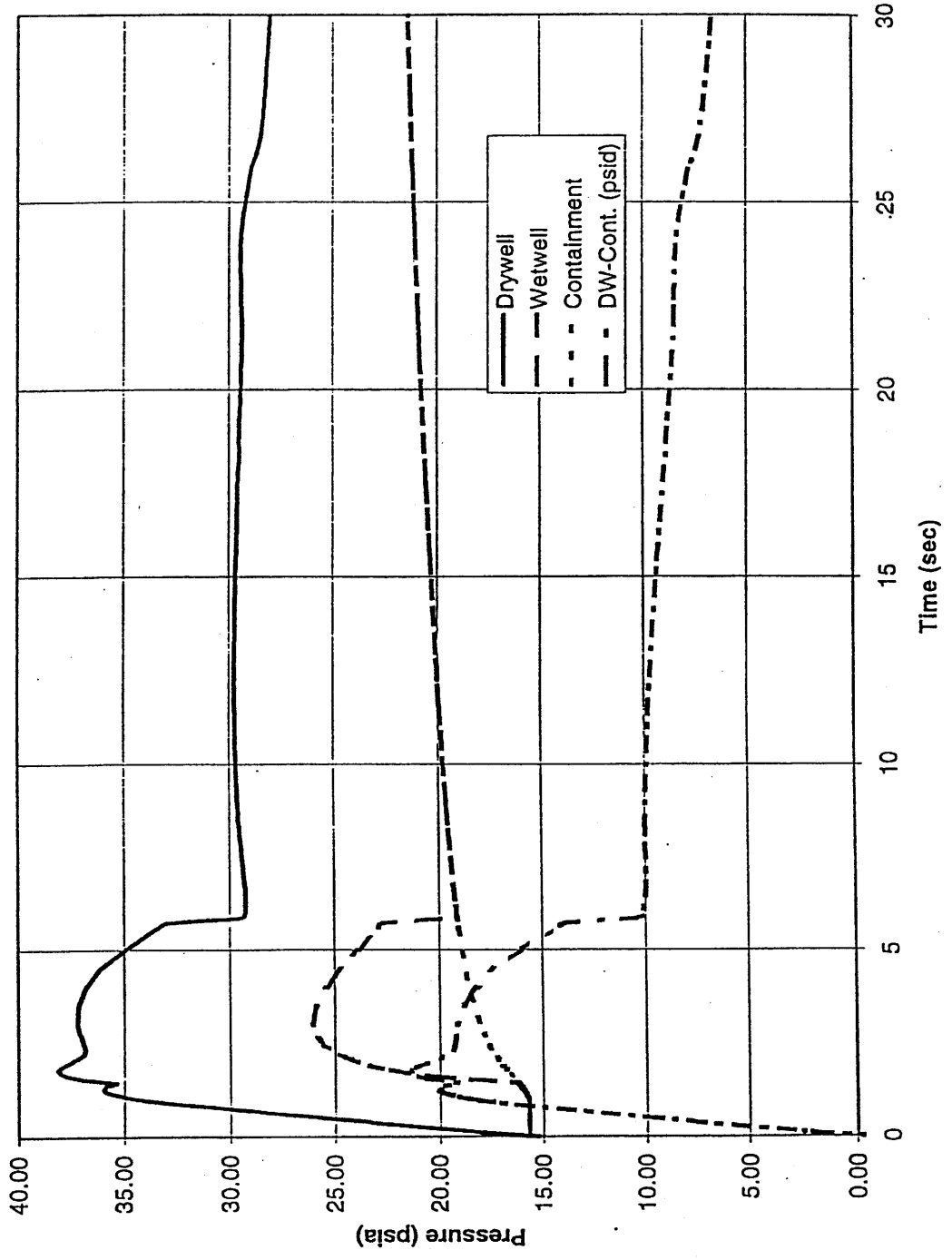
PERRY NUCLEAR POWER PLANT

Effective Blowdown Area for
Main Steam Line Break

Figure 6.2-10



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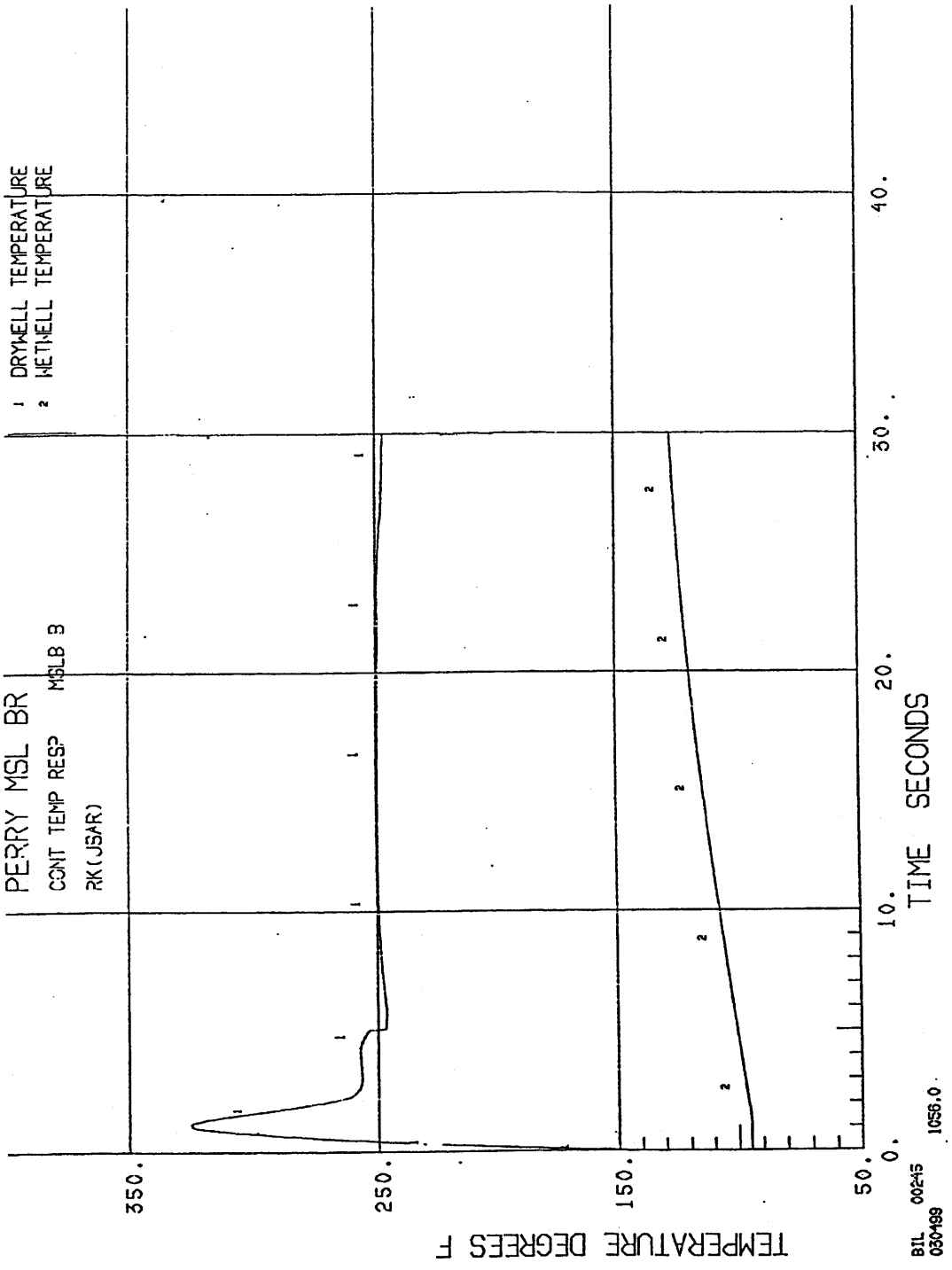
PERRY NUCLEAR POWER PLANT

Short Term Pressure Response
Following a Main Steam
Line Break

Figure 6.2-11

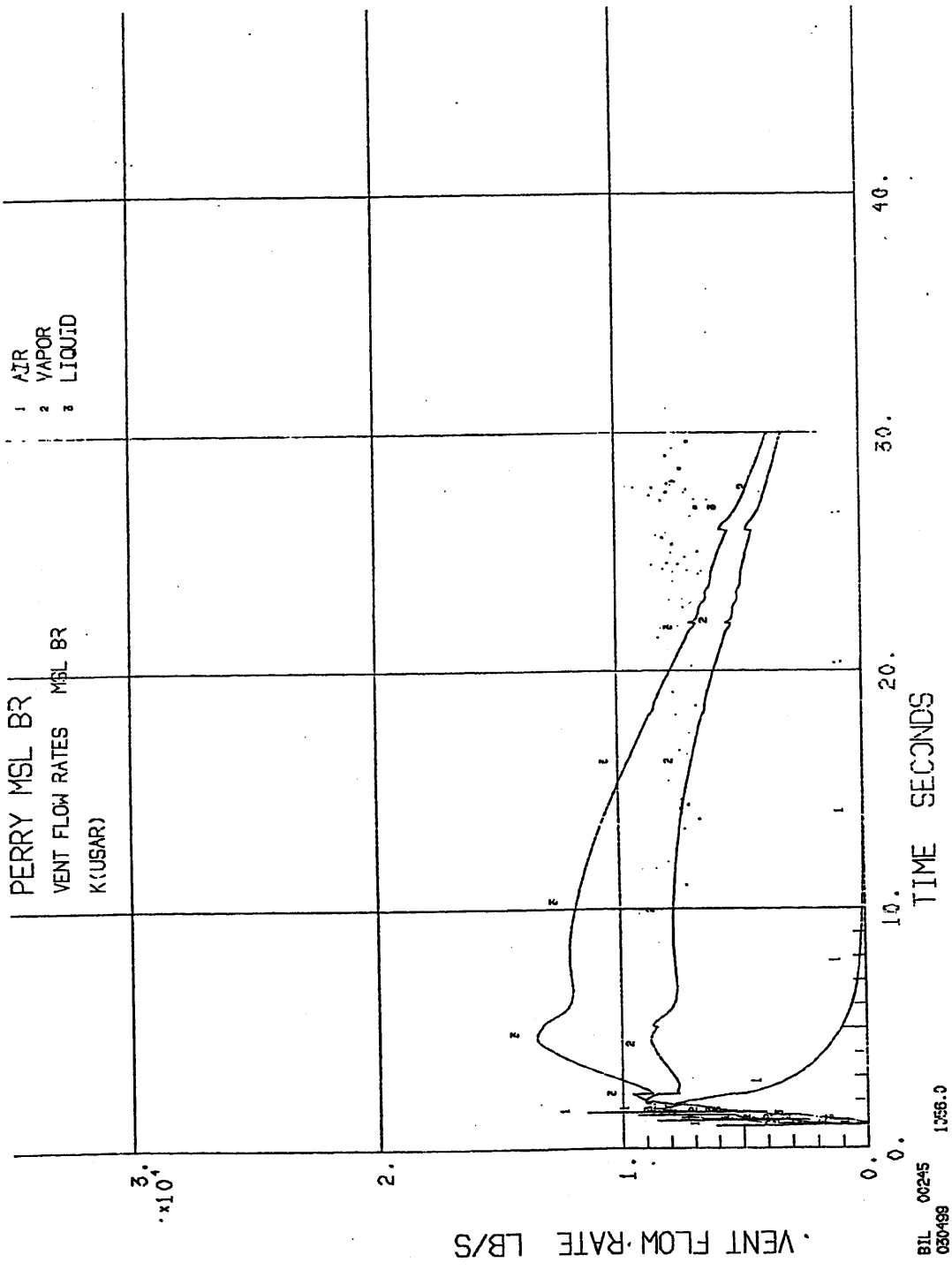


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Short Term Temperature Response
Following a Main Steam Line Break

Figure 6.2-12



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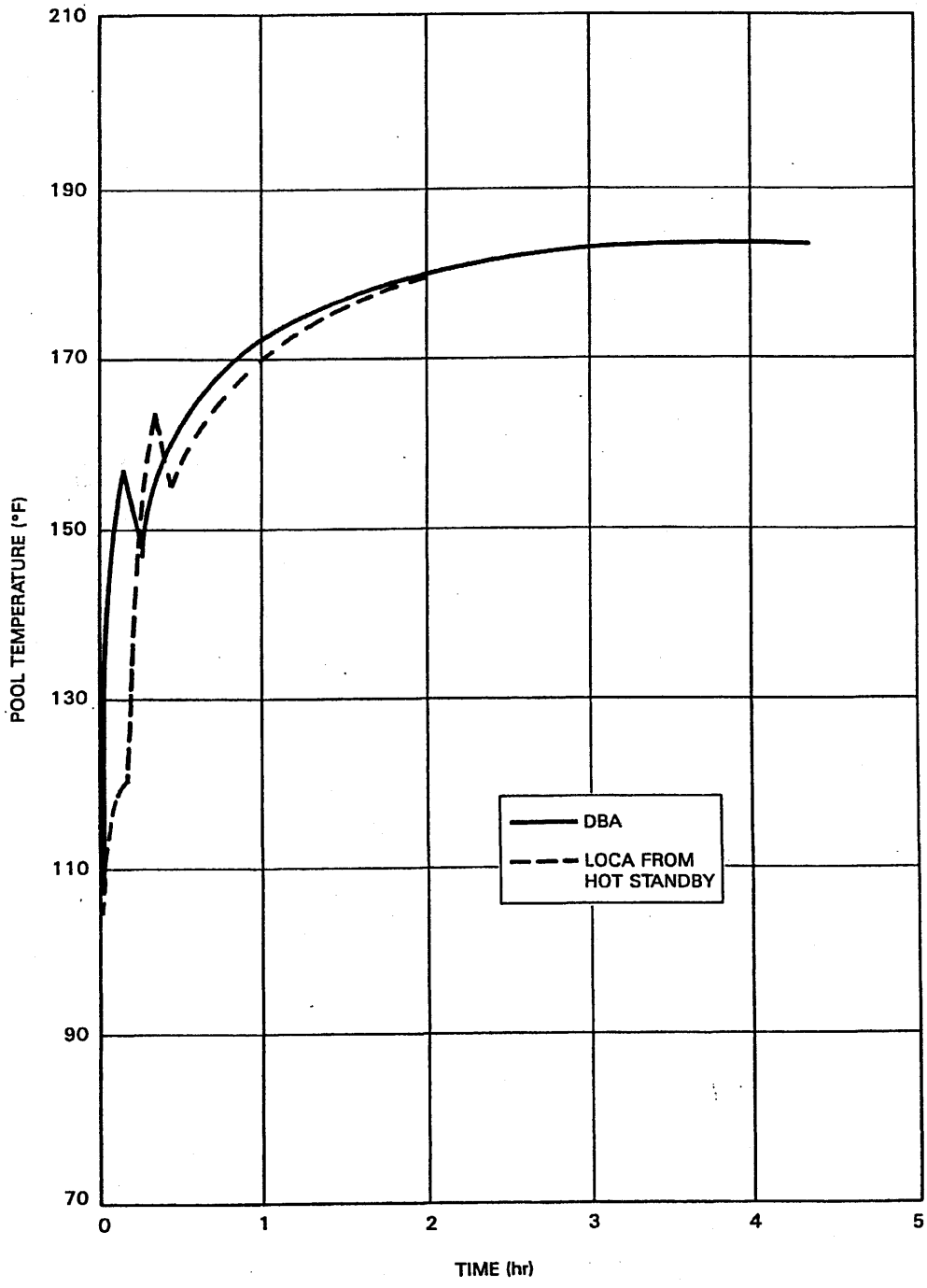
PERRY NUCLEAR POWER PLANT

Short Term Vent Flow Rates Following a Main Steam Line Break (Minimum ECCS)

Figure 6.2-14

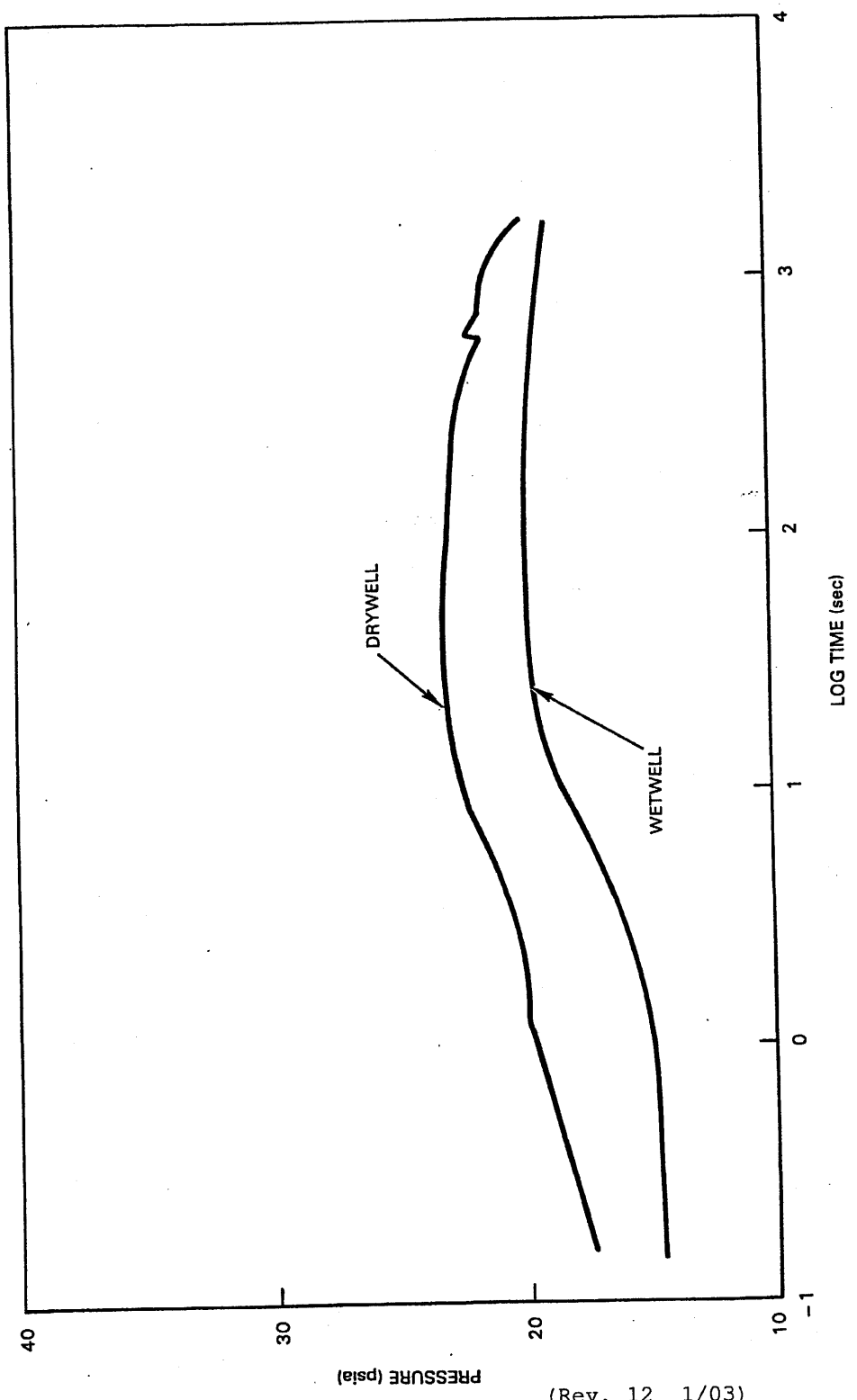


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Suppression Pool Temperature for DBA and for Blowdown During Hot Standby Operation (at 3729 MWt)

Figure 6.2-15



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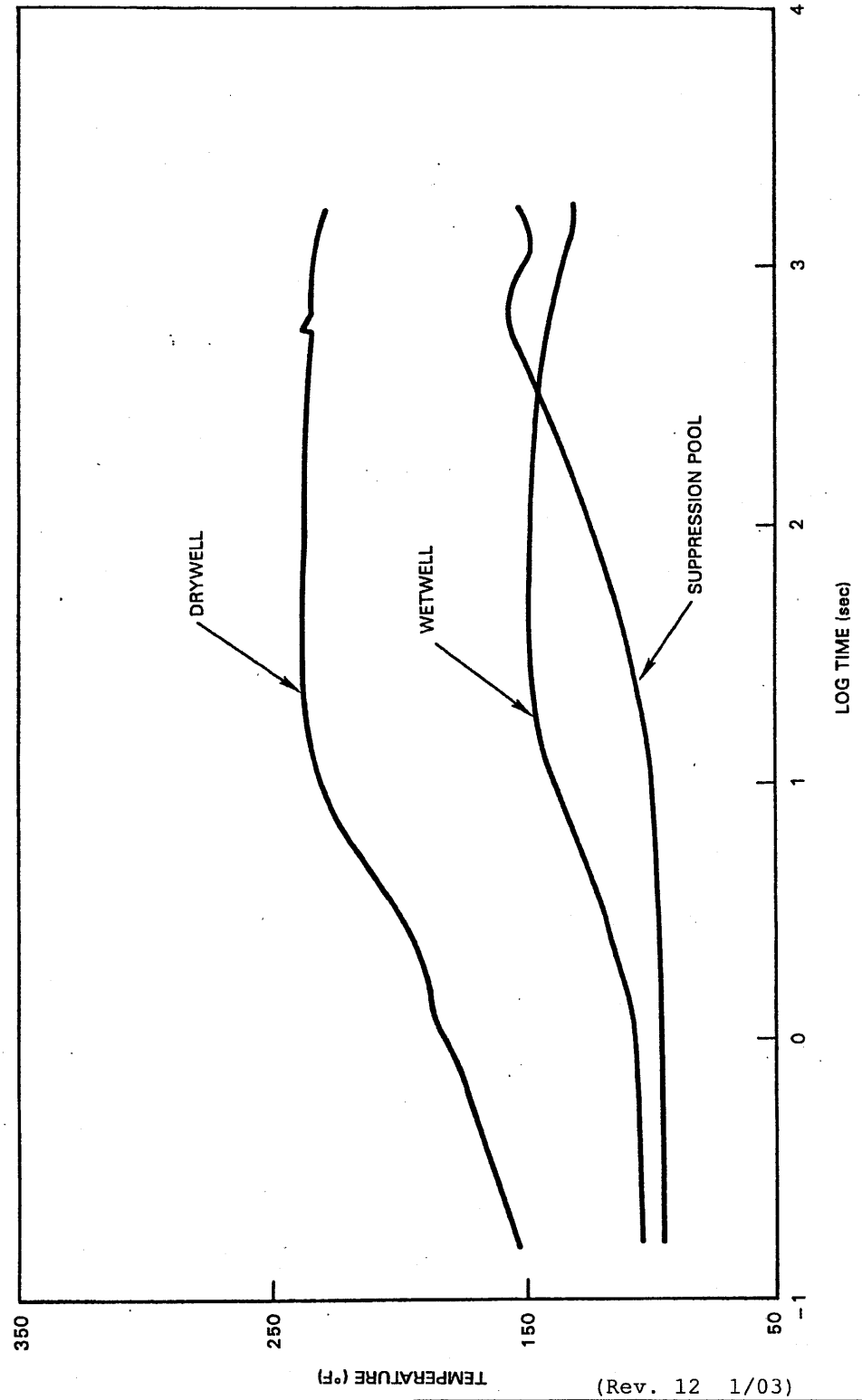
PERRY NUCLEAR POWER PLANT

Short Term Containment Pressure Response Following an Intermediate Size Break (IBA = 0.68 ft^2) (at 3729 MWt)

Figure 6.2-16



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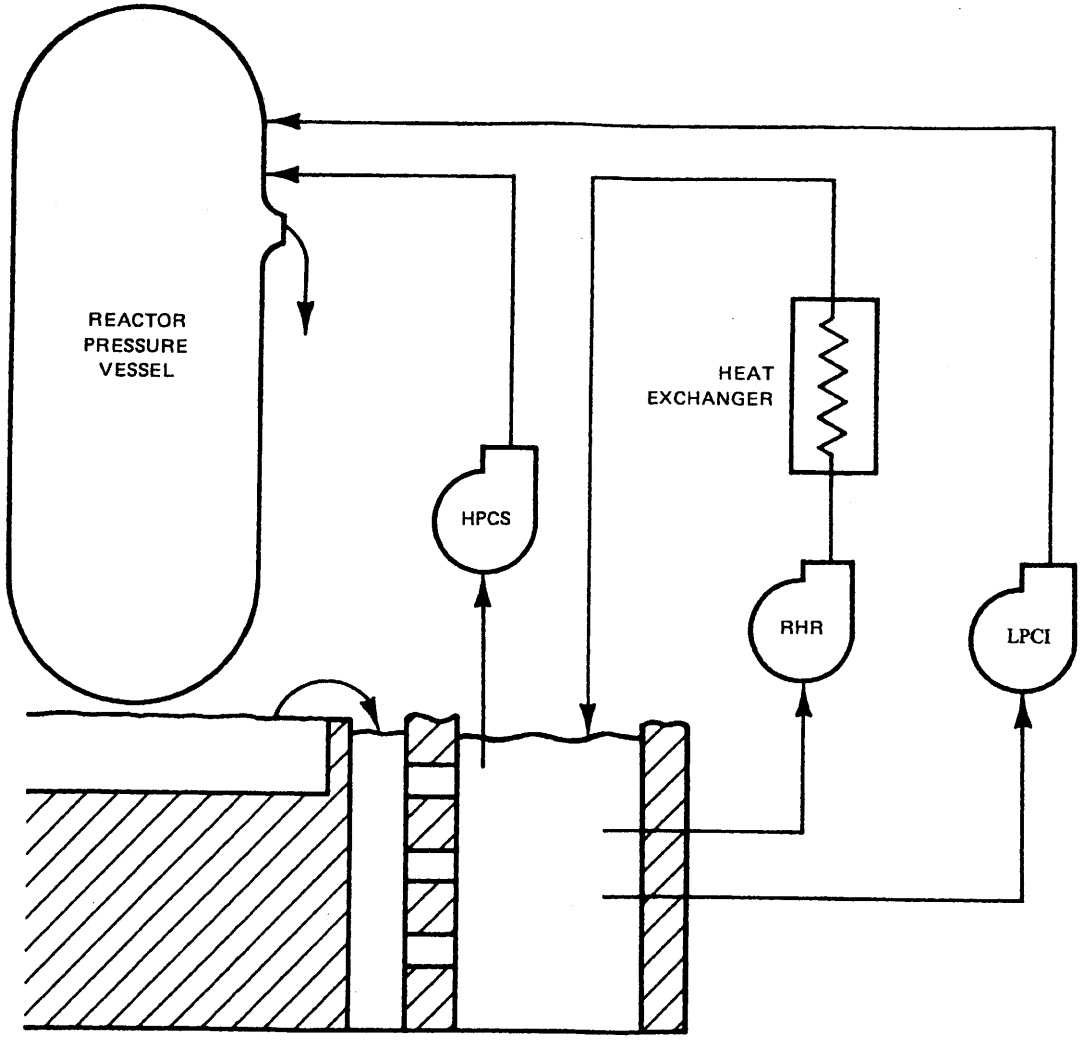
PERRY NUCLEAR POWER PLANT

Short Term Containment Temperature Response Following an Intermediate Size Break (IBA = 0.68 ft^2) (at 3729 MWt)

Figure 6.2-17



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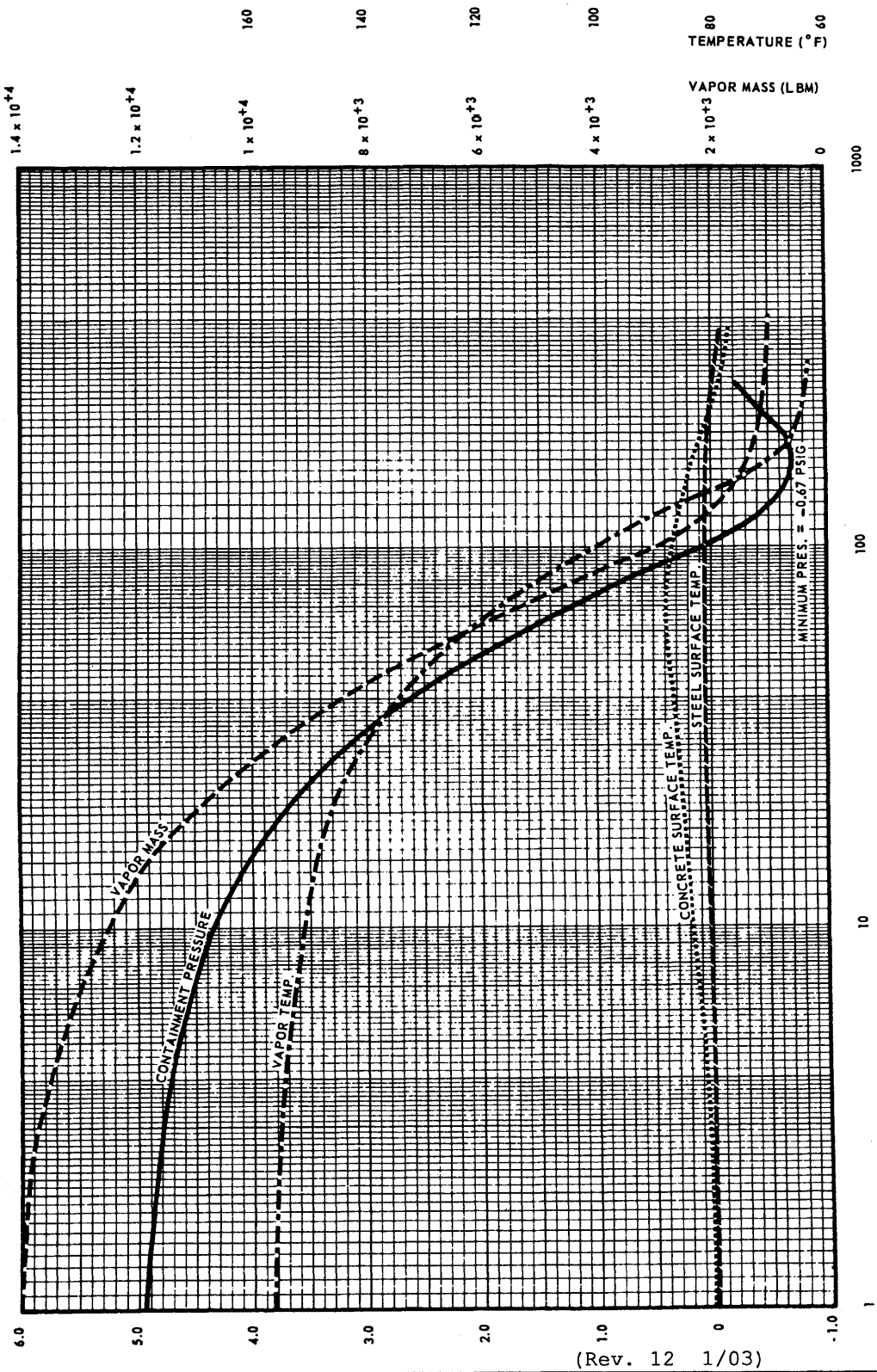
PERRY NUCLEAR POWER PLANT

Schematic of the RHR Containment Cooling System Analytical Model (Min. ECCS)

Figure 6.2-18



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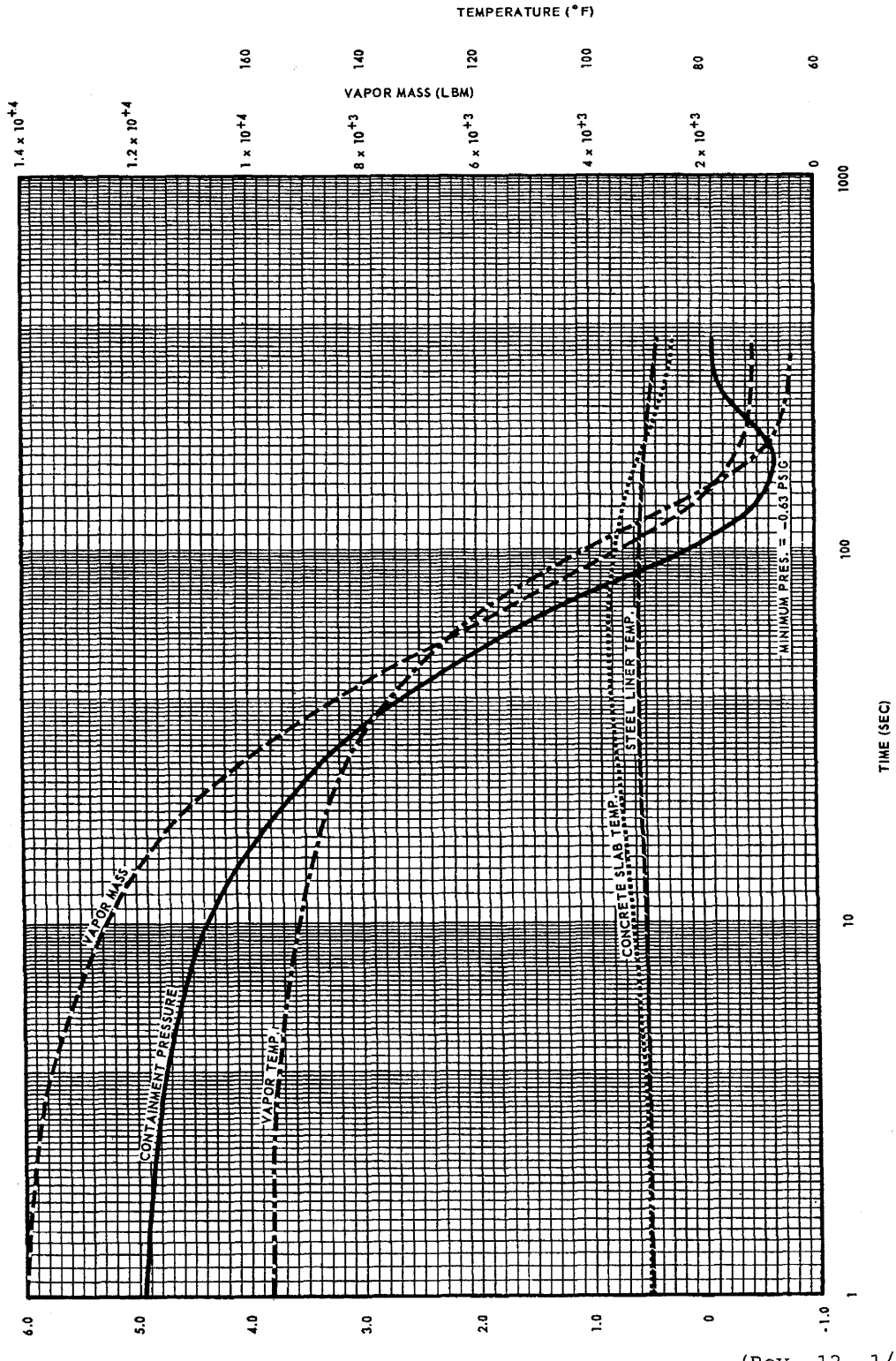
PERRY NUCLEAR POWER PLANT

Containment Vacuum Breaker
Analysis with Initial Internal
Surface Temperature 80°F

Figure 6.2-19

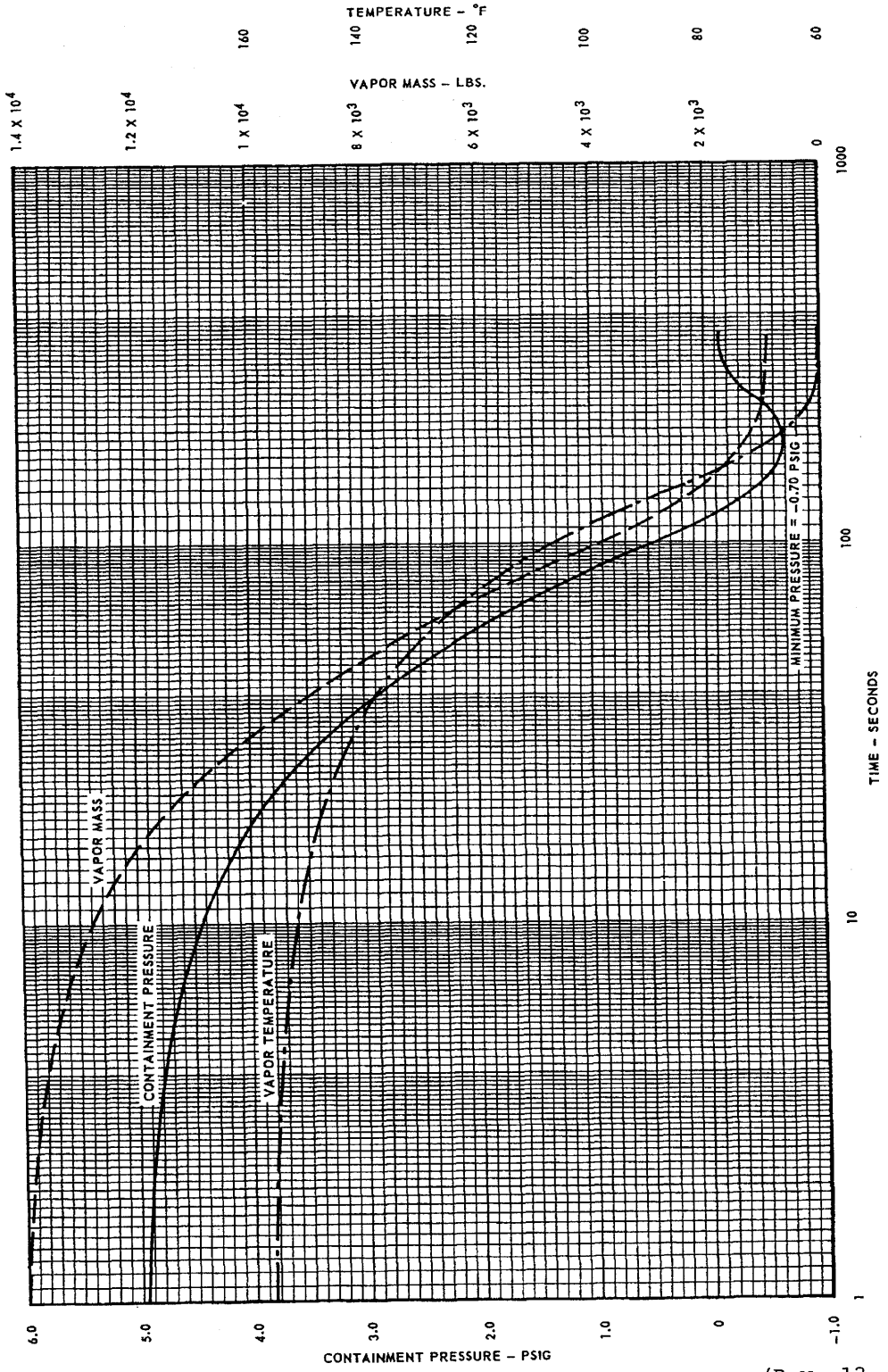


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Containment Vacuum Breaker
Analysis with Initial Internal
Surface Temperature 90°F

Figure 6.2-20

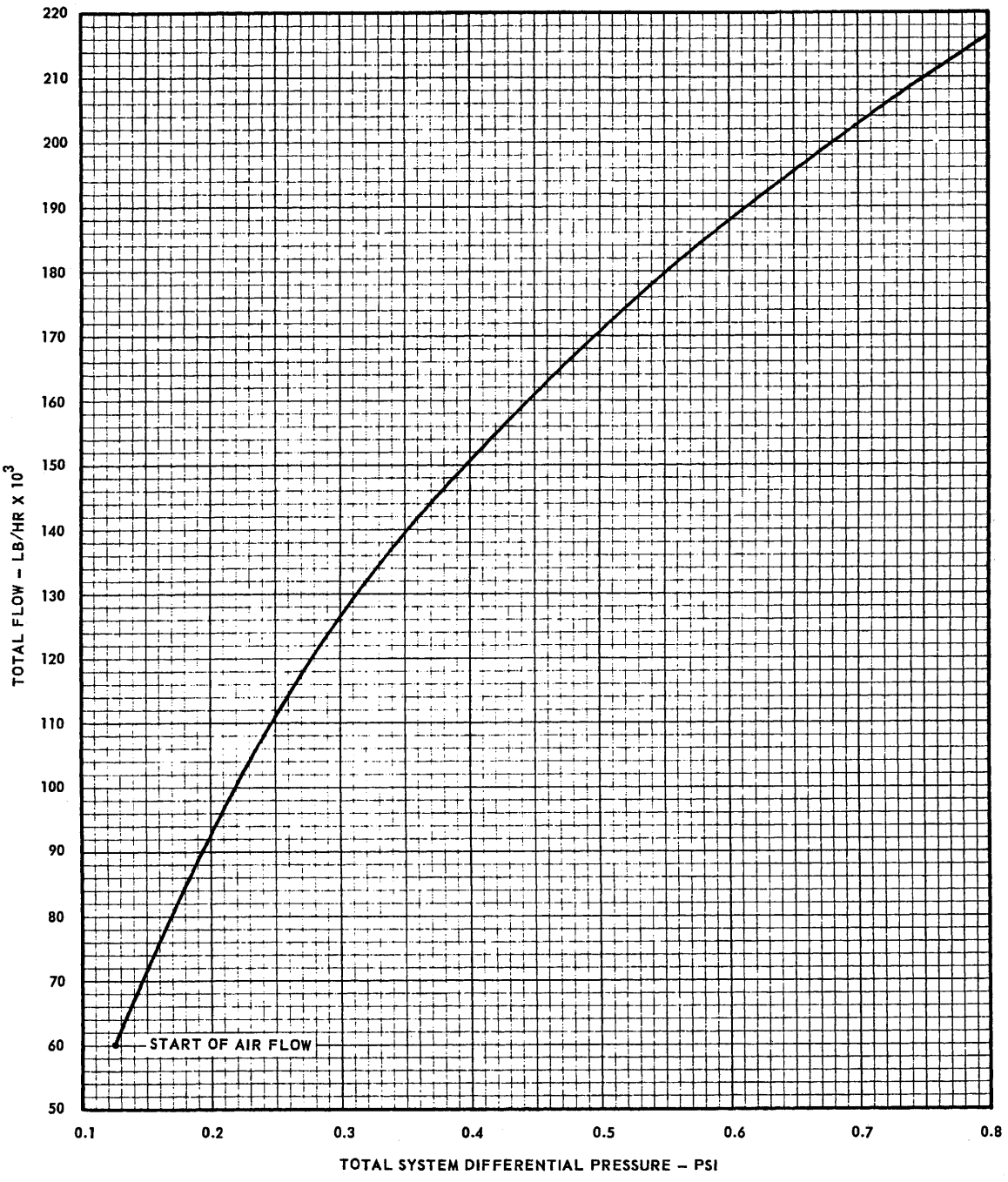


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Containment Pressure Versus
Time - Small Line Break

Figure 6.2-21

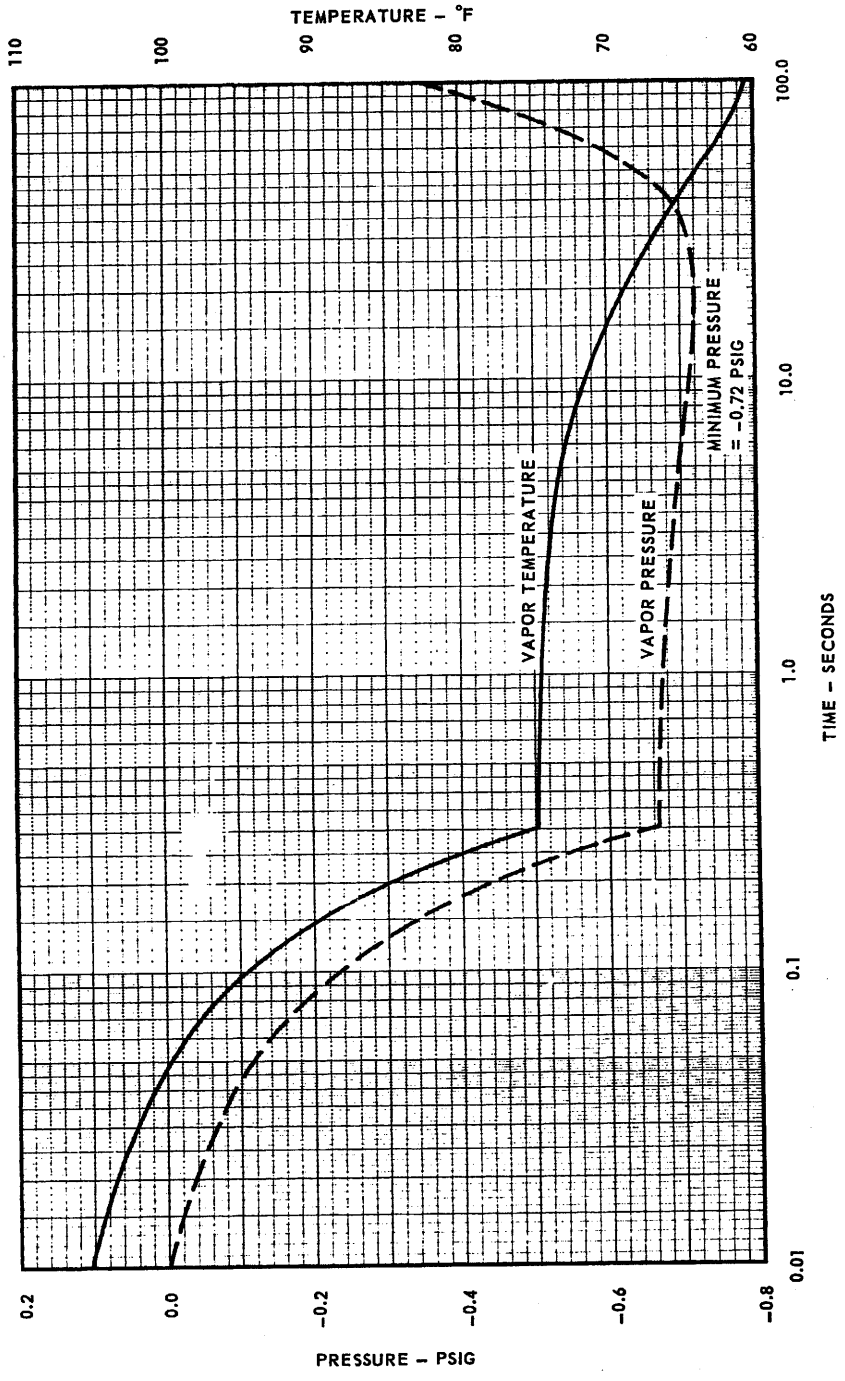


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Total Flow Through Two 24 - Inch Diameter CVR Lines Versus Total System Differential Pressure

Figure 6.2-22

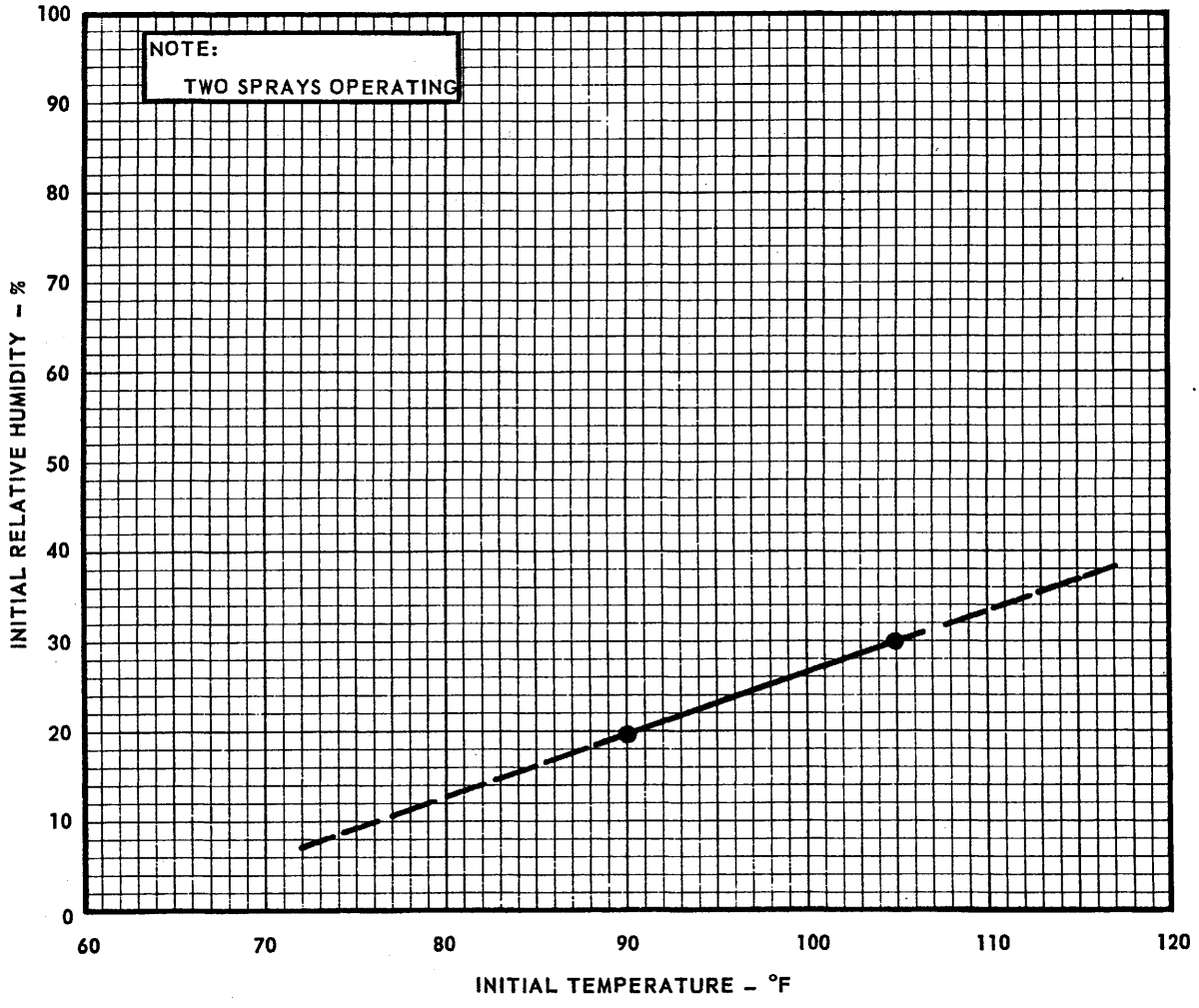


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Containment Pressure Versus Time
Inadvertent Spray Operation –
Normal Operation

Figure 6.2-23

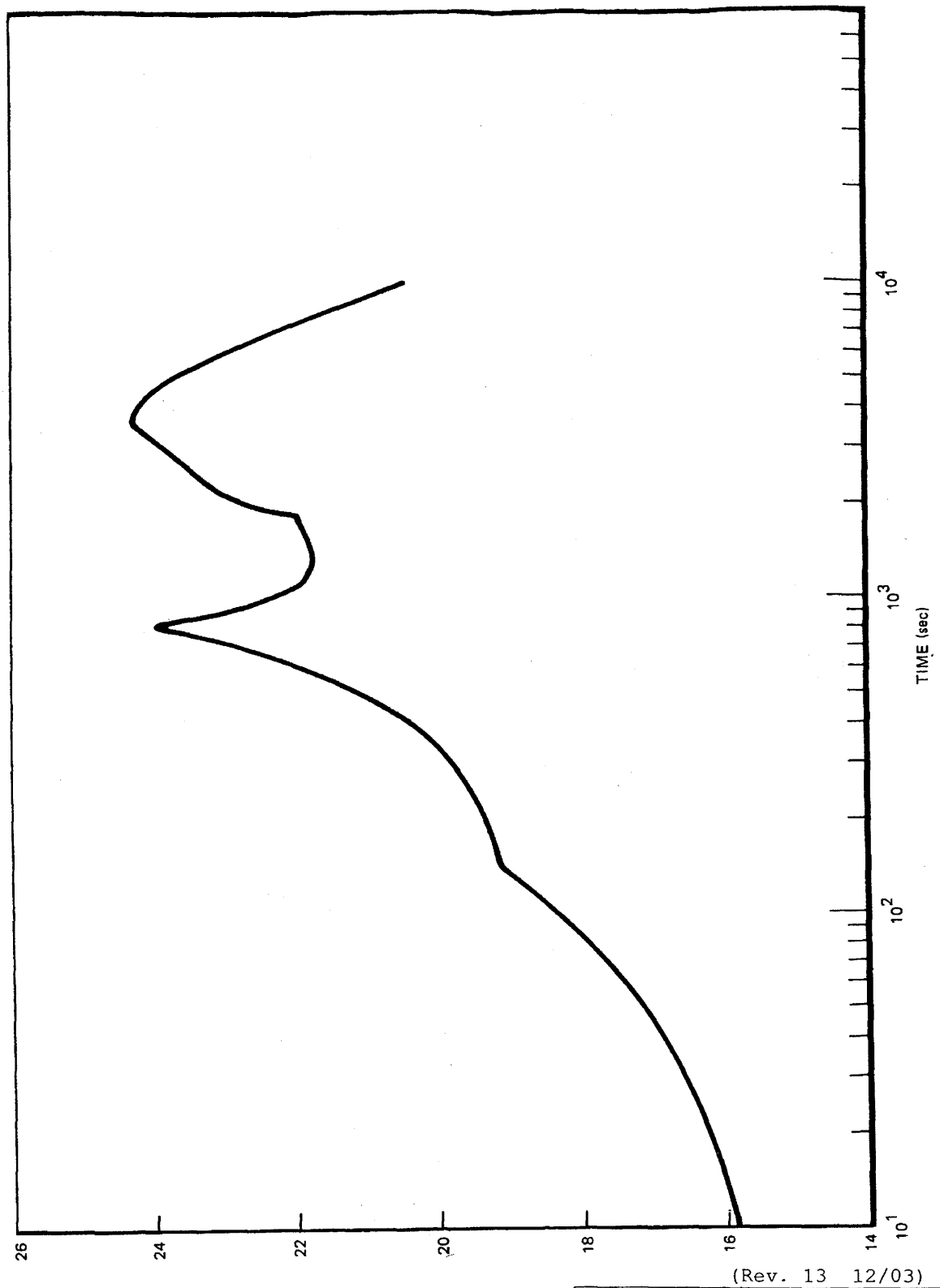


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Initial Relative Humidity Versus
Initial Temperature for
Inadvertent Spray Operation to
Maintain Peak Vacuum ≤ 0.72 PSI

Figure 6.2-24

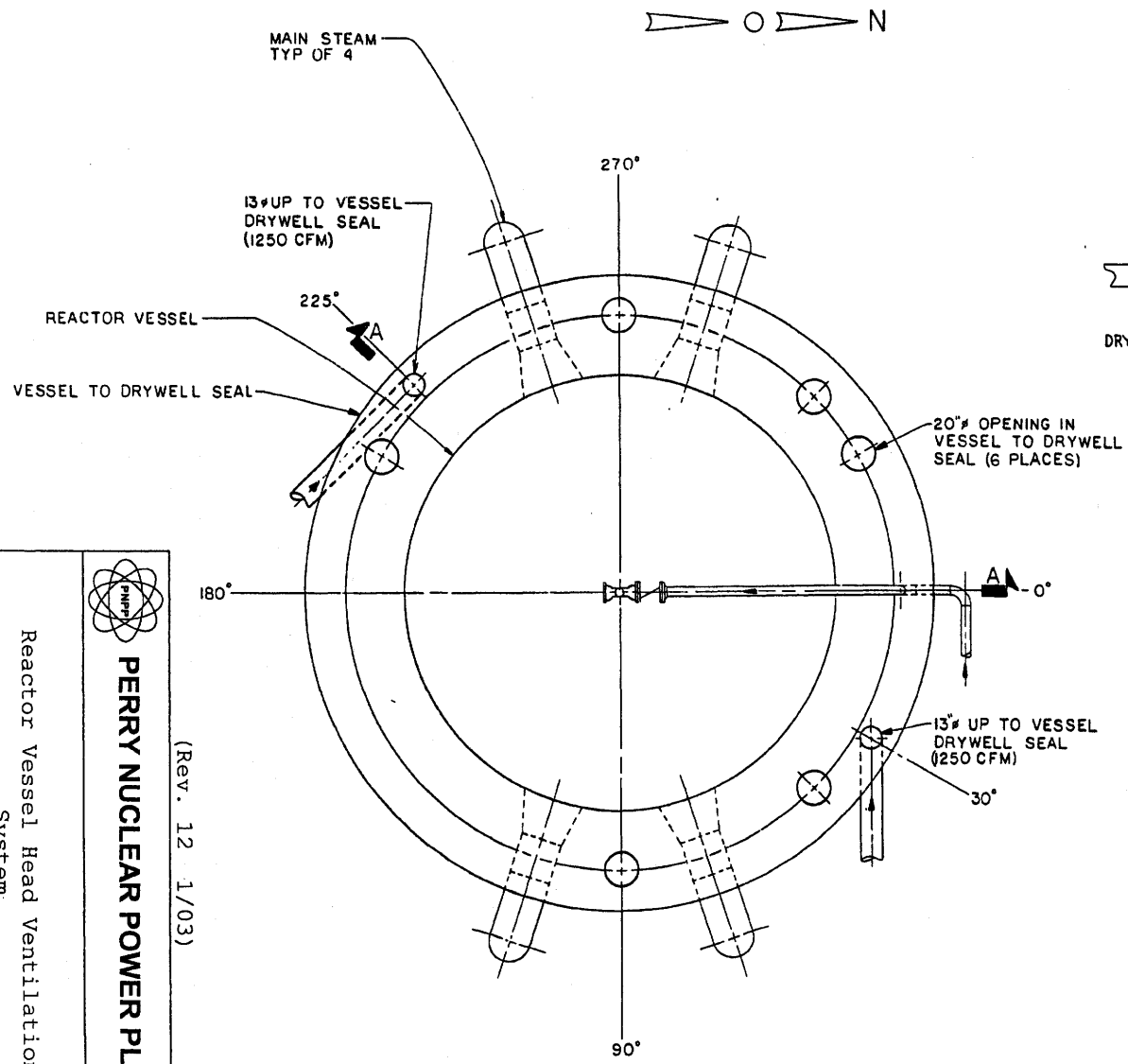


(Rev. 13 12/03)

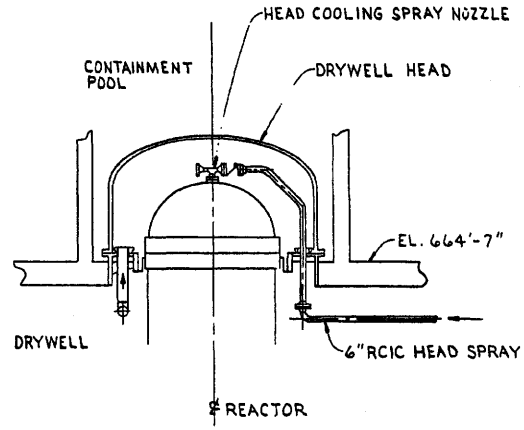
PERRY NUCLEAR POWER PLANT

Containment Pressure Following a Small Break with Steam Bypass (With Containment Spray and Heat Sinks & a minimum Mark III Design of $A/\sqrt{K} = 1.0\ ft^2$)

Figure 6.2-25



PLAN AT EL. 664'-7"



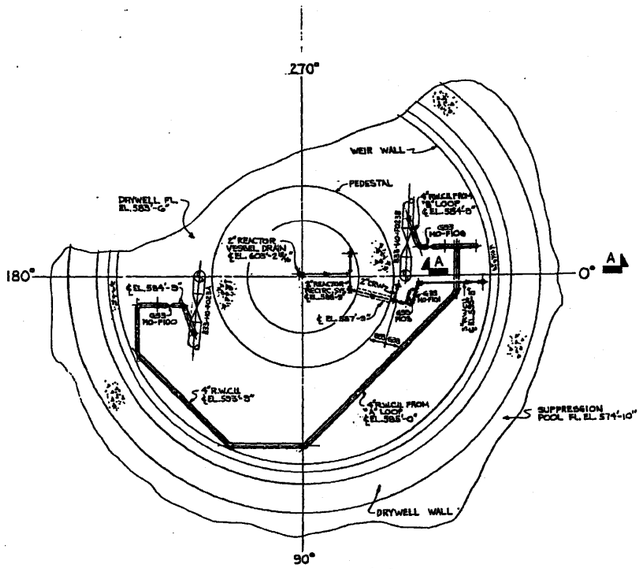
SECTION A-A

PERRY NUCLEAR POWER PLANT

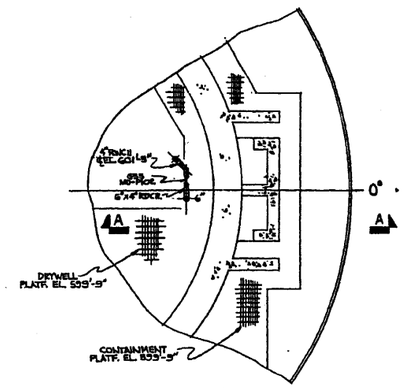
Reactor Vessel Head Ventilation System

Figure 6.2-26

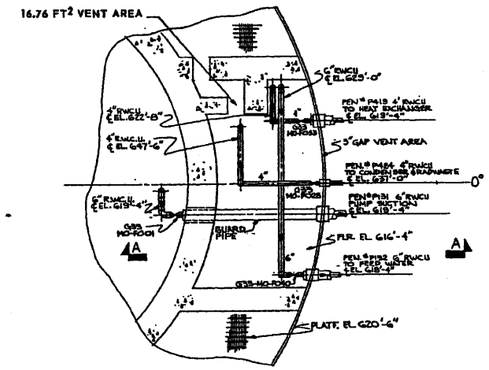
(Rev. 12 1/03)



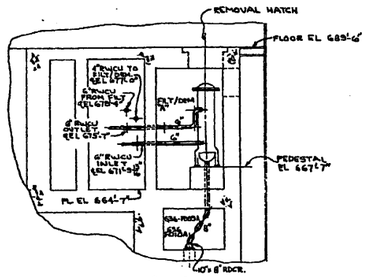
PLAN AT EL. 583'-6"
INSIDE DRYWELL



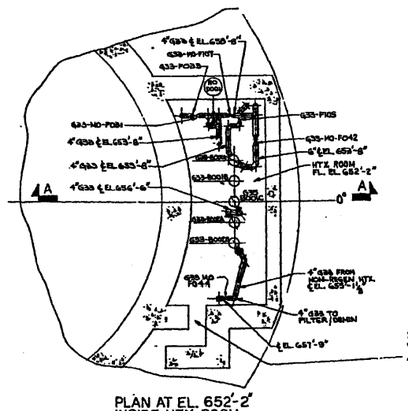
PLAN AT EL 599'-9"



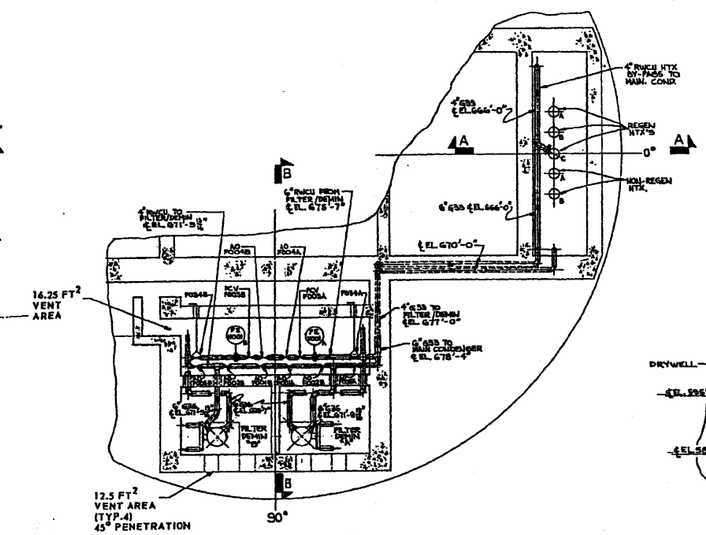
PLAN AT EL 616'-4"
INSIDE STEAM TUNNEL



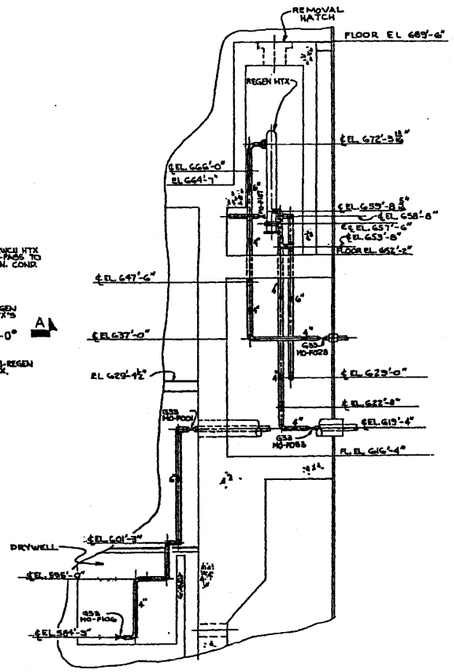
SECTION "B-B"



PLAN AT EL 652'-2"
INSIDE HTX. ROOM



PLAN AT EL 664'-7"
INSIDE HTX. ROOM
&FILTER DEMIN ROOM



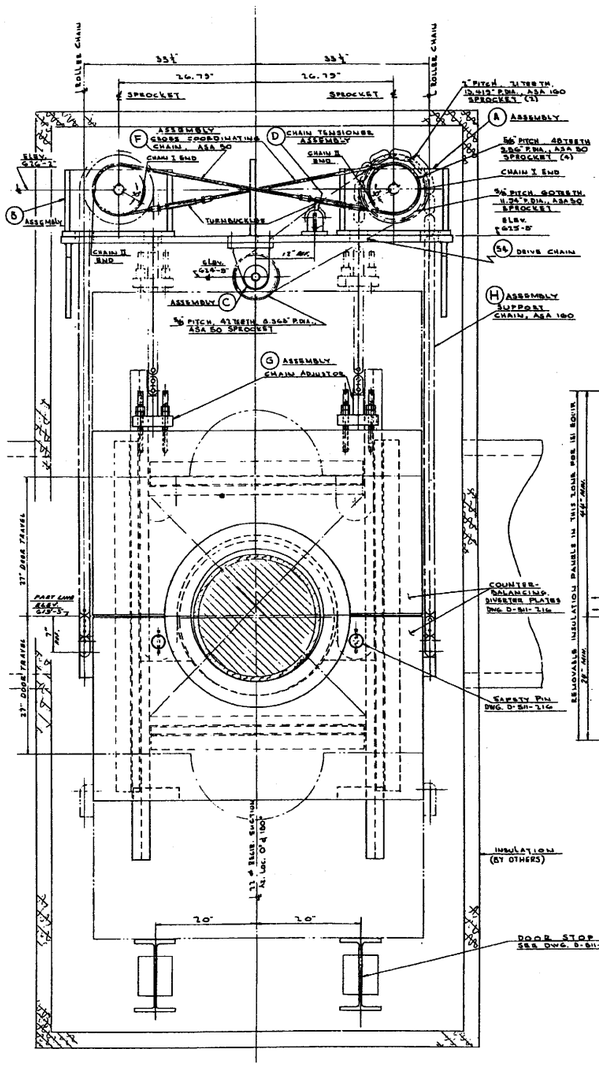
SECTION "A-A"

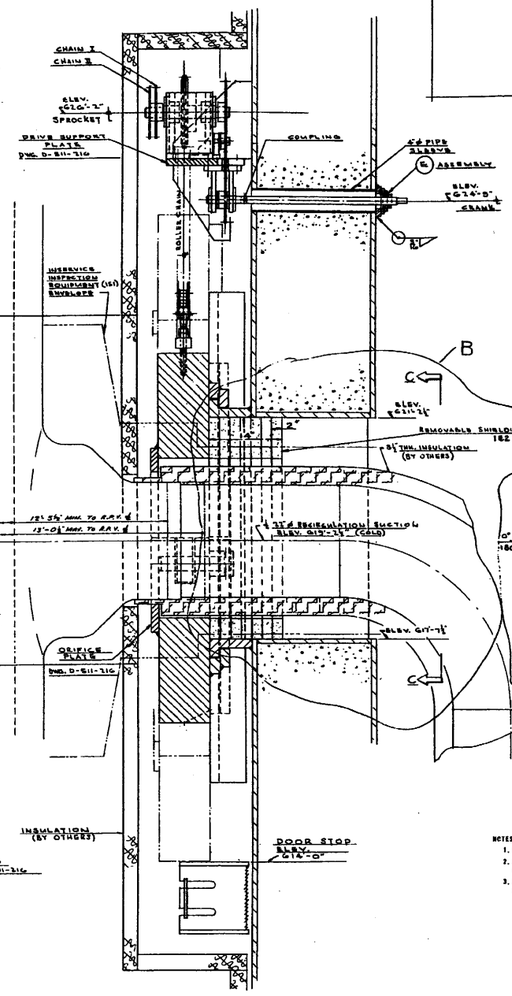
(Rev. 12 1/03)

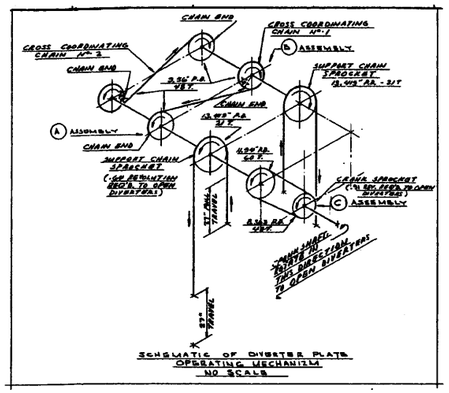
PERRY NUCLEAR POWER PLANT

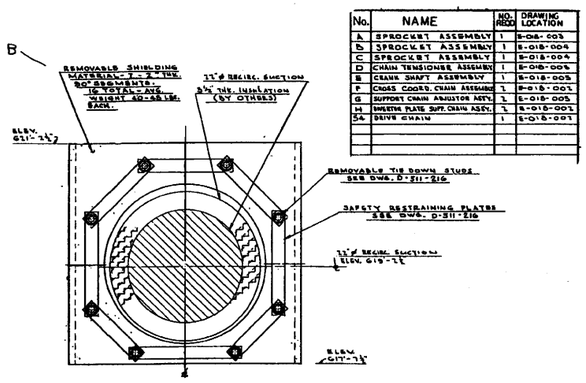
RWCU Main Flow Piping Inside Containment and Drywell

Figure 6.2-27



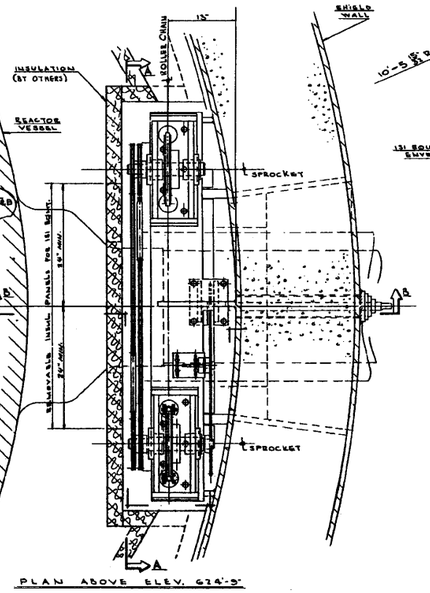


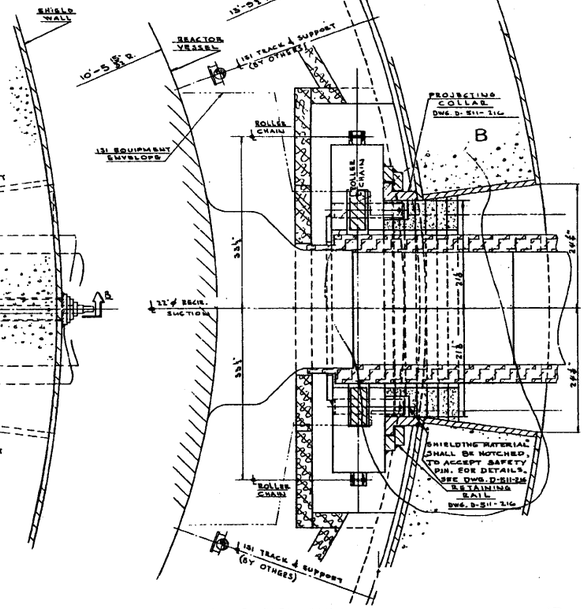




No.	NAME	NO. REQ'D	DRAWING LOCATION
A	SPROCKET ASSEMBLY	1	E-018-003
B	SPROCKET ASSEMBLY	1	E-018-004
C	SPROCKET ASSEMBLY	1	E-018-004
D	CHAIN TENSIONER ASSEMBLY	1	E-018-008
E	CRANK SHAFT ASSEMBLY	1	E-018-005
F	CROSS COORD. CHAIN ASSEMBLY	2	E-018-007
G	SUPPORT CHAIN ADJUSTOR ASSY.	2	E-018-005
H	SKELETON PLATE SUPP. CHAIN ASSY.	2	E-018-007
54	DRIVE CHAIN	1	E-018-009

SECTION C-C





NOTES:-

1. UNLESS OTHERWISE NOTED, ALL DIMENSIONS ARE IN INCHES.
2. ALL WORK SHOWN ON THIS DRAWING SHALL BE FABRICATED AND DELIVERED IN ACCORDANCE WITH SPECIFICATION SP-969-4543-00 AND ITS ATTACHMENT SPECIFICATIONS.
3. ALL WORK SHOWN ON THIS DRAWING SHALL BE INSTALLED IN ACCORDANCE WITH SPECIFICATION SP-96-4543-00 AND ITS ATTACHMENT SPECIFICATIONS.

NUCLEAR SAFETY RELATED

REFERENCES:-

E-818-002	RECIRCULATION SUCTION - FLOW DIVERTER - ASSEMBLIES AND DETAILS
E-818-003	RECIRCULATION SUCTION - FLOW DIVERTER - ASSEMBLIES AND DETAILS
E-818-004	RECIRCULATION SUCTION - FLOW DIVERTER - ASSEMBLIES AND DETAILS
E-818-005	RECIRCULATION SUCTION - FLOW DIVERTER - ASSEMBLIES AND DETAILS
E-818-006	RECIRCULATION SUCTION - FLOW DIVERTER - DETAILS
D-811-218	RECIRCULATION SUCTION - FLOW DIVERTER - PLANS, SECTIONS AND DETAILS

TOLERANCES:-

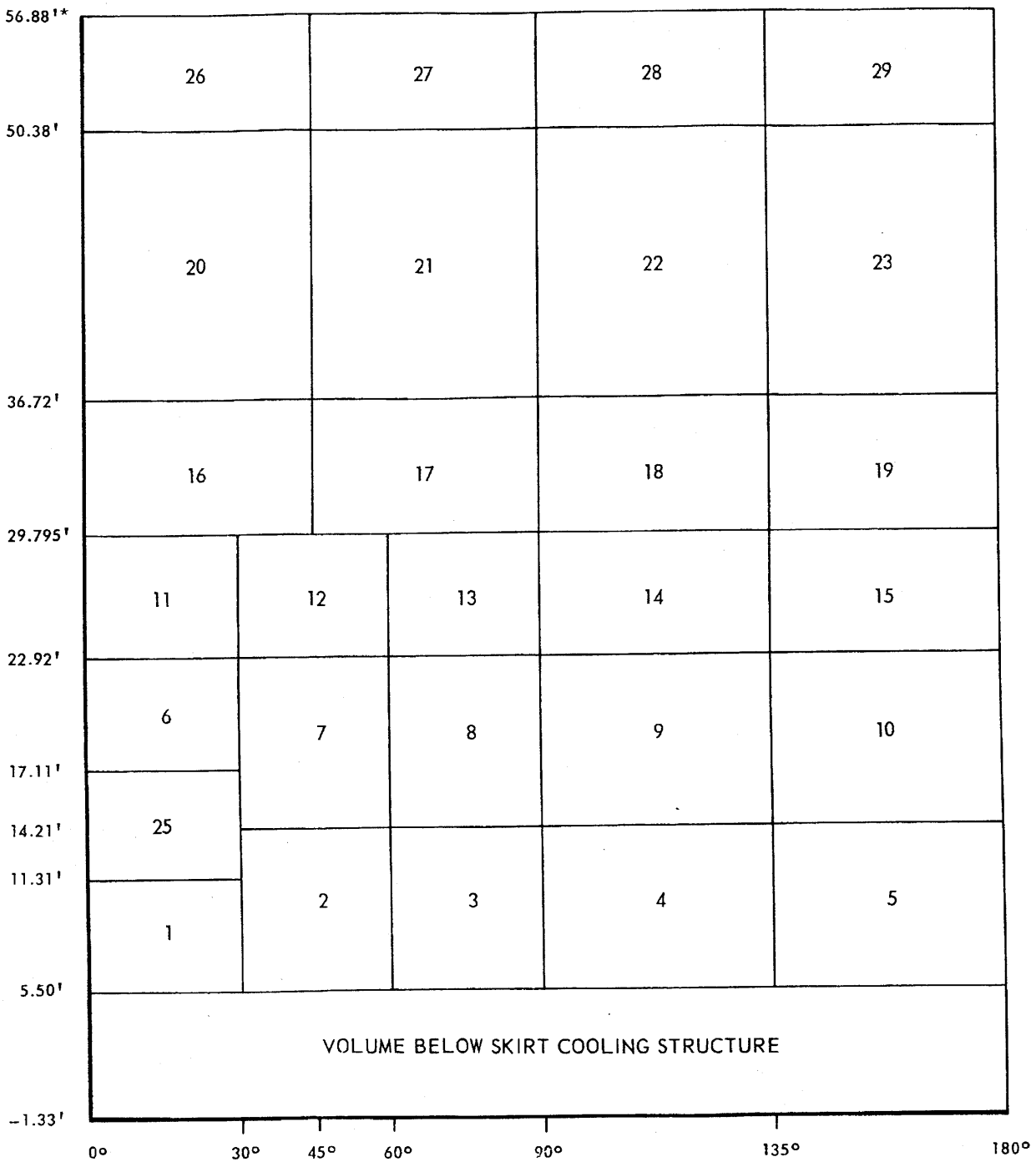
UNLESS OTHERWISE SPECIFIED;
TWO PLACE DECIMAL: ± .015"
THREE PLACE DECIMAL: ± .005"
FRACTIONS: ± 1/32"
ANGLES: ± 0°-30'
ALL DIMENSIONS TO BE CONCENTRIC WITHIN ± .001"

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Recirculation Suction Flow Diverter Arrangement

Figure 6.2-28
(Dwg. E-018-001)



ELEVATIONS GIVEN WITH RESPECT TO REACTOR PRESSURE VESSEL ZERO POINT.

