Attachment 2

GOTHIC Summer Condition Model

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Control Volumes							
Vol #	Description	Vol (ft3)	Elev (ft)	Ht (ft)	Hyd. D. (ft)	L/V IA (ft2)	Burn Opt
1	SUPPLY HEADER	23137.	54.	246.	20.	DEFAULT	NONE
2	EXHAUST HEADER	27471.	54.	246.	20.	DEFAULT	NONE
3	PIPE CHASES	48651.	102.	28.	20.	DEFAULT	NONE
4	CSP 4104,4105	29461.	54.	21.	20.	DEFAULT	NONE
5	CSP 4116,4118	27996.	54.	21.	20.	DEFAULT	NONE
6	RHR PMP RM 4107	23305.	54.	21.	20.	DEFAULT	NONE
7	RHR PMP RM 4114	23101.	54.	21.	20.	DEFAULT	NONE
8	RHRHX 4109,4208	37045.	54.	46.	20.	DEFAULT	NONE
9	RHRHX 4113,4214	37139.	54.	46.	20.	DEFAULT	NONE
10	HPCI RM EL 54	47223.	54.	21.	20.	DEFAULT	NONE
11	RCIC RM EL 54	32799.	54.	21.	20.	DEFAULT	NONE
12	TORUS & STM VNT	479484.	54.	46.	20.	DEFAULT	NONE
13	MCC AREA EL 77	102084.	77.	23.	20.	DEFAULT	NONE
14	CRD PMP/MCC 77	70013.	77.	23.	20.	DEFAULT	NONE
15	RACS HX, PMP 77	100016.	77.	23.	20.	DEFAULT	NONE
16	SACS HX,PMP 102	233917.	102.	28.	20.	DEFAULT	NONE
17	MCC AREA EL 102	215431.	102.	28.	20.	DEFAULT	NONE
18	CRD AREA EL 102	203129.	102.	28.	20.	DEFAULT	NONE
19	RWCU RMS EL132	10307.	132.	11.	20.	DEFAULT	NONE
20	FRVS,CMP EL 132	195259.	132.	23.	20.	DEFAULT	NONE
21	OP FRVS VNT 145	88701.	145.	15.	20.	DEFAULT	NONE
22	RWCU AREA 145	14958.	145.	15.	20.	DEFAULT	NONE
23	F POOL, SM 162	98388.	162.	24.	20.	DEFAULT	NONE
24	MCC, FRVS 162	248506.	162.	24.	20.	DEFAULT	NONE
25	GENERAL AREAS I	1730000.	201.	99.	20.	DEFAULT	NONE
26	FAN OUTLET	1000.	132.	10.	20.	DEFAULT	NONE
27	frvs heater enc	1000.	132.	10.	20.	DEFAULT	NONE
28	frvs fan heat	1000.	132.	10.	20.	DEFAULT	NONE

Fluid Boundary Conditions - Table 1									
BC#	Description	Press. (psia)	FF	Temp. (F)	FF	Flow (lbm/s)	FF	ON Trip	OFF Trip
1F	FRVS FAN INLET	14.7		94		V-550	1	0	
2C	FRVS FAN OUTLET	14.7		94					
3P	INLEAKAGE	14.6959		94					
4F	POOL EVAPORATIO	5.9926		E1134		0.3625			

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Fluid Boundary Conditions - Table 1									
BC#	Description	Press. (psia)	FF	Temp. (F)	FF	Flow (lbm/s)	FF	ON Trip	OFF Trip
5F	VENT FAN EXHAUS	14.7		94		v-1	28	23	

Fluid Boundary Conditions - Table 2														
BC#	Liq. V. Frac.	FF	Stm. P.R.	FF	Drop D. (in)	FF	Cpld BC#	Flow Frac.	FF	Heat (Btu/s)	FF	Outlet Quality	FF
1F	0.		H50		NONE							DEFAULT	
2C	0.		H50		NONE		1F	1.		0.		DEFAULT	
3P	0.		H50		NONE							DEFAULT	
4F	0.		1		NONE							DEFAULT	
5F	0.		H50		NONE							DEFAULT	

Fluid Boundary Conditions - Table 3 Gas Pressure Ratios								
BC#	Air Gas 1	FF	Gas 2	FF	Gas 3	FF	Gas 4	FF
1F	1.							
2C	1.							
3P	1.							
4F	1.							
5F	1.							

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Fluid Boundary Conditions - Table 4
Gas Pressure Ratios

BC#	Gas 5	FF	Gas 6	FF	Gas 7	FF	Gas 8	FF
1F								
2C								
3P								
4F								
5F								

Flow Paths - Table 1

F.P. #	Description	Vol A	Elev (ft)	Ht (ft)	Vol B	Elev (ft)	Ht (ft)
1	SUPPLY ROOM 3	1	112.	1.	3	112.	1.
2	SUPPLY ROOM 4	1	64.	1.	4	64.	1.
3	SUPPLY ROOM 5	1	64.	1.	5	64.	1.
4	SUPPLY ROOM 6	1	64.	1.	6	64.	1.
5	SUPPLY ROOM 7	1	64.	1.	7	64.	1.
6	SUPPLY ROOM 8	1	64.	1.	8	64.	1.
7	SUPPLY ROOM 9	1	64.	1.	9	64.	1.
8	SUPPLY ROOM 10	1	64.	1.	10	64.	1.
9	SUPPLY ROOM 11	1	64.	1.	11	64.	1.
10	SUPPLY ROOM 12	1	84.	1.	12	84.	1.
11	SUPPLY ROOM 13	1	87.	1.	13	87.	1.
12	SUPPLY ROOM 14	1	87.	1.	14	87.	1.
13	SUPPLY ROOM 15	1	87.	1.	15	87.	1.
14	SUPPLY ROOO 16	1	122.	1.	16	122.	1.
15	SUPPLY ROOM 17	1	122.	1.	17	122.	1.
16	SUPPLY ROOM 18	1	122.	1.	18	122.	1.
17	SUPPLY ROOM 19	1	140.	1.	19	140.	1.
18	SUPPLY ROOM 20	1	148.	1.	20	148.	1.
19	SUPPLY ROOM 21	1	155.	1.	21	155.	1.
20	SUPPLY ROOM 22	1	155.	1.	22	155.	1.
21	SUPPLY ROOM 23	1	182.	1.	23	182.	1.
22	SUPPLY ROOM 24	1	192.	1.	24	182.	1.
23	SUPPLY ROOM 25	1	205.	1.	25	205.	1.
24	EXHAUST ROOM 3	3	112.	1.	2	112.	1.
25	EXHAUST ROOM 4	4	64.	1.	2	64.	1.
26	EXHAUST ROOM 5	5	64.	1.	2	64.	1.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Flow Paths - Table 1

F.P. #	Description	Vol A	Elev (ft)	Ht (ft)	Vol B	Elev (ft)	Ht (ft)
27	EXHAUST ROOM 6	6	64.	1.	2	64.	1.
28	EXHAUST ROOM 7	7	64.	1.	2	64.	1.
29	EXHAUST ROOM 9	9	64.	1.	2	64.	1.
30	EXHAST ROOM 10	10	64.	1.	2	64.	1.
31	EXHAUST ROOM 11	11	64.	1.	2	64.	1.
32	EXHAUST ROOM 12	12	84.	1.	2	84.	1.
33	EXHAUST ROOM 13	13	87.	1.	2	87.	1.
34	EXHAUST ROOM 14	14	87.	1.	2	87.	1.
35	EXHAUST ROOM 15	15	87.	1.	2	87.	1.
36	EXHAUST ROOM 16	16	122.	1.	2	122.	1.
37	EXHAUST ROOM 17	17	122.	1.	2	122.	1.
38	EXHAUST ROOM 18	18	122.	1.	2	122.	1.
39	EXHAUST ROOM 19	19	140.	1.	2	140.	1.
40	EXHAUST ROOM 20	20	148.	1.	2	148.	1.
41	EXHAUST ROOM 21	21	155.	1.	2	155.	1.
42	EXHAUST ROOM 23	23	182.	1.	2	182.	1.
43	EXHAUST ROOM 24	24	182.	1.	2	182.	1.
44	EXHAUST ROOM 25	25	205.	1.	2	205.	1.
45	FRVS FAN INLET	2	132.	1.	1F	132.	1.
46	FRVS FAN OUTLET	26	132.	1.	27	132.	1.
47	ROOM 8 EXHAUST	8	64.	1.	2	64.	1.
48	13 TO 25	13	77.	1.	25	205.	1.
49	18 TO 17	18	102.	1.	17	102.	1.
50	19 TO 3	19	132.	1.	3	102.	1.
51	20 TO 19	20	132.	1.	19	132.	1.
52	21 TO 22	21	145.	1.	22	145.	1.
53	22 TO 3	22	145.	1.	3	102.	1.
54	22 TO 25	22	145.	1.	25	205.	1.
55	23 TO 24	23	162.	1.	24	162.	1.
56	21 TO 3	21	145.	1.	3	102.	1.
57	25 TO 16	25	201.	1.	16	102.	1.
58	25 TO 17	25	201.	1.	17	102.	1.
59	25 TO 18	25	201.	1.	18	102.	1.
60	EVAPORATION FLO	25	201.	1.	4F	201.	1.
61	VENT FAN DUCT	1	145.	1.	5F	300.	1.
62	DUCT	26	132.	1.	1	132.	1.
63	DUCT	28	132.	1.	2C	132.	1.
64	duct	28	132.	1.	27	132.	1.
65	INLEAKAGE	24	173.5	1.	3P	173.5	1.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Flow Paths - Table 2

Flow Path #	Flow Area (ft2)	Hyd. Diam. (ft)	Inertia Length (ft)	Friction Length (ft)	De-Entrmt Frac.	Mom Trn Opt	Strat Flow Opt
1	1.05	1.	10.	1.		-	NONE
2	0.18	1.	10.	1.		-	NONE
3	0.18	1.	10.	1.		-	NONE
4	0.11	1.	10.	1.		-	NONE
5	0.1	1.	10.	1.		-	NONE
6	0.09	1.	10.	1.		-	NONE
7	0.085	1.	10.	1.		-	NONE
8	0.7	1.	10.	1.		-	NONE
9	0.5	1.	10.	1.		-	NONE
10	1.41	1.	10.	1.		-	NONE
11	2.7	1.	10.	1.		-	NONE
12	1.85	1.	10.	1.		-	NONE
13	1.4	1.	10.	1.		-	NONE
14	0.7	1.	10.	1.		-	NONE
15	3.05	1.	10.	1.		-	NONE
16	3.7	1.	10.	1.		-	NONE
17	0.55	1.	10.	1.		-	NONE
18	2.65	1.	10.	1.		-	NONE
19	5.5	1.	10.	1.		-	NONE
20	0.6	1.	10.	1.		-	NONE
21	2.3	1.	10.	1.		-	NONE
22	1.9	1.	10.	1.		-	NONE
23	10.05	1.	10.	1.		-	NONE
24	3.25	1.	10.	1.		-	NONE
25	0.321	1.	10.	1.		-	NONE
26	0.321	1.	10.	1.		-	NONE
27	0.161	1.	10.	1.		-	NONE
28	0.161	1.	10.	1.		-	NONE
29	0.161	1.	10.	1.		-	NONE
30	0.56	1.	10.	1.		-	NONE
31	0.481	1.	10.	1.		-	NONE
32	1.804	1.	10.	1.		-	NONE
33	1.1	1.	10.	1.		-	NONE
34	1.6	1.	10.	1.		-	NONE
35	1.6	1.	10.	1.		-	NONE
36	0.6	1.	10.	1.	0.	-	NONE
37	2.9	1.	10.	1.		-	NONE
38	2.7	1.	10.	1.		-	NONE
39	0.55	1.	10.	1.		-	NONE

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Flow Paths - Table 2

Flow Path #	Flow Area (ft2)	Hyd. Diam. (ft)	Inertia Length (ft)	Friction Length (ft)	De-Entrmt Frac.	Mom Trn Opt	Strat Flow Opt
40	1.6	1.	10.	1.		-	NONE
41	2.2	1.	10.	1.		-	NONE
42	0.55	1.	10.	1.		-	NONE
43	2.566	1.	10.	1.		-	NONE
44	5.7	1.	10.	1.		-	NONE
45	100.	1.	100.	1.		-	NONE
46	100.	1.	100.	1.		-	NONE
47	0.161	1.	10.	1.		-	NONE
48	1.15	1.	10.	1.		-	NONE
49	0.5	1.	10.	1.		-	NONE
50	2.8	1.	10.	1.		-	NONE
51	1.1	1.	10.	1.		-	NONE
52	1.15	1.	10.	1.		-	NONE
53	0.95	1.	10.	1.		-	NONE
54	0.55	1.	10.	1.		-	NONE
55	1.4	1.	10.	1.		-	NONE
56	0.4	1.	10.	1.		-	NONE
57	0.45	1.	10.	1.		-	NONE
58	0.75	1.	10.	1.		-	NONE
59	1.8	1.	10.	1.		-	NONE
60	1.	1.	10.	1.		-	NONE
61	10.	1.	10.	1.		-	NONE
62	10.	1.	10.	1.		-	NONE
63	10.	1.	10.	1.		-	NONE
64	10.	1.	10.	1.		-	NONE
65	0.958	1.22	10.	1.		-	NONE

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Flow Paths - Table 3					
Flow Path #	Fwd. Loss Coeff.	Rev. Loss Coeff.	Comp. Opt.	Critical Flow Model	Exit Loss Coeff.
1	1.	1.	OFF	OFF	0.
2	1.	1.	OFF	OFF	0.
3	1.	1.	OFF	OFF	0.
4	1.	1.	OFF	OFF	0.
5	1.	1.	OFF	OFF	0.
6	1.	1.	OFF	OFF	0.
7	1.	1.	OFF	OFF	0.
8	1.	1.	OFF	OFF	0.
9	1.	1.	OFF	OFF	0.
10	1.	1.	OFF	OFF	0.
11	1.	1.	OFF	OFF	0.
12	1.	1.	OFF	OFF	0.
13	1.	1.	OFF	OFF	0.
14	1.	1.	OFF	OFF	0.
15	1.	1.	OFF	OFF	0.
16	1.	1.	OFF	OFF	0.
17	1.	1.	OFF	OFF	0.
18	1.	1.	OFF	OFF	0.
19	1.	1.	OFF	OFF	0.
20	1.	1.	OFF	OFF	0.
21	1.	1.	OFF	OFF	0.
22	1.	1.	OFF	OFF	0.
23	1.	1.	OFF	OFF	0.
24	1.	1.	OFF	OFF	0.
25	1.	1.	OFF	OFF	0.
26	1.	1.	OFF	OFF	0.
27	1.	1.	OFF	OFF	0.
28	1.	1.	OFF	OFF	0.
29	1.	1.	OFF	OFF	0.
30	1.	1.	OFF	OFF	0.
31	1.	1.	OFF	OFF	0.
32	1.	1.	OFF	OFF	0.
33	1.	1.	OFF	OFF	0.
34	1.	1.	OFF	OFF	0.
35	1.	1.	OFF	OFF	0.
36	1.	1.	OFF	OFF	0.
37	1.	1.	OFF	OFF	0.
38	1.	1.	OFF	OFF	0.
39	1.	1.	OFF	OFF	0.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Flow Paths - Table 3					
Flow Path #	Fwd. Loss Coeff.	Rev. Loss Coeff.	Comp. Opt.	Critical Flow Model	Exit Loss Coeff.
40	1.	1.	OFF	OFF	0.
41	1.	1.	OFF	OFF	0.
42	1.	1.	OFF	OFF	0.
43	1.	1.	OFF	OFF	0.
44	1.	1.	OFF	OFF	0.
45	1.	1.	OFF	OFF	0.
46	1.	1.	OFF	OFF	0.
47	1.	1.	OFF	OFF	0.
48	1.	1.	OFF	OFF	0.
49	1.	1.	OFF	OFF	0.
50	1.	1.	OFF	OFF	0.
51	1.	1.	OFF	OFF	0.
52	1.	1.	OFF	OFF	0.
53	1.	1.	OFF	OFF	0.
54	1.	1.	OFF	OFF	0.
55	1.	1.	OFF	OFF	0.
56	1.	1.	OFF	OFF	0.
57	1.	1.	OFF	OFF	0.
58	1.	1.	OFF	OFF	0.
59	1.	1.	OFF	OFF	0.
60	1.	1.	OFF	OFF	0.
61	1.	1.	OFF	OFF	0.
62	0.1	0.1	OFF	OFF	0.
63	0.1	0.1	OFF	OFF	0.
64	0.1	0.1	OFF	OFF	0.
65	1e+018	1.	OFF	OFF	0.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Thermal Conductors - Table 1

Cond #	Description	Vol A	HT Co	Vol B	HT Co	Cond Type	S. A. (ft2)	Init. T.(F)	Or
1	WALL ROOM 3	3	1	3	2	1	18612.	108.	I
2	WALL ROOM 4	4	1	4	2	1	8304.	79.	I
3	WALL ROOM 5	5	1	5	2	1	8146.	79.	I
4	WALL ROOM 6	6	1	6	2	1	6379.	84.	I
5	WALL ROOM 7	7	1	7	2	1	6375.	84.	I
6	WALL ROOM 8	8	1	8	2	1	8056.	81.	I
7	WALL ROOM 9	9	1	9	2	1	8038.	81.	I
8	WALL ROOM 10	10	1	10	2	1	12881.	102.	I
9	WALL ROOM 11	11	1	11	2	1	10343.	104.	I
10	WALL ROOM 12	12	1	12	2	1	43320.	94.	I
11	WALL ROOM 13	13	1	13	2	1	29709.	85.	I
12	WALL ROOM 14	14	1	14	2	1	19254.	93.	I
13	WALL ROOM 15	15	1	15	2	1	26387.	87.	I
14	WALL ROOM 16	16	1	16	2	1	37220.	98.	I
15	WALL ROOM 17	17	1	17	2	1	55356.	92.	I
16	WALL ROOM 18	18	1	18	2	1	55519.	87.	I
17	WALL ROOM 19	19	1	19	2	1	6484.	104.	I
18	WALL ROOM 20	20	1	20	2	1	43611.	85.	I
19	WALL ROOM 21	21	1	21	2	1	32399.	95.	I
20	WALL ROOM 22	22	1	22	2	1	6361.	110.	I
21	WALL ROOM 23	23	1	23	2	1	28952.	98.	I
22	WALL ROOM 24	24	1	24	2	1	61015.	83.	I
23	WALL ROOM 25	25	1	25	2	1	303855.	105.	I
24	Steel Rm 3	3	1	3	1	2	2461.	108.	I
25	Steel Rm 4	4	1	4	1	2	1490.	79.	I
26	Steel Rm 5	5	1	5	1	2	1416.	79.	I
27	Steel Rm 6	6	1	6	1	2	1179.	84.	I
28	Steel Rm 7	7	1	7	1	2	1169.	84.	I
29	Steel Rm 8	8	1	8	1	2	1874.	81.	I
30	Steel Rm 9	9	1	9	1	2	1879.	81.	I
31	Steel Rm 10	10	1	10	1	2	2389.	102.	I
32	Steel Rm 11	11	1	11	1	2	1659.	104.	I
33	Steel Rm 12	12	1	12	1	2	24256.	94.	I
34	Steel Rm 13	13	1	13	1	2	5164.	85.	I
35	Steel Rm 14	14	1	14	1	2	3542.	93.	I
36	Steel Rm 15	15	1	15	1	2	5060.	87.	I
37	Steel Rm 16	16	1	16	1	2	11833.	98.	I
38	Steel Rm 17	17	1	17	1	2	10897.	92.	I
39	Steel Rm 18	18	1	18	1	2	10276.	87.	I
40	Steel Rm 19	19	1	19	1	2	521.	104.	I

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Thermal Conductors - Table 1									
Cond #	Description	Vol A	HT Co	Vol B	HT Co	Cond Type	S. A. (ft2)	Init. T.(F)	Or
41	Steel Rm 20	20	1	20	1	2	9878.	85.	I
42	Steel Rm 21	21	1	21	1	2	4487.	95.	I
43	Steel Rm 22	22	1	22	1	2	757.	110.	I
44	Steel Rm 23	23	1	23	1	2	4977.	98.	I
45	Steel Rm 24	24	1	24	1	2	12571.	83.	I
46	Steel Rm 25	25	1	25	1	2	52263.	105.	I
47	1C-P-206 MOTOR	5	1	5	1	3	56.5	84.	I
48	1D-P-202 MOTOR	6	1	6	1	4	95.	81.	I
49	1B-P-206 MOTOR	4	1	4	1	3	56.5	84.	I
50	1C-P-202 MOTOR	7	1	7	1	4	95.	81.	I
51	1B-P-202 MOTOR	8	1	8	1	4	95.	102.	I
52	1A-P-202 MOTOR	9	1	9	1	4	95.	104.	I
53	1A-V-213 MOTOR	20	1	20	1	5	18.8	85.	I
54	1B-V-213 MOTOR	24	1	24	1	5	18.8	83.	I
55	1D-V-213 MOTOR	24	1	24	1	5	18.8	83.	I
56	1E-V-213 MOTOR	24	1	24	1	5	18.8	83.	I
57	1D-P-206	4	1	4	1	3	56.5	84.	I
58	1A-P-206	5	1	5	1	3	56.5	84.	I

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Thermal Conductors - Table 2				
Cond #	Therm. Rad. Side A	Emiss. Side A	Therm. Rad. Side B	Emiss. Side B
1	No		No	
2	No		No	
3	No		No	
4	No		No	
5	No		No	
6	No		No	
7	No		No	
8	No		No	
9	No		No	
10	No		No	
11	No		No	
12	No		No	
13	No		No	
14	No		No	
15	No		No	
16	No		No	
17	No		No	
18	No		No	
19	No		No	
20	No		No	
21	No		No	
22	No		No	
23	No		No	
24	No		No	
25	No		No	
26	No		No	
27	No		No	
28	No		No	
29	No		No	
30	No		No	
31	No		No	
32	No		No	
33	No		No	
34	No		No	
35	No		No	
36	No		No	
37	No		No	
38	No		No	
39	No		No	
40	No		No	

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Thermal Conductors - Table 2				
Cond #	Therm. Rad. Side A	Emiss. Side A	Therm. Rad. Side B	Emiss. Side B
41	No		No	
42	No		No	
43	No		No	
44	No		No	
45	No		No	
46	No		No	
47	No		No	
48	No		No	
49	No		No	
50	No		No	
51	No		No	
52	No		No	
53	No		No	
54	No		No	
55	No		No	
56	No		No	
57	No		No	
58	No		No	

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Heat Transfer Coefficient Types - Table 1

Type #	Heat Transfer Option	Nominal Value	FF	Cnd/ Cnv Opt	Cnd Opt	Sp Cnv HTC	Nat Cnv Opt	For Cnv Opt	Rad Opt
1	Direct			ADD	UCHI		VERT SURF	PIPE FLOW	ON
2	Sp Heat	0.							

Heat Transfer Coefficient Types - Table 2

Type #	Phase Opt	Min Liq Fract	Max Liq Fract	Convection Bulk Temp Model	FF	Condensation Bulk Temp Model	FF
1	VAP			Tg-Tf		Tb-Tw	
2							

Heat Transfer Coefficient Types - Table 3

Type #	Char. Length (ft)	Nat Conv Coef FF	Nat Conv Exp FF	For Conv Coef FF	For Conv Exp FF	Nom Vel (ft/s)	Vel FF	Minimum Conv HTC (B/h-f2-F)
1								DEFAULT
2								

HTC Types - Table 4

Type #	Total Heat (Btu)	Peak Time (sec)	Initial Value (B/h-f2-F)	Post-BD Direct FF
1				
2				

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Thermal Conductor Types							
Type #	Description	Geom	Thick. (in)	O.D. (in)	Regions	Heat (Btu/ft3-s)	Heat FF
1	1.5 FT THK CONC	WALL	18.	0.	4	0.	
2	3/8 IN STEEL	WALL	0.375	0.	1	0.	
3	CORE SPRAY MOTO	ROD	18.	36.	1	0.85	32
4	RHR PUMP MOTOR	ROD	21.	42.	1	0.9	32
5	FRVS FAN MOTOR	ROD	12.1	24.2	1	0.803	32

Thermal Conductor Type
1
1.5 FT THK CONCRETE

Region	Mat. #	Bdry. (in)	Thick (in)	Sub-regs.	Heat Factor
1	3	0.	1.296	4	0.
2	3	1.296	2.592	4	0.
3	3	3.888	7.056	4	0.
4	3	10.944	7.056	4	0.

Thermal Conductor Type
2
3/8 IN STEEL

Region	Mat. #	Bdry. (in)	Thick (in)	Sub-regs.	Heat Factor
1	4	0.	0.375	2	0.

Thermal Conductor Type
3
CORE SPRAY MOTOR

Region	Mat. #	Bdry. (in)	Thick (in)	Sub-regs.	Heat Factor
1	5	0.	18.	10	1.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Thermal Conductor Type 4 RHR PUMP MOTOR					
Region	Mat. #	Bdry. (in)	Thick (in)	Sub-regs.	Heat Factor
1	5	0.	21.	10	1.

Thermal Conductor Type 5 FRVS FAN MOTOR					
Region	Mat. #	Bdry. (in)	Thick (in)	Sub-regs.	Heat Factor
1	6	0.	12.1	10	1.

Materials	
Type #	Description
1	COPPER FINS
2	STAINLESS STEEL
3	CONCRETE
4	STEEL HEAT SINKS
5	CS/RHR MOTOR COMPOSITE
6	FRVS MOTOR COMPOSITE

Material Type 1 COPPER FINS			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	559.	225.	0.108

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Material Type 2 STAINLESS STEEL			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	490.	9.	0.11

Material Type 3 CONCRETE			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	150.	1.04	0.156

Material Type 4 STEEL HEAT SINKS			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	490.	18.	0.11

Material Type 5 CS/RHR MOTOR COMPOSITE			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	165.	3.	0.1

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Material Type 6 FRVS MOTOR COMPOSITE			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	137.4	3.	0.1

Cooler/Heater										
Heater Cooler #	Description	Vol. #	On Trip #	Off Trip #	Flow Rate (CFM)	Flow Rate FF	Heat Rate (Btu/s)	Heat Rate FF	Phs Opt	Ctrlr Loc
1H	FRVS FAN HEAT	28					97.63	1	VTI	28
2H	HEAT ROOM 3	3					1.	2	VTI	3
3H	EQP HEAT RM 4	4					1.	3	VTI	4
4H	FAN HEAT RM 4	4	1	14			24.66		VTI	4
5H	EQP HEAT RM 5	5					1.	4	VTI	5
6H	FAN HEAT RM 5	5	2	15			24.66		VTI	5
7H	EQP HEAT RM 6	6					1.	5	VTI	6
8H	FAN HEAT RM 6	6	3	16			16.25		VTI	6
9H	EQP HEAT RM 7	7					1.	6	VTI	7
10H	FAN HEAT RM 7	7	4	17			16.25		VTI	7
11H	EQP HEAT RM 8	8					1.	7	VTI	8
12H	FAN HEAT RM 8	8	5	18			16.25		VTI	8
13H	EQP HEAT RM 9	9					1.	8	VTI	9
14H	FAN HEAT RM 9	9	6	19			16.25		VTI	9
15H	EQP HT. RM 10	10					1.	9	VTI	10
16H	FAN HT. RM 10	10	7	20			12.33		VTI	10
17H	EQP HT. RM 11	11					1.	10	VTI	11
18H	FAN HT. RM 11	11	8	21			4.31		VTI	11
19H	SUPP POOL HT	12	0				1.	29	VTI	12
20H	MCC RM 13 HEA	13					1.	12	VTI	13
21H	RM 14 HEAT	14					1.	13	VTI	14
22H	RM 15 HEAT	15					1.	14	VTI	15
23H	EQP HT. RM 16	16					1.	15	VTI	16
24H	FAN HT. RM 16	16	9	22			12.62		VTI	16
25H	HEAT ROOM 17	17					1.	16	VTI	17
26H	HEAT ROOM 18	18					1.	17	VTI	18
27H	HEAT ROOM 19	19					1.	18	VTI	19
28H	HEAT ROOM 20	20					1.	19	VTI	20

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Cooler/Heater										
Heater Cooler #	Description	Vol. #	On Trip #	Off Trip #	Flow Rate (CFM)	Flow Rate FF	Heat Rate (Btu/s)	Heat Rate FF	Phs Opt	Ctrlr Loc
29H	HEAT ROOM 21	21					1.	20	VTI	21
30H	HEAT ROOM 22	22					1.	21	VTI	22
31H	HEAT ROOM 23	23					1.	22	VTI	23
32H	HEAT ROOM 24	24					1.	23	VTI	24
33H	HEAT ROOM 25	25					1.	24	VTI	25
34C	RM 4 COOLER	4	1	14			8.64	25	VTE	4
35C	RM 5 COOLER	5	2	15			8.64	25	VTE	5
36C	RM 6 COOLER	6	3	16			6.23	25	VTE	6
37C	RM 7 COOLER	7	4	17			6.23	25	VTE	7
38C	RM 8 COOLER	8	5	18			6.23	25	VTE	8
39C	RM 9 COOLER	9	6	19			6.23	25	VTE	9
40C	RM 10 COOLER	10	7	20			4.32	25	VTE	10
41C	RM 11 COOLER	11	8	21			1.9	25	VTE	11
42C	RM 16 COOLER	16	9	22			5.66	26	VTE	16
43H	frvs heater	27	12	13			379.2		VTI	27
44H	EQP HEAT RM12	12					1.	30	VTI	12

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Heat Exchangers - Table 1					
Heat Ex. #	Description	HX Type #	Prim Flow Path	Scnd Flow Path	Cpld HX #
1H	FRVS REC. COOLE	1	46	SPEC	

Heat Exchangers - Table 2								
Heat Ex. #	Scndy Flow (lbm/s)	Scndy Flow FF	Scndy Temp (F)	Scndy Temp FF	Ext. Flow (lbm/s)	Ext. Flow FF	Ext. Heat (Btu/s)	Ext. Heat FF
1H	211.1	0	100.					