* VOLUME BETWEEN ELEVATIONS 50.38' TO 56.88' REPRESENT THAT VOLUME BELOW THE REFUELING BELLOWS & ABOVE THE BIOLOGICAL SHIELD & STILL ISOLATED FROM THE DRYWELL.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Nodalization
- Recirculation Line Breaks

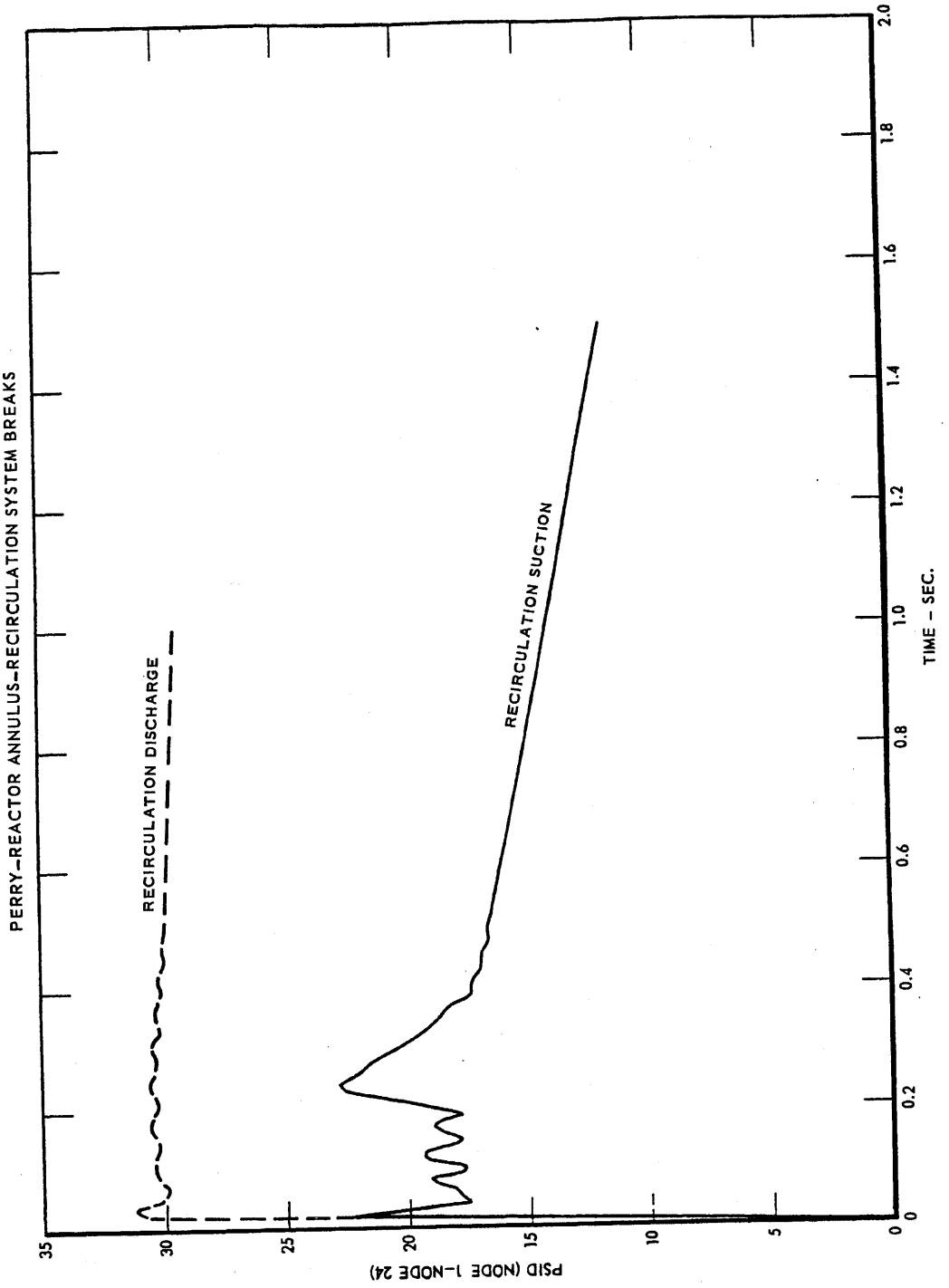
Figure 6.2-29

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Nodalization
Feedwater Line Break

Figure 6.2-30

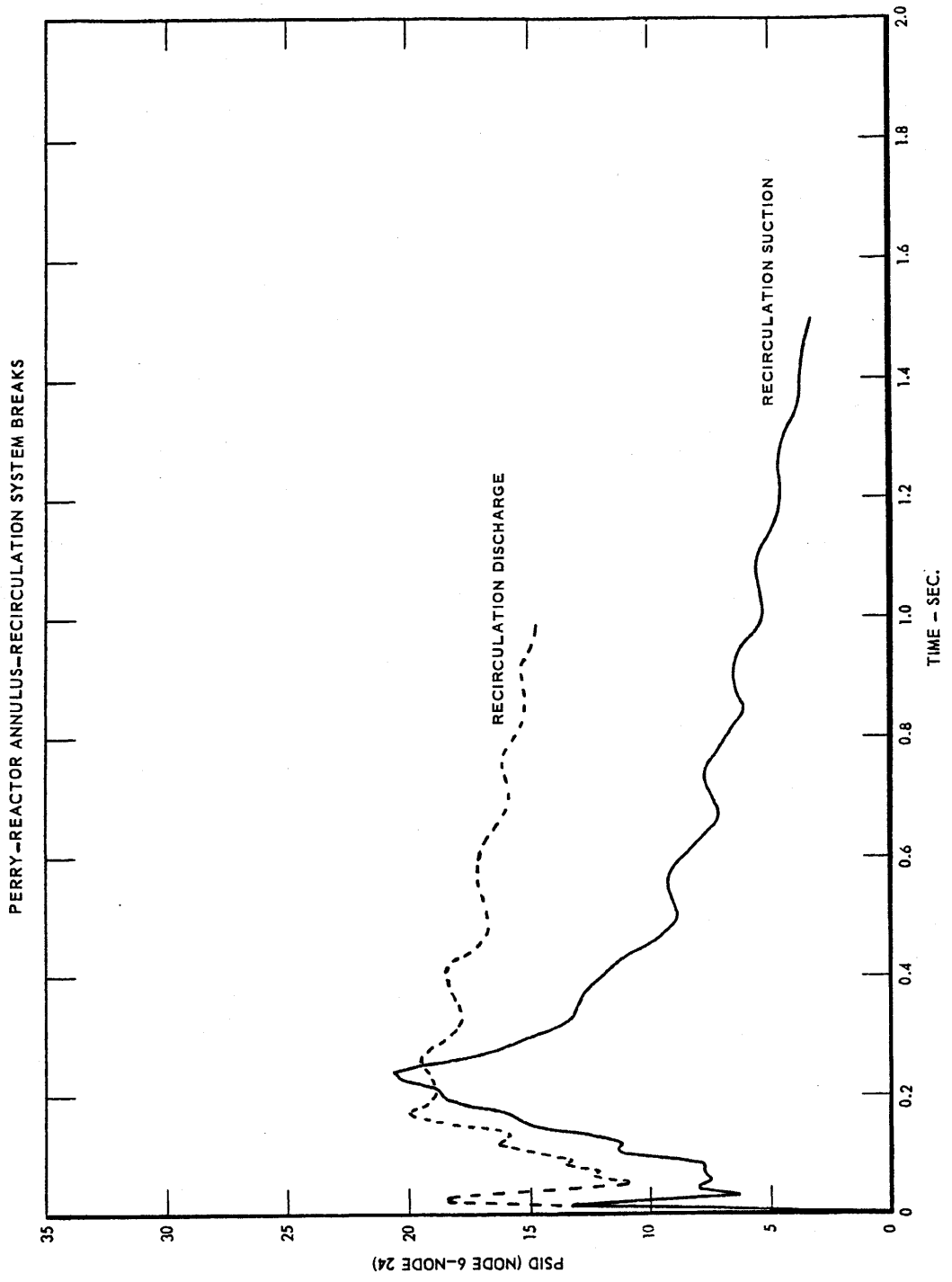


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure Differentials (Nodes 1 - 24)

Figure 6.2-31

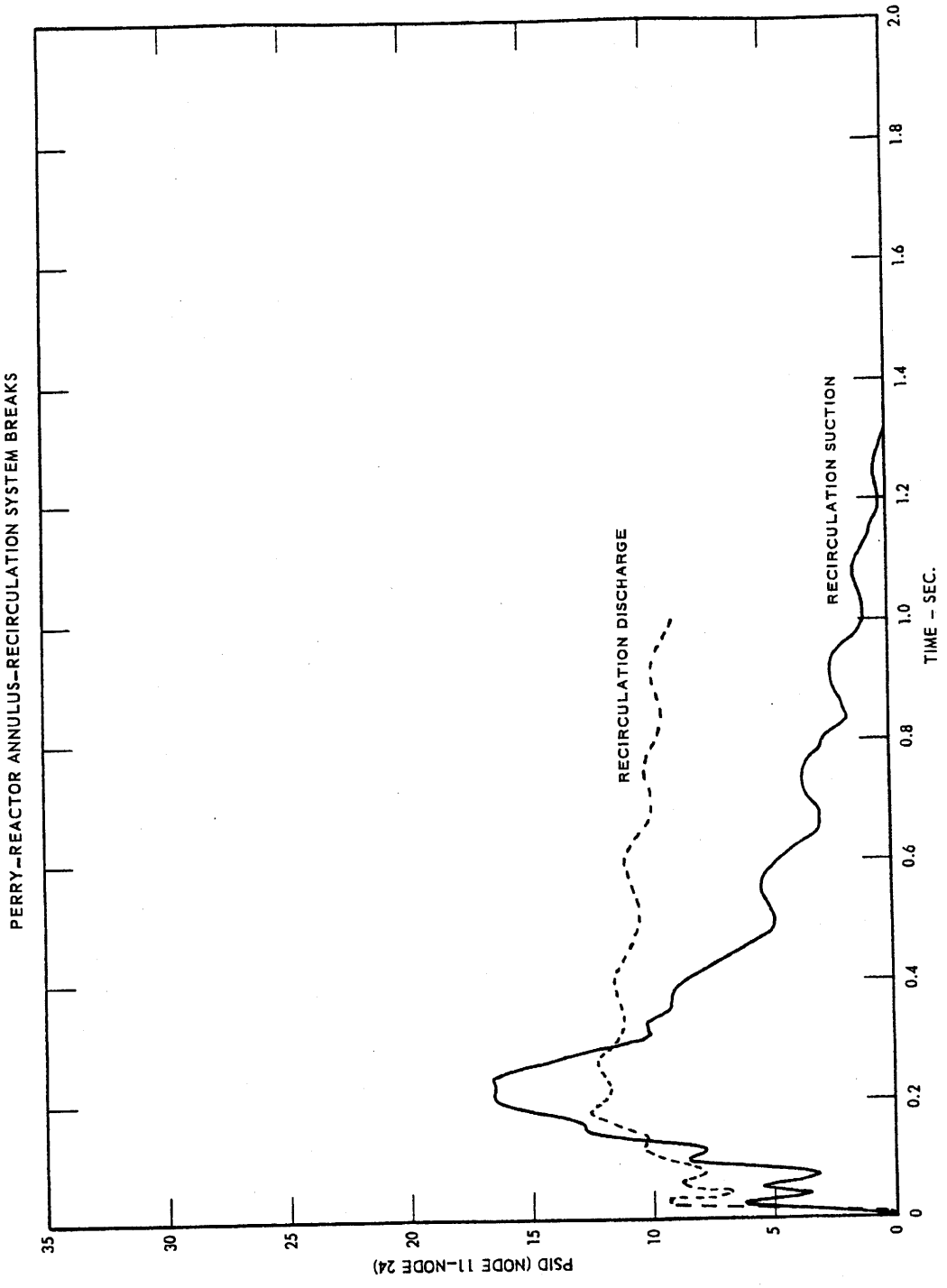


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure Differentials (Nodes 6 - 24)

Figure 6.2-32

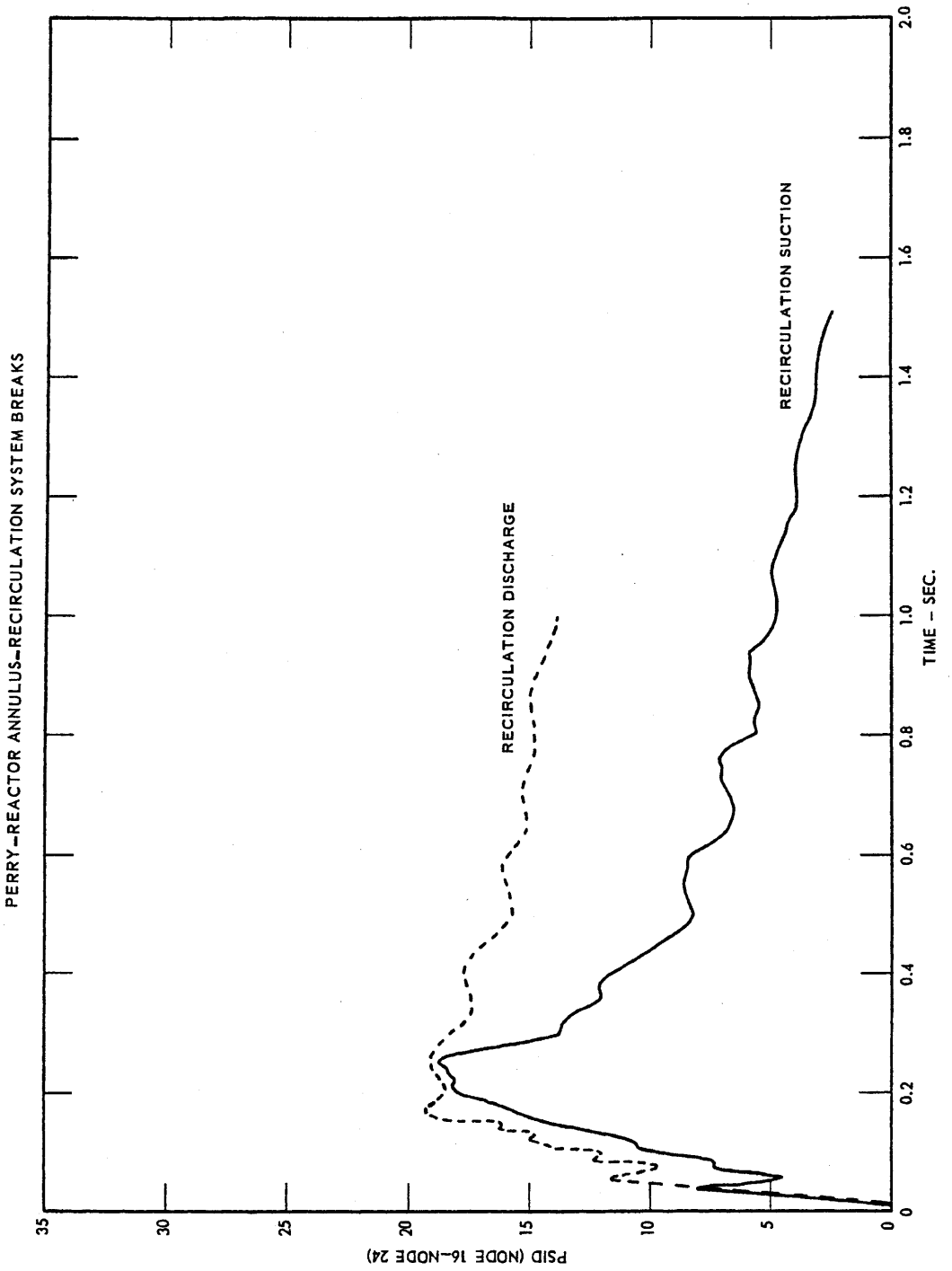


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure Differentials (Nodes 11 - 24)

Figure 6.2-33



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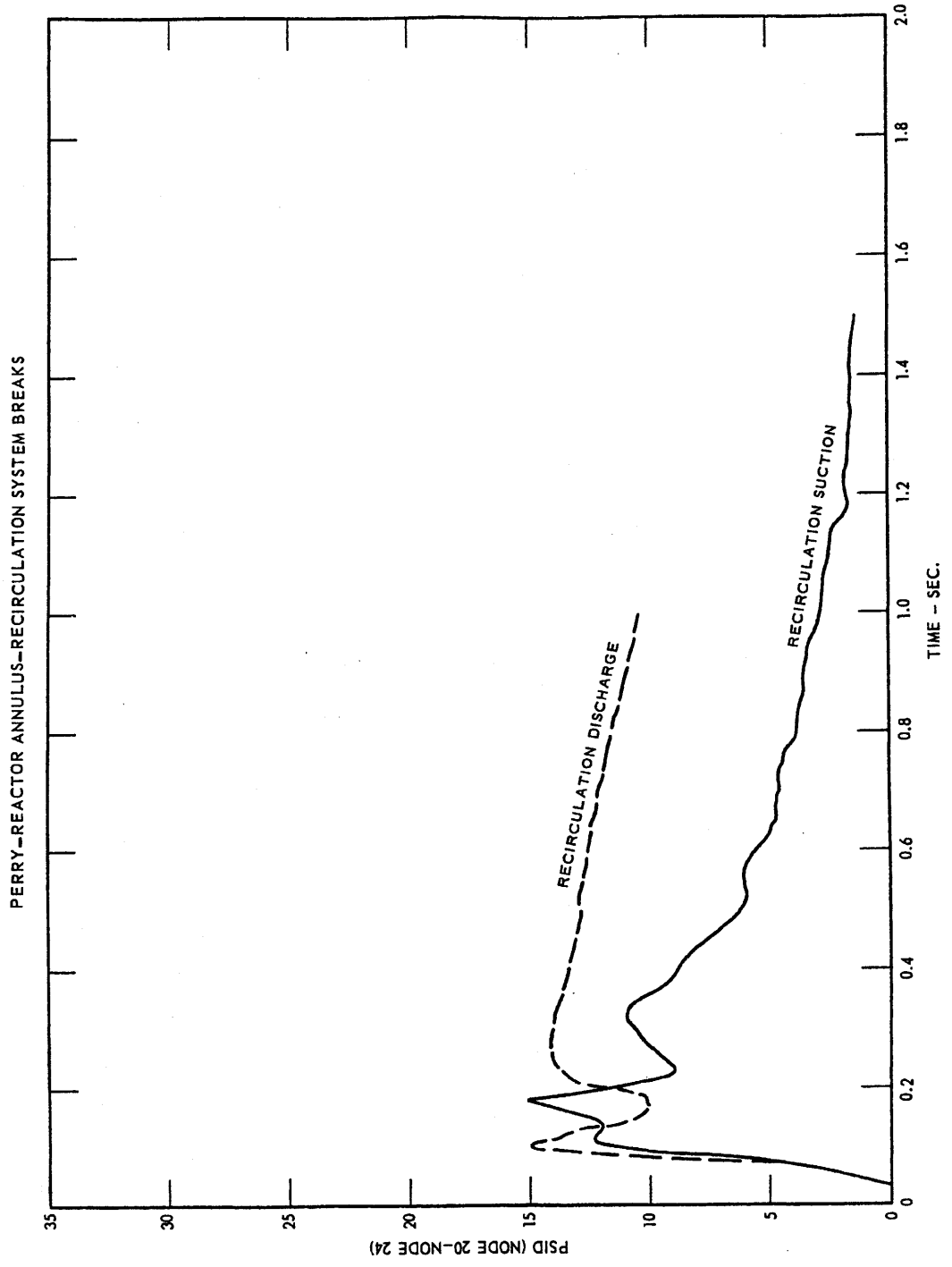
PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 16 - 24)

Figure 6.2-34



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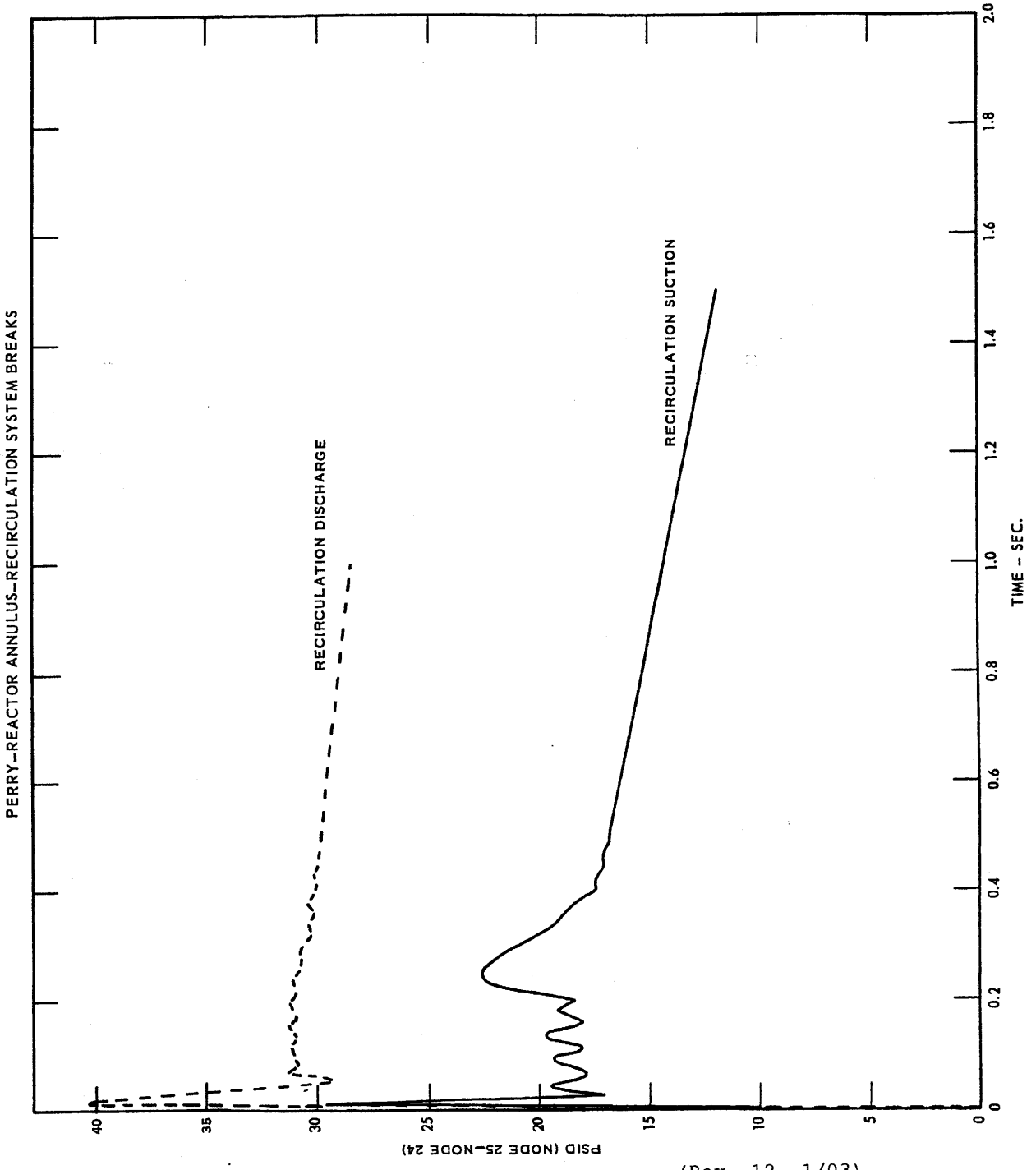
PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 20 - 24)

Figure 6.2-35

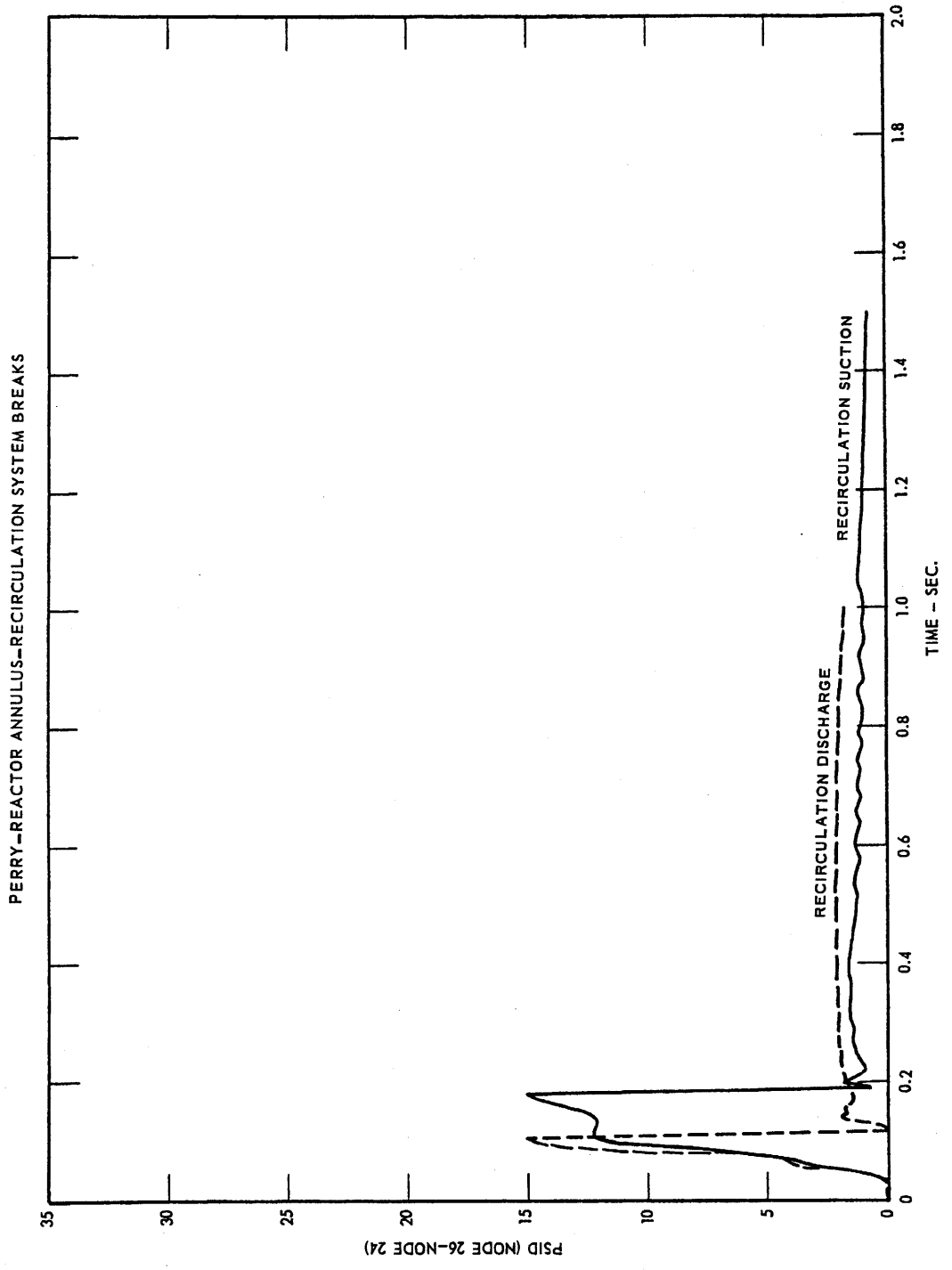


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure Differentials (Nodes 25 - 24)

Figure 6.2-36



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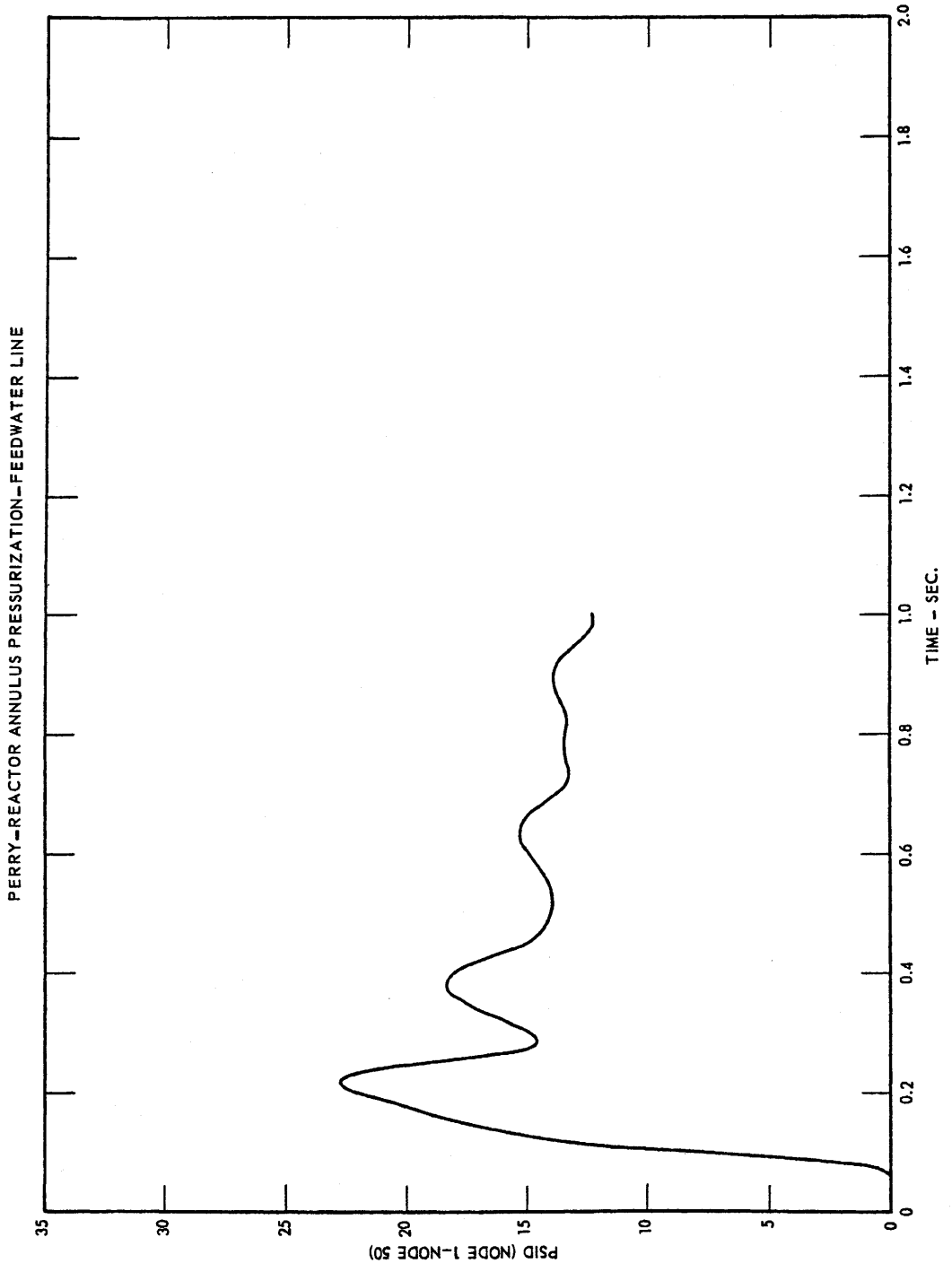
PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 26 - 24)

Figure 6.2-37

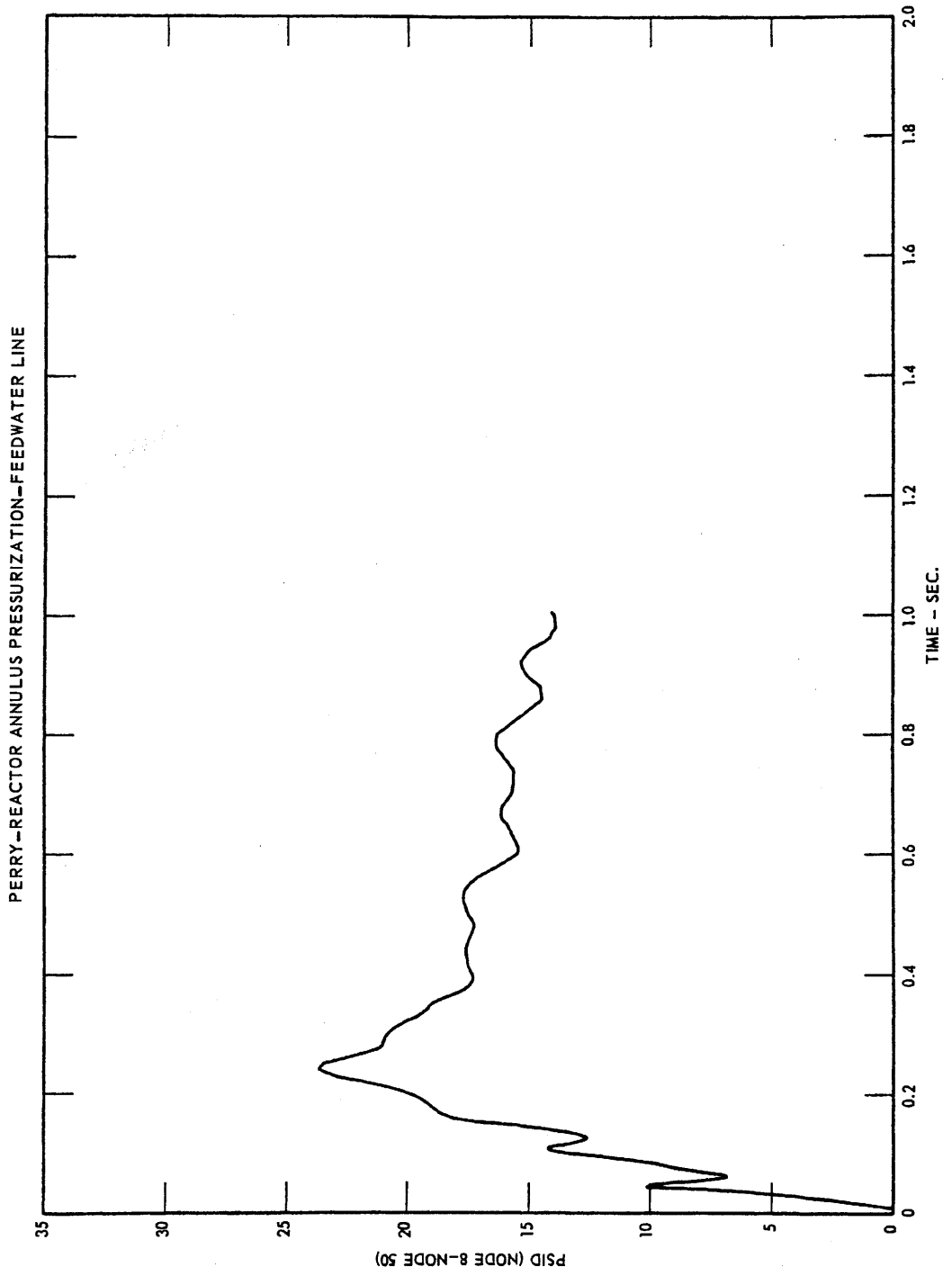


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 1 - 50)

Figure 6.2-38



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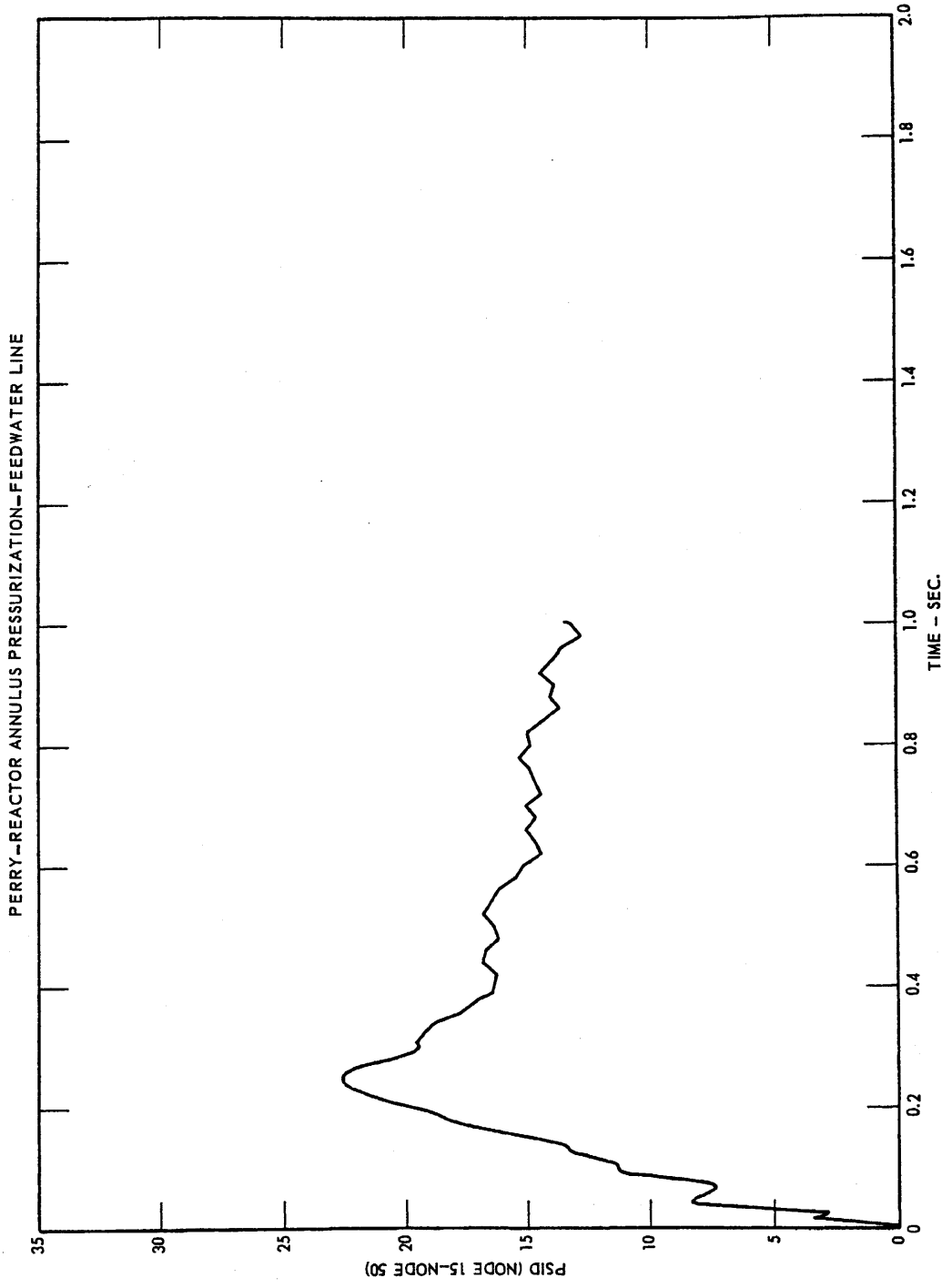
PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 8 - 50)

Figure 6.2-39

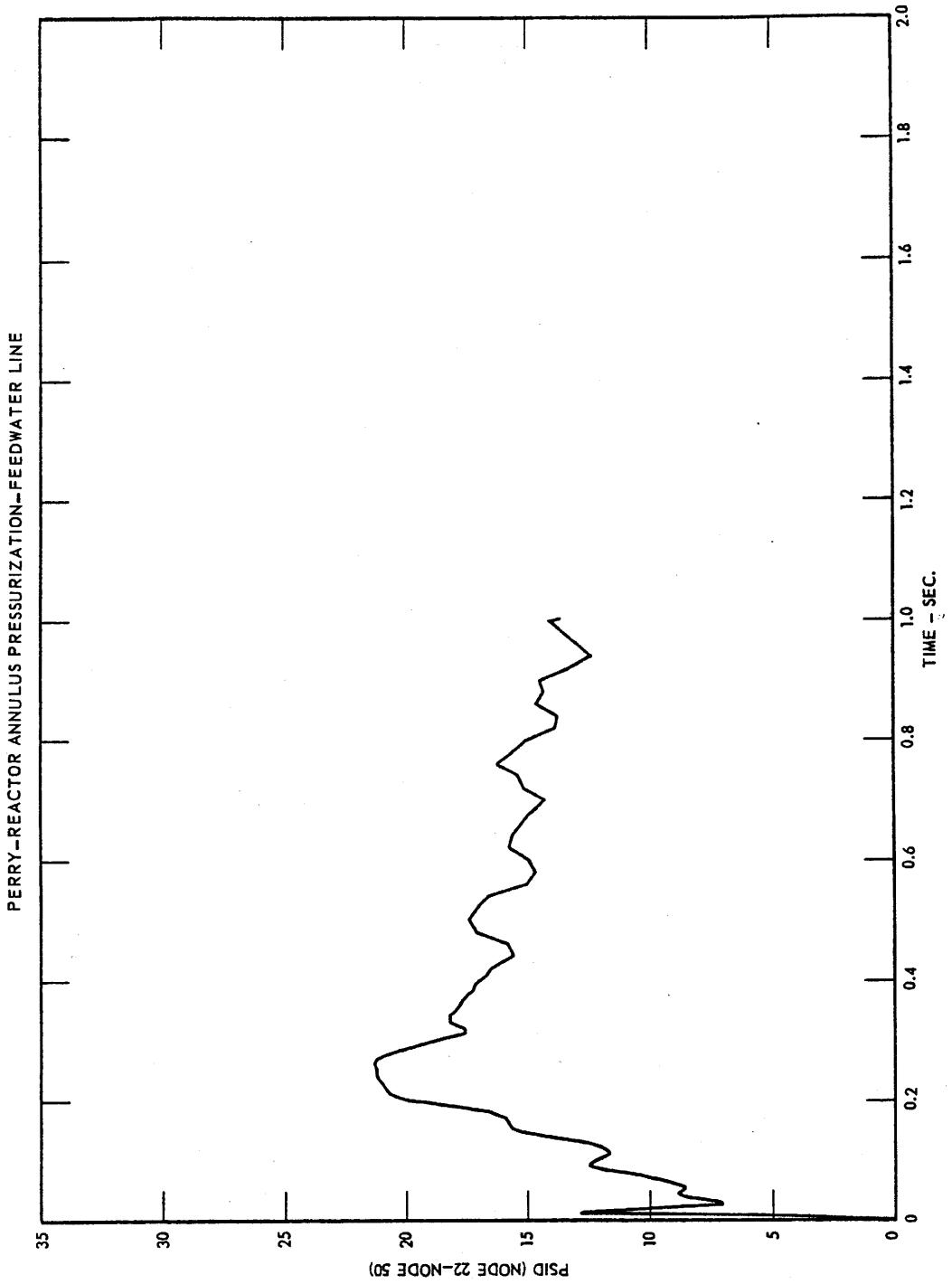


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 15 - 50)

Figure 6.2-40

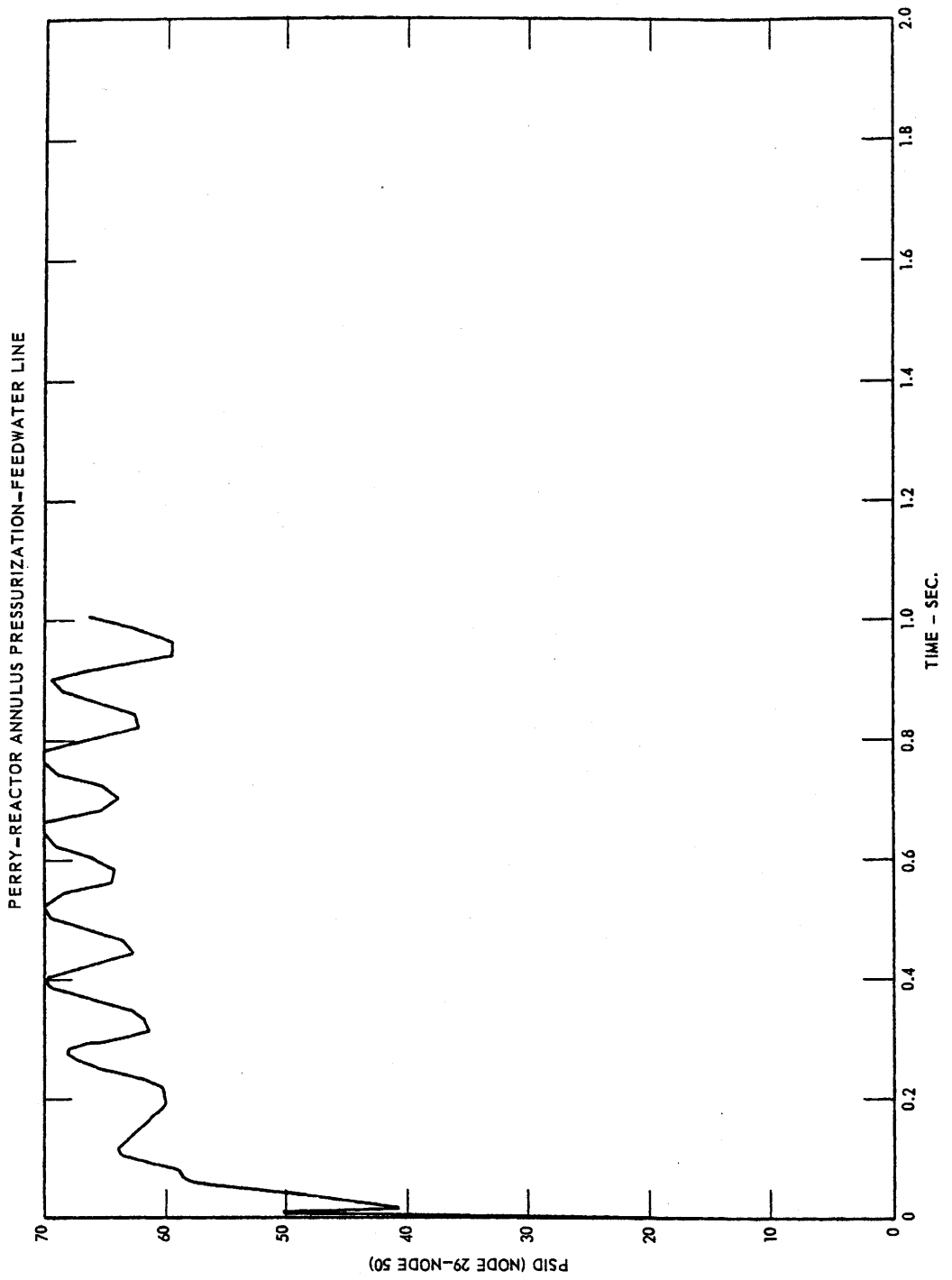


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 22 - 50)

Figure 6.2-41

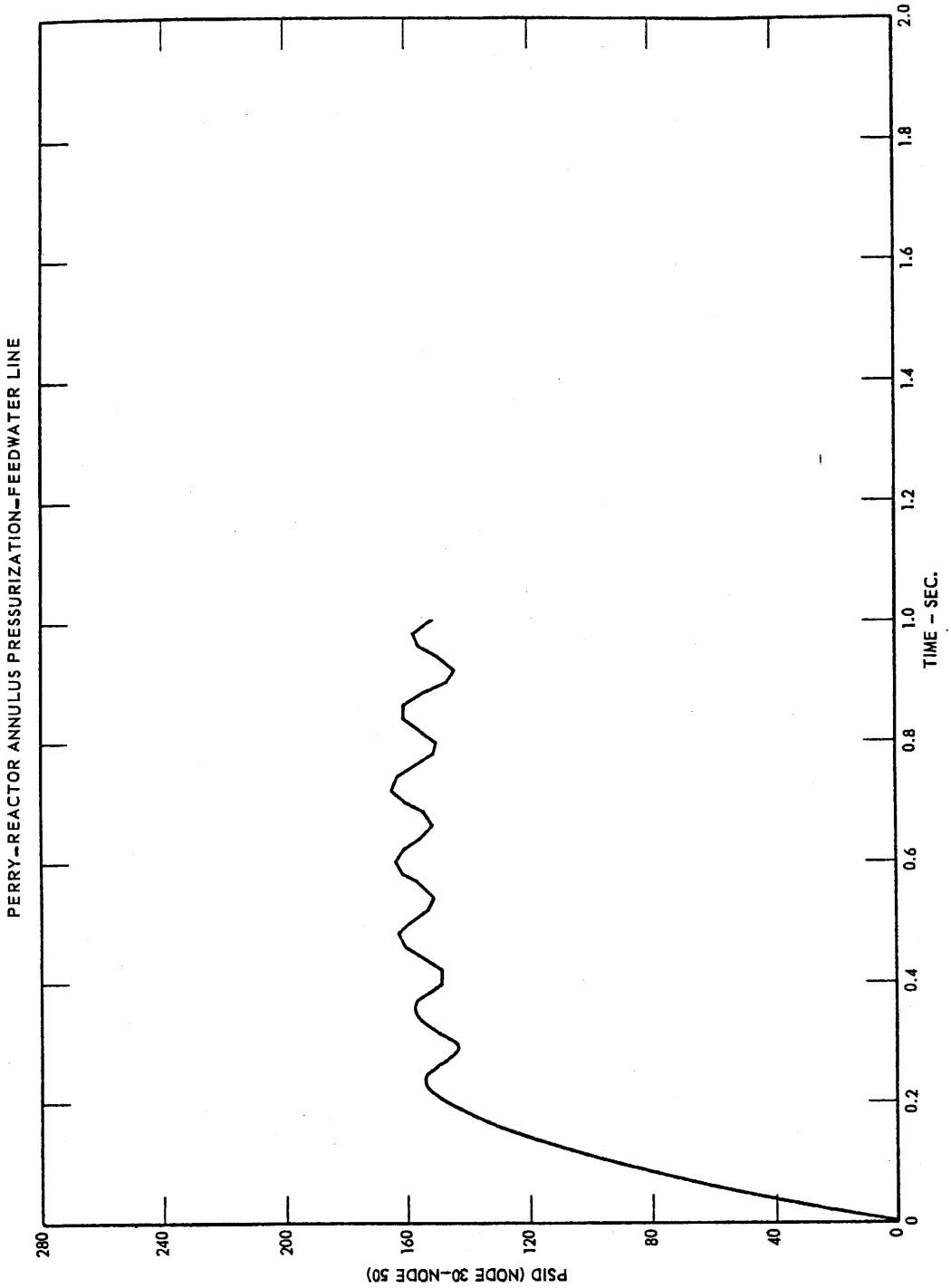


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 29 - 50)

Figure 6.2-42

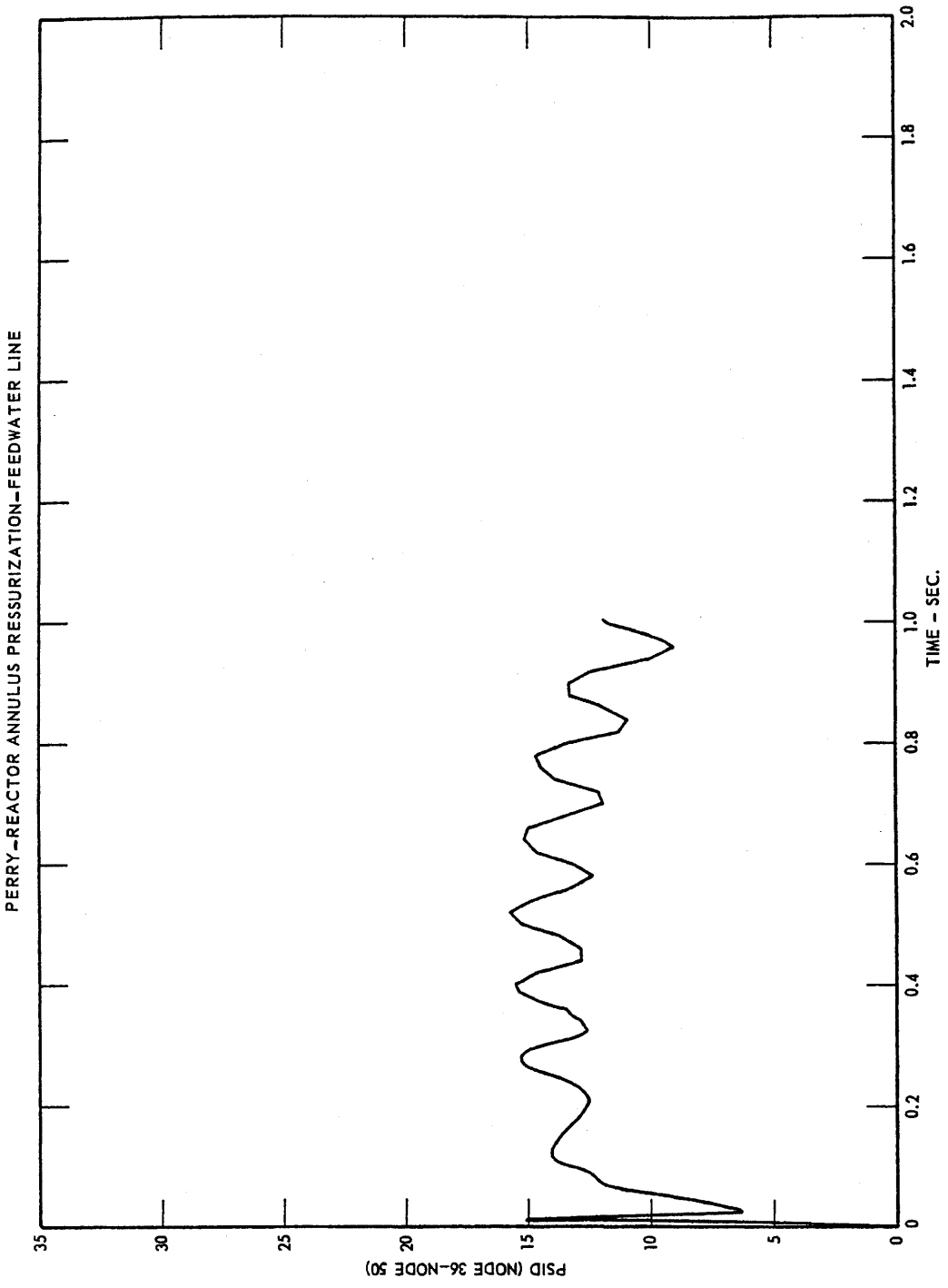


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 30 - 50)

Figure 6.2-43

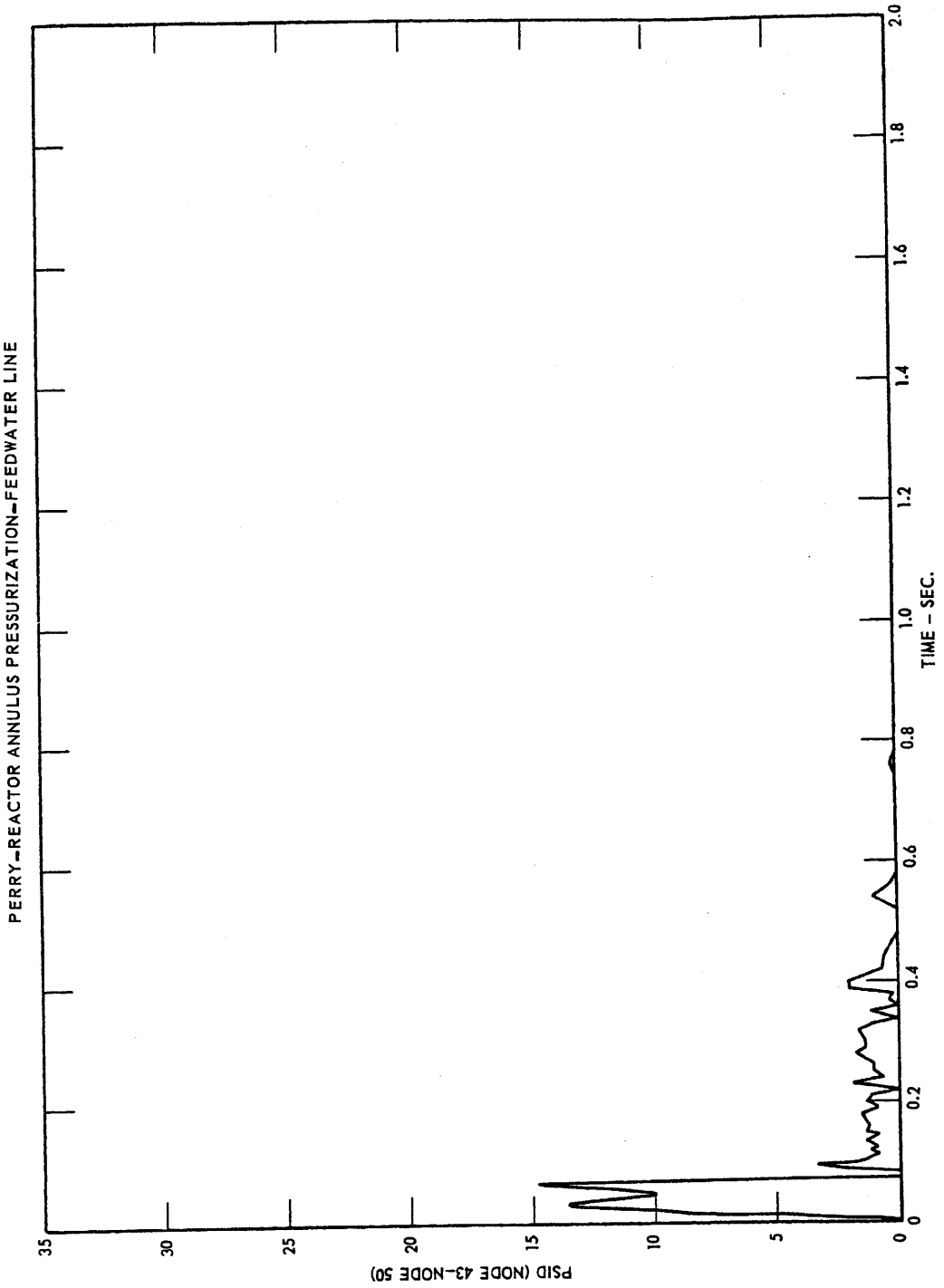


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 36 - 50)

Figure 6.2-44

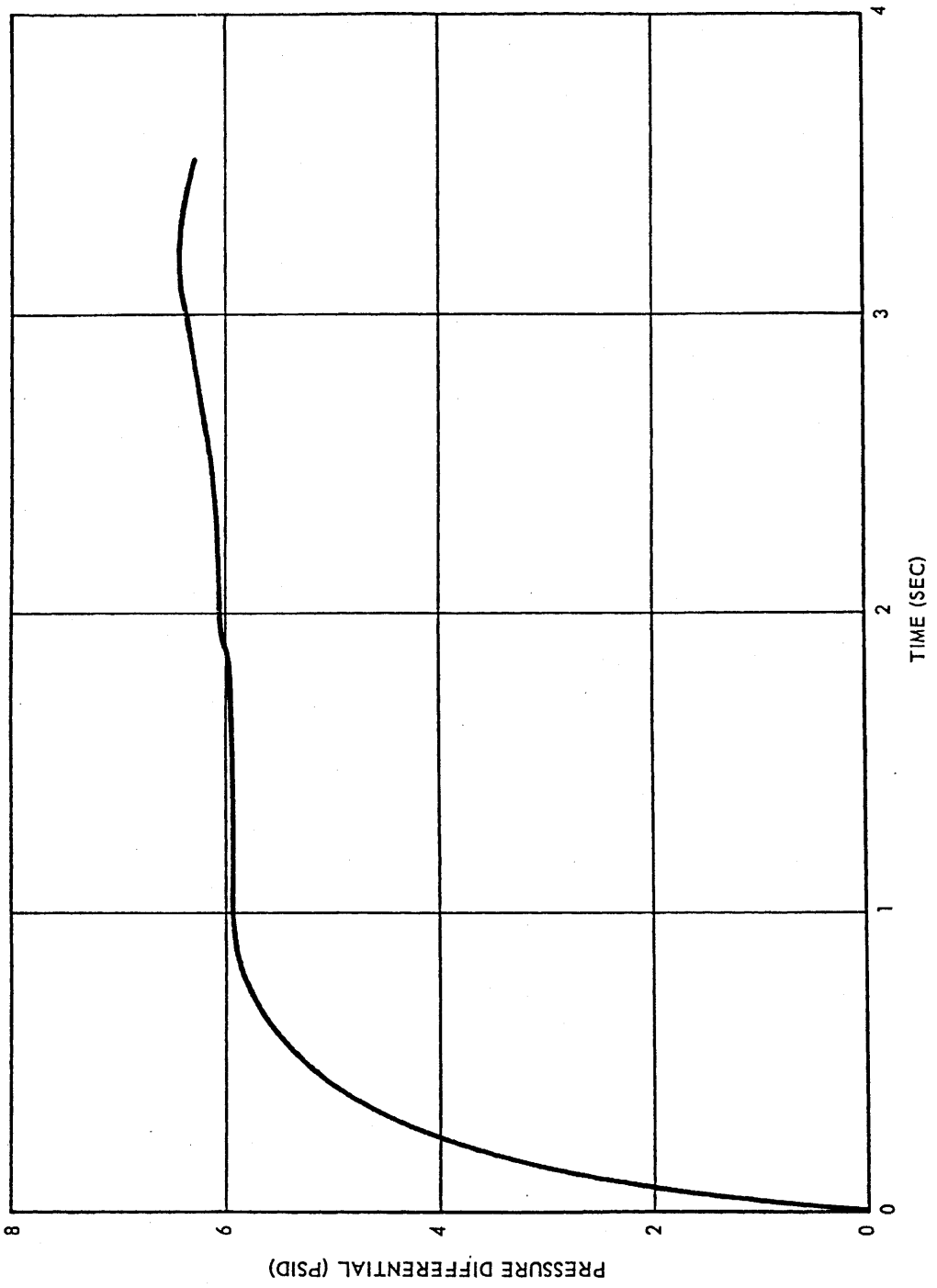


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Annulus Pressure
Differentials (Nodes 34 - 50)

Figure 6.2-45

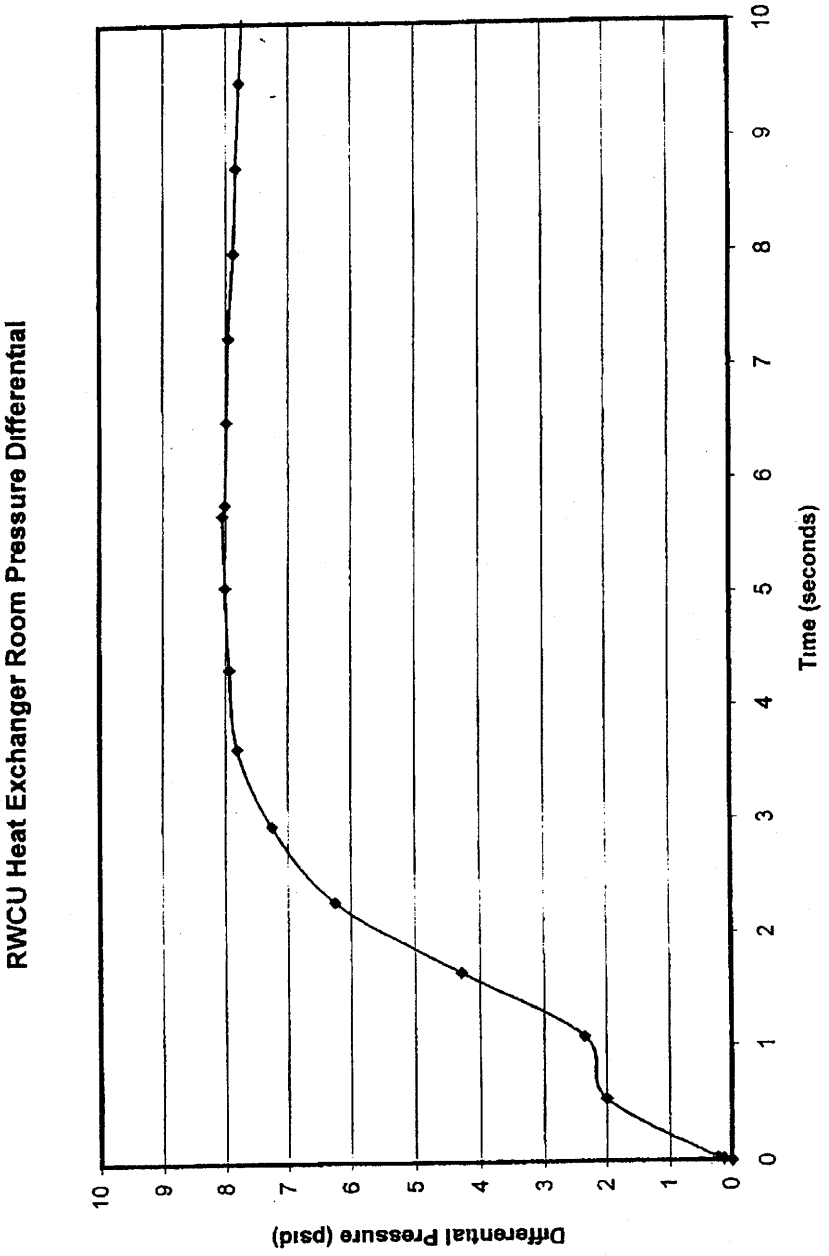


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Drywell Head Pressure
Differential