Heat Exchanger Types - Table 1					
HX Type #	Option	Passes or Zones	Tube Mat. #	Thick-ness (in)	Wall Area (ft2)
1	FAN COOLER	8	2	0.035	1095.6

Heat Exchanger Types - Table 2								
HX Type #	Side	Fin Type	Flow Area (ft2)	Hyd. Diam. (in)	Tot. S. Area (ft2)	H.T. Coef Curv	H.T. Coef Type	Fouling Resistance (h-f2-F/B)
1	prim	SHEE	58.32	0.625	20301.1	0	BUIL	0.
	SECO	NONE	0.269	0.555	930.	0	BUIL	5e-004

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Heat Exchanger Types - Table 3 Fin Parameters						
HX Type #	Side	Fin Mat. Type #	Pin Diam. (in)	Length (in)	Thick-ness (in)	Surf. Area (ft2)
1	PRIM	1	0.	0.4375	0.007	19214.
	seco	0	0.	0.	0.	0.

Component Trips									
Trip #	Sense Var.	Sensor 1 Loc.	Sensor 2 Loc.	Var. Limit	Set Point	Delay Time	Reset Trip	Cond Trip	Cond Type
1	GAS T	4		UPPER	115.	0.	14		AND
2	GAS T	5		UPPER	115.	0.	15		AND
3	GAS T	6		UPPER	115.	0.	16		AND
4	GAS T	7		UPPER	115.	0.	17		AND
5	GAS T	8		UPPER	115.	0.	18		AND
6	GAS T	9		UPPER	115.	0.	19		AND
7	GAS T	10		UPPER	115.	0.	20		AND
8	GAS T	11		UPPER	115.	0.	21		AND
9	GAS T	16		UPPER	104.	0.	22		AND
10	PRESS	3P	25	UPPER	0.	0.			AND
11	TIME			UPPER	45.	0.			AND
12	CONT	5		UPPER	60.	0.	13		AND
13	CONT	5		LOWER	50.	0.	12		AND
14	GAS T	4		LOWER	112.75	0.	1		AND
15	GAS T	5		LOWER	112.75	0.	2		AND
16	GAS T	6		LOWER	112.75	0.	3		AND
17	GAS T	7		LOWER	112.75	0.	4		AND
18	GAS T	8		LOWER	112.75	0.	5		AND
19	GAS T	9		LOWER	112.75	0.	6		AND
20	GAS T	10		LOWER	112.75	0.	7		AND
21	GAS T	11		LOWER	112.75	0.	8		AND
22	GAS T	16		LOWER	99.	0.	9		AND
23	TIME			UPPER	10.	0.			AND

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Functions				
FF#	Description	Ind. Var.	Dep. Var.	Points
0	Constant	-	-	0
1	NO. OF FRVS FAN	TIME (S)	NO. OF FRV	4
2	PIPE CHASE HEAT	TIME (S)	BTU/S	4
3	RM 4 TIME HEAT	TIME (S)	HEAT (BTU/	4
4	RM 5 TIME HEAT	TIME (S)	HEAT (BTU/	4
5	RM 6 TIME HEAT	TIME (S)	HEAT (BTU/	4
6	RM 7 TIME HEAT	TIME (S)	HEAT (BTU/	4
7	RM 8 TIME HEAT	TIME (S)	HEAT (BTU/	4
8	RM 9 TIME HEAT	TIME (S)	HEAT (BTU/	4
9	RM 10 TIME HEAT	TIME (S)	HEAT (BTU/	4
10	RM 11 TIME HEAT	TIME (S)	HEAT (BTU/	4
11	TORUS TEMP	TIME (S)	Torus Temp	22
12	RM 13 TIME HEAT	TIME (S)	HEAT (BTU/	4
13	RM 14 HEAT	TIME (S)	HEAT (BTU/	4
14	RM 15 HEAT	TIME (S)	HEAT (BTU/	4
15	RM 16 TIME HEAT	TIME (S)	HEAT (BTU/	4
16	RM 17 HEAT	TIME (S)	HEAT (BTU/	4
17	RM 18 HEAT	TIME (S)	HEAT (BTU/	4
18	RM 19 HEAT	TIME (S)	HEAT (BTU/	4
19	RM 20 HEAT	TIME (S)	HEAT (BTU/	4
20	RM 21 HEAT	TIME (S)	HEAT (BTU/	4
21	RM 22 HEAT	TIME (S)	HEAT (BTU/	4
22	RM 23 HEAT	TIME (S)	HEAT (BTU/	4
23	RM 24 HEAT	TIME (S)	HEAT (BTU/	4
24	RM 25 HEAT	TIME (S)	HEAT (BTU/	4
25	RM CLR, SACS 10	TEMPERATUR	HEAT TRANS	2
26	RM CLR, CW 51 F	TEMPERATUR	HEAT TRANS	2
27	FRVS HT RATE [N	FAN OUTLET	HEAT TRANS	2
28	exhaust flow	cv8	Exhaust fl	4
29	torus heat (y=x	cv4	torus heat	2
30	TORUS (RM 12) L	Time (sec)	Heat (Btu/	4
31	PDT Output	Reactor Bl	PDT Output	4
32	Motor Heat	TIME (S)	Normalized	8

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
1
NO. OF FRVS FANS
Ind. Var.: TIME (S)
Dep. Var.: NO. OF FRVS FANS OPERATING

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	0.	10.	0.
17.	4.	1000000.	4.

Function
2
PIPE CHASE HEAT
Ind. Var.: TIME (S)
Dep. Var.: BTU/S

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	18.27	10.	18.27
10.1	18.15	1000000.	18.15

Function
3
RM 4 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	1.18	10.	1.18
10.1	12.92	1000000.	12.92

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
4
RM 5 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	1.24	10.	1.24
10.1	12.78	1000000.	12.78

Function
5
RM 6 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	1.98	10.	1.98
10.1	3.21	1000000.	3.21

Function
6
RM 7 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	1.98	10.	1.98
10.1	3.14	1000000.	3.14

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
7
RM 8 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	1.05	10.	1.05
10.1	4.54	1000000.	4.54

Function
8
RM 9 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	1.05	10.	1.05
10.1	4.57	1000000.	4.57

Function
9
RM 10 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	7.55	10.	7.55
10.1	28.54	1000000.	28.54

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
10
RM 11 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	5.41	10.	5.41
10.1	17.05	1000000.	17.05

Function
11
TORUS TEMP
Ind. Var.: TIME (S)
Dep. Var.: Torus Temp F

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	96.	20.	121.
40.	131.	60.	134.
100.	138.	200.	142.
400.	150.	600.	159.
800.	163.	1000.	167.
2000.	181.	3000.	187.
4000.	191.	5000.	194.
7000.	198.	9000.	202.
11000.	204.	13000.	205.
16000.	207.	19000.	209.
22000.	210.	1000000.	210.

Function
12
RM 13 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	11.08	10.	11.08
10.1	7.3	1000000.	7.3

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
13
RM 14 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	21.49	10.	21.49
10.1	1.83	1000000.	1.83

Function
14
RM 15 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	22.02	10.	22.02
10.1	2.23	1000000.	2.23

Function
15
RM 16 TIME HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	140.47	10.	140.47
10.1	151.57	1000000.	151.57

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
16
RM 17 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	30.76	10.	30.76
10.1	28.47	1000000.	28.47

Function
17
RM 18 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	26.85	10.	26.85
10.1	17.98	1000000.	17.98

Function
18
RM 19 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	15.89	10.	15.89
10.1	7.84	1000000.	7.84

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
19
RM 20 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	58.81	10.	58.81
10.1	23.65	1000000.	23.65

Function
20
RM 21 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	55.2	10.	55.2
10.1	9.12	1000000.	9.12

Function
21
RM 22 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	13.62	10.	13.62
10.1	11.62	1000000.	11.62

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
22
RM 23 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	38.38	10.	38.38
10.1	25.76	1000000.	25.76

Function
23
RM 24 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	31.44	10.	31.44
10.1	17.15	1000000.	17.15

Function
24
RM 25 HEAT
Ind. Var.: TIME (S)
Dep. Var.: HEAT (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	220.43	10.	220.43
10.1	84.8	1000000.	84.8

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
25
RM CLR, SACS 100F
Ind. Var.: TEMPERATURE (F)
Dep. Var.: HEAT TRANSFER RATE (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	-100.	200.	100.

Function
26
RM CLR, CW 51 F
Ind. Var.: TEMPERATURE (F)
Dep. Var.: HEAT TRANSFER RATE (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
51.	0.	151.	100.

Function
27
FRVS HT RATE [NOT USED]
Ind. Var.: FAN OUTLET TEMPERATURE (F)
Dep. Var.: HEAT TRANSFER RATE (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	-23.88	200.	23.88

Function
28
exhaust flow
Ind. Var.: Control Variable 8
Dep. Var.: Exhaust flow rate (cfs)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
-1000000.	0.	-1.	0.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function
28
exhaust flow
Ind. Var.: Control Variable 8
Dep. Var.: Exhaust flow rate (cfs)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
1.	165.	1000000.	165.

Function
29
torus heat (y=x)
Ind. Var.: control variable 4
Dep. Var.: torus heat tr rate (Btu/sec)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
-1000000.	-1000000.	1000000.	1000000.

Function
30
TORUS (RM 12) LIGHT AND PIPING HEAT
Ind. Var.: Time (sec)
Dep. Var.: Heat (Btu/sec)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	10.25	10.	10.25
10.1	81.41	1000000.	81.41

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Function 31 PDT Output Ind. Var.: Reactor Bldg DP (in.w.g.) Dep. Var.: PDT Output (in.w.g.)			
Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
-1000.	-1.	-1.	-1.
1.	1.	1000.	1.

Function 32 Motor Heat Ind. Var.: TIME (S) Dep. Var.: Normalized Heat Generation Rate			
Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	0.	10.	0.
10.1	10.	11.	6.06
12.	3.25	13.	1.56
14.	1.	1000000.	1.

Control Variables

CV #	Description	Func. Form	Initial Value	Coeff. G	Coeff. a0	Min	Max	Upd. Int. Mult.
1	Sensor Tube P	sum	0.	27.7	-14.7	-1e+03	1e+032	0.
2	exh. flow rat	div	0.	60.	0.	-1e+03	1e+032	0.
3	torus temp.	tfunc	96.	1.	0.	-1e+03	1e+032	0.
4	torus ht rate	sum	0.	13.32	0.	-1e+03	1e+032	0.
5	frvs rel. hum	div	50.	100.	0.	-1e+03	1e+032	0.
6	inleakage fl.	sum	0.	60.	0.	-1e+03	1e+032	0.
7	PDTout-setpt	sum	0.	1.	0.5	-1e+03	1e+032	0.
8	PDIC-9426 SUM	proint	0.	1.	1.	-1e+03	1e+032	0.
9	PDT-9426 OUT	tfunc	0.	1.	0.	-1e+03	1e+032	0.
10	MCC Area Pres	sum	0.	27.7	-14.7	-1e+03	1e+032	0.
11	FRVS Vent Rm	sum	0.	27.7	-14.7	-1e+03	1e+032	0.

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Function Components
Control Variable 1
Sensor Tube Penetration Pressure (177 ft)
sum
Y=G*(a0+a1X1+a2X2+...+anXn)

#	Gothic_s Name	Variable location	Coef. a
1	p	cV24	1.

Function Components
Control Variable 2
exh. flow rate
div
Y=G*(a0+a2X2)/(a1X1)

#	Gothic_s Name	Variable location	Coef. a
1	rvg	cV1	1.
2	wgjnc	cJ61	1.

Function Components
Control Variable 3
torus temp.
tfunc
Y=G*interp(X1,tableX2)

#	Gothic_s Name	Variable location	Coef. a
1	timet	cM	1.
2	-	DC11	1.

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Function Components
Control Variable 4
torus ht rate
sum
Y=G*(a0+a1X1+a2X2+...+anXn)

#	Gothic_s Name	Variable location	Coef. a
1	cvval	cv3	1.
2	temv	cV12	-1.

Function Components
Control Variable 5
frvs rel. hum
div
Y=G*(a0+a2X2)/(a1X1)

#	Gothic_s Name	Variable location	Coef. a
1	psatv	cV28	1.
2	psteam	cV28	1.

Function Components
Control Variable 6
inleakage fl.
sum
Y=G*(a0+a1X1+a2X2+...+anXn)

#	Gothic_s Name	Variable location	Coef. a
1	wgjnc	cJ65	14.013

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Function Components
Control Variable 7
PDTout-setpt
sum
Y=G*(a0+a1X1+a2X2+...+anXn)

#	Gothic_s Name	Variable location	Coef. a
1	cvval	cv9	1.

Function Components
Control Variable 8
PDIC-9426 SUM
proint
Y=G*(a0X1+a1*integ(X1dt))

#	Gothic_s Name	Variable location	Coef. a
1	cvval	cv7	0.0167

Function Components
Control Variable 9
PDT-9426 OUT
tfunc
Y=G*interp(X1,tableX2)

#	Gothic_s Name	Variable location	Coef. a
1	cvval	cv1	1.
2	-	DC31	1.

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Function Components
Control Variable 10
MCC Area Pres
sum
Y=G*(a0+a1X1+a2X2+...+anXn)

#	Gothic_s Name	Variable location	Coef. a
1	p	cV13	1.

Function Components
Control Variable 11
FRVS Vent Rm P
sum
Y=G*(a0+a1X1+a2X2+...+anXn)

#	Gothic_s Name	Variable location	Coef. a
1	p	cV21	1.

Volume Initial Conditions

Vol #	Pressure (psia)	Vapor Temp. (F)	Liquid Temp. F	Relative Humidity (%)	Liquid Volume Fraction	Ice Volume Fract.	Ice Surf.A. (ft2)
def	14.693	94.	94.	50.	0.	0.	0.
1	14.693	94.	94.	50.	0.	0.	0.
2	14.693	108.	104.	50.	0.	0.	0.
3	14.72	79.	79.	50.	0.	0.	0.
4	14.745	79.	79.	50.	0.	0.	0.
5	14.745	84.	84.	50.	0.	0.	0.
6	14.745	84.	84.	50.	0.	0.	0.
7	14.745	84.	84.	50.	0.	0.	0.
8	14.74	81.	81.	50.	0.	0.	0.
9	14.74	81.	81.	50.	0.	0.	0.
10	14.745	102.	102.	50.	0.	0.	0.
11	14.745	104.	104.	50.	0.	0.	0.
12	14.74	94.	94.	50.	0.	0.	0.

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Volume Initial Conditions							
Vol #	Pressure (psia)	Vapor Temp. (F)	Liquid Temp. F	Relative Humidity (%)	Liquid Volume Fraction	Ice Volume Fract.	Ice Surf.A. (ft2)
13	14.733	85.	85.	50.	0.	0.	0.
14	14.733	93.	93.	50.	0.	0.	0.
15	14.733	87.	87.	50.	0.	0.	0.
16	14.72	98.	98.	50.	0.	0.	0.
17	14.72	92.	92.	50.	0.	0.	0.
18	14.72	87.	87.	50.	0.	0.	0.
19	14.71	104.	104.	50.	0.	0.	0.
20	14.707	85.	85.	50.	0.	0.	0.
21	14.704	95.	95.	50.	0.	0.	0.
22	14.704	110.	110.	50.	0.	0.	0.
23	14.693	98.	98.	50.	0.	0.	0.
24	14.693	83.	83.	50.	0.	0.	0.
25	14.656	105.	105.	50.	0.	0.	0.

Initial Gas Pressure Ratios								
Vol #	Air Gas 1	Gas 2	Gas 3	Gas 4	Gas 5	Gas 6	Gas 7	Gas 8
def	1.	0.	0.	0.	0.	0.	0.	0.
1	1.	0.	0.	0.	0.	0.	0.	0.
2	1.	0.	0.	0.	0.	0.	0.	0.
3	1.	0.	0.	0.	0.	0.	0.	0.
4	1.	0.	0.	0.	0.	0.	0.	0.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Initial Gas Pressure Ratios								
Vol #	Air Gas 1	Gas 2	Gas 3	Gas 4	Gas 5	Gas 6	Gas 7	Gas 8
5	1.	0.	0.	0.	0.	0.	0.	0.
6	1.	0.	0.	0.	0.	0.	0.	0.
7	1.	0.	0.	0.	0.	0.	0.	0.
8	1.	0.	0.	0.	0.	0.	0.	0.
9	1.	0.	0.	0.	0.	0.	0.	0.
10	1.	0.	0.	0.	0.	0.	0.	0.
11	1.	0.	0.	0.	0.	0.	0.	0.
12	1.	0.	0.	0.	0.	0.	0.	0.
13	1.	0.	0.	0.	0.	0.	0.	0.
14	1.	0.	0.	0.	0.	0.	0.	0.
15	1.	0.	0.	0.	0.	0.	0.	0.
16	1.	0.	0.	0.	0.	0.	0.	0.
17	1.	0.	0.	0.	0.	0.	0.	0.
18	1.	0.	0.	0.	0.	0.	0.	0.
19	1.	0.	0.	0.	0.	0.	0.	0.
20	1.	0.	0.	0.	0.	0.	0.	0.
21	1.	0.	0.	0.	0.	0.	0.	0.
22	1.	0.	0.	0.	0.	0.	0.	0.
23	1.	0.	0.	0.	0.	0.	0.	0.
24	1.	0.	0.	0.	0.	0.	0.	0.
25	1.	0.	0.	0.	0.	0.	0.	0.

Run Control Parameters (Seconds)								
Time Int	DT Min	DT Max	DT Ratio	End Time	Print Int	Graph Int	Max CPU	Dump Int
1	0.001	1.	1.	3600.	18000.	10.	5000.	0.
2	0.001	2.	1.	18000.	18000.	100.	5000.	0.

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Solution Options						
Time Dom	Solution Method	Imp Conv Limit	Imp Iter Limit	Pres Sol Method	Pres Conv Limit	Pres Iter Limit
1	SEMI-IMP	0.	1	DIRECT	0.	1
2	SEMI-IMP	0.	1	DIRECT	0.	1

Run Options	
Parameter	Value
Restart Time (sec)	0
Restart Time Step #	0
Restart Time Control	NEW
Revaporization Fraction	DEFAULT
Heterogenous Nucleation	INCLUDE
Minimum HT Coeff.	0
Reference Pressure	IGNORE
Forced Ent. Drop Diam.	0.00833
Vapor Phase Head Correction	INCLUDE
Kinetic Energy	IGNORE
Vapor Phase	INCLUDE
Liquid Phase	INCLUDE
Drop Phase	INCLUDE
Force Equilibrium	IGNORE
Drop-Liq. Conversion	INCLUDE
QA Logging	OFF

Ice Condenser Parameters			
Initial Temp. (F)	Bulk Density (lbm/ft3)	Surface Area Multiplier Function	Heat Transfer Option
15.	33.43		UCHIDA

Reactor Building Exhaust Rate (LOCA Case A - Summer)
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Graphs							
Graph #	Title	Mon	Curve Number 1	2	3	4	5
1			TV1	TV2	TV3	TV4	TV5
2			TV6	TV7	TV8	TV9	TV10
3			TV11	TV12	TV13	TV14	TV15
4			TV16	TV17	TV18	TV19	TV20
5			TV21	TV22	TV23	TV24	TV25
6	TEMPERATURES AT		TV26	TV27			
7	RELATIVE HUMIDI		RH26	RH27	RH28		
8	FRVS FAN FLOW R		FV46				
9	RB Exhaust (acf		cv2				
10	Vent Flow to At		FV61				
11	Pressure at Sen		cv1				
12	Inleakage Flow		cv6				
13	Pressure Error		cv7				
14	Controller Outp		cv8				
15	PDT Output (in.		cv9				
16	MCC Area Pressu		cv10				
17	FRVS Vent Room		cv11				

Noncondensing Gases						
Gas No.	Description	Symbol	Type	Mol. Weight	Lennard-Jones Diameter (Ang)	Parameters e/K (K)
1	Air	Air	POLY	28.97	3.617	97.

Noncondensing Gases - Cp/Visc. Equations						
Gas No.	Cp Tmin (R)	Equation Tmax (R)	(Required) Cp (Btu/lbm-R)	Visc. Tmin (R)	Equation Tmax (R)	(Optional) Viscosity (lbm/ft-hr)
1	360.	2280.	0.238534-6.2006			

Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:32
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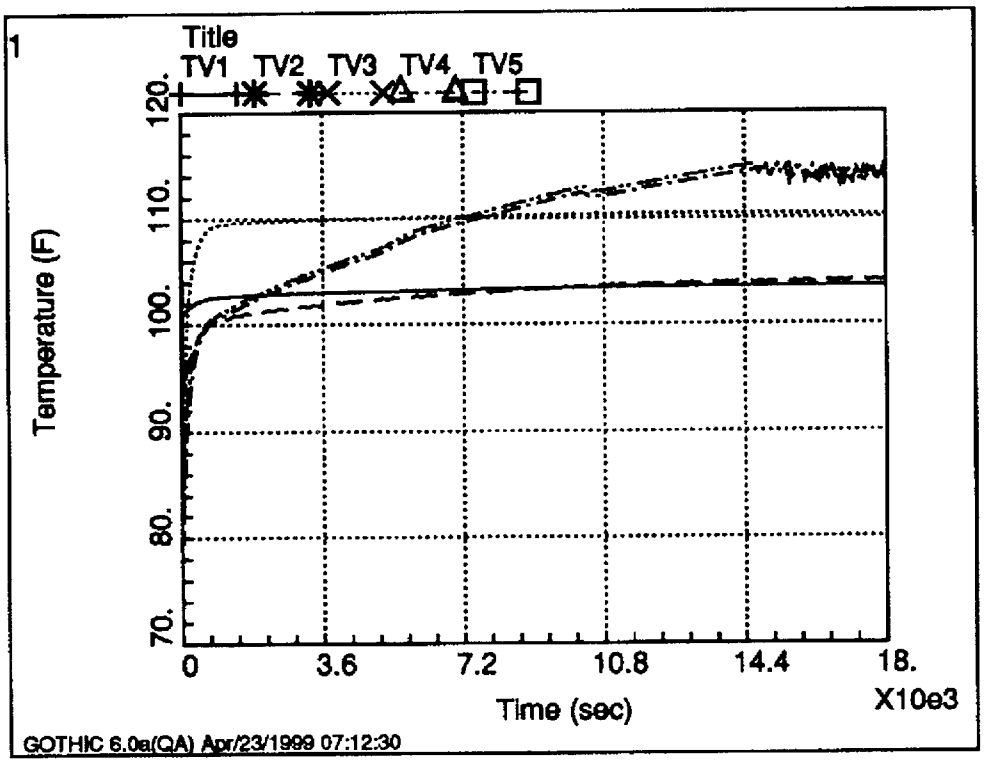
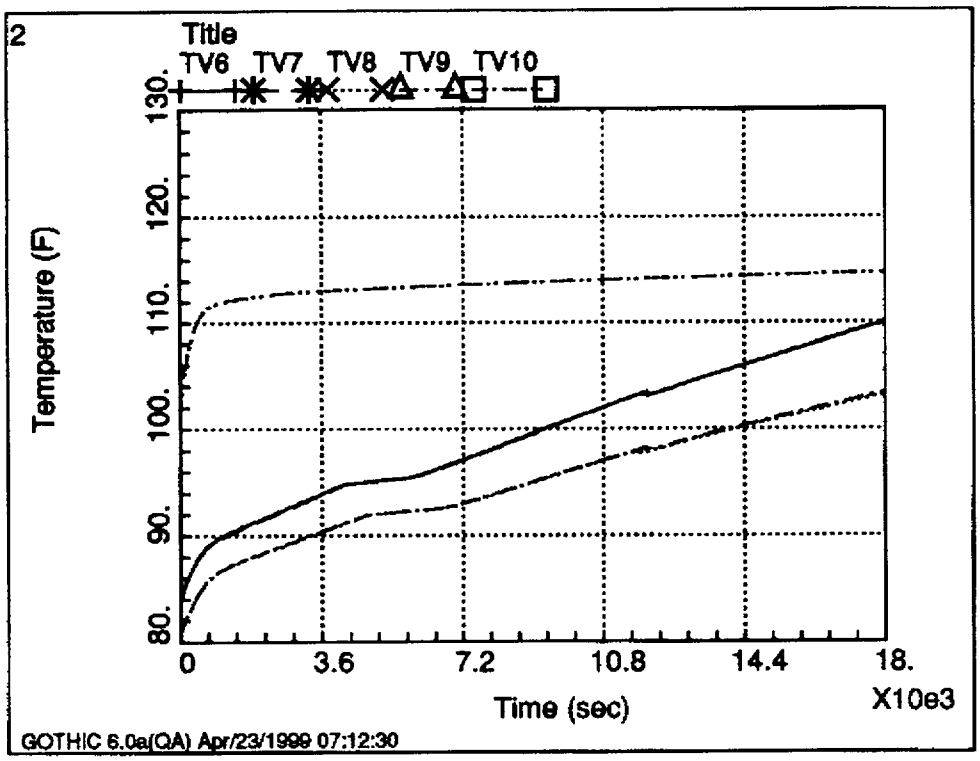
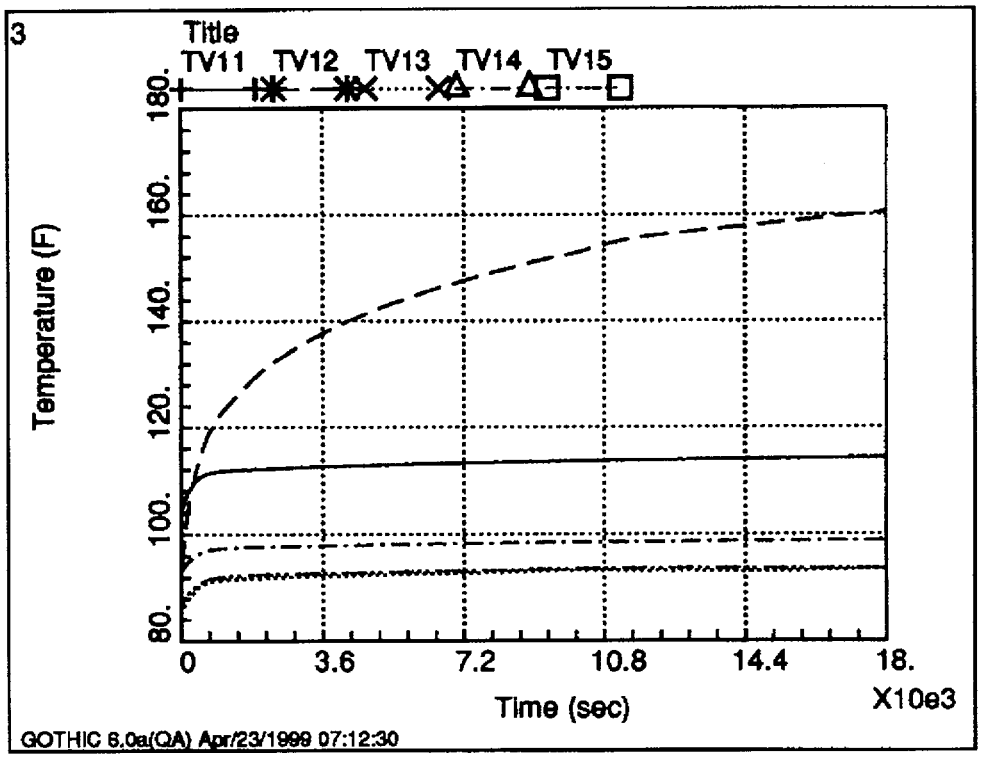


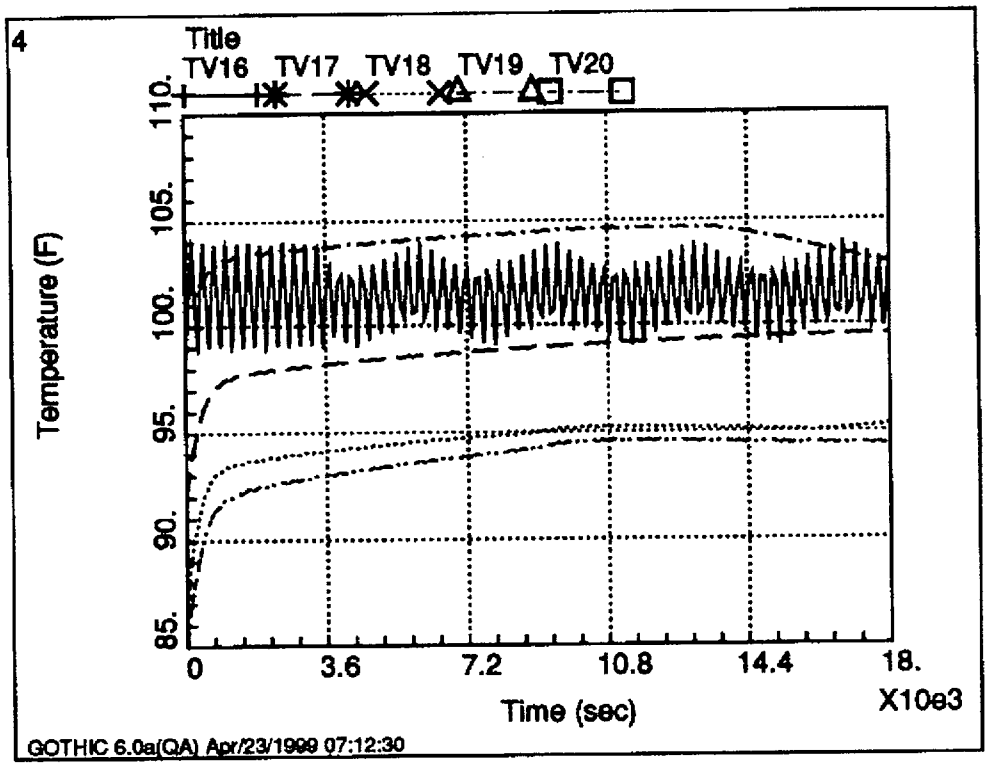
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:32
GOTHIC Version 6.0a(QA) - April 1998



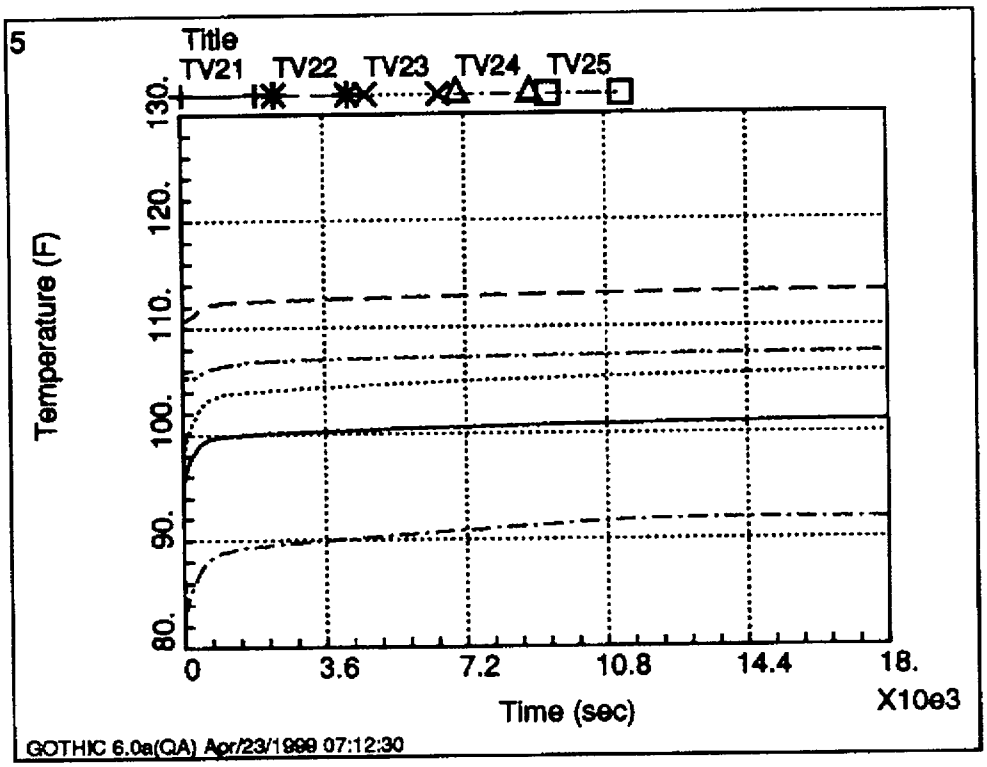
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:33
GOTHIC Version 6.0a(QA) - April 1998



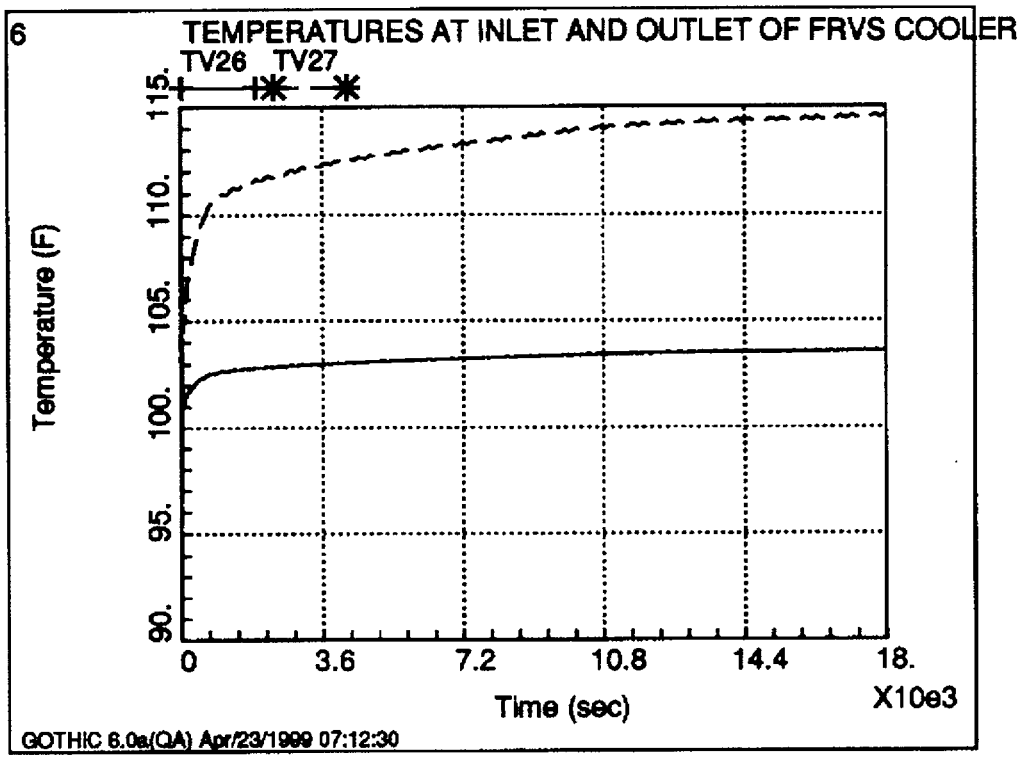
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:33
GOTHIC Version 6.0a(QA) - April 1998



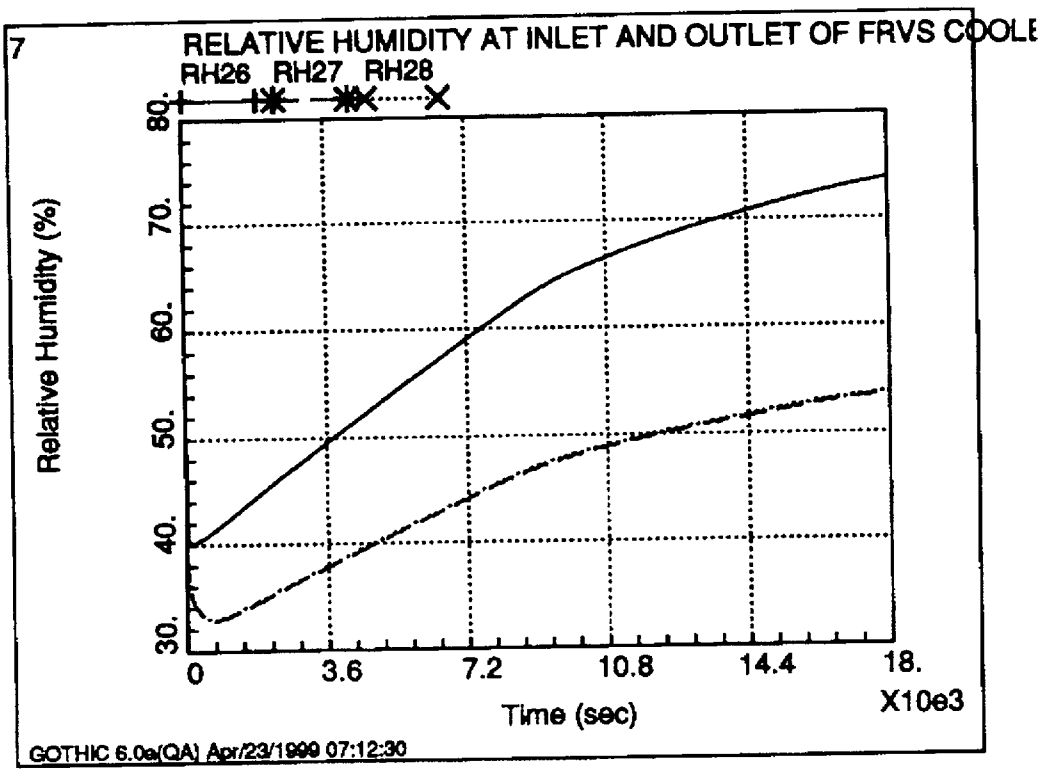
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:34
GOTHIC Version 6.0a(QA) - April 1998



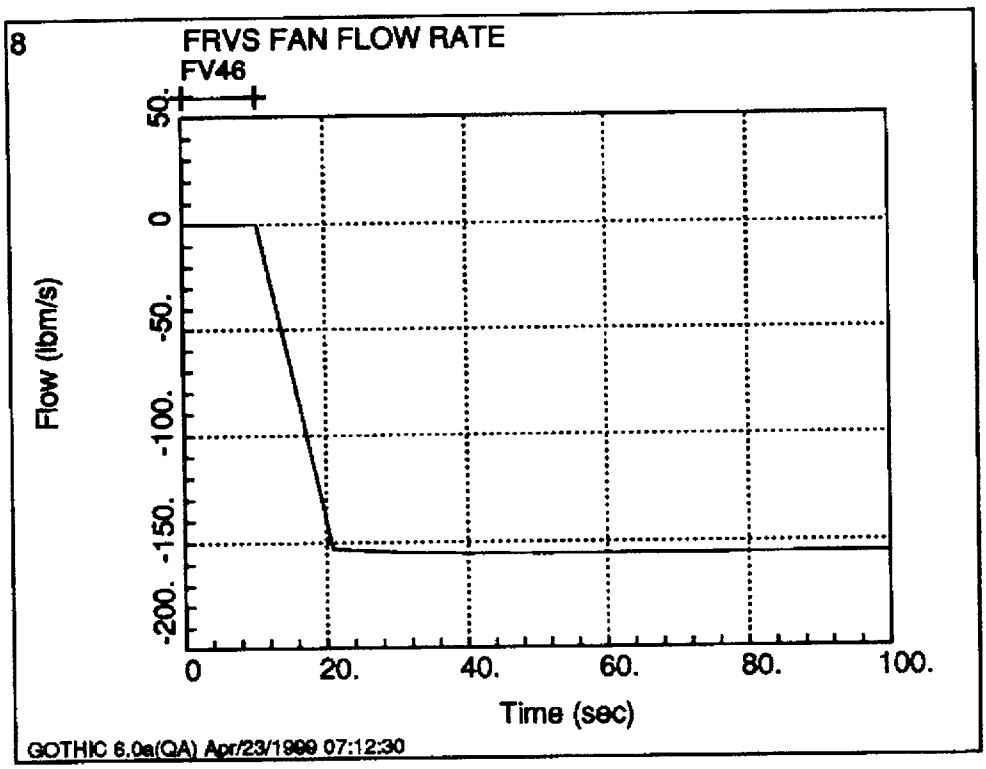
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:34
GOTHIC Version 6.0a(QA) - April 1998



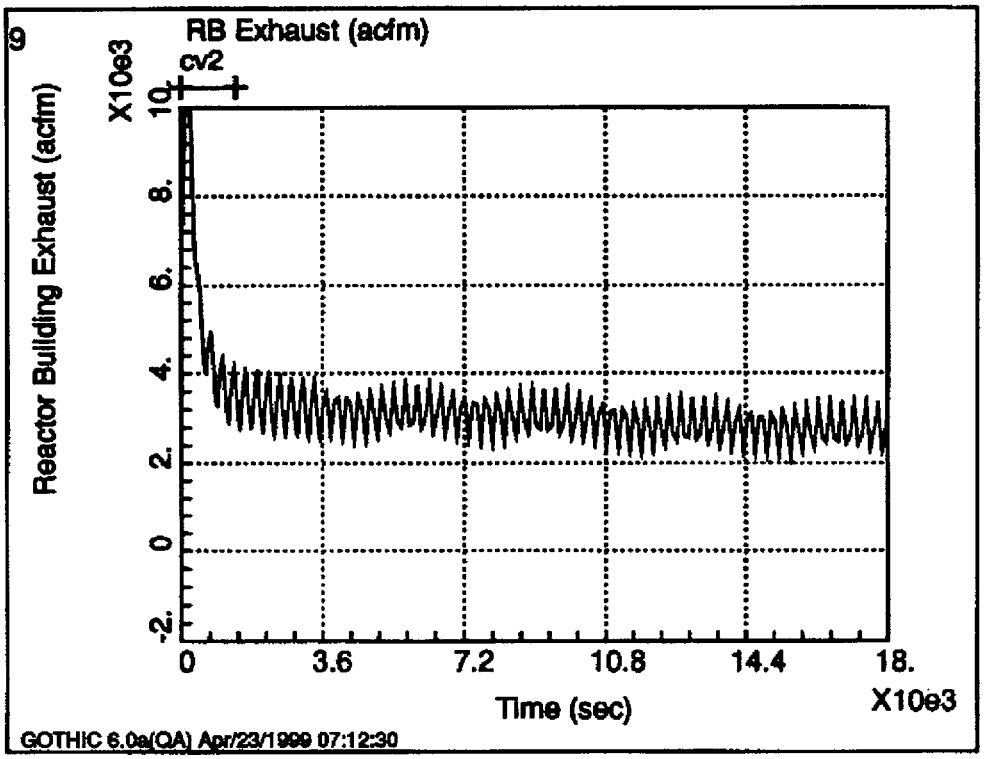
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



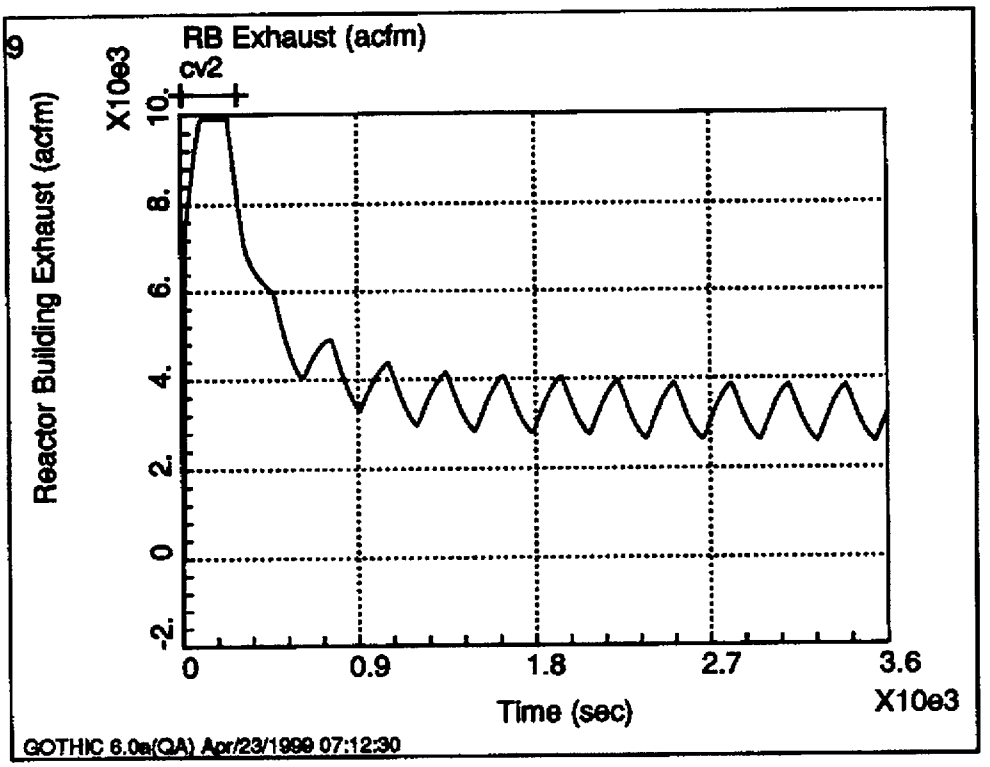
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



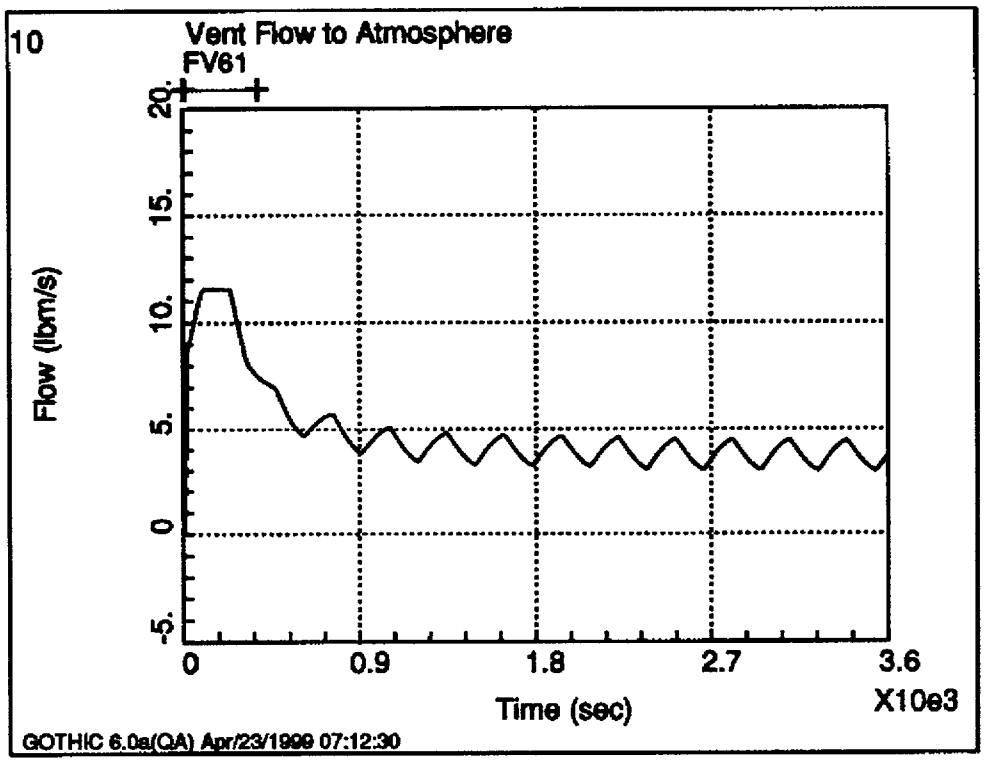
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:58:07
GOTHIC Version 6.0a(QA) - April 1998



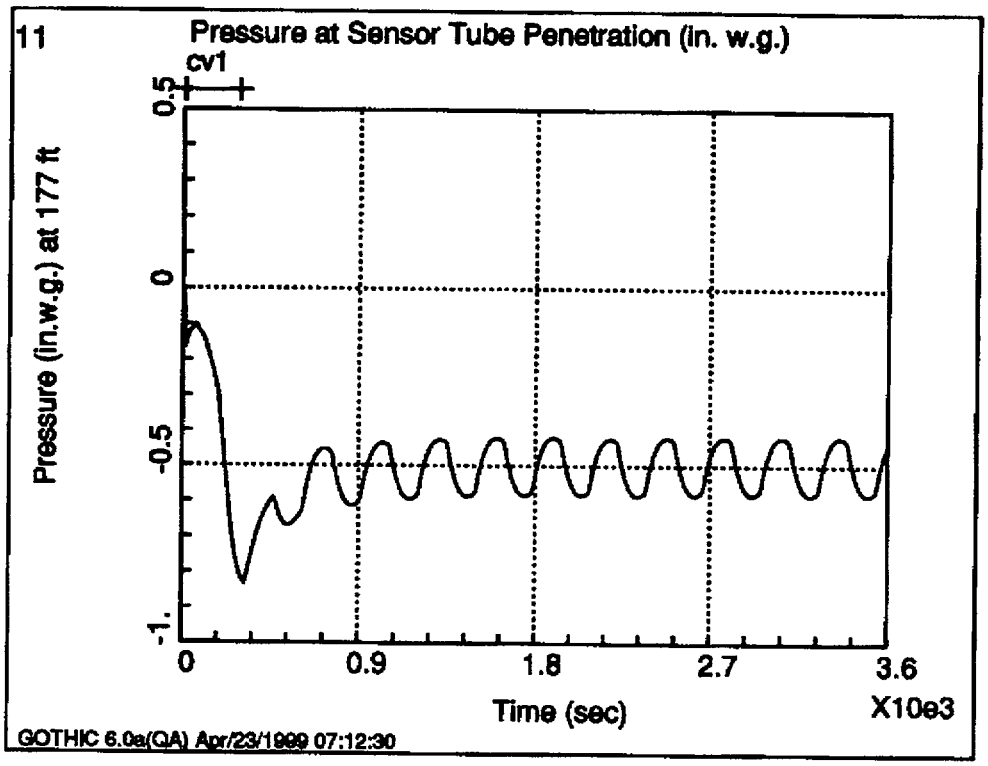
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



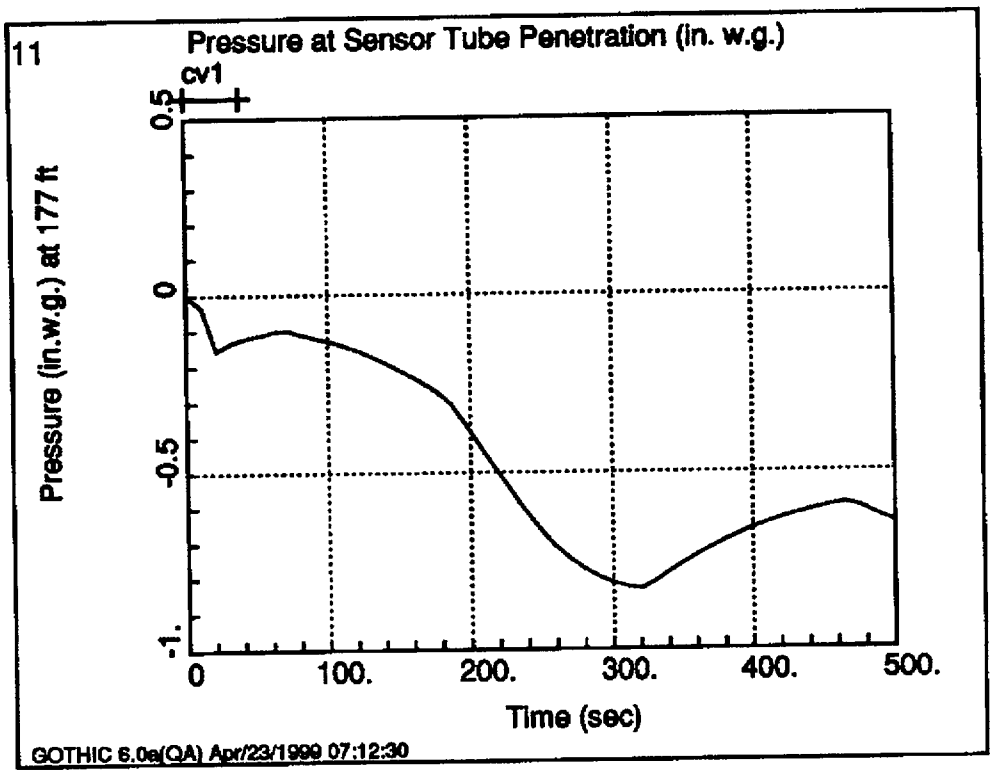
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



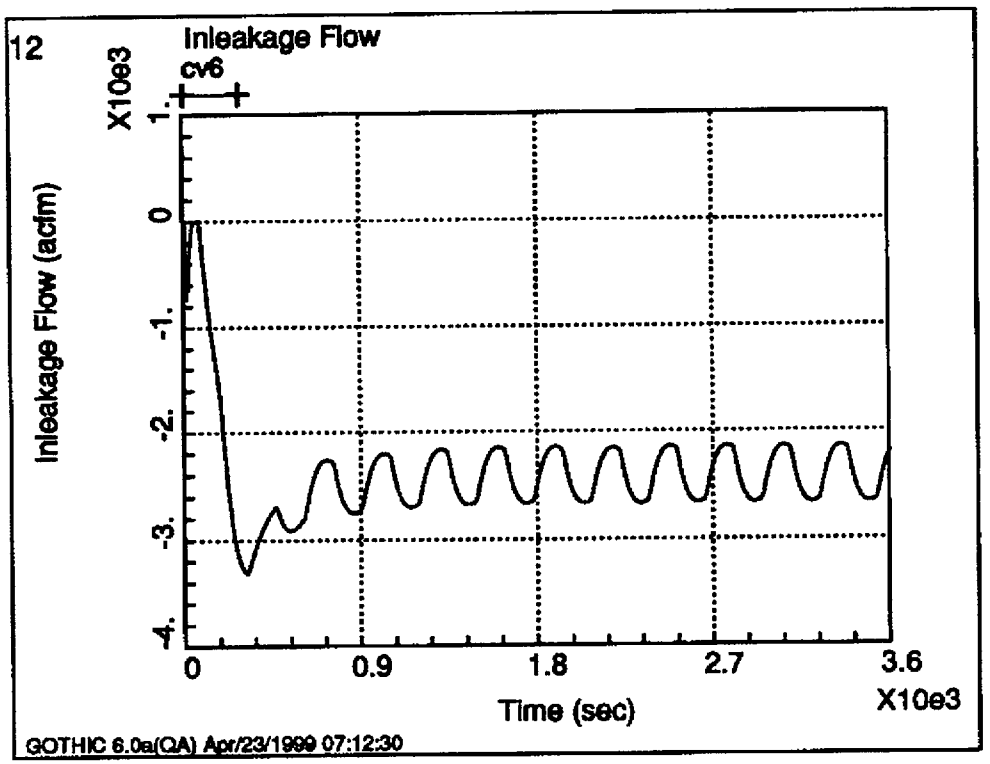
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



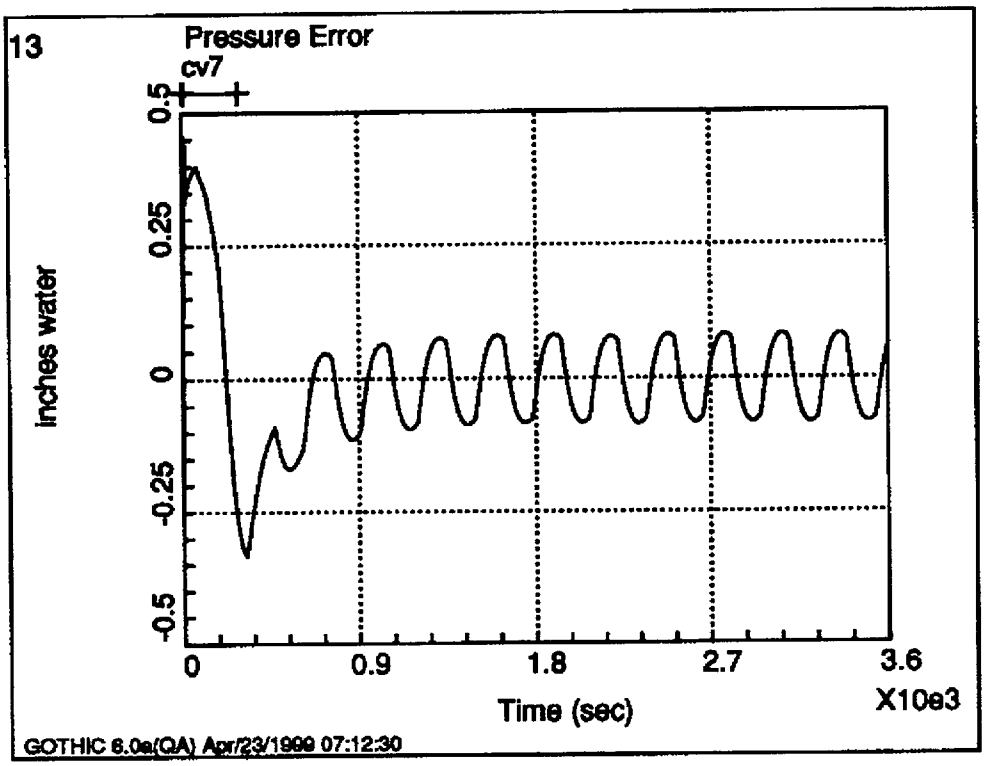
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:59:45
GOTHIC Version 6.0a(QA) - April 1998