Figure 6.2-46

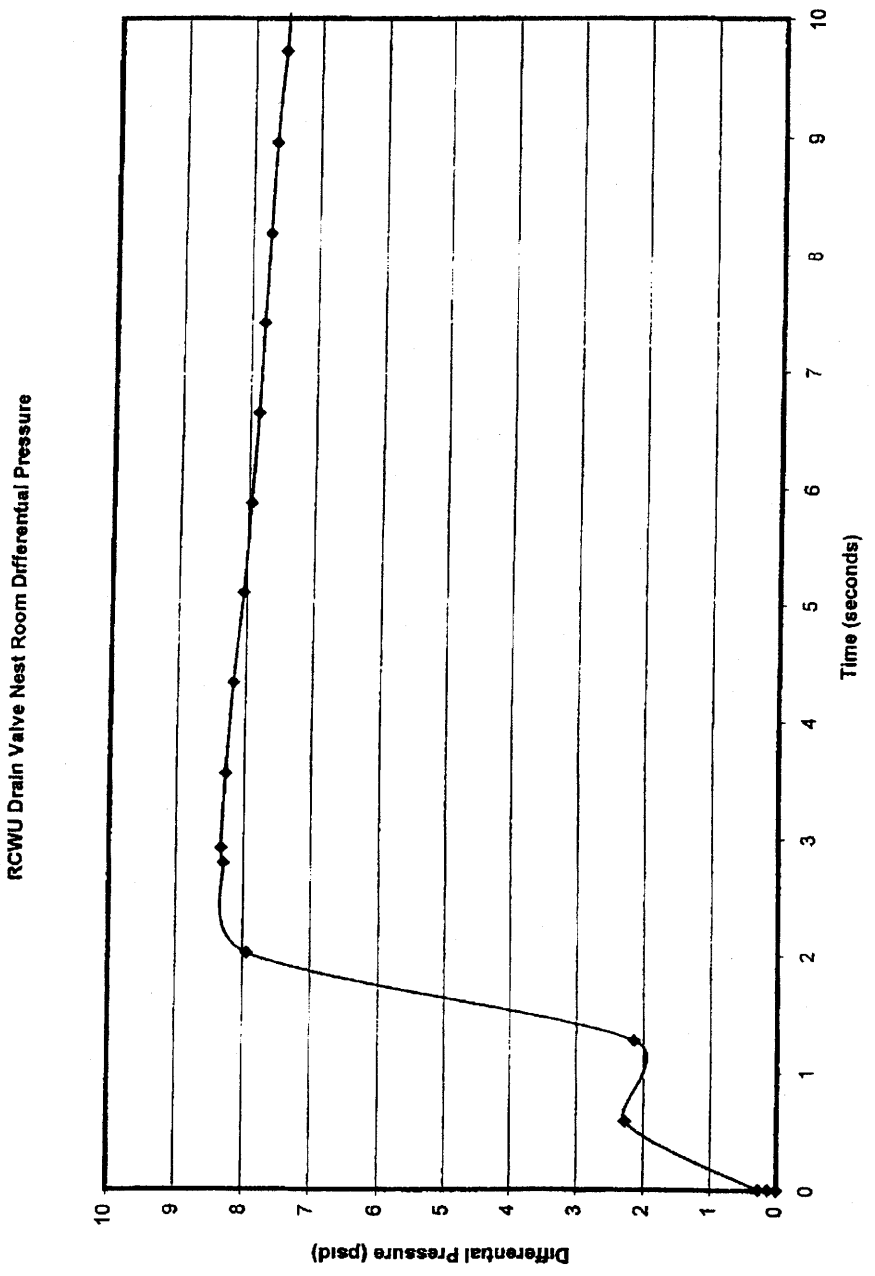


(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

RWCU Heat Exchanger
Pressure Differential

Figure 6.2-47

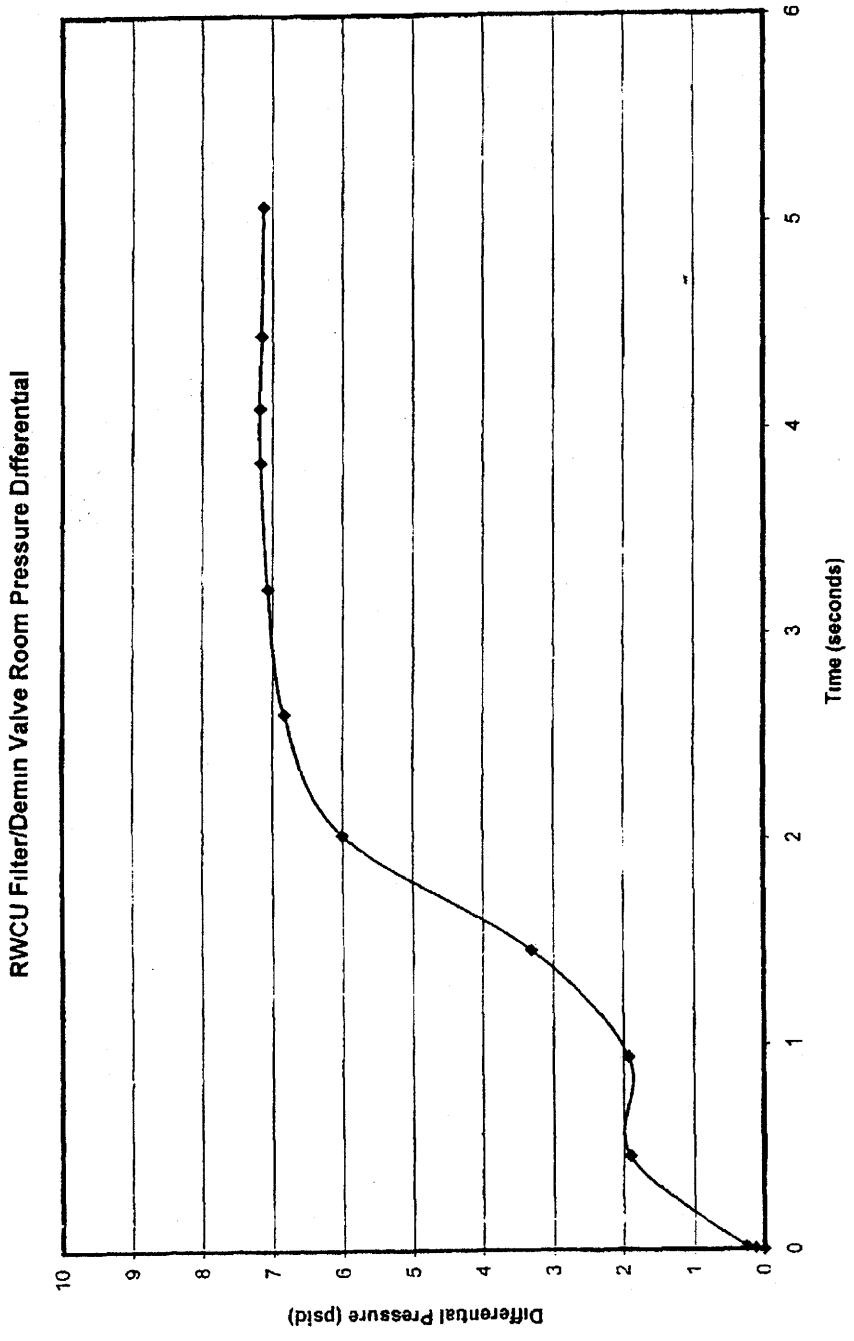


(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

RWCU Filter Demineralizer
Drain Valve Nest Room Pressure
Differential

Figure 6.2-48

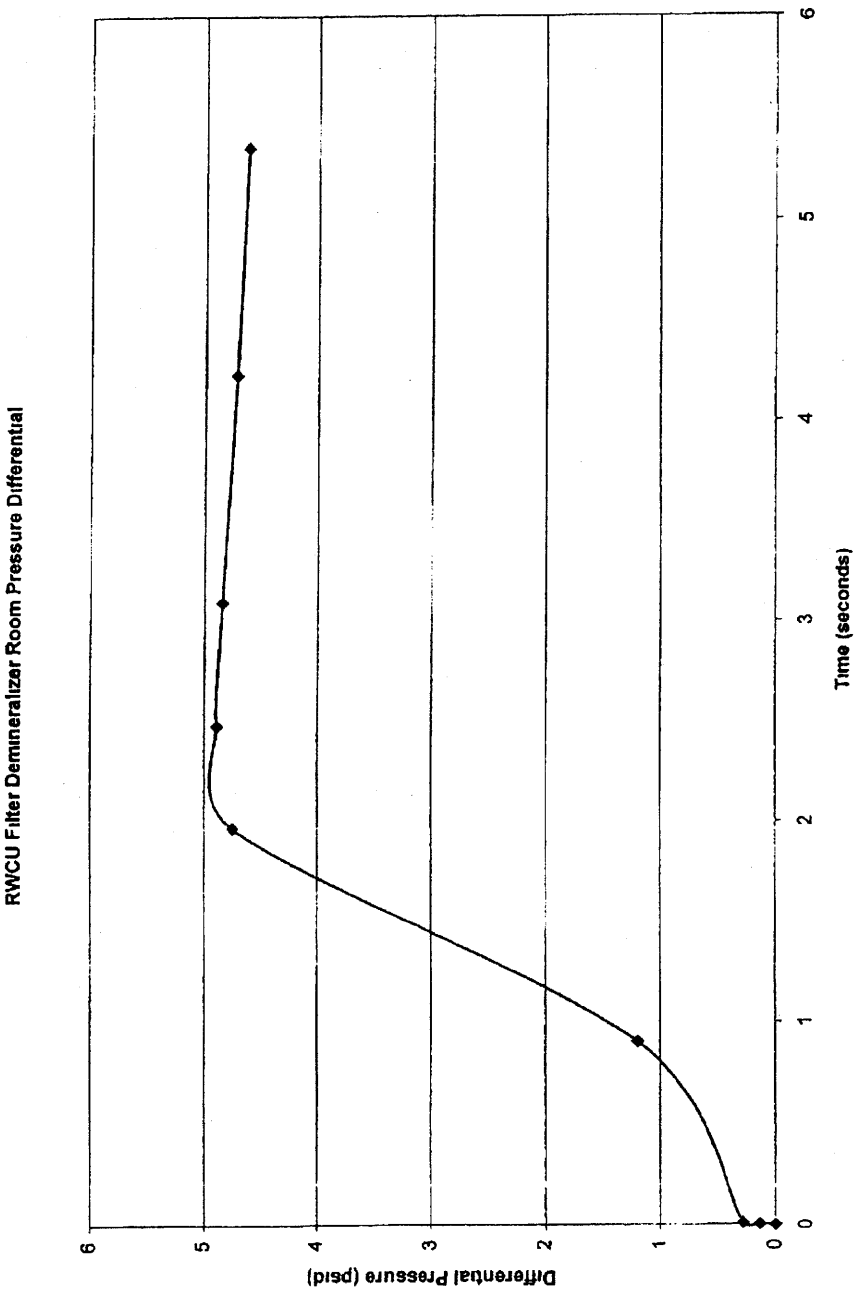


(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

RWCU Filter Demineralizer
Valve Room Pressure Differential

Figure 6.2-49

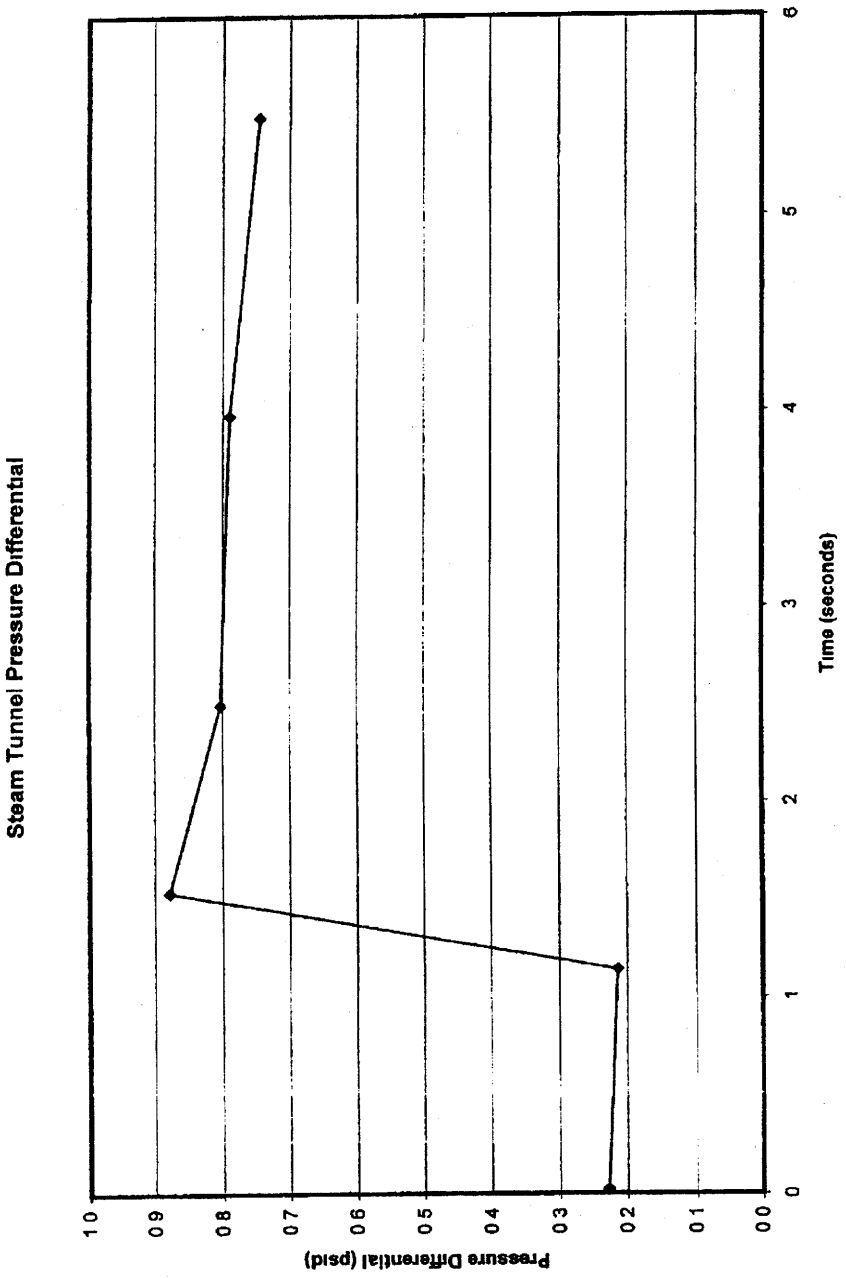


(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

RWCU Filter Demineralizer Room
Pressure Differential

Figure 6.2-50

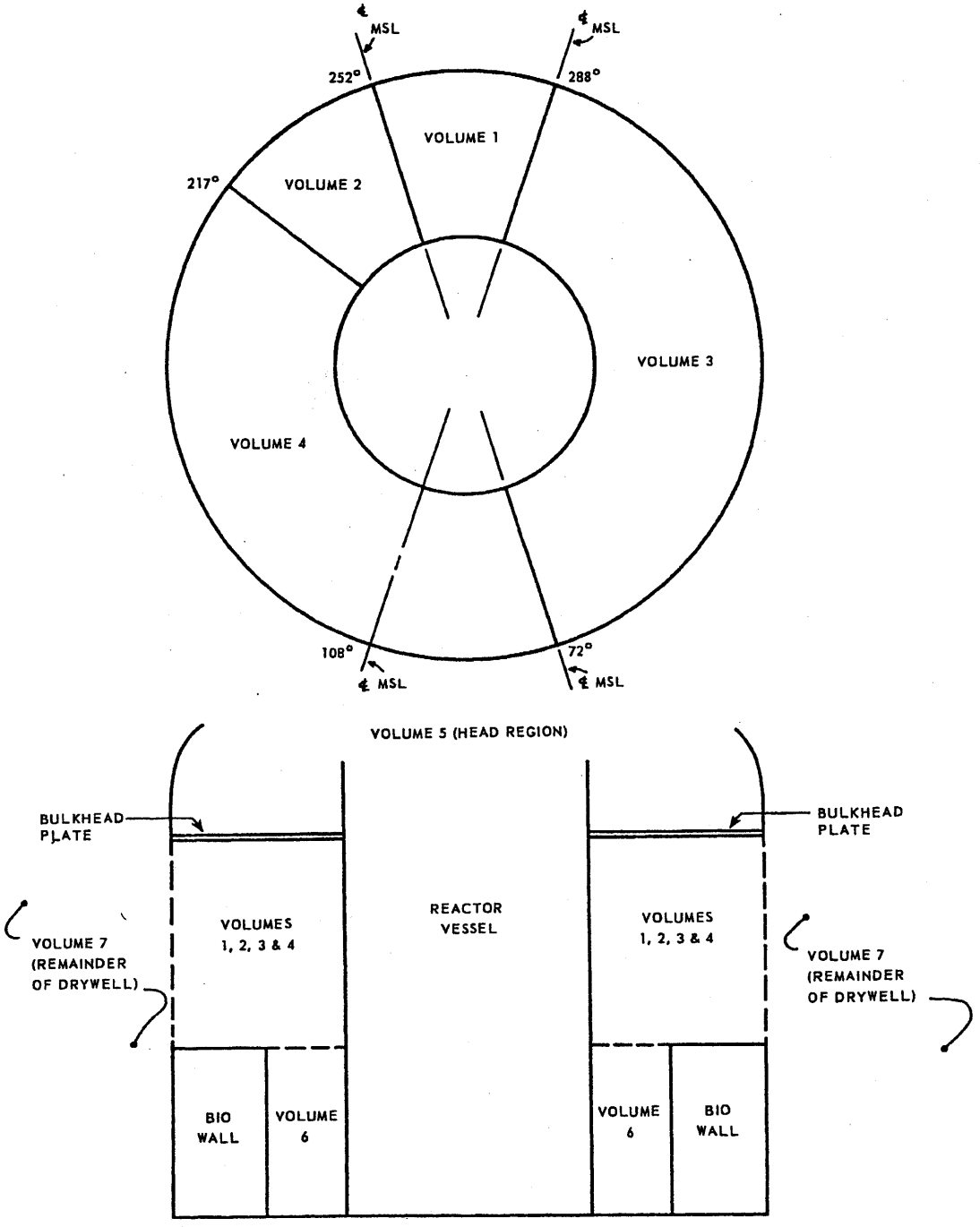


(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

Steam Tunnel
Pressure Differential

Figure 6.2-51

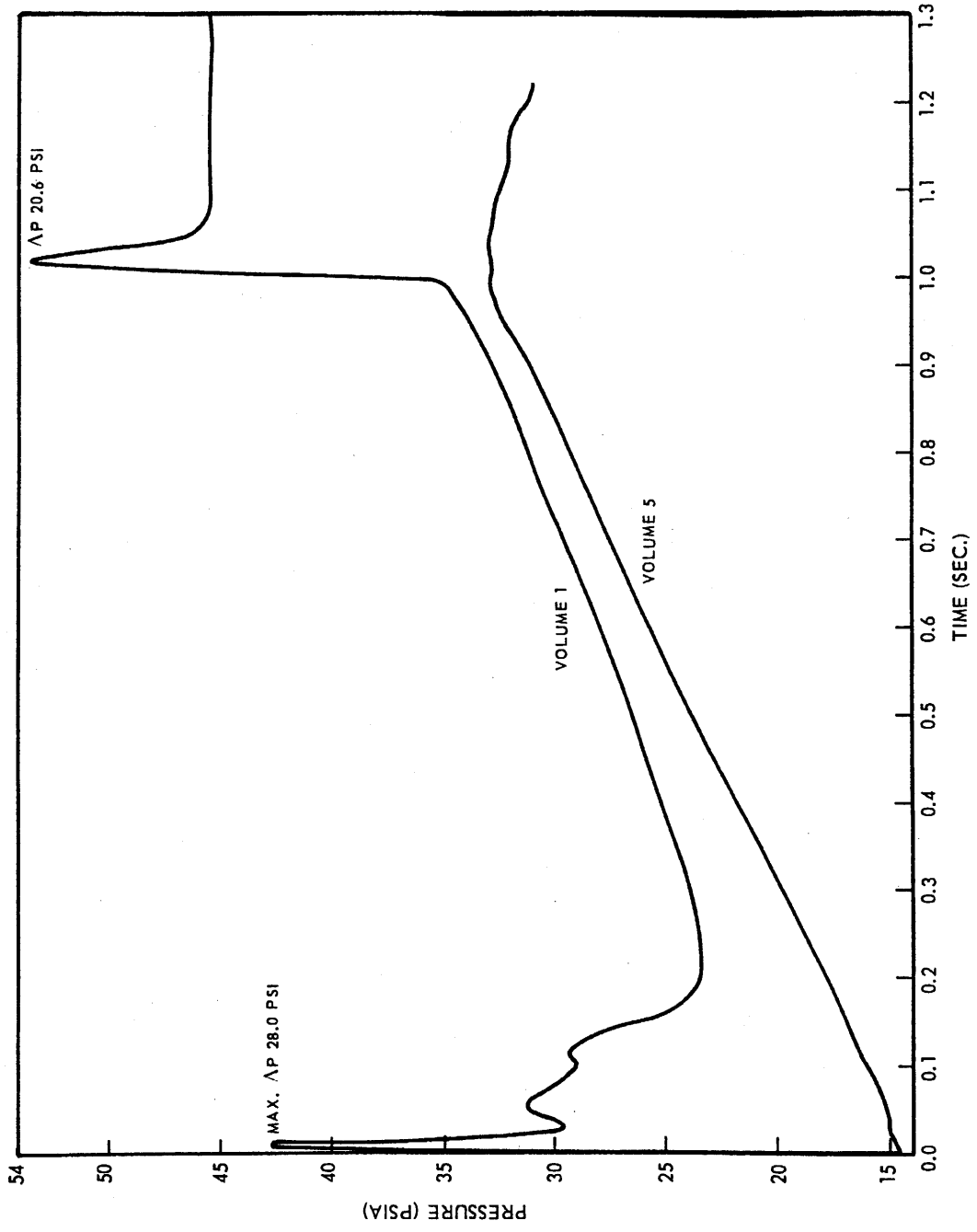


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Drywell Bulkhead ΔP Analysis
"COMPARE" Model

Figure 6.2-51a

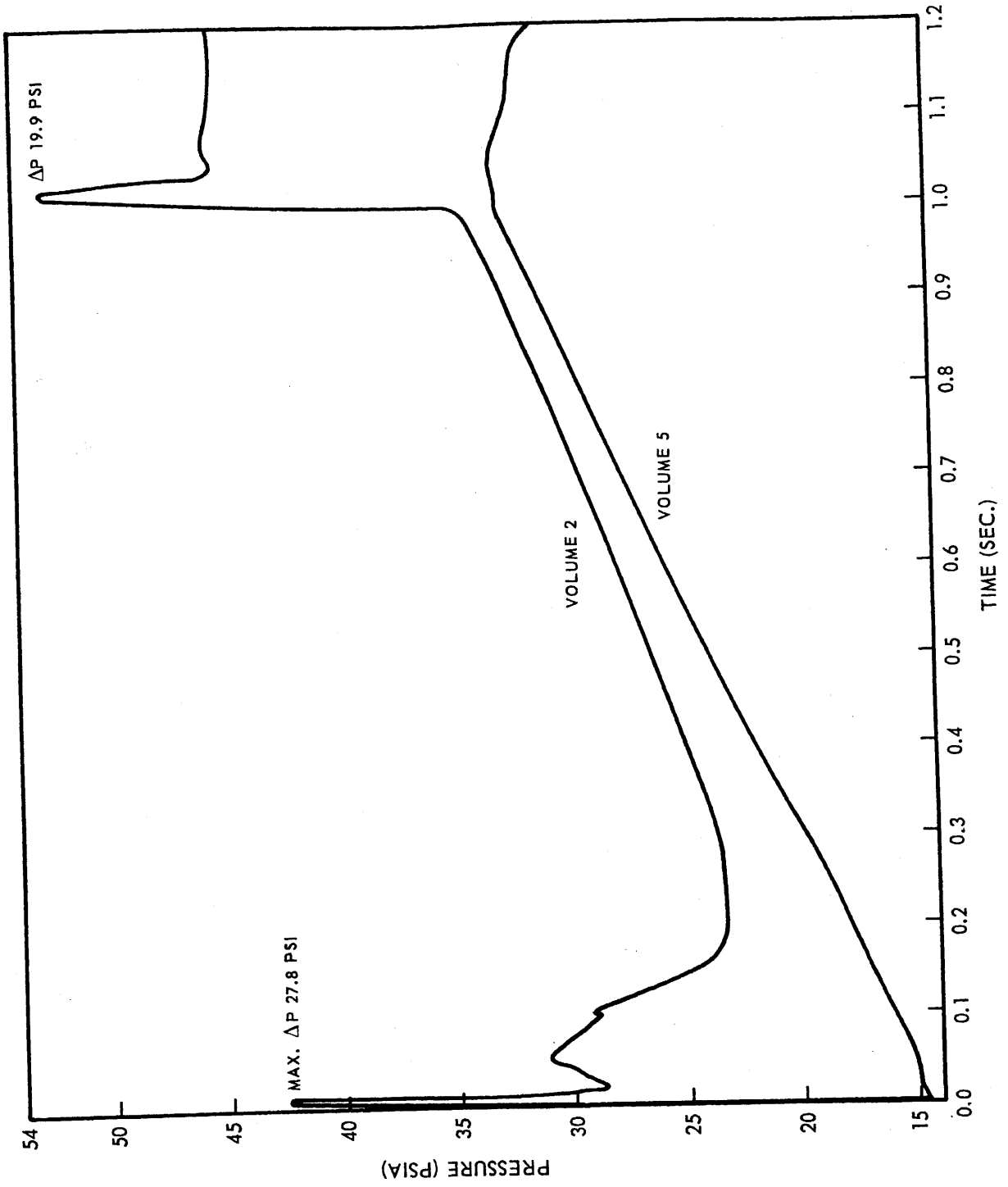


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Pressure Differential Across
Bulkhead Plate Due to MSLB

Figure 6.2-51b

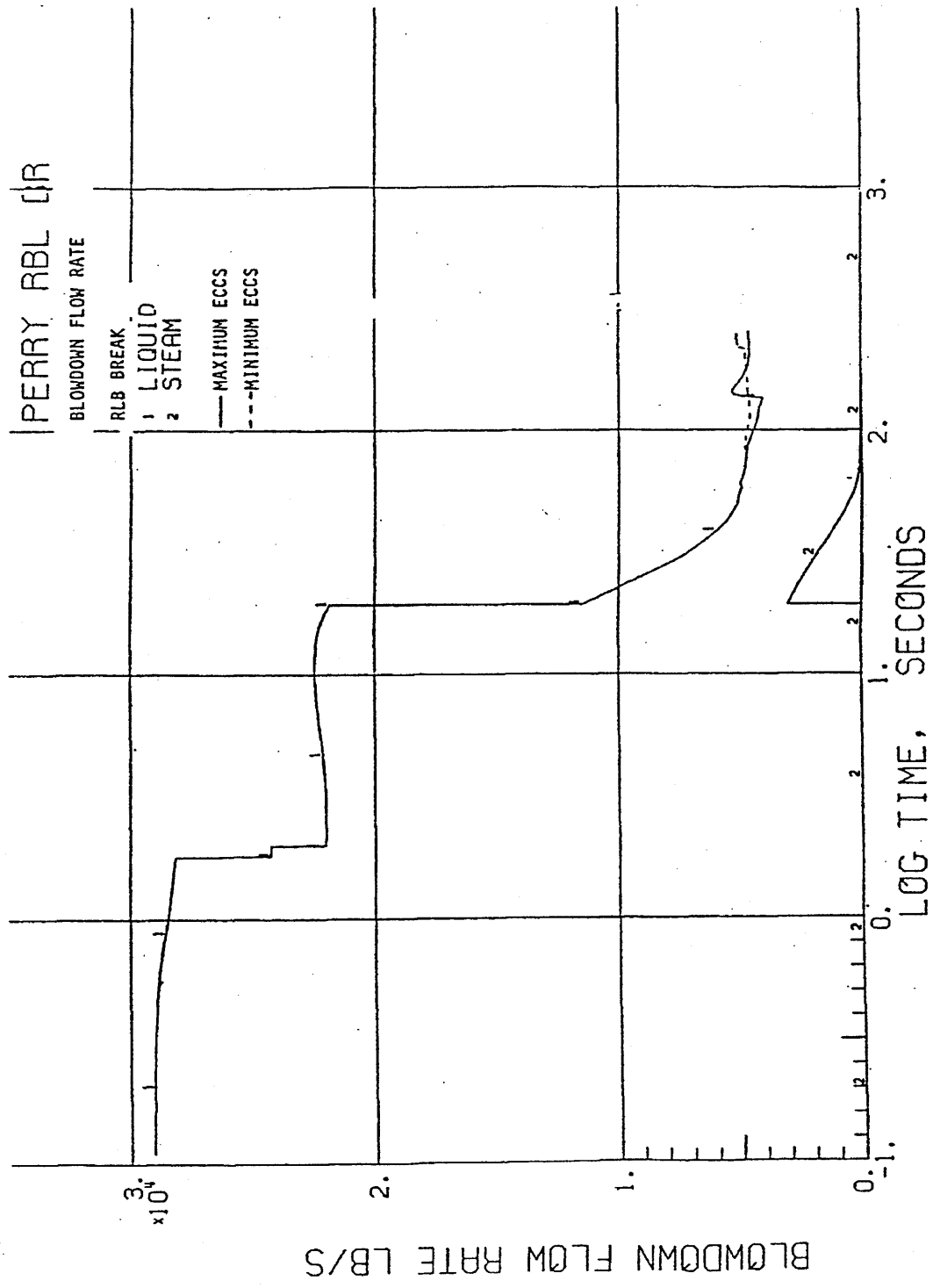


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Pressure Differential Across
Bulkhead Plate Due to MSLB

Figure 6.2-51c

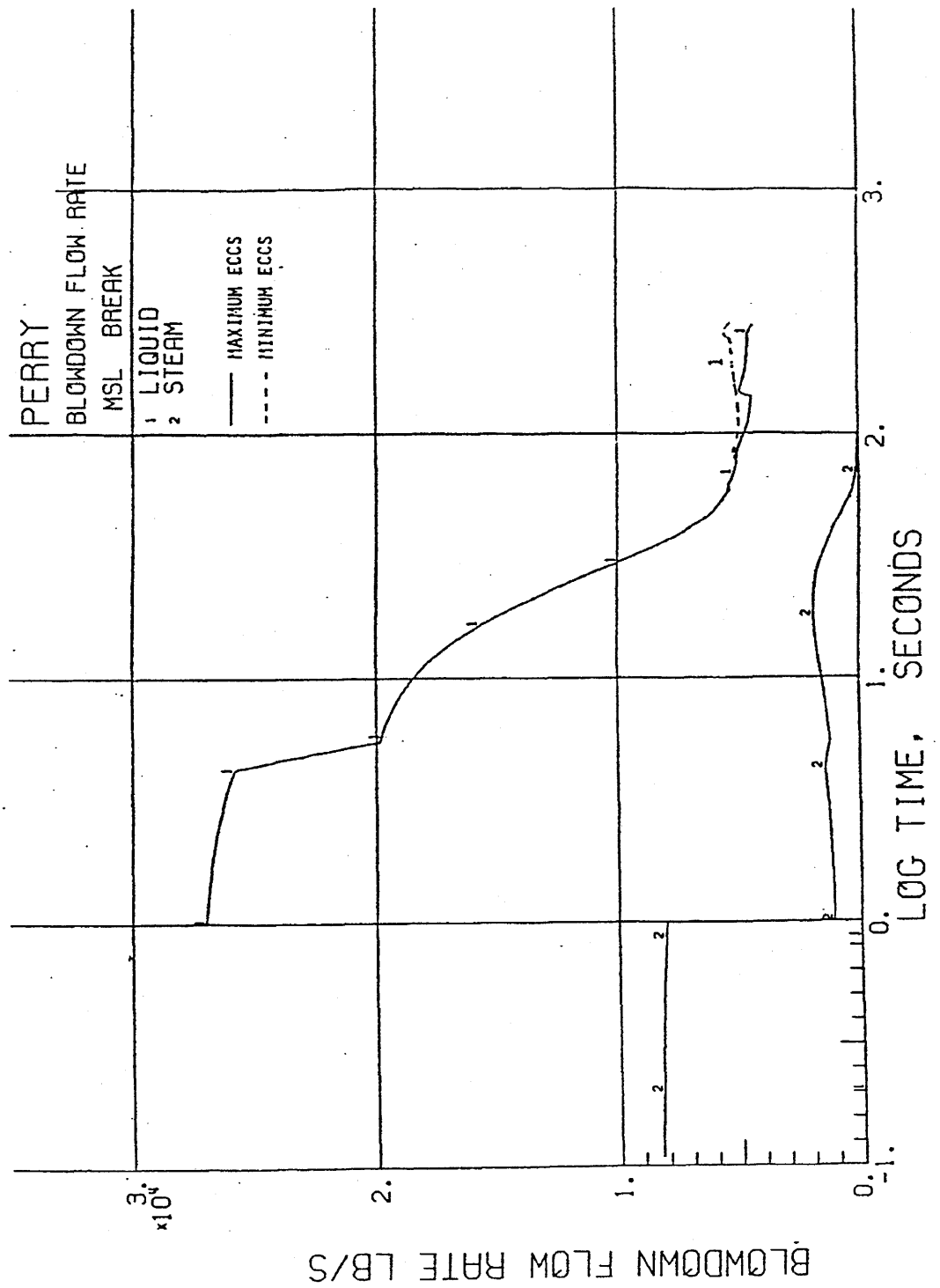


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Vessel Blowdown Flow Rates
Following a Recirculation
Line Break
(at 3729 MWt)

Figure 6.2-52

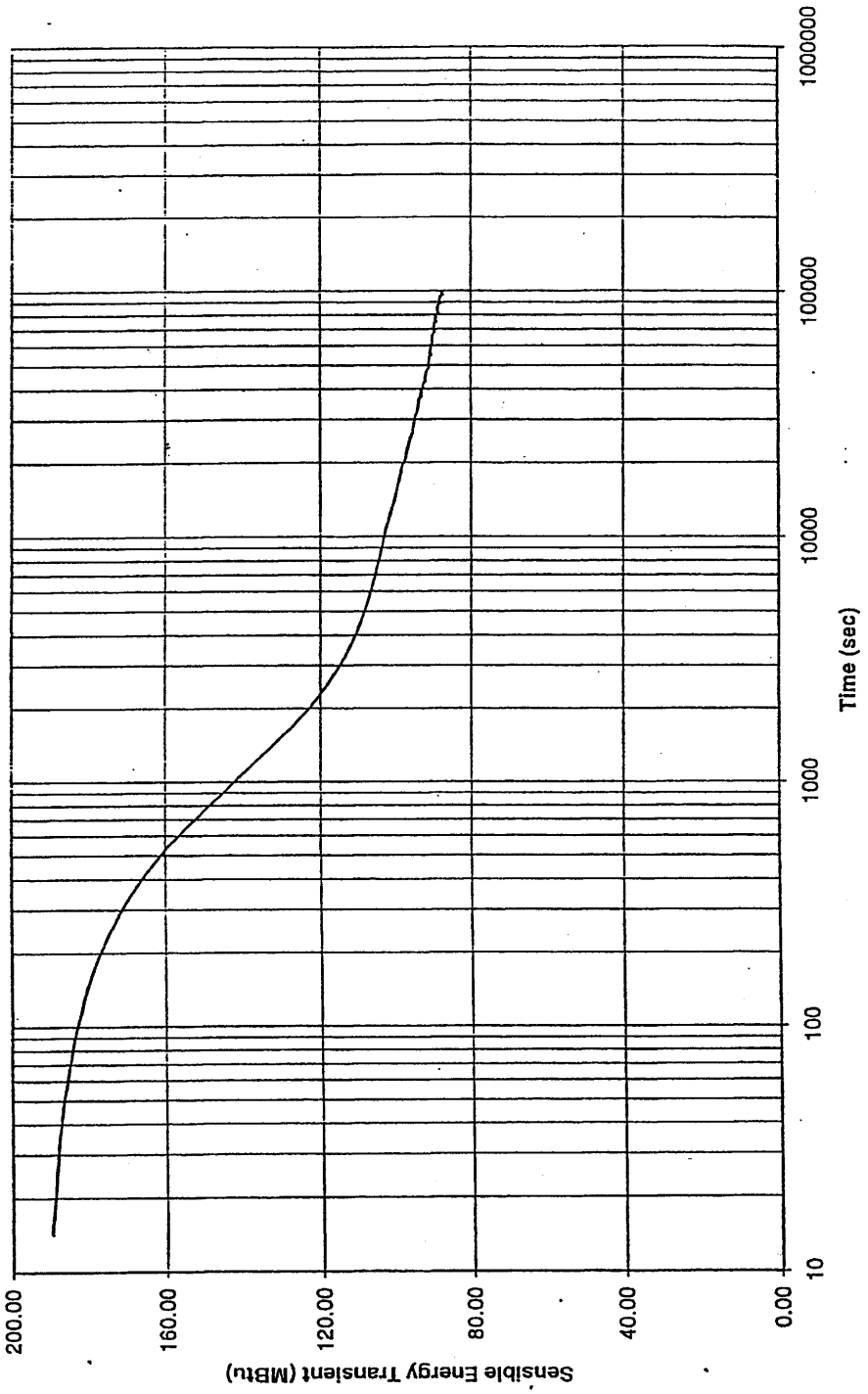


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Vessel Blowdown Flow Rates
Following a Main Steam
Line Break
(at 3729 MWt)

Figure 6.2-53

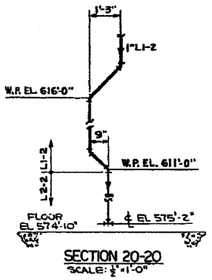


(Rev. 12 1/03)

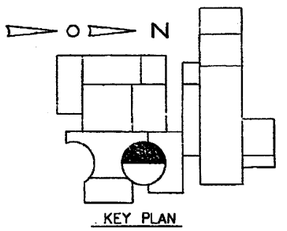
PERRY NUCLEAR POWER PLANT

Sensible Energy in the Reactor Pressure Vessel and Internal Metals Following a Main Steam Line Break

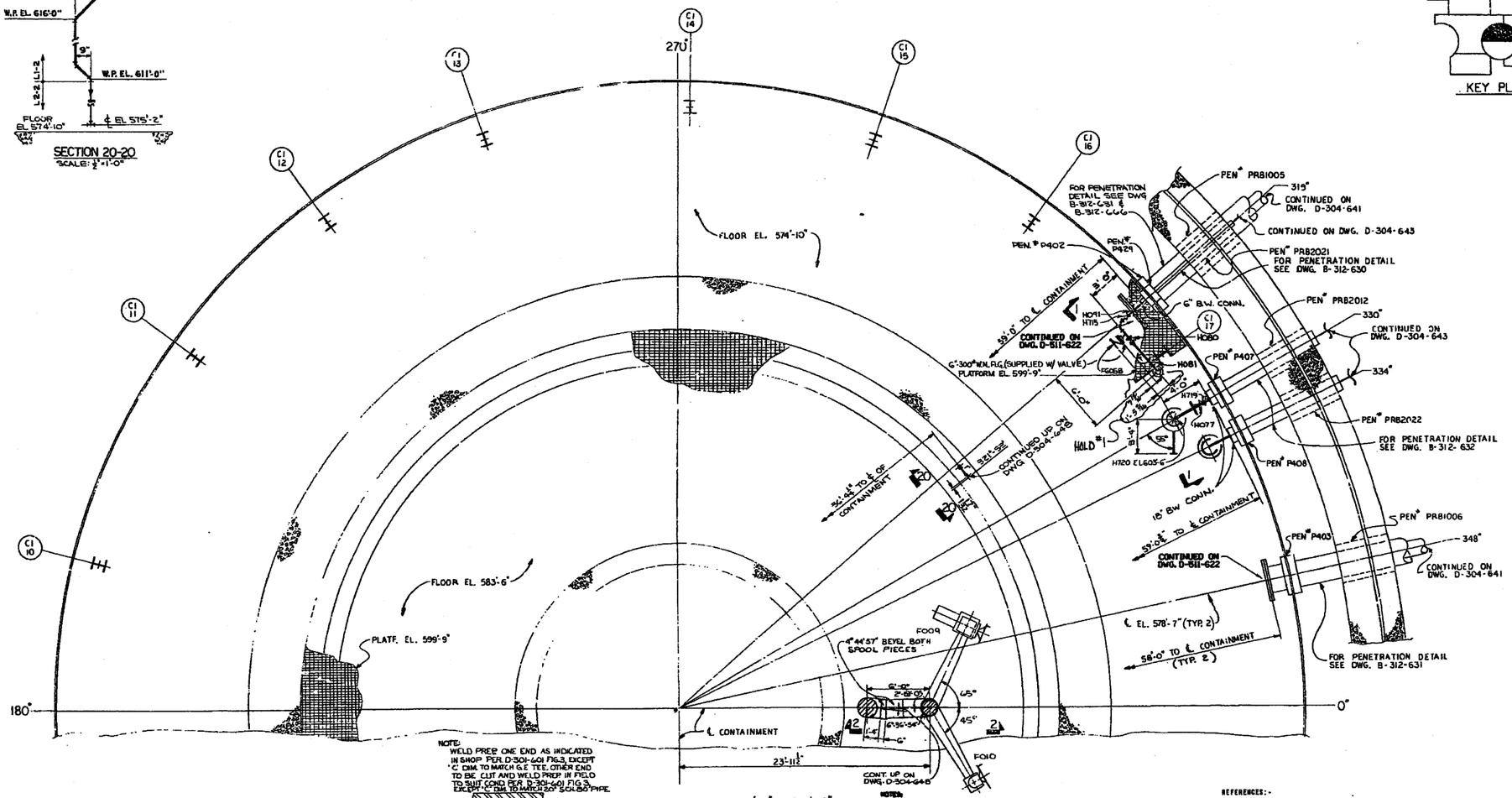
Figure 6.2-54

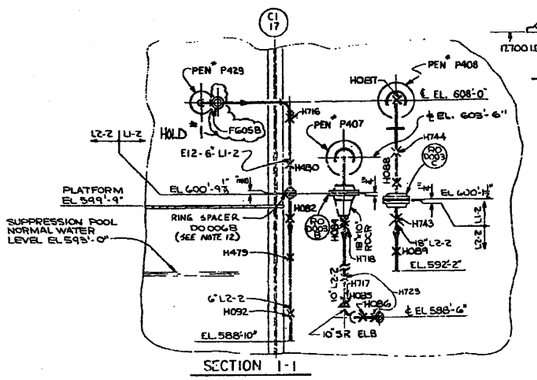


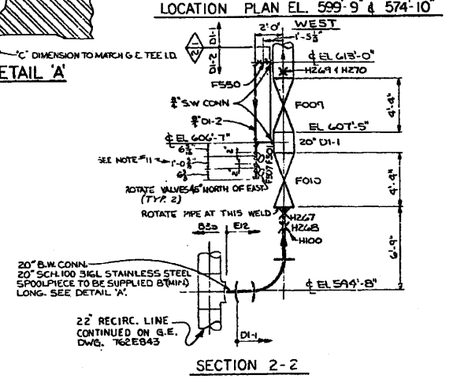
SECTION 20-20
SCALE: 1/4"=1'-0"



KEY PLAN







LOCATION PLAN EL. 599'-9" & 574'-10"

NOTES:

1. A. PIPING IS SAFETY CLASS AS INDICATED.
   B. PIPING IS SEISMIC CATEGORY I.
2. FOR PIPE MATERIAL, SEE GM SPECIFICATION SP-527-4549-00 (SAFETY CLASS), AND SP-308-4549-00 (NON-SAFETY CLASS). LINE CLASS AS INDICATED.
3. FOR INSULATION, SEE GM SPECIFICATION SP-352-4549-00.
4. FOR WELD END DETAILS, SEE GM DWG. D-301-601 (SAFETY CLASS) OR DWG. D-301-602 (NON-SAFETY CLASS).
5. ALL VENT AND DRAIN VALVES TO HAVE T.O.E. (THREAD ONE END) NIPPLE AT THE OUTLET END WITH CAP.
6. SMALL PIPING FOR DRAINS, SAMPLE AND INSTRUMENT CONNECTION LINES, TO SHOW ORIENTATION ONLY. DURING INSTALLATION OF VALVES AND OTHER APPENDAGES, CONTRACTOR MUST PROVIDE REQUIRED CLEARANCE FOR INSULATION.
7. NO ALLOWANCE FOR WELD CAPS.
8. THIS DRAWING TO BE WORKED IN CONJUNCTION WITH DWGS. D-304-647 AND D-304-650 RESIDUAL HEAT REMOVAL SYSTEM.
9. ALL VALVES HAVE PREFIX E12, UNLESS NOTED.
10. ALL BUTT WELDS ON PIPE WITH AN INSIDE DIAMETER OF 2.36 OR LARGER WILL BE VOLUMETRICALLY EXAMINED IN SERVICE INSPECTED AND REQUIRE SURFACE FINISHES IN ACCORDANCE WITH SPECIFICATION SP-527-4549-00 FOR SHOP WELDS AND SP-644-4549-00 FOR FIELD WELDS.
11. FILLET WELDS TO BE IN ACCORDANCE WITH FIGURE NC-3673.2 (b)-3 (d), LEG RATIO TO BE 3:4 WITH LONGER LEG ALONG PIPE.
12. PIPE SPACERS (NOZZ 117) SHOWN TO BE PLACED DURING PLANT OPERATION, SINGLE BLINDS B088A AND B088B TO BE TEMPORARILY DISCRETED DURING PERIODIC SYSTEM TESTING. SINGLE BLINDS TO BE STICKED BETWEEN TESTS.

REFERENCES:-

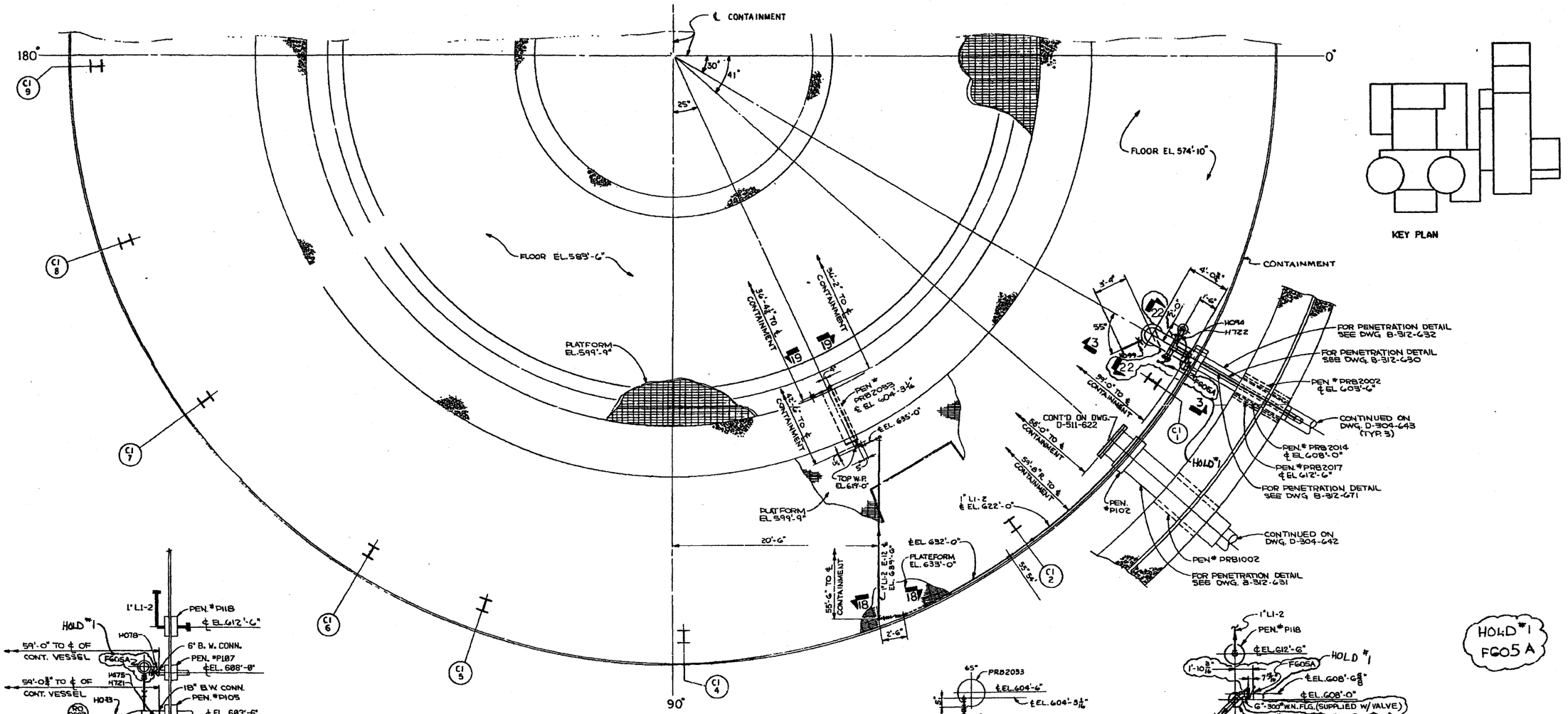
D-302-641	RESIDUAL HEAT REMOVAL SYSTEM - FLOW DIAGRAM
D-302-642	RESIDUAL HEAT REMOVAL SYSTEM - FLOW DIAGRAM
D-302-643	RESIDUAL HEAT REMOVAL SYSTEM - FLOW DIAGRAM

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

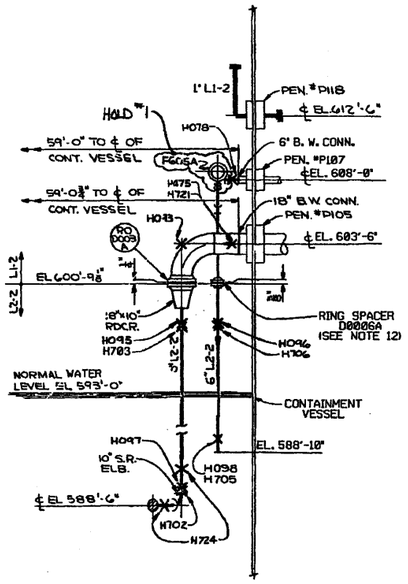
Residual Heat Removal System
Plan and Section - West

Figure 6.2-55
(Dwg. D-304-646)

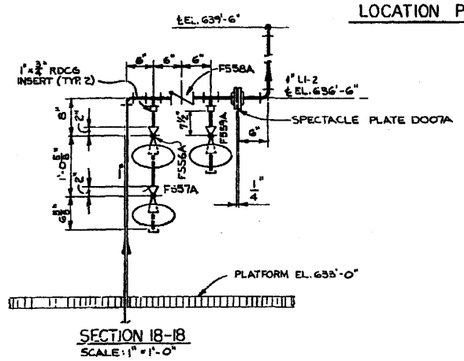


KEY PLAN

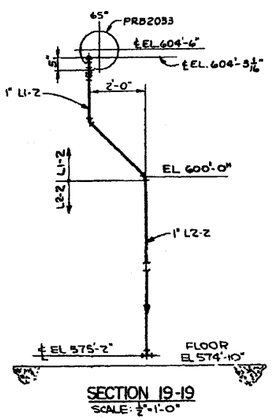
LOCATION PLAN EL. 599'-9" & 574'-10"
EAST



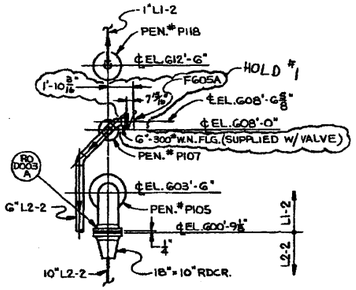
SECTION 3-3



SECTION 18-18
SCALE: 1" = 1'-0"



SECTION 19-19
SCALE: ¾"-1'-0"



SECTION 22-22

HOLD *1
FG05A

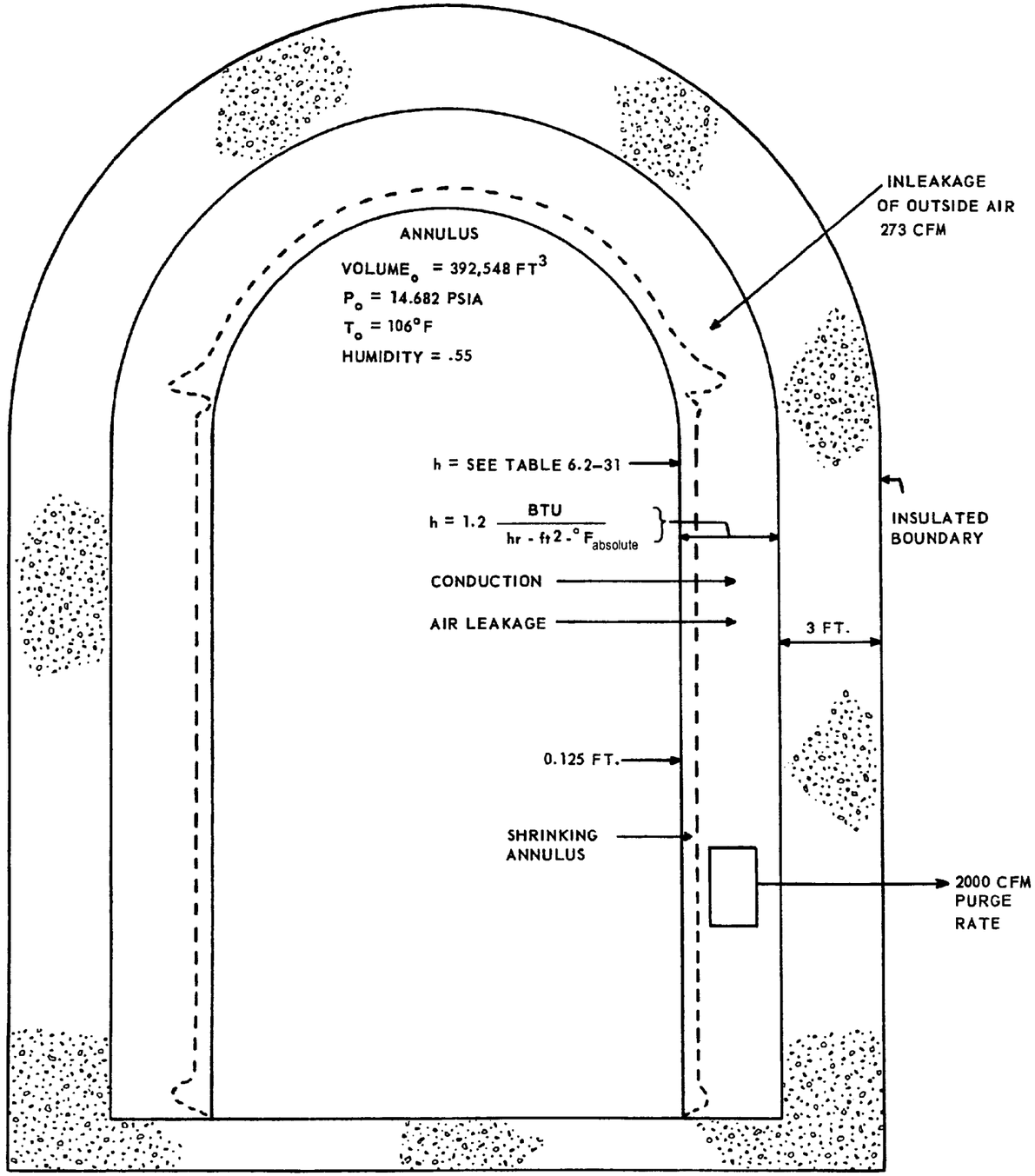
NOTES:
1. FOR NOTES AND REFERENCES, SEE DRAWING D-304-646

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Residual Heat Removal System
Plan and Section - East

Figure 6.2-56
(Dwg. D-304-647)

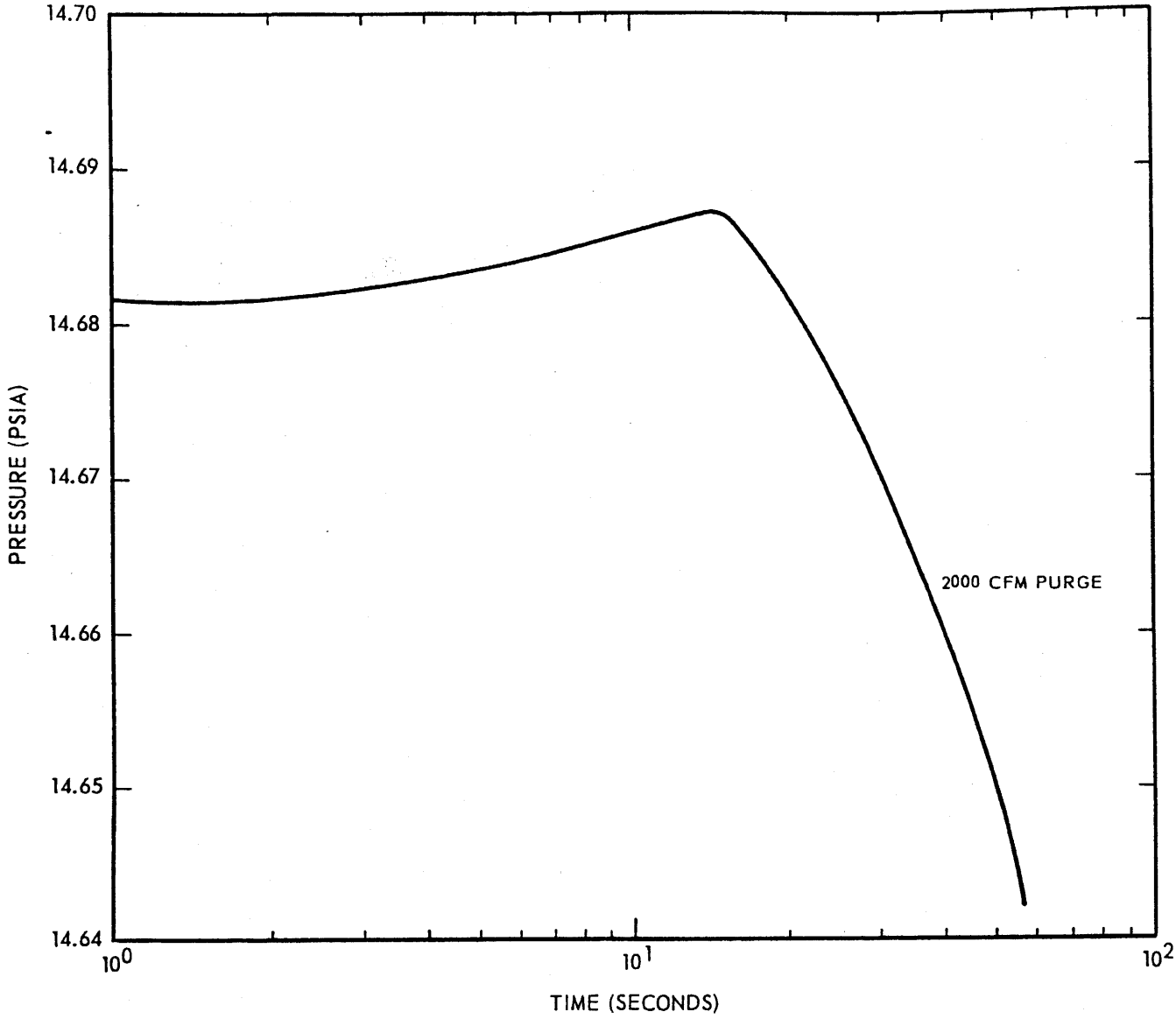


(REV. 20 10/2017)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

MODEL USED IN CONTEMPT

FIGURE 6.2-57

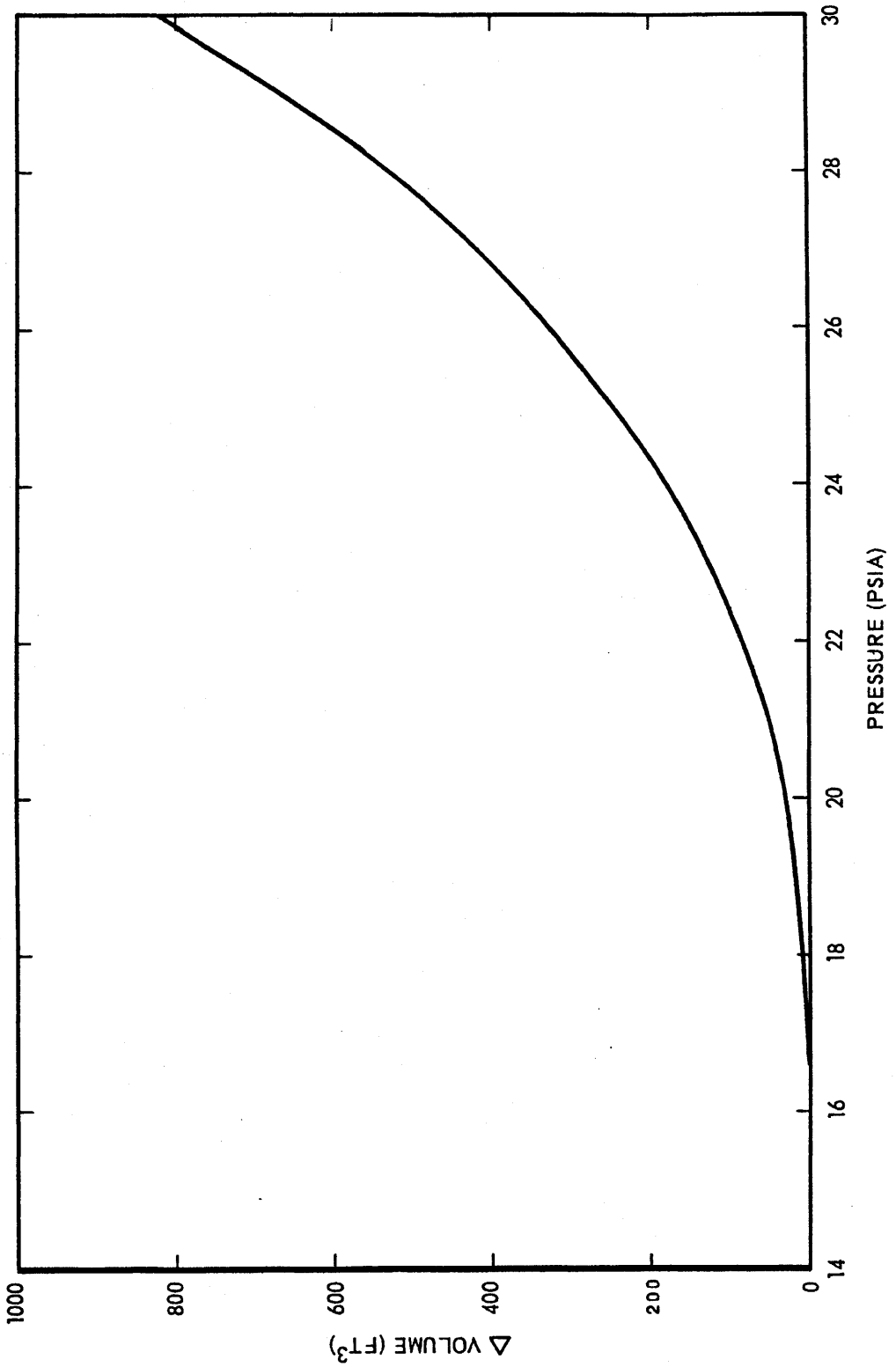


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Annulus Pressure Following
DBA LOCA Versus Time

Figure 6.2-58

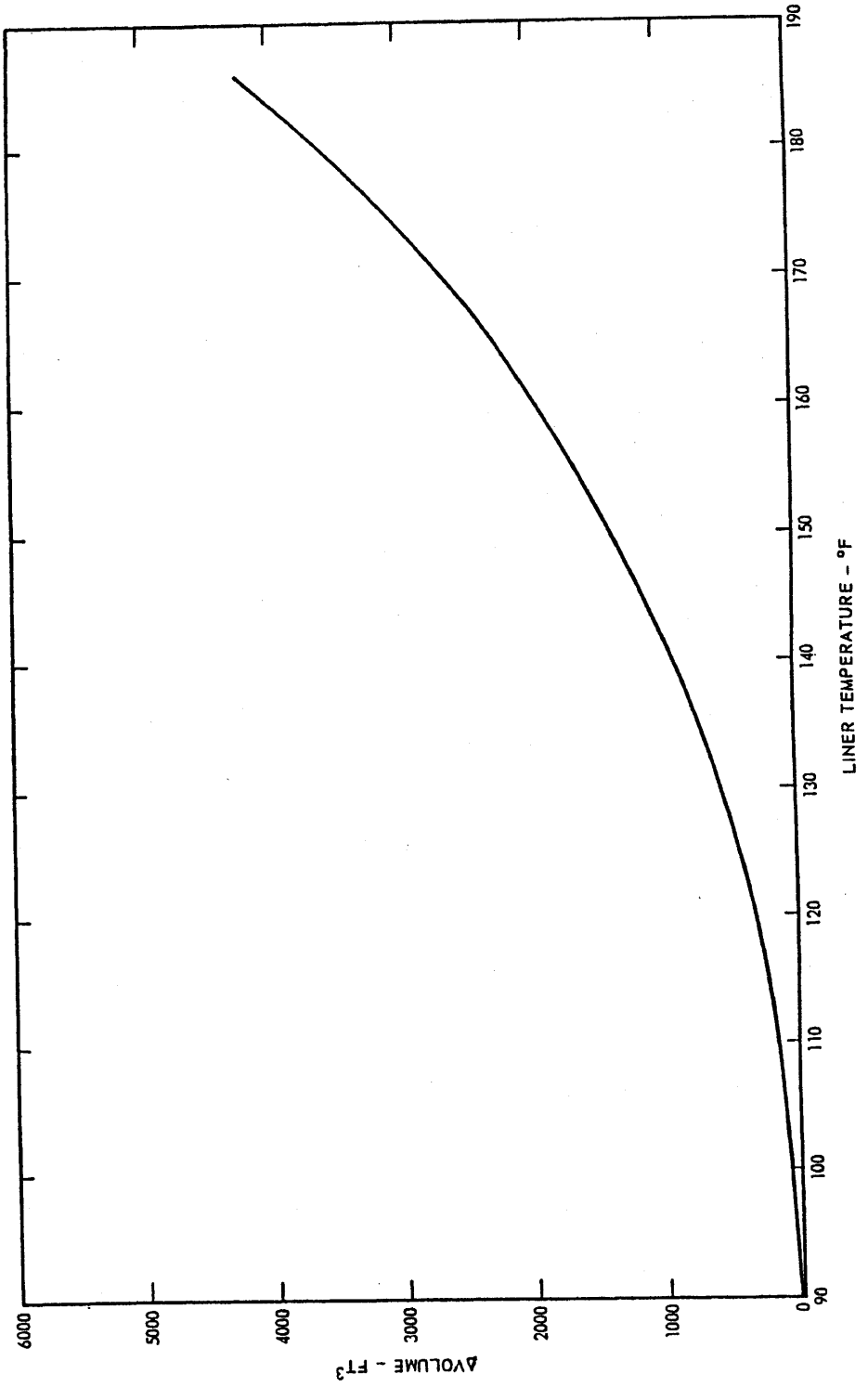


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Annulus Volume Reduction Due to Containment Vessel Response to Post-LOCA Containment Pressure

Figure 6.2-59a

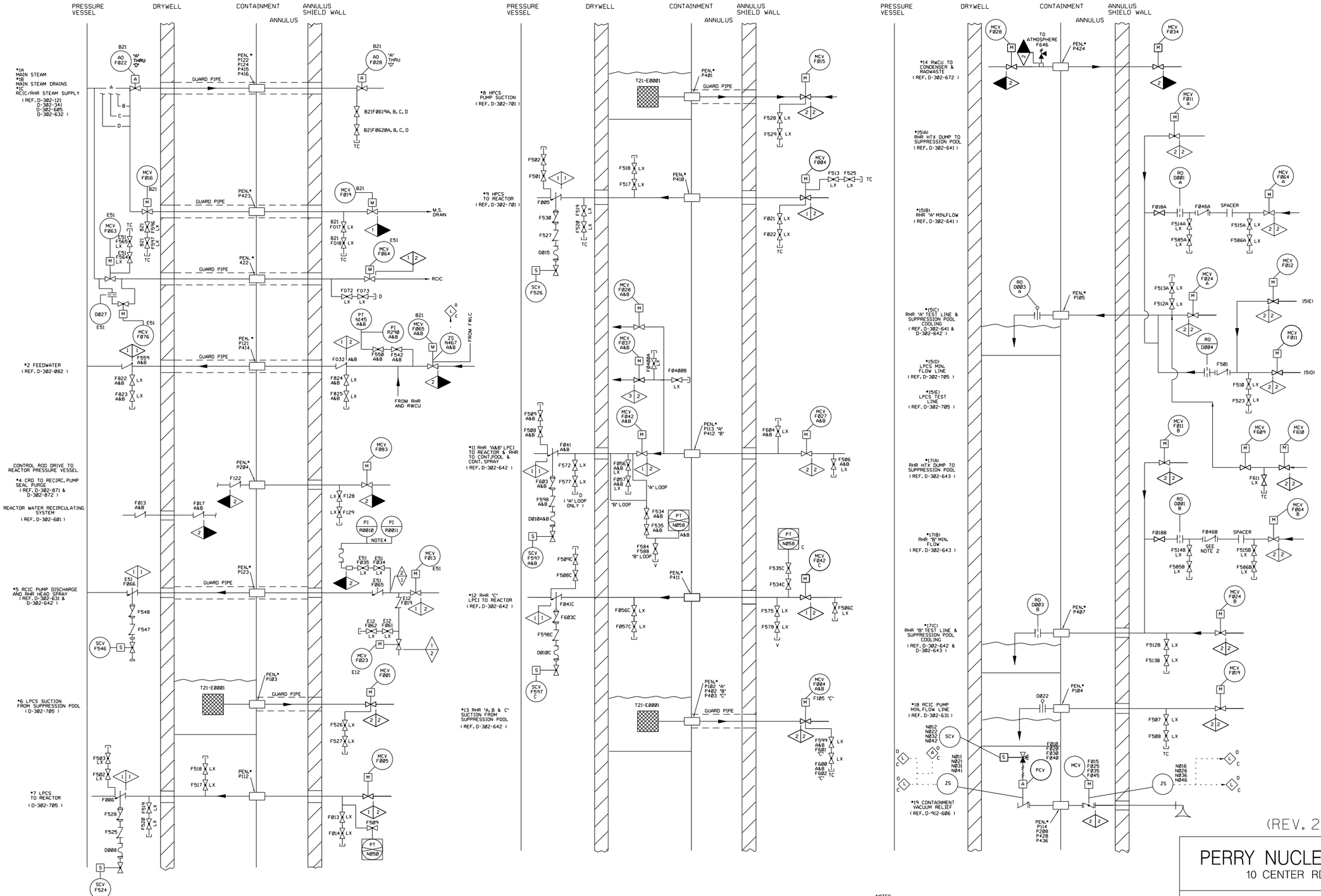


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Annulus Volume Reduction Due to Containment Vessel Response to Post LOCA Containment Temperature

Figure 6.2-59b



NOTES:

1. TC - LEAK RATE TEST CONNECTION FOR ISOLATION VALVES.
2. CHECK VALVE INTERNALS REMOVED FROM 1E12F046B (VALVE FUNCTIONS AS STRAIGHT PIPE).
3. VALVES 1B21F067A,B,C,&D DE-ENERGIZED, LOCKED CLOSED.
4. THE SENSING LINE FOR PRESSURE INDICATORS 1E51R0010 AND 1E51R0011 IS REMOVABLE SO THE TEST APPENDAGE CAN BE USED FOR LEAK TESTING THE CONTAINMENT ISOLATION VALVES.

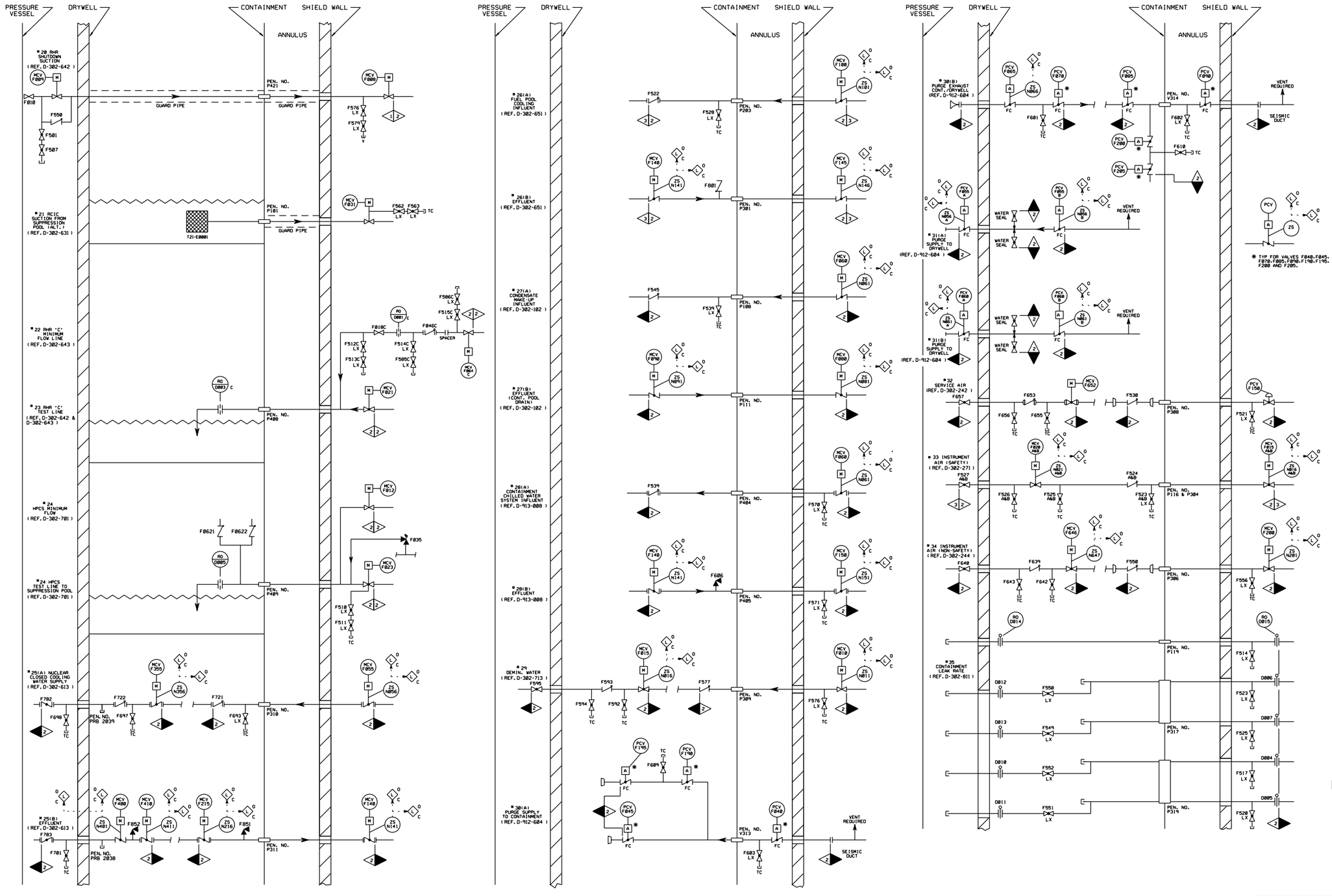
(REV. 20 10/2017)

PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

CONTAINMENT & DRYWELL ISOLATION

FIGURE 6.2-60 (SHEET 1 OF 4)
(DWG. D-300-0761-00000)



NOTES:
TC - LEAK RATE TEST CONNECTION FOR ISOLATION VALVES.

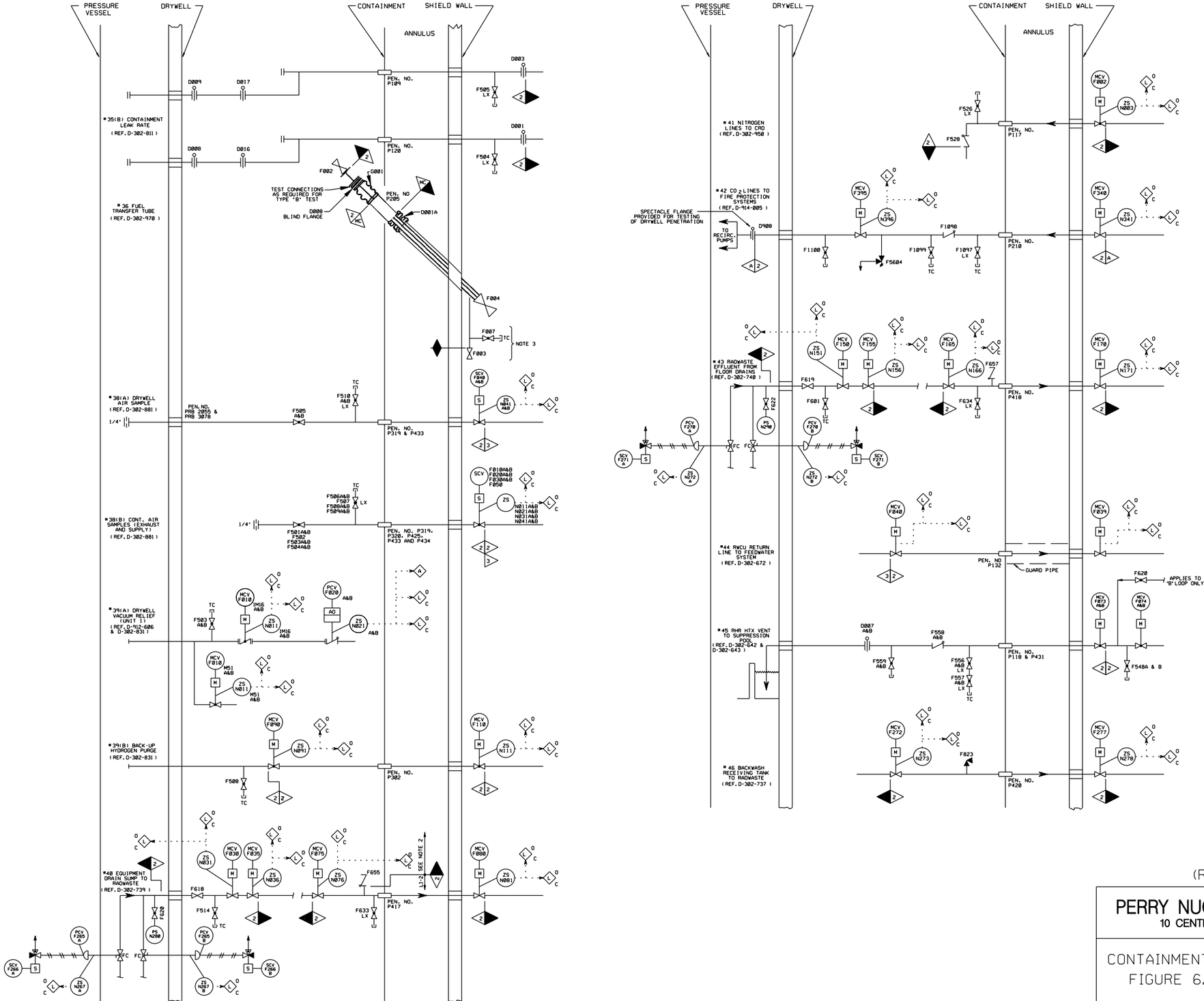
NUCLEAR SAFETY RELATED

(Rev. 17 10/11)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

Containment and
Drywell Isolation

Figure 6.2-60 (Sheet 2 of 4)
(DWG. D-300-0762-00000)



NOTES:

1. TC - LEAK RATE TEST CONNECTION FOR ISOLATION VALVES.
2. NON-ASME SAFETY RELATED CHECK VALVES INSTALLED PER DCP 97-5084 AND GENERIC LETTER 89-09.
3. TREATED AS CONTAINMENT ISOLATION VALVE WHEN IFTS BLIND FLANGE IS REMOVED IN MODES 1, 2 OR 3.

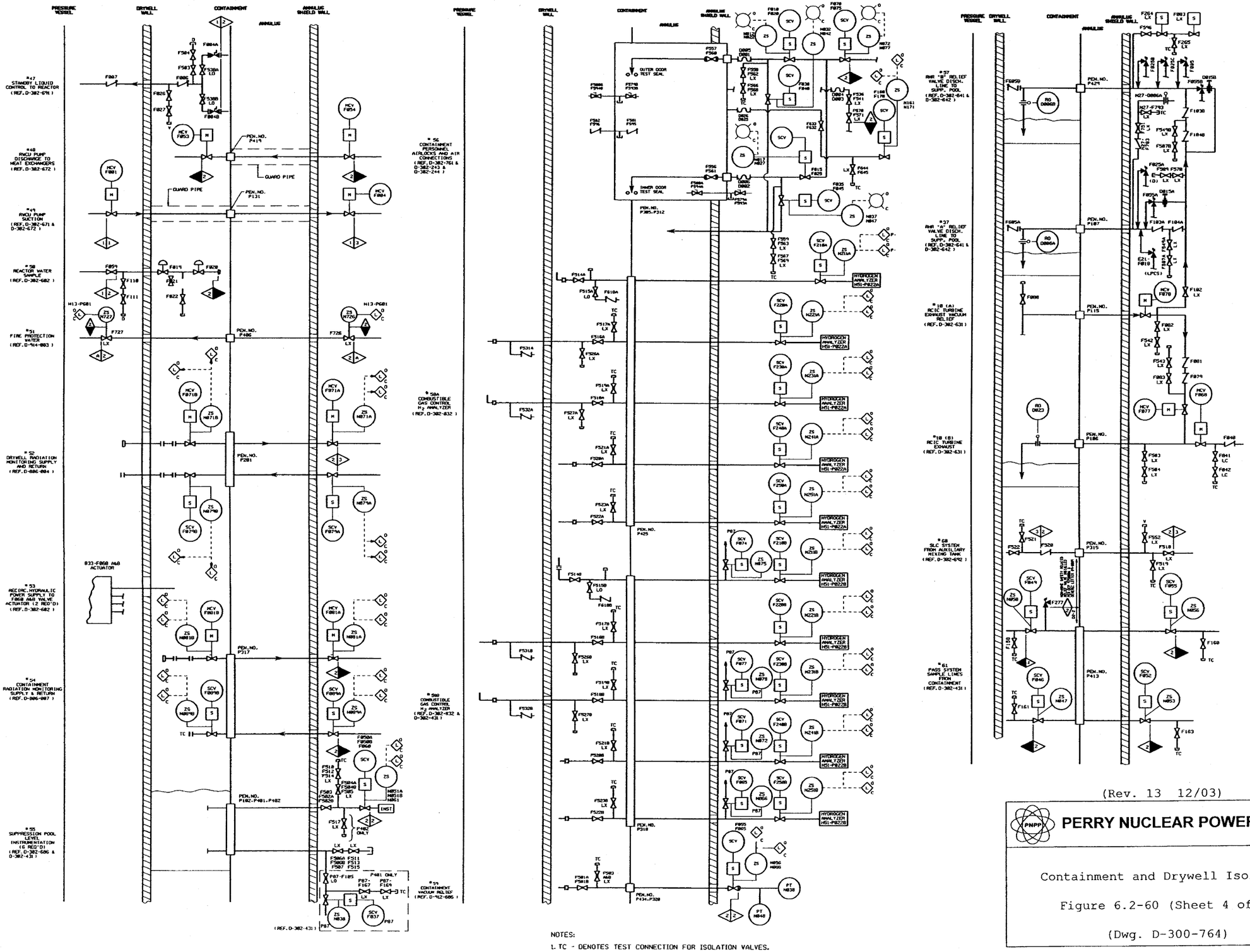
(Rev. 18 10/13)

PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

CONTAINMENT & DRYWELL ISOLATION
FIGURE 6.2-60 (SHEET 3 OF 4)

(DWG. 300-0763-00000)



NOTES:

1. TC - DENOTES TEST CONNECTION FOR ISOLATION VALVES.

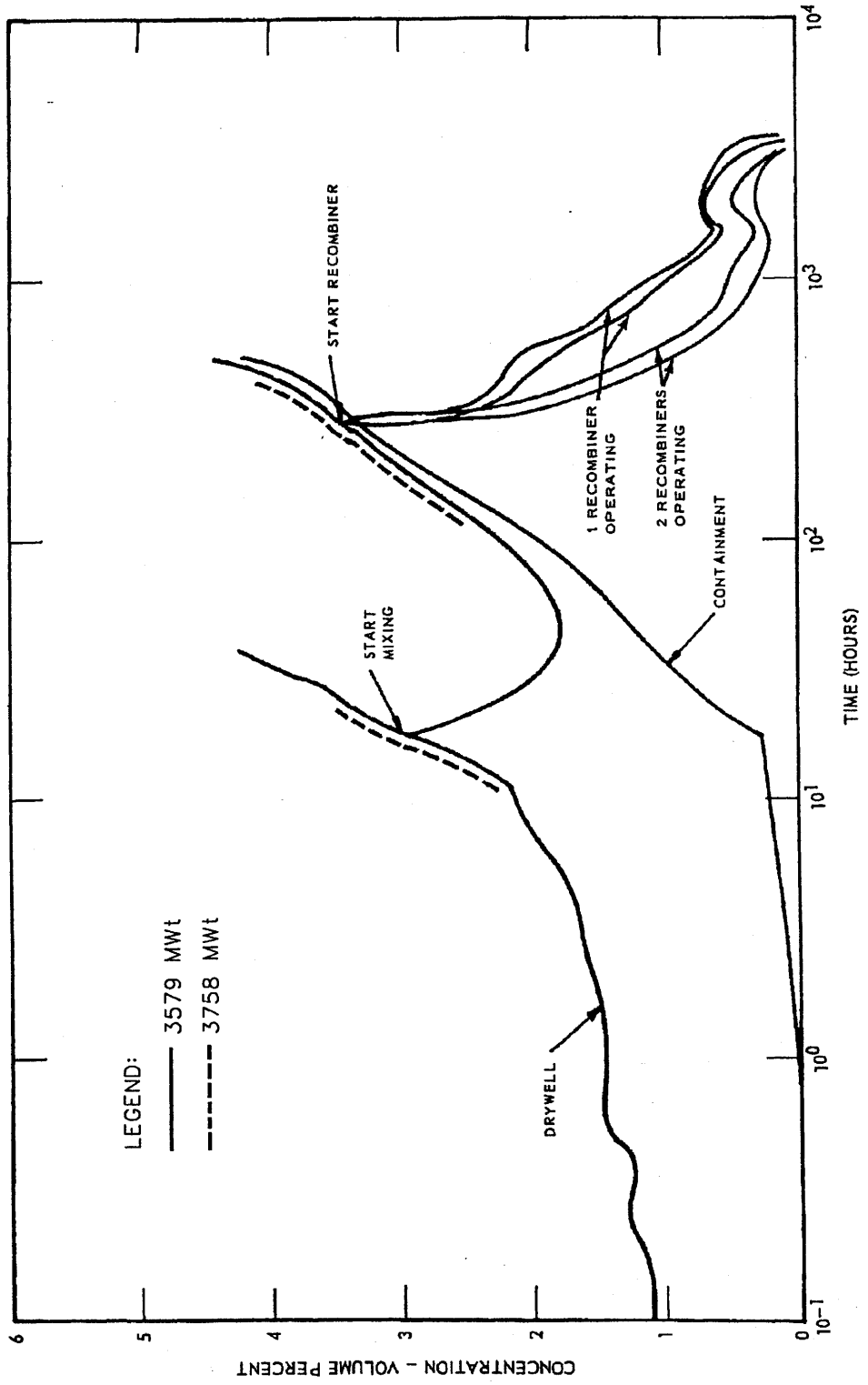
(Rev. 13 12/03)

PERRY NUCLEAR POWER PLANT

Containment and Drywell Isolation

Figure 6.2-60 (Sheet 4 of 4)

(Dwg. D-300-764)

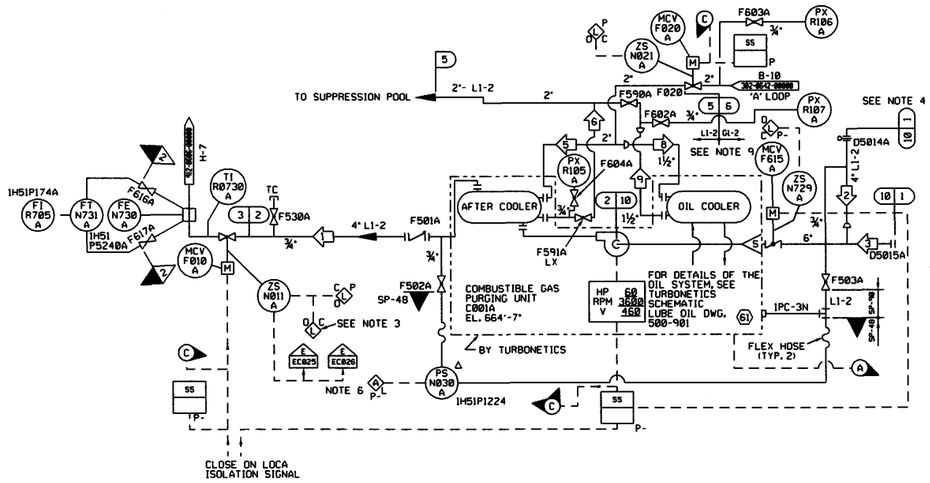


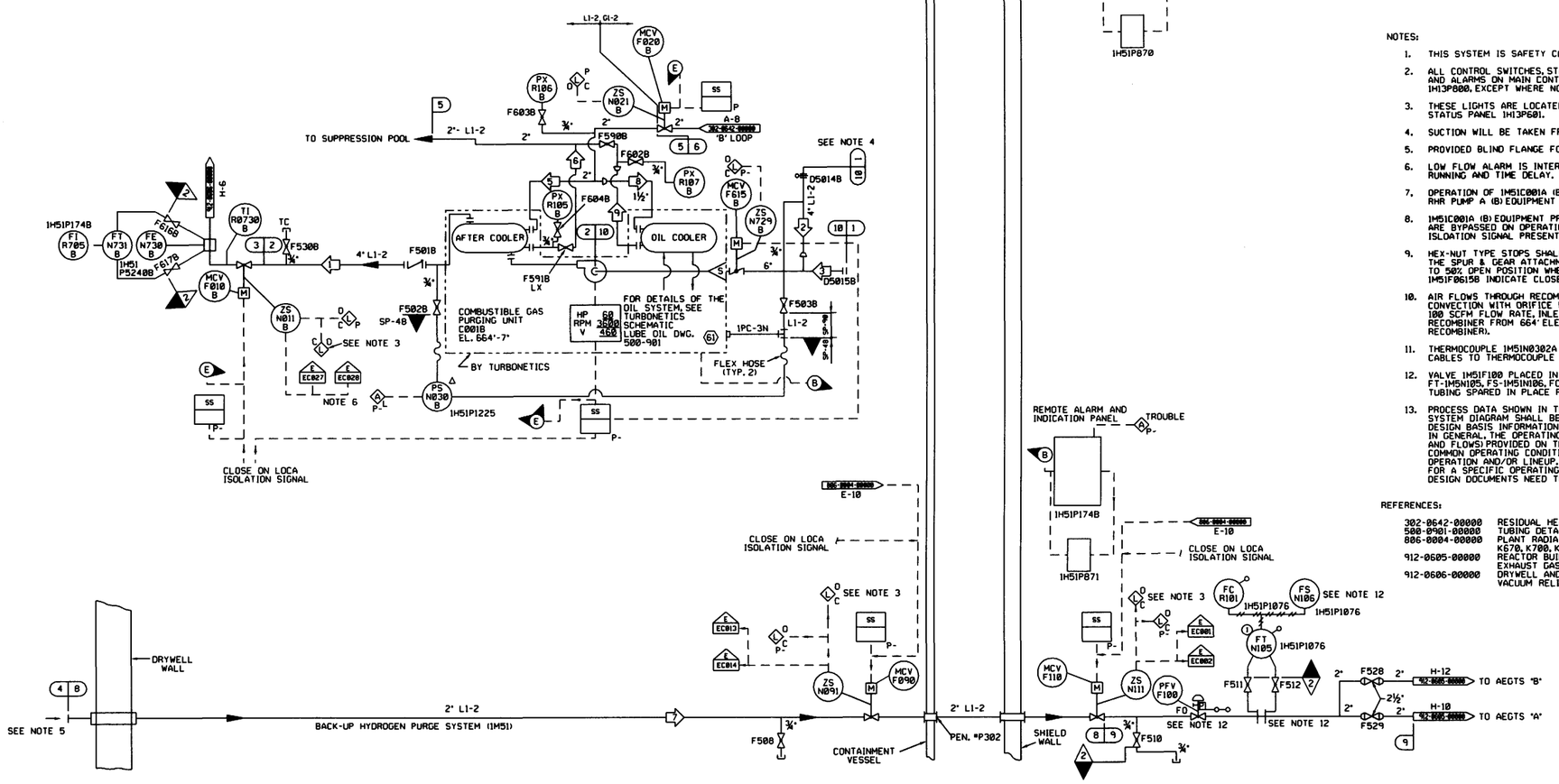
(Rev. 12 1/03)

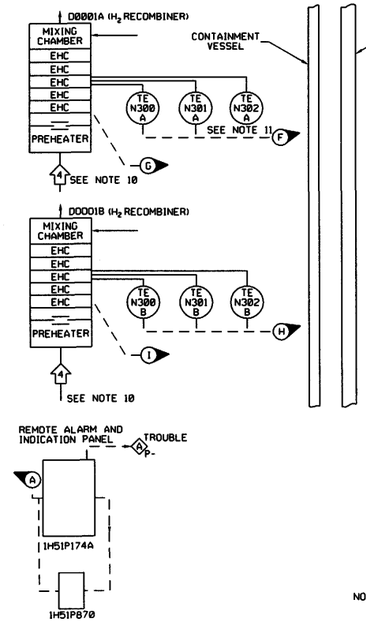
PERRY NUCLEAR POWER PLANT

Hydrogen Concentration Versus Time

Figure 6.2-61







OPERATING CONDITIONS

SEE NOTE 13

		INCHES H_2O (ABS)	SCFM	°F	BY	REMARKS
AIR	1	845	500	238	DJL	POST LOCA HIGH WATER LEVEL
	2	645	235	185	DJL	" "
	3	645	265	185	DJL	" "
	7	537	78	175	JEN	" "
	4	-	100	-	PJR	-
		PSIG	GPM	°F	BY	REMARKS
* WATER	5	7	-	140	ETO	POST LOCA HIGH WATER LEVEL
	6	-	-	151	ETO	" "
	8	7	17	140	ETO	" "
	9	2	17	151	ETO	" "

* AFTERCOOLERS ARE ISOLATED VIA CLOSURE OF 1M51F591A (B)

DESIGN DATA

	NORMAL		UPSET **			BY	CHKD	REMARKS	REV
	INCHES H_2O (ABS)	°F	INCHES H_2O (ABS)	°F	TIME				
1	407	90	740	185	LOCA	JET	KSE		
2	576	175	877	238	LOCA	JET	KSE		
3	565	175	1238	330	LOCA	JET	KSE		
4	537	175	1238	330	LOCA	JET	KSE		
8	537	175	1238	330	LOCA	JET	KSE		
9	486	212	1210	330	LOCA	JET	KSE		
10**	389	90	719	185	LOCA	JET	KSE		
	PSIG	°F	PSIG	°F	TIME				
5	125	212	160	212	LOCA	JET	KSE		
6	125	212	125	212	LOCA	JET	KSE		

* DESIGN CONDITIONS ARE INDICATED IN THE UPSET DESIGN DATA COLUMN
** DUAL DESIGN CONDITIONS, MINIMUM PRESSURE (VACUUM) AT NORMAL CONDITIONS, MAXIMUM PRESSURE AT UPSET CONDITIONS.

TEST CONDITIONS

	INCHES H_2O (ABS)	SCFM	°F	BY	REMARKS
1	565	500	153	JET	
2	389	235	90	DJL	
3	389	265	90	DJL	

NOTES:

1. THIS SYSTEM IS SAFETY CLASS 2.
2. ALL CONTROL SWITCHES, STATUS LIGHTS, VALVE POSITION LIGHTS, AND ALARMS ON MAIN CONTROL BOARD ARE LOCATED ON PANEL 1H13P800, EXCEPT WHERE NOTED.
3. THESE LIGHTS ARE LOCATED ON THE CONTAINMENT/DRYWELL ISOLATION STATUS PANEL 1H13P601.
4. SUCTION WILL BE TAKEN FROM CONTAINMENT DOME.
5. PROVIDED BLIND FLANGE FOR LEAK TEST.
6. LOW FLOW ALARM IS INTERLOCKED WITH 1M51C001A (B) RUNNING AND TIME DELAY.
7. OPERATION OF 1M51C001A (B) IS INTERLOCKED WITH RHR PUMP A (B) EQUIPMENT AND 1E12F028A (B) OPEN.
8. 1M51C001A (B) EQUIPMENT PROTECTION INTERLOCKS ARE BYPASSED ON OPERATION WITH A CONTAINMENT ISOLATION SIGNAL PRESENT.
9. HEX-NUT TYPE STOPS SHALL BE ADJUSTED ON THE SPUR & GEAR ATTACHMENT TO ACHIEVE A 40% TO 50% OPEN POSITION WHEN MCV-1M51F0615A AND 1M51F0615B INDICATE CLOSE.
10. AIR FLOWS THROUGH RECOMBINER BY NATURAL CONVECTION WITH ORIFICE PLATE SIZED TO MAINTAIN 100 SCFM FLOW RATE. INLET AIR IS DRAWN INTO RECOMBINER FROM 664' ELEV. (GENERAL AREA OF H RECOMBINER).
11. THERMOCOUPLE 1M51N0302A SCRAPPED IN PLACE. CABLES TO THERMOCOUPLE SPARED IN PLACE. SEE DCN 00798.
12. VALVE 1M51F100 PLACED IN THE FAIL OPEN POSITION. FT-1M51N105, FS-1M51N106, FC-1M51R101 AND ASSOCIATED TUBING SPARED IN PLACE PER DCP 900207.
13. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA (PRESSURES, TEMPERATURES, AND FLOWS) PROVIDED ON THIS DRAWING REPRESENTS THE MOST COMMON OPERATING CONDITION, AND/OR SYSTEM MODE OF OPERATION AND/OR LINEUP. TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.

REFERENCES:

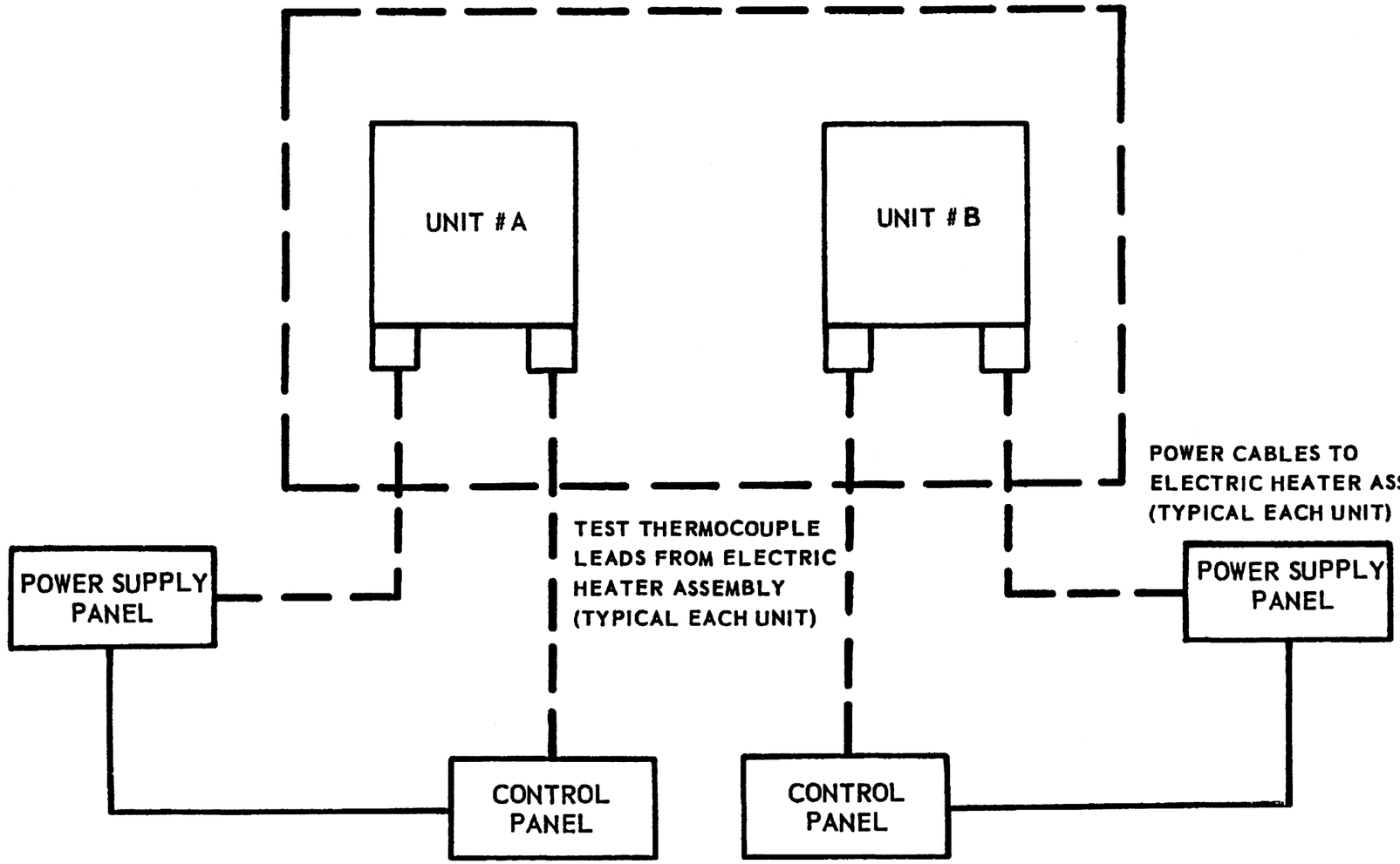
302-0642-00000	RESIDUAL HEAT REMOVAL E-12
500-0901-00000	TUBING DETAIL AIR MONITOR
806-0004-00000	PLANT RADIATION MONITORING D17, K670, K700, K768
912-0605-00000	REACTOR BUILDING ANNULUS EXHAUST GAS TREATMENT M15
912-0606-00000	DRYWELL AND CONTAINMENT VACUUM RELIEF, M16 AND M17

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

COMBUSTIBLE GAS CONTROL SYSTEM
FIGURE 6.2-62
(DWG. D-302-0831-00000)

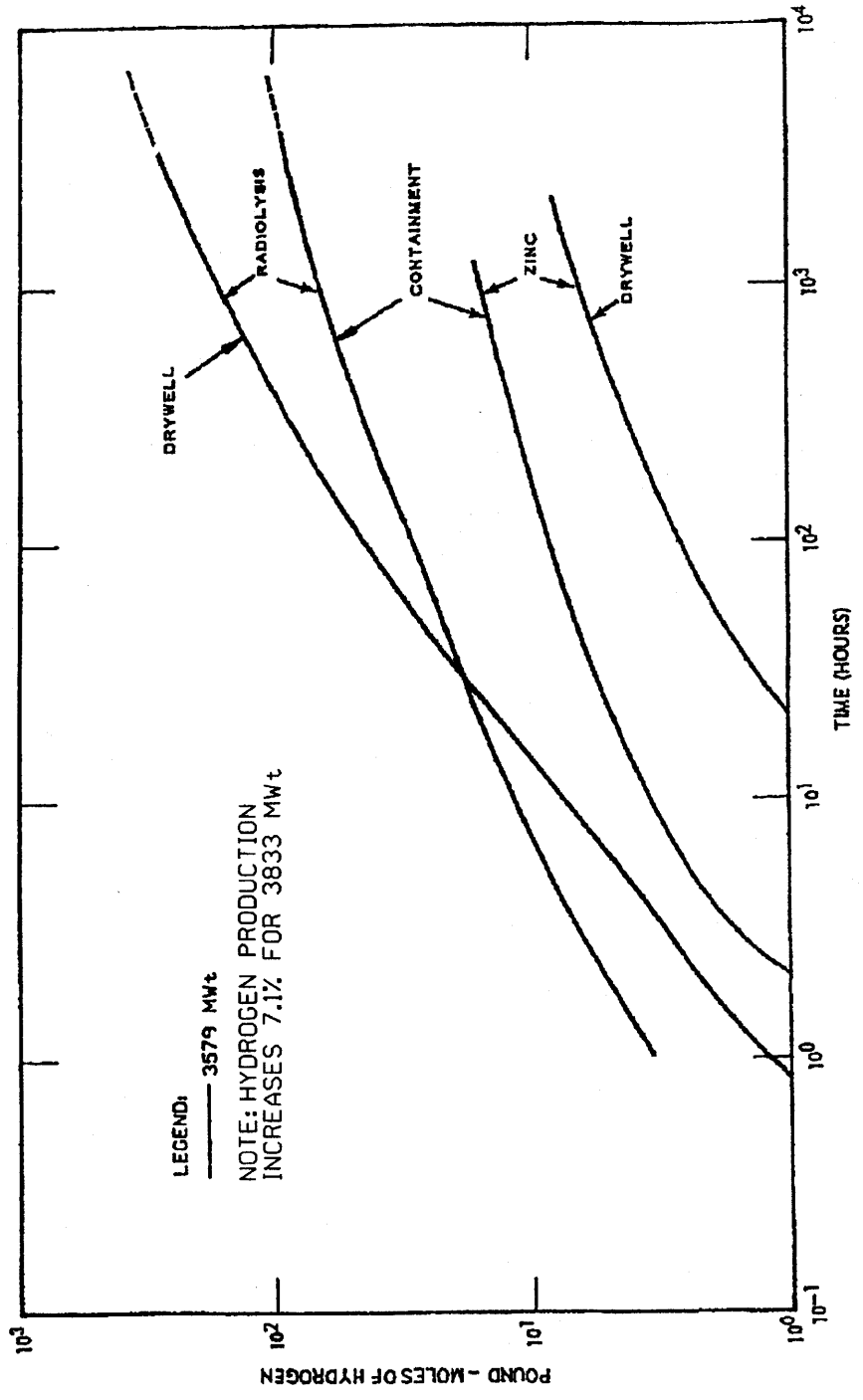


(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

HYDROGEN
RECOMBINER SYSTEM

FIGURE 6.2-63

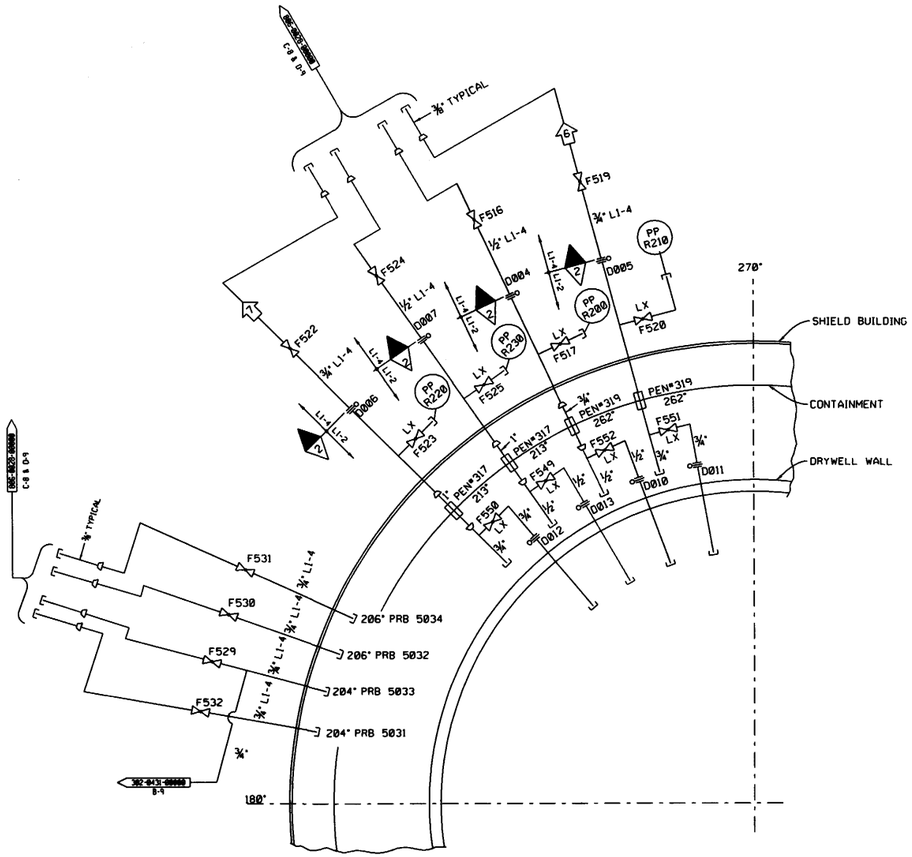


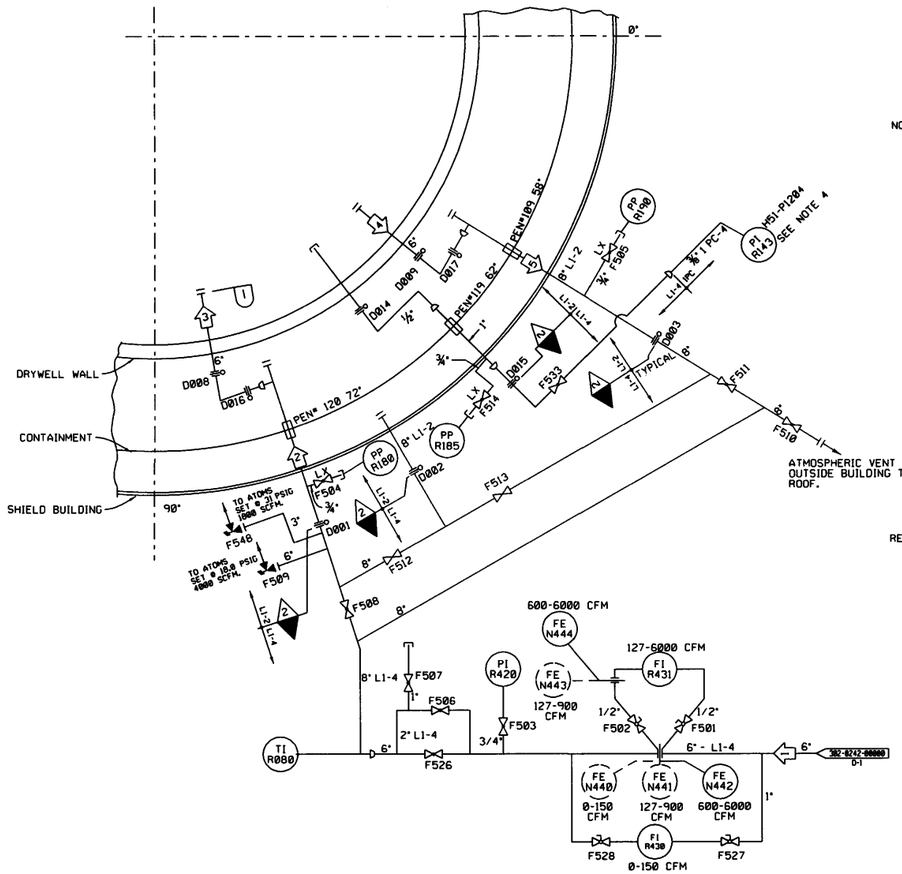
(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

Integrated Hydrogen Production
Within Containment and Drywell
Due to Radiolysis

Figure 6.2-64





OPERATING DATA CONTAINMENT TEST SEE NOTE 5						
#	PSIG	*CFM	F	BY	REMARKS	REV
1	100	560	100	DAK		
2	0	4250	90	DAK	MIN	
					|	
2	15	2100	90	DAK	MAX	
3		0		DAK		
4		0		AEH		
5				AEH	5 PSI/HR MAX BDN.	
6	15	.5	90	AEH	FLOW VERIFICATION	
7	15	.5	90	AEH	FLOW VERIFICATION	

*CFM ACTUAL

OPERATING DATA DRYWELL TEST SEE NOTE 5						
#	PSIG	CFM*	F	BY	REMARKS	REV
1	100	250	100	DAK		
2	-	-	-			
3	0	1900	90	DAK	MIN	
					|	
3	30	625	90	DAK	MAX	
4				AEH	5 PSI/HR MAX BDN.	
5				AEH	5 PSI/HR MAX BDN.	
6		0		AEH		
7		0		AEH		

DESIGN DATA										
#	NORMAL		UPSET			BY	CHKD	REMARKS	REV
	PSIG	F	PSIG	F	TIME				
1	150	110	-	-	-	AEH	JPA		

NOTES:

1. PRIOR TO REACTOR OPERATION:
   A. SPECTACLE FLANGES SHALL BE CLOSED ON ALL DRYWELL TEST LINES AND OUTBOARD SIDE OF ALL CONTAINMENT PENETRATIONS.
   B. BLIND FLANGES SHALL BE INSTALLED ON INBOARD SIDE OF CONTAINMENT PENETRATIONS.
2. WHEN THE LEAK RATE TEST SYSTEM IS USED TO PERFORM DRYWELL PRESSURIZATION THE LINES PENETRATING CONTAINMENT WILL BE CLOSED WITH BLIND FLANGES ON THE INTERIOR SIDE OF THE CONTAINMENT.
3. FOR CONTINUATION OF THIS SYSTEM, REFER TO 352-0811-0000 (CONTAINMENT INTEGRATED LEAK RATE TEST SYSTEM - UNIT 2).
4. PI R143 TO BE WALL MOUNTED NEAR F506 AND F526.
5. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA (PRESSURES, TEMPERATURES, AND FLOWS) PROVIDED ON THIS DRAWING, REPRESENTS THE MOST COMMON OPERATING CONDITION, AND/OR SYSTEM MODE OF OPERATION AND/OR LINEUP. TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.

REFERENCES:
302-0242-00000 SERVICE & INSTRUMENT AIR SUPPLY P51 & P52
806-0028-00000 INTRGRATED LEAK RATE TEST INSTRUMENTATION
302-0431-00000 POST ACCIDENT SAMPLING SYSTEM

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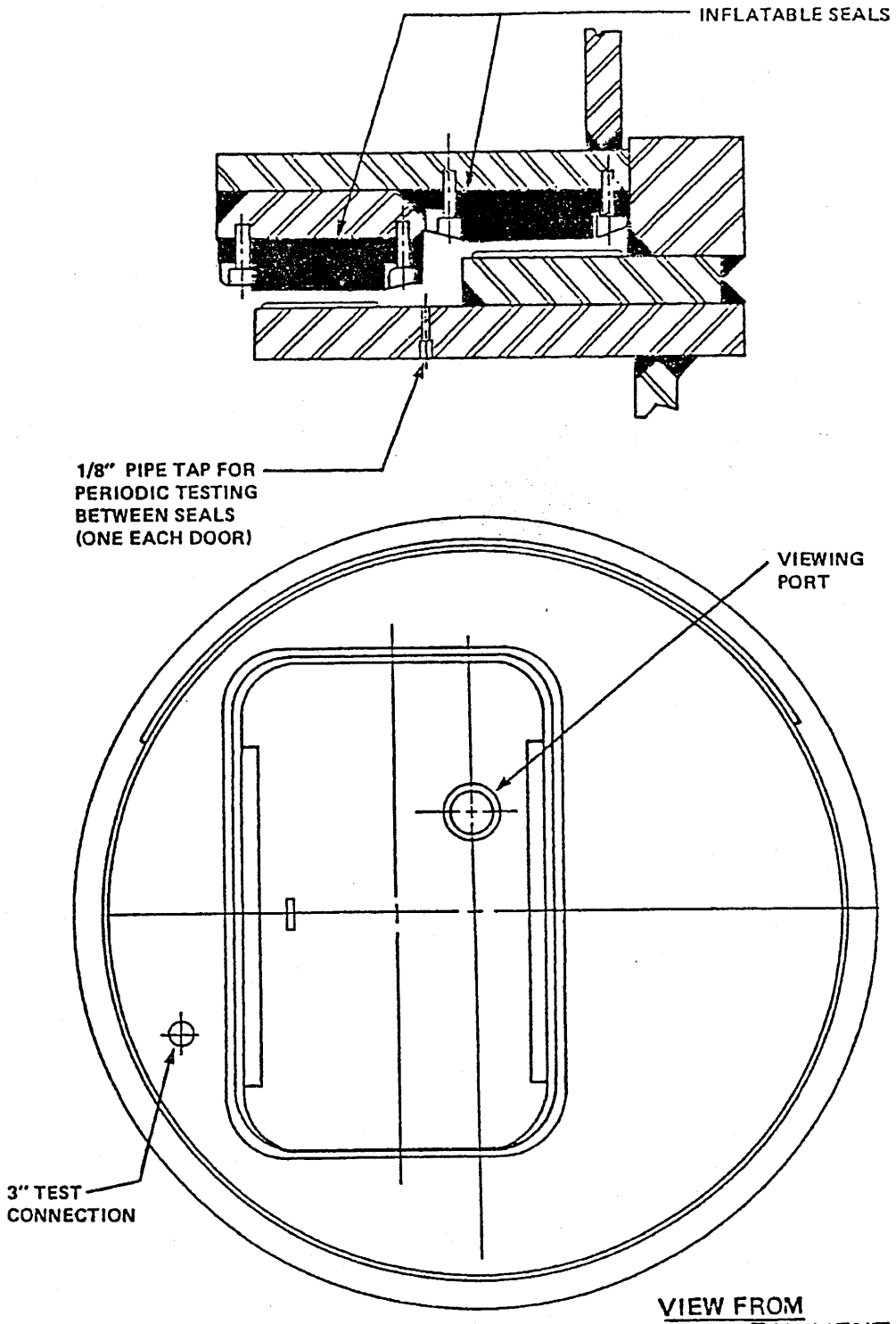
PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

CONTAINMENT INTEGRATED LEAK RATE TESTING SYSTEM FIGURE 6.2-65 (DWG. D-302-0811-00000)

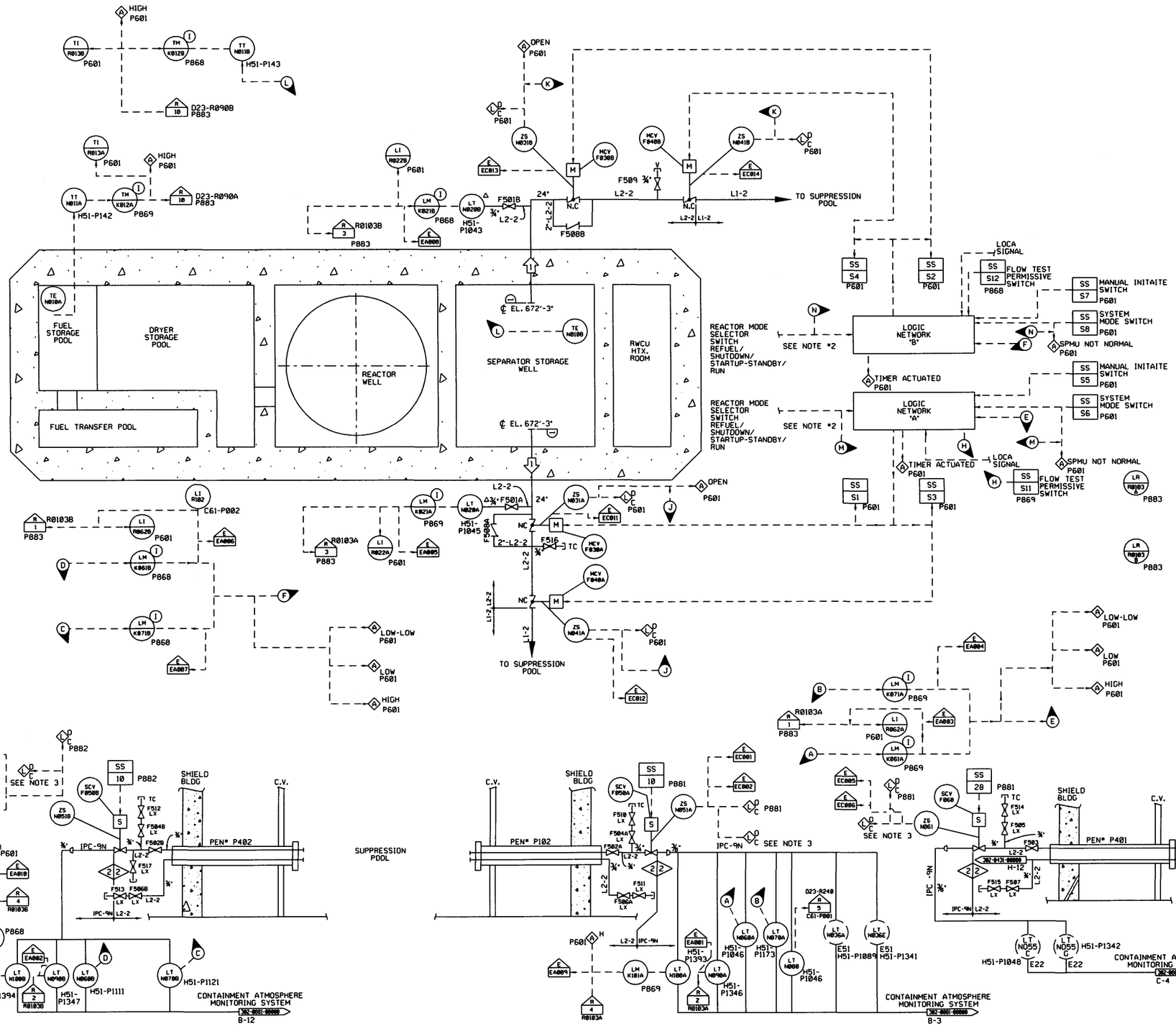


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Details of Personnel Lock for Periodic Testing

Figure 6.2-66



OPERATING DATA

SEE NOTE 7

ID	GPM	PSIG	°F	BY	REMARKS	REV
1	35600	50	180	JET		1

DESIGN DATA

ID	NORMAL PSIG	NORMAL °F	UPSET PSIG	UPSET °F	UPSET TIME	BY	CHKD	REMARKS	REV
1	50	180	50	180	-	JET			

NOTES:

1. ALL PANELS CARRY PREFIX 1H13, UNLESS OTHERWISE NOTED.
2. PROVIDED APPLICABLE PERMISSIVE SIGNALS ARE PRESENT, BOTH MCV'S ARE OPENED AUTOMATICALLY UPON RECEIPT OF THE FOLLOWING: (1) SUPPRESSION POOL LOW-LOW WATER LEVEL SIGNAL FROM EITHER LEVEL SENSOR SIGNAL WITH A LOCA (OR ECCS MANUALLY ACTUATED) SIGNAL. (2) LOCA SIGNAL PLUS 30 MINUTES TIME DELAY.
3. THESE LIGHTS ARE LOCATED ON THE CONTAINMENT/DRYWELL ISOLATION STATUS SECTION OF H13-P601.
4. ALL "A" TRAIN CHANNELS HAVE A COMMON FAILURE ALARM (COMPUTER POINT) AND A COMMON OUT-OF-LIMITS ALARM (COMPUTER POINT). "B" TRAIN CHANNELS ARE IDENTICAL.
5. BOTH MCV'S CAN BE OPENED REMOTE MANUALLY WITH THE MANUAL INITIATE SWITCH, PROVIDED A LOCA SIGNAL IS PRESENT OR ECCS HAS BEEN MANUALLY ACTIVATED.
6. A HIGH ALARM IS PROVIDED ON THE DIV 2 "B" CHANNEL IN THE CONTROL ROOM TO SIGNIFY THAT SUPPRESSION POOL WATER MAY OVERFLOW THE WEIR WALL INTO THE DRYWELL.
7. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA (PRESSURES, TEMPERATURES, AND FLOWS) PROVIDED ON THIS DRAWING, REPRESENTS THE MOST COMMON OPERATING CONDITION AND/OR SYSTEM MODE OF THE OPERATION AND OR LINEUP. TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.

REFERENCES:

302-0881-00000 CONTAINMENT ATMOSPHERE MONITORING SYSTEM D23

302-0431-00000 POST ACCIDENT SAMPLING SYSTEM P87

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT

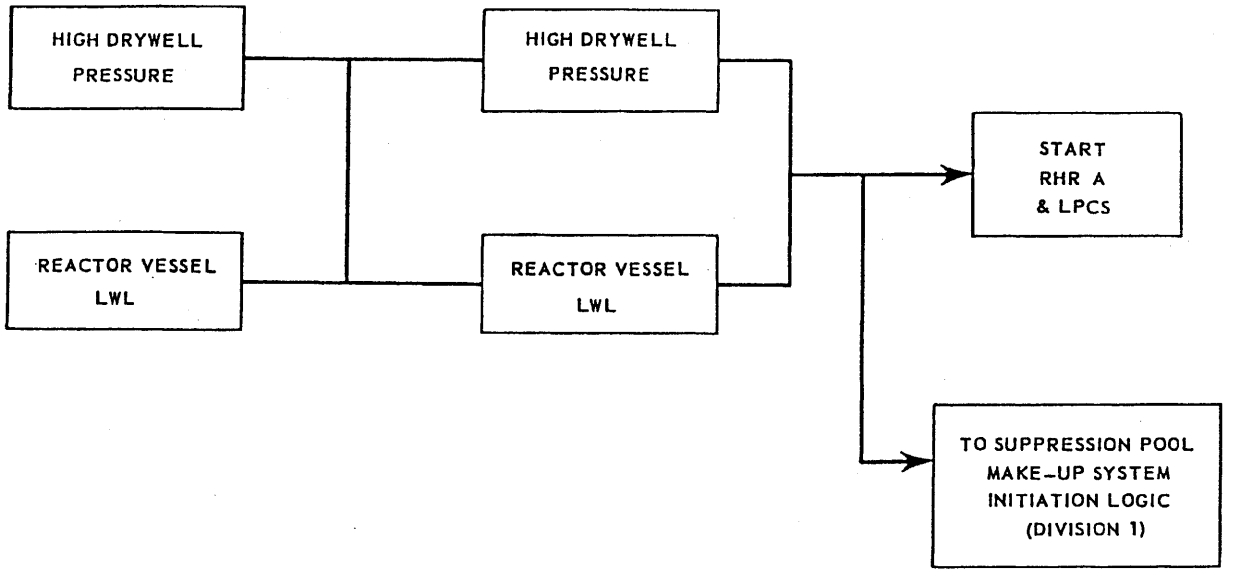
10 CENTER RD., PERRY, OHIO 44081

SUPPRESSION POOL MAKEUP SYSTEM

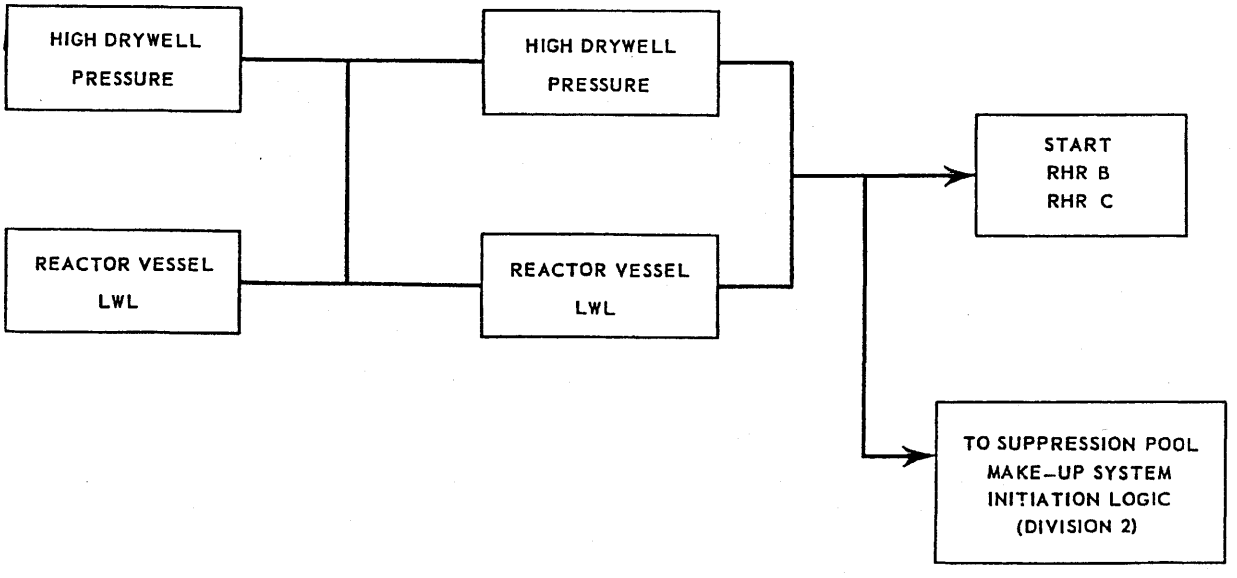
FIGURE 6.2-67

(DWG. D-302-0686-00000)

DIVISION 1



DIVISION 2

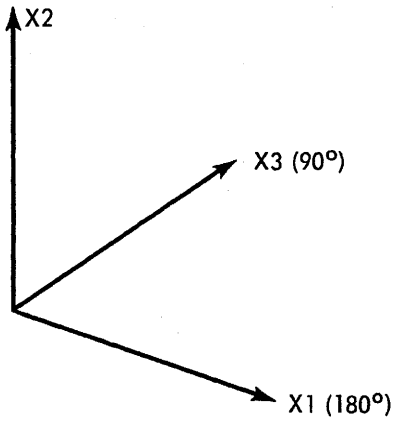


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

LOCA Signal Used in Initiation Logic of Suppression Pool Makeup System

Figure 6.2-68

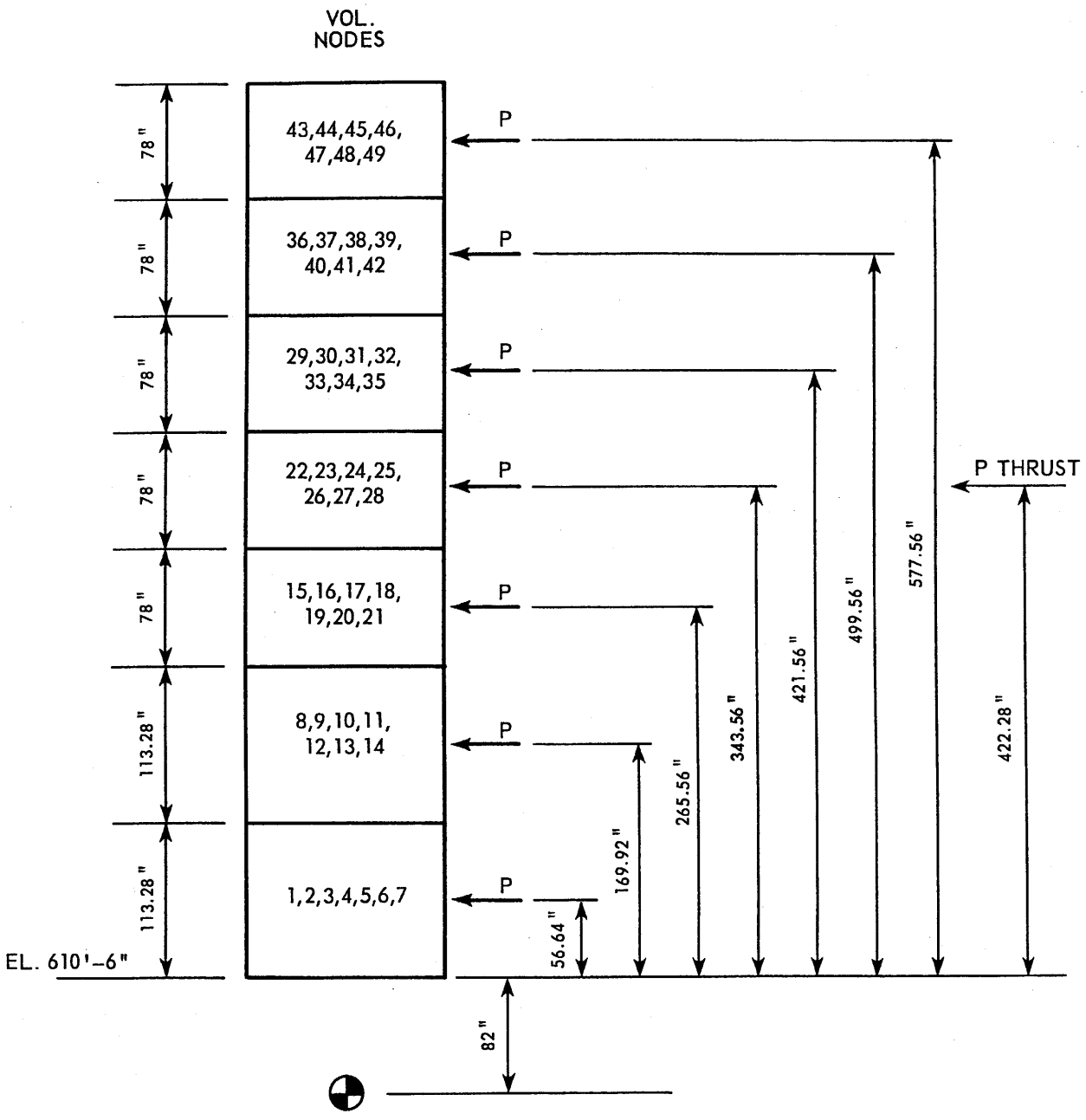


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Right Hand Coordinate System
Used for Bio-Wall Annulus
Pressurization Loadings

Figure 6.2-70

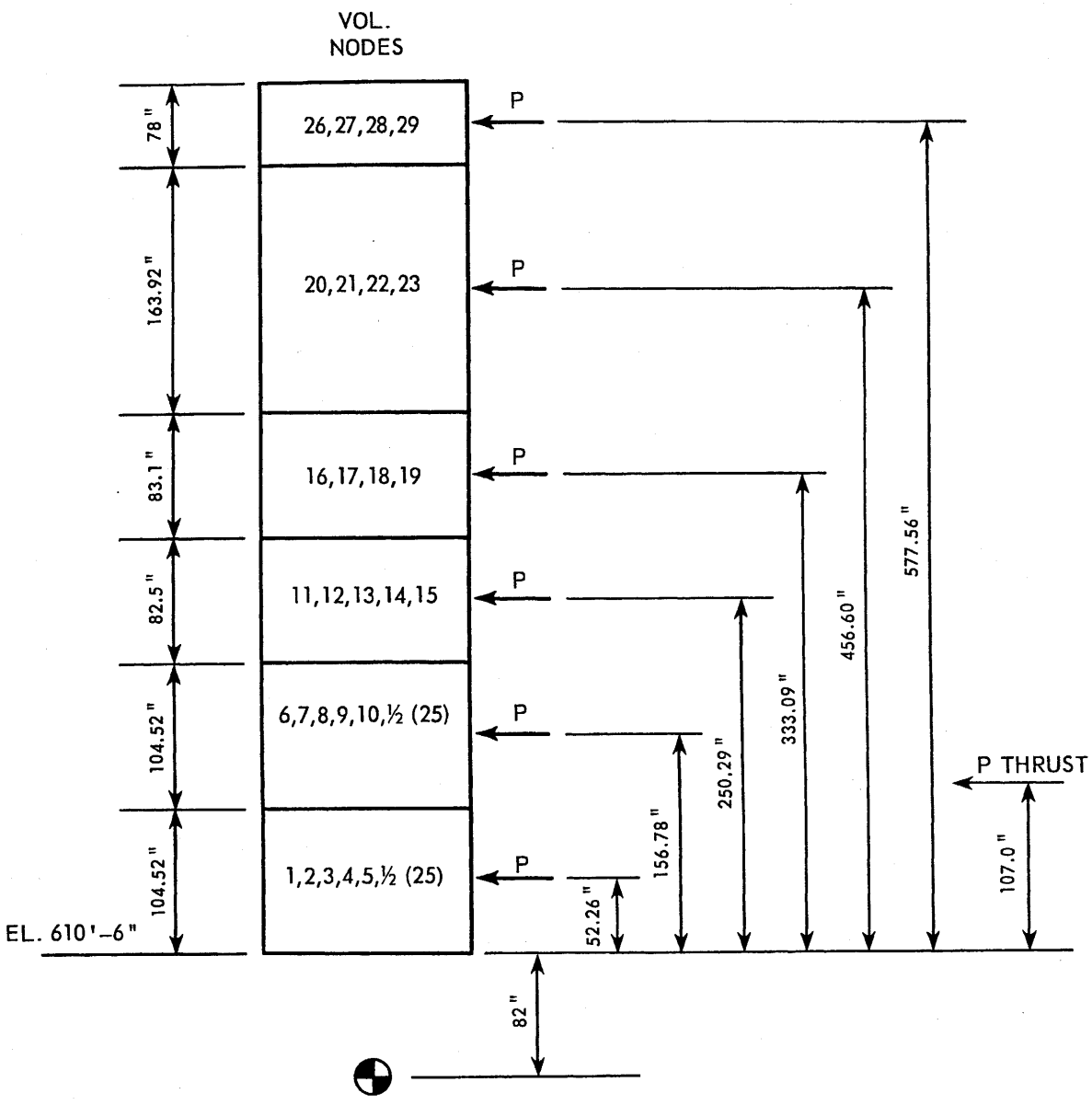


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Force Moment Arms on Bio-Wall
For Annulus Pressurization Due to
Feedwater Line Break

Figure 6.2-71



(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Force Moment Arms on Bio-Wall For Annulus Pressurization Due to Recirc Discharge and Suction Line Breaks

Figure 6.2-72

BREAK	SHEAR (KIPS)	MOMENT (IN-KIP)	TIME STEP (SEC)
FEEDWATER	2713.5	1,123,300.0	0.500
RECIRC. SUCTION	1380.5	286,137.0	0.024
RECIRC. DISCHARGE	1865.4	385,443.0	0.024
RECIRC. DISCHARGE	1652.0	464,821.0	0.400

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Resultant Bio-Wall Forces and Moments Due to Annulus Pressurization

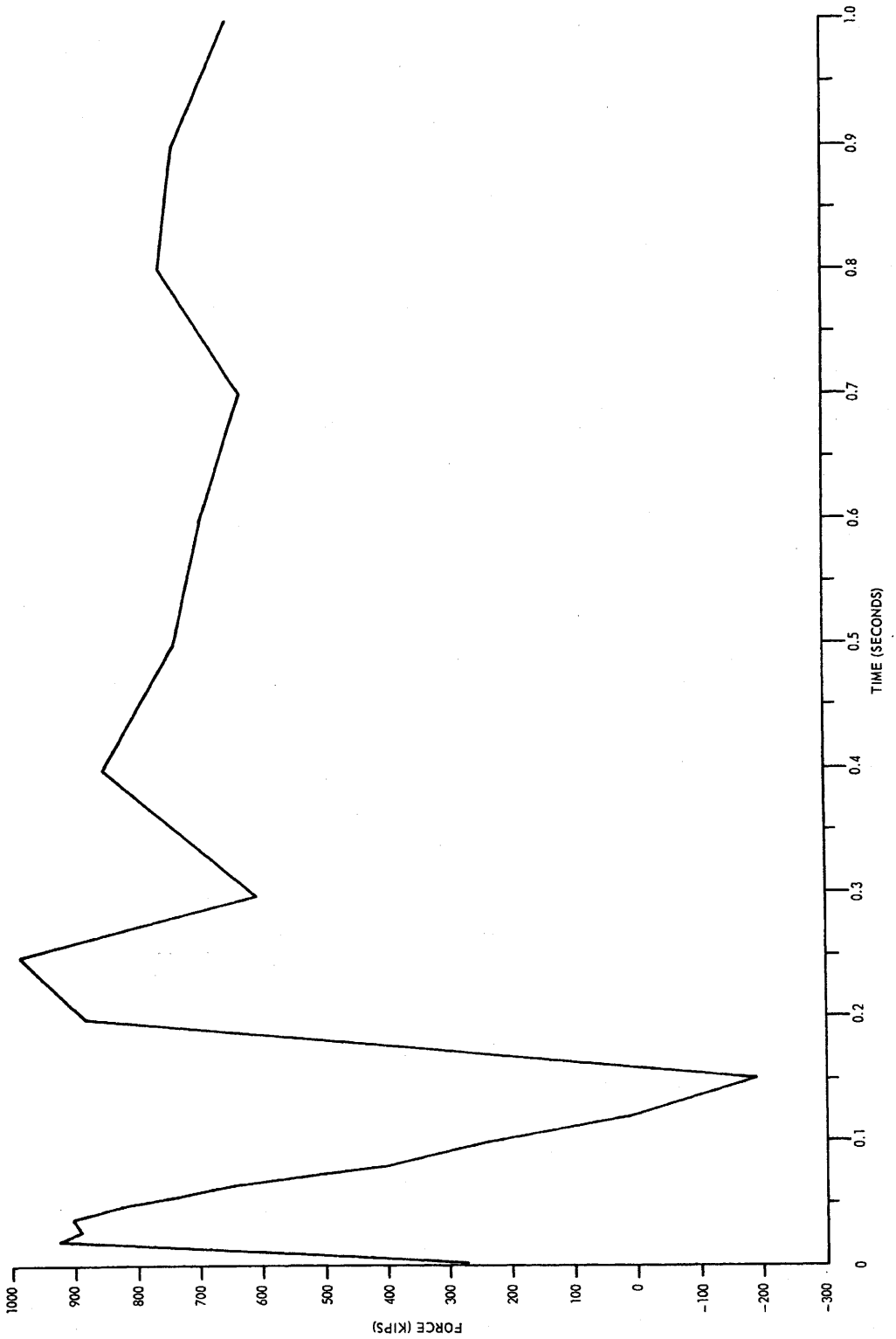
Figure 6.2-73

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Feedwater Line Break Force X1
Bio-Shield Wall

Figure 6.2-74

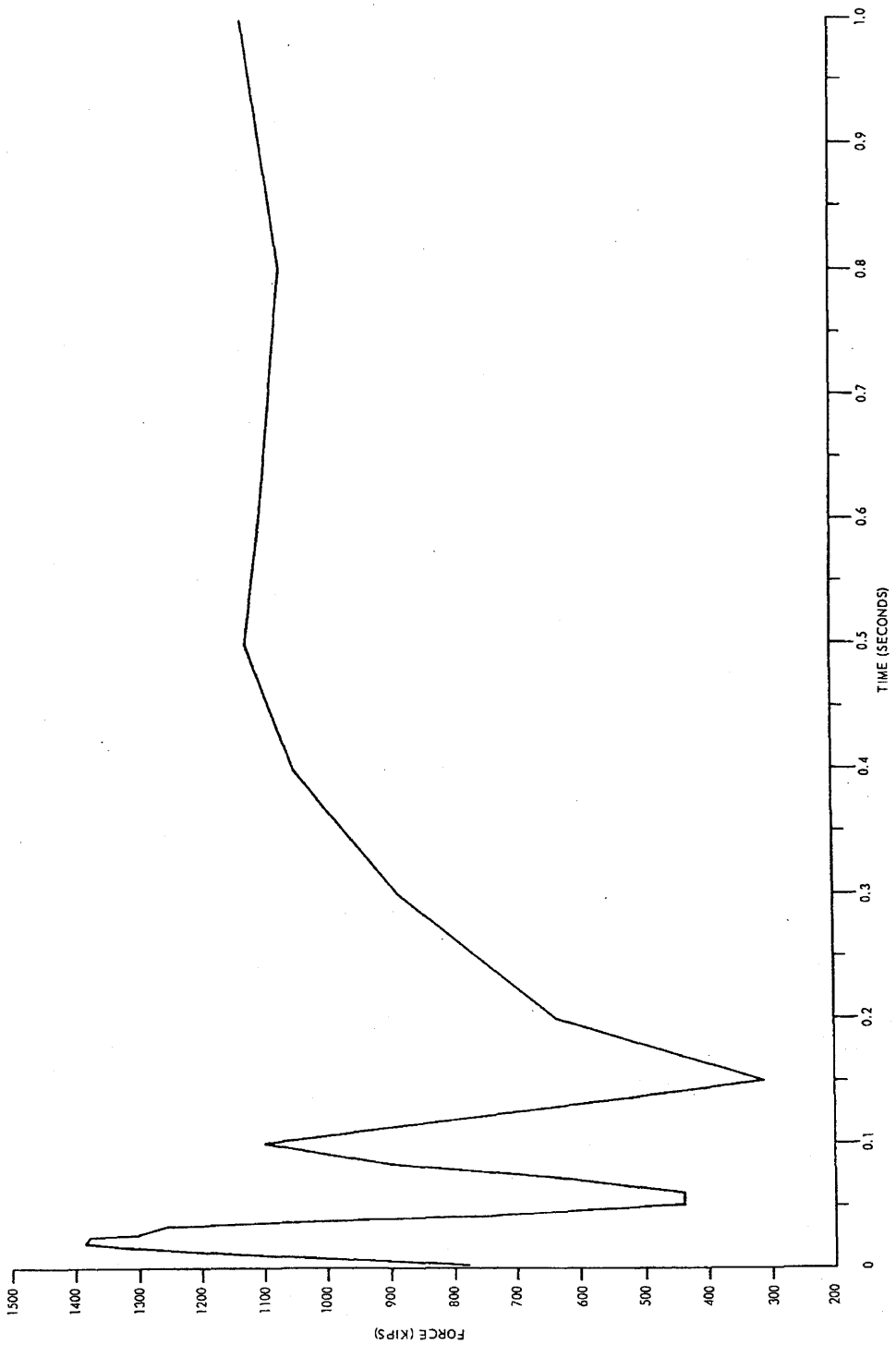


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Feedwater Line Breaks Force X3
Bio-Shield Wall

Figure 6.2-75

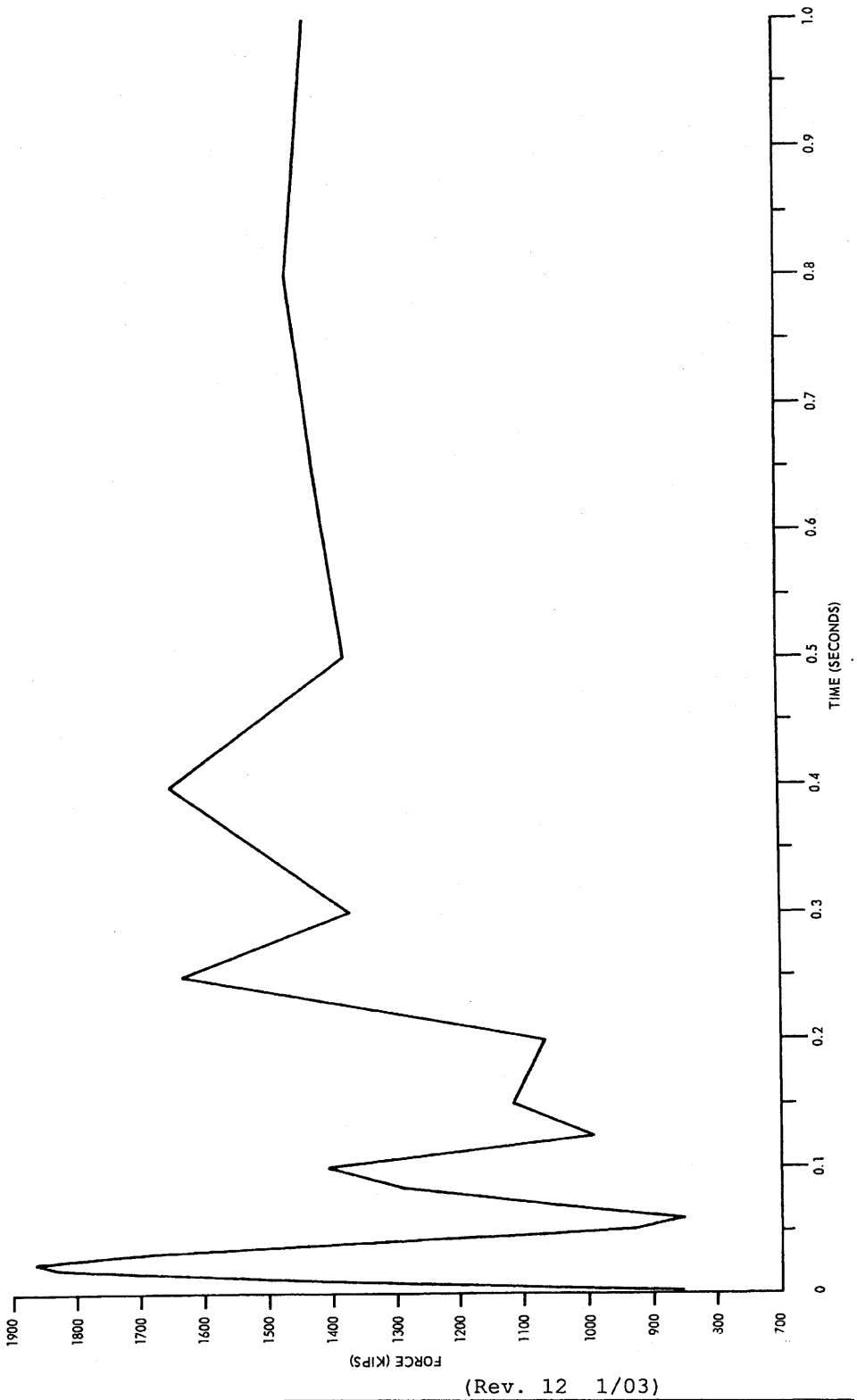


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Recirculation Suction Line Break
Force X1 Bio-Shield Wall

Figure 6.2-76

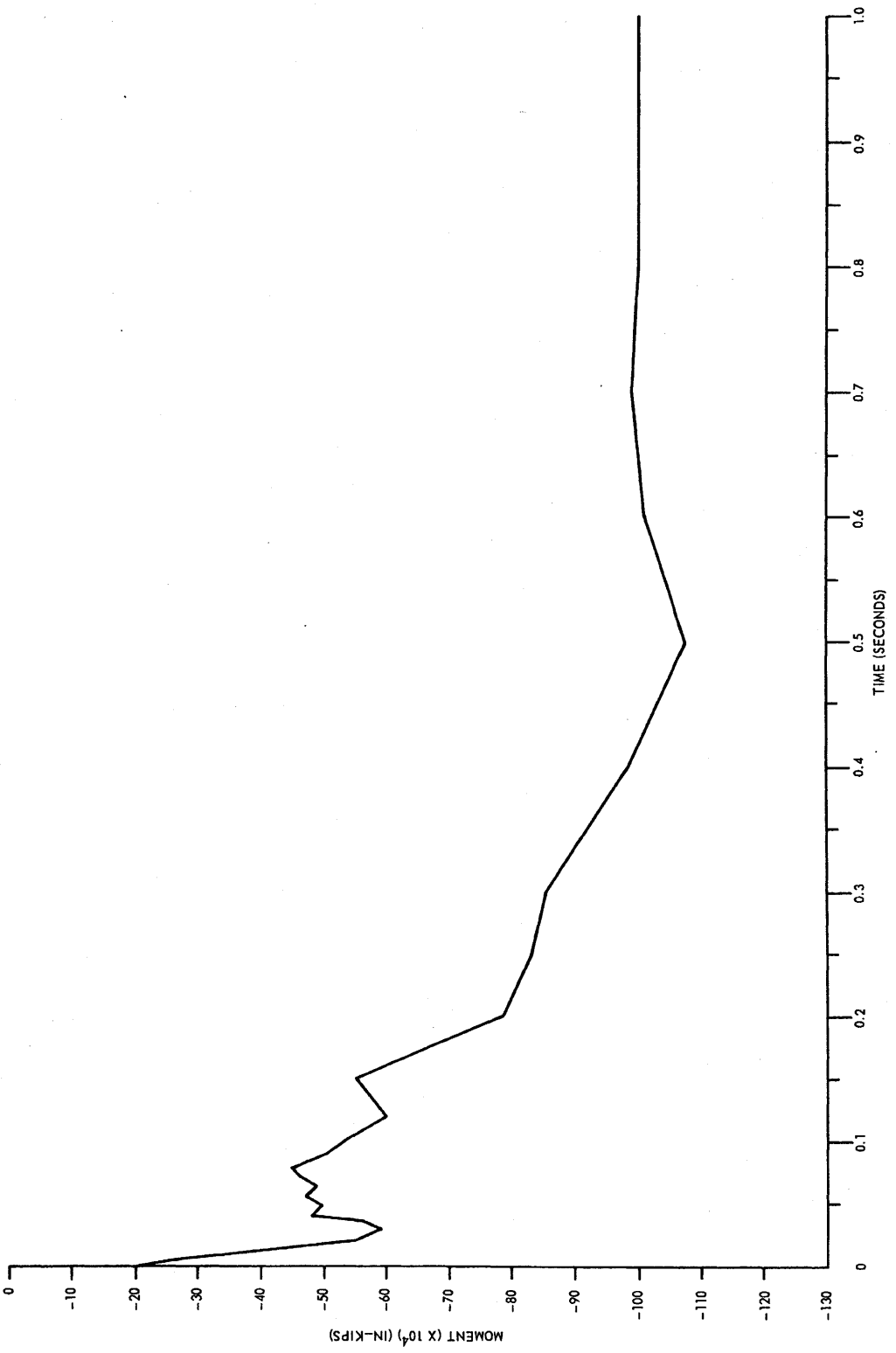


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Recirculation Discharge Line Break
Force X3 Bio-Shield Wall

Figure 6.2-77

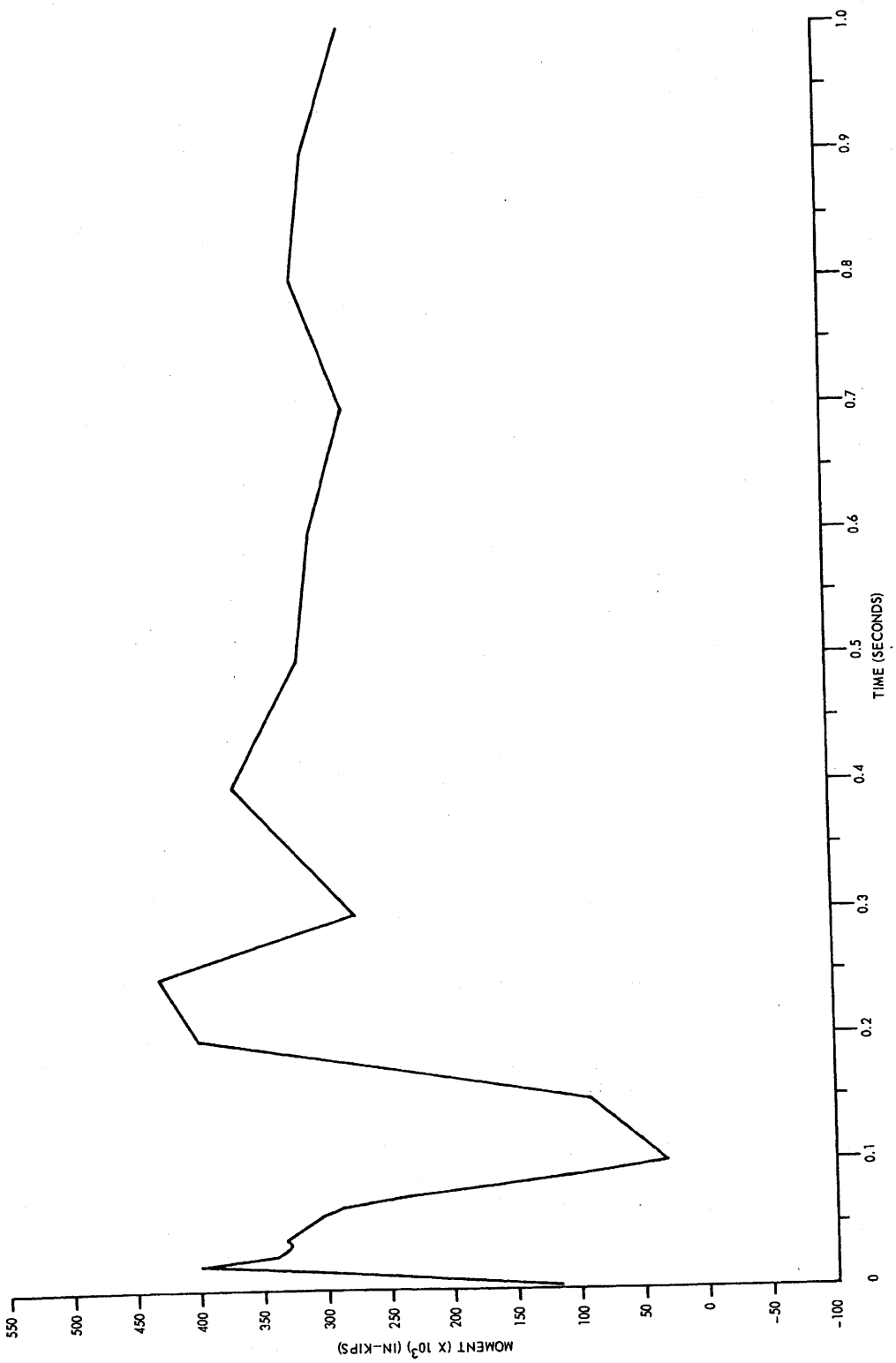


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Feedwater Line Break Moment X1
Bio-Shield Wall

Figure 6.2-78

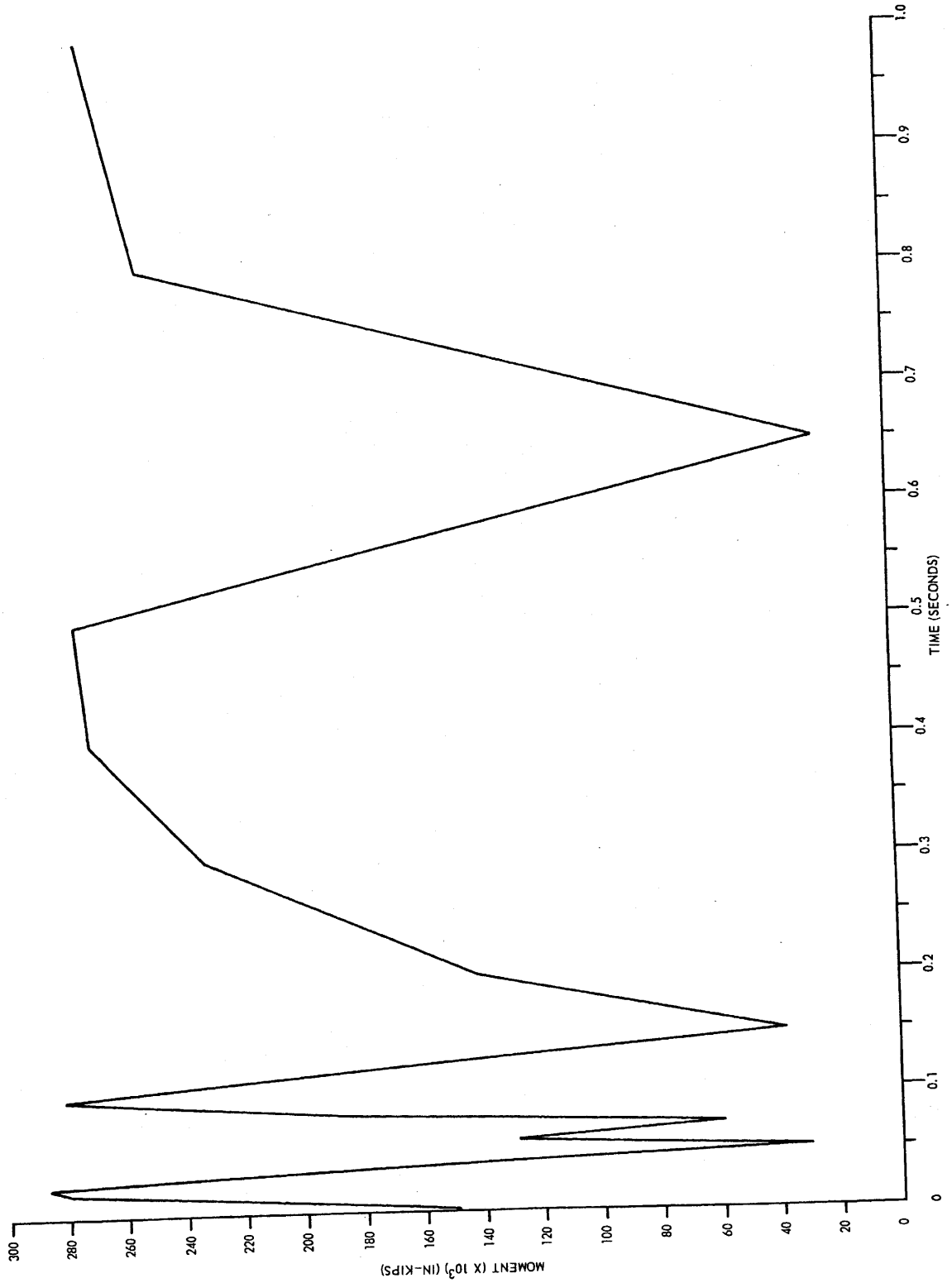


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Feedwater Line Break Moment X3
Bio-Shield Wall