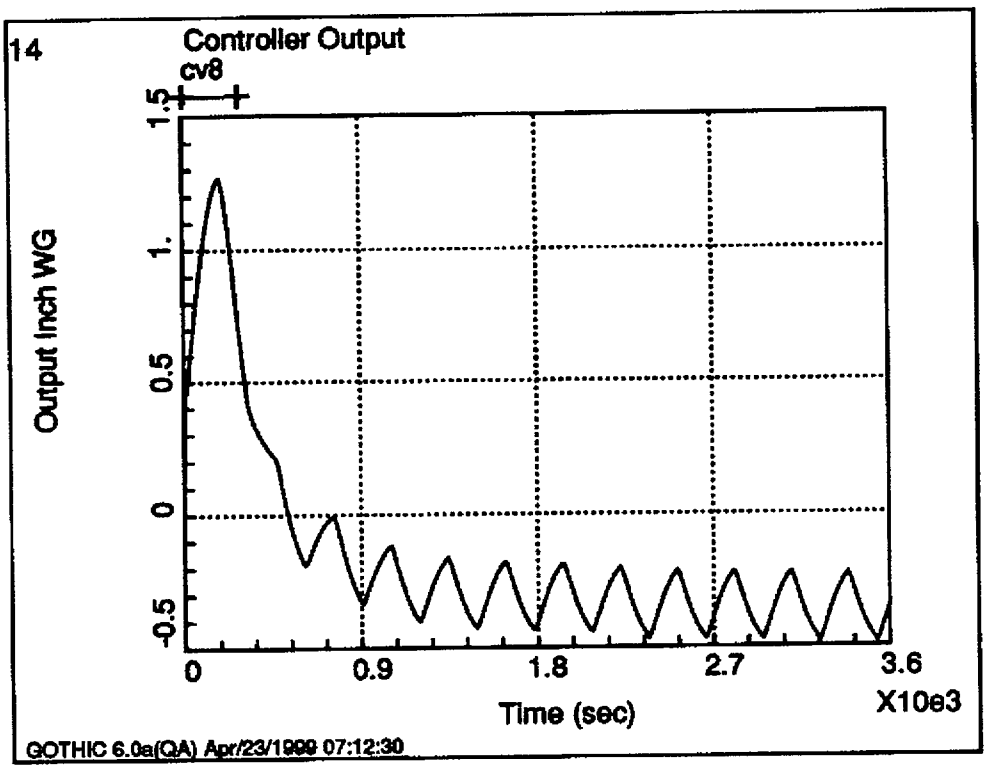
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



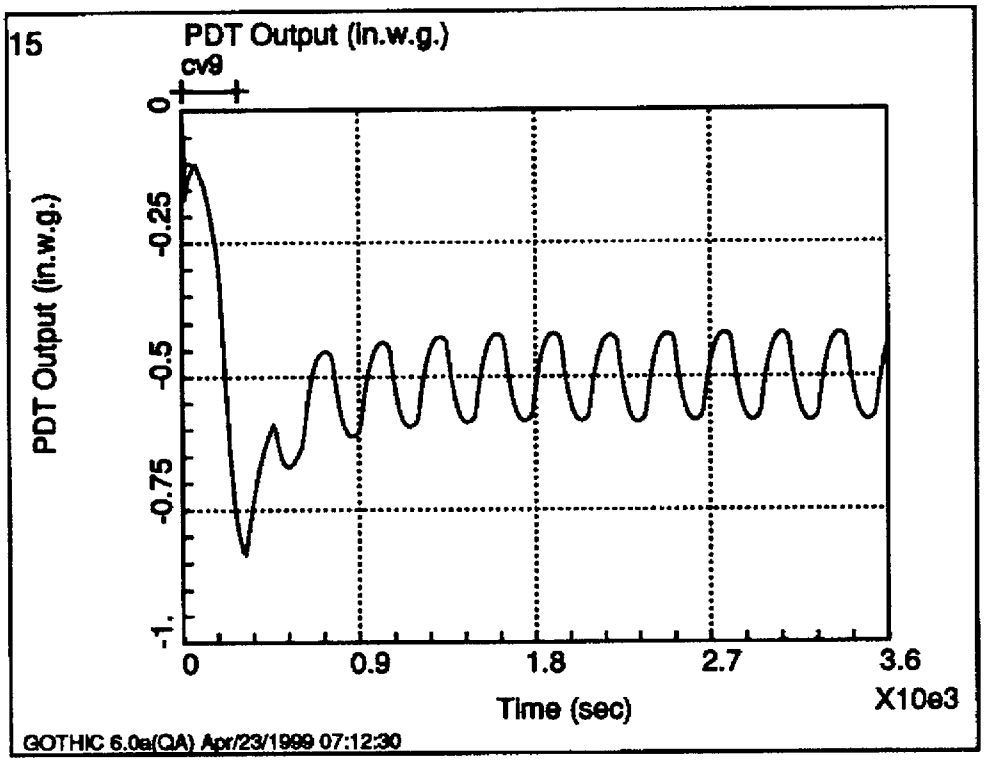
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:35
GOTHIC Version 6.0a(QA) - April 1998



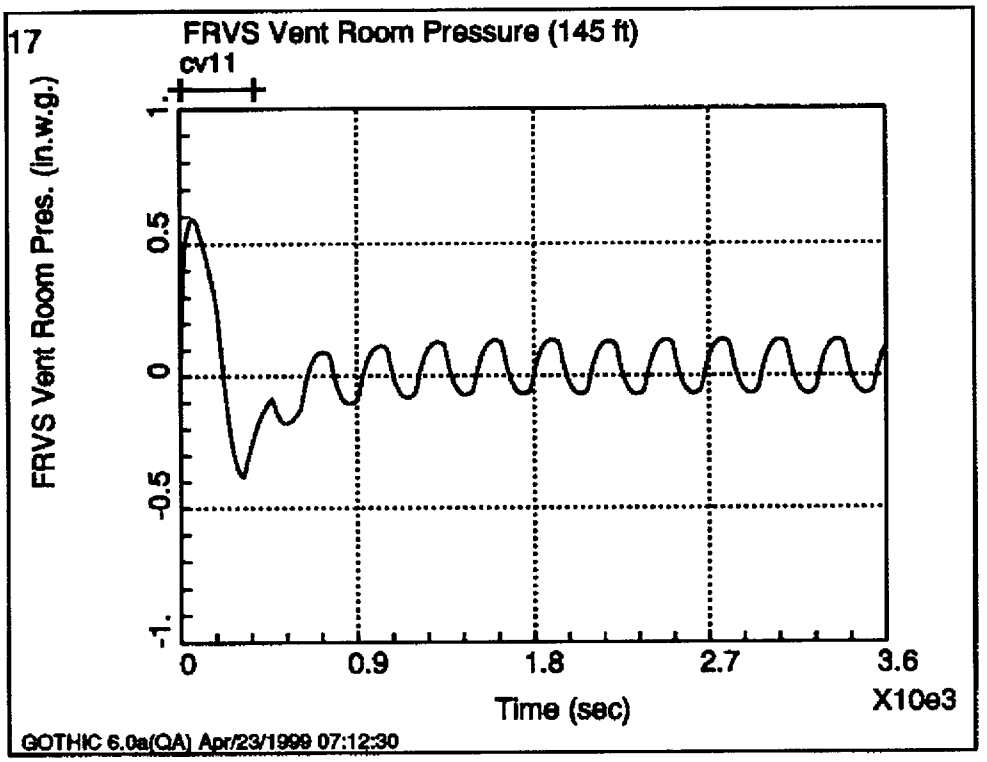
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:36
GOTHIC Version 6.0a(QA) - April 1998



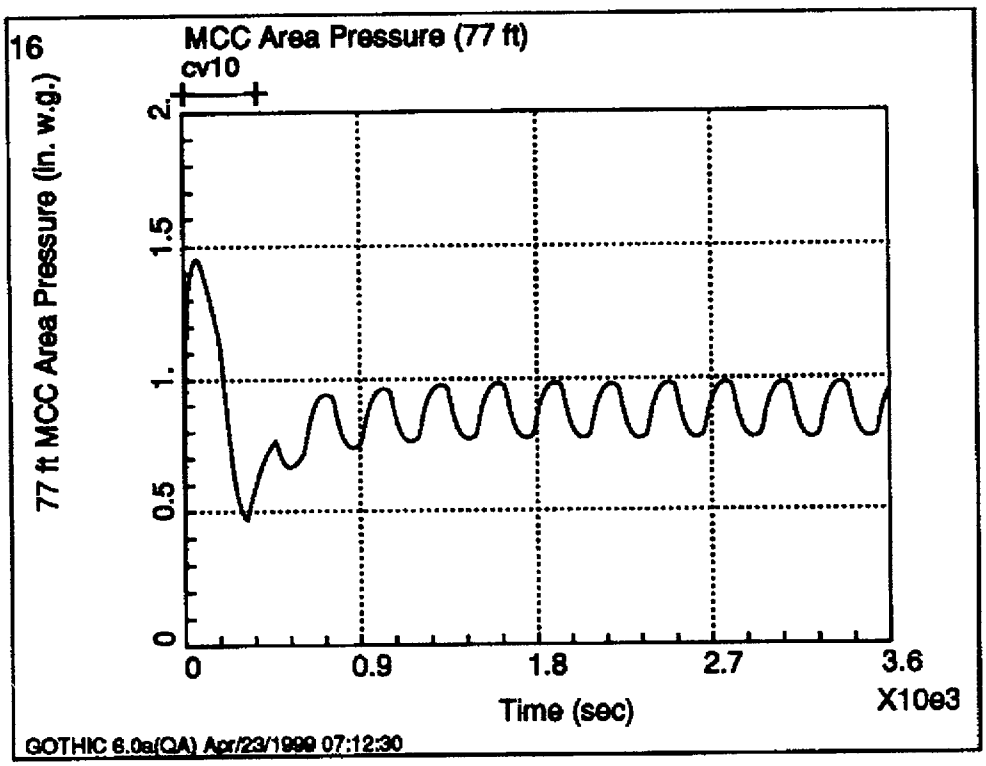
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:36
GOTHIC Version 6.0a(QA) - April 1998



Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:36
GOTHIC Version 6.0a(QA) - April 1998



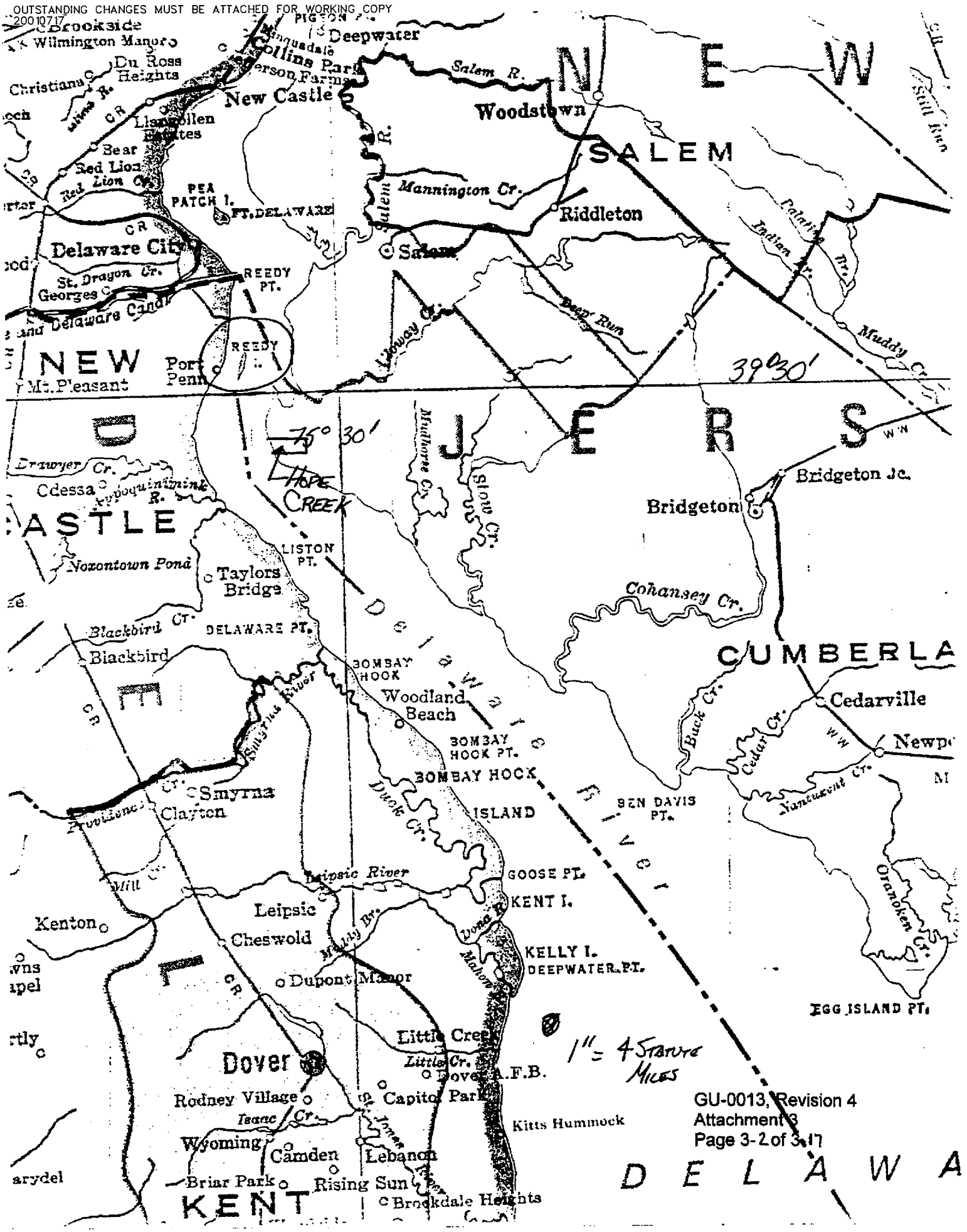
Reactor Building Exhaust Rate (LOCA Case A - Summer)
May/03/1999 12:44:36
GOTHIC Version 6.0a(QA) - April 1998



Attachment 3

U.S. Coast and Geodetic Data for Reedy Island

1991 - 1996


Brookside
Wilmington Manor
Du Ross Heights
Christiana
Deepwater
Collins Park
New Castle
Salem R.
Woodstown
N E W
SALEM
Still Run
Llanvollen Estates
Bear
Red Lion
Red Lion Cr.
PEA PATCH I.
FT. DELAWARE
Mannington Cr.
Riddleton
Delaware City
St. Dragon Cr.
Georges
REEDY PT.
Salem
Indian Br.
Muddy Cr.
Deep Run
Delaware Canal
NEW
Port Penn
Mt. Pleasant
39°30'
75°30'
Drawyer Cr.
Odessa
HOPE CREEK
Mulhorne Cr.
Slow Cr.
Bridgeton Jc.
Bridgeton
ASTLE
Noxontown Pond
Taylors Bridge
LISTON PT.
Cohansey Cr.
Blackbird Cr.
DELAWARE PT.
Blackbird
BOMBAY HOOK
Woodland Beach
CUMBERLA
Cedarville
Smyrna River
BOMBAY HOOK PT.
BOMBAY HOOK
Smyrna
Clayton
Duck Cr.
ISLAND
BEN DAVIS PT.
Back Cr.
Cedar Cr.
Nantuxent Cr.
Mill Cr.
Leipsic River
GOOSE PT.
KENT I.
Leipsic
Kenton
Cheswold
Mahlon Br.
KELLY I.
DEEPWATER PT.
Dupont Manor
Orankoken Cr.
EGG ISLAND PT.
Little Creek
Dover
Little Cr.
Dover A.F.B.
1" = 4 Statute Miles
Rodney Village
Capitol Park
Isaac Cr.
Kitts Hummock
Wyoming
Camden
Lebanon
Briar Park
Rising Sun
Brookdale Heights
KENT
DELAWA

OUTSTANDING CHANGES MUST BE ATTACHED FOR WORKING COPY
20010717

80°F = 26.7°C
85°F = 29.4°C

1992 wy

DELAWARE RIVER BASIN

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE

LOCATION.--Lat 39°30'03", long 75°34'07", New Castle County, Hydrologic Unit 02040205, on platform about 0.4 mi downstream from Reedy Island near Port Penn.

DRAINAGE AREA.--11,200 mi² approximately.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1963 to current year.
pH: February 1970 to current year.
WATER TEMPERATURE: February 1970 to current year.
DISSOLVED OXYGEN: February 1970 to current year.

INSTRUMENTATION.--Water-quality monitor since February 1970. Subsequent to 1986, interfaced with data collection platform.

REMARKS.--Interruptions in the daily record were due to instrument malfunctions.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 35,600 microsiemens, Nov. 15, 1978, minimum, 100 microsiemens, on several days in 1969, 1970, 1974, and 1979.
pH: Maximum, 8.9, Mar. 4, 1980; minimum, 5.4, Dec. 31, 1972.
WATER TEMPERATURE: Maximum 32.5°C, July 23, 1987; minimum, 0.0°C, on many days during winter.
DISSOLVED OXYGEN: Maximum, 17.1 mg/L, Dec. 16, 19, 1976; minimum, 0.3 mg/L, Sept. 16, 17, 1971.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 30,000 microsiemens, Nov. 11; minimum, 2,020 microsiemens, June 22.
pH: Maximum, 8.1, Mar. 5-8, Apr. 13; minimum, 7.0, on many days during year.
WATER TEMPERATURE: Maximum, 29.5°C, July 21; minimum, 1.0°C, Feb. 12.
DISSOLVED OXYGEN: Maximum, 14.6 mg/L, Feb. 21; minimum, 4.6 mg/L, July 10, Aug. 15.

SPECIFIC CONDUCTANCE, µS/CM @ 25 DEGREES CELSIUS, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	---	---	---	26300	17300	21500	17800	10800	13400	16900	7970	12200
2	---	---	---	24000	18200	20700	18700	10700	13600	17100	8220	12100
3	17100	9730	12000	21500	16800	19500	20600	10900	15400	19300	9240	13300
4	16700	9690	12100	21800	16300	18600	17500	8660	13100	23000	12800	16300
5	17100	9910	12200	23100	16400	18500	13000	7050	9150	21100	11700	16200
6	17100	9910	12200	22900	16300	19200	12900	6020	8500	19900	12000	14900
7	16200	9750	12100	23400	16600	19100	14800	6080	8790	17100	11200	13500
8	17600	9780	12500	23400	16800	19200	14000	5700	8470	16200	10200	12200
9	16400	9860	12300	25000	18200	21000	15000	3770	9110	17400	10300	13100
10	17100	9810	12600	28700	21100	24300	14600	5500	9560	17700	10400	13700
11	17800	10400	13000	30000	19600	24600	14800	5220	9710	17300	9600	12400
12	16900	10100	12800	25700	19300	21800	13300	5220	8330	16500	9230	12500
13	16900	10200	12800	27100	19300	22800	13900	5140	9080	16600	9250	12300
14	17100	10400	13000	27200	19300	23200	13500	4750	9100	18500	9520	14100
15	17900	11100	13600	25700	17800	21800	6980	3340	4940	12600	7240	9140
16	18400	11000	13600	25000	18300	21300	9770	2290	5140	14800	5330	8780
17	19600	12100	15500	25900	17900	21700	---	---	---	14800	6270	9380
18	21000	11300	16000	27500	19000	22600	---	---	---	14400	5440	8240
19	20700	11600	16300	25200	18700	21800	---	---	---	13800	4320	7320
20	21400	12200	16400	25500	18400	21350	---	---	---	18000	5670	9940
21	22000	12500	17200	24400	17100	20120	---	---	---	18100	6180	10200
22	20700	13000	16600	24800	17400	20000	---	---	---	16500	7170	10900
23	20300	13400	16000	23800	17100	20120	---	---	---	18400	7690	12300
24	21000	12800	16200	25700	16200	19900	---	---	---	17900	6730	11400
25	21300	13300	16200	20400	14500	17400	---	---	---	10200	4850	6300
26	20600	12700	16000	18500	13500	15120	5700	7540	9290	13400	4910	8390
27	20600	13000	16100	20000	12500	14850	13700	7410	10100	15500	4440	9710
28	21100	13200	16400	18600	12500	14900	14200	7190	10000	15200	6020	9890
29	23700	14700	18500	16300	11500	13300	15100	7240	10500	16800	6710	11600
30	24600	15400	20000	18300	11200	14300	16100	8080	11500	17000	6850	11200
31	27300	17900	22400	---	---	---	19000	8880	13100	18100	7850	12500
MONTH	27300	9690	14900	30000	11200	19800	20600	2290	9990	23000	4320	11500

DELAWARE RIVER BASIN

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE--Continued

PH (STANDARD UNITS), WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DAY	MAX	MIN JUNE	MEAN	MAX	MIN JULY	MEAN	MAX	MIN AUGUST	MEAN	MAX	MIN SEPTEMBER	MEAN
1	---	---	---	7.1	7.0	7.0	7.4	7.3	7.4	7.5	7.4	7.5
2	---	---	---	7.2	7.0	7.1	7.4	7.3	7.4	7.5	7.5	7.5
3	---	---	---	7.3	7.2	7.2	7.5	7.3	7.4	7.5	7.5	7.5
4	---	---	---	7.2	7.1	7.2	7.4	7.3	7.4	7.5	7.4	7.4
5	---	---	---	7.2	7.1	7.2	7.4	7.3	7.4	7.5	7.4	7.4
6	---	---	---	7.2	7.1	7.1	7.4	7.3	7.3	7.5	7.5	7.5
7	---	---	---	7.2	7.1	7.1	7.5	7.3	7.4	7.5	7.4	7.5
8	---	---	---	7.2	7.1	7.1	7.5	7.3	7.4	7.5	7.4	7.5
9	---	---	---	7.2	7.1	7.2	7.4	7.3	7.4	7.5	7.4	7.5
10	---	---	---	7.2	7.1	7.1	7.4	7.3	7.4	7.5	7.4	7.5
11	---	---	---	7.2	7.1	7.2	7.4	7.3	7.4	7.5	7.3	7.4
12	---	---	---	7.2	7.1	7.1	7.5	7.3	7.4	7.5	7.4	7.5
13	---	---	---	7.2	7.1	7.1	7.4	7.3	7.4	7.5	7.4	7.5
14	---	---	---	7.3	7.1	7.2	7.4	7.3	7.4	7.5	7.4	7.5
15	---	---	---	7.4	7.2	7.3	7.5	7.4	7.4	7.5	7.4	7.5
16	---	---	---	7.5	7.3	7.3	7.5	7.4	7.5	7.5	7.4	7.4
17	---	---	---	7.5	7.3	7.4	---	---	---	7.5	7.4	7.4
18	7.2	7.1	7.1	7.4	7.3	7.3	---	---	---	7.4	7.4	7.4
19	7.2	7.1	7.1	7.4	7.3	7.3	---	---	---	7.4	7.4	7.4
20	7.1	7.0	7.0	7.5	7.3	7.3	7.5	7.4	7.4	7.5	7.4	7.5
21	7.1	7.0	7.1	7.6	7.2	7.3	7.5	7.4	7.4	7.5	7.4	7.5
22	7.3	7.0	7.2	7.5	7.3	7.3	7.5	7.3	7.4	7.5	7.4	7.5
23	7.5	7.2	7.3	7.4	7.3	7.3	7.5	7.3	7.4	7.6	7.5	7.5
24	7.4	7.2	7.3	7.4	7.3	7.3	7.5	7.4	7.4	7.7	7.6	7.7
25	7.4	7.2	7.3	7.4	7.3	7.4	7.4	7.4	7.4	7.7	7.7	7.7
26	7.3	7.1	7.2	7.4	7.3	7.3	7.4	7.3	7.4	7.7	7.6	7.7
27	7.3	7.1	7.2	7.4	7.3	7.3	7.4	7.3	7.4	7.6	7.5	7.6
28	7.2	7.1	7.2	7.4	7.3	7.3	7.5	7.3	7.4	7.6	7.5	7.5
29	7.2	7.0	7.1	7.4	7.3	7.3	7.5	7.4	7.4	7.6	7.5	7.5
30	7.1	7.0	7.0	7.4	7.3	7.3	7.5	7.4	7.4	7.6	7.6	7.6
31	---	---	---	7.4	7.3	7.3	---	---	---	---	---	---
MONTH	---	---	---	7.5	7.0	7.0	7.5	7.3	7.4	7.7	7.3	7.5

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DAY	MAX	MIN OCTOBER	MEAN	MAX	MIN NOVEMBER	MEAN	MAX	MIN DECEMBER	MEAN	MAX	MIN JANUARY	MEAN
1	---	---	---	15.5	15.0	15.5	10.5	10.0	10.0	6.0	5.5	5.5
2	---	---	---	16.0	15.0	15.5	10.5	10.0	10.0	6.5	5.5	6.0
3	22.0	21.5	21.5	15.0	15.0	15.0	10.5	10.0	10.0	6.5	6.0	6.0
4	22.5	21.0	21.5	15.0	13.5	14.0	10.0	8.5	9.5	6.5	6.5	6.5
5	22.5	21.5	22.0	14.0	13.0	13.5	9.0	7.5	8.5	7.0	6.5	6.5
6	22.0	21.0	21.5	13.5	12.5	13.0	8.5	7.5	8.0	7.0	6.5	6.5
7	21.0	20.0	20.5	13.0	12.5	12.5	8.5	7.0	8.0	6.5	6.0	6.5
8	20.0	19.5	20.0	13.0	12.0	12.5	8.5	7.5	8.0	6.5	6.0	6.5
9	20.0	19.0	19.5	12.0	11.0	11.5	9.0	8.0	8.5	6.5	6.0	6.5
10	20.0	19.0	19.5	11.0	10.5	10.5	8.5	8.0	8.0	6.5	6.0	6.5
11	19.5	19.0	19.0	11.0	10.5	10.5	8.5	8.0	8.0	6.5	6.0	6.0
12	19.5	18.5	19.0	10.5	10.0	10.5	8.0	7.5	8.0	6.5	6.0	6.0
13	19.0	18.5	18.5	10.5	10.0	10.0	8.5	8.0	8.0	6.5	6.0	6.0
14	18.5	17.5	18.0	11.0	10.0	10.5	9.0	7.5	8.5	7.5	5.5	6.5
15	18.5	18.0	18.0	11.0	10.0	10.5	7.5	6.5	7.0	6.0	5.0	5.5
16	18.5	17.5	18.0	10.5	10.0	10.5	7.0	5.5	6.0	5.5	4.5	5.0
17	17.5	16.0	17.0	10.0	9.5	10.0	6.5	5.5	6.0	4.5	3.5	4.0
18	17.0	16.0	16.5	10.0	9.5	9.5	---	---	---	4.5	3.0	4.0
19	18.0	16.5	17.0	10.5	9.5	9.5	---	---	---	3.0	2.0	2.5
20	16.5	16.0	16.0	11.0	9.5	10.0	---	---	---	3.0	2.0	2.5
21	16.5	15.5	16.0	11.0	10.0	10.5	---	---	---	3.5	2.0	2.5
22	17.0	15.5	16.0	11.0	10.5	11.0	---	---	---	3.0	2.5	3.0
23	17.0	16.0	16.5	11.5	11.0	11.0	---	---	---	4.0	2.5	3.0
24	17.0	16.0	16.5	11.5	11.0	11.0	---	---	---	3.5	2.5	3.0
25	17.0	16.5	16.5	11.0	10.0	10.5	---	---	---	3.0	2.0	2.5
26	17.0	16.5	17.0	10.0	9.0	9.5	6.0	5.5	6.0	2.5	2.0	2.5
27	17.5	17.0	17.0	9.5	9.0	9.0	6.0	5.5	6.0	2.5	2.0	2.5
28	17.5	16.5	17.0	9.5	8.5	9.0	6.0	5.5	6.0	3.0	2.0	2.5
29	16.5	15.5	16.5	10.0	9.0	9.5	6.5	6.0	6.0	3.5	2.5	2.5
30	16.0	15.5	16.0	10.5	9.5	10.0	6.5	5.5	6.0	3.5	2.5	3.0
31	16.0	15.0	15.5	---	---	---	6.0	5.5	5.5	3.5	3.0	3.0
MONTH	22.5	15.0	18.0	16.0	8.5	11.0	10.5	5.5	7.5	7.5	2.0	4.5

DELAWARE RIVER BASIN

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1991 TO SEPTEMBER 1992

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	3.5	2.5	3.0	6.0	4.0	5.0	9.0	8.0	8.5	17.0	15.0	16.0
2	3.0	1.5	2.5	6.5	5.5	5.5	9.0	8.0	8.5	18.0	15.5	16.5
3	3.5	2.5	3.0	6.0	5.5	5.5	9.0	7.5	8.5	---	---	---
4	3.5	2.5	3.0	6.5	5.5	6.0	9.5	8.0	8.5	---	---	---
5	3.0	2.5	2.5	6.5	6.0	6.0	10.0	8.5	9.0	---	---	---
6	3.0	2.0	2.5	6.5	6.0	6.5	10.0	8.5	9.0	---	---	---
7	3.0	2.0	2.5	7.0	6.5	6.5	10.5	9.0	9.5	---	---	---
8	3.0	2.5	3.0	8.0	7.0	7.5	11.0	9.5	10.5	---	---	---
9	3.0	2.5	2.5	8.5	7.5	8.0	11.5	10.0	10.5	---	---	---
10	2.5	1.5	2.0	8.5	7.5	8.0	12.5	10.5	11.0	---	---	---
11	3.5	1.5	3.0	8.5	7.0	8.0	13.0	11.0	11.5	15.5	14.5	15.0
12	3.0	1.0	2.0	8.0	7.0	7.5	13.0	11.5	12.0	16.0	14.0	14.5
13	2.5	1.5	2.0	8.0	7.0	7.5	13.0	11.0	11.5	16.5	14.5	15.5
14	4.5	2.0	3.0	7.5	7.0	7.0	13.5	11.0	12.0	17.0	15.0	16.0
15	3.5	2.5	3.0	7.5	6.5	7.0	13.5	12.0	12.5	16.5	16.0	16.0
16	5.0	3.0	4.0	7.5	6.0	6.5	12.5	12.0	12.0	16.0	16.0	16.0
17	5.0	3.0	4.0	7.5	6.0	6.5	14.0	12.0	13.0	16.5	16.0	16.0
18	4.5	3.0	4.0	7.5	6.5	7.0	13.0	12.0	12.5	17.0	16.0	16.5
19	5.5	3.5	4.5	6.5	6.5	6.5	12.5	12.0	12.5	17.0	16.0	16.5
20	5.5	3.5	4.5	7.0	6.5	6.5	13.0	12.0	12.5	17.5	16.0	16.5
21	5.0	3.5	4.0	7.0	6.5	6.5	14.0	12.5	13.5	18.0	16.0	17.0
22	4.0	3.0	3.5	6.5	6.0	6.5	15.0	13.5	14.0	19.0	17.0	18.0
23	5.0	4.0	4.5	6.5	6.0	6.5	16.0	14.0	15.0	---	---	---
24	4.5	4.5	4.5	7.0	6.0	6.5	16.5	14.5	15.5	---	---	---
25	5.0	4.5	4.5	7.5	6.0	6.5	16.5	14.5	15.5	---	---	---
26	5.0	4.5	5.0	7.5	6.5	7.0	16.0	14.5	15.0	---	---	---
27	5.5	4.5	5.0	8.0	7.0	7.0	16.0	15.0	15.0	---	---	---
28	6.0	5.0	5.5	8.0	7.0	7.5	15.5	14.5	15.0	---	---	---
29	5.5	5.0	5.0	8.5	7.0	7.5	16.5	14.5	15.0	---	---	---
30	---	---	---	7.5	7.0	7.5	15.5	14.5	15.0	---	---	---
31	---	---	---	9.0	7.0	8.0	---	---	---	---	---	---
MONTH	6.0	1.0	3.5	9.0	4.0	7.0	16.5	7.5	12.0	19.0	14.0	16.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	---	---	---	26.0	24.5	25.0	27.5	26.5	27.0	26.5	25.5	26.0
2	---	---	---	26.0	25.0	25.0	27.5	26.5	27.0	26.0	25.0	25.5
3	---	---	---	25.0	24.0	24.5	27.0	26.5	27.0	25.5	25.0	25.5
4	---	---	---	25.0	24.0	24.5	27.5	26.5	27.0	26.5	25.0	25.5
5	---	---	---	25.5	24.5	25.0	27.0	26.5	26.5	25.5	25.0	25.0
6	---	---	---	25.5	25.0	25.0	27.5	26.0	26.5	25.0	24.5	24.5
7	---	---	---	26.0	24.5	25.0	27.0	26.0	26.5	24.5	24.0	24.5
8	---	---	---	26.0	25.0	25.5	26.5	26.0	26.0	25.5	24.0	24.5
9	---	---	---	26.0	25.0	25.5	27.0	25.5	26.0	25.5	24.5	25.0
10	---	---	---	27.0	25.5	26.0	27.0	26.0	26.0	25.5	24.5	25.0
11	---	---	---	27.0	25.5	26.0	27.0	26.0	26.0	25.0	24.5	24.5
12	---	---	---	26.5	26.0	26.0	27.0	26.0	26.0	24.5	23.0	24.0
13	---	---	---	27.0	26.0	26.5	26.0	25.5	26.0	24.5	23.5	24.0
14	---	---	---	27.0	26.0	26.5	25.5	25.0	25.5	24.5	23.0	23.5
15	---	---	---	27.5	26.5	27.0	25.0	24.0	24.5	24.5	23.5	24.0
16	---	---	---	27.5	26.5	27.0	24.5	24.0	24.0	24.5	23.5	24.0
17	---	---	---	28.0	26.5	27.0	---	---	---	24.5	23.5	24.0
18	23.0	22.5	23.0	28.0	27.0	27.5	---	---	---	24.5	24.0	24.5
19	23.5	22.5	23.0	28.0	27.0	27.5	---	---	---	24.5	23.5	24.0
20	24.0	23.0	23.0	29.0	27.5	28.0	25.5	24.5	24.5	24.5	23.0	23.5
21	23.5	22.5	23.0	29.5	28.0	28.5	25.5	24.0	24.5	24.0	23.0	23.5
22	22.5	22.0	22.5	28.5	27.5	28.0	25.5	24.5	25.0	24.5	23.5	24.0
23	23.0	21.5	22.0	28.0	27.5	27.5	26.0	25.0	25.0	24.0	22.0	23.0
24	23.5	22.0	22.5	27.5	26.5	27.0	26.0	25.0	25.5	22.0	21.0	21.5
25	24.5	22.5	23.0	27.5	26.5	27.0	26.5	25.0	25.5	21.5	20.5	20.5
26	24.0	23.0	23.5	27.0	27.0	27.0	27.0	25.5	26.0	20.5	20.0	20.5
27	24.5	23.0	23.5	27.5	27.0	27.0	27.5	26.0	26.5	20.5	20.0	20.5
28	25.5	23.0	24.0	27.5	27.0	27.0	27.0	26.5	26.5	20.5	20.0	20.5
29	25.0	23.5	24.0	28.0	26.5	27.0	26.5	25.5	26.0	20.5	19.5	20.0
30	25.5	24.0	24.5	28.0	27.0	27.5	26.0	25.0	25.5	19.5	18.5	19.0
31	---	---	---	28.0	27.0	27.5	---	---	---	---	---	---
MONTH	25.5	21.5	23.0	29.5	24.0	26.5	27.5	24.0	26.0	26.5	18.5	23.5

1993 wy

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE

LOCATION.--Lat 39°30'03", long 75°34'07", New Castle County, Del. Hydrologic Unit 02040205, on platform about 0.4 mi downstream from Reedy Island near Port Penn.

DRAINAGE AREA.--11,200 mi^2, approximately.

PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1963 to current year.
pH: February 1970 to current year.
WATER TEMPERATURES: February 1970 to current year.
DISSOLVED OXYGEN: February 1970 to current year.

INSTRUMENTATION.--Water-quality monitor since February 1970. Probes interfaced with a data collection platform since the 1986 water year.

REMARKS.--Interruptions in the record were due to malfunctions of the recording instrument.

EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 35,600 microsiemens, Nov. 15, 1978; minimum, 100 microsiemens, several days in 1969, 1970, 1974 and 1978.
pH: Maximum, 8.9, Mar. 4, 1980; minimum, 5.4, Dec. 31, 1972.
WATER TEMPERATURE: Maximum, 32.5°C, July 23, 1987; minimum, 0.0°C, many days during winter periods.
DISSOLVED OXYGEN: Maximum, 17.1 mg/L, Dec. 16, 19, 1976; minimum, 0.3 mg/L, Sept. 16, 17, 1971.

EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 20,900 microsiemens, Aug. 15, 16; minimum, 143 microsiemens, Apr. 5.
pH: Maximum, 8.2, Sept. 11; minimum, 6.6, Apr. 8-15.
WATER TEMPERATURE: Maximum, 30.0°, July 13; minimum, 1.0°, Feb. 7, 19, 20, 25-27.
DISSOLVED OXYGEN: Maximum, 14.0 mg/L, Mar. 2; minimum, 4.1 mg/L, Aug. 9.

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25° CELSIUS, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	OCTOBER MAX	OCTOBER MIN	OCTOBER MEAN	NOVEMBER MAX	NOVEMBER MIN	NOVEMBER MEAN	DECEMBER MAX	DECEMBER MIN	DECEMBER MEAN	JANUARY MAX	JANUARY MIN	JANUARY MEAN
1	15800	8920	11600	15600	9230	12100	6710	1830	3870	9580	2600	4590
2	16500	8790	11900	17300	9870	12800	9960	2560	5960	9020	2340	5120
3	15300	9290	10900	16000	9850	12600	9890	3390	5710	10000	2890	6160
4	17400	8610	11100	14400	9770	11800	11300	2910	6760	10400	3260	6470
5	19900	10800	14700	13500	8750	10700	11400	2460	5630	10200	2760	5080
6	18500	11900	14900	14300	7930	10300	12200	2090	6840	8530	2000	3810
7	19000	11200	14300	13700	7590	10400	12900	4280	7450	9400	1920	4110
8	19300	11200	14500	15100	8270	10500	---	---	---	8130	1990	3620
9	19300	12300	14800	15800	7880	10500	---	---	---	7270	2010	3470
10	19000	11200	14300	14500	8280	10500	---	---	---	8440	2310	4450
11	18200	11000	14200	16400	8240	11200	---	---	---	6480	2180	4160
12	17700	10800	13500	15900	8320	10500	---	---	---	5960	2130	3450
13	16500	10100	13100	14900	6910	10400	---	---	---	6450	2130	3730
14	17100	10100	12500	11900	6660	9050	---	---	---	5670	2220	3380
15	17100	9820	12400	---	---	---	---	---	---	7210	2040	3500
16	17600	9820	12700	---	---	---	9540	5640	7190	6200	1950	2940
17	15900	8490	11200	---	---	---	9880	5040	6800	6820	2020	3540
18	16700	8990	12000	---	---	---	7940	4100	5190	5620	1950	2800
19	14600	9140	11900	---	---	---	8310	3800	4830	6940	1920	3340
20	19700	9280	13800	---	---	---	8530	3150	4630	8540	1980	3700
21	17000	10500	13200	---	---	---	6660	2810	3730	8350	2140	3920
22	17500	8850	11900	---	---	---	7270	2630	3790	9280	2480	5060
23	16700	9700	12700	---	---	---	8210	2520	3900	6900	2520	4030
24	16900	9950	12800	9140	3800	5490	4270	1880	2930	8210	2400	4010
25	15000	8940	11400	9460	2910	5120	7520	2190	3310	5010	1860	2860
26	18300	9400	12600	7290	2550	3820	2690	1890	2360	7210	1650	2840
27	15900	9260	11600	5940	2340	3190	5800	1890	2560	7980	2080	4070
28	15300	8580	11500	5420	2060	2880	6520	1900	3350	6790	1850	4030
29	15300	8680	10900	6000	2060	3030	7630	2130	3980	7100	1160	2850
30	15300	8580	11000	5830	1860	2890	7330	2260	4010	5530	901	2840
31	15900	8580	11400	---	---	---	8330	2490	4880	7310	838	4450
MONTH	19900	8490	12600	17300	1860	8560	12900	1830	4770	10400	838	3950

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.8	7.5	7.6	7.4	7.3	7.3	---	---	---	8.0	7.9	7.9
2	7.8	7.5	7.7	7.3	7.3	7.3	---	---	---	8.0	7.8	7.9
3	7.8	7.5	7.7	7.3	7.2	7.3	---	---	---	8.0	7.8	7.9
4	7.9	7.5	7.7	7.3	7.2	7.3	---	---	---	8.0	7.9	7.9
5	7.9	7.6	7.7	7.3	7.2	7.2	---	---	---	8.0	7.9	7.9
6	7.9	7.6	7.7	7.3	7.2	7.3	---	---	---	8.1	7.9	7.9
7	7.9	7.6	7.7	7.3	7.2	7.3	---	---	---	8.0	7.9	7.9
8	7.8	7.6	7.7	7.3	7.2	7.2	7.6	7.5	7.5	8.0	7.9	7.9
9	7.8	7.6	7.6	7.3	7.2	7.2	7.6	7.5	7.5	8.1	7.9	8.0
10	7.7	7.5	7.6	7.3	7.2	7.3	7.6	7.5	7.5	8.1	8.0	8.0
11	7.6	7.4	7.5	7.5	7.2	7.3	7.6	7.5	7.6	8.2	8.0	8.1
12	7.7	7.4	7.5	7.3	7.2	7.3	7.6	7.5	7.6	8.1	7.5	7.6
13	7.7	7.5	7.6	7.5	7.3	7.3	---	---	---	7.7	7.6	7.6
14	7.7	7.5	7.6	7.4	7.3	7.4	---	---	---	7.6	7.5	7.6
15	7.7	7.5	7.6	7.4	7.3	7.3	7.8	7.6	7.7	7.6	7.5	7.6
16	7.7	7.5	7.6	7.4	7.3	7.3	7.8	7.6	7.7	7.6	7.5	7.6
17	7.8	7.5	7.6	7.5	7.3	7.4	7.8	7.7	7.7	7.6	7.5	7.6
18	7.8	7.5	7.7	7.5	7.3	7.4	7.7	7.7	7.7	7.6	7.5	7.5
19	7.7	7.5	7.6	7.4	7.3	7.4	7.8	7.6	7.7	7.6	7.5	7.5
20	7.8	7.5	7.6	7.4	7.3	7.3	7.7	7.6	7.7	7.6	7.5	7.6
21	7.7	7.4	7.5	7.4	7.3	7.3	7.7	7.6	7.7	7.6	7.5	7.6
22	7.5	7.4	7.5	7.4	7.3	7.3	7.7	7.5	7.6	7.6	7.5	7.5
23	7.6	7.4	7.5	7.4	7.3	7.3	7.5	7.4	7.5	7.6	7.5	7.5
24	7.8	7.4	7.5	7.4	7.3	7.3	7.5	7.4	---	7.6	7.4	7.5
25	7.6	7.4	7.5	7.3	7.2	7.3	---	---	---	7.5	7.4	7.5
26	7.6	7.4	7.5	7.4	7.3	7.3	---	---	---	7.4	7.3	7.4
27	7.6	7.4	7.4	7.4	7.3	7.3	---	---	---	7.4	7.3	7.3
28	7.6	7.4	7.4	7.4	7.3	7.3	---	---	---	7.3	7.3	7.3
29	7.5	7.3	7.4	7.4	7.3	7.3	---	---	---	7.3	7.2	7.3
30	7.4	7.3	7.3	7.4	7.3	7.3	---	---	---	7.3	7.2	7.3
31	---	---	---	7.4	7.3	7.3	---	---	---	---	---	---
MONTH	7.9	7.3	7.6	7.5	7.2	7.3	7.8	7.4	7.6	8.2	7.2	7.7
YEAR	8.2	6.6	7.4									

WATER TEMPERATURE, (DEG. C), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.0	18.0	18.5	13.5	12.5	13.0	10.5	9.5	10.0	5.5	4.5	5.0
2	18.5	18.0	18.5	13.0	12.5	12.5	10.5	10.0	10.0	5.0	4.5	4.5
3	19.0	18.0	18.5	14.0	13.0	13.5	10.0	9.0	10.0	5.0	4.0	4.5
4	19.0	18.5	18.5	14.0	13.0	13.5	9.5	8.5	9.0	6.0	4.5	5.5
5	18.5	17.5	18.5	14.0	13.5	13.5	9.5	7.0	8.5	6.5	5.5	6.0
6	18.5	17.5	18.0	13.5	13.0	13.5	8.0	6.5	7.5	6.0	5.0	5.5
7	19.0	17.5	18.0	13.0	12.5	13.0	8.0	7.0	7.5	6.0	5.5	6.0
8	19.0	18.0	18.5	13.0	12.0	12.5	---	---	---	6.0	5.5	6.0
9	19.0	18.5	18.5	12.5	11.5	12.0	---	---	---	6.0	5.0	5.5
10	19.5	18.5	19.0	12.5	11.5	12.0	---	---	---	5.5	4.5	5.0
11	19.0	18.5	19.0	12.5	12.0	12.0	---	---	---	5.0	4.5	5.0
12	19.0	18.0	18.5	13.0	12.0	12.5	---	---	---	5.0	4.5	5.0
13	18.0	18.0	18.5	13.0	12.0	12.5	---	---	---	5.5	4.5	5.0
14	18.5	18.0	18.5	12.5	11.5	12.0	---	---	---	5.5	4.5	5.0
15	19.0	18.0	18.5	12.0	10.5	11.5	---	---	---	5.0	4.5	5.0
16	19.0	18.5	18.5	11.0	10.0	10.5	6.5	6.0	6.0	5.0	4.5	5.0
17	18.5	17.0	18.0	11.0	10.0	10.5	7.0	6.0	6.5	5.0	4.5	5.0
18	17.5	16.5	17.0	10.5	10.0	10.5	6.5	6.0	6.5	5.0	4.5	4.5
19	17.0	15.0	16.5	10.0	9.5	10.0	7.0	6.0	6.5	5.0	4.0	4.5
20	15.5	14.5	15.0	10.0	9.5	9.5	7.0	6.0	6.5	5.0	4.0	4.5
21	15.5	14.5	15.0	10.0	9.5	10.0	6.5	5.5	6.0	5.0	4.0	4.5
22	15.0	14.0	14.5	10.5	10.0	10.0	6.5	5.5	6.0	5.0	4.5	5.0
23	15.0	14.0	14.5	11.0	10.5	10.5	6.5	5.5	6.0	5.0	4.5	5.0
24	15.0	14.0	14.5	11.0	10.5	10.5	6.0	5.0	5.5	5.5	4.5	5.0
25	14.5	13.5	14.0	11.0	10.5	10.5	5.5	4.5	5.0	5.0	4.5	5.0
26	14.0	13.0	13.5	11.0	10.5	11.0	5.0	3.5	4.5	5.0	4.0	4.5
27	14.0	13.0	13.5	11.0	10.5	11.0	4.5	3.0	3.5	5.0	4.0	4.5
28	13.5	13.0	13.5	11.0	10.5	10.5	4.5	3.5	4.0	5.0	3.5	4.5
29	13.5	13.5	13.5	11.0	10.0	10.5	4.5	4.0	4.5	5.0	3.5	4.5
30	14.0	13.5	13.5	10.5	9.5	10.0	5.0	4.0	4.5	4.5	3.5	4.0
31	13.5	13.0	13.0	---	---	---	5.5	4.5	5.0			
MONTH	19.5	13.0	16.5	14.0	9.5	11.5	10.5	3.0	6.5	6.5	3.5	5.0

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE--Continued

WATER TEMPERATURE, (DEG. C), WATER YEAR OCTOBER 1992 TO SEPTEMBER 1993

DAY	FEBRUARY MAX	FEBRUARY MIN	FEBRUARY MEAN	MARCH MAX	MARCH MIN	MARCH MEAN	APRIL MAX	APRIL MIN	APRIL MEAN	MAY MAX	MAY MIN	MAY MEAN
1	4.5	1.5	3.5	---	---	---	8.5	7.5	8.0	15.5	13.5	14.5
2	2.5	1.5	2.5	3.5	2.0	2.5	8.5	8.0	8.5	16.0	14.5	15.0
3	4.0	2.0	2.5	3.5	2.5	3.0	9.0	8.0	8.5	16.0	14.5	15.5
4	4.0	2.5	3.0	3.5	3.0	3.0	8.5	7.5	8.0	16.0	15.0	15.5
5	4.0	2.5	3.0	3.5	3.5	3.5	8.0	7.0	8.0	16.5	15.5	16.0
6	3.5	1.5	2.5	3.5	3.5	3.5	8.5	7.5	8.0	17.5	16.0	16.5
7	2.5	1.0	2.0	4.5	3.5	4.0	8.5	7.5	8.0	18.0	16.5	17.0
8	3.0	2.0	2.5	4.5	4.0	4.0	9.0	8.0	8.5	17.5	16.5	17.0
9	2.5	2.0	2.0	5.0	4.0	4.5	9.0	8.0	8.5	18.0	17.0	17.5
10	3.0	2.0	2.5	4.5	4.0	4.5	9.0	8.5	9.0	18.5	17.5	18.0
11	3.0	2.5	3.0	4.5	4.5	4.5	9.5	8.5	9.0	20.0	18.0	18.5
12	3.0	2.5	2.5	5.0	4.0	4.5	9.5	9.0	9.5	20.0	18.5	19.5
13	3.5	2.5	3.0	4.5	3.5	4.0	10.0	9.0	9.5	19.5	19.0	19.5
14	3.5	2.5	3.0	4.0	2.5	3.0	11.0	9.5	10.0	20.5	18.5	19.5
15	4.0	2.5	3.0	3.5	2.0	2.5	11.5	10.0	10.5	20.5	19.0	19.5
16	4.0	2.5	3.5	4.0	2.0	3.0	11.5	11.0	11.0	21.0	18.5	20.0
17	4.5	3.0	3.5	3.5	2.5	3.0	12.5	11.5	12.0	21.0	19.5	20.0
18	4.0	2.0	3.0	3.0	2.0	2.5	13.0	11.5	12.0	20.0	19.0	19.5
19	3.0	1.0	2.0	3.5	1.5	2.5	14.0	12.0	13.0	19.5	19.0	19.5
20	3.5	1.0	2.0	3.5	2.5	3.0	14.5	12.5	13.5	19.5	19.0	19.5
21	2.5	2.0	2.0	4.0	3.0	3.5	14.0	13.5	13.5	19.5	18.5	19.0
22	3.5	2.0	2.5	4.5	3.5	3.5	13.5	12.0	13.0	19.5	18.5	19.0
23	3.0	2.0	2.5	4.0	3.5	4.0	12.5	11.5	12.0	19.5	18.5	19.0
24	2.5	1.5	2.0	4.5	4.0	4.0	12.5	11.5	12.0	20.0	18.5	19.5
25	2.5	1.0	2.0	5.0	4.5	4.5	13.5	12.0	12.5	20.5	19.0	20.0
26	2.0	1.0	1.5	6.5	4.5	5.5	13.5	12.5	13.0	20.5	19.5	20.0
27	2.5	1.0	2.0	6.0	5.5	5.5	13.5	12.0	13.0	20.5	19.5	20.0
28	---	---	---	7.0	5.5	6.5	13.5	12.5	13.0	21.5	19.5	20.5
29	---	---	---	7.0	6.0	6.5	14.5	13.0	13.5	21.5	20.5	21.0
30	---	---	---	7.5	6.5	7.0	14.5	13.0	13.5	21.5	20.0	20.5
31	---	---	---	10.5	7.0	7.5	---	---	---	20.5	20.0	20.5
MONTH	4.5	1.0	2.5	10.5	1.5	4.0	14.5	7.0	10.5	21.5	13.5	18.5

DAY	JUNE MAX	JUNE MIN	JUNE MEAN	JULY MAX	JULY MIN	JULY MEAN	AUGUST MAX	AUGUST MIN	AUGUST MEAN	SEPTEMBER MAX	SEPTEMBER MIN	SEPTEMBER MEAN
1	21.0	20.0	20.5	27.5	26.0	26.5	---	---	---	28.5	27.5	28.0
2	21.0	20.0	20.0	26.5	25.5	26.0	---	---	---	28.5	27.5	28.0
3	21.0	20.0	20.0	27.5	25.5	26.5	---	---	---	28.5	28.0	28.5
4	21.0	20.0	20.5	28.0	26.0	27.0	---	---	---	28.5	28.0	28.0
5	20.5	20.0	20.0	28.0	26.5	27.0	---	---	---	28.0	27.5	28.0
6	20.5	19.5	20.0	27.5	26.5	27.0	---	---	---	28.0	27.0	28.0
7	20.5	19.5	20.0	28.0	27.0	27.5	---	---	---	28.0	27.0	27.5
8	20.0	20.0	20.0	28.5	27.0	27.5	26.5	26.0	26.5	27.5	26.5	27.0
9	21.5	20.0	21.0	29.0	27.5	28.0	27.0	25.5	26.0	27.0	26.5	27.0
10	22.0	20.5	21.5	28.5	27.5	28.0	27.0	25.5	26.0	27.0	25.5	26.5
11	22.5	21.5	22.0	29.5	28.0	28.5	26.5	26.0	26.0	26.0	24.5	25.5
12	22.5	21.5	22.0	29.0	28.0	28.5	27.0	25.5	26.0	25.5	24.5	25.0
13	23.0	21.5	22.0	30.0	28.0	28.5	---	---	---	25.5	24.0	24.5
14	23.0	21.5	22.0	29.5	28.0	28.5	---	---	---	25.5	24.5	25.0
15	23.5	22.0	22.5	29.0	28.5	28.5	28.5	27.0	27.5	26.0	24.5	25.0
16	24.0	22.5	23.0	29.0	28.0	28.5	28.0	27.0	27.0	25.0	24.0	24.5
17	25.5	23.0	23.5	28.5	27.5	28.0	27.5	26.0	27.0	24.5	23.5	24.0
18	25.5	23.0	24.0	29.0	27.0	28.0	27.0	27.0	27.0	24.0	23.5	23.5
19	25.5	23.5	24.5	27.5	27.0	27.0	28.0	26.5	27.0	23.5	22.5	23.0
20	26.0	24.0	25.0	28.0	27.0	27.0	27.5	26.5	27.0	22.5	21.5	22.0
21	25.5	24.5	25.0	27.5	26.5	27.0	27.0	26.5	27.0	22.0	21.5	22.0
22	26.0	25.0	25.5	27.5	26.5	27.0	27.0	26.0	26.5	22.0	21.5	21.5
23	25.5	24.5	25.0	27.5	26.5	27.0	27.5	26.5	26.5	21.5	21.0	21.5
24	26.0	24.5	25.0	27.5	26.5	27.0	27.0	26.0	26.5	21.5	21.0	21.5
25	25.5	24.5	25.0	26.0	26.5	27.0	---	---	---	21.5	20.5	21.0
26	26.0	25.0	25.5	27.0	26.5	26.5	---	---	---	22.0	20.5	21.0
27	27.0	25.0	26.0	27.5	26.0	27.0	---	---	---	22.0	21.0	21.5
28	27.0	25.5	26.0	28.5	26.5	27.5	---	---	---	21.0	20.0	20.5
29	27.5	26.0	26.5	28.0	27.0	27.5	---	---	---	20.5	19.5	20.0
30	28.0	26.5	27.0	28.0	27.0	27.5	---	---	---	20.0	19.0	19.5
31	---	---	---	28.0	27.0	27.5	---	---	---	---	---	---
MONTH	28.0	19.5	23.0	30.0	25.5	27.5	28.5	25.[illegible]	[illegible]	28.5	19.0	[illegible]
YEAR	30.0	1.0	14.5									

1994 WY

DELAWARE RIVER BASIN

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE

LOCATION.--Lat 39°30'03", long 75°34'07", New Castle County, Del. Hydrologic Unit 02040205, on platform about 0.4 mi downstream from Reedy Island near Port Penn.
DRAINAGE AREA.--11,200 mi^2, approximately.
PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: October 1963 to current year.
pH: February 1970 to current year.
WATER TEMPERATURES: February 1970 to current year.
DISSOLVED OXYGEN: February 1970 to current year.
INSTRUMENTATION.--Water-quality monitor since February 1970. Probes interfaced with a data collection platform since the 1986 water year.
REMARKS.--Interruptions in the record were due to malfunctions of the recording instrument.
EXTREMES FOR PERIOD OF DAILY RECORD.--
SPECIFIC CONDUCTANCE: Maximum, 35,600 microsiemens, Nov. 15, 1978; minimum, 100 microsiemens, several days in 1969, 1970, 1974 and 1979.
pH: Maximum, 8.9, Mar. 4, 1980; minimum, 5.4, Dec. 31, 1972.
WATER TEMPERATURE: Maximum, 32.5°C, July 23, 1987; minimum, 0.0°C, many days during winter periods.
DISSOLVED OXYGEN: Maximum, 17.1 mg/L, Dec. 16, 19, 1976; minimum, 0.3 mg/L, Sept. 16, 17, 1971.
EXTREMES FOR CURRENT YEAR.--
SPECIFIC CONDUCTANCE: Maximum, 19,700 microsiemens, Oct. 27; minimum, 117 microsiemens, Apr. 22.
WATER TEMPERATURE: Maximum, 30.0°C, July 7; minimum, 0.5°C, Jan. 10, 11.