Figure 6.2-79

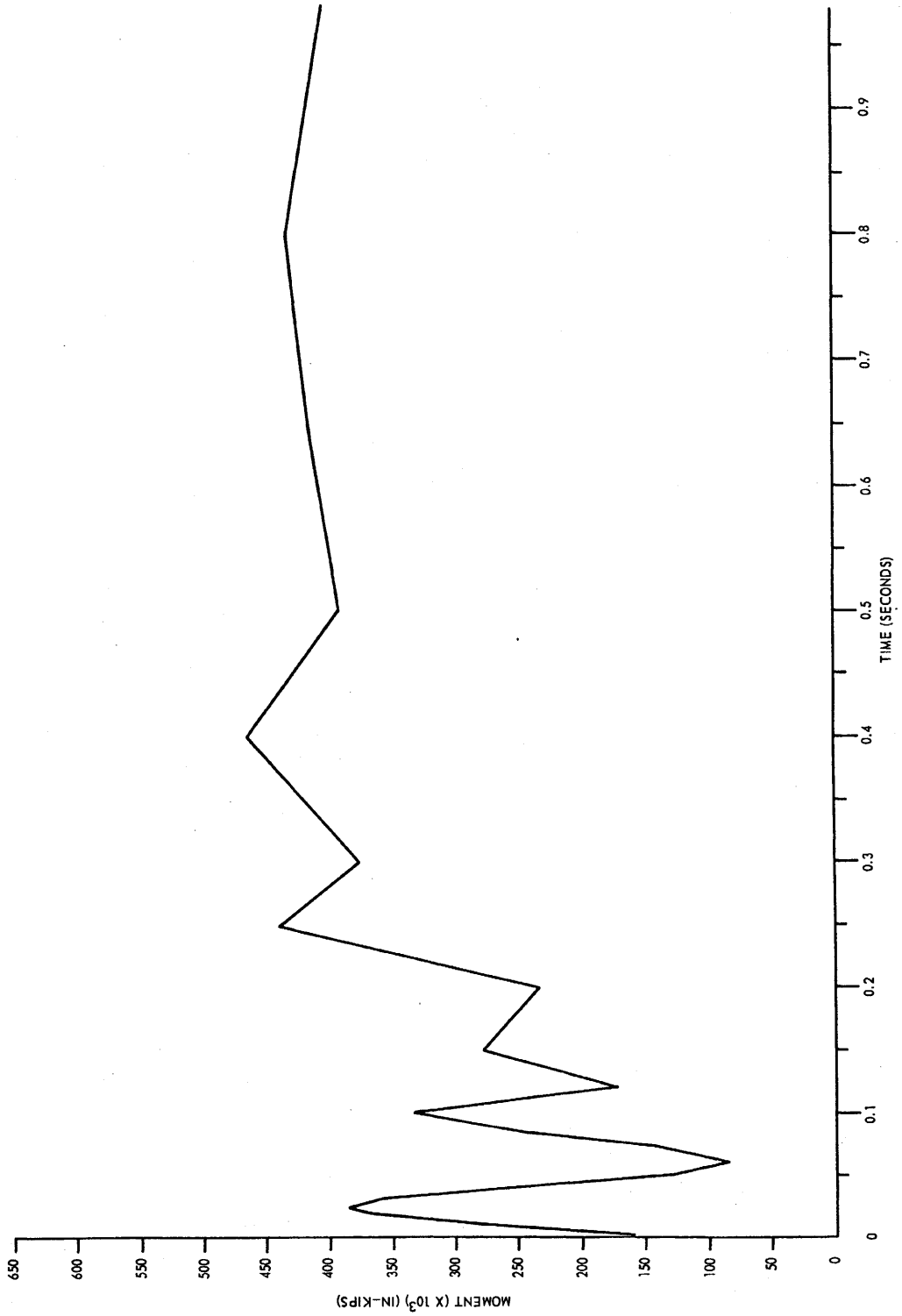


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Recirculation Suction Line Break
Moment At X3 Bio-Shield Wall

Figure 6.2-80

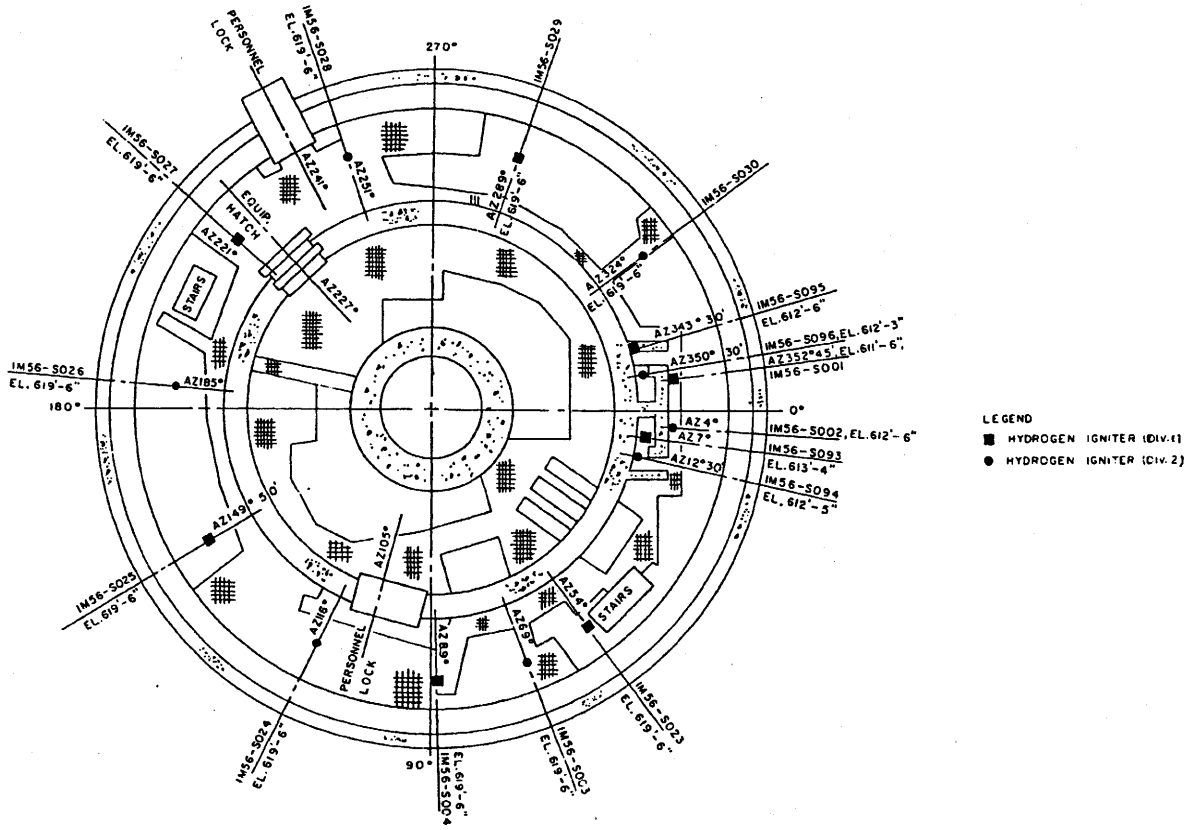


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Recirculation Discharge Line Break
Moment At X1 Bio-Shield Wall

Figure 6.2-81

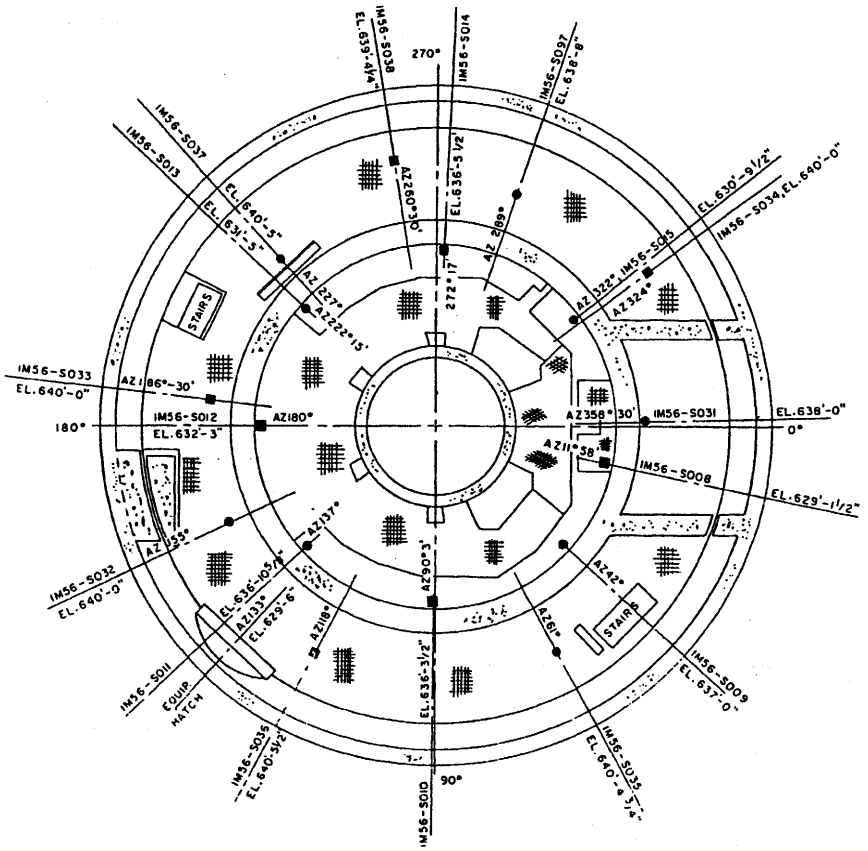


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Essential Equipment Location
Plan El. 599'-9"

Figure 6.2-82 (Sheet 1 of 5)



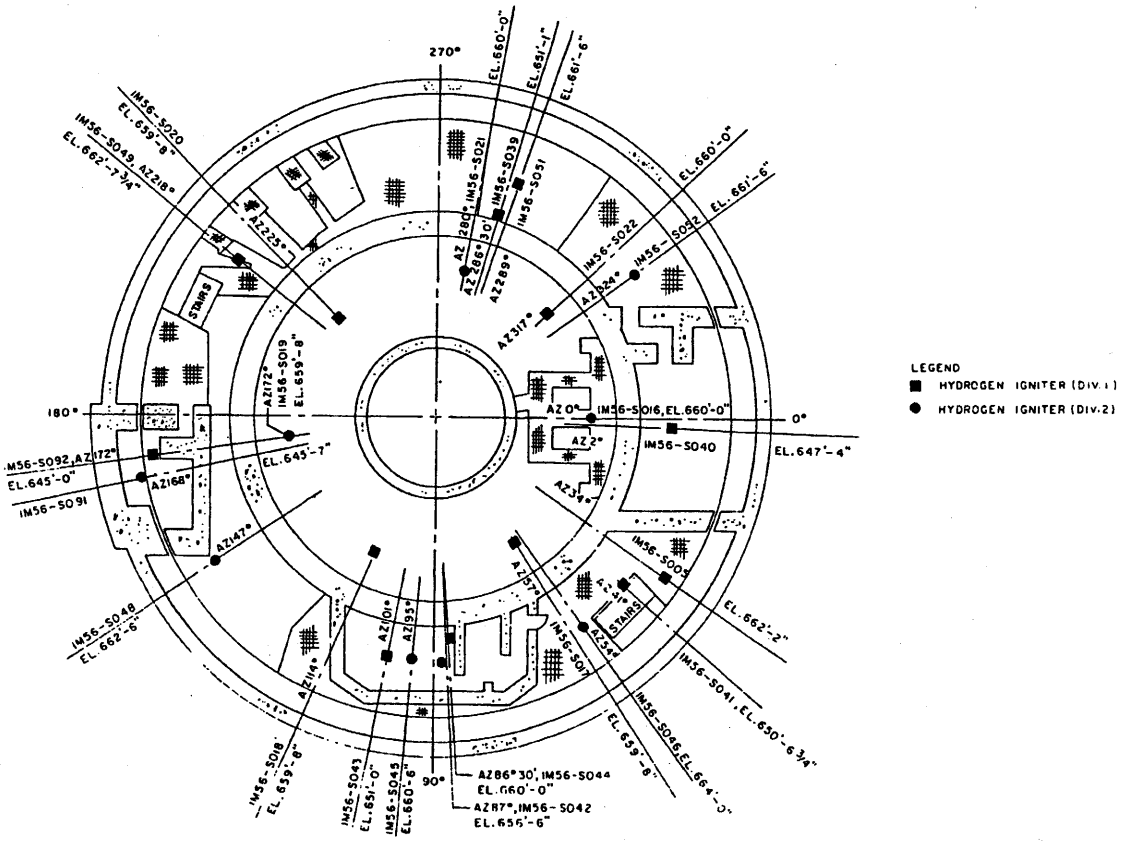
LEGEND
- HYDROGEN IGNITER (DIV 1)
- HYDROGEN IGNITER (DIV 2)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Essential Equipment Location
Plan El. 620′-6″

Figure 6.2-82 (Sheet 2 of 5)

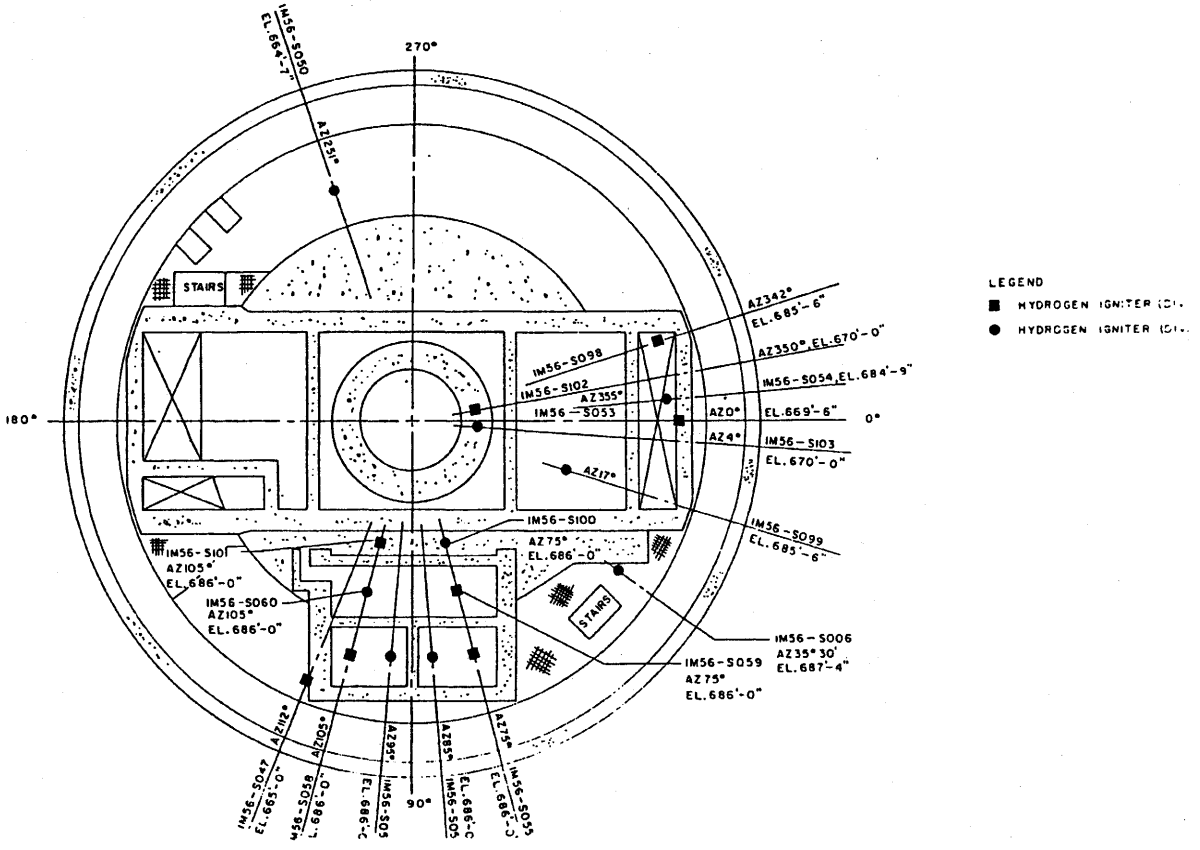


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Essential Equipment Location
Plan El. 642'-0"

Figure 6.2-82 (Sheet 3 of 5)

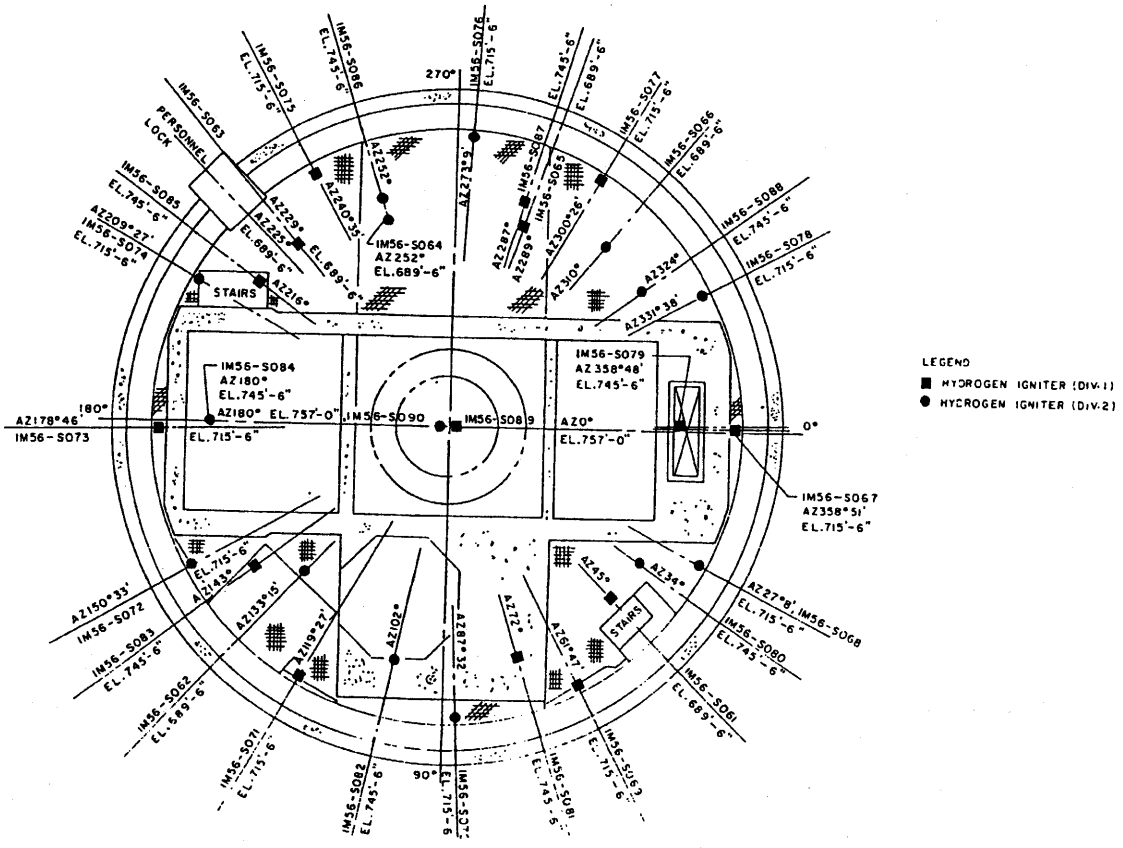


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Essential Equipment Location
Plan El. 664'-7"

Figure 6.2-82 (Sheet 4 of 5)

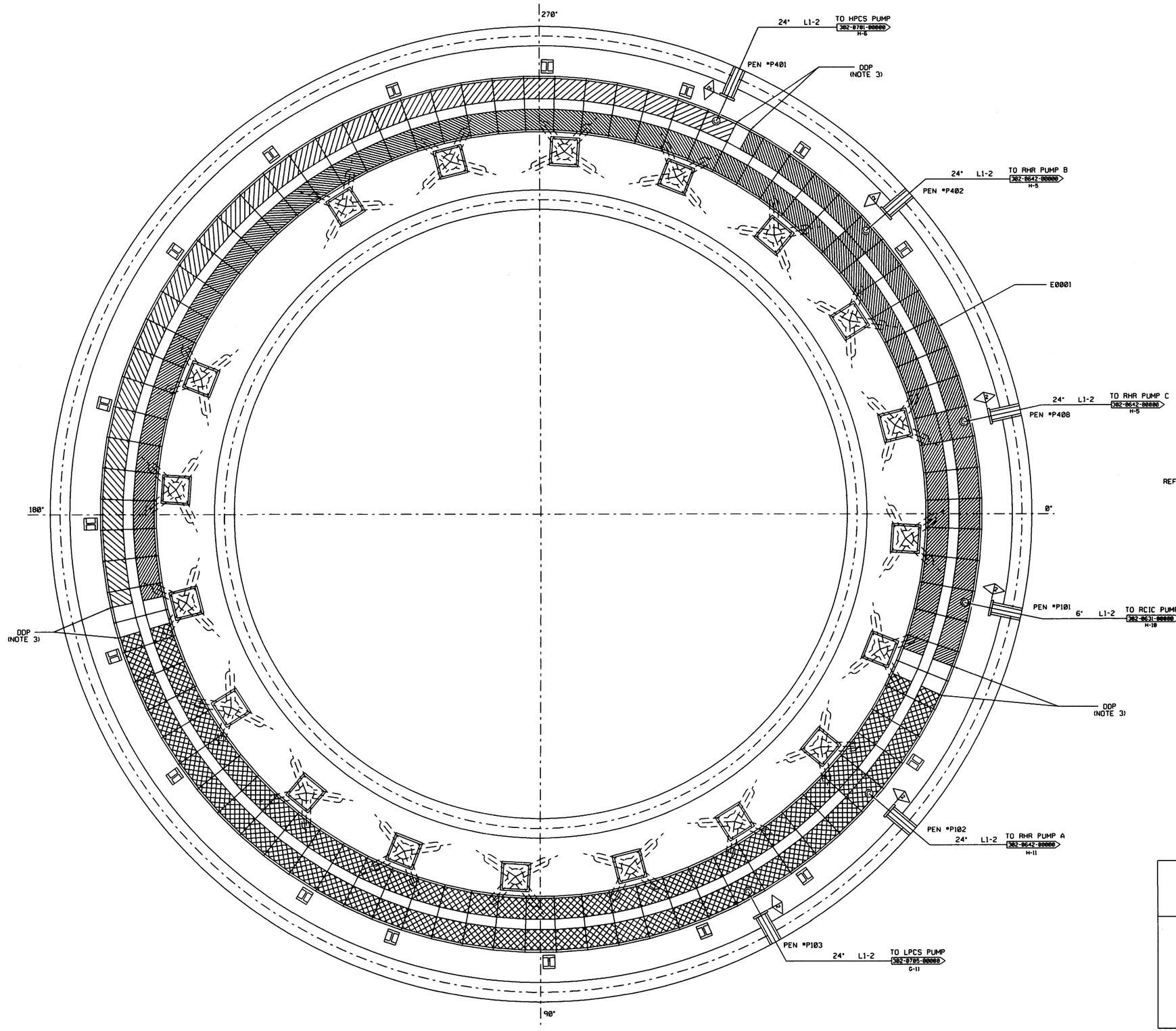


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Essential Equipment Location
Plan El. 689'-6"

Figure 6.2-82 (Sheet 5 of 5)



NOTES:

1. ALL EQUIPMENT IS PREFIXED BY T21, UNLESS NOTED OTHERWISE.
2. STRAINER IS SAFETY RELATED, NON-ASME INSTALLED VIA DCP 960042.
3. DDP = DIVISION DIVIDER PLATE
4. DIVISIONS ARE DEFINED AS FOLLOWS:
   - DIV. 1
   - DIV. 2
   - DIV. 3

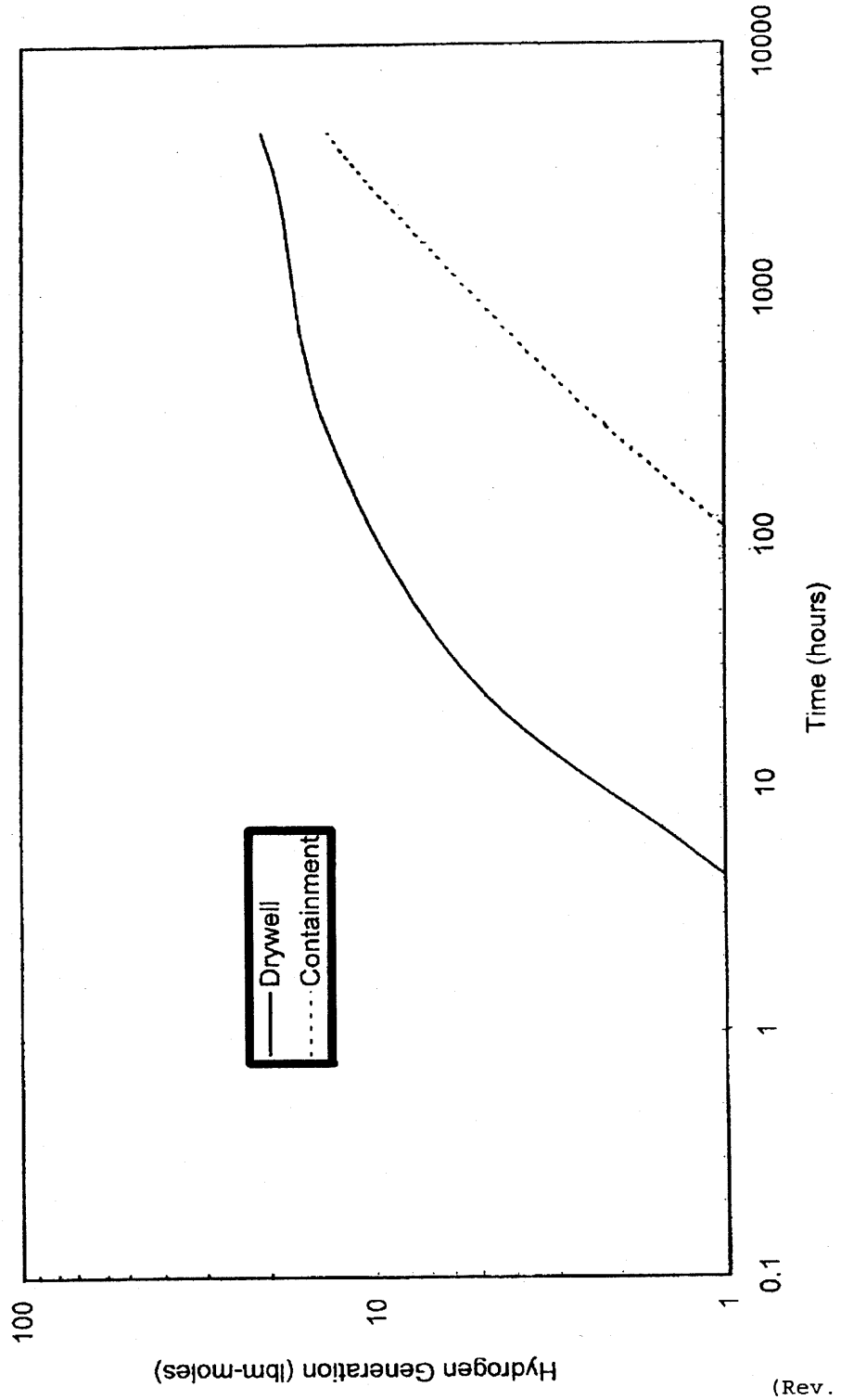
REFERENCES:

302-0642-00000	RHR SYSTEM E12
302-0701-00000	HIGH PRESSURE CORE SPRAY SYSTEM E22
302-0631-00000	REACTOR CORE ISOLATION COOLING SYSTEM E51
302-0705-00000	LOW PRESSURE CORE SPRAY SYSTEM E21
511-0622-00000	ECCS SUCTION STRAINER PLAN

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

ECCS SUCTION
STRAINER
FIGURE 6.2-83
(DWG. D-302-0574-00000)

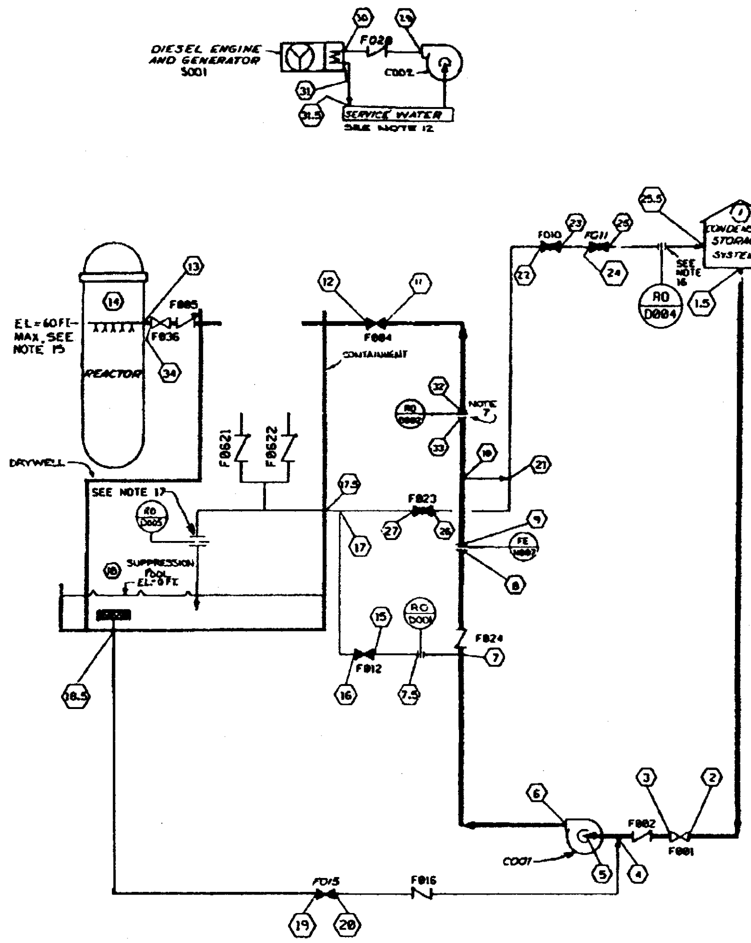


(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

Integrated Hydrogen Production Within Containment and Drywell Due to Corrosion of Zinc (3833 MWc)

Figure 6.2-84



PRIMARY MODES

MODE A ACCIDENT OR RCIC BACKUP, REACTOR AT HIGH PRESSURE, SUCTION FROM CONDENSATE STORAGE

POSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FLOW GPM	N/A	1550	←										→ 1550	N/A
PRESS. PSIA	14.7													1162
TEMP °F	AMB	120/40	←										→ 120/40	AMB
MAX PRESS DIFFERENCE FT					← 2815 →									

SEE NOTE 18

MODE B ACCIDENT, REACTOR AT HIGH PRESSURE, SUCTION FROM SUPPRESSION POOL

POSITION	4	5	6	7	8	9	10	11	12	13	14	19	20	18
FLOW GPM	1550	←								→ 1550	N/A	1550	1550	N/A
PRESS. PSIA											1162			14.7
TEMP °F	120/40	←								→ 120/40	AMB	120/40	120/40	AMB
MAX PRESS DIFFERENCE FT			← 2815 →											

SEE NOTE 18

MODE C ACCIDENT, SYSTEM INJECTION AT RATED CORE SPRAY, SUCTION FROM SUPPRESSION POOL

POSITION	4	5	6	7	8	9	10	11	12	13	14	19	20	18		29	30	31
FLOW GPM NOTE 7	6110	←								→ 6110	N/A	6110	6110	N/A		← SEE NOTE 12 →		
PRESS PSIA											219			14.7				
TEMP °F	212/40	←								→ 212/40	AMB	212/40	212/40	AMB		← SEE NOTE 11 →		
MAX PRESS DIFFERENCE FT		← 900 →			← 21 →			← 1.4 →		← 223 →		← .07 →					← 40 →	

MODE CC ACCIDENT OR RCIC BACK UP, REACTOR AT HIGH PRESSURE (SEE NOTE 19) SUCTION FROM SUPPRESSION POOL

POSITION	18	19	20	4	5	6	7	8	9	10	11	12	13	14	7.5	15	16	17	17.5
FLOW GPM	N/A	1117	←				→ 1117	517	←				→ 517	N/A	600	←			→ 600
PRESS PSIA	14.7													1215					
TEMP °F	AMB	120/40	←										→ 120/40	AMB	120/40	←			→ 120/40
MAX PRESS DIFFERENCE FT					← 2811 →											← 1.6 →			

SEE NOTE 19

MODE E ACCIDENT, SYSTEM INJECTION AT RATED CORE SPRAY, SUCTION FROM CONDENSATE STORAGE

POSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FLOW GPM NOTE 7	N/A	6110	←										→ 6110	N/A
PRESS PSIA	14.7	NOTE 5			NOTE 6									215
TEMP °F	AMB	180/40	←										→ 180/40	AMB
MAX PRESS DIFFERENCE FT		← .4 →			← 900 →			← 21 →			← 1.4 →		← 223 →	

MODE F ACCIDENT, SYSTEM OPERATING AT RUNOUT, SUCTION FROM SUPPRESSION POOL

POSITION	4	5	6	7	8	9	10	11	12	13	14	19	20	18
FLOW GPM NOTE 7	7800	←								→ 7800	N/A	7800	7800	N/A
PRESS PSIA		SEE NOTE 5									14.7			14.7
TEMP °F	212/40	←								→ 212/40	AMB	212/40	212/40	AMB
MAX PRESS DIFFERENCE FT		← 564 →										← 8.1 →		

MODE G SYSTEM TEST, SUCTION FROM SUPPRESSION POOL

POSITION	4	5	6	7	8	9	10	21	26	27	17	19	20	18
FLOW GPM	7800	←											→ 7800	N/A
PRESS PSIA	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	14.7
TEMP. °F	120/40	←											→ 120/40	AMB
MAX PRESS DIFFERENCE FT		← 564 →							← 48 → SEE NOTE 8					

MODE H SYSTEM TEST, SUCTION FROM CONDENSATE STORAGE

POSITION	1	2	3	4	5	6	7	8	9	10	21	22	23	24	25
FLOW GPM	N/A	6110	←												→ 6110
PRESS PSIA	14.7	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠
TEMP °F	AMB	120/40	←												→ 120/40
MAX PRESS DIFFERENCE FT					← 900 →							← 12 → NOTE 8		← 12 → NOTE 8	

TABLE I
VALVE POSITION TABLE

VALVE	F001	F004	F010	F011	F012	F015	F023	F036
MODE A	O	O	C	C	C	C	C	O
MODE B	C	O	C	C	C	O	C	
MODE C	C	O	C	C	C	O	C	
MODE CC	C	O	C	C	O	O	C	
MODE E	O	O	C	C	C	C	C	
MODE F	C	O	C	C	C	O	C	
MODE G	C	C	C	C	C	O	O	
MODE H	O	C	O	O	C	C	C	
MODE J	O	C	C	C	O	C	C	
MODE S	O	C	C	C	C	C	C	O

O-VALVE OPEN
C-VALVE CLOSED

TABLE II
LIMITING LINE LOSS

MODE	FLOW PATH	COMMENT
F	18.5-19-20-4-5	SEE NOTE 5
E	1.5-2-3-4	SEE NOTE 6
C OR E	6-7-8-9-10-11-12-13	
J	7-15-16-17	
H	21-22-23-24-25-25.5	
G	10-21-26-27-17-17.5	

MODE J PUMP OPERATING ON BYPASS, SUCTION FROM CONDENSATE STORAGE

POSITION	1	2	3	4	5	6	7	15	16	17	18
FLOW GPM	N/A	600	←					SEE NOTE 9		→ 600	N/A
PRESS PSIA	14.7	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	14.7
TEMP. °F	AMB	120/40	←							→ 120/40	AMB
MAX PRESS DIFFERENCE FT					← 3450 →			← 1.6 →			

MISCELLANEOUS INFORMATION
(SEE NOTE 10)

LINE	LOCATION	DESIGN TEMP (°F)	DESIGN PRESS (PSIG)	ESTIMATED LINE SIZE (IN.)
CONDENSATE STG SUCTION	1.5 2 4	140 / 212	100	16
SUPPRESS POOL SUCTION	18.5 4 5	212	100	24
MAIN HPCS LINE TO REACTOR	6 11 12 34 13	212 / 575 / * / 575	1575 / 1575 / * / 1250	16 / 12 / 12 / 12
BY-PASS LINE	7 16 17	212	1575 / 100	4
SUPPRESS POOL TEST LINE	10 27 17.5	212	1575 / 100	12
CONDENSATE STORAGE TEST RETURN LINE	21 25 25.5	212 / 140	1575 / 100	10
DIESEL COOL. WATER LINE	29 30 31 31.5	100 / DIESEL HEAT EXCHANGER / 130	100 / 100	5 / 5

* DUAL DESIGN CONDITIONS
1250 PSI @ 575° F AND
1575 PSI @ 140° F

MODE S SYSTEM ON STANDBY DUTY

POSITION	1	2	3	4	5	6	7	8	9	10	11	12	13	14
FLOW GPM	N/A	0	←										→ 0	N/A
PRESS PSIA	14.7	⊠	⊠	⊠		⊠	⊠	⊠	⊠	⊠	⊠	⊠	⊠	[illegible]
TEMP.	AMB	120/40	←							→ 120/40	AMB	←	→	AMB
MAX PRESS DIFFERENCE FT					← 0 →									

NOTES:

1. ALL EMPTY PRESSURE DATA BLANKS CAN BE FILLED IN BY OTHERS BASED ON ACTUAL ARRANGEMENT OR EQUIVALENT HYDRAULIC DATA SUBMITTED TO GE. ⊠ INDICATES DATA IS NOT SIGNIFICANT.
2. ◸ INDICATES MAXIMUM AND MINIMUM VALUE OF PARAMETER FOR THE MODE SPECIFIED.
3. ELEVATIONS ARE NOT INCLUDED IN ΔP VALUES GIVEN. ELEVATIONS SHALL BE INCLUDED WHEN DETERMINING FINAL VALUES FOR EMPTY PRESSURE DATA BLANKS.
4. THE PUMP MAXIMUM SHUTOFF HEAD WILL NOT EXCEED 3500 FT.
5. IN MODE F, AT THE FLOW SPECIFIED, THE NET POSITIVE SUCTION HEAD (NPSH) AVAILABLE AT A REFERENCE LOCATION 3 FEET ABOVE THE PUMP MOUNTING FLANGE MUST EQUAL OR EXCEED 4.5 FEET. THE NPSH AVAILABLE AT THE PUMP SUCTION NOZZLE MUST EQUAL OR EXCEED THIS VALUE PLUS THE DIFFERENCE IN ELEVATION BETWEEN THE REFERENCE LOCATION AND THE CENTERLINE OF THE PUMP SUCTION NOZZLE.
6. IN MODE E AND AT FLOW RATE OF 7800 GPM, THE AVAILABLE NPSH MUST EQUAL OR EXCEED THE VALUE SPECIFIED IN NOTE 5 FOR MODE F.
7. THE ΔP BETWEEN LOCATIONS 32 AND 33 WILL BE DETERMINED IN PRE-OPERATIONAL TEST. THE ΔP WILL BE ADJUSTED SUCH THAT:
   (A) THE FLOW SPECIFIED FOR MODES C AND E ARE EQUALED OR EXCEEDED AT THE REACTOR PRESSURE SPECIFIED.
   (B) THE FLOW IN MODE F IS LESS THAN OR EQUAL TO THE FLOW SPECIFIED WITH A REACTOR PRESSURE OF 14.7 PSIA.
   (C) THE FLOW IN MODE E IS EQUAL TO OR LESS THAN 7800 GPM WITH A VESSEL PRESSURE OF 14.7 PSIA AND A PUMP TDH OF 564 FT.
   (D) THE FLOW IN MODES E AND F WITH A VESSEL PRESSURE OF 14.7 PSIA IS LESS THAN OR EQUAL TO THE MAXIMUM FLOW THAT THE PUMP HAS BEEN TESTED TO BY THE PUMP SUPPLIER.
   (E) THE FLOW IS LESS THAN OR EQUAL TO A VALUE THAT ASSURES ADEQUATE NPSH TO THE PUMP FOR MODES E AND F AT A VESSEL PRESSURE OF 14.7 PSIA AS DETERMINED FROM THE NPSH PERFORMANCE TEST DATA.
   (F) THE FLOW IN MODES E AND F WITH A VESSEL PRESSURE OF 14.7 PSIA IS LESS THAN OR EQUAL TO THE MAXIMUM ALLOWABLE PUMP FLOW RATE SPECIFIED IN THE PUMP INSTRUCTION MANUAL (IF ANY UPPER LIMIT IS SPECIFIED).
8. THE ΔP GIVEN FOR THE VALVES IN MODES G AND H ARE THE MINIMUM POSSIBLE AND MAY BE INCREASED BY PIPING DESIGNER (THROTTLING) TO ACOMMODATE PIPING ARRANGEMENT.
9. THE BYPASS FLOW SPECIFIED IN MODE J IS APPROXIMATE AND WILL BE SPECIFIED BY THE PUMP VENDOR.
10. PIPING SYSTEM DESIGN PRESSURE AND TEMPERATURE AND THE ESTIMATED LINE SIZES ARE FOR INFORMATION ONLY. ACTUAL DESIGN TEMPERATURE AND PRESSURE AND LINE SIZES AS DETERMINED BY PIPING DESIGNER SHALL MEET THE PROCESS DIAGRAM HYDRAULIC REQUIREMENTS.
11. THE TEMPERATURE RANGE AT LOCATION ⟨29⟩ AND ⟨30⟩ IS EQUAL TO THE TEMPERATURE RANGE OF THE SERVICE WATER AVAILABLE TO THE HPCS DIESEL GENERATOR. THE TEMPERATURE AT LOCATION ⟨31⟩ CAN BE AS HIGH AS 30° F GREATER THAN THE MAXIMUM SERVICE WATER TEMPERATURE AND AS LOW AS THE LOWEST SERVICE WATER TEMPERATURE.
12. THE DIESEL SERVICE WATER FLOW RATE IS A FUNCTION OF MAXIMUM SITE SERVICE WATER TEMPERATURE AS SPECIFIED IN THE DATA SHEETS OF HPCS SYSTEM.
13. ΔP VALUES FOR EQUIPMENT WITHIN G.E. SCOPE AS NOTED.
14. TABLE I INDICATES VALVE POSITION DURING VARIOUS OPERATING MODES.
15. THE DIFFERENCE IN ELEVATION BETWEEN THE MINIMUM WATER LEVEL OF THE SUPPRESSION POOL AFTER LOCA FOLLOWING POOL PUMP DOWN AND THE CORE SPRAY SPARGER SHALL NOT EXCEED 60 FEET.
16. IT IS RECOMMENDED THAT THIS ORIFICE BE INSTALLED IF IT IS REQUIRED TO LIMIT FLOW TO 6110 GPM IN MODE H WHEN VALVES F010 AND F011 ARE FULLY OPEN.
17. IT IS RECOMMENDED THAT THIS ORIFICE BE INSTALLED IF IT IS REQUIRED TO LIMIT FLOW IN MODE G TO THE VALUE SPECIFIED OR TO THE MAXIMUM FLOW PERMITTED BY NOTE 7(D), 7(E), OR 7(F) WHEN VALVE F023 IS FULLY OPEN.
18. FOR MODES A AND B ONE THIRD OF THE FLOW SPECIFIED SHALL BE DELIVERED TO THE REACTOR VESSEL WITH THE REACTOR VESSEL PRESSURE AT 1215 PSIA AND THE LOW FLOW BYPASS VALVE (E22-F012) OPEN.
19. THE FLOW SPECIFIED FOR MODE CC MUST BE EQUALED OR EXCEEDED WITH SUCTION FROM THE CONDENSATE STORAGE SYSTEM AND WITH THE REACTOR PRESSURE EQUAL TO 1215 PSIA.

REFERENCES:

A42-1010 PIPING AND INSTRUMENT SYMBOLS DRAWING

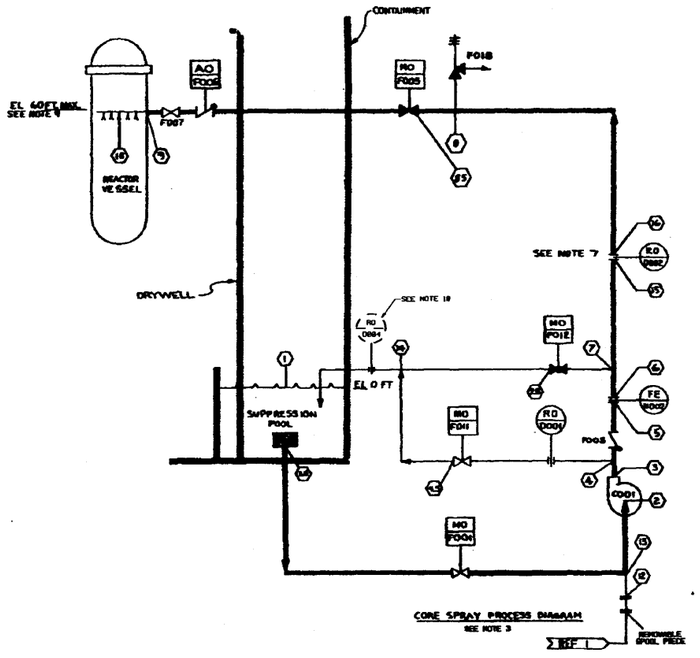
GENERAL ELECTRIC INFORMATION REFER TO
DESIGN SPECIFICATION DSP-E22-1-4549-00
PERRY PROCESS DIAGRAM

(Rev. 15 10/07)

PERRY NUCLEAR POWER PLANT

High Pressure Core Spray System
Process Diagram

Figure 6.3-1



MODE A — SYSTEM TEST, SUCTION FROM SUPPRESSION POOL

LOCATION	1	2	3	4	5	6	7	8	9	10		12	13	14
FLOW - GPM	N/A	7600	→				→	7600	0	0	0	0	0	7600
PRESS - PSIA	14.7	X	X	X	X	X	X	X	X	X	X	X	X	
TEMP - °F	120/40	→					→	220/40	AMB	→		→	AMB	220/40
MAX. PRESS DIFFERENCE - FEET		"645"												

MODE B — SYSTEM TEST, SUCTION FROM RESIDUAL HEAT REMOVAL SYSTEM

LOCATION	1	2	3	4	5	6	7	8	9	10		12	13	14
FLOW - GPM	N/A	8960	→						→	8960		8960	8960	0
PRESS - PSIA	14.7	X	X	X	X	X	X	X	X	14.7		X	X	X
TEMP - °F	N/A	125/40	→						→	125/40		125/40	125/40	AMB
MAX. PRESS DIFFERENCE - FEET		"649"												

SEE NOTE 6 & 7

MODE C — PUMP OPERATING ON BYPASS, SUCTION FROM SUPPRESSION POOL

LOCATION	1	2	3	4	5	6	7	8	9	10		12	13	14
FLOW - GPM SEE NOTE 4	N/A	1200	1200	1200	0	0	0	0	0	0		0	0	1200
PRESS - PSIA	14.7	X	X		X	X	X	X	X	X		X	X	
TEMP - °F	212/40	→		→	212/40	AMB	→					→	AMB	212/40
MAX. PRESS DIFFERENCE - FEET		1233/180												

MODE D — ACCIDENT, SYSTEM INJECTION AT RATED CORE SPRAY (100 PSID)

LOCATION	1	2	3	4	5	6	7	8	9	10
FLOW - GPM	N/A	6110	→							→ 6110
PRESS - PSIA	14.7									142.7
TEMP - °F	120	→								→ 120
MAX. PRESS DIFFERENCE - FEET		"730"			"250"					"223"

SEE NOTE 7

MODE F — ACCIDENT, SYSTEM OPERATING AT RUNOUT

LOCATION	1	2	3	4	5	6	7	8	9	10
FLOW - GPM	N/A	7800	→							→ 7800
PRESS - PSIA	14.7	X	X	X	X	X	X	X	X	14.7
TEMP - °F	212	→								→ 212
MAX. PRESS DIFFERENCE - FEET		"645"								

SEE NOTES 5 & 7

MODE S — SYSTEM ON STANDBY DUTY

LOCATION	1	2	3	4	5	6	7	8	9	10		12	13	14
FLOW - GPM	N/A	0	→										→	0
PRESS - PSIA	14.7	X	X	X	X	X	X	X	X	ATTM 1035		X	X	X
TEMP - °F	120/40	→					→	120/40	AMB	AMB	AMB	120/40	120/40	120/40
MAX. PRESS DIFFERENCE - FEET		"0"												

MISCELLANEOUS INFORMATION SEE NOTE 8

LOCATION	1,2	3	4	5	6	7	8	8.5	9	4	4.5	14	7	7.5	14	12	13
RESIDUAL TEMP (°F)	212	LPCS + LPCI PUMP	→	612	→			500	575	→	212	→	→	212	→	→	212
RESIDUAL PRESS (PSIG)	100		→	600	→			250		100			100			→	100
ORIFICATION LINE SIZE (IN.)	24"		→					12"		4"			12"			→	12"
	MAIN CORE SPRAY LINE TO REACTOR									BY PASS LINE			TEST LINE			RHR LINE	

NOTES:

1. ALL EMPTY PRESSURE DATA BLANKS CAN BE FILLED IN BY OTHERS BASED ON ACTUAL ARRANGEMENTS OR EQUIVALENT HYDRAULIC DATA SUBMITTED TO GE. [ ] INDICATES THE DATA IS NOT SIGNIFICANT.
2. [ ] INDICATES MAXIMUM & MINIMUM VALUE OF PARAMETER FOR THE MODE SPECIFIED.
3. ELEVATIONS ARE NOT INCLUDED IN THE ΔP VALUES GIVEN. ELEVATIONS SHALL BE INCLUDED WHEN DETERMINING FINAL VALUES FOR THE EMPTY DATA BLANKS.
4. THE BYPASS FLOW SPECIFIED IN MODE C IS APPROXIMATED AND WILL BE SPECIFIED BY THE PUMP VENDOR.
5. IN MODE F, AT THE FLOW SPECIFIED, THE NET POSITIVE SUCTION HEAD (NPSH) AVAILABLE AT A REFERENCE LOCATION 2 FEET ABOVE THE PUMP MOUNTING FLANGE MUST EQUAL OR EXCEED 9 FT. THE NPSH AVAILABLE AT THE PUMP SUCTION NOZZLE MUST EQUAL THIS VALUE PLUS THE DIFFERENCE IN ELEVATION BETWEEN THE REFERENCE LOCATION AND THE CENTERLINE OF THE PUMP SUCTION NOZZLE.
6. IN MODE B, THE NPSH AVAILABLE MUST EQUAL THE VALUE SPECIFIED IN NOTE 5 PLUS 30 FT.
7. THE ΔP BETWEEN LOCATIONS 13 AND 16 WILL BE DETERMINED IN PRE-OPERATIONAL TEST. THE ΔP WILL BE ADJUSTED SUCH THAT-
   A. THE FLOW SPECIFIED FOR MODE D IS EQUALED OR EXCEEDED AT 128 PSID (DIFFERENTIAL PRESSURE BETWEEN THE REACTOR VESSEL AND THE SUPPRESSION POOL AIR VOLUME).
   B. THE FLOWS SPECIFIED FOR MODE B AND MODE F ARE NOT EXCEEDED.
   C. THE FLOW IN MODES B AND F IS LESS THAN OR EQUAL TO THE MAXIMUM FLOW THAT THE PUMP HAS BEEN TESTED TO BY THE PUMP SUPPLIER.
   D. THE FLOW IS LESS THAN OR EQUAL TO A VALVE THAT ASSURES ADEQUATE NPSH TO THE PUMP FOR MODES B AND F AS DETERMINED FROM THE PUMP NPSH PERFORMANCE TEST DATA.
   E. THE FLOW IN MODES B AND F IS LESS THAN OR EQUAL TO THE MAXIMUM ALLOWABLE PUMP FLOW RATE SPECIFIED IN THE PUMP INSTRUCTION MANUAL (IF ANY UPPER LIMIT IS SPECIFIED)
8. PIPING SYSTEM DESIGN PRESSURE AND TEMPERATURE AND THE ESTIMATED LINE SIZES ARE FOR INFORMATION ONLY. ACTUAL DESIGN TEMPERATURE AND PRESSURE AND LINE SIZES AS DETERMINED BY THE PIPING DESIGNER SHALL MEET THE PROCESS DIAGRAM HYDRAULIC REQUIREMENT.
9. THE DIFFERENCE IN ELEVATION BETWEEN THE MINIMUM SUPPRESSION POOL WATER LEVEL (FOLLOWING LOCA & POOL PUMP DOWN) AND THE CORE SPRAY SPARGER SHALL NOT EXCEED 80 FT.
10. IT IS RECOMMENDED THAT THIS ORIFICE BE INSTALLED IF REQUIRED TO LIMIT FLOW IN MODE A TO THE VALUE SPECIFIED OR TO THE MAXIMUM FLOW PERMITTED BY NOTE 7C, 7D (MODE F ONLY) AND 7E.

REFERENCE DOCUMENTS: — NPL ITEM NO.

1. RESIDUAL HEAT REMOVAL SYS P&ID - - - - - E12-1010

SUPPORTING DOCUMENTS: — NPL ITEM NO.

1. PIPING & INSTRUMENT SYMBOLS - - - - - - - - A42-1010

TABLE II
LIMITING LINE LOSS

MODE	FLOW PATH	COMMENTS
F	15-13-7	SEE NOTE 5
D	3-4-5-6-8-8-8-5-4-10	
A	7-15-14	
C	4-15-14	
B	12-15	SEE NOTE 6

VALVE POSITIONS

CONDITION	VALVE NO					
	F001		F005	F007	F012	F011
MODE A	O		C	O	P	C
MODE B	C		O	O	C	C
MODE C	O		C	O	C	O
MODE D	O		O	O	C	C
MODE F	O		O	O	C	C
MODE S	O		C	O	C	O

P - PARTIALLY OPEN
C - FULLY CLOSED
O - FULLY OPEN

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PERRY NUCLEAR POWER PLANT

Low Pressure Core Spray System
Process Diagram

Figure 6.3-2

MODE A-1 (SEE NOTES 3 & 13)

POSITION	1	2	3	4	5	6	$7_{A,B}$	$8_{A,B}$	9	10	46	11	29
FLOW GPM	—	7100	←								→	7100	—
PRESSURE PSIA	29.7 / 14.7	←											53.7 / 38.7
TEMPERATURE °F	—	170 / 40	←								→	170 / 40	—
MAX. PRESSURE DROP FEET	←	○			TDH = 275				ΔH = 20			ΔH = 35	⊣

LOOP A & B — LOOP C — SEE NOTE 7 TYP ALL TABLES

MODE A-2 SEE NOTE 13

POSITION	1	2	3	4	5	6	$7_{A,B}$	$8_{A,B}$	9	10	46	11	29
FLOW GPM	—	8520	←								→	8520	—
PRESSURE PSIA	14.7	←											14.7
TEMPERATURE °F	—	180 / 90	←								→	180 / 90	—
MAX. PRESSURE DROP FEET	←	○				TDH = 244							⊣

LOOP A & B — LOOP C

MODE B-1 SEE NOTE 20 (SEE NOTE 29)

POSITION	1	2_B	3_B	4_B	5_B	6_B	18_B	19_B	9_B	10_B	13_B	53_B	44_B	43_B	24_B	1		60_B	61_B
FLOW GPM	—	7100	←											→	7100	—		—	—
PRESSURE PSIA	29.7 / 14.7	←														29.7 / 14.7			
TEMPERATURE °F	—	185	←			→	185	139.4	←					→	139.4	—		—	—
MAX. PRESSURE DROP FEET	←				TDH = 275											⊣			

HEAT REMOVAL CAPABILITY PER HX LOOP 158.4 X 10^6 BTU/HR (1 HX OPERATING)

MODE B-2 (SEE NOTE 29)

POSITION	1	2	3_B	4_B	5_B	6_B	18_B	19_B	9_B	10_B	16_B	67_B	68_B	69_B	1			60_B	61_B
FLOW GPM	—	5250	←										→	5250	—			—	—
PRESSURE PSIA	29.7 / 14.7	←													29.7 / 14.7				
TEMPERATURE °F	—	200	←			→	200	139.7	←					→	139.7	—		—	—
MAX. PRESSURE DROP FEET	←				TDH = 370											⊣			

HEAT REMOVAL CAPABILITY PER HX LOOP 153 X 10^6 BTU/HR (1 HX OPERATING)

NOTES:

1. —
2. PIPING BETWEEN POINTS WITH EMPTY DATA BLANKS (SEE ALSO TABLE 3) SHALL BE SIZED BY CUSTOMER OR AE BASED ON SPECIFIED OPERATING CONDITIONS. EMPTY DATA BLANKS CAN BE FILLED IN BASED ON ACTUAL ARRANGEMENT OR EQUIVALENT HYDRAULIC DATA SUBMITTED TO BWRSD FOR REVIEW.
   ⊠ ----INDICATES THE DATA IS NOT SIGNIFICANT.
3. SHOWN AS TYPICAL FOR ONE LOOP. IF LOOPS OR SIDE 1 AND SIDE 11 ARE NOT SYMETRICALLY ARRANGED, VALUES FOR BOTH SIDES SHALL BE SUBMITTED.
4. ΔH VALUES FOR EQUIPMENT WITHIN GE SCOPE ARE AS NOTED.
5. ELEVATIONS ARE NOT INCLUDED IN ΔP VALUES GIVEN. ELEVATIONS SHALL BE INCLUDED WHEN DETERMINING FINAL VALUES FOR THE EMPTY DATA BLANKS.
6. ⊠ -INDICATES MAXIMUM (X) AND MINIMUM (Y) VALUES FOR THE MODE SPECIFIED.
7. DASHED LINES INDICATE FLOW DOES NOT PASS THRU THESE POINTS. SOLID LINES INDICATE FLOW DOES PASS THRU THESE POINTS.
8. THE NPSH AVAILABLE IN MODE A-2 AT A REFERENCE LOCATION 3 FEET ABOVE THE PUMP MOUNTING FLANGE MUST EQUAL OR EXCEED 6.2 FEET, ASSUMING SATURATION TEMPERATURE OF 212°F. THE NPSH AVAILABLE IN MODES B-1 & D-1 AT A REFERENCE LOCATION 3 FEET ABOVE THE PUMP MOUNTING FLANGE MUST EQUAL OR EXCEED 4 FEET ASSUMING SATURATION TEMPERATURES OF 212°F AND 356°F, RESPECTIVELY. THE NPSH AVAILABLE AT THE PUMP SUCTION NOZZLE MUST EQUAL OR EXCEED THIS VALUE PLUS THE DIFFERENCE IN ELEVATION BETWEEN THE REFERENCE LOCATION AND THE CENTER-LINE OF THE PUMP SUCTION NOZZLE.
9. PIPING SYSTEM DESIGN PRESSURE AND TEMPERATURE AND THE ESTIMATED LINE SIZES ARE FOR INFORMATION ONLY. ACTUAL DESIGN PRESSURE AND TEMPERATURE AND LINE SIZES AS DETERMINED BY PIPING DESIGNER SHALL MEET THE PROCESS DATA HYDRAULIC REQUIREMENTS. REFER TO HARDWARE DWGS. FOR NOZZLE SIZES ON GE SUPPLIED EQUIPMENT.
10. FUEL POOL CONNECTIONS MUST PROVIDE ADEQUATE NPSH TO AVOID PUMP CAVITATION AND AT THE SAME TIME PROVIDE FOR GREATER THAN MINIMUM PUMP FLOW.
11. TABLE 1 INDICATES VALVE POSITION DURING VARIOUS MODES OF OPERATION.
12. DELETED
13. TYPICAL VALUES FOR MAX. SUPPRESSION POOL TEMP SHOWN. FINAL TEMPERATURE DEPENDS ON INITIAL POOL WATER TEMPERATURE & POOL WATER VOLUME.
14. WATER FLOWS ARE IN GPM.
15. MAXIMUM SOH 700 FEET.
16. SERVICE WATER CROSSTIE SHALL BE SIZED TO FLOW 300 GPM AND ENOUGH HEAD TO FLOOD THE CONTAINMENT.
17. THE WEIGHT OF WATER IN THE SHUTDOWN COOLING SUBSYSTEM PIPING, INCLUDING THE HEAT EXCHANGERS AND PUMPS SHALL NOT EXCEED 278,000 LBS AT 75°F TO PREVENT DILUTION OF STANDBY LIQUID CONTROL NEUTRON ABSORBER BELOW MINIMUM REQUIREMENTS.
18. SEE REFERENCE 5 FOR SUPPLEMENTAL FLOWS ENTERING DOWNSTREAM OF E12-F050 DURING NORMAL PLANT OPERATIONS.
19. FLOW SHOWN IS A MAXIMUM. ACTUAL FLOW WILL BE INDICATED LATER FOR EACH PROJECT.
20. MAXIMUM SHELL SIDE FLOW RATE IS 7800 GPM.
21. FLOW SHOWN AT POSITION 71 DOES NOT INCLUDE FLOW FROM FUEL POOL COOLING AND CLEANUP SYSTEM.
22. SEE SYSTEM DATA SHEET FOR SUGGESTED VALVE SIZING.
23. SUCTION TEMPERATURE AND PRESSURE ARE FOR LOOPS A&B ONLY. LOOP C CONDITIONS ARE 0 PSIG VESSEL PRESSURE 125 °F.
24. THE HX INLET PRESSURE SHALL BE GREATER THAN 60 PSIA TO MINIMIZE THE POSSIBILITY OF FLOW INDUCE VIBRATION.
25. FOR LOOPS A AND B, MODE 6 MAYBE ELIMINATED FROM DESIGN CONSIDERATION DURING SHUTDOWN COOLING IF MOV-F064 IS ELECTRICALLY DISABLED. WHEN SHUTDOWN COOLING IS INITIATED IN THE A+B LOOP, ONLY ONE VALVE SHOULD BE DISABLED AT ANY GIVEN TIME. CUSTOMER ESTABLISHED DESIGN ALTERNATE TO GE STANDARD.
26. REFER TO DSP-E12-1-4549-00, TABLE 1, MODE J, NOTE 5 FOR OPERATING PARAMETERS IN THE SHUTDOWN COOLING HEADER LEAK-OFF LINE PIPING DURING NORMAL OPERATION.
27. THE RHR STEAM CONDENSING MODE IS NO LONGER USED AT THE PERRY NUCLEAR POWER PLANT (REF: GENE-E12NR161-11).
28. THE DIAPHRAGM ACTUATOR, BONNET, YOKE, VALVE STEM AND PLUG HAVE BEEN REMOVED FROM VALVES F003A & F003B AND REPLACED WITH A BLIND BONNET. (VALVE FUNCTIONS AS STRAIGHT PIPE)
29. FOR CORRESPONDING ESW OPERATING DATA REFER TO P&ID 302-0793-00000. ESW OPERATING DATA CORRESPONDING TO RHR MODES B-2 AND D-2 ARE NOT PROVIDED SINCE THESE MODES ARE NOT LIMITING FOR ESW. HOWEVER, ESW INLET POSITION 699 FLOW RATES AND TEMPERATURES ARE THE SAME FOR MODES B-1 AND B-2 AND MODES D-1 AND D-2.

LEGEND:

ΔH	-HEAD LOSS
ΔP	-PRESSURE LOSS
RX PRESS	-REACTOR VESSEL PRESSURE
SOH	-SHUTOFF HEAD
TDH	-TOTAL DYNAMIC HEAD

REFERENCE DOCUMENTS

	MPL ITEM NO.
1. RCIC SYSTEM PROCESS DIAGRAM	E51-1020
2. RECIC SYSTEM DESIGN SPEC DATA	B33-4010
3. LOW PRESSURE CORE SPRAY SYSTEM PD	E21-1020
4. NUCLEAR BOILER SYSTEM PROCESS DIAGRAM	B21-1020
5. REACTOR WATER CLEANUP SYSTEM PD	G33-1030

SUPPORTING DOCUMENTS

1. PIPING & INSTRUMENT SYMBOLS	A42-1010

MODES

- A-1 LOW PRESSURE COOLANT INJECTION (LPCI) RECIRCULATION LINE BREAK IN EITHER SIDE AND THREE PUMPS OPERATING. ONE STRAINER 50% PLUGGED.
- A-2 LOW PRESSURE COOLANT INJECTION (LPCI) RECIRCULATION LINE BREAK IN EITHER SIDE AND THREE PUMPS OPERATING. ONE STRAINER 50% PLUGGED. VESSEL PRESSURE=0 PSIG.
- B-1 POST ACCIDENT SUPPRESSION POOL COOLING WITH ONE PUMP OPERATION AND STRAINER 50% PLUGGED. (PEAK SUPPRESSION POOL TEMPERATURE)
- B-2 POST ACCIDENT CONTAINMENT SPRAY WITH HEAT REJECTION WITH ONE PUMP OPERATION AND STRAINER 50% PLUGGED.
- D-1 INITIATION OF SHUTDOWN COOLING AFTER BLOWDOWN TO MAIN CONDENSER AT 4 HOURS.
- D-2 CONTINUATION OF SHUTDOWN COOLING AT 55 HOURS.
- E-1 CONTINUATION OF SHUTDOWN COOLING AT 20 HOURS AND FUNCTIONAL PUMP TEST AFTER SHUTDOWN.
- E-2 CONTINUATION OF SHUTDOWN COOLING WITH RETURN TO UPPER CONTAINMENT POOL AT GREATER THAN 20 HOURS AND FUNCTIONAL PUMP TEST AFTER SHUTDOWN.
- F RHR SYSTEM TEST DURING PLANT OPERATION.
- G MINIMUM FLOW BYPASS MODE, 2 SUCTION SOURCES.
- S SYSTEM ON STANDBY DUTY.

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PERRY NUCLEAR POWER PLANT

Residual Heat Removal System
Process Diagram

Figure 6.3-3 (Sheet 1 of 3)

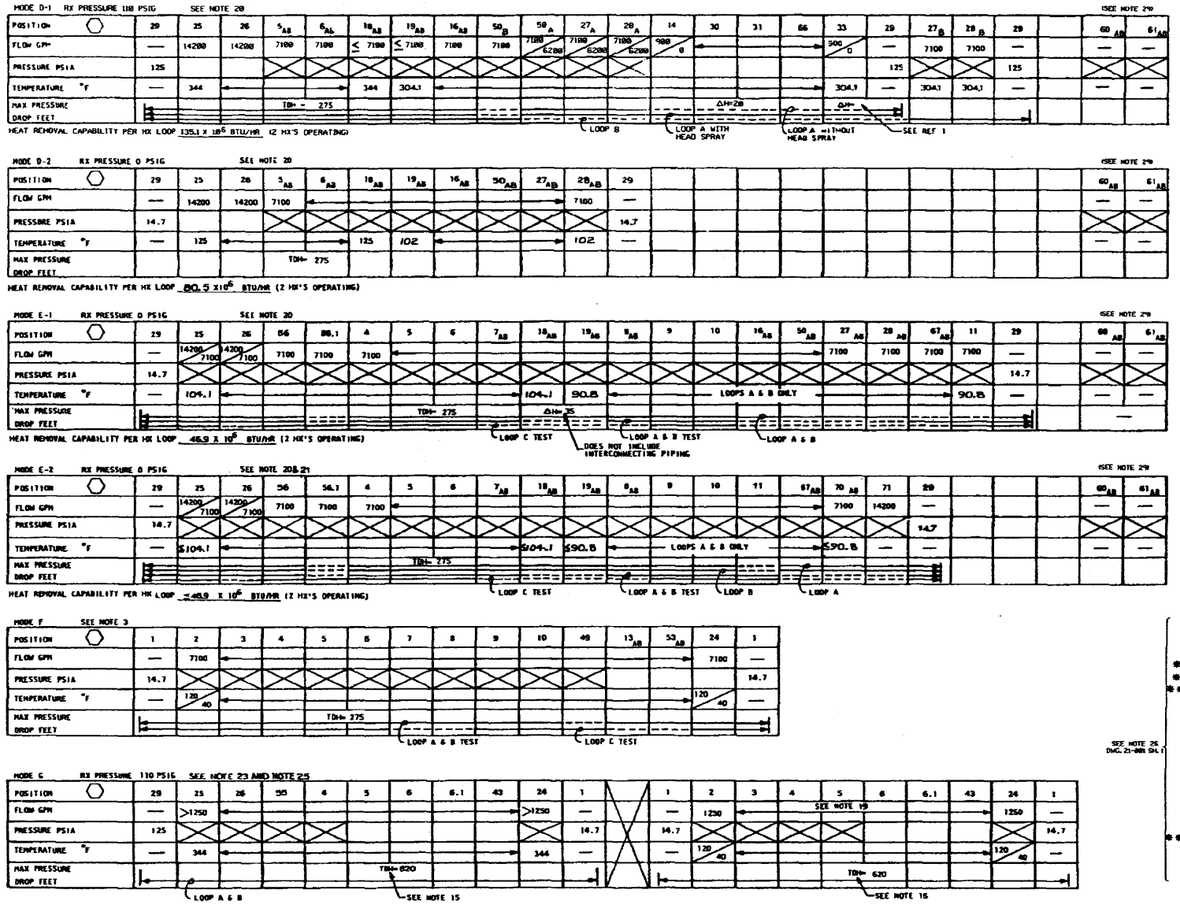


TABLE 2 LIMITING LINE LOSSES (NUMBERS REFER TO POSITIONS ○)

MODE A-1	6-7-8-9-18-11 PUMP DISCHARGE LINE TO RPV FLOODING PENETRATION
MODE A-2	1-2-5 SUCTION LINE SUPRESSION POOL TO PUMP
MODE B-1	1-2-5 SUCTION LINE SUPRESSION POOL TO PUMP 17-18-19-28BX PIPING-68-61 SERVICE WATER
MODE B-2	67-68-09-1 CONTAINMENT SPRAY FROM LPCI LINE
MODE D-1 & D-2	14-51-66 VESSEL HEAD SPRAY LINE 29-25-4 SHUTDOWN SUCTION LINE RPV TO PUMP
MODE E-1	16-27 SHUTDOWN RETURN LINE LPCI BRANCH TO FEEDWATER SYS. 56-4C C PUMP TEST
MODE E-2	67-70-71 SHUTDOWN RETURN LINE TO UPPER CONTAINMENT POOL
MODE F	13-43-26 & 49-48.1-24 TEST LINES TO SUPPRESSION POOL
MODE G	6-43 PUMP MINIMUM FLOW BYPASS LINE

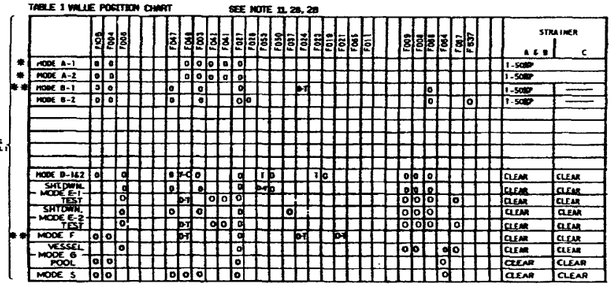
O VALVE OPEN
T VALVE THROTTLED
T-C VALVE THROTTLED OR CLOSED
O-T VALVE OPEN OR THROTTLED
P STRAINER PLUGGED
BLANK SPACE INDICATES VALVE IS CLOSED

NOTE: SYSTEM DATA PROVIDED IN THE ABOVE TABLE REFLECTS NOMINAL DESIGN VALUES FOR SYSTEM MODES A-1, A-2, B-1, AND F, AND DOES NOT ACCOUNT FOR THE FOLLOWING:

* - LPCI FLOW PATH IS SPLIT BETWEEN 1E12FB003A/B AND 1E12FB400A/B

** - 1E12FB024A/B THROTTLING IN SP COOLING AND TESTING FLOWPATHS

TABLE 1 VALVE POSITION CHART SEE NOTE 11, 28, 29



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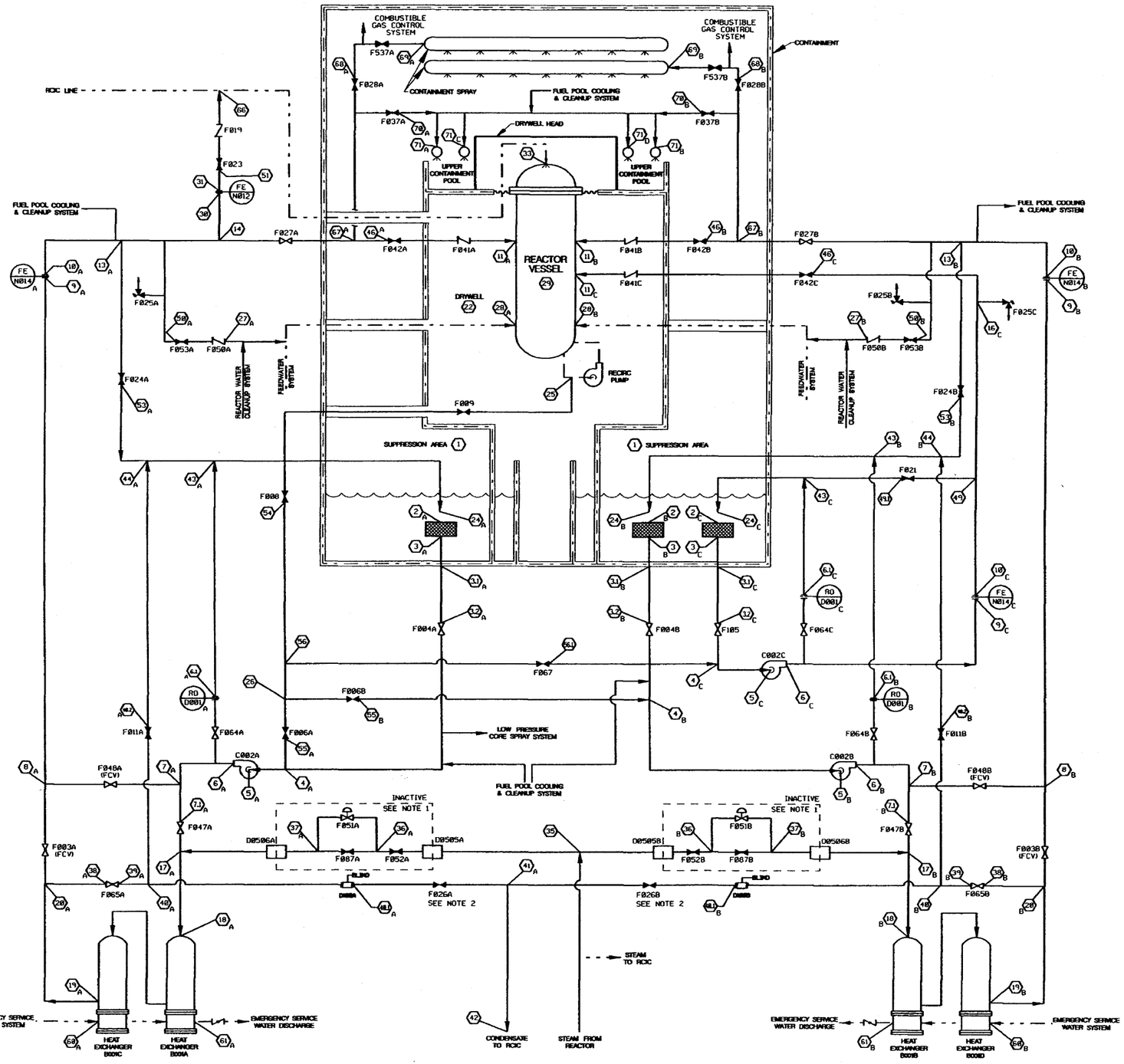
PERRY NUCLEAR POWER PLANT

Residual Heat Removal System
Process Diagram

Figure 6.3-3 (Sheet 2 of 3)



NOTES:

1. THE PIPING & COMPONENTS BETWEEN BLINDS D0505A/B & D0506A/B ARE INACTIVE & ARE REQUIRED ONLY FOR THE SEISMIC & STRUCTURAL INTEGRITY OF THE PIPING SYSTEM.
2. VALVES F026A/B HAVE BEEN DETERMINATED AT THE MCC COMPARTMENT. THEY ARE REQUIRED TO MAINTAIN THE SEISMIC & STRUCTURAL INTEGRITY OF THE PIPING SYSTEM & TO MAINTAIN A PRESSURE BOUNDARY.