SPECIFIC CONDUCTANCE, MICROSIEMENS PER CENTIMETER AT 25° CELSIUS, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	15500	7210	10600	15500	8070	11800	6830	1960	3210	8050	2310	3690
2	15000	7590	10400	13400	8070	9420	5910	1660	2910	9610	2400	4420
3	12500	6760	9010	17600	7910	11700	5190	1390	2430	8220	2790	4780
4	13900	6680	9660	15300	7800	10400	6470	1470	2510	13700	4370	9180
5	13100	5850	8070	15100	7430	10500	4800	1070	2230	6840	3700	4960
6	13900	5830	9550	14000	7060	9590	1740	760	1140	6340	3140	4080
7	14100	6860	9490	13600	6710	9240	960	670	810	8140	3250	4830
8	14200	6130	8840	14200	6250	9860	1350	680	807	9690	3260	5040
9	16700	6450	10900	13900	3240	9150	2430	740	925	6920	2770	3930
10	16900	7570	10800	15200	6650	10100	3450	830	1080	6020	2650	3320
11	18900	8670	12600	15700	7060	10800	1420	840	1090	9000	2620	4320
12	18900	9650	14200	14300	6660	9670	3860	940	1400	11100	3070	5550
13	16900	9280	12700	15100	6320	9140	7120	1020	2710	11800	3690	6400
14	16800	9030	12000	15500	6410	9350	9980	1950	4640	11600	4410	7180
15	18400	9060	12300	13400	6250	9160	8860	2240	4280	8450	4150	5600
16	17200	8760	11900	14000	6340	8650	10100	3250	5320	5430	3520	4290
17	17900	8860	12000	14500	6940	9670	10400	2920	5820	9060	3720	7010
18	15800	8830	12000	12000	6620	8660	8140	2880	4840	6070	3950	4720
19	16400	8830	11500	15100	6810	10300	5390	2700	3510	5280	5030	5140
20	16100	8950	11600	13500	5970	9210	6160	2460	3730	5250	5200	5230
21	17600	9380	12700	11000	5970	7740	7450	2330	3940	5260	5190	5240
22	13800	8550	10200	11600	4910	7650	4030	1630	2530	5270	5190	5250
23	15300	7980	10100	12300	4630	7910	6070	1380	2850	5300	5250	5270
24	14700	8010	11100	13600	4900	9280	7810	1470	4090	---	---	---
25	13700	7310	9800	15000	3350	9640	8570	2210	4560	---	---	---
26	17400	7820	11100	15500	7180	10800	5440	1520	2900	---	---	---
27	19700	10100	14600	15200	7960	11000	5630	1090	2140	---	---	---
28	18900	10500	13600	17400	7310	12800	6450	1220	2520	---	---	---
29	16100	9460	12200	11800	4110	6950	8810	2000	4210	---	---	---
30	16200	9390	11900	6420	2590	4290	7380	2100	3960	---	---	---
31	19200	10000	13700	---	---	---	10000	2190	4480	---	---	---
MONTH	19700	5830	11300	17600	2590	9480	10400	670	3020	13700	2310	5190

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE--Continued

PH, WATER, WHOLE, FIELD, STANDARD UNITS, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	7.5	7.3	7.4	6.9	6.8	6.8	7.5	7.3	7.4	7.4	7.3	7.3
2	7.6	7.4	7.5	6.8	6.7	6.7	7.5	7.3	7.4	7.5	7.4	7.4
3	7.8	7.5	7.6	6.8	6.6	6.7	7.5	7.3	7.4	7.5	7.4	7.4
4	8.0	7.6	7.7	7.4	6.6	7.1	7.5	7.3	7.4	7.5	7.4	7.5
5	7.9	7.3	7.8	7.4	7.2	7.3	7.4	7.3	7.4	7.5	7.4	7.5
6	7.9	7.6	7.7	7.4	7.2	7.3	7.6	7.4	7.5	7.5	7.4	7.4
7	7.8	7.6	7.6	7.4	7.2	7.3	7.6	7.4	7.5	7.5	7.4	7.4
8	7.6	7.5	7.5	7.6	7.2	7.4	7.6	7.5	7.5	7.5	7.4	7.4
9	7.5	7.4	7.5	7.7	7.4	7.5	7.7	7.5	7.5	7.5	7.4	7.4
10	7.5	7.3	7.4	7.7	7.5	7.6	7.6	7.5	7.5	7.5	7.4	7.4
11	7.4	7.2	7.3	7.8	7.5	7.6	7.6	7.5	7.5	7.5	7.4	7.4
12	7.4	7.3	7.3	7.8	7.5	7.6	7.6	7.4	7.5	7.5	7.4	7.4
13	7.5	7.3	7.4	---	---	---	7.5	7.4	7.4	7.5	7.5	7.5
14	7.4	7.3	7.4	---	---	---	7.5	7.4	7.4	7.6	7.5	7.5
15	7.4	7.3	7.4	---	---	---	7.5	7.3	7.4	7.7	7.4	7.6
16	7.4	7.3	7.4	7.7	7.5	7.5	7.5	7.4	7.4	7.6	7.6	7.6
17	7.4	7.3	7.3	7.6	7.3	7.4	7.5	7.3	7.4	7.6	7.5	7.6
18	7.4	7.2	7.3	7.6	7.2	7.4	7.5	7.3	7.4	7.7	7.5	7.6
19	7.4	7.2	7.3	7.5	7.2	7.3	7.4	7.3	7.4	7.7	7.7	7.7
20	7.5	7.3	7.3	7.3	7.1	7.3	7.4	7.3	7.4	7.8	7.7	7.7
21	7.4	7.3	7.3	7.3	7.1	7.2	7.4	7.3	7.3	7.8	7.7	7.8
22	7.4	7.2	7.3	7.2	7.0	7.1	7.4	7.3	7.3	8.0	7.8	7.9
23	7.3	7.2	7.3	7.1	7.0	7.0	7.5	7.4	7.4	8.0	7.9	7.9
24	7.3	7.2	7.3	7.1	6.9	6.9	7.4	7.3	7.3	8.0	8.0	8.0
25	7.3	7.2	7.2	7.0	6.8	6.9	7.3	7.3	7.3	8.0	7.4	7.7
26	7.3	7.1	7.2	7.5	6.7	7.0	7.4	7.3	7.3	7.5	7.4	7.5
27	7.2	7.1	7.2	7.6	7.3	7.4	7.3	7.2	7.3	7.5	7.4	7.5
28	7.1	7.0	7.1	7.5	7.3	7.5	7.4	7.2	7.3	7.5	7.4	7.4
29	7.1	6.9	7.0	7.6	7.4	7.5	7.4	7.3	7.3	7.5	7.4	7.4
30	7.0	6.8	6.9	7.5	7.4	7.5	7.4	7.3	7.3	7.6	7.4	7.5
31	---	---	---	7.5	7.4	7.4	7.5	7.3	7.4	---	---	---
MONTH	8.0	6.8	7.4	7.8	6.6	7.3	7.7	7.2	7.4	8.0	7.3	7.5

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	19.5	18.5	19.0	14.5	13.0	13.5	9.0	8.5	8.5	2.5	2.0	2.0
2	19.5	18.5	19.0	13.0	12.0	13.0	9.0	8.5	9.0	2.5	2.0	2.5
3	19.0	18.5	19.0	13.0	12.0	12.5	9.5	8.5	9.0	2.5	2.0	2.5
4	19.0	18.0	18.5	12.5	11.5	12.5	9.0	9.0	9.0	2.5	2.5	2.5
5	18.5	17.0	18.0	12.5	12.0	12.5	9.5	9.0	9.0	2.5	2.0	2.0
6	18.5	17.5	18.0	12.5	11.5	12.0	9.0	8.5	9.0	2.0	1.5	2.0
7	18.0	17.5	18.0	11.5	11.0	11.5	9.0	8.5	8.5	2.0	2.0	2.0
8	18.5	18.0	18.0	11.5	10.5	11.0	9.0	8.5	8.5	2.5	1.0	2.0
9	19.0	18.0	18.5	11.5	10.5	11.0	8.5	8.0	8.5	1.5	1.0	1.5
10	18.5	16.5	17.5	11.5	10.5	11.0	8.5	8.0	8.5	1.5	.5	1.0
11	17.0	16.0	16.5	11.5	10.5	11.0	8.5	6.5	8.0	1.5	.5	1.0
12	16.5	16.0	16.5	11.5	10.5	11.0	7.0	5.5	6.5	1.5	1.0	1.5
13	16.5	15.5	16.0	11.0	10.5	11.0	6.5	6.0	6.0	1.5	1.5	1.5
14	16.0	15.0	15.5	12.0	11.0	11.5	6.5	6.0	6.0	1.5	1.0	1.5
15	16.5	15.5	16.0	12.5	12.0	12.0	6.0	6.0	6.0	---	---	---
16	16.0	15.5	16.0	12.5	12.0	12.0	6.5	6.0	6.0	---	---	---
17	16.5	16.0	16.0	12.5	12.0	12.5	6.0	5.5	6.0	---	---	---
18	16.5	16.0	16.5	12.5	12.0	12.0	6.0	5.5	5.5	---	---	---
19	16.5	16.0	16.0	12.5	12.0	12.0	6.0	5.5	5.5	---	---	---
20	16.5	16.0	16.0	12.0	11.0	12.0	6.0	5.5	5.5	---	---	---
21	17.0	16.5	16.5	11.5	10.5	11.0	5.5	5.0	5.5	---	---	---
22	16.5	16.0	16.5	11.5	10.5	11.0	5.5	4.5	5.0	---	---	---
23	16.5	15.5	16.0	11.5	10.5	11.0	5.0	4.5	5.0	---	---	---
24	16.5	15.5	15.5	11.0	10.5	11.0	5.0	4.5	4.5	---	---	---
25	16.5	15.5	16.0	11.0	9.5	10.0	5.0	4.5	5.0	---	---	---
26	16.0	15.5	15.5	9.5	9.0	9.5	5.0	3.5	4.0	---	---	---
27	16.0	15.5	15.5	10.0	9.0	9.5	3.5	2.5	3.0	---	---	---
28	16.0	15.5	15.5	10.5	10.0	10.5	3.5	2.5	3.0	---	---	---
29	16.0	15.0	15.0	10.5	9.5	10.0	3.0	2.5	2.5	---	---	---
30	15.5	14.5	15.0	9.5	9.0	9.5	3.0	2.0	2.5	---	---	---
31	15.0	14.0	14.5	---	---	---	2.5	1.5	---	---	---	---
MONTH	19.5	14.0	16.6	14.5	9.0	11.3	9.5	1.5	[illegible]	.5	.5	1.8

DELAWARE RIVER BASIN

01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE--Continued

WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1993 TO SEPTEMBER 1994

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	---	---	---	2.0	1.5	2.0	9.0	8.0	8.5	17.0	16.0	16.5
2	---	---	---	2.0	1.5	1.5	10.0	8.0	8.5	17.0	16.0	16.0
3	---	---	---	2.0	1.0	1.5	9.5	8.5	9.0	17.0	15.5	16.0
4	---	---	---	2.0	1.5	2.0	10.5	9.0	9.5	16.0	15.0	15.5
5	---	---	---	2.5	1.5	2.0	10.0	8.5	9.0	16.5	15.0	15.5
6	---	---	---	2.5	2.0	2.5	10.5	9.0	9.5	16.5	15.5	16.0
7	---	---	---	3.5	2.5	3.0	10.5	9.5	10.0	16.0	15.0	15.5
8	---	---	---	3.5	3.0	3.5	10.5	8.5	9.5	16.0	15.0	15.5
9	---	---	---	3.5	3.0	3.0	10.5	9.0	9.5	16.5	15.0	15.5
10	---	---	---	3.5	3.0	3.5	11.0	10.0	10.5	16.5	15.5	16.0
11	---	---	---	4.5	3.0	3.5	11.5	10.0	10.5	16.5	15.5	16.0
12	---	---	---	4.5	3.5	4.0	11.0	10.5	10.5	17.0	16.0	16.0
13	---	---	---	5.0	4.0	4.0	11.5	10.5	11.0	17.0	15.5	16.0
14	---	---	---	5.5	4.5	4.5	13.0	11.0	11.5	16.5	15.5	16.0
15	---	---	---	5.5	4.5	5.0	13.0	11.5	12.0	17.5	16.0	16.5
16	---	---	---	5.5	5.0	5.0	13.0	12.0	12.5	17.5	16.5	17.0
17	---	---	---	5.0	4.0	4.5	12.5	12.0	12.5	17.5	16.0	16.5
18	---	---	---	5.0	4.5	4.5	13.0	12.0	12.5	16.5	15.5	16.0
19	---	---	---	5.0	4.5	5.0	13.5	12.5	13.0	16.0	15.5	15.5
20	---	---	---	6.0	4.5	5.0	14.0	13.0	13.5	15.5	15.0	15.0
21	---	---	---	5.5	5.0	5.5	14.5	13.0	13.5	16.5	15.0	15.5
22	---	---	---	7.0	5.5	6.0	14.5	13.0	13.5	17.5	15.5	16.0
23	---	---	---	8.0	6.0	7.0	14.5	13.0	13.5	18.0	16.0	17.0
24	---	---	---	8.0	6.5	7.0	15.5	13.5	14.0	27.5	17.0	22.0
25	---	---	---	8.0	7.0	7.5	16.0	14.0	14.5	27.0	20.5	23.0
26	3.5	2.5	3.0	8.0	7.0	7.5	16.0	14.0	15.0	24.0	19.5	21.5
27	2.5	1.0	2.0	7.5	7.0	7.5	16.0	14.5	15.5	20.5	16.0	17.5
28	2.0	1.5	2.0	8.0	7.5	7.5	16.5	15.5	16.0	21.5	13.5	18.0
29	---	---	---	8.5	7.5	8.0	16.5	15.5	16.0	23.5	16.5	20.0
30	---	---	---	8.5	8.0	8.5	16.5	16.0	16.5	21.0	18.5	19.5
31	---	---	---	8.5	8.0	8.5	---	---	---	21.0	19.5	20.0
MONTH	3.5	1.0	2.3	8.5	1.0	4.8	16.5	8.0	12.0	27.5	13.5	17.0

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	21.5	20.0	20.5	27.0	25.5	26.0	29.0	27.5	28.0	26.0	25.0	25.0
2	21.5	20.0	20.5	27.0	25.5	26.0	29.0	28.0	28.0	25.5	24.0	24.5
3	21.5	20.0	20.5	27.5	26.0	26.5	29.0	28.0	28.5	25.0	24.0	24.0
4	22.5	20.5	21.0	27.5	26.0	26.5	29.5	28.0	28.5	24.0	23.0	23.5
5	21.5	21.0	21.0	28.0	26.0	27.0	28.5	27.5	28.0	24.0	23.0	23.0
6	22.0	21.0	21.5	29.0	27.0	28.0	27.5	26.5	27.0	24.0	22.5	23.0
7	23.0	21.5	22.0	30.0	28.0	28.5	28.0	26.0	27.0	23.5	22.5	23.0
8	23.0	22.0	22.5	29.5	28.0	28.5	27.5	26.0	26.5	23.0	22.5	22.5
9	23.0	21.5	22.0	29.5	28.0	28.5	27.5	26.0	26.5	23.0	22.0	22.5
10	23.0	22.0	22.5	29.0	28.0	28.5	27.0	26.5	26.5	23.0	22.0	22.5
11	22.5	22.0	22.0	29.0	27.5	28.0	26.5	26.0	26.5	22.5	21.5	22.0
12	22.5	22.0	22.5	28.5	27.5	28.0	27.0	26.0	26.5	22.0	21.5	22.0
13	23.5	22.0	23.0	---	---	---	27.5	26.5	27.0	22.5	21.5	22.0
14	24.5	23.0	23.5	---	---	---	27.5	26.5	27.0	23.5	22.0	22.5
15	25.5	23.5	24.5	---	---	---	27.0	26.5	26.5	24.0	22.5	22.5
16	25.5	24.5	24.5	29.0	28.5	28.5	27.0	26.0	26.5	23.5	22.5	23.0
17	25.5	24.5	25.0	29.0	28.0	28.5	26.5	25.5	26.0	24.0	23.0	23.0
18	26.5	25.0	25.5	29.0	28.0	28.5	26.5	25.5	26.0	24.0	23.0	23.5
19	27.5	25.5	26.0	29.5	28.0	28.5	26.5	25.5	26.0	24.0	22.5	23.0
20	27.0	26.0	26.5	29.5	28.5	28.5	26.5	25.5	26.0	23.5	22.5	23.0
21	26.5	26.0	26.0	29.5	28.5	29.0	26.5	26.0	26.0	23.5	22.5	23.0
22	27.0	26.0	26.5	29.0	28.5	28.5	26.5	25.5	26.0	23.0	21.5	22.5
23	27.0	26.0	26.5	28.5	28.0	28.5	26.0	25.0	25.5	22.0	21.5	22.0
24	27.5	26.0	26.5	29.0	28.0	28.5	26.0	25.0	25.5	22.5	21.5	22.0
25	27.0	26.5	27.0	29.0	28.5	28.5	25.5	24.5	25.0	22.5	22.0	22.0
26	27.0	26.0	26.5	28.5	28.0	28.5	26.0	25.0	25.0	22.0	22.0	22.0
27	26.5	26.0	26.5	29.0	28.0	28.5	26.0	25.0	25.5	22.5	22.0	22.5
28	26.5	26.0	26.0	28.0	27.5	28.0	26.5	25.5	26.0	22.5	22.0	22.0
29	26.5	25.5	26.0	28.0	27.5	28.0	26.0	25.0	25.5	22.0	21.0	22.0
30	26.5	25.5	26.0	28.5	27.5	28.0	26.0	25.0	25.5	21.5	20.5	21.0
31	---	---	---	28.5	27.5	28.0	25.5	24.5	25.0	---	[illegible]	[illegible]
MONTH	27.5	20.0	24.0	30.0	25.5	28.0	29.5	24.5	26.4	26.0	[illegible]	[illegible]
YEAR	30.0	.5	16.0									

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OUTSTANDING CHANGES MUST BE ATTACHED FOR WORKING COPY
20010717

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - PENNSYLVANIA ADAPS SYSTEM 04/10/97

STATION NUMBER 01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE ESTUARY SOURCE AGENCY USGS
LATITUDE 393003 LONGITUDE 0753407 DATUM STATE 10 COUNTY 003
(DCP - PRIMARY)
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		OCTOBER			NOVEMBER			DECEMBER			JANUARY	
1	20.9	20.3	20.6	16.4	15.7	16.0	9.7	9.1	9.3	6.4	5.6	6.0
2	21.2	20.2	20.6	15.8	14.9	15.4	9.6	8.7	9.2	6.2	5.4	5.9
3	20.4	19.5	19.8	15.5	14.3	15.0	9.5	9.0	9.2	5.5	4.7	5.1
4	19.7	18.8	19.2	---	---	---	9.7	9.0	9.4	5.4	4.2	5.0
5	19.2	18.4	18.8	---	---	---	10.2	9.5	9.8	4.5	3.1	3.8
6	19.0	17.8	18.4	---	---	---	10.2	9.8	10.0	4.0	3.1	3.6
7	18.8	18.0	18.4	15.3	14.2	14.7	10.4	9.9	10.2	4.0	3.1	3.7
8	18.9	18.1	18.5	14.8	14.1	14.4	10.0	8.7	9.4	3.9	3.2	3.6
9	19.0	18.4	18.7	14.7	14.1	14.5	9.1	8.9	9.0	4.1	3.3	3.7
10	18.8	18.0	18.5	14.5	13.5	14.0	9.1	8.6	8.9	3.6	3.1	3.4
11	18.2	17.5	17.9	13.9	12.9	13.5	9.0	7.9	8.7	3.7	3.1	3.5
12	18.3	17.3	17.7	13.7	12.7	13.1	8.0	7.2	7.7	4.4	3.4	3.8
13	18.3	17.2	17.6	13.7	12.9	13.3	7.3	7.0	7.1	5.0	3.9	4.3
14	17.6	17.2	17.4	13.9	13.0	13.4	7.4	6.9	7.2	5.3	4.1	4.7
15	17.9	17.0	17.3	14.0	13.1	13.5	7.0	6.5	6.8	5.8	5.0	5.4
16	17.7	16.6	17.1	---	---	---	6.7	6.3	6.5	5.9	5.5	5.7
17	17.8	16.6	17.0	---	---	---	6.8	6.4	6.6	6.4	5.6	5.9
18	17.7	16.5	17.0	---	---	---	7.2	6.5	6.7	6.1	5.7	5.9
19	17.7	16.8	17.1	---	---	---	6.8	6.2	6.5	6.1	5.8	6.0
20	17.5	17.1	17.3	---	---	---	6.8	6.1	6.4	6.8	6.1	6.4
21	17.6	17.0	17.3	---	---	---	6.8	6.0	6.3	6.4	5.5	6.2
22	17.7	16.9	17.3	---	---	---	6.7	6.1	6.3	6.1	5.2	5.7
23	17.4	17.1	17.3	12.0	10.2	11.4	6.7	6.2	6.5	5.5	4.9	5.2
24	17.5	16.8	17.2	11.0	9.8	10.5	6.7	6.5	6.6	5.5	4.6	5.0
25	17.2	16.6	16.9	10.7	10.0	10.3	7.0	6.5	6.7	5.9	4.4	5.0
26	16.7	15.7	16.4	10.2	9.4	9.9	7.0	6.3	6.6	5.2	4.3	4.7
27	16.2	15.5	15.8	9.6	8.9	9.3	7.3	6.3	6.6	5.4	3.9	4.5
28	16.3	15.2	15.6	10.5	9.5	9.8	7.4	6.4	6.8	4.6	3.8	4.2
29	15.9	15.0	15.4	10.0	9.5	9.7	7.0	5.8	6.5	4.9	3.3	4.0
30	16.4	15.2	15.7	10.0	9.4	9.7	6.2	5.3	5.8	4.9	3.6	4.0
31	16.4	15.4	15.8	---	---	---	5.9	5.3	5.6	5.1	3.7	4.3
MONTH	21.2	15.0	17.6	16.4	8.9	12.6	10.4	5.3	7.6	6.8	3.1	4.8

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - PENNSYLVANIA ADAPS SYSTEM 04/10/97

STATION NUMBER 01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE ESTUARY SOURCE AGENCY USGS
LATITUDE 393003 LONGITUDE 0753407 DATUM STATE 10 COUNTY 003
(DCP - PRIMARY)
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	5.2	4.1	4.5	3.0	2.5	2.7	10.3	9.3	9.7	---	---	---
2	5.2	3.2	4.5	3.1	2.4	2.7	10.1	9.5	9.8	---	---	---
3	4.4	2.6	3.6	3.4	2.5	3.0	10.3	9.3	9.9	---	---	---
4	4.3	3.2	3.9	3.2	2.8	3.0	10.7	9.5	10.3	---	---	---
5	---	---	---	3.8	2.9	3.3	9.9	8.5	9.4	---	---	---
6	---	---	---	4.1	3.3	3.6	9.8	8.8	9.4	---	---	---
7	---	---	---	4.4	3.6	4.0	10.6	9.2	9.8	---	---	---
8	---	---	---	5.3	4.0	4.6	10.6	9.5	10.0	---	---	---
9	---	---	---	5.1	4.0	4.6	11.8	10.0	10.6	16.9	14.8	15.5
10	---	---	---	4.7	4.0	4.3	11.3	10.1	10.6	15.5	15.1	15.3
11	---	---	---	5.3	3.9	4.5	11.3	10.3	10.7	16.9	15.1	15.6
12	---	---	---	6.5	4.5	5.2	11.6	10.5	11.0	16.9	15.8	16.3
13	---	---	---	6.8	5.0	5.7	11.8	11.0	11.3	17.7	16.1	16.7
14	---	---	---	7.4	5.8	6.4	11.5	10.8	11.1	16.6	16.2	16.3
15	---	---	---	8.0	6.3	6.9	11.7	10.5	11.0	17.3	16.2	16.6
16	---	---	---	8.6	7.0	7.5	11.9	10.5	11.2	17.7	16.4	17.0
17	2.2	.9	1.4	8.9	7.4	8.1	11.8	11.0	11.4	17.5	17.0	17.3
18	2.1	1.3	1.7	8.9	7.7	8.3	12.2	11.3	11.7	17.7	17.2	17.4
19	3.0	1.7	2.3	9.1	8.1	8.6	13.0	11.6	12.3	18.0	17.2	17.5
20	3.3	2.2	2.5	9.3	8.3	8.9	14.1	12.4	13.0	18.5	17.4	17.9
21	3.1	2.0	2.4	9.8	8.9	9.4	13.4	12.8	13.2	19.0	17.9	18.4
22	3.2	2.0	2.4	9.7	9.2	9.4	14.6	13.2	13.7	19.8	18.3	18.9
23	2.8	2.2	2.4	9.4	9.0	9.2	14.2	13.2	13.7	19.9	18.5	19.2
24	3.7	2.2	2.7	9.9	8.4	9.1	13.6	13.1	13.4	20.8	19.0	19.7
25	3.8	2.3	2.7	9.8	8.4	8.9	14.8	13.1	13.8	22.3	19.8	20.5
26	2.8	2.0	2.5	9.9	8.5	9.1	14.9	13.3	14.0	20.8	20.1	20.4
27	2.6	2.0	2.2	10.2	8.9	9.4	---	---	---	22.0	20.1	20.7
28	3.0	2.4	2.7	10.1	9.2	9.5	---	---	---	20.5	20.0	20.3
29	---	---	---	10.5	9.3	9.7	---	---	---	21.6	20.0	20.5
30	---	---	---	10.1	9.6	9.8	---	---	---	21.1	20.4	20.8
31	---	---	---	10.2	9.5	9.8	---	---	---	22.1	20.2	21.0
MONTH	5.2	.9	2.8	10.5	2.4	6.7	14.9	8.5	11.4	22.3	14.8	18.3

OUTSTANDING CHANGES MUST BE ATTACHED FOR WORKING COPY
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UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - PENNSYLVANIA ADAPS SYSTEM 04/10/97

STATION NUMBER 01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE ESTUARY SOURCE AGENCY USGS
LATITUDE 393003 LONGITUDE 0753407 DATUM STATE 10 COUNTY 003
(DCP - PRIMARY)
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1994 TO SEPTEMBER 1995

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	22.0	20.8	21.4	25.0	24.1	24.5	29.9	28.8	29.4	26.8	25.6	25.9
2	22.1	21.3	21.7	24.9	24.4	24.7	30.6	29.0	29.5	26.0	25.1	25.5
3	22.6	21.7	22.2	25.5	24.1	24.7	---	---	---	26.2	24.9	25.3
4	22.8	21.9	22.4	25.2	24.5	24.7	---	---	---	25.9	24.7	25.1
5	23.3	22.1	22.6	26.0	24.7	25.2	---	---	---	25.8	24.6	25.1
6	22.9	22.2	22.5	---	---	---	---	---	---	26.4	24.8	25.3
7	23.9	22.4	22.9	---	---	---	---	---	---	---	---	---
8	24.2	22.8	23.3	25.7	24.6	25.0	---	---	---	---	---	---
9	24.2	22.9	23.3	25.5	24.4	24.8	---	---	---	---	---	---
10	23.1	22.5	22.8	25.4	24.2	24.7	---	---	---	---	---	---
11	24.4	22.3	23.0	26.0	24.3	24.9	---	---	---	---	---	---
12	23.4	22.6	23.0	26.2	24.7	25.3	---	---	---	24.5	23.5	24.0
13	22.7	22.1	22.4	26.4	25.2	25.7	---	---	---	24.2	23.5	23.9
14	23.4	22.2	22.7	27.1	25.5	26.2	---	---	---	24.4	23.8	24.0
15	23.8	22.3	22.9	28.1	26.3	27.1	27.9	27.2	27.5	24.2	23.1	23.7
16	23.6	22.5	23.1	---	---	---	28.0	27.0	27.5	23.4	22.6	23.1
17	24.2	22.8	23.3	---	---	---	28.2	27.5	27.8	22.9	22.2	22.6
18	24.7	23.0	23.6	29.3	28.1	28.6	28.4	27.4	27.7	23.2	22.1	22.5
19	25.0	23.4	24.0	29.6	28.5	29.0	27.9	26.7	27.3	22.7	21.8	22.1
20	25.9	23.9	24.5	29.5	28.6	28.9	27.8	26.5	27.0	---	---	---
21	25.9	24.3	24.8	29.6	28.6	29.0	28.0	26.5	27.2	22.8	21.8	22.2
22	25.0	24.2	24.5	30.3	28.5	29.0	28.1	26.8	27.3	22.5	21.9	22.2
23	24.3	23.9	24.1	30.0	28.7	29.1	28.0	26.3	26.8	21.9	20.8	21.2
24	24.6	23.7	24.1	29.7	28.8	29.1	27.5	26.1	26.7	20.8	20.2	20.4
25	25.6	24.0	24.5	30.2	28.8	29.3	27.3	25.8	26.4	20.2	19.9	20.1
26	25.8	24.4	24.8	30.0	29.0	29.4	26.7	25.7	26.2	20.1	19.9	20.0
27	24.7	24.1	24.5	30.3	29.0	29.5	26.9	25.9	26.3	20.4	19.6	20.0
28	25.2	23.5	24.1	29.7	29.1	29.4	26.3	25.7	26.0	20.6	19.8	20.2
29	24.8	23.5	24.0	30.1	29.0	29.4	26.5	25.1	25.6	20.3	19.5	19.9
30	24.7	23.8	24.3	29.9	29.0	29.5	26.1	25.3	25.7	20.1	19.2	19.8
31	---	---	---	30.1	28.9	29.5	26.3	25.2	25.7	---	---	---
MONTH	26.9	20.8	23.4	30.3	24.1	27.3	30.6	25.1	27.0	26.8	19.2	22.7
YEAR	36.6	.9	15.0									

OUTSTANDING CHANGES MUST BE ATTACHED FOR WORKING COPY
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OUTSTANDING CHANGES MUST BE ATTACHED FOR WORKING COPY
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UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - PENNSYLVANIA ADAPS SYSTEM 04/10/97