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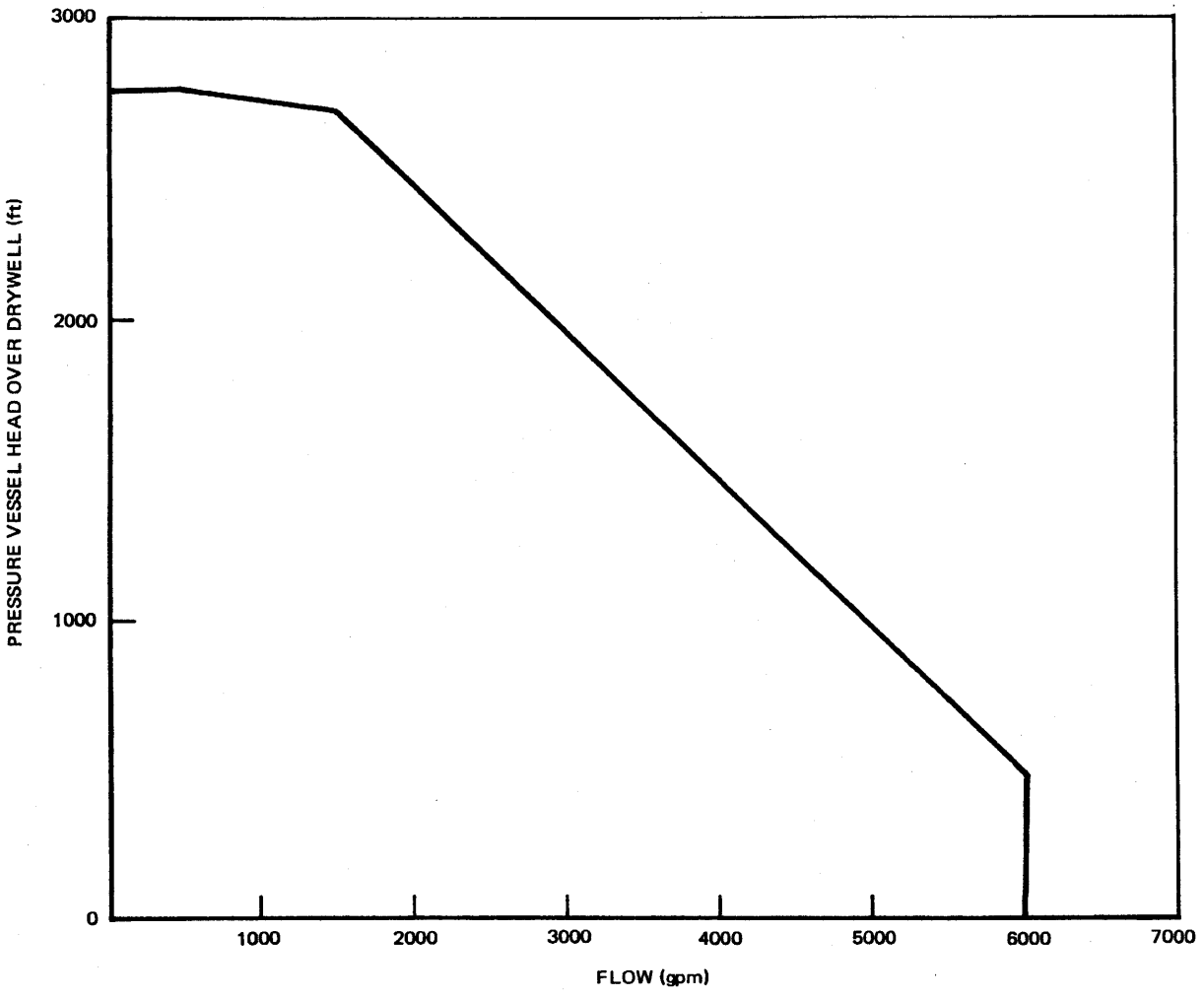
PERRY NUCLEAR POWER PLANT

Residual Heat Removal System
Process Diagram

Figure 6.3-3 (Sheet 3 of 3)



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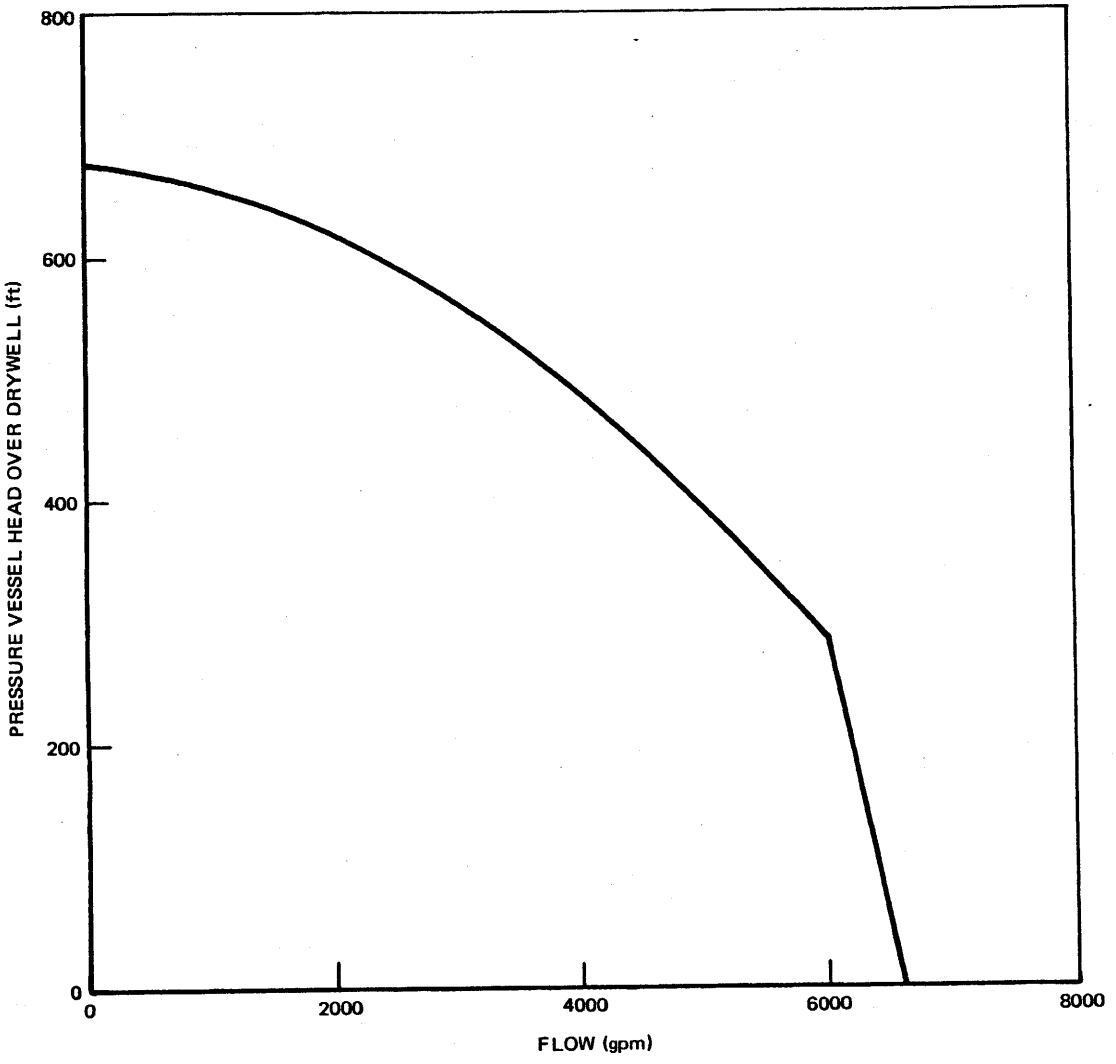
PERRY NUCLEAR POWER PLANT

Head Versus High Pressure Core Spray Flow Used in LOCA Analysis

Figure 6.3-4



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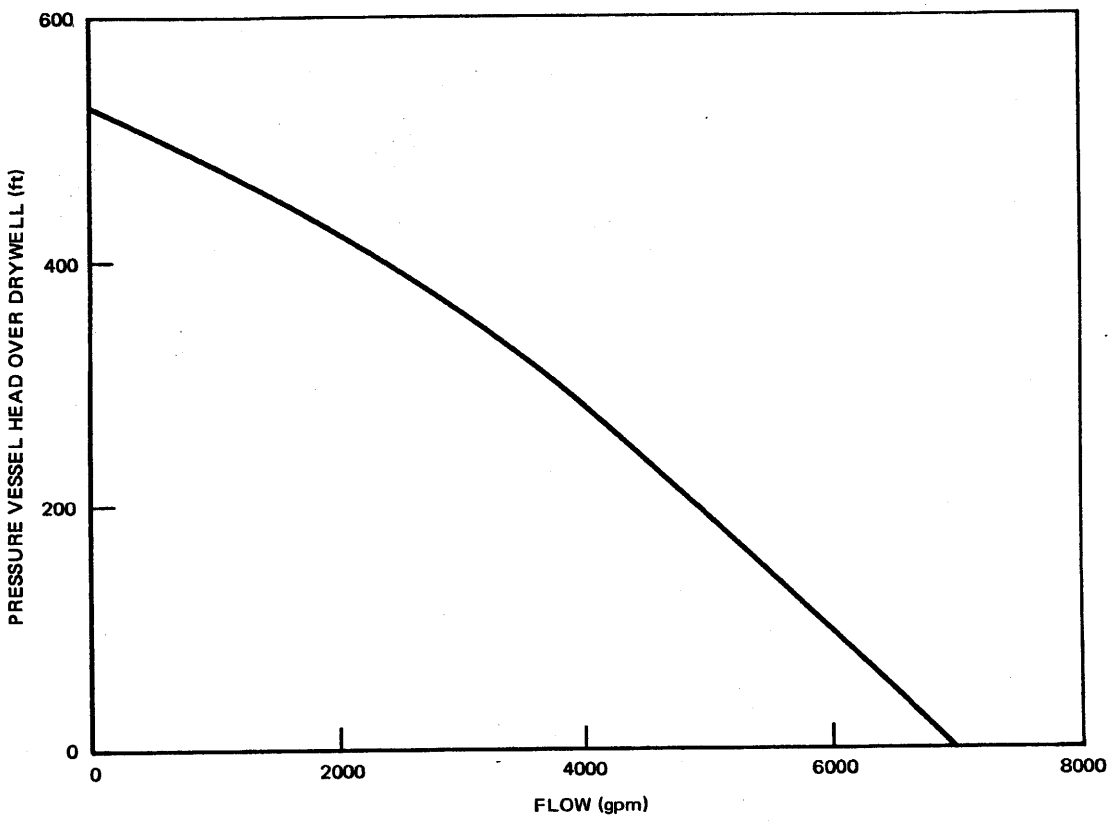
PERRY NUCLEAR POWER PLANT

Head Versus Low Pressure Core Spray Flow Used in LOCA Analysis

Figure 6.3-5



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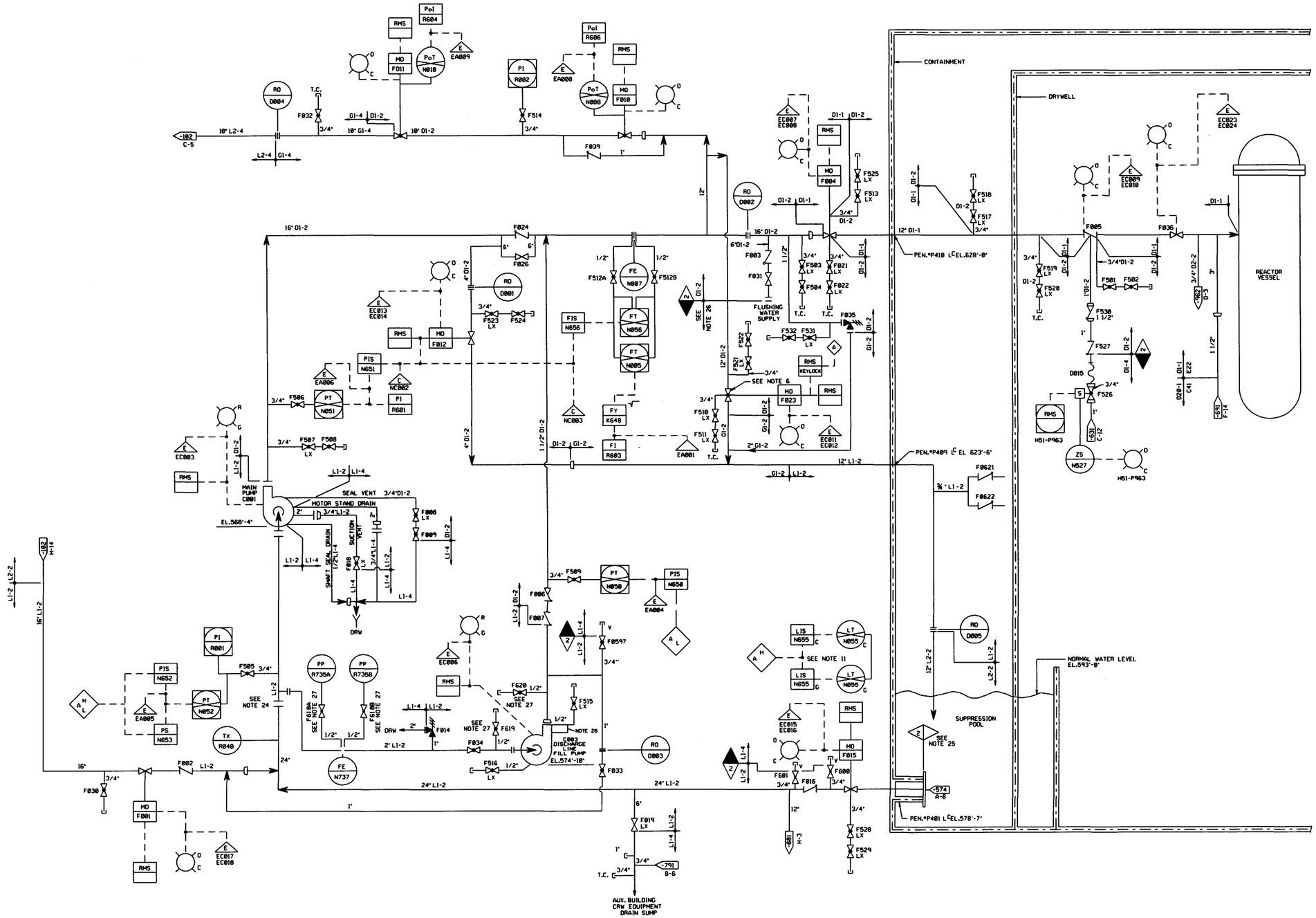
PERRY NUCLEAR POWER PLANT

Head Versus Low Pressure Coolant Injection Flow Used in LOCA Analysis for 1 Pump Only

Figure 6.3-6



NOTES:

1. EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NUMBER E22, UNLESS NOTED OTHERWISE.
2. DELETED
3. CHEMICAL CLEANING CONNECTIONS,(VALVES,ETC.), IF REQUIRED,ARE TO BE PROVIDED AS NECESSARY.
4. INSTRUMENT LINE DESIGN AND VALVING SHALL BE IN ACCORDANCE WITH INSTRUMENTATION SPECIFICATION A62-4070.
5. DELETED
6. VALVE F023 SHALL BE INSTALLED WITH THE PACKING GLAND ON THE UPSTREAM SIDE OF THE VALVE DISCHARGE.
7. DELETED
8. FOR ADDITIONAL CONTROL ROOM LIGHTS, SYSTEM ALARMS AND REMOTE MANUAL SWITCHES, SEE HPCS SYSTEM FCD AND ELECTRICAL ONE LINE DIAGRAM.
9. PROVISION FOR ISOLATION SHALL BE IN ACCORDANCE WITH CURRENT LICENSING REQUIREMENTS.
10. E22 LEVEL INSTRUMENTATION (LT-N054C, LIS-N654C, LIS-N654G) FOR THE CONDENSATE STORAGE TANK IS SHOWN ON DWG.302-0102-00000.
11. E22 LEVEL INSTRUMENTATION (LT-N055C, LT-N055G, LIS-N655C, LIS-N655G) IMPULSE LINES FOR THE SUPPRESSION POOL ARE SHOWN ON DWG.302-0686-00000, AREA J-5.
12. DELETED
13. DELETED
14. DELETED
15. EXCEPT AT POINTS CONNECTING WITH G.E.SUPPLIED EQUIPMENT OR PIPING, THE PIPING DESIGNER SHALL SIZE PIPES IN CONFORMANCE WITH THE SYSTEM DESIGN SPECIFICATION AND PROCESS DIAGRAM.
16. FLUSHING CONNECTIONS SHALL BE PROVIDED IN ACCORDANCE WITH A62-4140. TEMPORARY STRAINER SCREENS SHALL BE PROVIDED ON THE SUCTION SIDE OF ALL PUMPS IN ACCORDANCE WITH A62-4140.
17. DELETED
18. DELETED
19. DELETED
20. ALL MOTOR OPERATED VALVES ARE AC OPERATED, UNLESS OTHERWISE NOTED.
21. THIS SYSTEM DIAGRAM WAS ADAPTED FROM G.E. DRAWING 795E873 .
22. ALL LIGHTS, ALARMS, SWITCHES AND INDICATORS ARE LOCATED ON H13-P601, UNLESS OTHERWISE NOTED.
23. ALL INSTRUMENT LOCATIONS ARE IDENTIFIED ON THE INSTRUMENT INDEX.
24. TEMPORARY STRAINER D013, USED FOR START-UP ONLY, IS REMOVED FOR PLANT OPERATION.
25. STRAINER IS SAFETY RELATED NON-ASME INSTALLED VIA DCP*960042.
26. *FAST FIRE WATER* HOSE CONNECTION ASSEMBLY (NORMAL PLANT CONFIGURATION) IS NON-SAFETY, NON ASME, INSTALLED VIA DCP 930017. *FAST FIRE WATER* HOSE CONNECTION ASSEMBLY TO BE REPLACED WITH ALTERNATE BORON INJECTION CONNECTION ASSEMBLY, WHEN REQUIRED (DCP 940073). (REFERENCE DRAWING 302-0642-00000, NOTE 9)
27. VALVES ARE NOT IN ACCORDANCE WITH LINE SPEC L1-2. SEE 50A-0011.
28. VENDOR SUPPLIED PIPING BELOW VALVE F515 SERVES BOTH AS A PUMP CASING VENT AND TO PROVIDE COOLING WATER TO THE PUMP SEAL.

REFERENCE DRAWINGS

302-0681-00000	SUPPRESSION POOL CLEAN-UP G42
302-0102-00000	CONDENSATE TRANSFER P11
302-0962-00000	LEAK DETECTION SYSTEM E31
302-0964-00000	LEAK DETECTION SYSTEM E31
C91-4030	INPUT/OUTPUT LIST
E22-1020	HIGH PRESSURE CORE SPRAY PROCESS DIAGRAM
302-0791-00000	EMERGENCY SERVICE WATER SYSTEM
302-0691-00000	STANDBY LIQUID CONTROL C41
302-0631-00000	REACTOR CORE ISOLATION COOLING E51
302-0574-00000	EMERGENCY CORE COOLING SYSTEM SUCTION STRAINER T21

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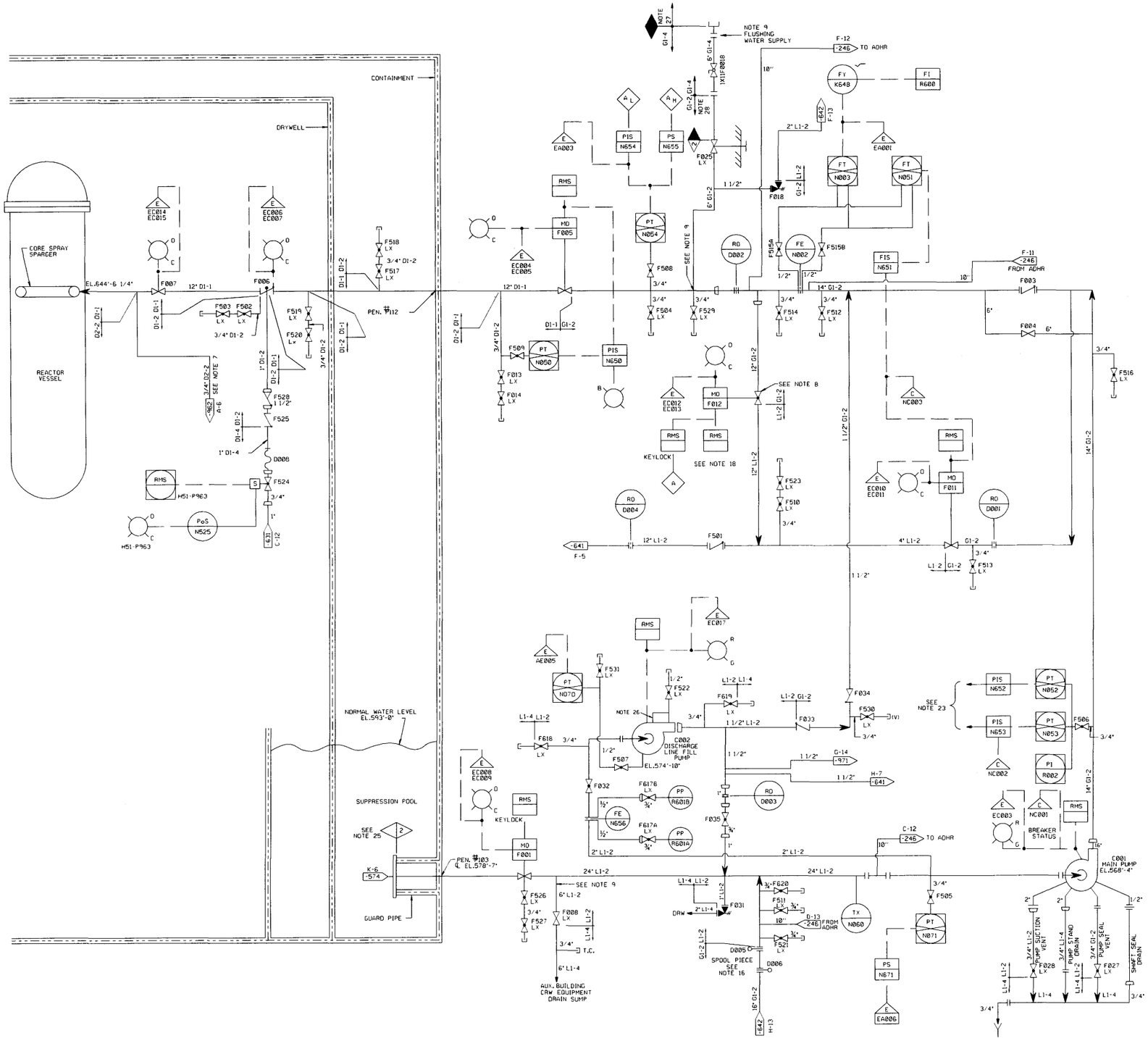
PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

HIGH PRESSURE CORE SPRAY SYSTEM

FIGURE 6.3-7

(DWG. D-302-0701-00000)



NOTES:

1. DELETED
2. CHEMICAL CLEANING CONNECTIONS (I.E. VALVES, ETC.) IF REQUIRED, ARE TO BE PROVIDED AS NECESSARY.
3. INSTRUMENT LINE DESIGN AND VALVING SHALL BE IN ACCORDANCE WITH INSTRUMENT PIPING SPECIFICATION A62-4070.
4. DELETED
5. DELETED
6. FOR ADDITIONAL CONTROL ROOM LIGHTS, SYSTEM ALARMS, AND REMOTE MANUAL SWITCHES, SEE THE LPCS SYSTEM FUNCTIONAL CONTROL DIAGRAM.
7. PROVISIONS FOR CONTAINMENT ISOLATION SHALL BE IN ACCORDANCE WITH CURRENT LICENSING REQUIREMENTS.
8. THE PACKING GLAND OF VALVE F012 SHALL BE LOCATED ON THE UPSTREAM SIDE OF THE VALVE DISC. ALTERNATIVELY, THE PACKING GLAND IS CAN BE ON THE DOWNSTREAM SIDE OF THE DISK PROVIDED THE PACKING IS TESTED FOR LEAKAGE.
9. FLUSHING WATER CONNECTIONS ARE LOCATED AS CLOSE AS PRACTICAL TO VALVES F001 AND F005. FLUSHING CONNECTIONS SHALL BE PROVIDED IN ACCORDANCE WITH A62-4140. TEMPORARY STRAINER SCREENS SHALL BE PROVIDED ON THE SUCTION SIDE OF ALL PUMPS IN ACCORDANCE WITH A62-4140. STORZ HOSE FITTING FOR FLEX CAN BE REMOVED TO PROVIDE 6" FLANGED CONNECTION FOR THE FLUSHING WATER SUPPLY.
10. EQUIPMENT AND INSTRUMENTS ARE PREFIXED BY SYSTEM NUMBER (E21), UNLESS NOTED OTHERWISE.
11. DELETED
12. DELETED
13. EXCEPT AT POINTS OF CONNECTION WITH THE G.E. SUPPLIED EQUIPMENT OR PIPING, THE PIPING DESIGNER SHALL SIZE PIPES IN CONFORMANCE WITH SYSTEM DESIGN SPECIFICATION AND PROCESS DIAGRAM.
14. DELETED
15. DELETED
16. SPECTACLE PORTION OF D005/D006 TO BE INSTALLED ONLY DURING REFUELING SHUTDOWN.
17. DELETED.
18. FOR SIZING, SEE LPCS SYSTEM PROCESS DIAGRAM.
19. ALL MOTOR OPERATED VALVES ARE AC OPERATED, UNLESS NOTED OTHERWISE.
20. THIS SYSTEM DIAGRAM WAS ADAPTED FROM G.E. DRAWING 105D5593 REV. 4.
21. ALL REMOTE SWITCHES, ALARMS AND INDICATING LIGHTS ARE LOCATED ON H13-P601, UNLESS NOTED OTHERWISE.
22. FOR CONTROL ROOM, LOCAL OR REMOTE PANEL, AND RACK I.D. NUMBERS FOR INSTRUMENTS, SEE INSTRUMENT INDEX.
23. ADS DIVISION I PERMISSIVE LOGIC, SEE DWG. B-208-011 SH. C07.
24. DELETED
25. STRAINER IS SAFETY RELATED NON-ASME INSTALLED VIA DCP#960042.
26. VENDOR SUPPLIED PIPING BELOW VALVE F522 SERVES BOTH AS A PUMP CASING VENT AND TO PROVIDE COOLING WATER TO THE PUMP SEAL.
27. 5" DIA. STORZ HOSE CONNECTION IS NON-SAFETY, NON-ASME AND IS PROVIDED FOR WATER SUPPLY FROM ESW SYSTEM FOR FLEX STRATEGY. NON-SAFETY, NON-ASME PIPING AND COMPONENTS ARE SEISMICALLY DESIGNED AND INSTALLED PER ECP 13-0522. REFERENCE DRAWING 302-1000-00000.
28. SAFETY RELATED BOUNDARY RELOCATED TO VALVE F025 PER ECP 13-0522. NON-SAFETY RELATED PIPING SEGMENT BETWEEN F025 AND FLANGED CONNECTION TO G1-4 PIPING REMAINS AS G1-2 AS ORGINALLY INSTALLED.

REFERENCES:

302-0641-00000	RHR SYSTEM E12
302-0642-00000	RHR SYSTEM E12
C91-4030	PROCESS COMPUTER SYSTEM INPUT/OUTPUT LIST
302-0962-00000	LEAK DETECTION SYSTEM E31
302-0964-00000	LEAK DETECTION SYSTEM E31
921-1030	NUCLEAR BOILER SYSTEM FC0
A62-4230	EMERGENCY EQUIPMENT COOLING WATER
E21-1020	LOW PRESSURE CORE SPRAY PROCESS DIAGRAM
302-0971-00000	FEEDWATER LEAKAGE CONTROL SYSTEM, N27
302-0631-00000	REACTOR CORE ISOLATION COOLING SYSTEM, E51
302-0574-00000	EMERGENCY CORE COOLING SYSTEM SUCTION STRAINER T21

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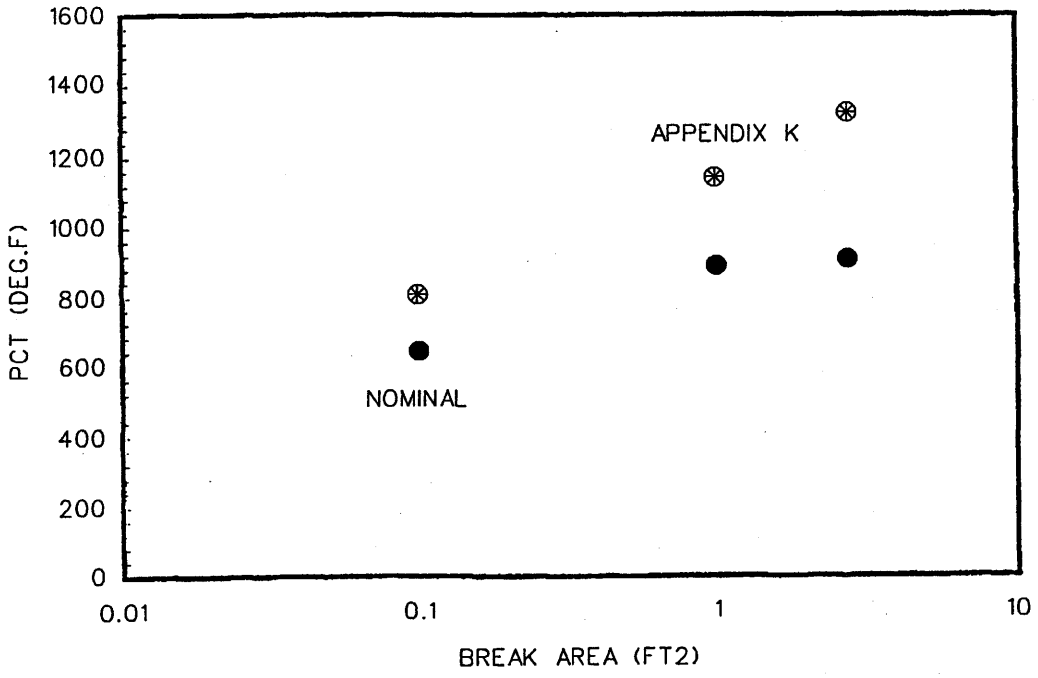
PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

LOW PRESSURE CORE SPRAY SYSTEM

FIGURE 6.3-8

(DWG. D-302-0705-00000)



NOTE: LIMITING FUEL TYPE IS GE11 FOR CYCLE 8.

LEGEND:

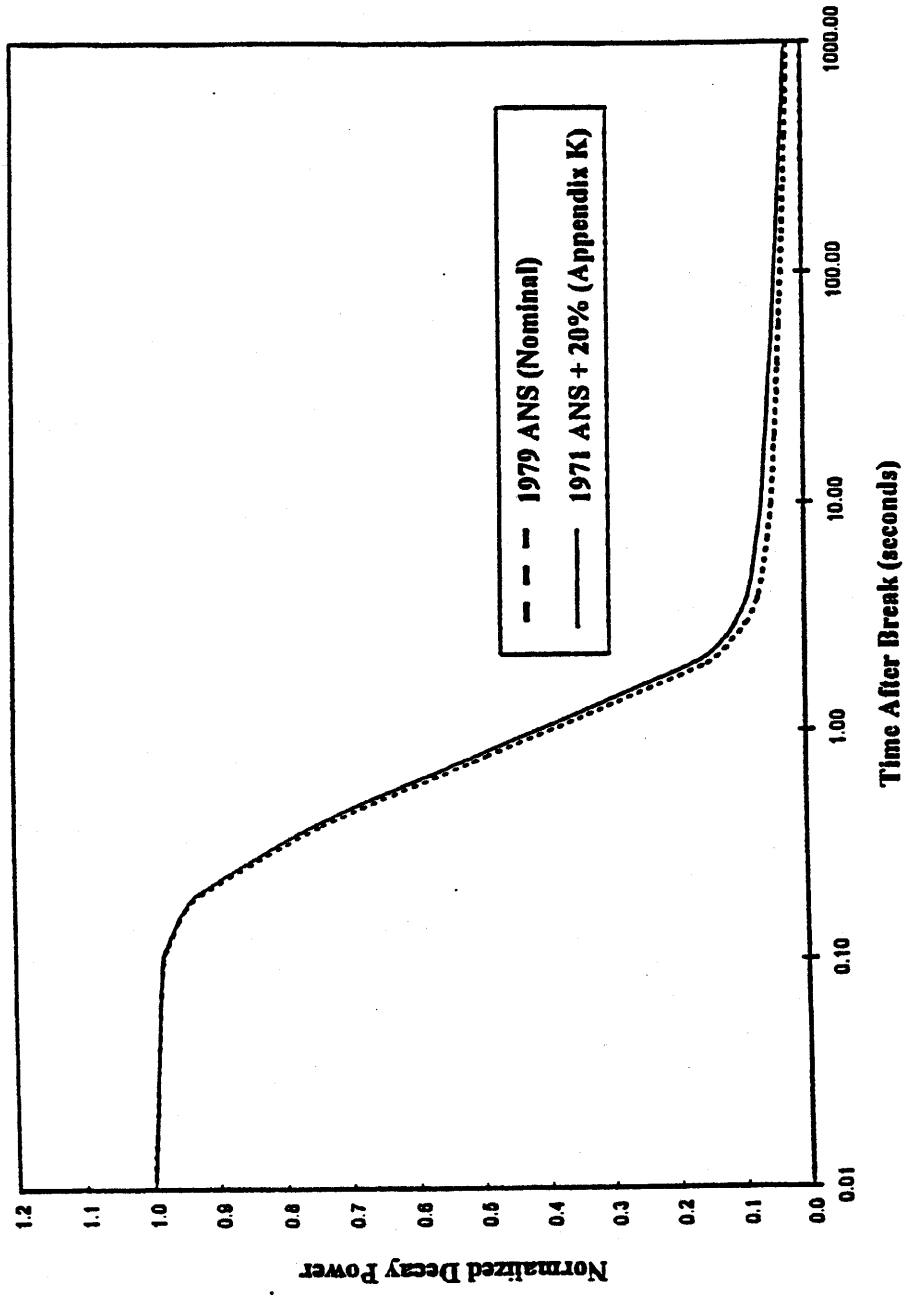
- ● REF. 18 UPRATE (NOMINAL)
- ⊛ REF. 18 UPRATE (APPENDIX K)

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Limiting Peak Cladding
Temperature Versus Break Area

Figure 6.3-9



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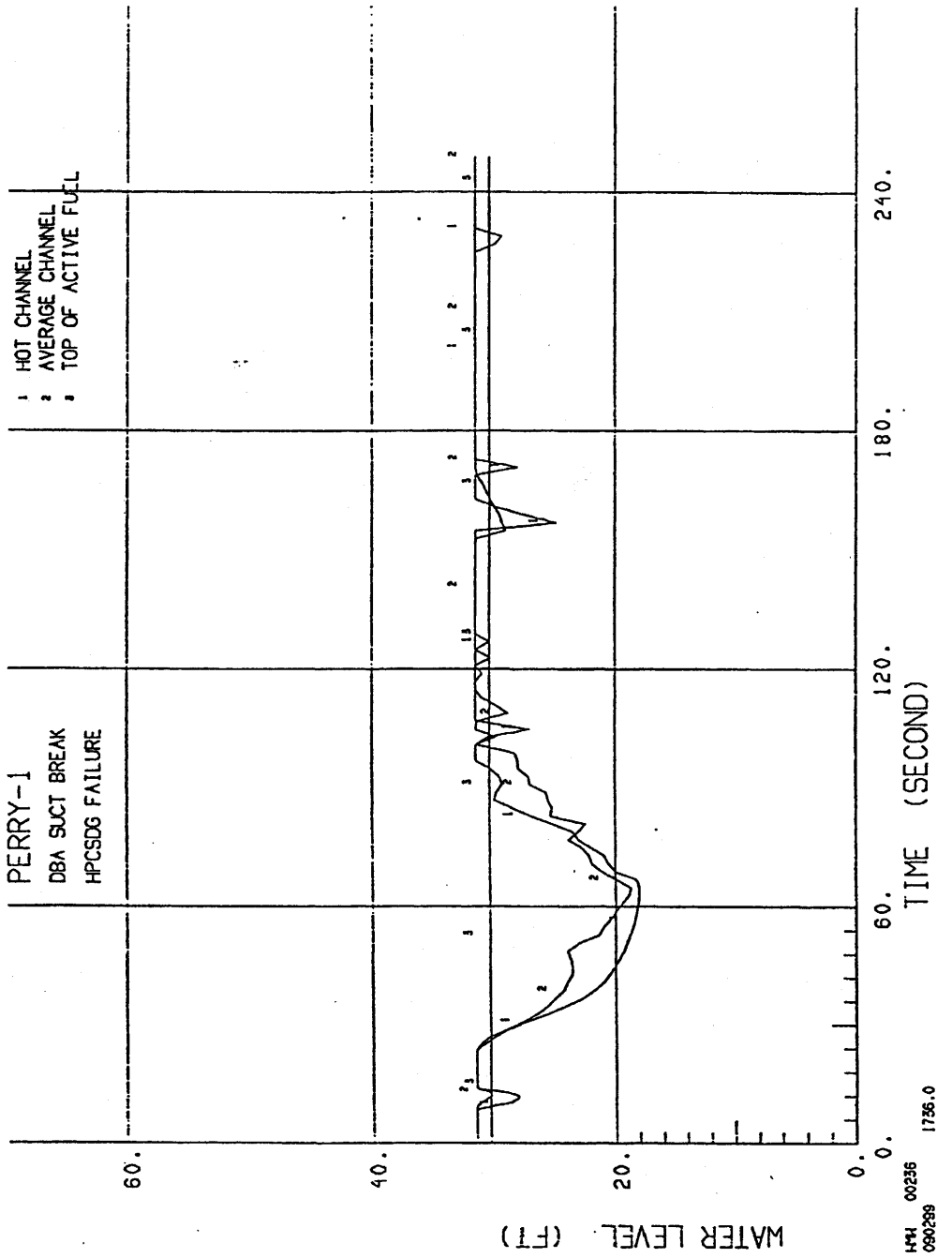
PERRY NUCLEAR POWER PLANT

Normalized Power Versus Time

Figure 6.3-10



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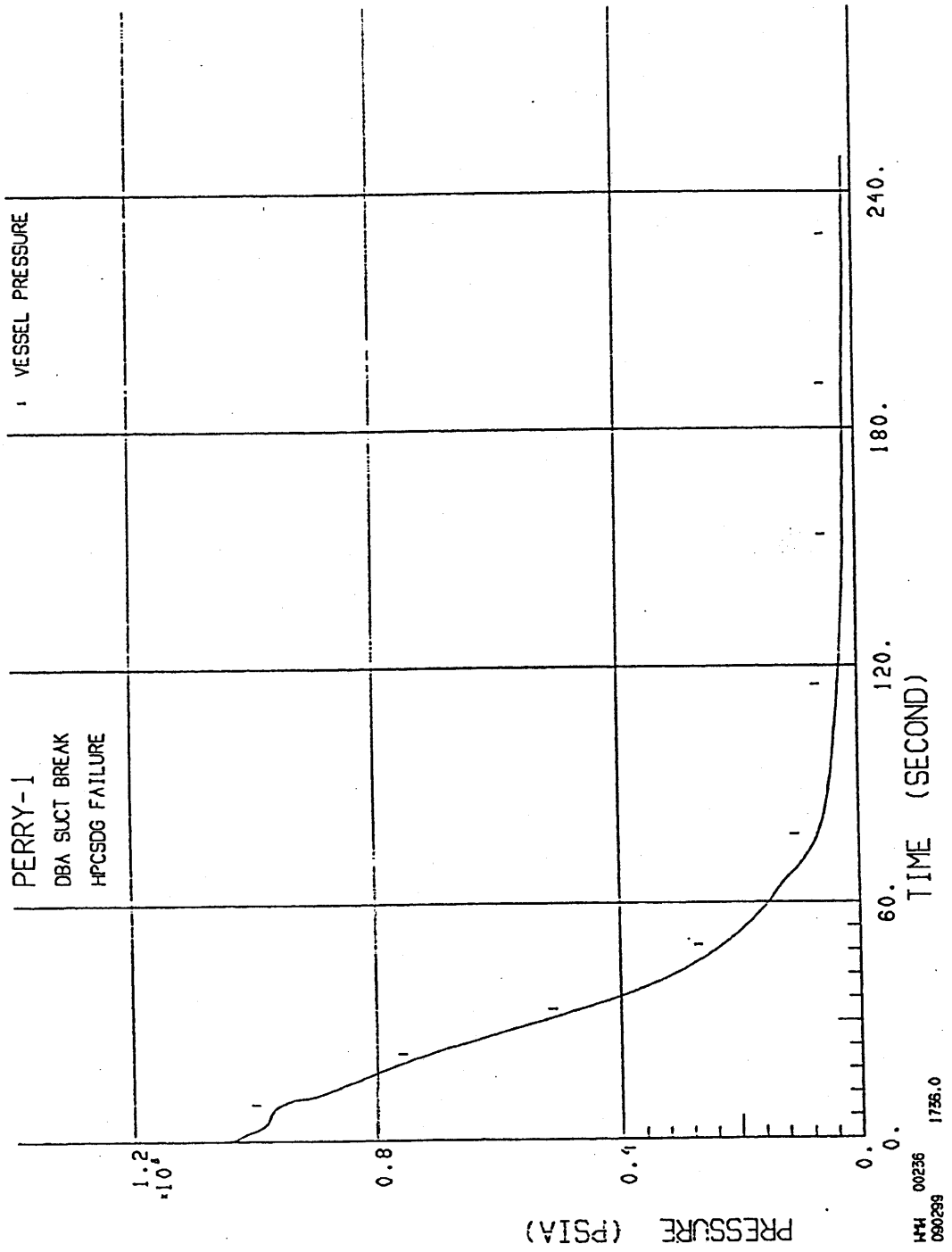
PERRY NUCLEAR POWER PLANT

Water Level in Hot and Average Channels - DBA Suction - HPCS D/G Failure (Nominal) LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 1 of 11)



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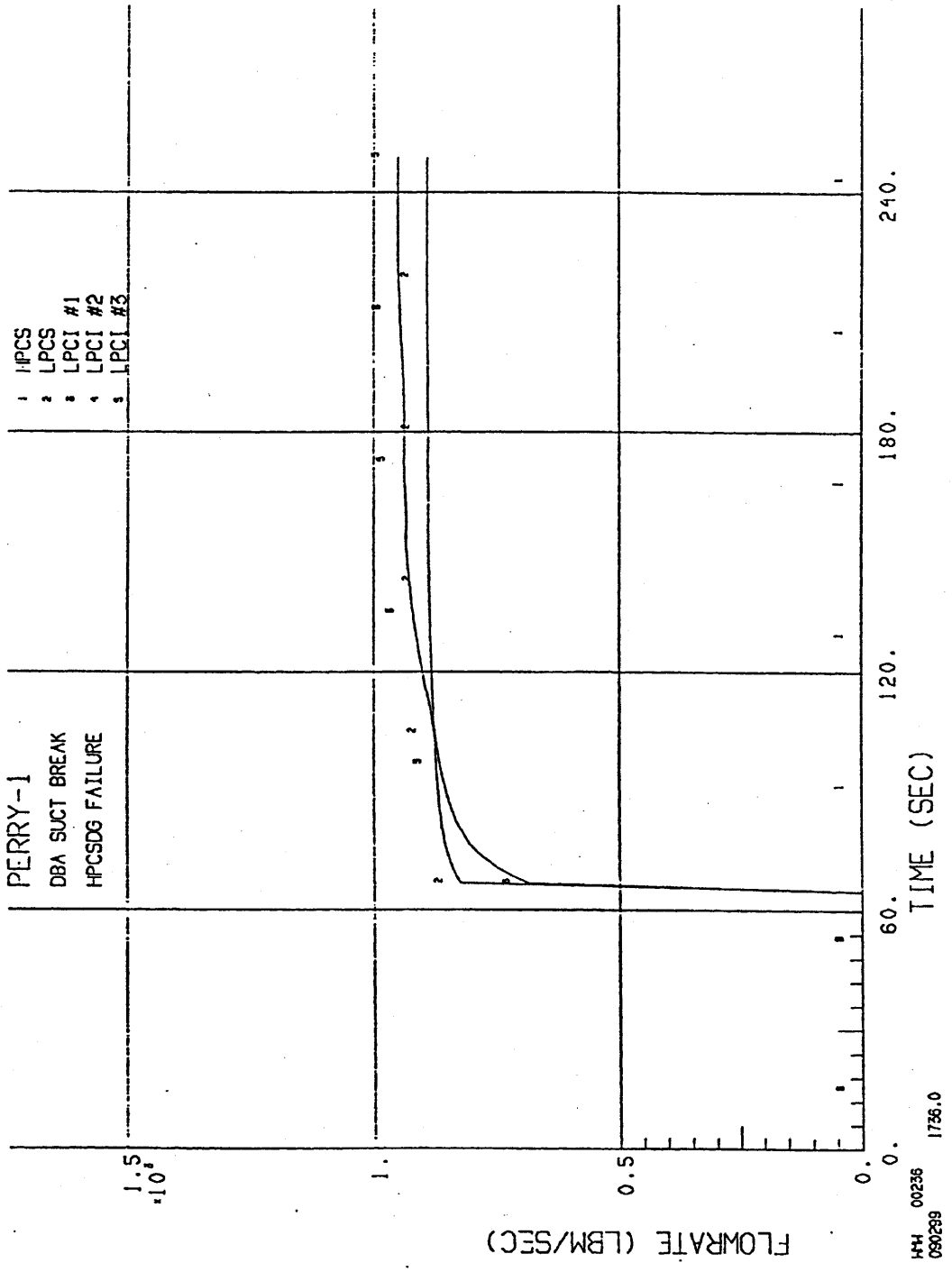
PERRY NUCLEAR POWER PLANT

Reactor Vessel Pressure -
DBA Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 2 of 11)



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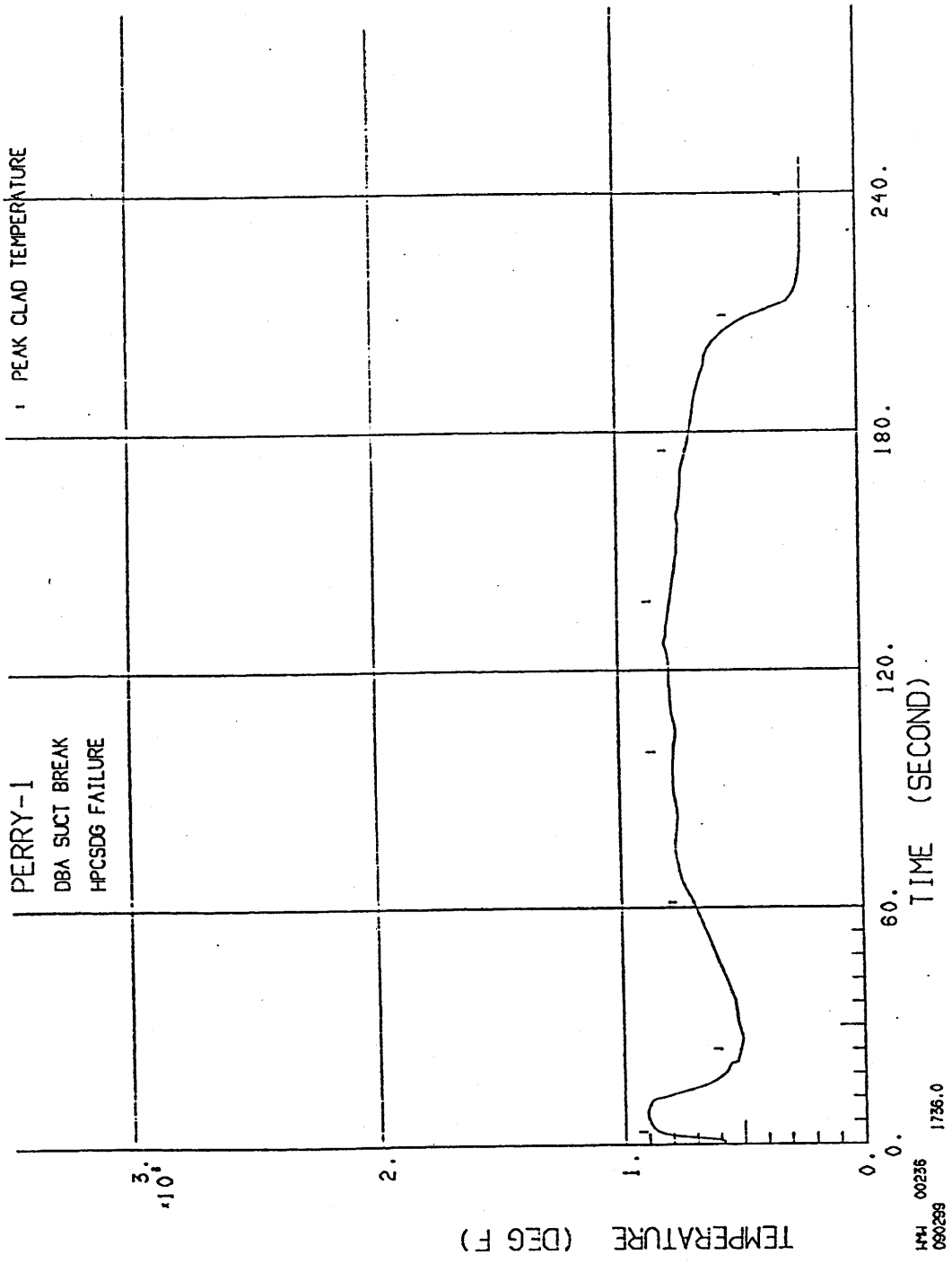
PERRY NUCLEAR POWER PLANT

ECCS Flow - DBA Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 5 of 11)



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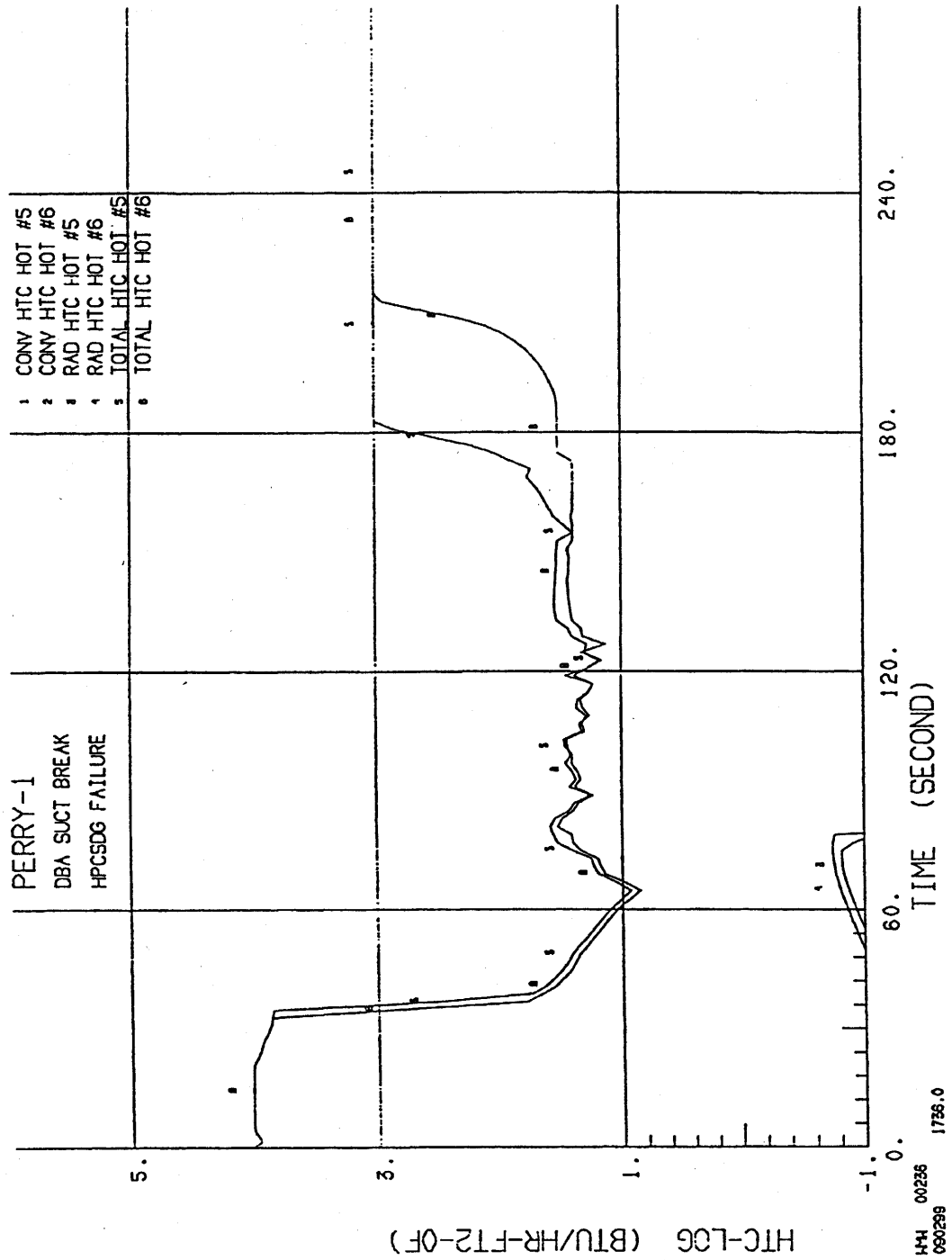
PERRY NUCLEAR POWER PLANT

Peak Cladding Temperature
(GE11) - DBA Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 6 of 11)



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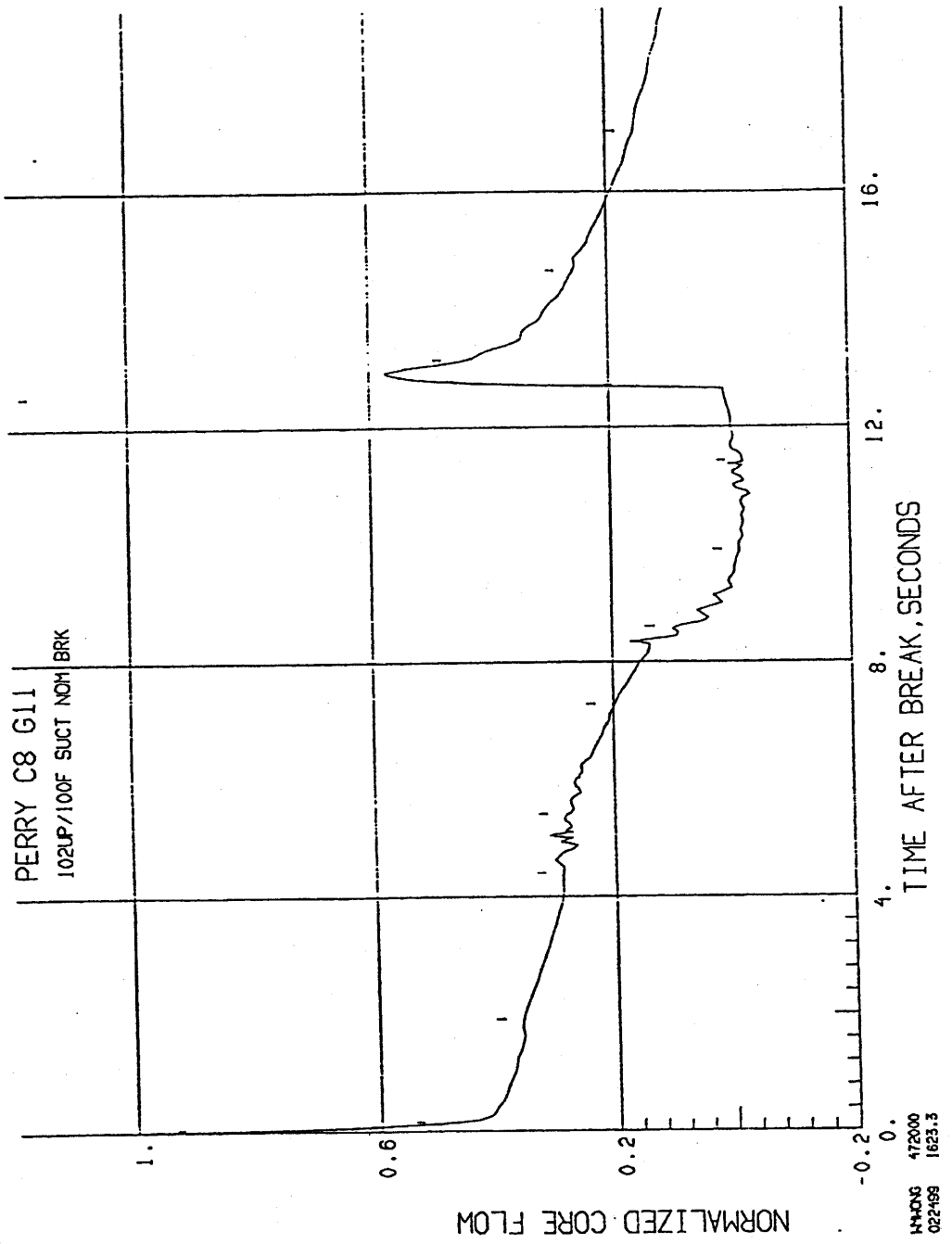
PERRY NUCLEAR POWER PLANT

Heat Transfer Coefficient
(GE11) - DBA Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 7 of 11)



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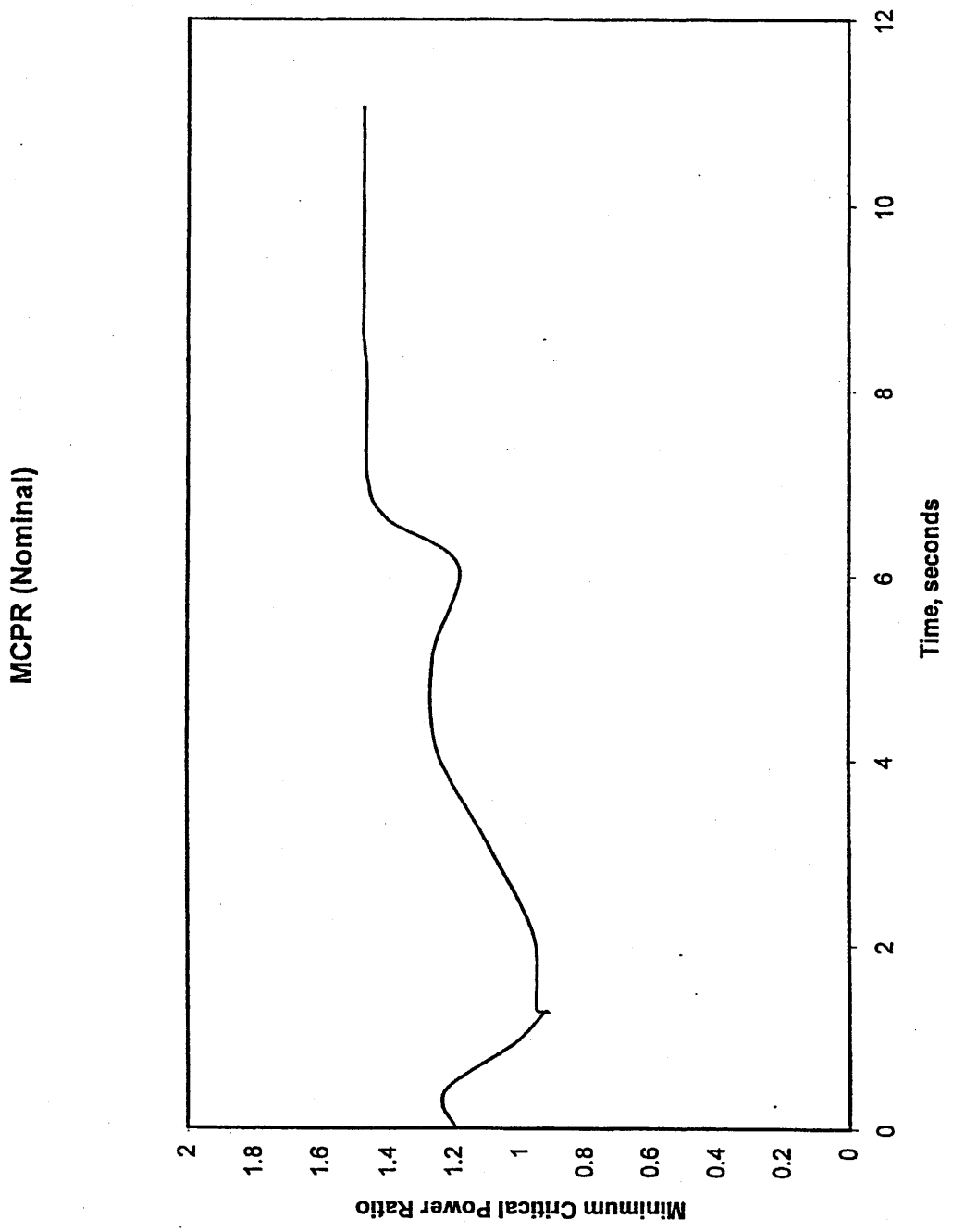
PERRY NUCLEAR POWER PLANT

Core Average Inlet Flow -
DBA Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 10 of 11)



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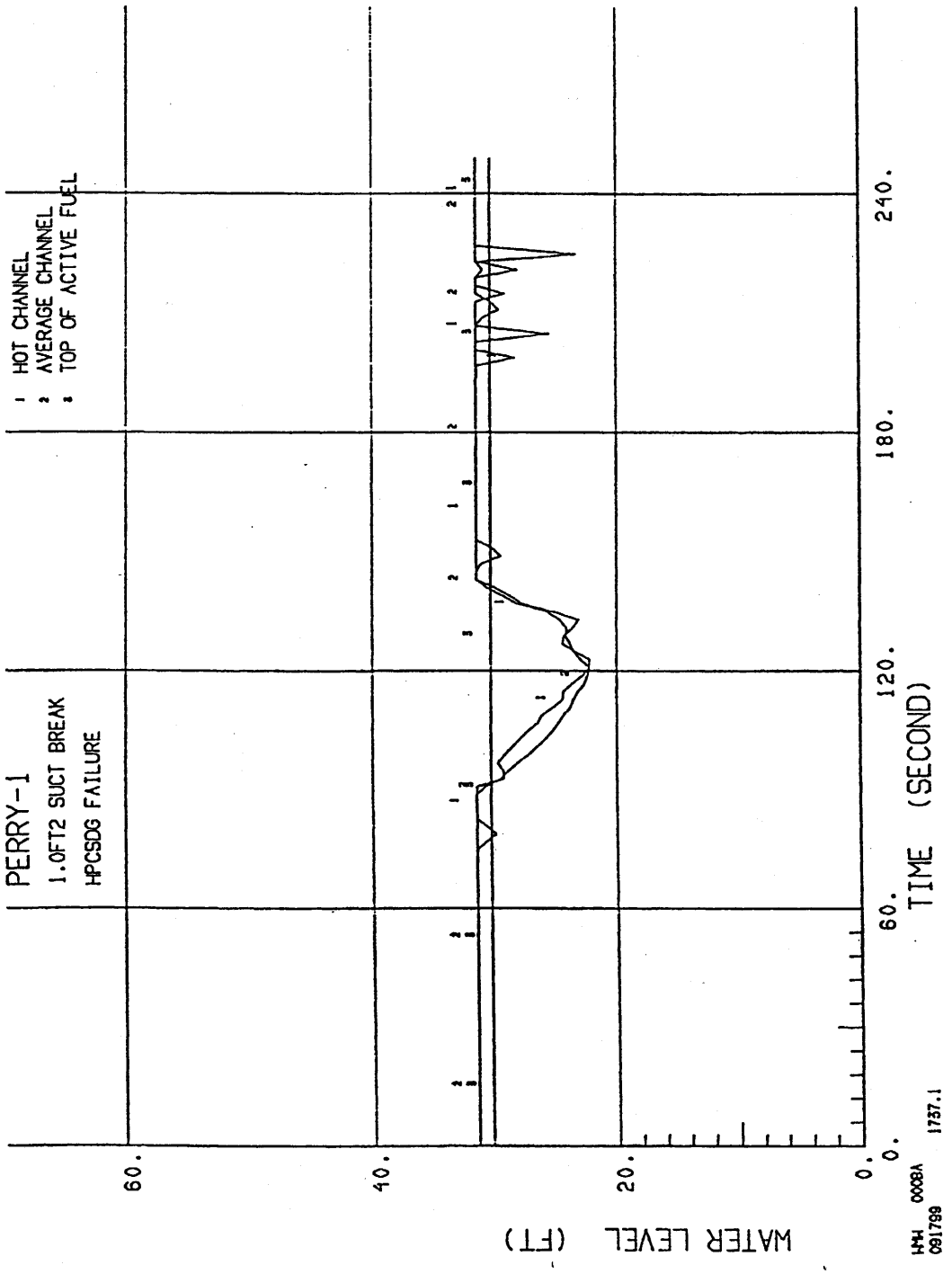
PERRY NUCLEAR POWER PLANT

Minimum Critical Power Ratio –
DBA Suction –
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-11 (Sheet 11 of 11)



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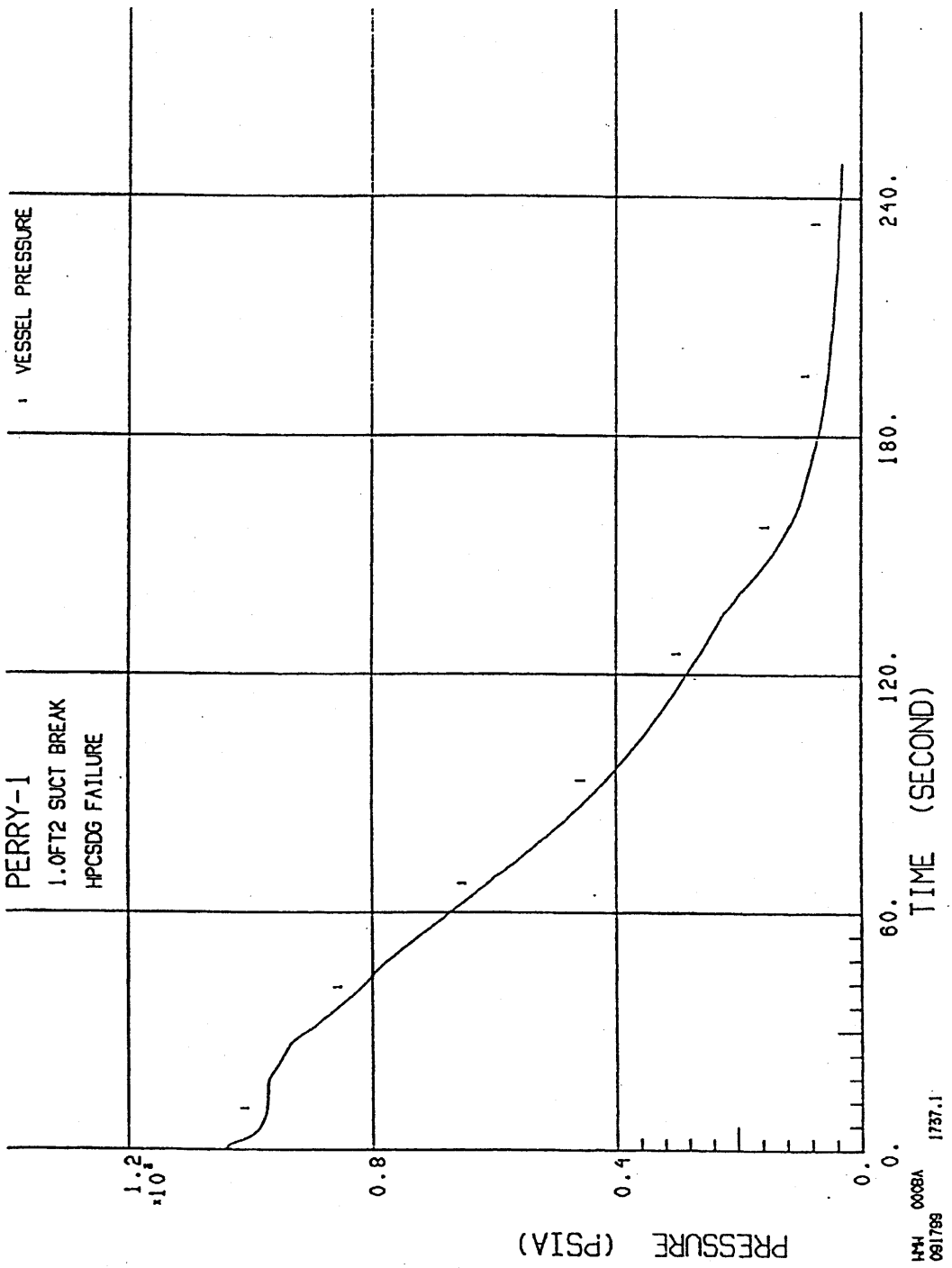
PERRY NUCLEAR POWER PLANT

Water Level in Hot and Average Channel - 1.0 ft^2 Suction - HPCS D/G Failure (Nominal) LPCS + 3LPCI + ADS Available

Figure 6.3-12 (Sheet 1 of 7)



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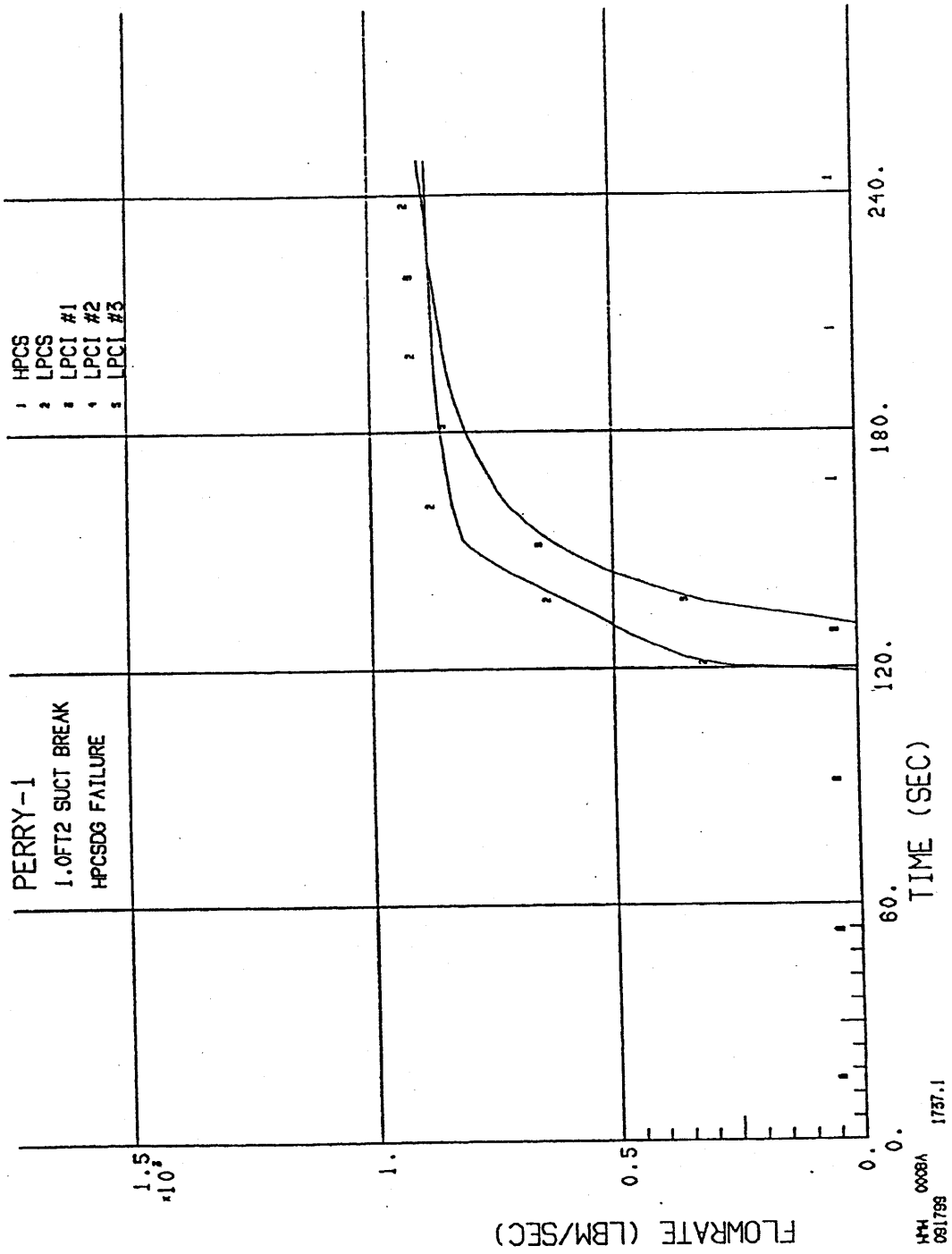
PERRY NUCLEAR POWER PLANT

Reactor Vessel Pressure -
1.0 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-12 (Sheet 2 of 7)



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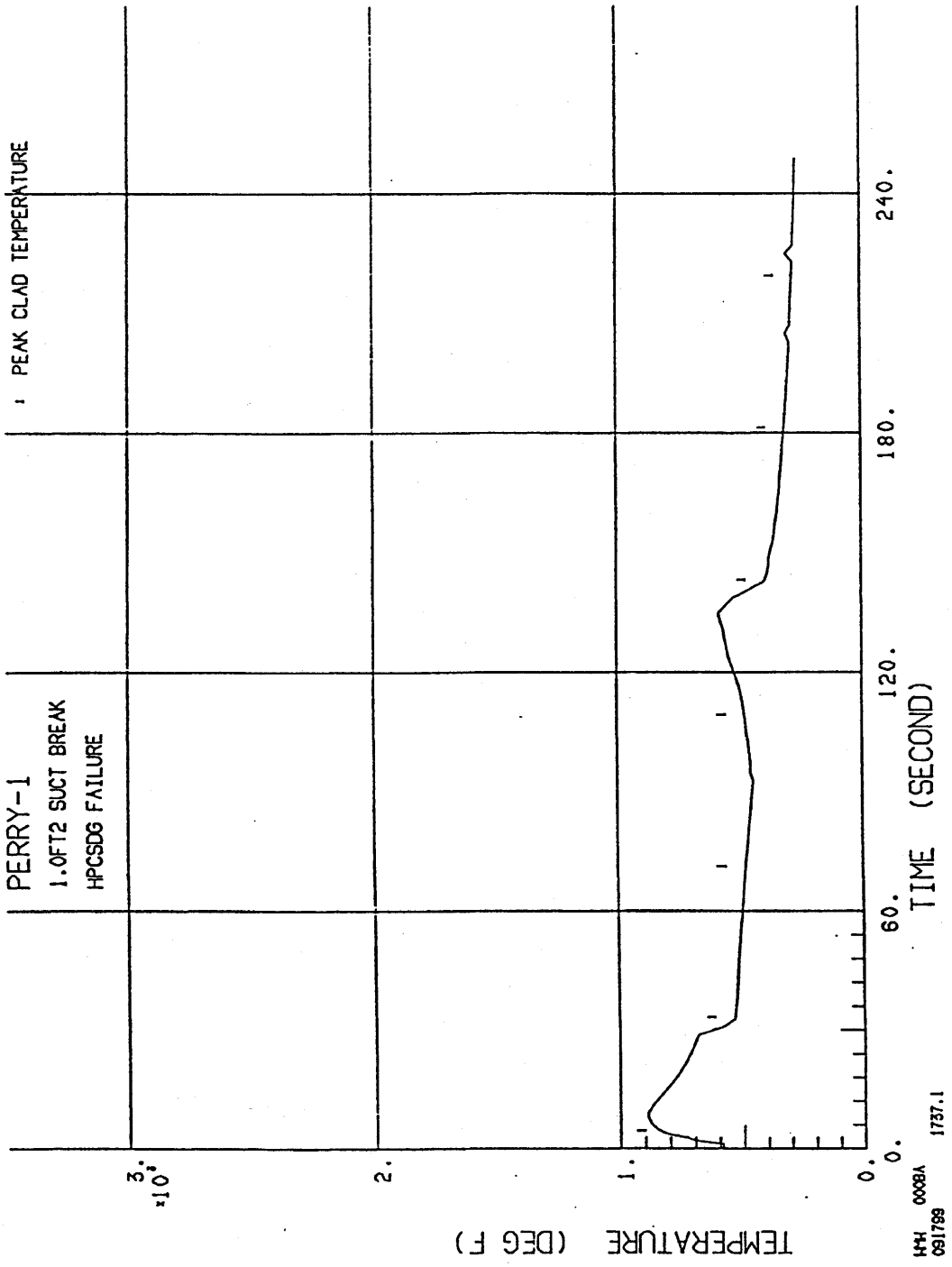
PERRY NUCLEAR POWER PLANT

ECCS Flow - 1.0 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-12 (Sheet 5 of 7)