STATION NUMBER 01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE ESTUARY SOURCE AGENCY USGS
LATITUDE 393003 LONGITUDE 0753407 DATUM STATE 10 COUNTY 003
PROVISIONAL DATA (DCP - PRIMARY) SUBJECT TO REVISION
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
	OCTOBER			NOVEMBER			DECEMBER			JANUARY		
1	20.7	19.5	19.9	---	---	---	6.6	5.7	6.1	1.3	.8	1.1
2	21.2	19.6	20.1	---	---	---	6.5	5.7	6.0	1.4	1.1	1.3
3	21.0	20.0	20.3	---	---	---	6.5	5.5	6.0	1.5	1.2	1.3
4	20.8	20.3	20.4	---	---	---	6.6	5.9	6.2	1.2	.5	.9
5	21.0	20.4	20.6	14.2	13.4	13.9	6.1	5.6	5.9	1.1	.6	.8
6	21.7	20.7	21.1	13.8	12.8	13.3	6.1	5.6	5.8	.9	.1	.4
7	21.4	21.0	21.2	13.1	12.5	12.7	6.0	5.3	5.6	---	---	---
8	21.3	20.7	21.0	12.8	11.6	12.2	5.5	4.8	5.1	---	---	---
9	21.3	20.3	20.7	11.8	10.5	11.1	5.1	4.6	4.8	---	---	---
10	21.0	20.3	20.6	11.1	10.1	10.7	4.7	2.5	3.9	---	---	---
11	20.9	20.2	20.6	11.3	10.4	10.9	3.8	1.9	2.7	---	---	---
12	21.0	20.2	20.6	10.7	8.7	9.7	2.8	1.7	2.4	---	---	---
13	21.1	20.2	20.7	9.6	8.9	9.3	2.5	1.7	2.1	---	---	---
14	20.9	20.5	20.7	9.5	8.9	9.2	2.4	1.8	2.2	---	---	---
15	20.6	19.6	20.2	9.2	8.4	8.9	2.6	2.0	2.3	---	---	---
16	20.0	18.5	19.4	8.7	8.1	8.5	2.6	2.3	2.4	---	---	---
17	19.1	18.2	18.6	8.6	7.9	8.2	3.0	2.3	2.6	---	---	---
18	18.7	17.7	18.3	8.2	7.9	8.1	2.8	2.3	2.6	---	---	---
19	19.1	17.7	18.3	8.4	7.9	8.1	2.7	2.2	2.5	---	---	---
20	18.9	18.0	18.4	8.4	7.7	8.0	2.5	1.9	2.2	---	---	---
21	18.6	17.9	18.2	8.6	7.8	8.1	2.2	1.3	1.8	---	---	---
22	18.2	17.3	17.7	7.9	7.1	7.5	2.1	1.0	1.7	1.8	1.2	1.5
23	18.6	17.3	17.7	7.4	6.6	7.0	1.9	1.5	1.7	1.7	1.3	1.5
24	18.1	17.3	17.7	7.2	6.5	6.8	1.8	1.5	1.6	2.4	1.4	2.0
25	17.8	17.1	17.4	6.9	6.2	6.5	1.6	1.2	1.5	1.8	1.0	1.5
26	17.4	16.5	17.0	6.8	6.2	6.4	1.4	.7	1.2	1.7	.9	1.3
27	17.1	16.6	16.9	7.0	6.3	6.6	.9	.7	.8	2.7	1.5	2.0
28	---	---	---	7.5	6.7	7.0	1.0	.4	.7	2.7	1.6	2.2
29	---	---	---	6.9	6.1	6.4	1.1	.4	.6	3.0	2.2	2.7
30	---	---	---	6.5	5.7	6.1	1.2	.3	.6	3.7	2.7	3.1
31	---	---	---	---	---	---	1.3	.5	.8	3.4	2.7	3.1
MONTH	21.7	16.5	19.4	14.2	5.7	8.9	6.6	.3	3.0	3.7	.1	1.7

PROVISIONAL DATA
SUBJECT TO REVISION

UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - PENNSYLVANIA ADAPS SYSTEM 04/10/97

STATION NUMBER 01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE ESTUARY SOURCE AGENCY USGS
LATITUDE 393003 LONGITUDE 0753407 DATUM STATE 10 COUNTY 003
PROVISIONAL DATA (DCP - PRIMARY) SUBJECT TO REVISION
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		FEBRUARY			MARCH			APRIL			MAY	
1	2.8	2.3	2.6	4.4	3.1	3.6	---	---	---	16.1	14.6	15.2
2	2.7	2.1	2.4	4.3	3.2	3.6	---	---	---	16.4	15.0	15.5
3	2.1	1.1	1.5	3.9	3.4	3.6	---	---	---	16.0	15.2	15.5
4	1.3	.6	.9	4.2	3.0	3.5	8.9	7.7	8.3	16.4	15.4	15.8
5	---	---	---	5.3	3.4	4.1	8.5	8.0	8.3	17.1	15.6	16.2
6	---	---	---	4.7	4.2	4.4	8.4	7.7	8.1	16.3	15.6	15.9
7	---	---	---	4.2	3.8	4.1	8.1	7.7	7.9	16.0	15.2	15.6
8	---	---	---	3.8	3.0	3.5	8.3	7.4	7.9	16.3	15.4	15.8
9	---	---	---	3.5	2.3	3.0	8.1	7.2	7.6	15.9	15.5	15.7
10	---	---	---	3.3	2.3	2.9	8.1	7.2	7.6	16.9	15.6	16.1
11	---	---	---	3.4	2.5	3.0	8.9	7.3	8.0	18.3	16.1	16.9
12	---	---	---	4.1	2.5	3.3	9.5	8.0	8.6	17.0	15.9	16.5
13	---	---	---	5.1	2.9	3.8	9.9	8.4	9.0	16.5	15.2	15.8
14	---	---	---	5.3	3.3	4.3	10.5	8.8	9.4	16.7	15.1	15.7
15	---	---	---	6.1	4.3	5.1	9.7	9.0	9.4	16.1	15.2	15.6
16	---	---	---	6.5	4.6	5.4	10.9	9.3	9.9	15.5	15.1	15.3
17	---	---	---	6.0	4.9	5.6	10.6	9.7	10.1	16.3	15.3	15.7
18	---	---	---	6.7	5.4	6.0	11.9	9.6	10.7	16.4	15.6	15.9
19	---	---	---	6.6	5.7	6.1	12.1	10.6	11.3	18.6	15.9	16.8
20	---	---	---	6.6	5.8	6.1	12.5	11.1	11.7	19.3	16.6	17.7
21	---	---	---	6.4	5.9	6.2	13.5	11.8	12.5	20.0	17.5	18.6
22	---	---	---	---	---	---	13.7	12.3	13.0	20.0	18.2	19.2
23	---	---	---	---	---	---	14.8	13.2	14.1	20.5	18.6	19.6
24	---	---	---	---	---	---	14.9	13.3	14.2	21.1	19.3	20.1
25	---	---	---	---	---	---	14.8	13.3	14.1	20.6	19.1	19.9
26	---	---	---	---	---	---	15.2	14.0	14.4	20.0	19.0	19.5
27	---	---	---	---	---	---	15.2	14.1	14.5	19.6	18.4	18.9
28	4.7	3.3	3.9	---	---	---	15.3	13.8	14.4	18.5	17.9	18.3
29	4.2	3.4	3.8	---	---	---	16.0	14.3	15.0	18.1	17.6	18.0
30	---	---	---	---	---	---	15.6	14.8	15.3	18.7	17.4	17.9
31	---	---	---	---	---	---	---	---	---	19.2	17.4	18.1
MONTH	7	.6	2.5	6.7	2.3	4.3	16.0	7.2	10.9	21.1	14.6	17.0

PROVISIONAL DATA
SUBJECT TO REVISION

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UNITED STATES DEPARTMENT OF THE INTERIOR - GEOLOGICAL SURVEY - PENNSYLVANIA ADAPS SYSTEM 04/10/97

STATION NUMBER 01482800 DELAWARE RIVER AT REEDY ISLAND JETTY, DE ESTUARY SOURCE AGENCY USGS
LATITUDE 393003 LONGITUDE 0753407 DATUM STATE 10 COUNTY 003
(DCP - PRIMARY)
PROVISIONAL DATA SUBJECT TO REVISION
WATER TEMPERATURE, DEGREES CELSIUS, WATER YEAR OCTOBER 1995 TO SEPTEMBER 1996

DAY	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN	MAX	MIN	MEAN
		JUNE			JULY			AUGUST			SEPTEMBER	
1	19.3	17.7	18.4	25.5	24.3	24.8	25.4	24.5	24.8	27.4	26.6	27.1
2	19.4	18.0	18.6	25.5	24.5	25.0	25.6	24.5	25.0	27.7	26.7	27.2
3	18.9	18.3	18.6	25.5	24.6	25.0	25.2	24.8	25.0	28.6	27.0	27.5
4	19.6	18.1	18.7	24.9	24.3	24.7	25.8	24.6	25.1	27.8	27.0	27.3
5	20.0	18.6	19.3	25.0	24.1	24.6	26.4	24.9	25.5	27.6	26.7	27.1
6	20.8	19.0	19.8	25.8	24.2	24.9	27.3	25.4	26.0	26.8	26.3	26.6
7	20.8	19.5	20.0	26.6	24.7	25.4	27.6	25.8	26.3	27.2	26.3	26.6
8	22.5	20.0	21.1	27.1	25.2	25.7	27.2	25.9	26.3	27.4	26.3	26.6
9	23.1	21.1	21.7	27.3	25.5	26.1	26.8	26.0	26.3	27.4	26.3	26.7
10	23.0	21.6	22.2	26.9	25.6	26.1	27.5	26.0	26.6	27.6	26.4	26.9
11	23.3	22.2	22.7	27.0	25.4	25.8	27.2	25.7	26.2	26.9	26.2	26.6
12	24.0	22.6	23.1	25.6	25.0	25.4	25.9	25.1	25.7	26.3	25.7	26.1
13	24.4	22.9	23.6	25.4	24.6	25.0	25.1	24.4	24.7	26.1	25.3	25.6
14	25.2	23.3	24.2	26.9	25.0	25.6	25.9	24.2	24.8	25.5	24.8	25.1
15	25.5	23.7	24.7	26.1	25.4	25.8	25.6	24.6	25.0	24.9	24.4	24.7
16	26.1	24.3	25.1	27.0	25.7	26.2	25.6	24.6	25.1	24.5	23.7	24.1
17	26.0	24.6	25.3	27.1	25.9	26.5	26.1	24.9	25.4	23.8	23.1	23.5
18	25.8	25.0	25.4	27.2	26.2	26.6	26.2	25.2	25.6	23.3	22.6	23.0
19	25.3	24.9	25.1	27.0	26.2	26.5	26.5	25.3	25.8	22.8	22.2	22.6
20	25.9	24.9	25.3	26.8	25.8	26.2	26.8	25.2	25.8	22.8	22.0	22.4
21	26.1	25.1	25.6	26.1	25.2	25.8	26.1	25.3	25.7	22.9	22.0	22.4
22	26.4	25.3	25.8	25.7	25.2	25.5	26.9	25.5	26.0	22.5	21.8	22.1
23	26.4	25.4	25.9	25.5	24.9	25.2	27.4	25.8	26.4	21.9	21.2	21.7
24	26.7	25.5	25.8	[illegible]	[illegible]	[illegible]	27.4	26.2	26.6	21.4	21.0	21.2
25	26.8	25.4	25.9	[illegible]	[illegible]	[illegible]	27.7	26.2	26.6	21.5	20.8	21.1
26	26.6	25.1	25.6	[illegible]	[illegible]	[illegible]	27.8	26.2	26.7	21.1	20.4	20.7
27	26.4	25.0	25.5	---	---	---	27.4	26.3	26.8	20.9	20.3	20.6
28	27.1	24.9	25.6	26.8	25.3	25.8	27.3	26.4	26.8	20.9	20.4	20.6
29	25.6	24.7	25.2	25.7	25.0	25.5	27.6	26.5	26.9	20.9	20.4	20.5
30	24.7	24.3	24.5	25.1	24.6	24.9	27.8	26.6	27.0	20.9	20.1	20.5
31	---	---	---	25.1	24.4	24.7	27.6	26.7	27.2	---	---	---
MONTH	27.1	17.7	23.3	27.3	24.1	25.5	27.8	24.2	25.9	28.6	20.1	24.2
YEAR	24.6	.1	15.6									

PROVISIONAL DATA
SUBJECT TO REVISION

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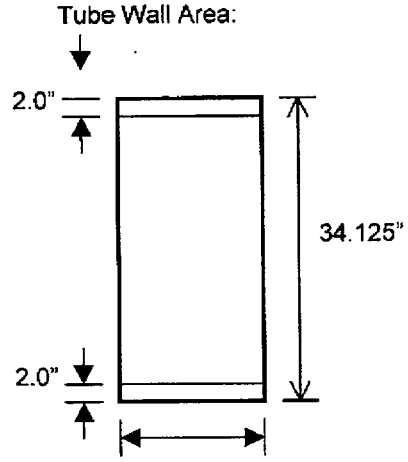
Attachment 4
FRVS Cooling Coil Benchmark

Each FRVS recirculation unit has a single coiling coil, as shown on PM786Q-0003, Sheet 1.

Coil Model Number: 20-120-8W5-8

Total Number of Tubes:	10 x 8 = 160
Length of Tubes:	120 in.
Tube O.D.:	5/8 in = .625 in.
Tube wall thickness:	0.035 in.
Tube I.D.:	0.625 – 2(.035) = .555 in.
Tube D_{ave}:	½ (.625 + .555) = .590 in.
Tube Wall Area:	$N\pi D_{ave}$(Length) = 160π(.590)(120) = 35588 in^2 = 247.1 ft^2



$$\text{Tube spacing} = \frac{34.125 - 2(2)}{20} = 1.5 \text{ in.}$$

Air side flow area = 120 x 20(1.5 - .625) =2100 in^2 = 14.58 ft^2

Fin thickness = 0.007 in.

Fin Material = Copper: k=225 Btu/hr-ft-°F

14" – 1.5 " = 12.5 in. [This width is approximate—it will be adjusted by benchmarking]

Air Side Surface Area:

Each fin sheet area = fin height x approximate fin width = (30.125x 12.5) = 376.6 in^2
Total hole area = 20 x 8 x (π/4) x 0.625^2 = 49.1 in^2

Total Heat Transfer Area of Fins = (120 in.)(8 fins/in.)(2 sides/fin)(376.6 – 49.1 in^2) = 628824 in^2 = 4366.8 ft^2
<u>NOTE</u>: For benchmarking, this value was increased 10% to 4803.5 ft^2 in the Gothic model

Exposed Area of Tubes = (120)[1-8(0.007)]in./tube(20 x 8)tubes x π(0.625 in.) = 35588 in^2 = 247.1 ft^2

Total Heat Transfer Area = 4366.8 + 247.1 = 4613.9 ft^2
<u>NOTE</u>: For benchmarking, this value was increased 10% to 5075.3 ft^2 in the Gothic model

Water Side Flow Area:

Double Serpentine: 2 x 20 x (π/4)(0.555 in)^2 = 9.67 in^2 = .0672 ft^2

Water Side Flow Rate = [380 gal/min][.1337 ft^3/gal][1 lbm/0.016114 ft^3][1 min/60 sec] = 52.54 lbm/sec

Water Side Surface Area = $\pi D_i LN$ = π(0.555 in)(120 in)(20 x 8) =33477 in^2 = 232.5 ft^2

Fin Length = ½(Tube Spacing – Tube O.D.) = ½ (1.5 – 0.625) = 0.4375 in.

Water Supply Temperature = 95°F

Fouling Factor = 0.0005

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Appendix F, Specification 10855-M-786(Q)

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PLANT: Hope Creek Generating Station	LOCATION: New Jersey	ELEVATION:	ITEM NO.: Part of Item 1
BUILDING: Reactor Building, Units 1 and 2	REQ. NO./P.O.: 10855-M-786(Q)		NO. REQ'D: 1/Unit
LOCATION: ☒ INDOORS ☐ OUTDOORS	RADIOACTIVE AREA: ☒ YES ☐ NO	COST CODE: 49.140	
OUTSIDE DESIGN TEMPERATURES: WINTER 5 °F, SUMMER 94 °FDB, 78 °FWB	INDOOR DESIGN TEMPERATURES: WINTER 60 °F, SUMMER 104 °FDB, 75 °FWB		

RATING

TOTAL COOLING CAPACITY: 1.1×10^6 BTU/HR.	AIR FLOW ACROSS COIL: 30,000 S CFM
SENSIBLE HEAT COOLING LOAD: 1,100 MBH	LATENT HEAT COOLING LOAD: 0 MBH
COOLANT: ☐ CHILLED WTR. ☒ SACS WTR. ~13.5% RH TEMP. IN 95 °F, TEMP. OUT 100.8	
ENTERING AIR TEMP. 140 °F DB 88 °F,WB	LEAVING AIR TEMP. 106.5 °F,DB 81.2 °F,WB ~34.5% R.H.
MAX. WATER PRESSURE DROP: 14.7 FT. OF WATER	AIR PRESSURE DROP: 0.69 IN. OF WATER
MAX. COIL FACE VELOCITY: 600 FPM	MAX. WATER FLOW RATE: 380 GPM
FOULING FACTOR: 0.0005	MAX. WATER VELOCITY: 6.0 FPS

CONSTRUCTION

TYPE OF COILS: ☒ WITH HEADER ☐ MULTIPLE PASS (BOOSTER) ☐ OTHERS

CONNECTION ARRANGEMENT (FACING IN THE DIRECTION OF FLOW) (Later) ☐ OPPOSITE ☐ LEFT HAND ☐ RIGHT HAND

CONNECTION TYPE: ☐ STEEL THREADED ☒ STEEL FLANGED ☐ COPPER THREADED ☐ OTHERS

TOTAL FACE AREA: 50 SQ. FT (MAX.)	TYPE OF FINS *: ☐ PLATE (CONFIGURATED) ☐ PLATE (FLAT) ☐ HELICAL
CIRCUITING *: ☐ FULL ☐ HALF ☐ OTHERS	
DIRECTION OF AIR FLOW: ☒ HORIZONTAL ☐ VERTICAL	MIN. NO. OF ROWS: 8 NO. OF ROWS: 8
CLEANABLE TUBES: ☐ YES ☒ NO	FIN SPACING: 8 FINS PER INCH

MATERIALS

TUBES:	ALUMINUM	☐ YES ☒ NO	COPPER	☒ YES ☐ NO	90/10 COPPER-NICKEL	☐ YES ☒ NO	
FINS:	ALUMINUM	☐ YES ☒ NO	COPPER	☒ YES ☐ NO	OTHER		
HEADERS:	STEEL	☐ YES ☒ NO	COPPER	☒ YES ☐ NO	90/10 COPPER-NICKEL	☐ YES ☒ NO	
INT. SUPPORTS:	GALV. STL.	☒ YES ☐ NO	OTHER				
CASING:	GALV. STL.	☒ YES ☐ NO	OTHER				

ACCESSORIES

STACKING FLANGES	☒ YES ☐ NO
FACTORY INSTALLED BAFFLES	☒ YES ☐ NO

INSTALLATION

FIELD	☒ YES ☐ NO
INTEGRAL PART OF HV/AC UNIT	☒ YES ☐ NO
SPEC. NO. M -786(Q)	ITEM NO. Part of Item 1
PURCHASE ORDER NO. 10855-M-786(Q)	

EXPECTED WATER ANALYSIS Demineralized Water

HARDNESS (ppm as $CaCO_3$)	0
pH (AVERAGE)	7.0
TOTAL DISSOLVED SOLIDS (ppm)	Effl Mixed Bed 0.04
Conductivity Micromho/cm CHLORIDE (ppm as Cl)	Effl Mixed Bed 0.01
SULFATE (ppm as SO_4)	0
CALCIUM (ppm as Ca)	0
IRON (ppm as Fe)	0

QUALITY CONTROL REQ'D PER Spec. G-002(Q) ☒ YES ☐ NO	MFG. STD. ☐ YES ☒ NO	"Q" LISTED ☒ YES ☐ NO			
EXAMINATION	ULTRASONIC No	EDDY CURR. Yes	MAG. PART No	LIQ. PEN. Yes PER PARA. 7.6.3.2 PART VI	RADIOGR. No
SEISMIC	☒ CATEGORY 1	☐ UBC		☐ NONE	* Data by Seller

NO.	DATE	REVISIONS	BY	CHK'D	ENG'R	PROJ ENG'R	APPR.
2△	12-26-78	Revised as Noted	OHR				
1△	3-13-78	Issued for Purchase	OHR				
△	3-13-77	Issued for Bids	OHR				

ORIGIN

BECHTEL

COOLING COIL

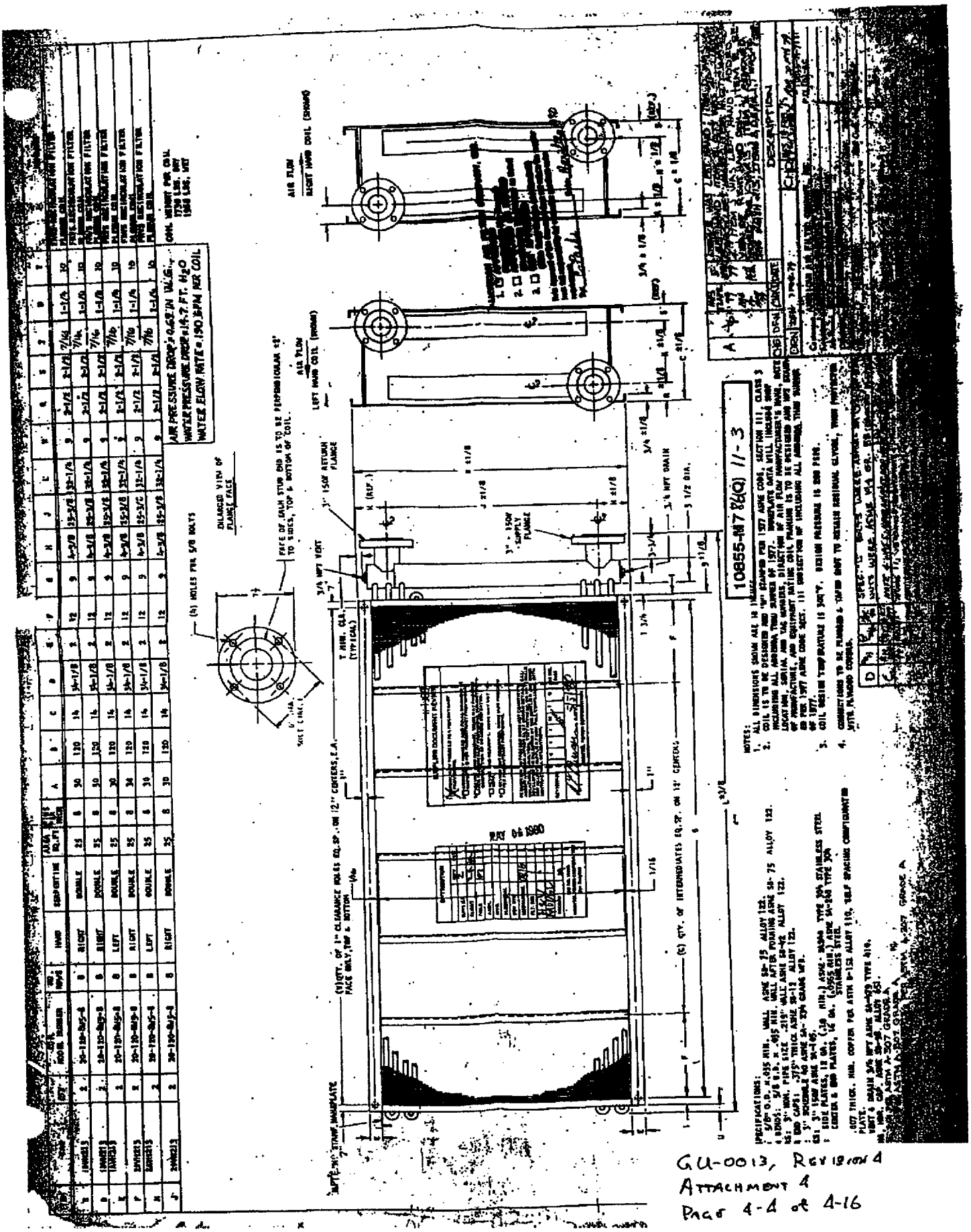
PUBLIC SERVICE ELECTRIC AND GAS COMPANY
HOPE CREEK GENERATING STATION
NOS. 1 & 2 UNITS

CHIEF ENG'R
JOB NO. 10855
DATA SHEET NUMBER | REV. 2

10336

FRVS RECIRC COOLER M-786

GQ-0013, Revision 4
Attachment 4
Page 4-3 of 4-16



GU-0013, Revision 4
Attachment 4
Page 4-4 of 4-16

PM 7853 - 1011

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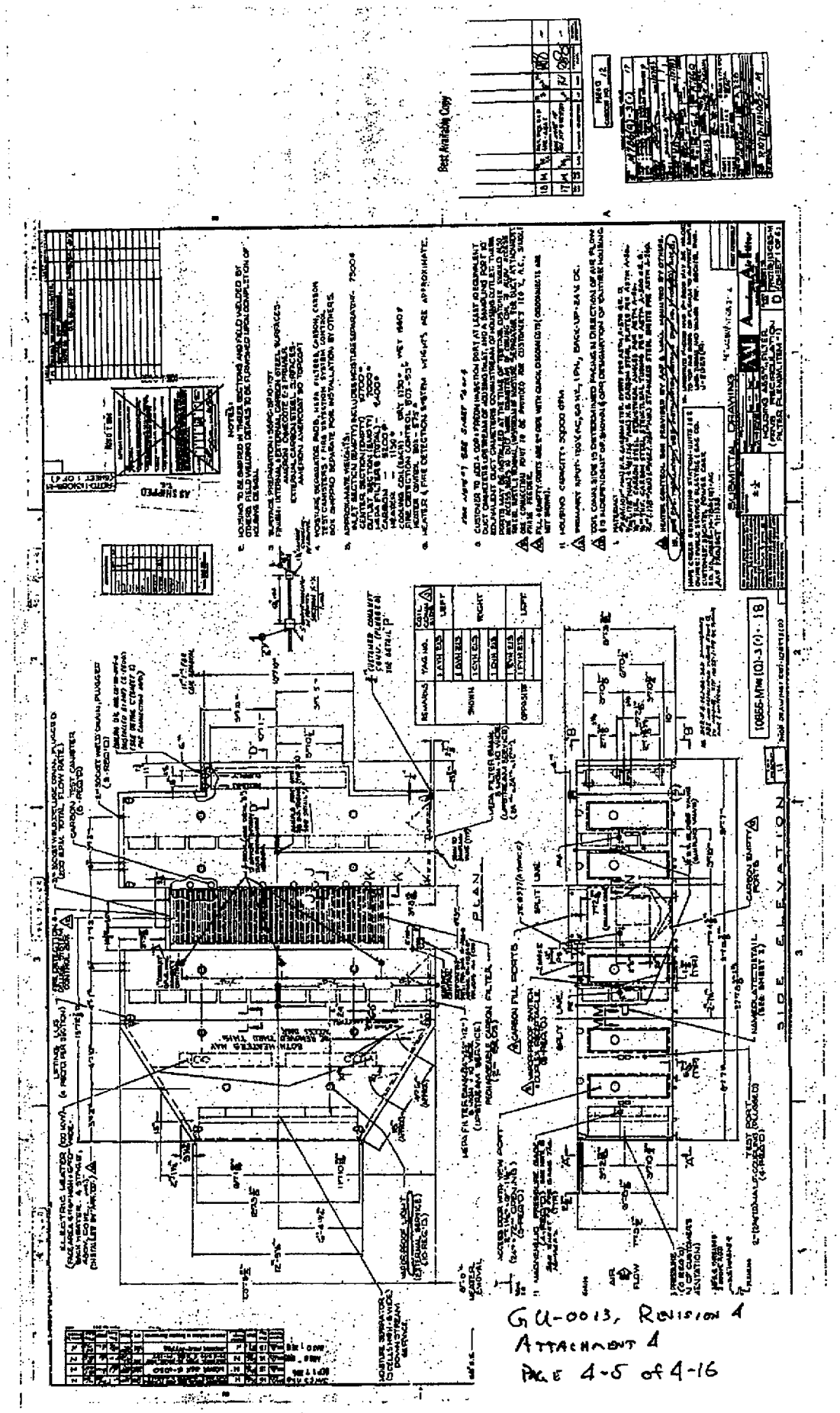
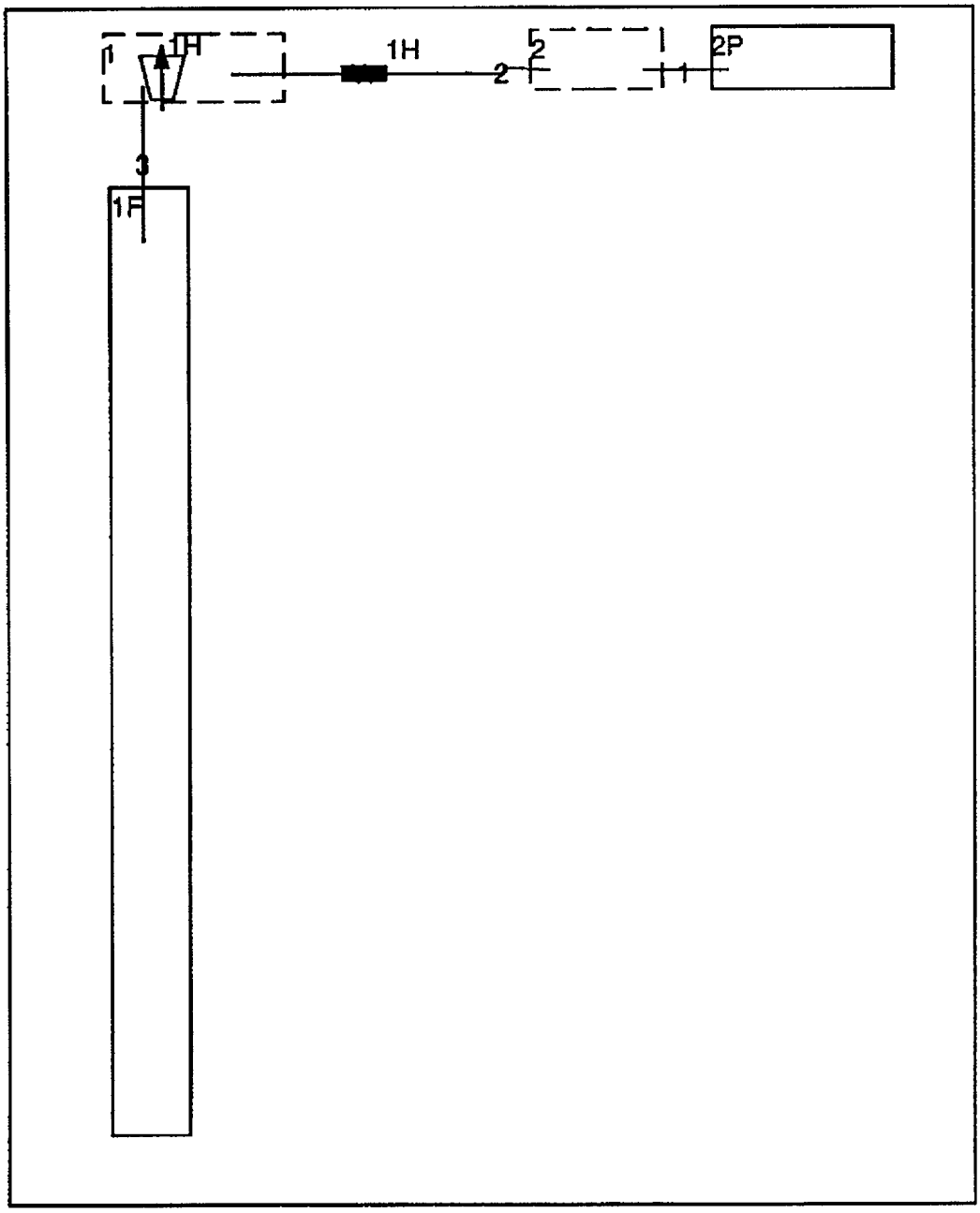


GU-0013, Revision 4
Attachment 4
Page 4-5 of 4-16

PM 786Q-0003

AVH213 COOLER BASE LINE 10/28/98
Oct/28/1998 15:57:55
GOTHIC Version 6.0a(QA) - April 1998



AVH213 COOLER BASE LINE 12/07/98
Dec/07/1998 10:40:10
GOTHIC Version 6.0a(QA) - April 1998

Control Volumes

Vol #	Description	Vol (ft3)	Elev (ft)	Ht (ft)	Hyd. D. (ft)	L/V IA (ft2)	Burn Opt
1	FAN CHAMBER	1000.	137.	16.	10.	DEFAULT	NONE
2	COOLER INLET	1000.	137.	16.	10.	DEFAULT	NONE

Fluid Boundary Conditions - Table 1

BC#	Description	Press. (psia)	FF	Temp. (F)	FF	Flow (lbm/s)	FF	ON Trip	OFF Trip
1F	SUPPLY HEADER	14.687		140		37.5			
2P	MAKE UP AIR	14.687		94					

Fluid Boundary Conditions - Table 2

BC#	Liq. V. Frac.	FF	Stm. P.R.	FF	Drop D. (in)	FF	Cpld BC#	Flow Frac.	FF	Heat (Btu/s)	FF	Outlet Quality	FF
1F	0.		H13.5		NONE							DEFAULT	
2P	0.		H50		NONE							DEFAULT	

Fluid Boundary Conditions - Table 3
Gas Pressure Ratios

BC#	Air Gas 1	FF	Gas 2	FF	Gas 3	FF	Gas 4	FF
1F	1.							
2P	1.							