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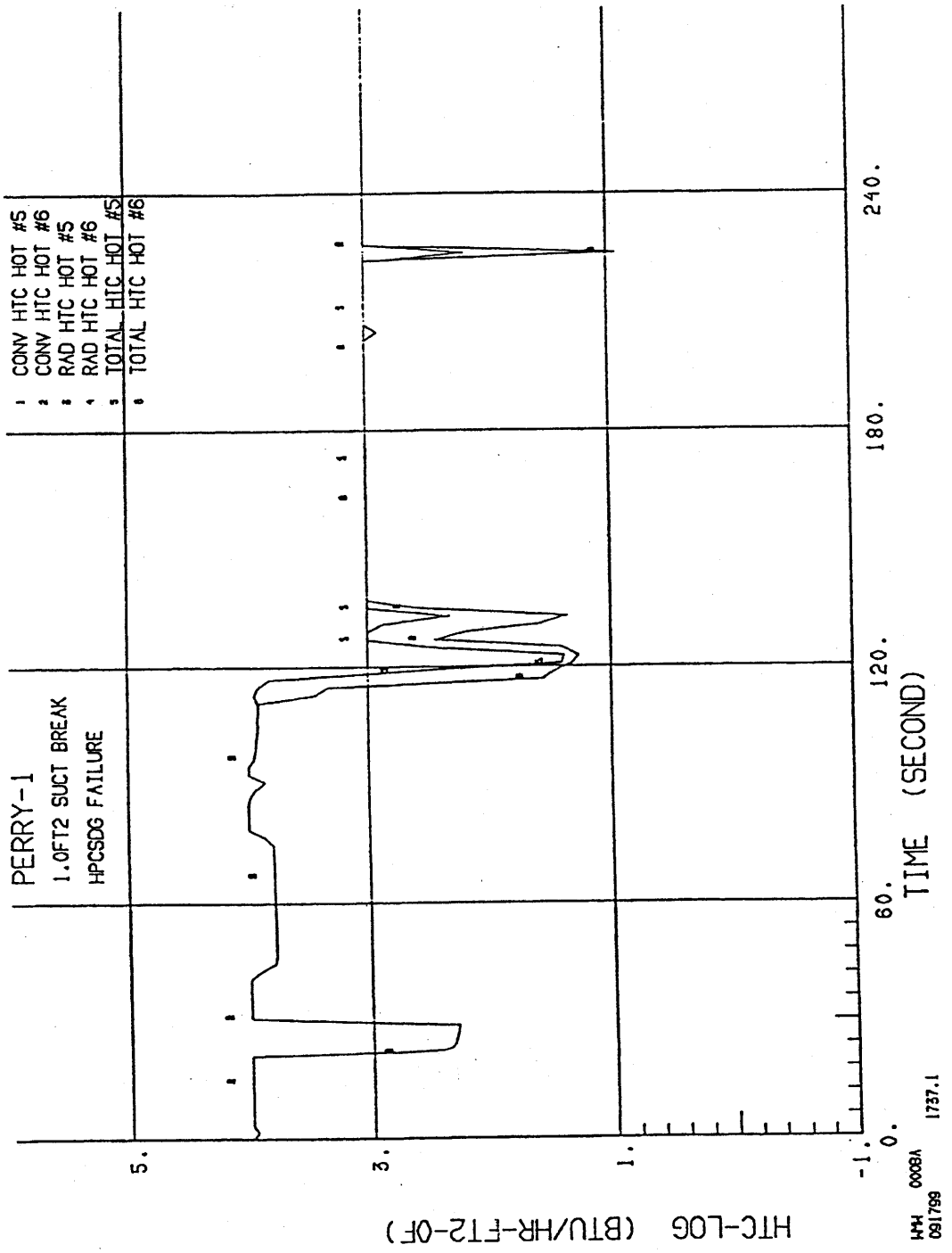
PERRY NUCLEAR POWER PLANT

Peak Cladding Temperature
(GE11) - 1.0 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-12 (Sheet 6 of 7)



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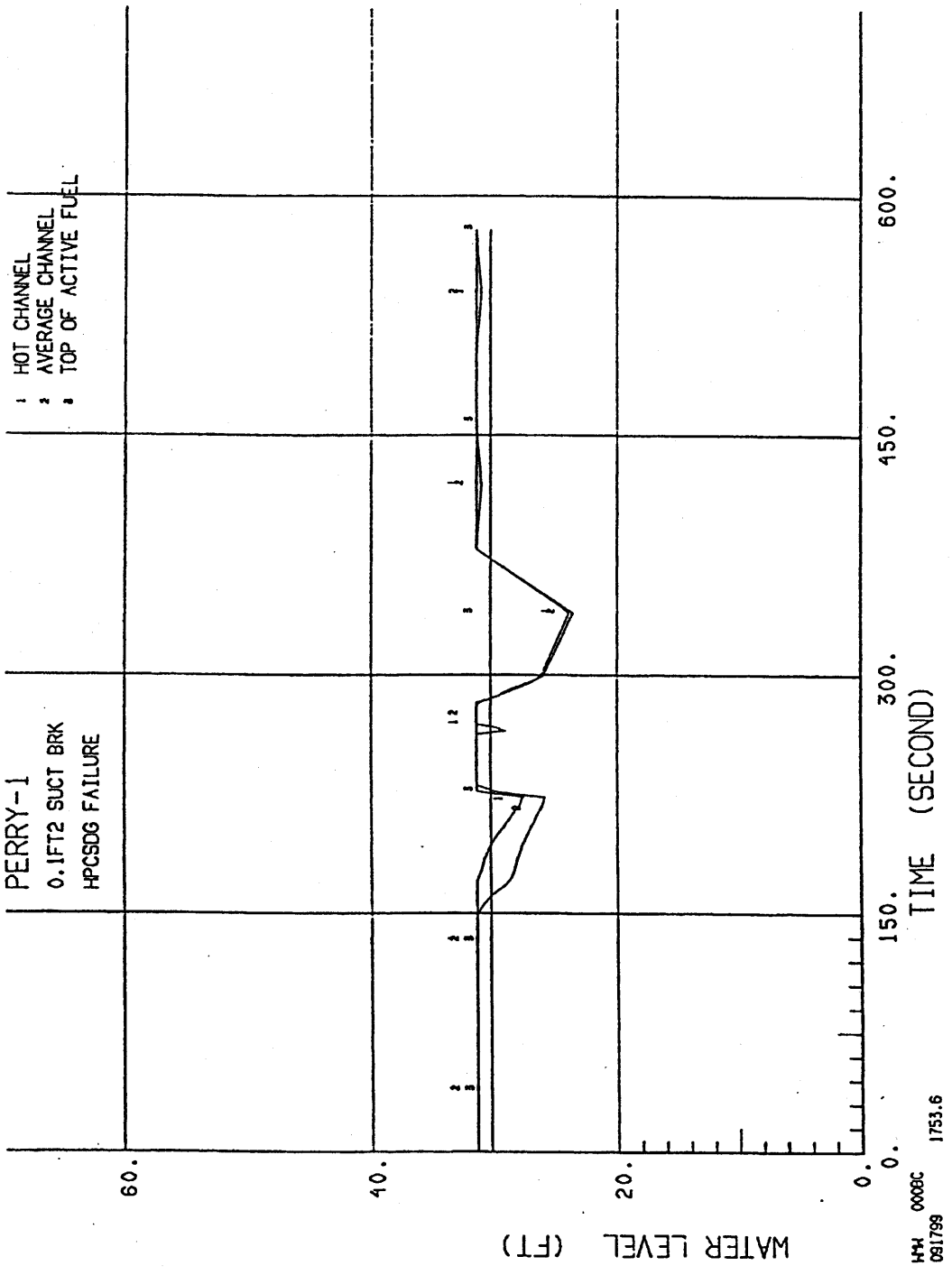
PERRY NUCLEAR POWER PLANT

Heat Transfer Coefficient
(GE11) - 1.0 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-12 (Sheet 7 of 7)



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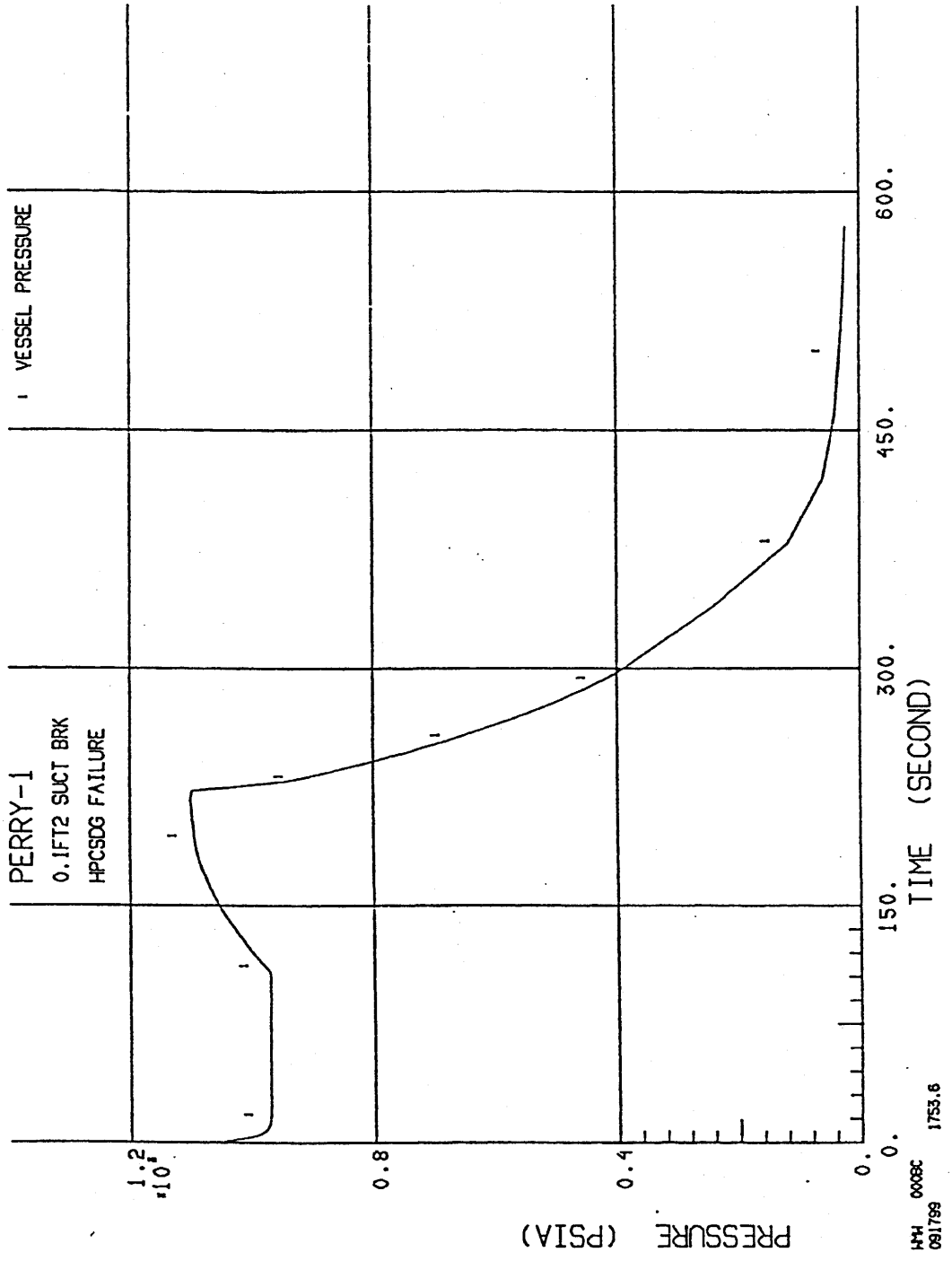
PERRY NUCLEAR POWER PLANT

Water Level in Hot and Average Channel - 0.1 ft^2 Suction - HPCS D/G Failure (Nominal) LPCS + 3LPCI + ADS Available

Figure 6.3-13 (Sheet 1 of 7)



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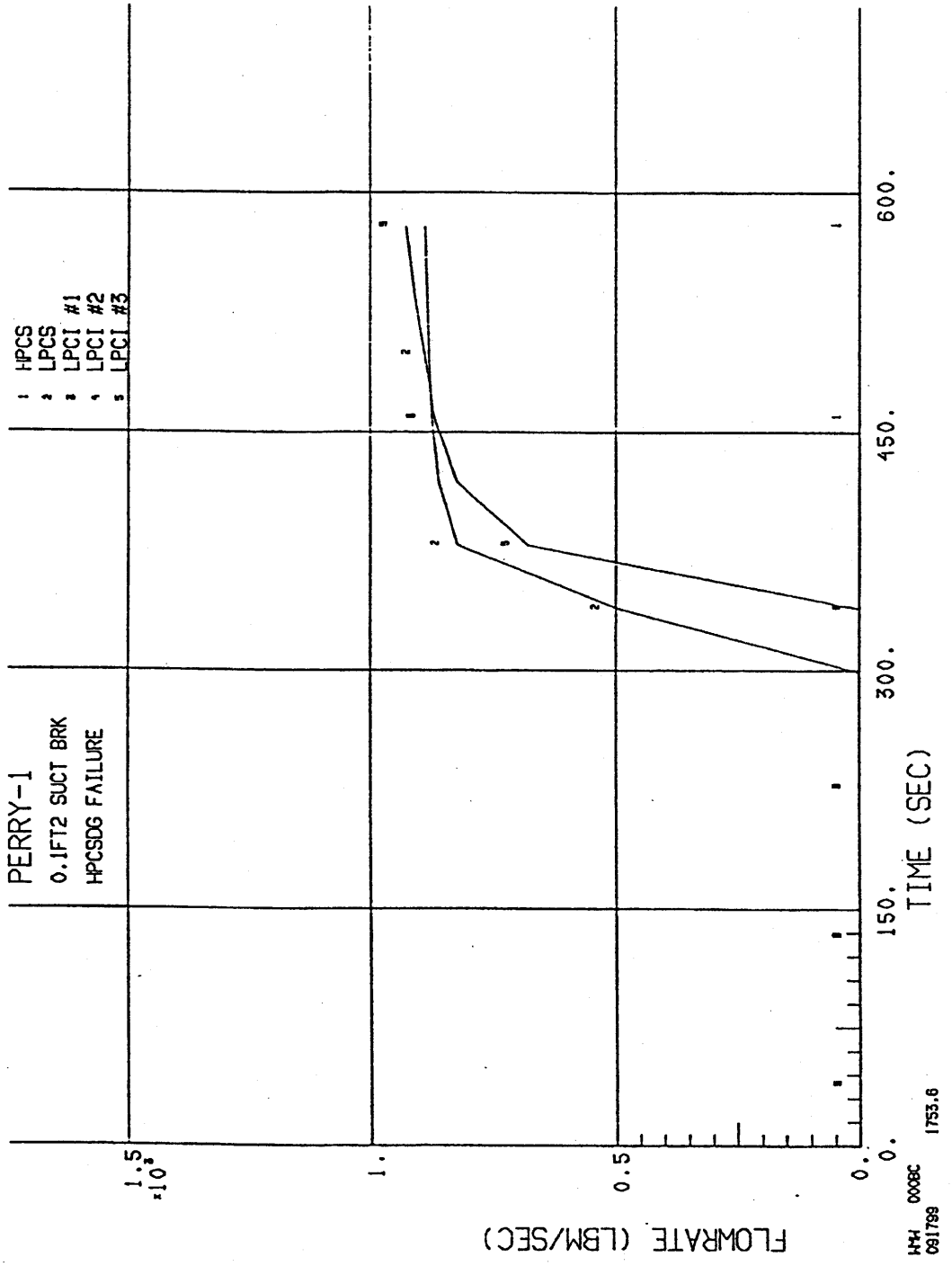
PERRY NUCLEAR POWER PLANT

Reactor Vessel Pressure –
0.1 ft^2 Suction –
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-13 (Sheet 2 of 7)



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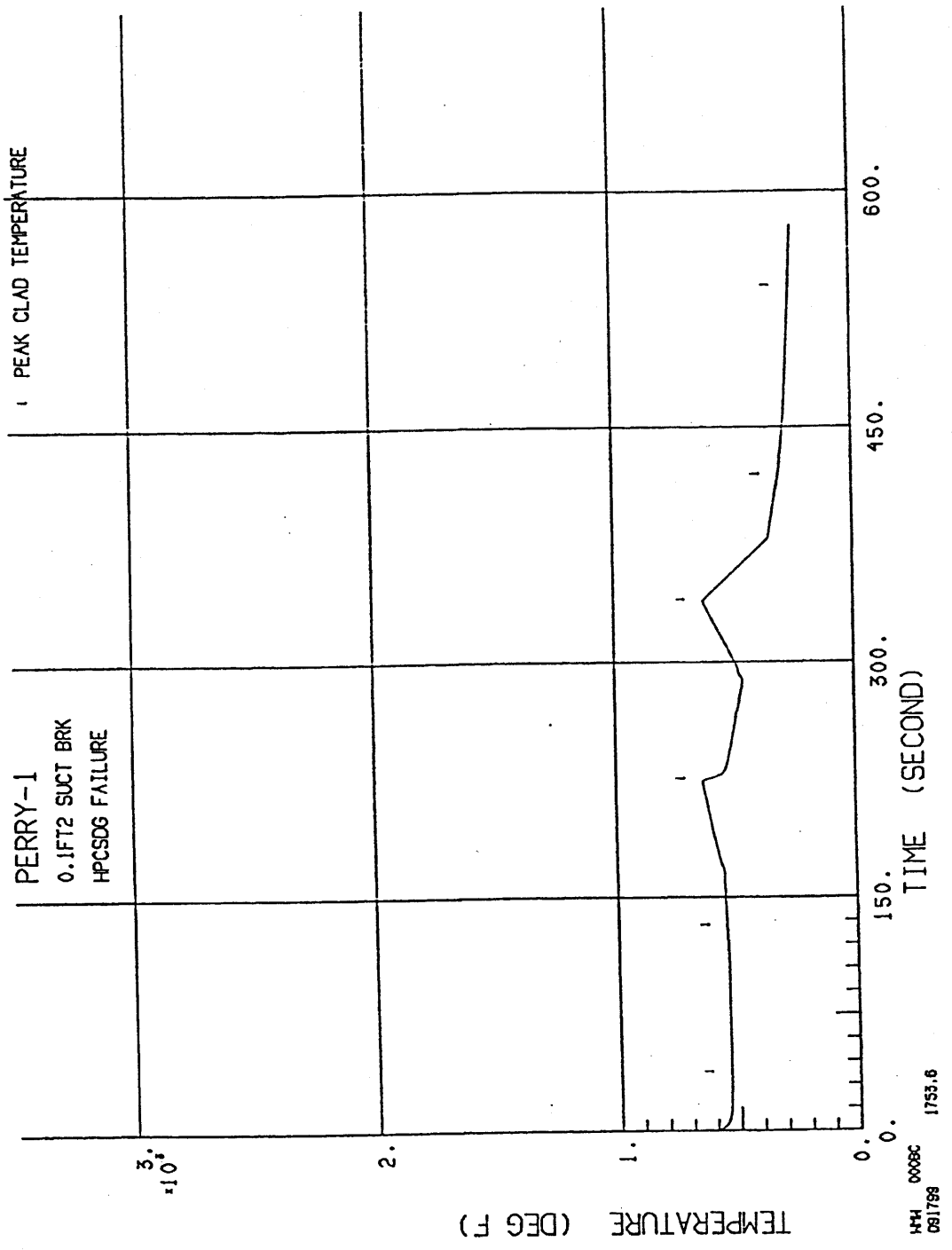
PERRY NUCLEAR POWER PLANT

ECCS Flow - 0.1 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-13 (Sheet 5 of 7)



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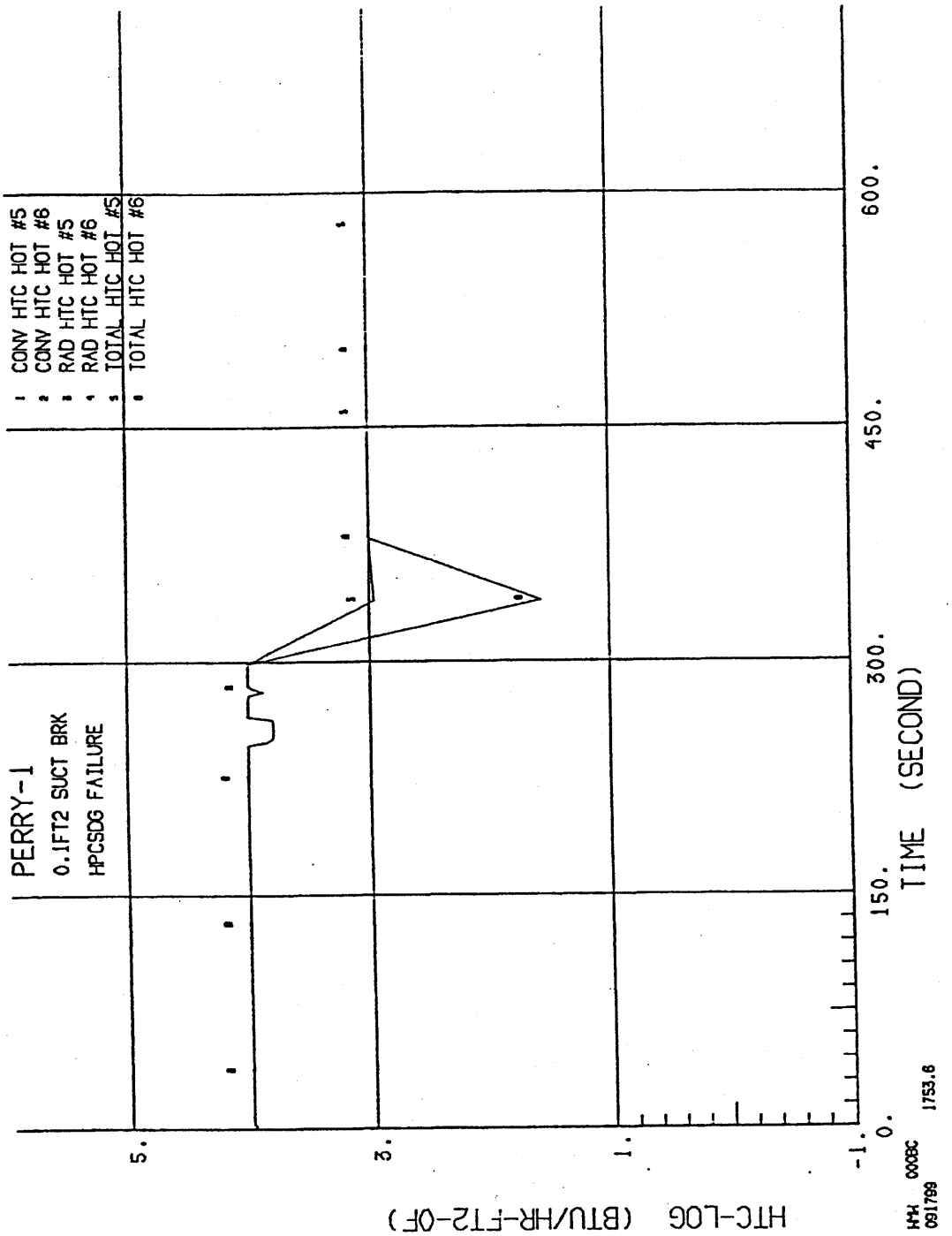
PERRY NUCLEAR POWER PLANT

Peak Cladding Temperature
(GE11) - 0.1 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-13 (Sheet 6 of 7)



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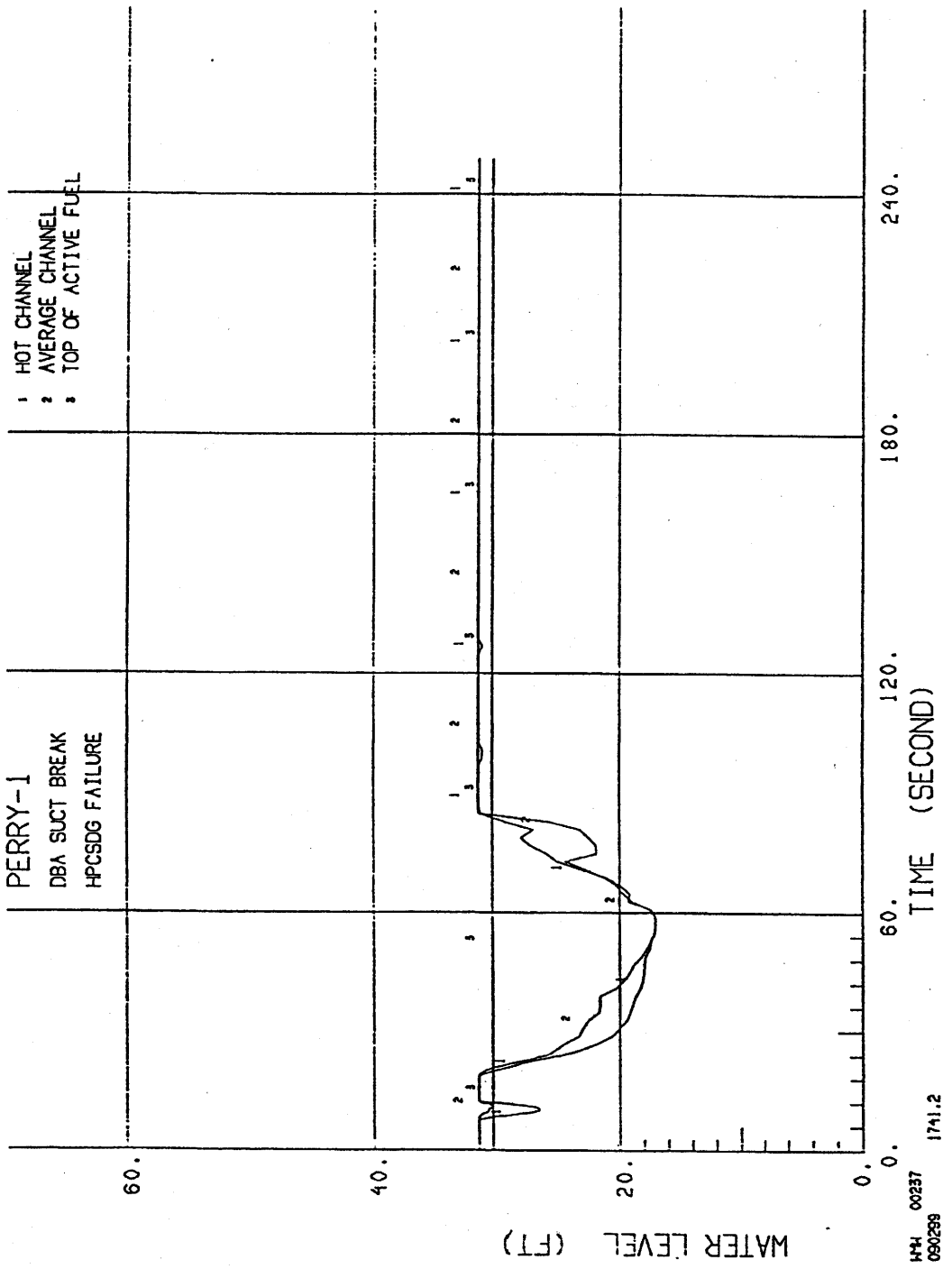
PERRY NUCLEAR POWER PLANT

Heat Transfer Coefficient
(GE11) - 0.1 ft^2 Suction -
HPCS D/G Failure (Nominal)
LPCS + 3LPCI + ADS Available

Figure 6.3-13 (Sheet 7 of 7)



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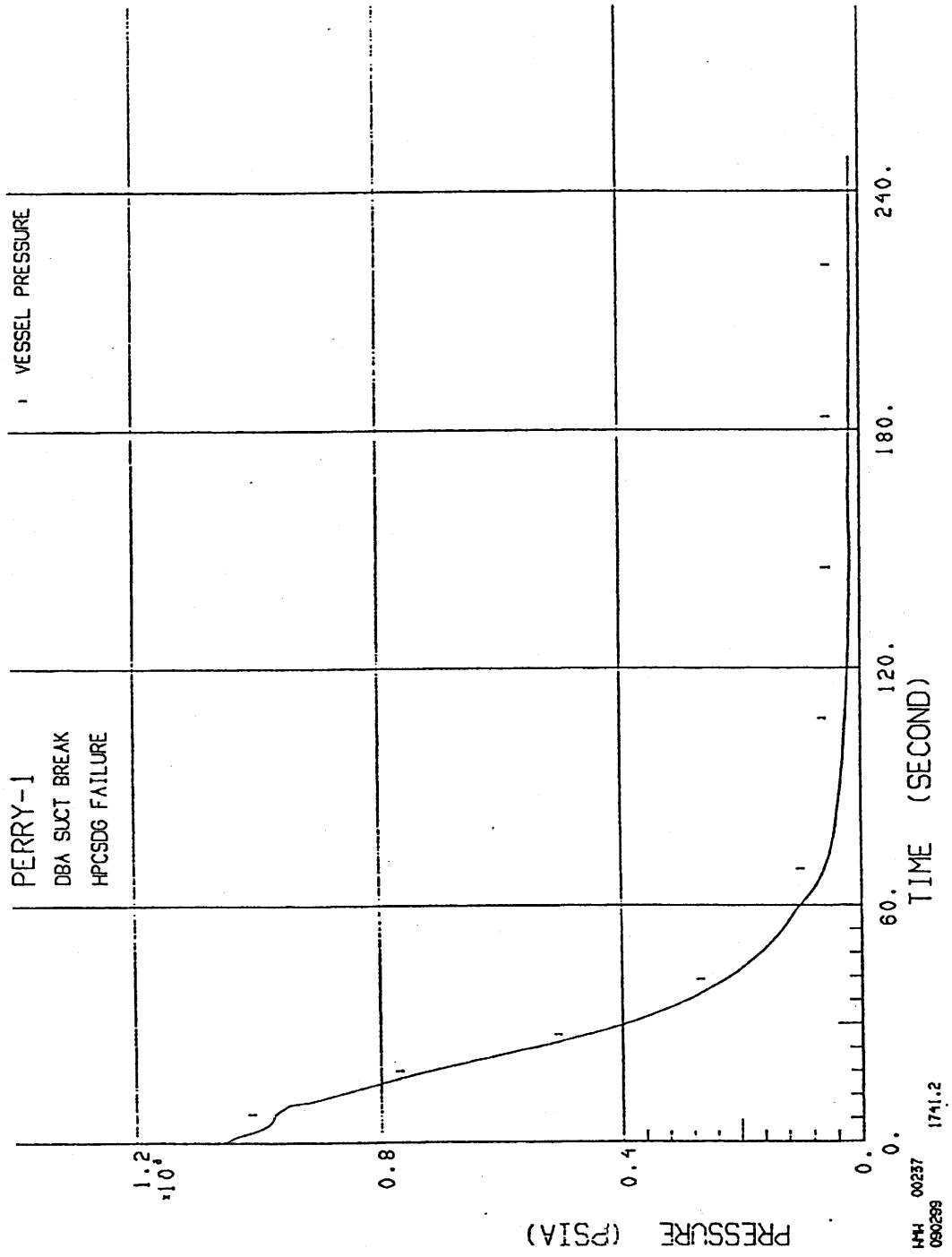
PERRY NUCLEAR POWER PLANT

Water Level in Hot and Average Channel - DBA Suction - HPCS D/G Failure (Appendix K) LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 1 of 11)



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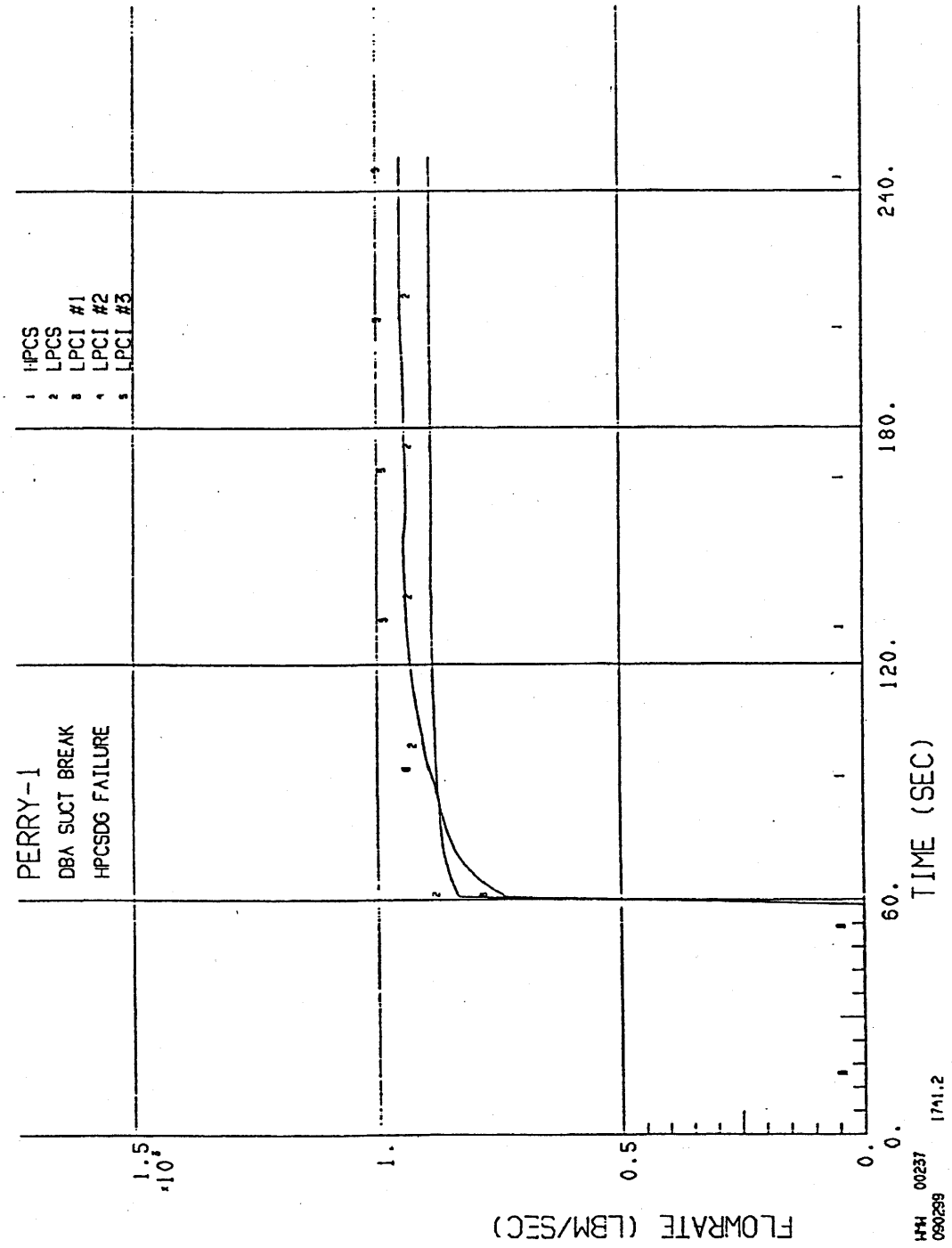
PERRY NUCLEAR POWER PLANT

Reactor Vessel Pressure -
DBA Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 2 of 11)



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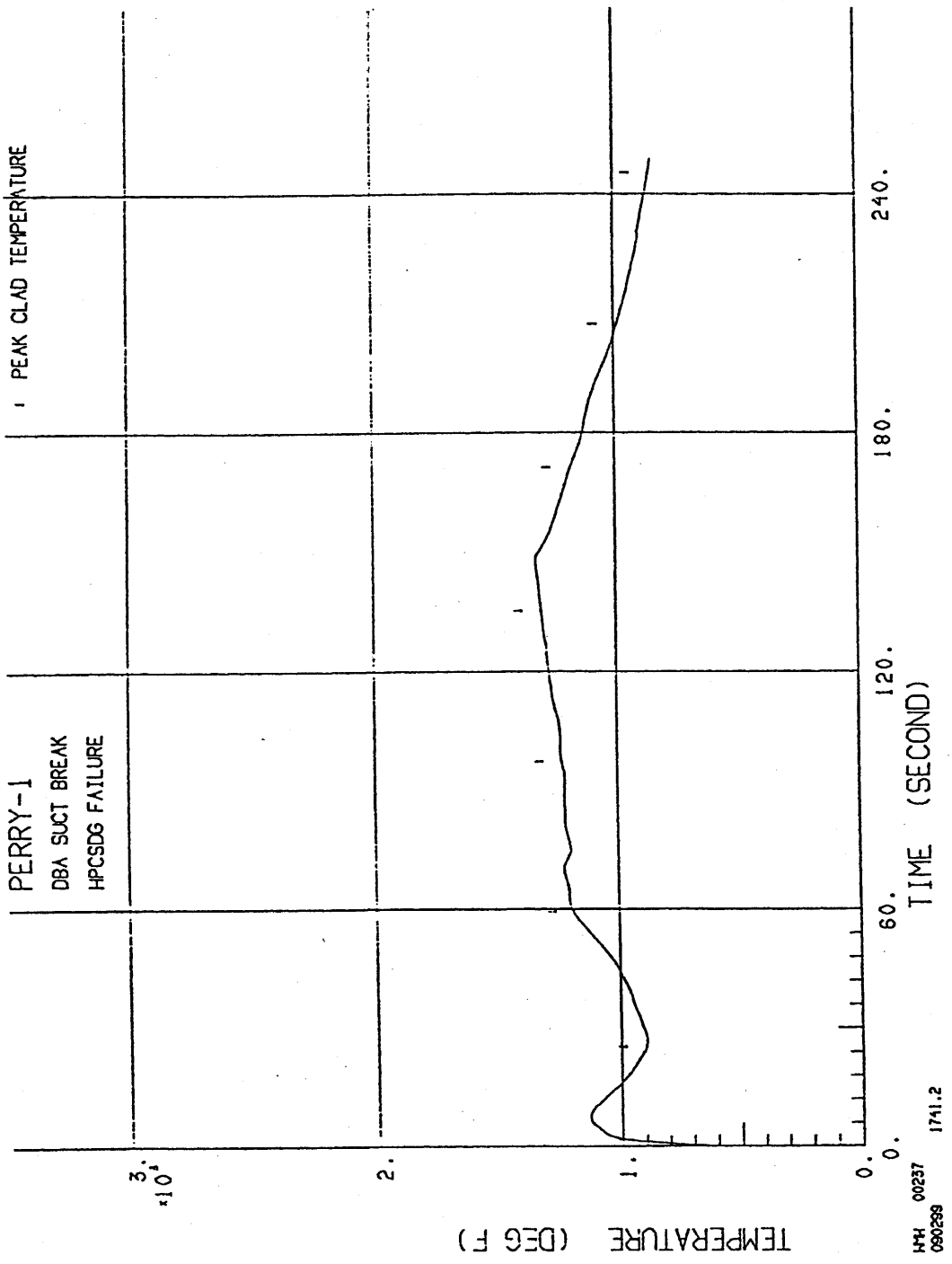
PERRY NUCLEAR POWER PLANT

ECCS Flow - DBA Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 5 of 11)



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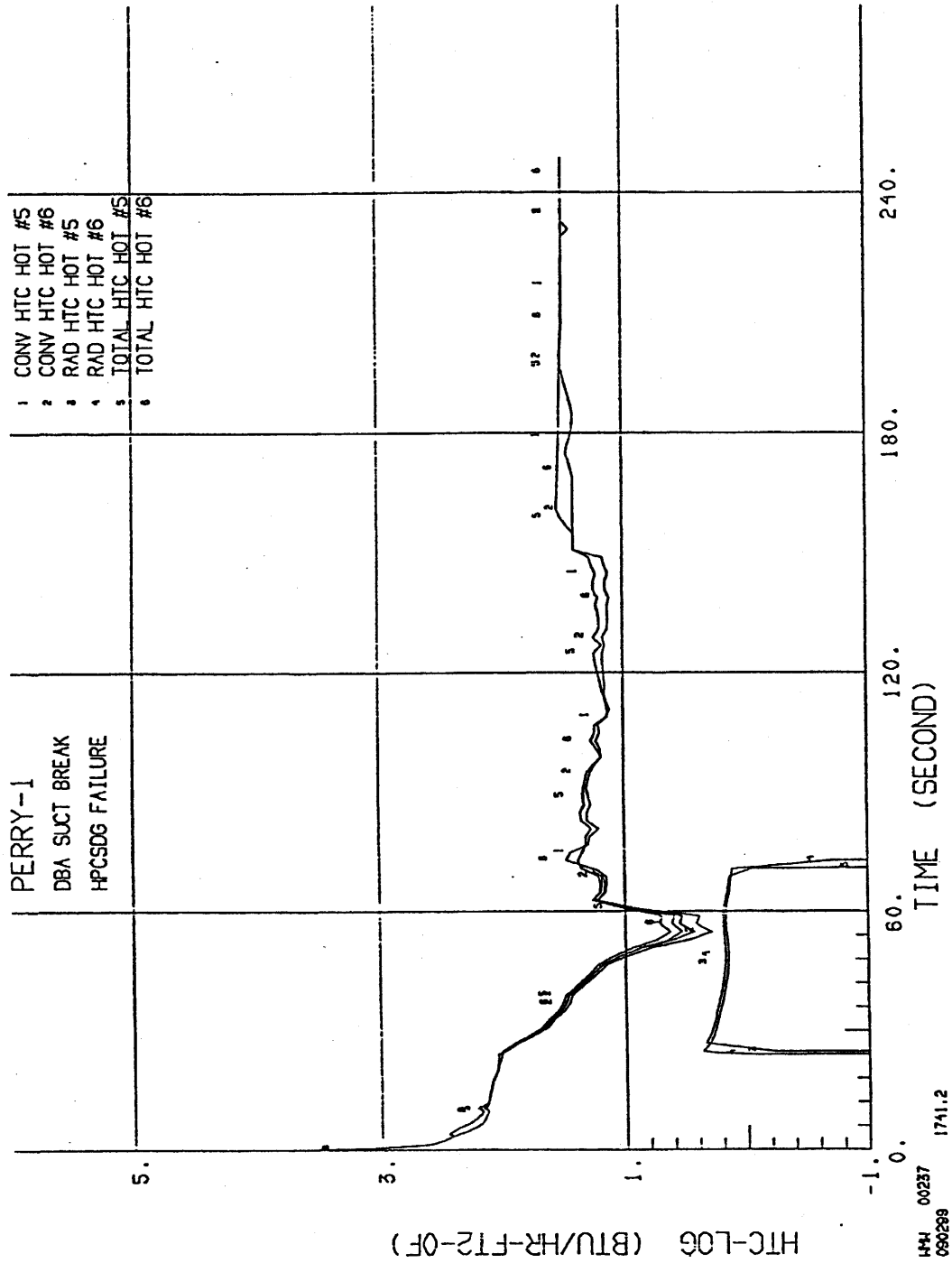
PERRY NUCLEAR POWER PLANT

Peak Cladding Temperature
(GE11) - DBA Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 6 of 11)



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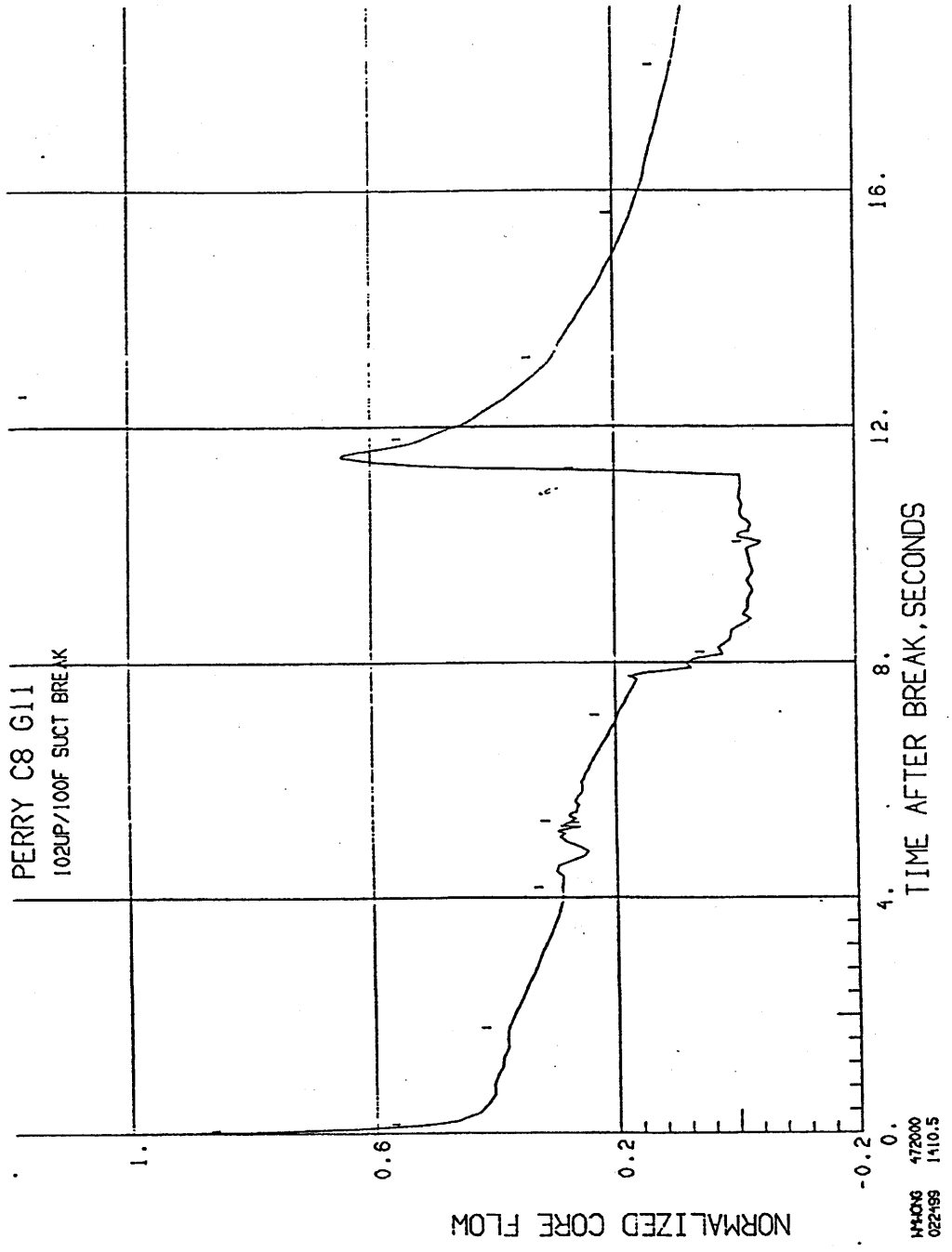
PERRY NUCLEAR POWER PLANT

Heat Transfer Coefficient
(GE11) - DBA Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 7 of 11)



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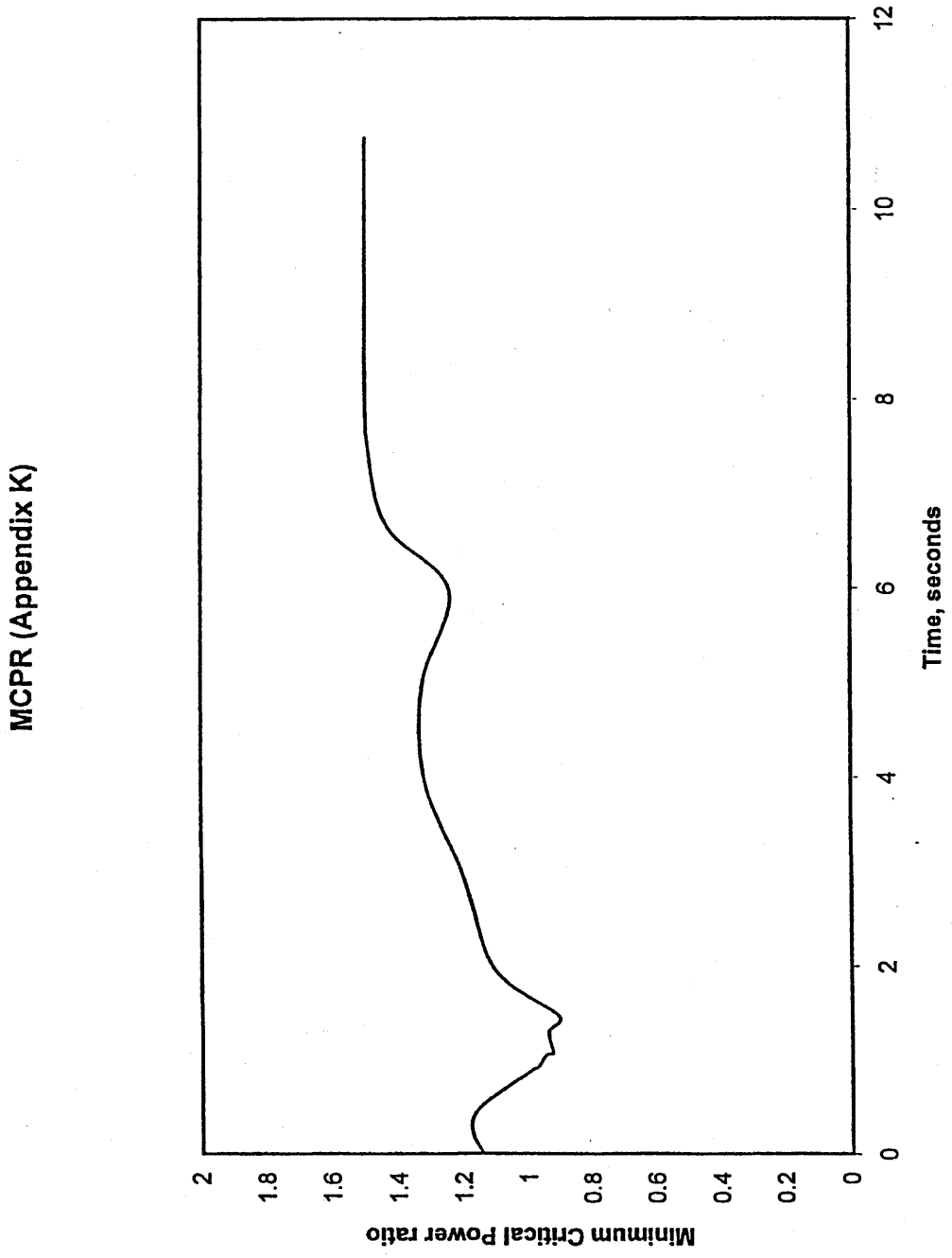
PERRY NUCLEAR POWER PLANT

Core Average Inlet Flow -
DBA Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 10 of 11)

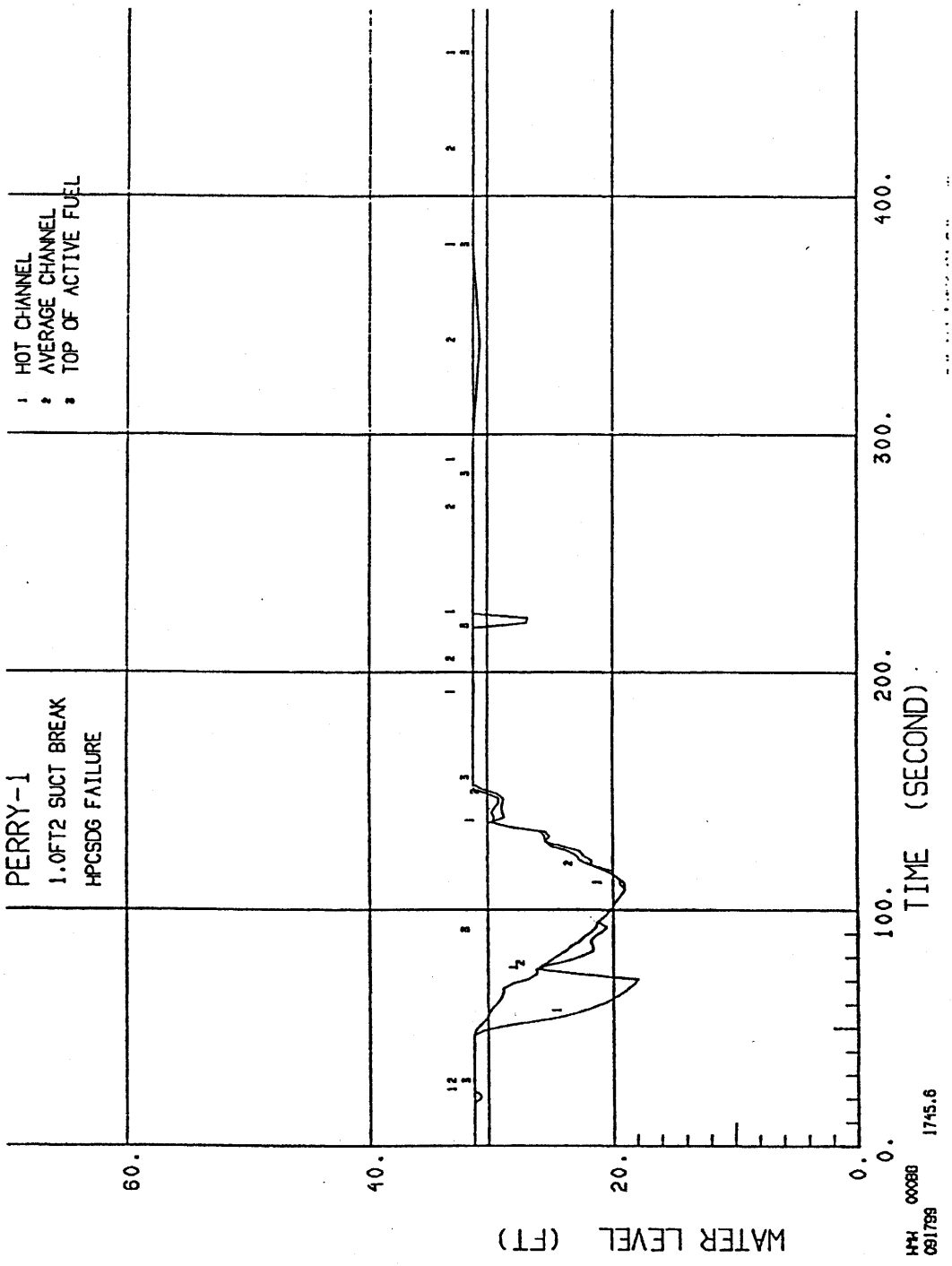


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Minimum Critical Power Ratio -
DBA Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-14 (Sheet 11 of 11)



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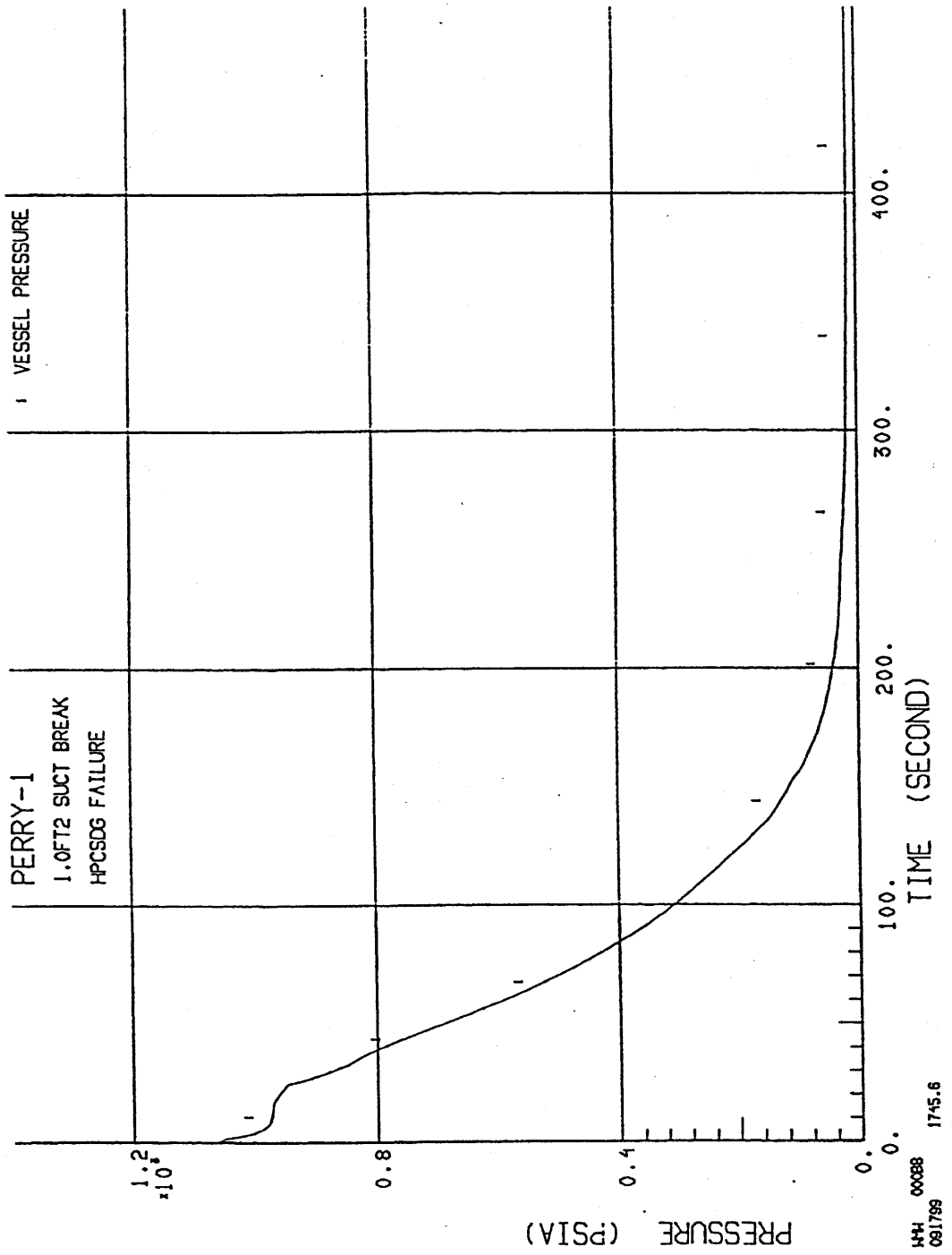
PERRY NUCLEAR POWER PLANT

Water Level in Hot and Average Channel - 1.0 ft^2 Suction - HPCS D/G Failure (Appendix K) LPCS + 3LPCI + ADS Available

Figure 6.3-15 (Sheet 1 of 7)



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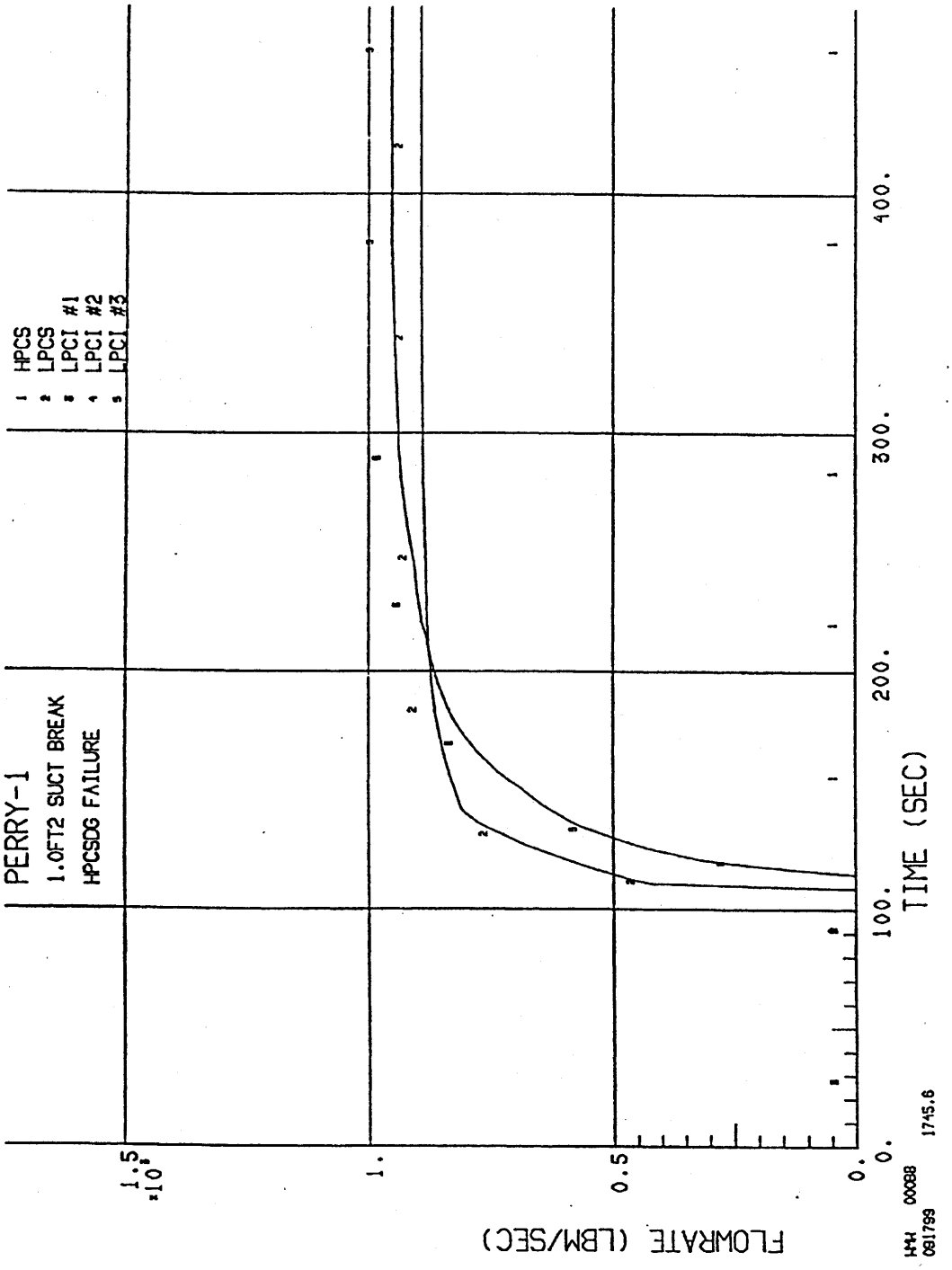
PERRY NUCLEAR POWER PLANT

Reactor Vessel Pressure -
1.0 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-15 (Sheet 2 of 7)



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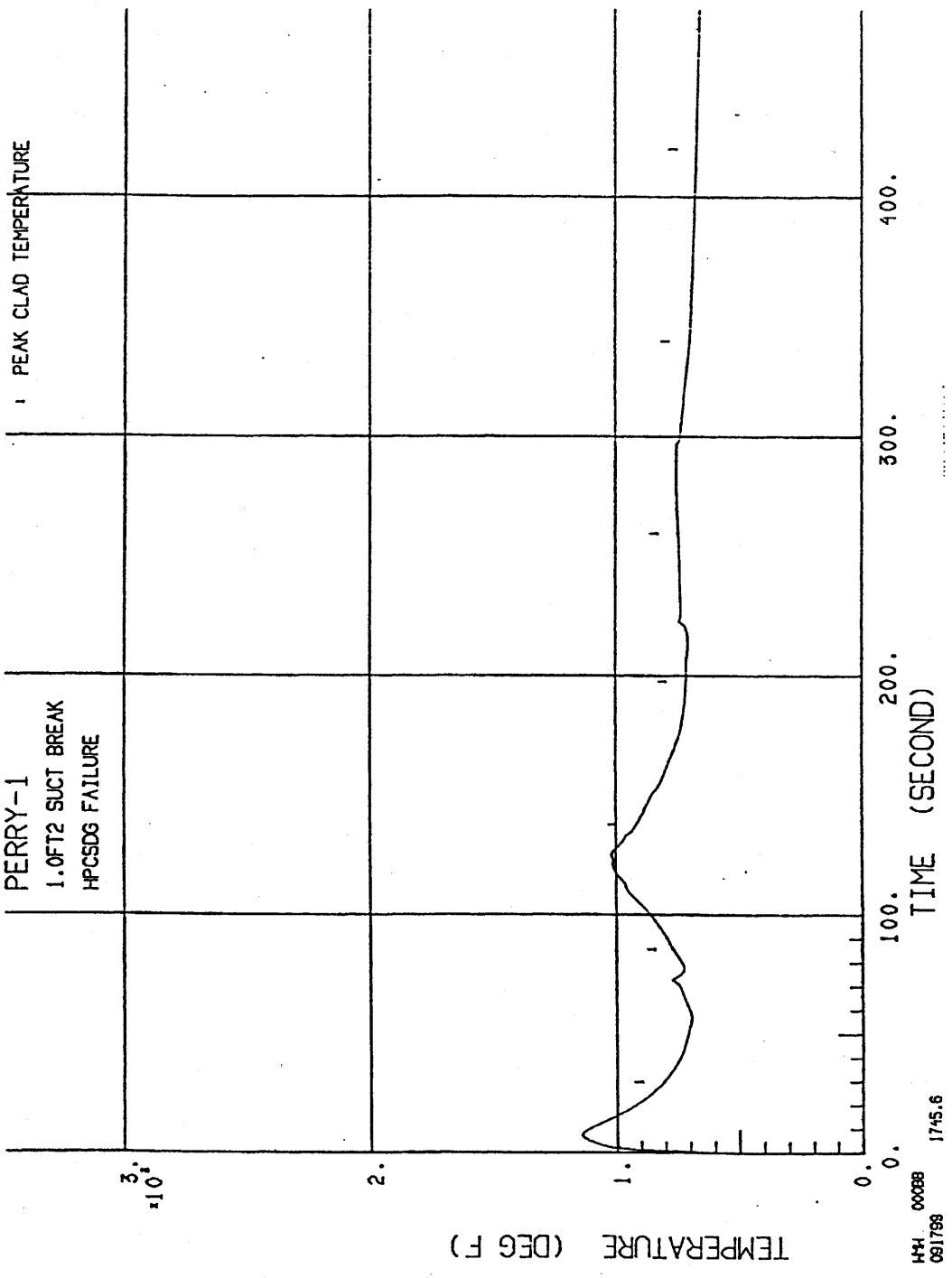
PERRY NUCLEAR POWER PLANT

ECCS Flow - 1.0 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-15 (Sheet 5 of 7)

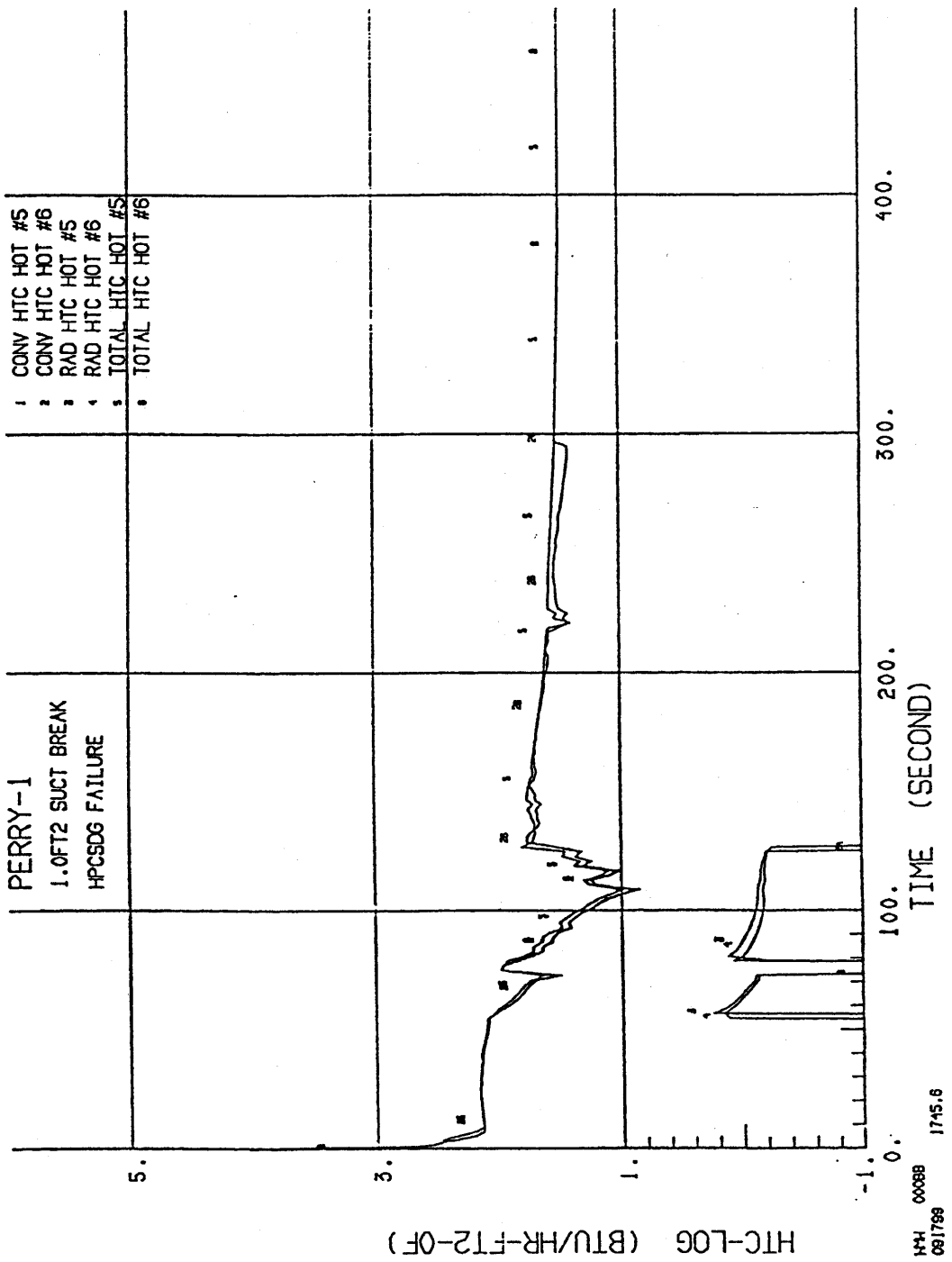


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Peak Cladding Temperature
(GE11) - 1.0 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-15 (Sheet 6 of 7)

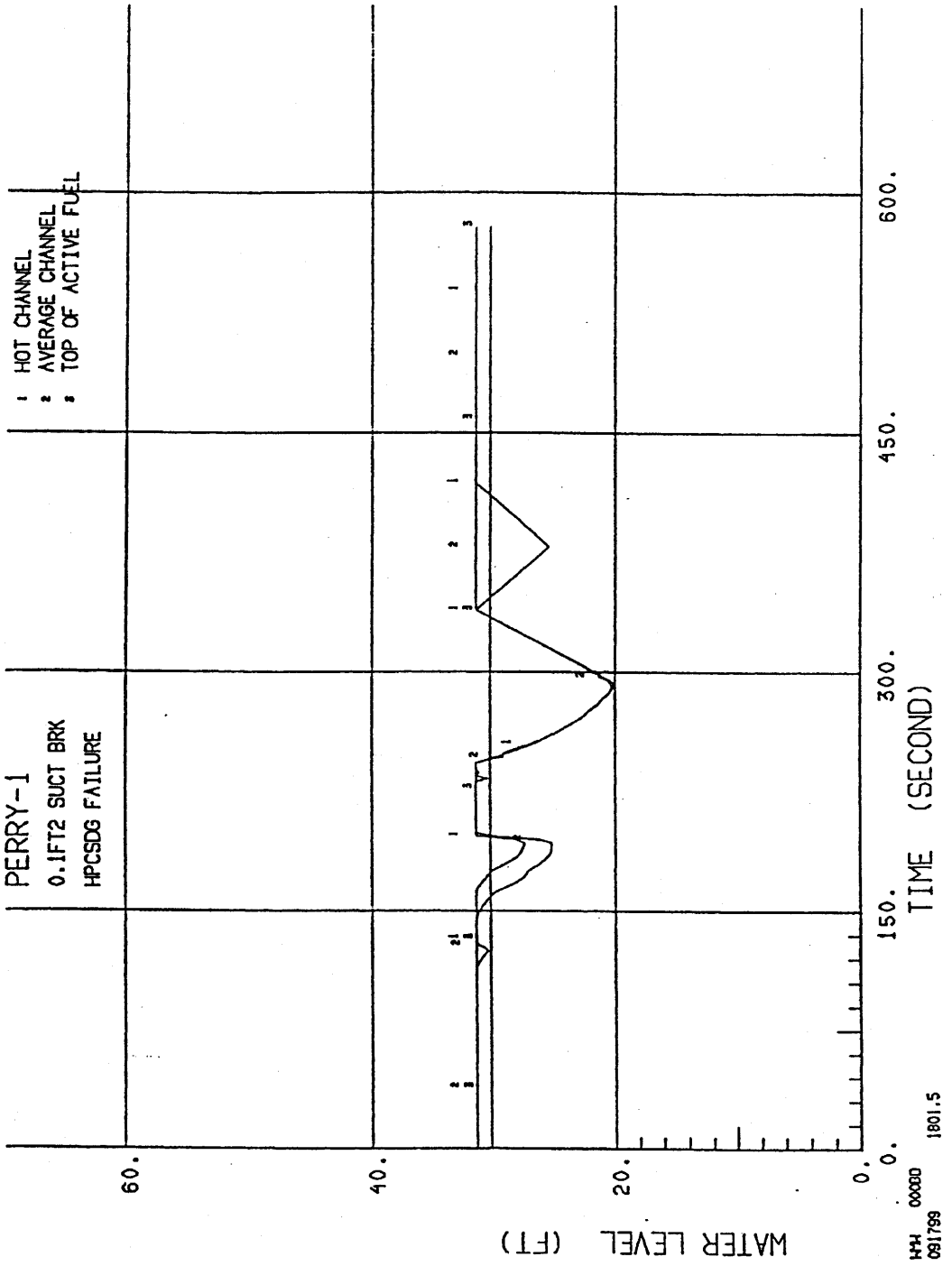


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Heat Transfer Coefficient
(GE11) - 1.0 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-15 (Sheet 7 of 7)

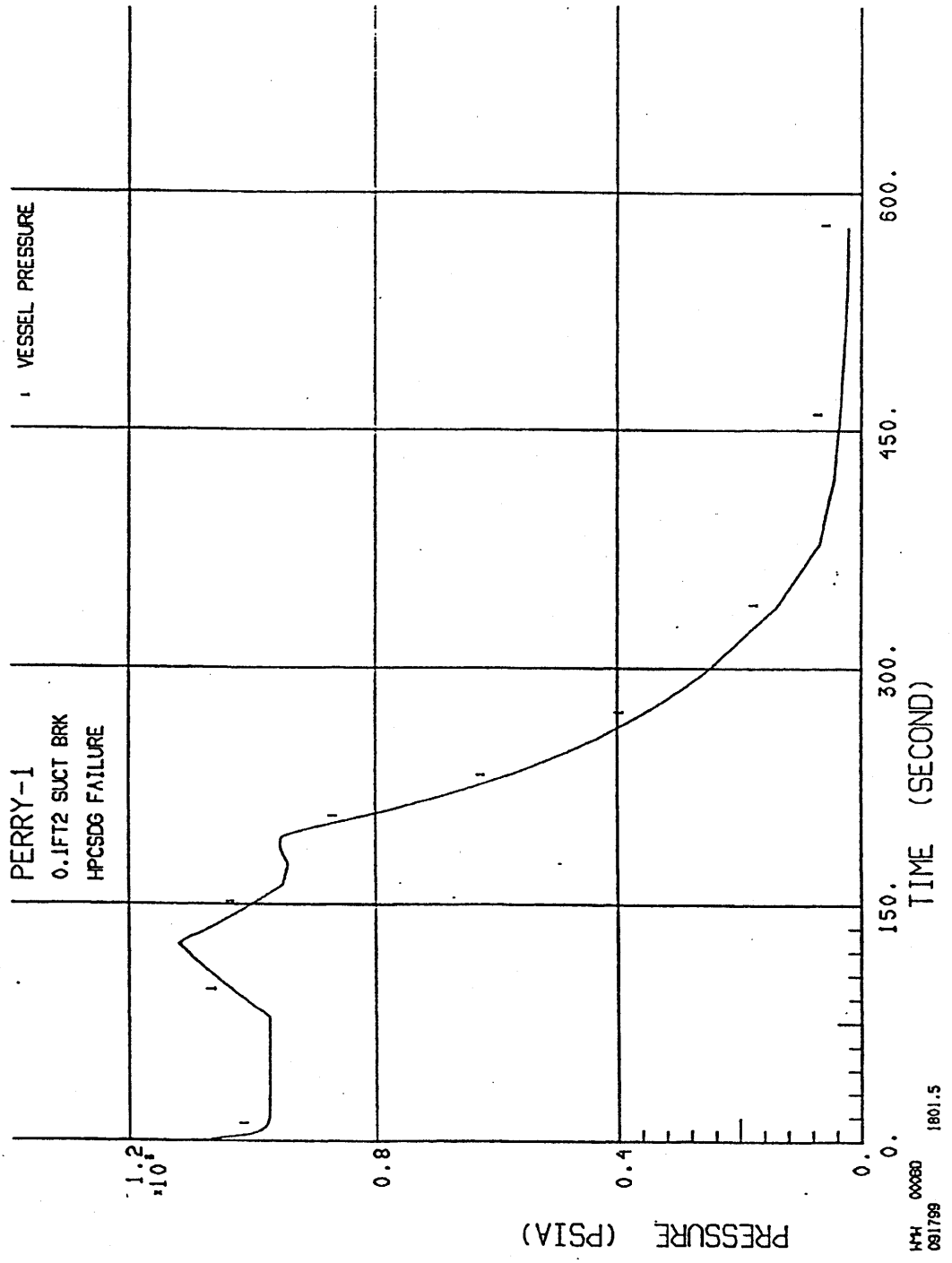


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Water Level in Hot and Average Channel - 0.1 ft^2 Suction - HPCS D/G Failure (Appendix K) LPCS + 3LPCI + ADS Available

Figure 6.3-16 (Sheet 1 of 7)

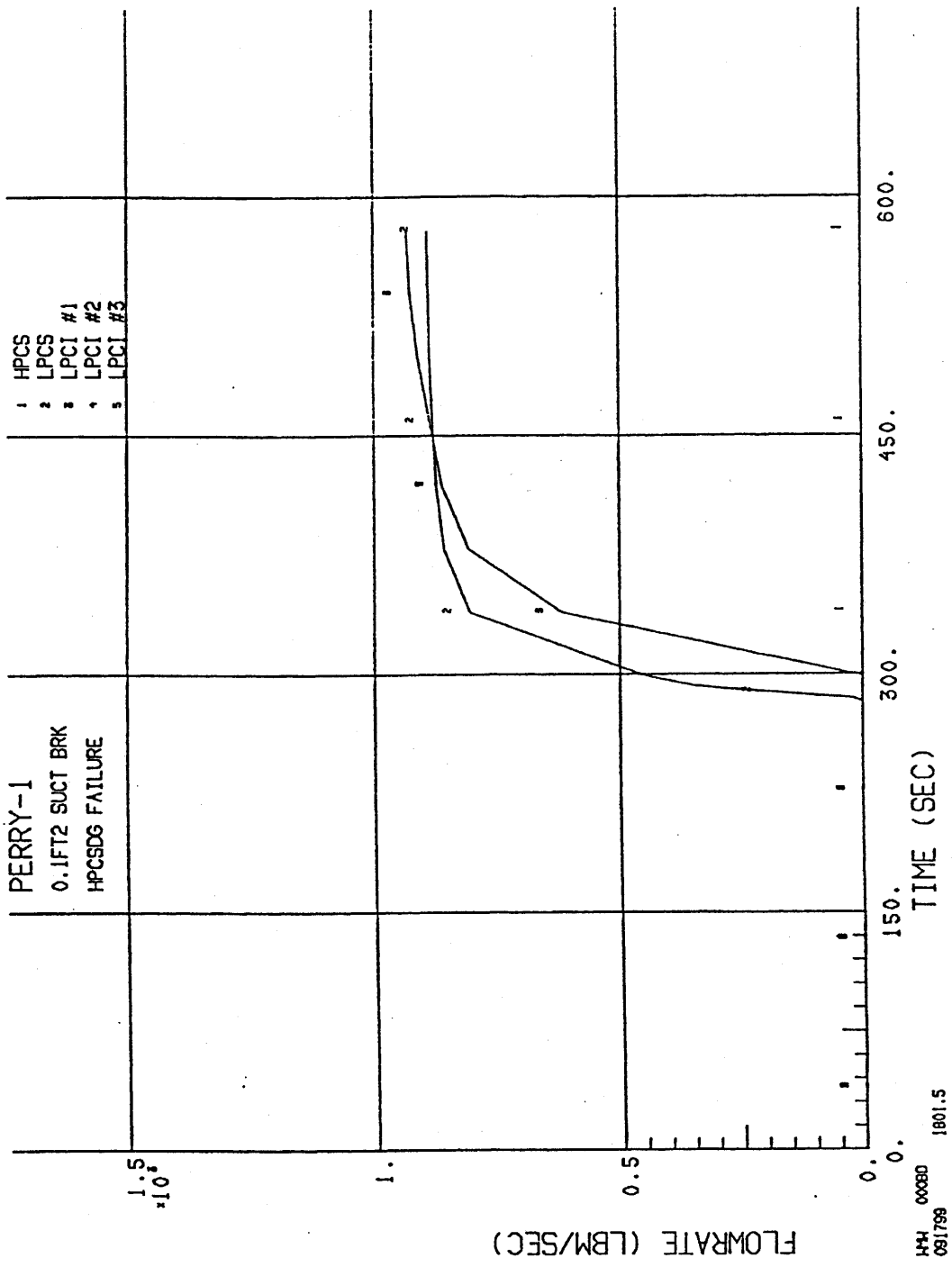


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Reactor Vessel Pressure -
0.1 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-16 (Sheet 2 of 7)

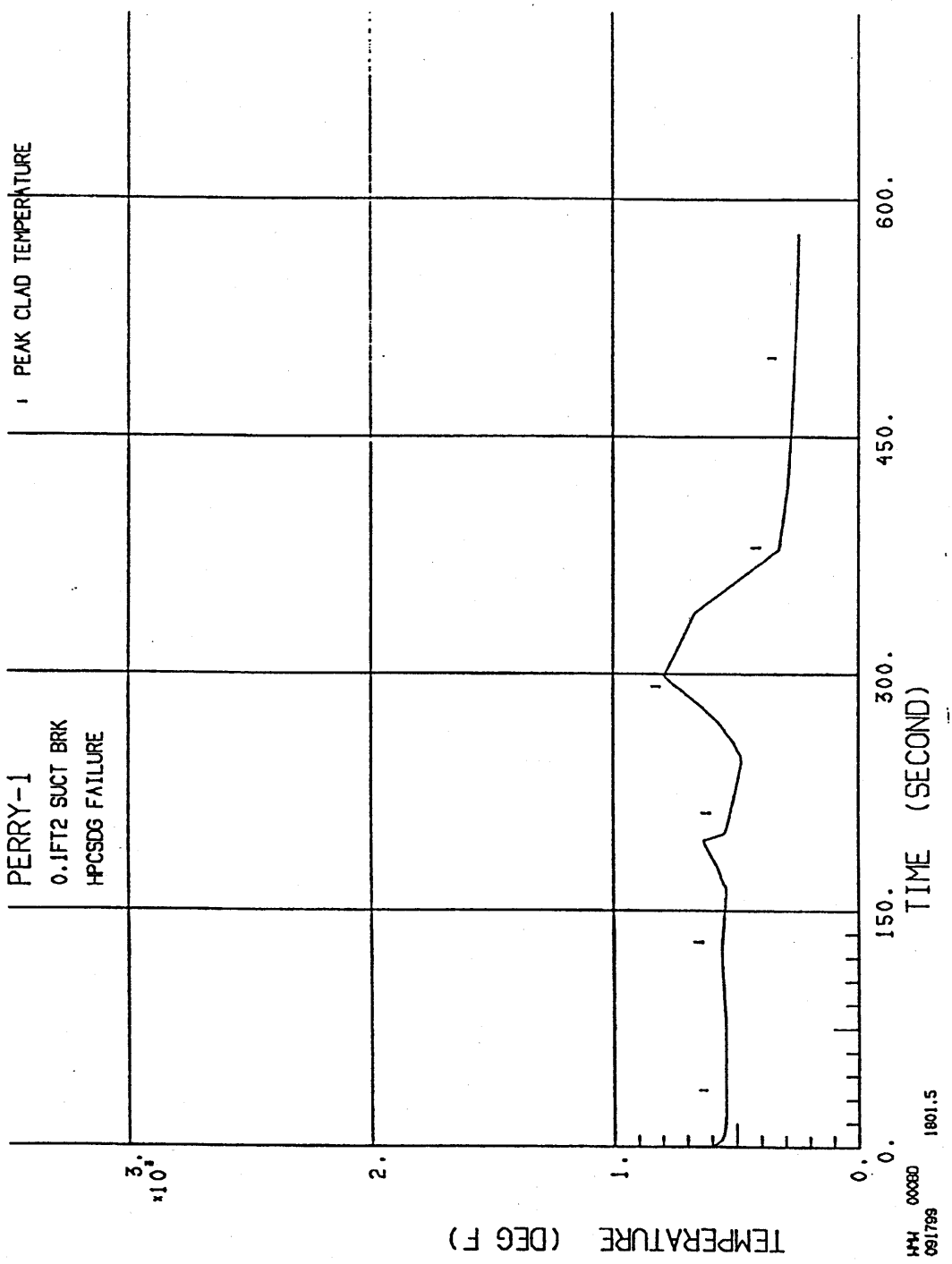


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

ECCS Flow - 0.1 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-16 (Sheet 5 of 7)



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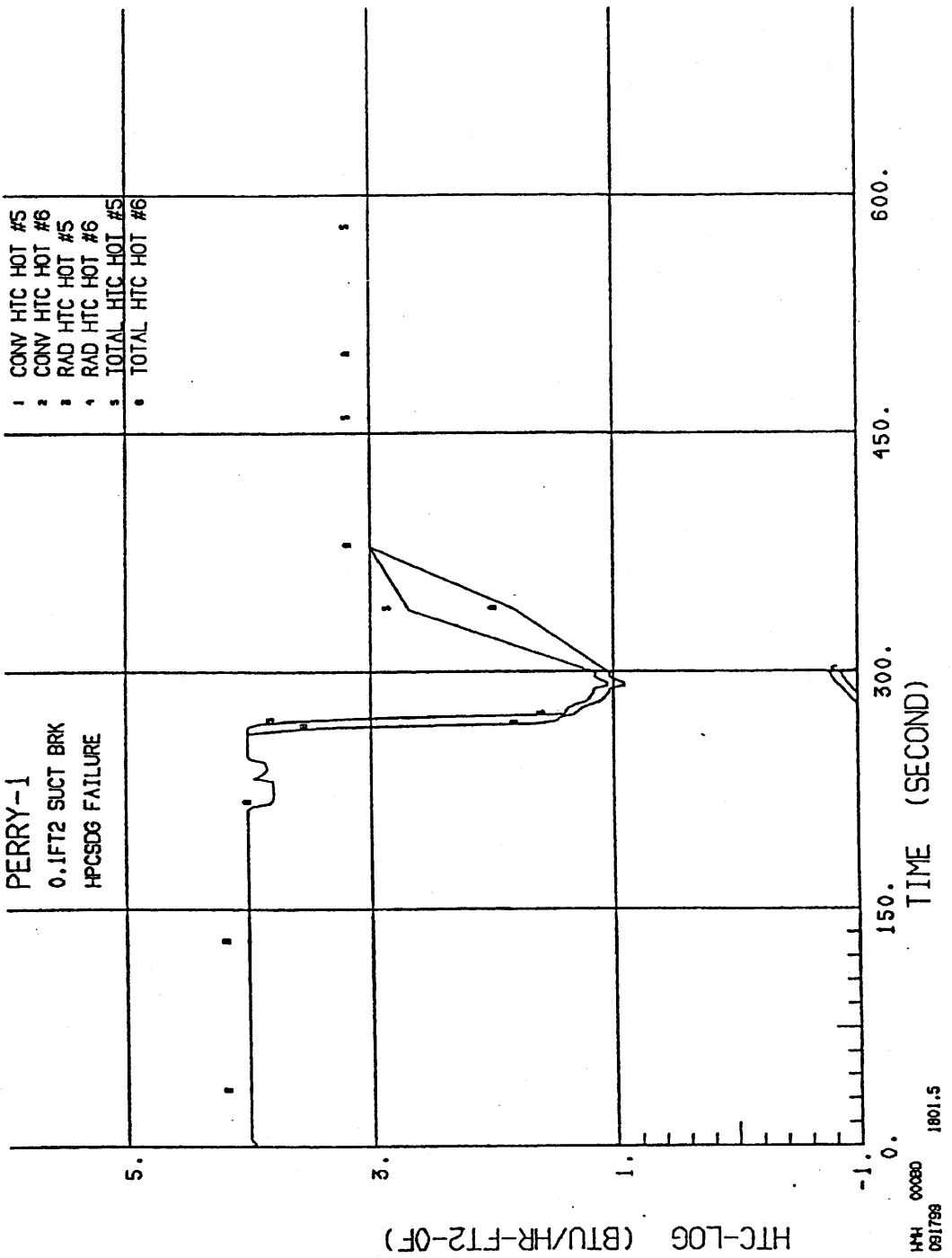
PERRY NUCLEAR POWER PLANT

Peak Cladding Temperature
(GE11) - 0.1 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-16 (Sheet 6 of 7)

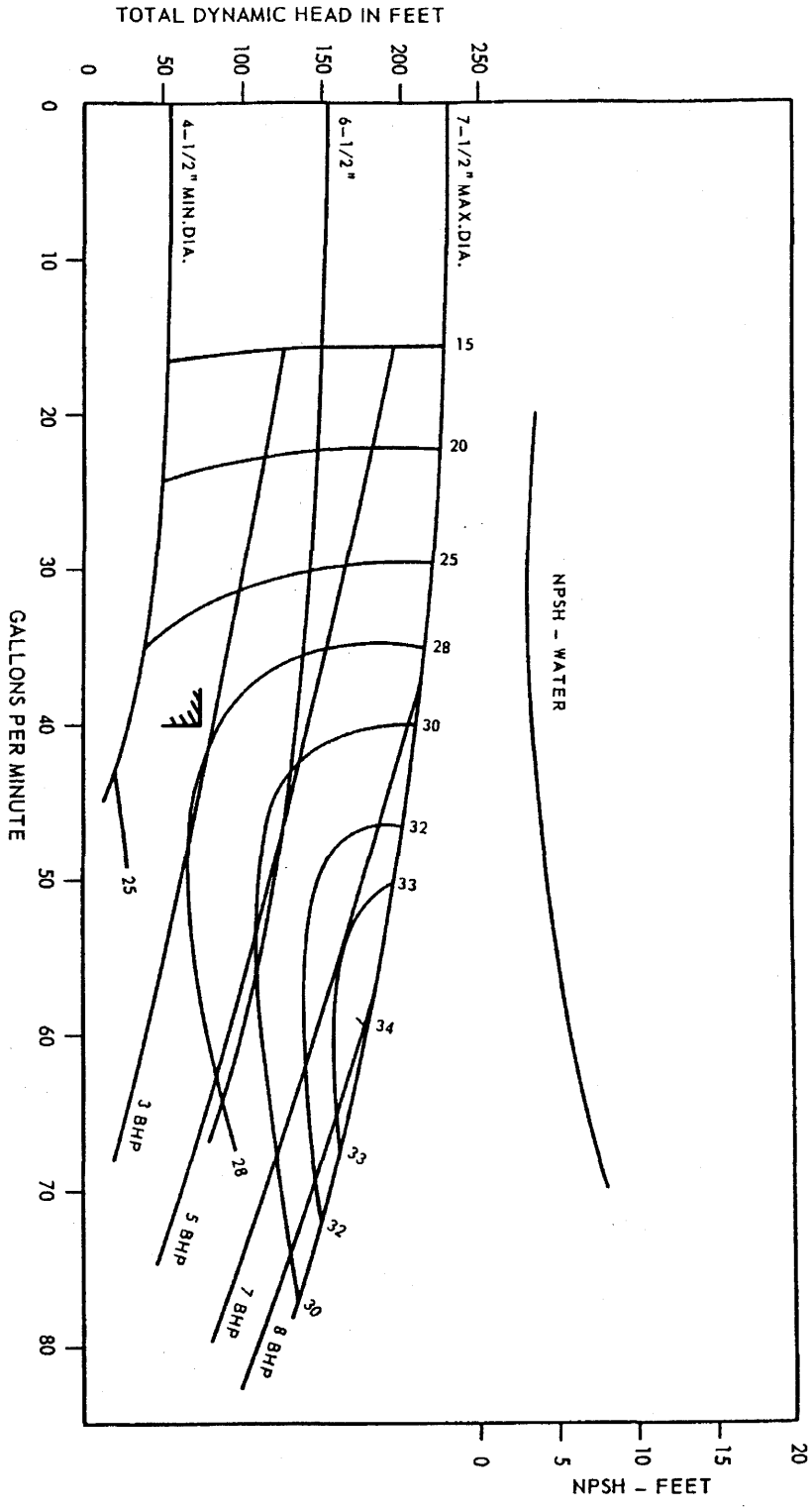


(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Heat Transfer Coefficient
(GE11) - 0.1 ft^2 Suction -
HPCS D/G Failure (Appendix K)
LPCS + 3LPCI + ADS Available

Figure 6.3-16 (Sheet 7 of 7)



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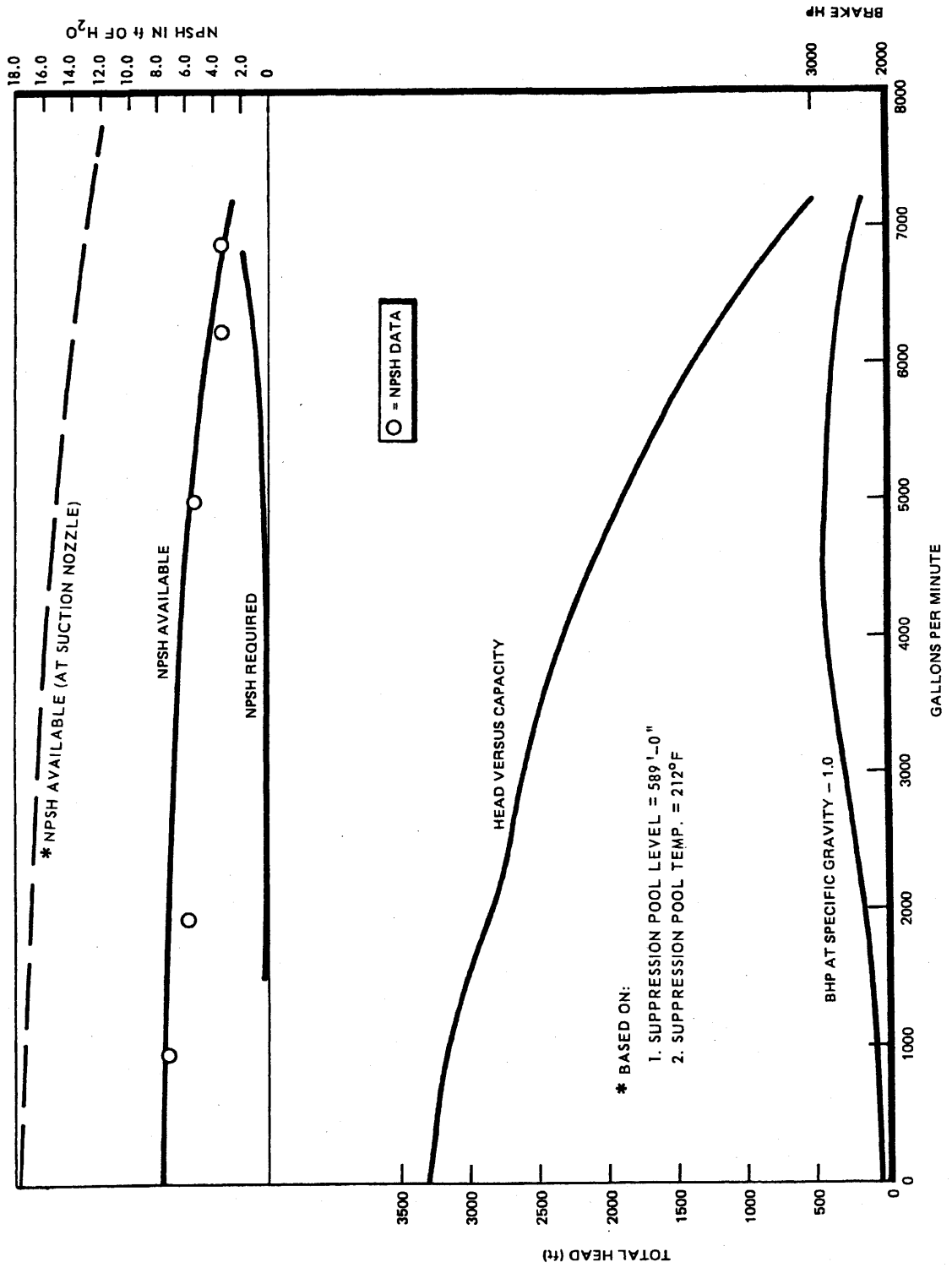
PERRY NUCLEAR POWER PLANT

Jockey Pump Performance Curve

Figure 6.3-74



NOTE:

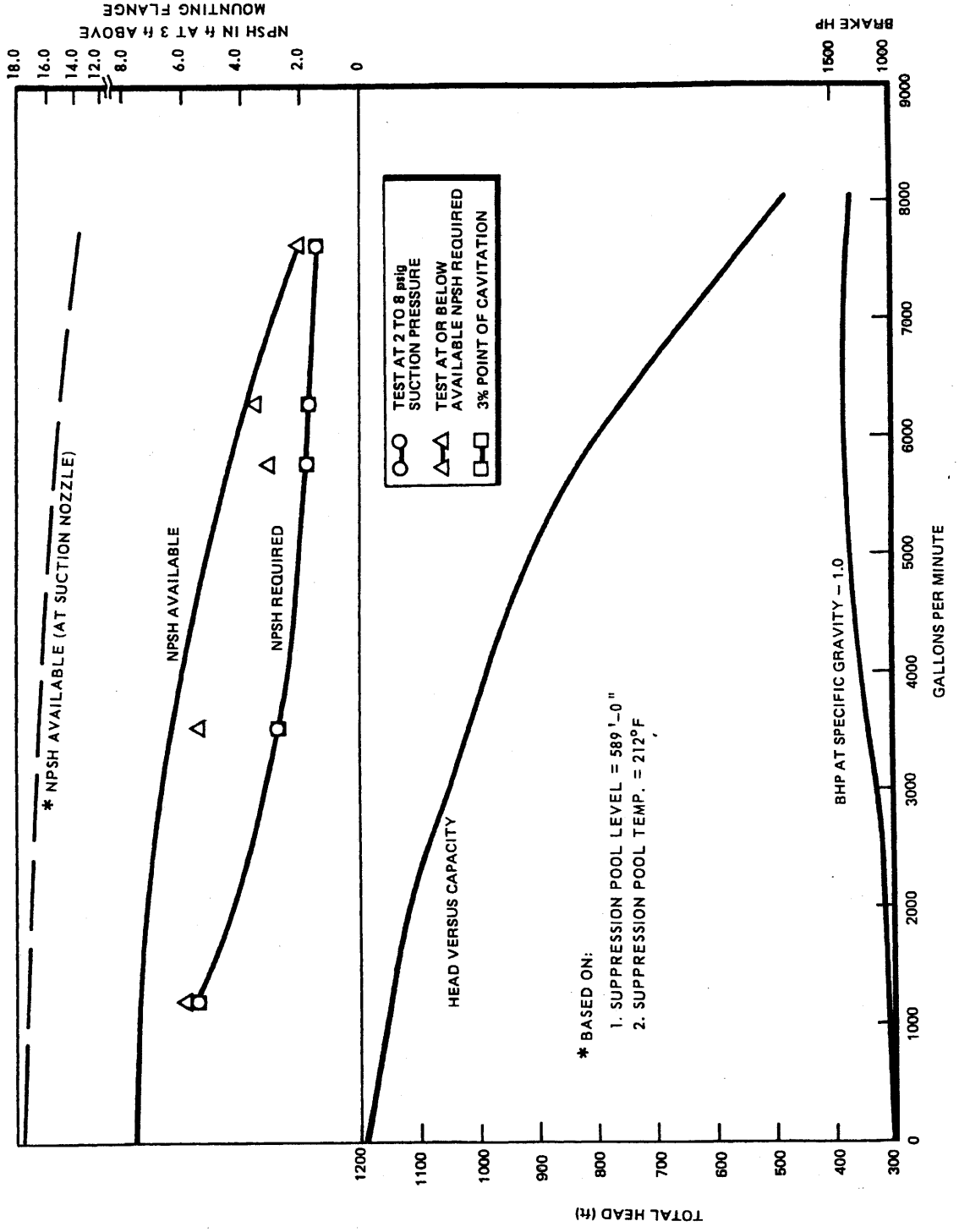
1. THE NPSH AVAILABLE CURVES IN THIS FIGURE DO NOT REPRESENT THE AVAILABLE NPSH FOR THE HPCS PUMP WITH THE LARGE PASSIVE STRAINER. SEE SECTION 6.3.2.2.1 FOR THE AVAILABLE NPSH WITH THE SUPPRESSION POOL AT 185°F.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Pump Curves for
HPCS Pump

Figure 6.3-75



NOTE:

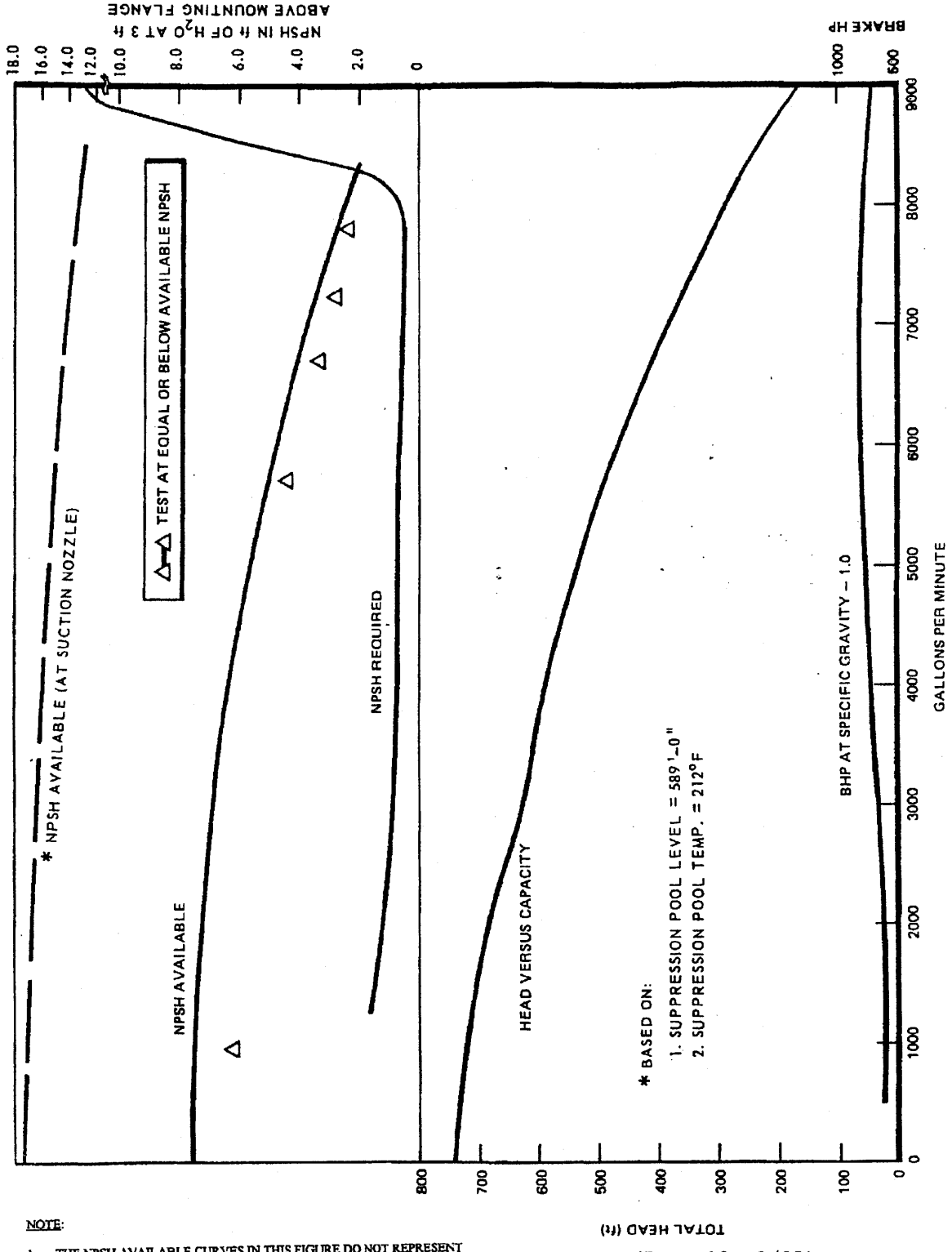
1. THE NPSH AVAILABLE CURVES IN THIS FIGURE DO NOT REPRESENT THE AVAILABLE NPSH FOR THE LPCS PUMP WITH THE LARGE PASSIVE STRAINER. SEE SECTION 6.3.2.2.3 FOR THE AVAILABLE NPSH WITH THE SUPPRESSION POOL AT 185°F.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Pump Curves for LPCS Pump

Figure 6.3-76



NOTE:

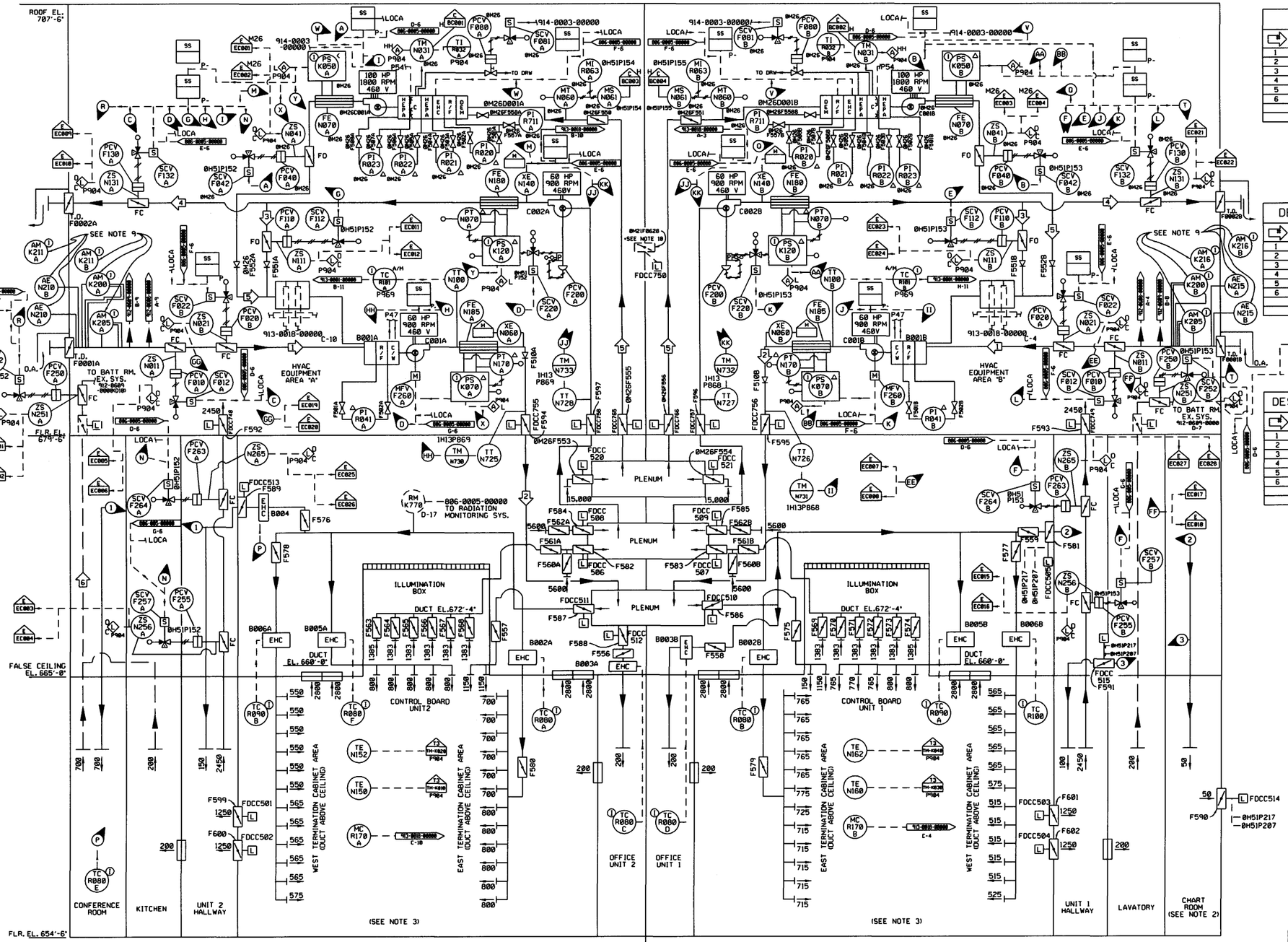
1. THE NPSH AVAILABLE CURVES IN THIS FIGURE DO NOT REPRESENT THE AVAILABLE NPSH FOR THE RHR PUMP WITH THE LARGE PASSIVE STRAINER. SEE SECTION 5.4.7.2.2 FOR THE AVAILABLE NPSH WITH THE SUPPRESSION POOL AT 185°F.

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Pump Curves for RHR Pump

Figure 6.3-77



DESIGN DATA (NORMAL)

		CFM		BY	REMARKS	REV
1		6,000				
2		45,000				
3		39,000				
4		0				
5		0				
6		900				

DESIGN DATA (EMERGENCY)

		CFM		BY	REMARKS	REV
1		0				
2		30,000				
3		0				
4		0				
5		30,000				
6		0				

DESIGN DATA (SMOKE CLEAR)

		CFM		BY	REMARKS	REV
1		30,000				
2		30,000				
3		0				
4		30,000				
5		0				
6		0				

NOTES:
1. ALL FANS, SUPPLY PLENUMS, AND EXHAUST PLENUMS ARE FLOOR MOUNTED.
2. CHART ROOM VENTS 50 CFM TO UNIT 1 HALLWAY.
3. ALL DUCTING SHOWN IN THIS AREA ACTUALLY IN FALSE CEILING WITH REGISTERS DOWN TO ROOM.
4. ILLUMINATION BOXES CONTAIN LIGHTING FOR AREA BELOW.
5. INLET VANES FOR FANS 0M26C001A, C001B ARE MANUALLY OPERATED.
6. ALL AIR QUANITIES ARE IN CFM.
7. ADDITIONAL NOTES AND OPERATING DATA ARE SHOWN ON DWG. 912-0611-00000.
8. FIRE DAMPERS (FDXX-XXX) SHOWN ON THIS DRAWING ARE TO BE ANS SAFETY CLASS NNS AND SESIMIC CATERGORY I.
9. TOXIC GAS DETECTION EQUIPMENT SPARED IN PLACE.
10. REFER TO DWG. 912-0608-00000 FOR FIRE DAMPER FDCC-750 (F628) FLOW VALUES.
11. ALL FUNCTIONAL LOCATIONS ARE PREFIXED BY 0M25 UNLESS OTHERWISE NOTED.
12. ALL PANEL NUMBERS ARE PREFIXED BY 0H13 UNLESS OTHERWISE NOTED

REFERENCES:

912-0608-00000	CONTROLLED ACCESS AND MISC. EQUIPMENT AREAS-HVAC SYSTEM M21
912-0609-00000	MCC SWITCHGEAR AND MISC. ELECTRICAL EQUIPMENT AREAS -HVAC SYSTEMS AND BATTERY ROOM EXHAUST SYSTEMS M23 AND M24
913-0001-00000	CONTROL COMPLEX CHILLED WATER SYSTEM P47
913-0018-00000	STEAM HUMIDIFICATION SYSTEM M29
914-0003-00000	FIRE SERVICE WATER SYSTEM P54
806-0005-00000	PLANT RADIATION MONITORING SYSTEM DIAGRAM D17
912-0611-00000	MCC SWITCHGEAR AND MISC. ELECTRICAL EQUIPMENT SYSTEMS M23, M24, M25, AND M26

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

CONTROL ROOM HVAC AND EMERGENCY RECIRCULATION SYSTEMS
FIGURE 6.4-1 (SHEET 1 OF 2)
(DWG. D-912-0610-00000)

MOTOR CONTROL CENTER, SWITCHGEAR AND MISCELLANEOUS ELECTRICAL EQUIPMENT AREAS
-HVAC SYSTEM AND BATTERY ROOM M23-M24
NOTES AND OPERATING DATA
912-0689-00000

NOTES:-

1. ALL DIFFERENTIAL PRESSURE SWITCH ALARMS ARE INTERLOCKED WITH THE FAN MOTOR STARTER AND PROVIDED WITH TIME DELAY RELAY.
2. ALL CONTROL SWITCHES, FAN STATUS LIGHTS, ALARM INDICATING LIGHTS, AND DAMPER POSITION LIGHTS ARE LOCATED ON THE CORRESPONDING LOCAL PANEL. H51-P177A OR H51-P177B. EXCEPT WHERE NOTED.
3. FAN STATUS LIGHTS, ALARMS, AND TEMPERATURE INDICATORS ARE LOCATED ON THE COMMON HVAC PANEL H13-P804 IN CONTROL ROOM #1.
4. ALL ALARMS FROM THIS SYSTEM ARE ANNUNCIATED AS "COMMON HVAC TROUBLE" ON PANEL H13-P880 IN BOTH CONTROL ROOMS.
5. THE FAN TRAIN SETUP SWITCH WILL START THE 3 FANS WITH A TIME DELAY FOR M23-C001A(B) AND M23-C002A(B) IN ORDER TO START M24-C001A(B) FIRST.
6. WHEN A FAN TRAIN IS SIGNALED TO START, THE FANS ARE PROVIDED WITH TIME DELAY SO THAT THE DAMPERS WILL BE POSITIONED FIRST, PRIOR TO FAN TRAIN START.
7. ON LOSS OF FAN OPERATION (LOW FLOW OR FAN TRIP) ON ANY OF THE 3 OPERATING FANS (A OR B) THE AIR FLOW MONITOR DEVICE WILL TRIP THE REMAINING FANS IN THE TRAIN AND THE DIFFERENTIAL PRESSURE SWITCH WILL PROVIDE A SIGNAL TO AUTOMATICALLY SWITCH OVER TO THE STAND BY FAN TRAIN (A OR B).
8. THE 2 – POSITION SELECTOR SWITCH WILL POSITION THE DAMPERS AS INDICATED IN THE TABLE BELOW:

SYSTEM	ITEM	RECIRC	NORMAL	REMARKS
M24	F011A (B)	C	O	
M23	F010A (B)	C	O	
M24	F065A (B)	O	C	
M24	F051A (B)	C	O	SEE NOTE 11

O = OPEN
C = CLOSED

9. DAMPERS ARE POSITIONED ACCORDING TO THE DAMPER OPERATOR SELECTOR SWITCH POSITION ONLY WHEN THE ASSOCIATED FAN TRAIN IS MANUALLY STARTED OR IN STANDBY WITH AUTOMATIC START SIGNAL FROM THE SWITCHOVER NETWORK. OTHERWISE THE DAMPERS ARE IN THE FAIL SAFE POSITION (RECIRCULATION MODE).
10. EACH ROOM (TOTAL OF 23 ROOMS) SERVED BY M23/M24/M27 ARE PROVIDED WITH THE FOLLOWING TEMPERATURE ELEMENTS WHICH TRANSMIT TO THE RILEY MODEL 88 TEMPERATURE MONITORING SYSTEM LOCATED ON PANEL H13-P904.

TEMP. ELEM. NUMBER	ROOM OR AREA LOCATED
M23-N100-TE	DC SWGR ROOM, DIV. I, UNIT 1
M23-N110-TE	DC SWGR ROOM, DIV. II, UNIT 1
M23-N120-TE	DC SWGR ROOM, DIV. I, UNIT 2
M23-N130-TE	DC SWGR ROOM, DIV. II, UNIT 2
M23-N140-TE	BATTERY ROOM, DIV. I, UNIT 1
M23-N150-TE	BATTERY ROOM, DIV. II, UNIT 1
M23-N160-TE	BATTERY ROOM, DIV. I, UNIT 2
M23-N170-TE	BATTERY ROOM, DIV. II, UNIT 2
M23-N180-TE	CABLE SPREADING AREA, DIV. I, UNIT 1
M23-N190-TE	CABLE SPREADING AREA, DIV. II, UNIT 1
M23-N200-TE	CABLE SPREADING AREA, DIV. I, UNIT 2
M23-N210-TE	CABLE SPREADING AREA, DIV. II, UNIT 2
M27-N220-TE	COMPUTER ROOM UNIT 1
M27-N230-TE	COMPUTER ROOM UNIT 2
M23-N240-TE	MCC & SWGR ROOM, DIV. I, UNIT 1
M23-N250-TE	MCC & SWGR ROOM, DIV. II, UNIT 1
M23-N260-TE	MCC & SWGR. ROOM, UNIT 2
M23-N270-TE	H48 MCC ROOM, UNIT 2
M23-N280-TE	HPCS TRANSFORMER & BATTERY ROOM, UNIT 1
M23-N290-TE	HPCS TRANSFORMER & BATTERY ROOM, UNIT 2
M23-N300-TE	REMOTE SHUTDOWN PANEL ROOM, UNIT 1
M23-N320-TE	RPS MG SET ROOM, DIV. I, UNIT 1
M23-N330-TE	RPS MG SET ROOM, DIV. II, UNIT 1

11. M24-F051A (B) IS POSITIONED CLOSED WHEN ANY OF THE FOLLOWING IS MET:
    A. M25/26 IN SMOKE CLEAR OR EMERG. RECIRC. MANUAL OR AUTO INITIATION
    B. M23/M24 MODE SWITCH IN RECIRC.
    C. ASSOCIATED FAN TRAIN IS SHUT DOWN.

CONTROL ROOM HVAC AND EMERGENCY RECIRCULATION SYSTEM- M25, M26
NOTES AND OPERATING DATA
912-0610-00000

NOTES:-

1. ALL DIFFERENTIAL PRESSURE SWITCH ALARMS ARE INTERLOCKED WITH THE FAN MOTOR STARTER AND PROVIDED WITH TIME DELAY RELAY.
2. ALL CONTROL SWITCHES, STATUS LIGHTS, ALARMS AND TEMPERATURE INDICATORS ARE LOCATED ON THE COMMON HVAC PANEL (H13-P804) IN CONTROL ROOM #1.
3. ALL ALARMS FROM THIS SYSTEM ARE ANNUNCIATED AS "COMMON HVAC TROUBLE" ON PANEL H13-P880 IN BOTH CONTROL ROOMS.
4. THE 3-POSITION MODE SELECT SWITCH WILL POSITION THE DAMPERS AND START AND STOP FANS AS INDICATED IN THE TABLE BELOW:

ITEM		SMOKE CLEAR	NORMAL	REMARKS	EMER RECIRC.
F130A (B)		O	C		C
F110A (B)		C	O		C
F010A (B)		O	O		C
F250A (B)		C	O	SEE NOTE 12	C
← F255A (B)		C	O		C
SCV-F220A (B)		E	DE	SEE NOTE 8	E
M26-C001A (B)		S	S		R
M25-C001A (B)		R	R		R
M25-C002A (B)		R	R		S
M25-F260A (B)		DE	E	SEE NOTE 9	DE
M25-F263A (B)		C	O		C

R = RUN
S = STOP
C = CLOSED
O = OPEN
E = ENERGIZE
DE = DEENERGIZE

5. FANS AND DAMPERS, EXCEPT F110A (B), F250A (B), F255A (B), AND F263A (B), ARE OPERATED ACCORDING TO THE MODE SELECT SWITCH POSITION ONLY WHEN THE ASSOCIATED FAN TRAIN INITIATE SWITCH IS IN THE "ON" POSITION, OTHERWISE THE DAMPERS ARE IN THE FAIL SAFE POSITION.
6. LOSS OF FAN OPERATION (LOW FLOW OR FAN TRIP) ON ANY OF THE OPERATING FAN TRAIN (A OR B) WILL TRIP THE REMAINING FANS. THE STAND BY FAN TRAIN (A OR B) IS MANUALLY STARTED AND WILL OPERATE ACCORDING TO THE MODE SELECT SWITCH POSITION (SEE NOTE 4)
7. LOCA (FROM EITHER REACTOR), HIGH RADIATION OR LOOP WILL OVERRIDE THE MODE SELECT SWITCH AND OPERATE THE SYSTEM IN THE EMERGENCY RECIRCULATION MODE. BOTH FAN TRAINS WILL RUN.
8. THE SOLENOID VALVE (SCV-F220A, B) ENERGIZES TO VENT ACTUATORS (PCV-F208A, B) AND POSITION THE VARIABLE INLET VANES OF FANS (M25-C002A, B) TO REDUCE THE AIR FLOW TO 30,000 CFM.
9. DE-ENERGIZING ACTUATOR (PCV-F220A, B) WILL POSITION THE VARIABLE INLET VANES OF FANS (M25-C001A, B) TO REDUCE THE AIR FLOW TO 30,000 CFM.
10. BYPASS AND INOPERABLE STATUS INDICATION IS REQUIRED IN THE CONTROL ROOM.
11. FOR PROPER SYSTEM OPERATION, BOTH A AND B TRAIN MODE SELECT SWITCHES SHOULD BE ADMINISTRATIVELY KEPT IN THE SAME POSITION.
12. M24-F051A (B) OPERATES WITH M25-F255A (B) EXCEPT WHEN M23/24 SYSTEM MODE SWITCH IS IN RECIRC. OR WHEN THE ASSOCIATED M23/24 FAN TRAIN IS SHUTDOWN EITHER OF WHICH CLOSES M24-F051A (B).
13. M25-F020A (B) IS NOT POSITIONED BY THE MODE SWITCH, BUT IS CLOSED BY LOCA, HIGH RADIATION, OR LOOP. M25-F020A (B) HAS AN INDEPENDENT CONTROL SWITCH FOR MANUAL POSITIONING THE DAMPER IN OTHER MODES.

REFERENCES:
912-0689-00000 MCC SWITCHGEAR AND MISCELLANEOUS ELECTRICAL EQUIPMENT. M23, M24
912-0610-00000 CONTROL ROOM HVAC AND EMERGENCY RECIRCULATION SYSTEM M25, M26.

NOTES:-
1. SEE DRAWINGS 912-0689-00000 AND 912-0610-00000

(Rev. 12 1/03)

PERRY NUCLEAR POWER PLANT

Notes and Operating Data for
<Figure 6.4-1> and <Figure 9.4-1>

Figure 6.4-1 (Sheet 2 of 2)
(Dwg. D-912-611)

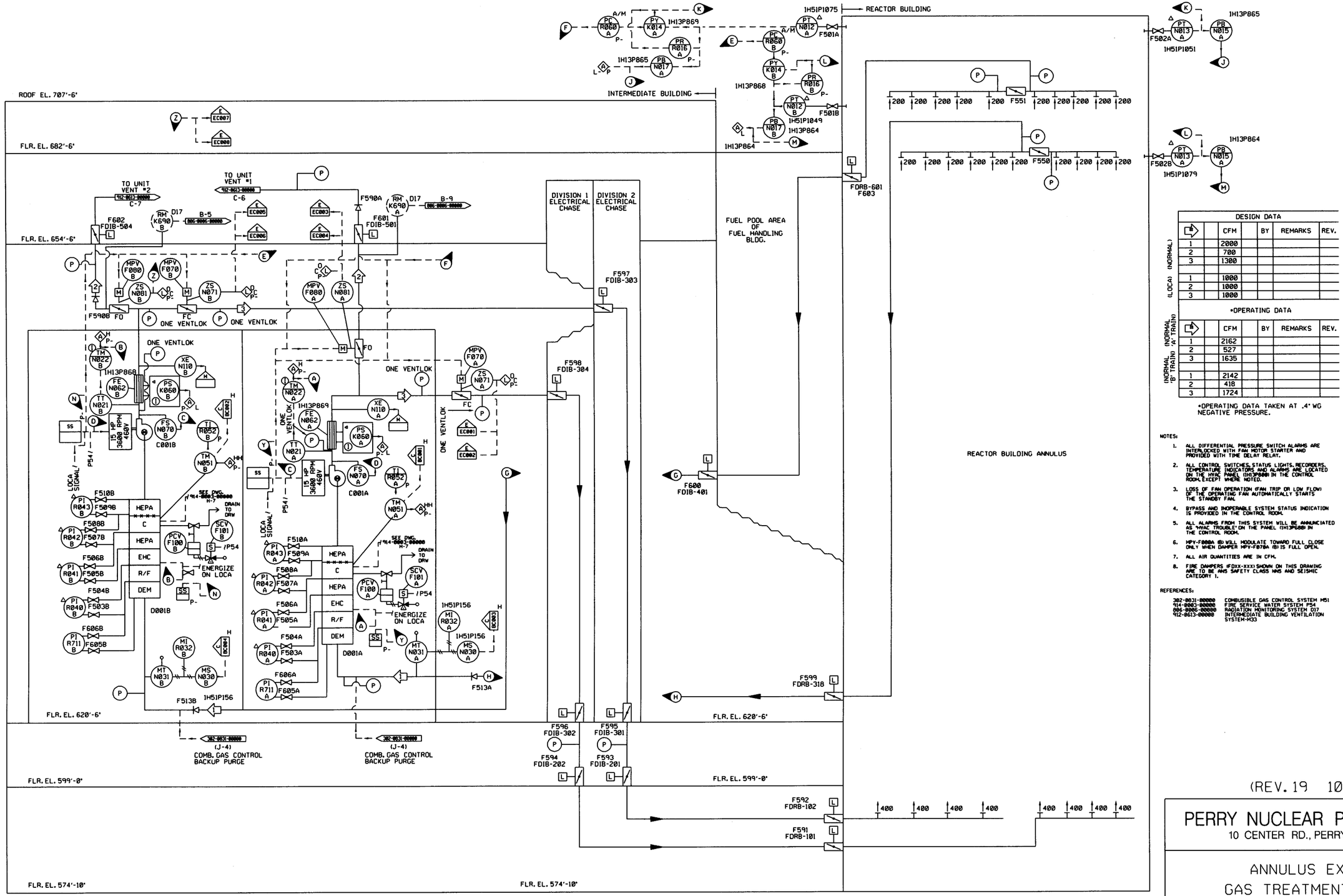
Removed in Accordance with RIS 2015–17

(REV. 20 10/2017)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

CONTROL ROOM ENVELOPE

FIGURE 6.4-2
(DWG. D-105-0015-00000)



DESIGN DATA						
	#	CFM		BY	REMARKS	REV.
(LOCA) (NORMAL)	1	2000				
	2	700				
	3	1300				
	1	1000				
	2	1000				
	3	1000				

•OPERATING DATA

	#	CFM		BY	REMARKS	REV.
(NORMAL 'A' TRAIN)	1	2162				
	2	527				
	3	1635				
(NORMAL 'B' TRAIN)	1	2142				
	2	418				
	3	1724				

•OPERATING DATA TAKEN AT .4" WG NEGATIVE PRESSURE.

NOTES:

1. ALL DIFFERENTIAL PRESSURE SWITCH ALARMS ARE INTERLOCKED WITH FAN MOTOR STARTER AND PROVIDED WITH TIME DELAY RELAY.
2. ALL CONTROL SWITCHES, STATUS LIGHTS, RECORDERS, TEMPERATURE INDICATORS AND ALARMS ARE LOCATED ON THE HVAC PANEL (1H13P688) IN THE CONTROL ROOM, EXCEPT WHERE NOTED.
3. LOSS OF FAN OPERATION (FAN TRIP OR LOW FLOW) OF THE OPERATING FAN AUTOMATICALLY STARTS THE STANDBY FAN.
4. BYPASS AND INOPERABLE SYSTEM STATUS INDICATION IS PROVIDED IN THE CONTROL ROOM.
5. ALL ALARMS FROM THIS SYSTEM WILL BE ANNUNCIATED AS "HVAC TROUBLE" ON THE PANEL (1H13P688) IN THE CONTROL ROOM.
6. HPV-F088A (B) WILL MODULATE TOWARD FULL CLOSE ONLY WHEN DAMPER HPV-F078A (B) IS FULL OPEN.
7. ALL AIR QUANTITIES ARE IN CFM.
8. FIRE DAMPERS (FDXX-XXX) SHOWN ON THIS DRAWING ARE TO BE ANS SAFETY CLASS NNS AND SEISMIC CATEGORY I.

REFERENCES:

302-0831-00000	COMBUSIBLE GAS CONTROL SYSTEM M51
914-0063-00000	FIRE SERVICE WATER SYSTEM P54
886-0006-00000	RADIATION MONITORING SYSTEM D17
912-0613-00000	INTERMEDIATE BUILDING VENTILATION SYSTEM-M33

(REV. 19 10/2015)

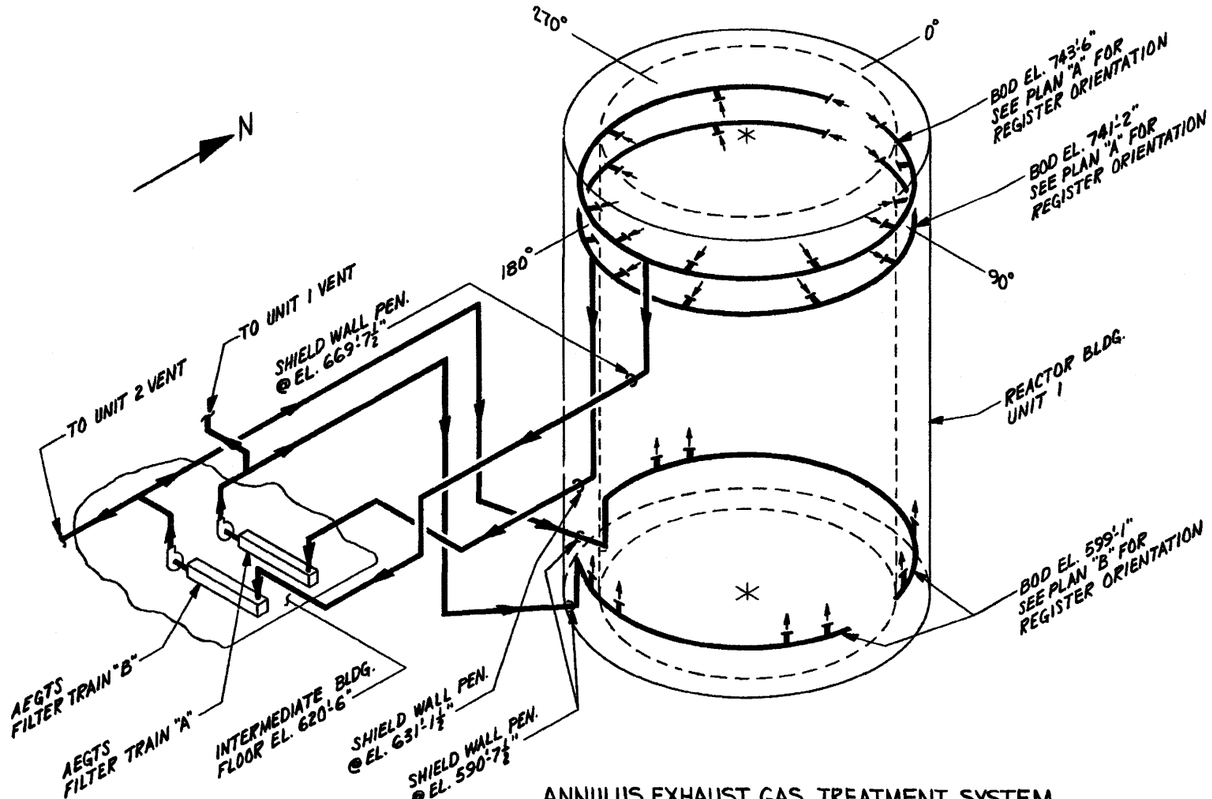
PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

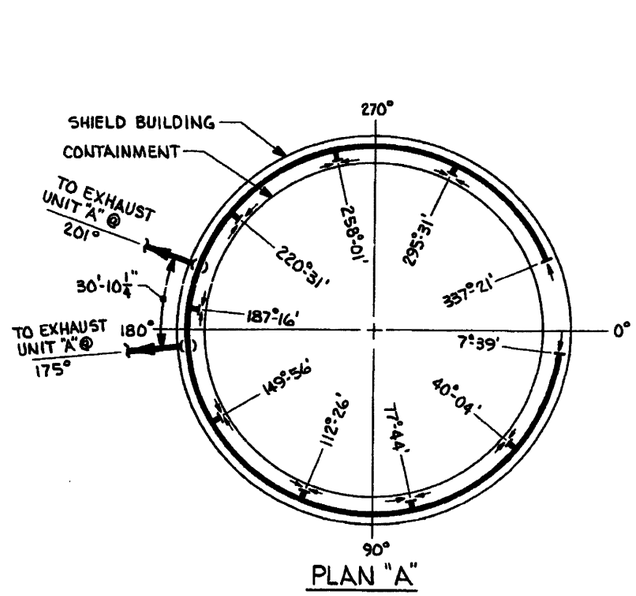
ANNULUS EXHAUST GAS TREATMENT SYSTEM

FIGURE 6.5-1

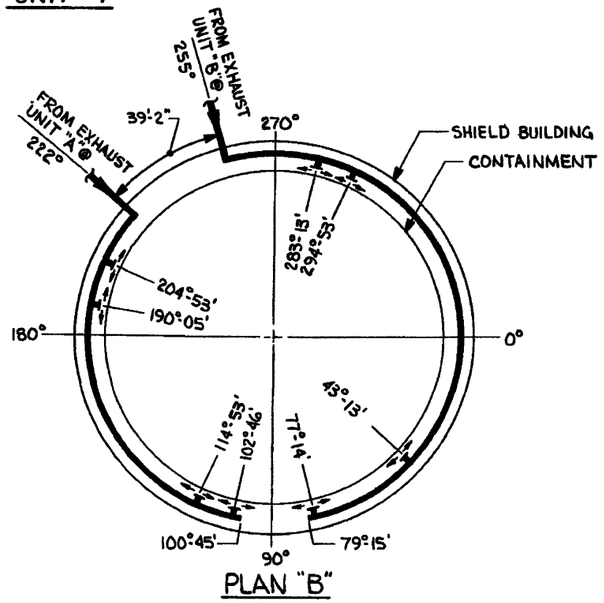
(DWG. D-912-0605-00000)



ANNULUS EXHAUST GAS TREATMENT SYSTEM
UNIT 1



PLAN "A"



PLAN "B"

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT
10 CENTER RD., PERRY, OHIO 44081

ANNULUS EXHAUST GAS TREATMENT SYSTEM DISTRIBUTION DUCTWORK

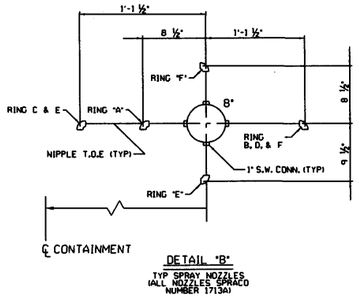
FIGURE 6.5-2

NOZZLE DATA

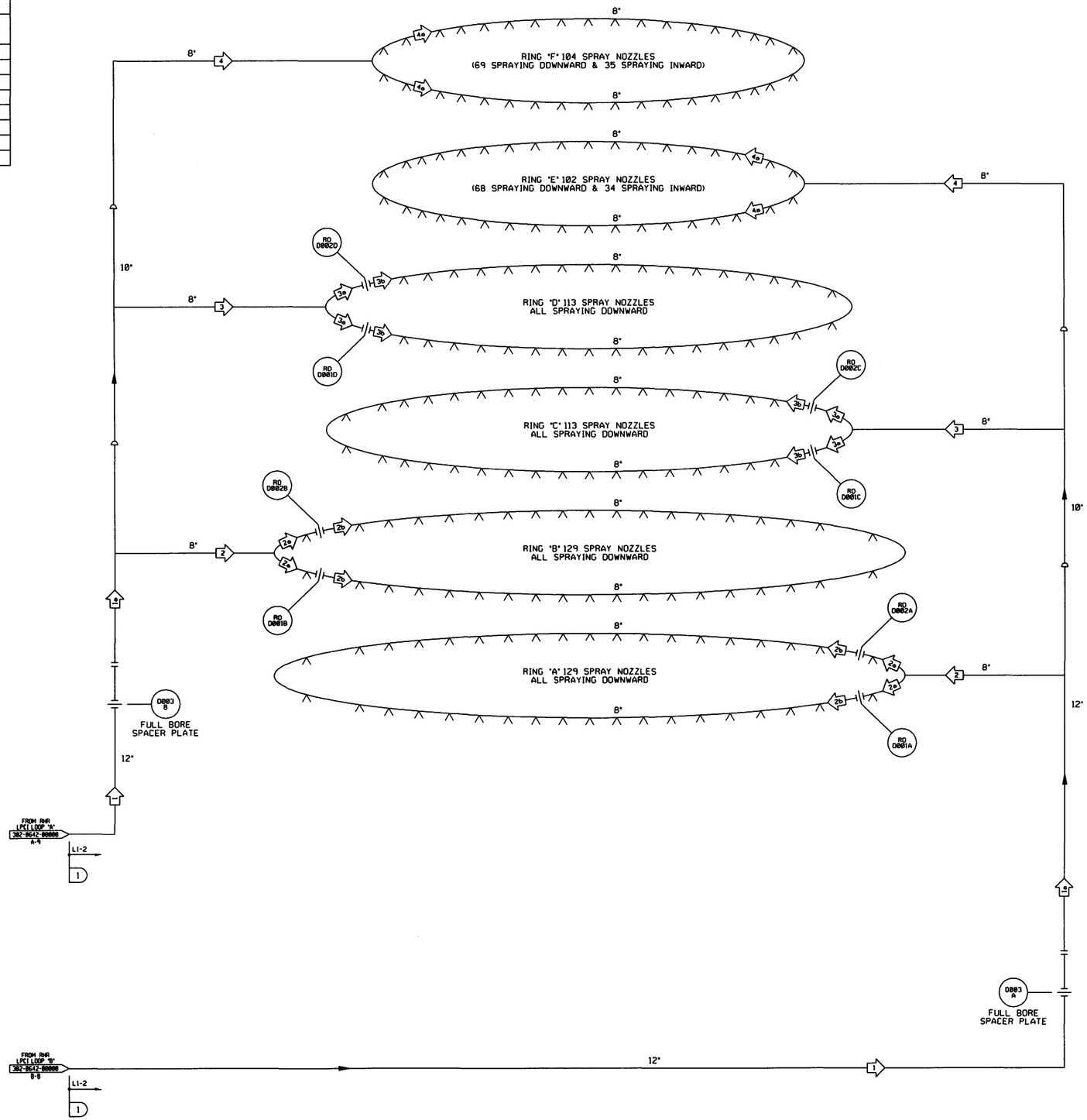
RING	NUMBER OF NOZZLES	TYPICAL SPACING BETWEEN NOZZLES		CONNECTION TO RING **
A	129	2° 46' 9.2302"		HORIZONTAL
B	129	2° 46' 9.2302"		HORIZONTAL
C	113	2° 44' 53.1294"	*	HORIZONTAL
D	113	2° 44' 53.1294"	*	HORIZONTAL
E	68	4° 44' 12.631"	*	HORIZONTAL
E	34	9° 28' 25.262"	*	VERTICAL
F	69	4° 44' 12.631"	*	HORIZONTAL
F	35	9° 28' 25.262"	*	VERTICAL

* NOZZLE SPACING IS TYPICAL FOR INDIVIDUAL RINGS. WHERE NECESSARY NOZZLES WERE ELIMINATED AT CONNECTION OF SUPPLY RISER TO RING HEADER.

** SEE DETAIL "B"



DETAIL "B"
TYP SPRAY NOZZLES
(ALL NOZZLES SPRAED NUMBER 1713A)



OPERATING DATA

SEE NOTE 2

#	PSIG	GPM	F	BY	REMARKS	REV
1	130	5250	139.7	CWE		
2	54.5	1963	139.7	CWE		
2a	56.5	981.5	139.7	CWE		
2b	58	981.5	139.7	CWE		
3	54	1734.8	139.7	CWE		
3a	52.12	867.4	139.7	CWE		
3b	58	867.4	139.7	CWE		
4	54	1552.2	139.7	CWE		
4a	58	776.1	139.7	CWE		
1a	60	5258	139.7	CWE		

DESIGN DATA

#	NORMAL		UPSET			BY	CHKD	REMARKS	REV
	PSIG	F	PSIG	F	TIME				
1	150	212	150	212	-	CWE			

NOTES:

1. THIS SYSTEM IS SAFETY CLASS 2, SEISMIC CATEGORY I
2. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA (PRESSURES, TEMPERATURES, AND FLOWS) PROVIDED ON THIS DRAWING, REPRESENTS THE MOST COMMON OPERATING CONDITION, AND/OR SYSTEM MODE OF OPERATION AND/OR LINEUP, TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.

REFERENCES:

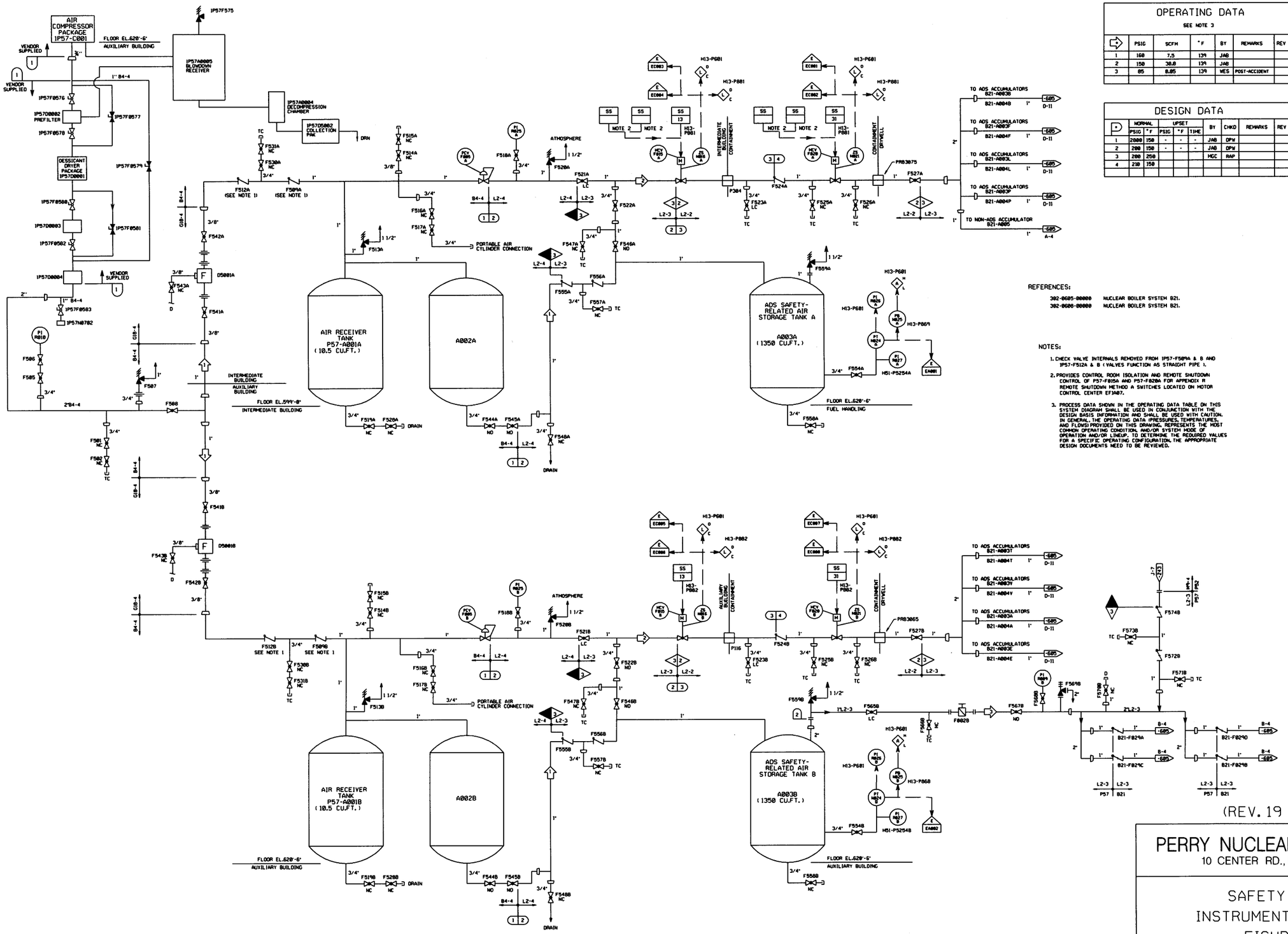
302-0881-00000 CONTAINMENT ATMOSPHERE MONITORING SYSTEM D23
302-0842-00000 RESIDUAL HEAT REMOVAL SYSTEM E-12 (G.E.)
302-0642-00000 CONTAINMENT SPRAY SYSTEM E15

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

CONTAINMENT
SPRAY SYSTEM
FIGURE 6.5-3
(DWG. D-302-0661-00000)



OPERATING DATA

SEE NOTE 3

	PSIG	SCFM	°F	BY	REMARKS	REV
1	160	7.5	139	JAB		
2	150	30.0	139	JAB		
3	85	8.85	139	WES	POST-ACCIDENT	

DESIGN DATA

	NORMAL		UPSET			BY	CHKD	REMARKS	REV
	PSIG	°F	PSIG	°F	TIME				
1	2000	150	-	-	-	JAB	DPW		
2	200	150	-	-	-	JAB	DPW		
3	200	250				MCC	RAP		
4	210	150							

REFERENCES:

302-0605-00000 NUCLEAR BOILER SYSTEM B21.
302-0606-00000 NUCLEAR BOILER SYSTEM B21.

NOTES:

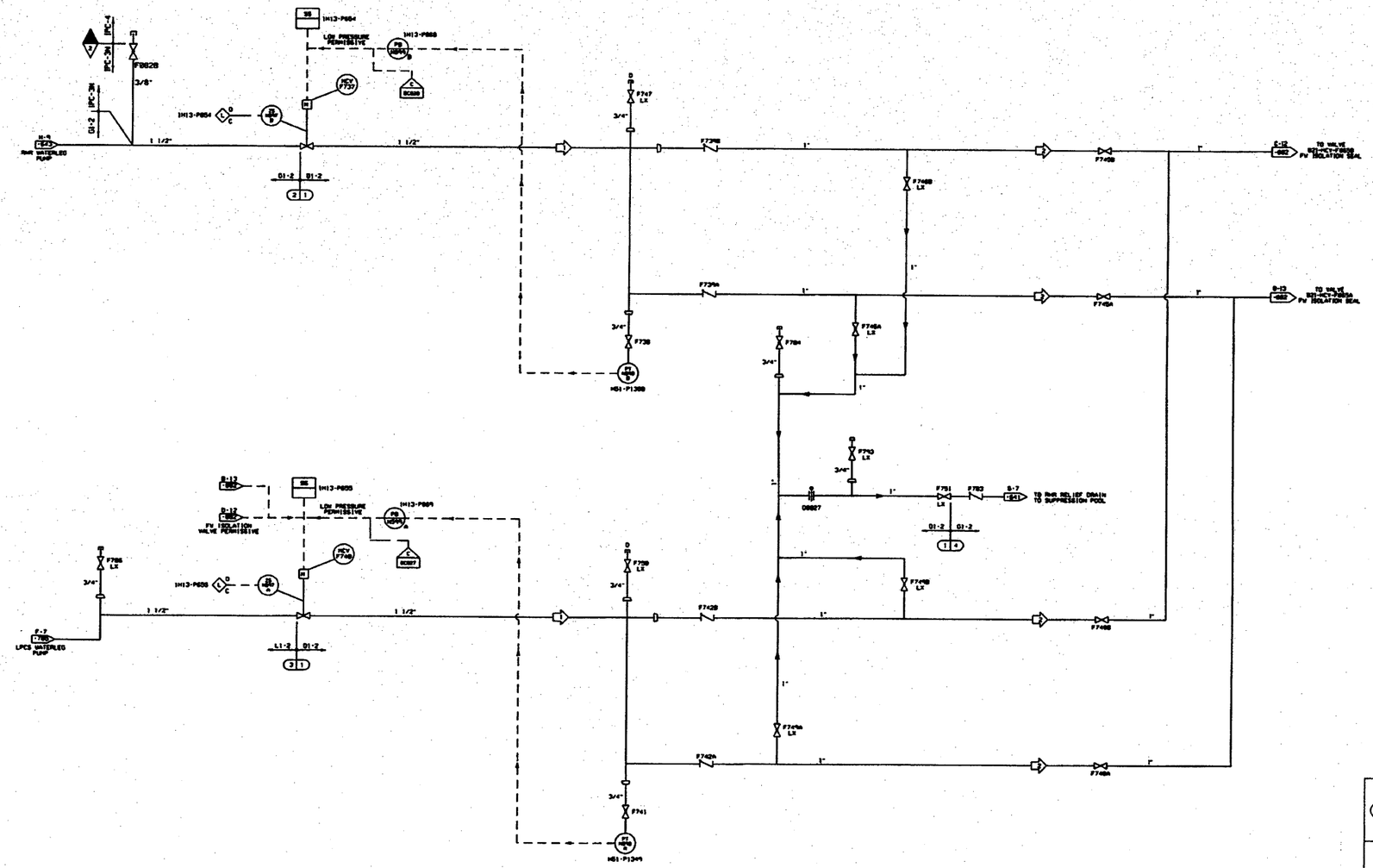
1. CHECK VALVE INTERNALS REMOVED FROM 1P57-F509A & B AND 1P57-F512A & B (VALVES FUNCTION AS STRAIGHT PIPE).
2. PROVIDES CONTROL ROOM ISOLATION AND REMOTE SHUTDOWN CONTROL OF P57-F015A AND P57-F020A FOR APPENDIX R REMOTE SHUTDOWN METHOD A SWITCHES LOCATED ON MOTOR CONTROL CENTER EJA07.
3. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA (PRESSURES, TEMPERATURES, AND FLOWS) PROVIDED ON THIS DRAWING, REPRESENTS THE MOST COMMON OPERATING CONDITION, AND/OR SYSTEM MODE OF OPERATION AND/OR LINEUP. TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.

(REV. 19 10/2015)

PERRY NUCLEAR POWER PLANT

10 CENTER RD., PERRY, OHIO 44081

SAFETY RELATED
INSTRUMENT AIR SYSTEM
FIGURE 6.8-1
(DWG. D-302-0271-00000)



OPERATING DATA

SEE NOTE 6

	PSIG	GPM	°F	BY	REMARKS	REV
1	**	**	90	NTS	TEST	0
2	**	**	90	NTS	TEST	0
1	1100	0	425***	NTS	100% POWER	0
2	1100	0	425***	NTS	100% POWER	0
1	**	**	100		POST LOCA	
2	**	**	100		POST LOCA	

DESIGN DATA

	NORMAL*		UPSET			BY	CHKD	REV
	PSIG	°F	PSIG	°F	TIME			
1	1250	575	1500	575	<1%	NTS	MOC	0
2	150	212	150	212		NTS	MOC	0
3	100	212	100	212		NTS	MOC	0
4	150	400	50	400		NTS	MOC	0

* SEE NOTE 4.
** SEE NOTE 5.
*** SEE NOTE 7.

REFERENCES:

302-0002-00000 FEEDWATER SYSTEM N27
302-0642-00000 RESIDUAL HEAT REMOVAL SYSTEM E12
302-0643-00000 RESIDUAL HEAT REMOVAL SYSTEM E12
302-0705-00000 LOW PRESSURE CORE SPRAY SYSTEM E21

NOTES:

1. ALL PANELS AND RACKS ARE PREFIXED 1H13. UNLESS OTHERWISE NOTED.
2. ALL INSTRUMENTS AND CONTROLS ARE PREFIXED 1N27. UNLESS OTHERWISE NOTED.
3. ALL PIPING IS SAFETY CLASS 2.
4. THE DATA UNDER THE NORMAL COLUMN ARE THE SYSTEM DESIGN CONDITIONS.
5. DURING INJECTION TO THE BONNET OF VALVES N21-F0050A/B TO FORM A PRESSURE SEAL, PRESSURE REACHES A MAXIMUM OF 39 PSIG AT PT-N0950A/B. FLOWRATE AT OPERATING DATA POINT 1 DECREASES FROM 14 GPM TO 0 GPM, AND FLOWRATE AT OPERATING DATA POINT 2 DECREASES FROM 7 GPM TO 0 GPM. SEE DCC-003 TO CALCULATION N27-30, REV.0 AND CALCULATION N27-45, REV.2.
6. PROCESS DATA SHOWN IN THE OPERATING DATA TABLE ON THIS SYSTEM DIAGRAM SHALL BE USED IN CONJUNCTION WITH THE DESIGN BASIS INFORMATION AND SHALL BE USED WITH CAUTION. IN GENERAL, THE OPERATING DATA PRESSURES, TEMPERATURES, AND FLOWS PROVIDED ON THIS DRAWING, REPRESENTS THE MOST COMMON OPERATING CONDITION, AND/OR SYSTEM MODE OF OPERATION AND/OR LINEUP. TO DETERMINE THE REQUIRED VALUES FOR A SPECIFIC OPERATING CONFIGURATION, THE APPROPRIATE DESIGN DOCUMENTS NEED TO BE REVIEWED.
7. FOUR FEET FROM THE FW HEADER THE PWLCS PIPING WILL BE AT AMBIENT TEMPERATURE.

NUCLEAR SAFETY RELATED

(Rev. 16 10/09)

PERRY NUCLEAR POWER PLANT

Feedwater Leakage Control System

Figure 6.9-1

(Dwg. D-302-971)