AVH213 COOLER BASE LINE 12/07/98
Dec/07/1998 10:40:11
GOTHIC Version 6.0a(QA) - April 1998

Fluid Boundary Conditions - Table 4 Gas Pressure Ratios								
BC#	Gas 5	FF	Gas 6	FF	Gas 7	FF	Gas 8	FF
1F 2P								

Flow Paths - Table 1							
F.P. #	Description	Vol A	Elev (ft)	Ht (ft)	Vol B	Elev (ft)	Ht (ft)
1	MAKE UP AIR	2	145.	1.	2P	145.	1.
2	FAN OUTLET	2	145.	1.	1	145.	1.
3	FLOW TO SUPHEAD	1	145.	1.	1F	145.	1.

Flow Paths - Table 2							
Flow Path #	Flow Area (ft2)	Hyd. Diam. (ft)	Inertia Length (ft)	Friction Length (ft)	De-Entrmt Frac.	Mom Trn Opt	Strat Flow Opt
1	10.	1.	10.	10.		-	NONE
2	50.	5.	10.	10.		-	NONE
3	50.	5.	10.	10.		-	NONE

Flow Paths - Table 3					
Flow Path #	Fwd. Loss Coeff.	Rev. Loss Coeff.	Comp. Opt.	Critical Flow Model	Exit Loss Coeff.
1	1.	1.	OFF	OFF	0.
2	1.	1.	OFF	OFF	0.
3	1.	1.	OFF	OFF	0.

AVH213 COOLER BASE LINE 12/07/98
Dec/07/1998 10:40:11
GOTHIC Version 6.0a(QA) - April 1998

Materials	
Type #	Description
1	COPPER FINS
2	STAINLESS STEEL

Material Type 1 COPPER FINS			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	559.	225.	0.108

Material Type 2 STAINLESS STEEL			
Temp. (F)	Density (lbm/ft3)	Cond. (Btu/hr-ft-F)	Sp. Heat (Btu/lbm-F)
120.	490.	9.	0.1

Cooler/Heater										
Heater Cooler #	Description	Vol. #	On Trip #	Off Trip #	Flow Rate (CFM)	Flow Rate FF	Heat Rate (Btu/s)	Heat Rate FF	Phs Opt	Ctrlr Loc
1H	FRVS HEATER	1					0.	1	VTI	1

AVH213 COOLER BASE LINE 12/07/98
Dec/07/1998 10:40:11
GOTHIC Version 6.0a(QA) - April 1998

Heat Exchangers - Table 1					
Heat Ex. #	Description	HX Type #	Prim Flow Path	Scnd Flow Path	Cpld HX #
1H	COOLING COIL	1	2	SPEC	

Heat Exchangers - Table 2								
Heat Ex. #	Scndy Flow (lbm/s)	Scndy Flow FF	Scndy Temp (F)	Scndy Temp FF	Ext. Flow (lbm/s)	Ext. Flow FF	Ext. Heat (Btu/s)	Ext. Heat FF
1H	52.54		95.					

Heat Exchanger Types - Table 1					
HX Type #	Option	Passes or Zones	Tube Mat. #	Thick-ness (in)	Wall Area (ft2)
1	FAN COOLER	8	2	0.035	273.9

Heat Exchanger Types - Table 2								
HX Type #	Side	Fin Type	Flow Area (ft2)	Hyd. Diam. (in)	Tot. S. Area (ft2)	H.T. Coef Curv	H.T. Coef Type	Fouling Resistance (h-f2-F/B)
1	prim	SHEE	14.58	0.625	5075.3		BUIL	0.
	SECO	NONE	0.0672	0.555	232.5		BUIL	5e-004

AVH213 COOLER BASE LINE 12/07/98
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Heat Exchanger Types - Table 3
Fin Parameters

HX Type #	Side	Fin Mat. Type #	Pin Diam. (in)	Length (in)	Thick-ness (in)	Surf. Area (ft2)
1	PRIM	1	0.	0.4375	0.007	4803.5
	seco	0	0.	0.	0.	0.

Functions

FF#	Description	Ind. Var.	Dep. Var.	Points
0	Constant	-	-	0
1	RAMP	TIME (SEC)	NORMALIZED	3

Function
1
RAMP
Ind. Var.: TIME (SEC)
Dep. Var.: NORMALIZED HEAT RATE (BTU/S)

Ind. Var.	Dep. Var.	Ind. Var.	Dep. Var.
0.	0.	10.	1.
10000.	1.		

Volume Initial Conditions

Vol #	Pressure (psia)	Vapor Temp. (F)	Liquid Temp. F	Relative Humidity (%)	Liquid Volume Fraction	Ice Volume Fract.	Ice Surf.A. (ft2)
def	14.7	80.	80.	60.	0.	0.	0.

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Initial Gas Pressure Ratios								
Vol #	Air Gas 1	Gas 2	Gas 3	Gas 4	Gas 5	Gas 6	Gas 7	Gas 8
def	1.	0.	0.	0.	0.	0.	0.	0.

Run Control Parameters (Seconds)								
Time Int	DT Min	DT Max	DT Ratio	End Time	Print Int	Graph Int	Max CPU	Dump Int
1	0.001	0.5	1.	490.	20000.	25.	6000.	0.

Solution Options						
Time Dom	Solution Method	Imp Conv Limit	Imp Iter Limit	Pres Sol Method	Pres Conv Limit	Pres Iter Limit
1	SEMI-IMP	0.	1	DIRECT	0.	1

Run Options	
Parameter	Value
Restart Time (sec)	0
Restart Time Step #	0
Restart Time Control	NEW
Revaporization Fraction	DEFAULT
Heterogenous Nucleation	INCLUDE
Minimum HT Coeff.	0
Reference Pressure	IGNORE
Forced Ent. Drop Diam.	0.00833
Vapor Phase Head Correction	INCLUDE
Kinetic Energy	IGNORE
Vapor Phase	INCLUDE
Liquid Phase	INCLUDE
Drop Phase	INCLUDE
Force Equilibrium	IGNORE

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Run Options	
Parameter	Value
Drop-Liq. Conversion	INCLUDE
QA Logging	OFF

Ice Condenser Parameters			
Initial Temp. (F)	Bulk Density (lbm/ft3)	Surface Area Multiplier Function	Heat Transfer Option
15.	33.43		UCHIDA

Graphs							
Graph #	Title	Mon	Curve Number 1	2	3	4	5
1			TV2	TV1			
2			xq1H				
3			RH2	RH1			

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Noncondensing Gases						
Gas No.	Description	Symbol	Type	Mol. Weight	Lennard-Jones Diameter (Ang)	Parameters e/K (K)
1	Air	Air	POLY	28.97	3.617	97.

Noncondensing Gases - Cp/Visc. Equations						
Gas No.	Cp Tmin (R)	Equation Tmax (R)	(Required) Cp (Btu/lbm-R)	Visc. Tmin (R)	Equation Tmax (R)	(Optional) Viscosity (lbm/ft-hr)
1	360.	2280.	0.238534-6.2006			

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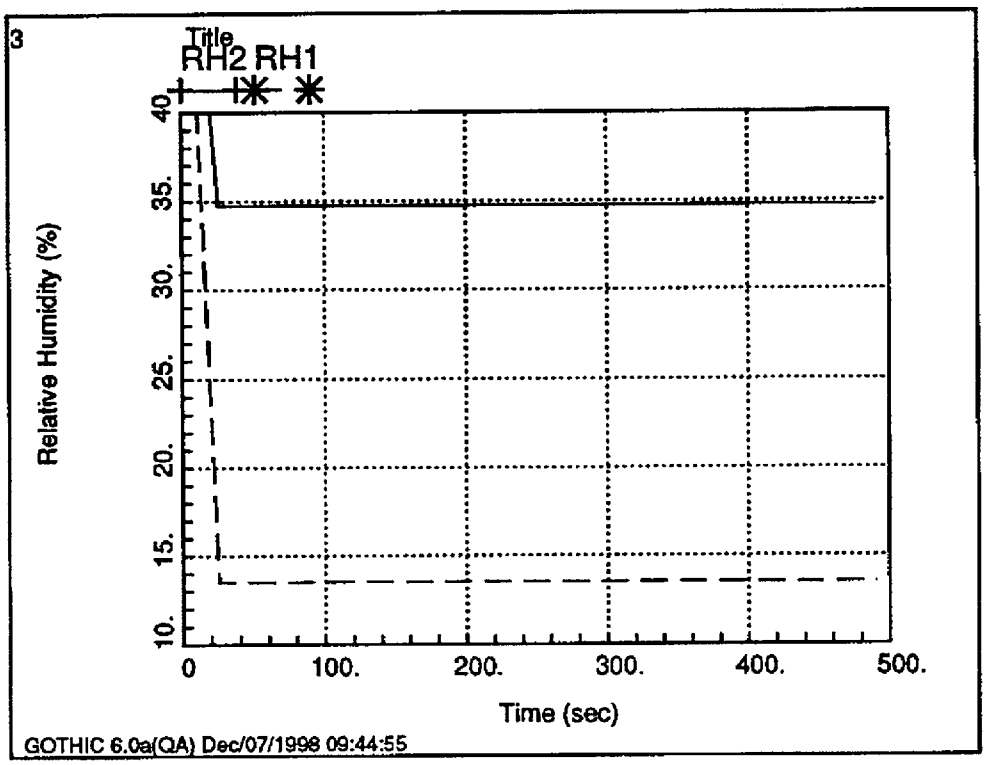
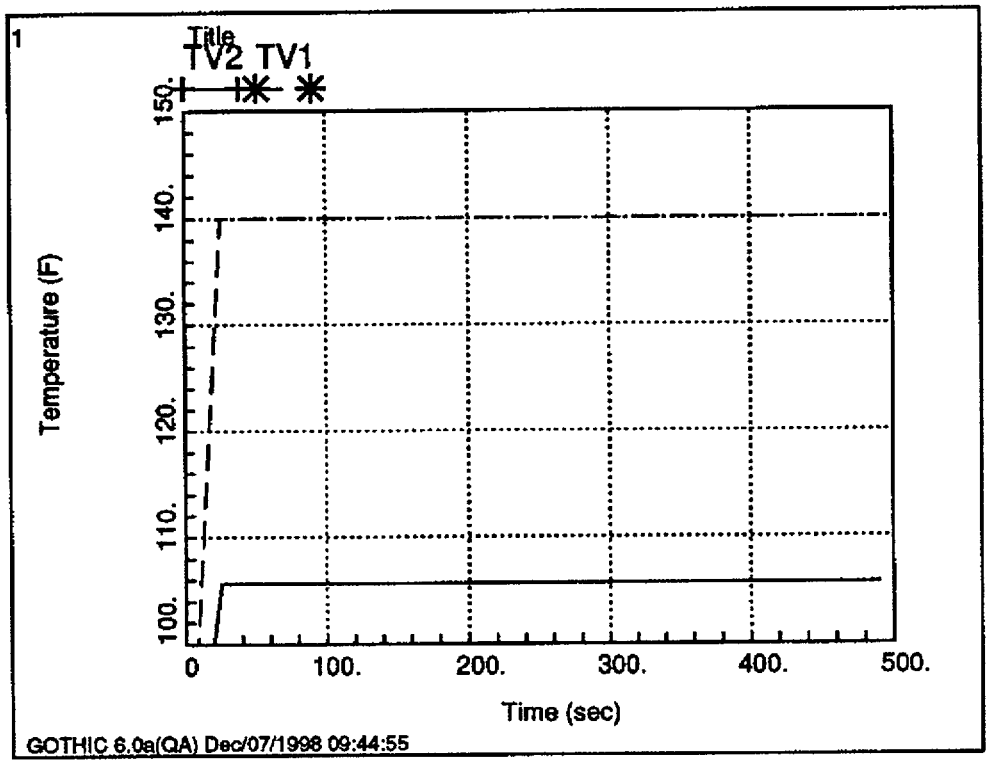


AVH213 COOLER BASE LINE 12/07/98
Dec/07/1998 10:42:14
GOTHIC Version 6.0a(QA) - April 1998



Attachment 5

Tables Excerpted From Design Calculation 11-0066, Revision 6

PCFLUD Comp #	Description	Room Numbers	Volume (cuft)	85% Volume (cuft)	Concrete Heat Transfer Surface Area *	Steel Heat Transfer Surface Area ***
1	Inlet Header	-	23137		-	
2	Exhaust Header	-	27471		-	
3	Pipechases	4319	5062		2045	
		4321	13851		4111	
		4327	3755		1998	
		4329	15241		4406	
		4402	8322		2251	
		4505	7391		2128	
		4509	3614		1673	
		Total	**57236**	**48651**	**18612**	**2461**
4	CS Pmps 4104/4105	4104	17145		4124	
		4105	17515		4180	
		Total	**34660**	**29461**	**8304**	**1490**
5	CS Pmps 4116/4118	4116	17297		4138	
		4118	15640		4008	
		Total	**32937**	**27996**	**8146**	**1416**
6	RHR Pump Rm 4107	**4107**	**27418**	**23305**	**6379**	**1179**
7	RHR Pump Rm 4114	**4114**	**27178**	**23101**	**6375**	**1169**
8	RHR Hx 4109/4208	4109	20198		4002	
		4208	23384		4054	
		Total	**43582**	**37045**	**8056**	**1874**
9	RHR Hx 4113/4214	4113	20547		4018	
		4214	23146		4020	
		Total	**43693**	**37139**	**8038**	**1879**
10	HPCI Area El 54	4111	36623		7502	
		4112	18933		5379	
		Total	**55556**	**47223**	**12881**	**2389**
11	RCIC Area El 54	4108	19217		5448	
		4110	19370		4895	
		Total	**38587**	**32799**	**10343**	**1659**
12	Torus & Stm Vent	4102	534333		34695	
		4409 - 102 ft	8701		2398	
		4409 - 132 ft	4855		1357	
		4409 - 145 ft	4835		1491	
		4409 - 162 ft	11375		3379	
		Total	**564099**	**479484**	**43320**	**24256**

TABLE 1 Reactor Building Volumes and Surface Areas

PCFLUD Comp #	Description	Room Numbers	Volume (cuft)	85% Volume (cuft)	Concrete Heat Transfer Surface Area *	Steel Heat Transfer Surface Area ***
13	MCC Area El 77	4201	29647		8824	
		4215	29766		6167	
		4216	15502		5398	
		4217	484		411	
		above 4217	718		n/a	
		4218	43982		8909	
		Total	120099	102084	29709	5164
14	CRD Pmp/MCC El 77	4202	33695		6688	
		4203	17026		5669	
		4205	31647		6897	
		Total	82368	70013	19254	3542
15	RACS Hx & Pmp El 77	4207	5048		2258	
		4209	49340		9549	
		4210	1378		771	
		above 4210	2044		296	
		4211	48863		9414	
		4213	7501		3011	
		4219	1406		786	
		above 4219	2086		302	
		Total	117666	100016	26387	5060
16	SACS Hx / Pmp El 102	4307	115373		15879	
		4309	159824		21341	
		Total	275197	233917	37220	11833
17	MCC Area El 102	4301	26642		8139	
		4303	77803		15575	
		4310	60900		14155	
		4323	88082		17487	
		Total	253427	215413	55356	10897
18	CRD Area El 102	4315	7160		2705	
		above 4315	3641		n/a	
		4317	39299		9473	
		4318	11097		3385	
		4320	34571		6936	
		4322	28480		7666	
		4326	31206		6944	
		4328	37797		7585	
		4330	8594		3177	
		4331	37130		7648	
		Total	238975	203129	55519	10276

TABLE 1 (Con't)
Reactor Building Volumes and Surface Areas

PCFLUD Comp #	Description	Room Numbers	Volume (cuft)	85% Volume (cuft)	Concrete Heat Transfer Surface Area *	Steel Heat Transfer Surface Area ***
19	RWCU Rooms El 132	4403	2599		1484	
		4405	3237		1717	
		4406	2217		1348	
		4407	4073		1935	
		Total	**12126**	**10307**	**6484**	**521**
20	FRVS/Cmp/Elec El 132	4410	72301		8790	
		4411	73824		9081	
		4412	3834		1588	
		4413	3381		1427	
		4408	40033		10428	
		4404	11789		4122	
		4401	24554		8175	
		Total	**229716**	**195259**	**43611**	**9878**
21	Open/FRVS Vent 145	4501	24248		8947	
		4504	31669		7624	
		4508	28173		8351	
		4513	4325		1962	
		4511	7140		2505	
		4512	8799		3010	
		Total	**104354**	**88701**	**32399**	**4487**
22	RWCU Area El 145	4502	3155		1493	
		4503	3037		1447	
		4506	11406		3421	
		Total	**17598**	**14958**	**6361**	**757**
23	FPool/Sm Rm El 162	4606	22975		5051	
		above 4606	11163		n/a	
		4607	13878		5945	
		4608	30260		9596	
		4613	6055		2330	
		4609	3424		1659	
		4625	2573		1330	
		above 4625	6024		n/a	
		4626	2422		1172	
		above 4626	5670		n/a	
		4627	1676		926	
		above 4627	3923		n/a	
		4628	1708		943	
		above 4628	3999		n/a	
		Total	**115750**	**98388**	**28952**	**4977**

TABLE 1 (Con't)
Reactor Building Volumes and Surface Areas

PCFLUD Comp #	Description	Room Numbers	Volume (cuft)	85% Volume (cuft)	Concrete Heat Transfer Surface Area *	Steel Heat Transfer Surface Area ***
24	MCC/Recom/FRVS El 162	4601	19021		6066	
		4602	26947		5453	
		4603	29671		7171	
		4604	48813		8616	
		4614	34187		7638	
		4615	33550		7433	
		4616	51553		9783	
		4617	48618		8855	
		Total	**292360**	**248506**	**61015**	**12571**
25	Reactor Building total volume		4,000,000	3400000		172000
	Reactor Building (Volume of Compartments 3-24)		2,784,582			
	General Areas Reactor Building	**Total**	**1,215,418**	**1033105**	**303,855 ****	**52263**

TABLE 1 (Con't)
Reactor Building Volumes and Surface Areas

* Wall, floor and ceiling/ roof data from Reference 5.12
** The surface area for the Reactor Building General Areas is based on 25% of the numerical value of the total volume. A review of the ratio of volumes to surface areas for the other compartments was performed. On average the ratio was 25%.
*** See Section 6.14

PCFLUD Comp #	Description	Heat Load (Btu/sec)	Heat Load (Btu/sec)
		t < 10 sec	t ≥ 10sec
1	Inlet Header	0	0
2	Exhaust Header	0	280.0 (26 ≤ t < 37 sec) 373.3 (t ≥ 37 sec)
3	Pipechases	18.27	18.15
4	CS Pump Rms 4104/4105	1.18	1.11 85.02 (t ≥ 19 sec)
5	CS Pump Rms 4116/4118	1.24	0.97 84.88 (t ≥ 19 sec)
6	RHR Pump Rm 4107	1.98	1.95 80.61 (t ≥ 13 sec)
7	RHR Pump Rm 4114	1.98	1.88 80.54 (t ≥ 13 sec)
8	RHR Hx Rm 4109/4208	1.05	0.80 81.94 (t ≥ 13 sec)
9	RHR Hx Rm 4113/4214	1.05	0.83 81.97 (t ≥ 13 sec)
10	HPCI Area El 54	7.55	28.54
11	RCIC El 54	5.41	17.05
12	Torus & Steam Vent (lighting and piping heat loads only)	10.25	81.41
13	MCC Area	11.08	7.30
14	CRD Pump/MCC	21.49	1.83
15	RACS Hx & Pump	22.02	2.23
16	SACS Hx & Pump	140.47	43.26 (10≤t<45 sec) 124.49 (t ≥ 45 sec)
17	MCC Area El 102	30.76	28.47
18	CRD Area El 102	26.85	17.98
19	RWCU Room El 132	15.89	7.84
20	FRVS/Comp/Elect El 132	58.81	23.64 (10 ≤ t< 26 sec) 31.21 (t ≥ 26 sec)
21	Open/FRVS vent	55.20	8.17 (10≤t<55 sec) 9.12 (t≥55 sec)
22	RWCU Area El 145	13.62	11.62
23	Fuel Pool Hx/Small Rooms El 162	38.38	25.76
24	MCC/Recomb/FRVS El 162	31.44	17.15 (10 ≤ t< 19 sec) 24.92 (19 ≤ t< 37 sec) 39.85 (t ≥ 37 sec)
25	General Areas	220.43	84.80
	Total	736.40	432.74 (10 ≤ t< 13 sec) 752.34 (13 ≤ t< 19 sec) 927.93 (19 ≤ t< 26 sec) 1215.50 (26 ≤ t< 37 sec) 1323.73 (37 ≤ t< 45 sec) 1404.96 (45 ≤ t< 55 sec) 1405.91 (t ≥ 55 sec)

TABLE 4
Reactor Building Heat Loads

6.10 Section 5 - Flow Path Data

The following Table is a summary of the data required for input in Section five of the PCFLUD program. The information which is required is listed in order in the heading of the Table. The forward flow coefficients were determined as described in Section 6.3 of this calculation.

From PCFLUD Comp #	To PCFLUD Comp #	Initial Flow Area (sqft)	Forward Flow Coefficient	Reverse Coefficient	Blowout panel Set Pressure (psid)	Flow Path Valve Number
1	3	1.050	1.00	1.0	0.00	0
1	4	0.180	1.00	1.0	0.00	0
1	5	0.180	1.00	1.0	0.00	0
1	6	0.110	1.00	1.0	0.00	0
1	7	0.100	1.00	1.0	0.00	0
1	8	0.090	1.00	1.0	0.00	0
1	9	0.085	1.00	1.0	0.00	0
1	10	0.700	1.00	1.0	0.00	0
1	11	0.500	1.00	1.0	0.00	0
1	12	1.410	1.00	1.0	0.00	0
1	13	2.700	1.00	1.0	0.00	0
1	14	1.850	1.00	1.0	0.00	0
1	15	1.400	1.00	1.0	0.00	0
1	16	0.700	1.00	1.0	0.00	0
1	17	3.050	1.00	1.0	0.00	0
1	18	3.700	1.00	1.0	0.00	0
1	19	0.550	1.00	1.0	0.00	0
1	20	2.650	1.00	1.0	0.00	0
1	21	5.500	1.00	1.0	0.00	0
1	22	0.600	1.00	1.0	0.00	0
1	23	2.300	1.00	1.0	0.00	0
1	24	1.900	1.00	1.0	0.00	0
1	25	10.050	1.00	1.0	0.00	0
3	2	3.250	1.00	1.0	0.00	0
4	2	0.321	1.00	1.0	0.00	0
5	2	0.321	1.00	1.0	0.00	0
6	2	0.161	1.00	1.0	0.00	0
7	2	0.161	1.00	1.0	0.00	0
8	2	0.161	1.00	1.0	0.00	0
9	2	0.161	1.00	1.0	0.00	0
10	2	0.560	1.00	1.0	0.00	0
11	2	0.481	1.00	1.0	0.00	0
12	2	1.804	1.00	1.0	0.00	0
13	2	1.100	1.00	1.0	0.00	0
14	2	1.600	1.00	1.0	0.00	0
15	2	1.600	1.00	1.0	0.00	0
16	2	0.600	1.00	1.0	0.00	0
17	2	2.900	1.00	1.0	0.00	0
18	2	2.700	1.00	1.0	0.00	0
19	2	0.550	1.00	1.0	0.00	0
20	2	1.600	1.00	1.0	0.00	0

TABLE 5

From PCFLUD Comp #	To PCFLUD Comp #	Initial Flow Area (sqft)	Forward Flow Coefficient	Reverse Coefficient	Blowout panel Set Pressure (psid)	Flow Path Valve Number
21	2	2.200	1.00	1.0	0.00	0
23	2	0.550	1.00	1.0	0.00	0
24	2	2.566	1.00	1.0	0.00	0
25	2	5.700	1.00	1.0	0.00	0
12	0	310.0	1.00	1.0	1.00	0
13	25	1.150	1.00	1.0	0.00	0
18	17	0.500	1.00	1.0	0.00	0
19	3	2.800	1.00	1.0	0.00	0
20	19	1.100	1.00	1.0	0.00	0
21	22	1.150	1.00	1.0	0.00	0
22	3	0.950	1.00	1.0	0.00	0
22	25	0.550	1.00	1.0	0.00	0
23	24	1.400	1.00	1.0	0.00	0
21	3	0.400	1.00	1.0	0.00	0
25	0	0.168 - 10% 0.832 - 50% 1.660 - 100%	0.00	1.0	0.00	0
25	16	0.450	1.00	0.3	0.00	0
25	17	0.750	1.00	1.0	0.00	0
25	18	1.800	1.00	1.0	0.00	0

TABLE 5 (Con't)
Compartment Flow Path Data

FORM NC.DE-AP.ZZ-0010-1
Page 2 of 4

CERTIFICATION FOR DESIGN VERIFICATION

Reference No. GU-0013

SUMMARY STATEMENT

In this calculation, the FRVS vent flow time history has been calculated using GOTHIC computer program. There was some uncertainty in the relationship between the controller output and the exhaust damper position. To circumvent this uncertainty, a sensitivity study was performed to see the effect of change in this relationship on the exhaust flow rate. The results showed that the vent flow time history some what insensitive to this relationship.

The undersigned hereby certifies (in the right column) that the design verification for the subject document has been completed, the questions from the generic checklist have been reviewed and addressed as appropriate, and all comments have been adequately incorporated.

Robert DeNight 5/4/99 Vijay Chandra 04 May 1999
Design Verifier Assigned By (signature of Manager/Supervisor)* | Signature of Design Verifier/Date

Design Verifier Assigned By (signature of Manager/Supervisor)* | Signature of Design Verifier/Date

Design Verifier Assigned By (signature of Manager/Supervisor)* | Signature of Design Verifier / Date

Design Verifier Assigned By (signature of Manager/Supervisor)* | Signature of Design Verifier / Date

*If the Manager/Supervisor acts as the Design Verifier, the signature of the next higher level of technical management is required.

Page 1 of 1

CERTIFICATION FOR DESIGN VERIFICATION

REFERENCE DOCUMENT NO. /REV. GU-0013

COMMENTS	RESOLUTION	
1. Include a statement about source of areas and loss factors. It is page 50 of calc. 11-0066. Include a statement about source of room volumes.	1. Included in para. 5.3.4	v.c.
2. Page 5, section 3.1: Ref. 4.6.1 does not appear to be right.	2. Corrected.	v.c.
3. Page 10, 11: Remove equations from section 5.2.1 and 5.2.2 because these equations imply that the reactor building is modeled as a single volume. Also remove section 5.2.3.	3. Done	v.c.
4. Include heat from two more C.S. pump motors as thermal conductors in vol. 4 and remove it from the heater.	4. Done	v.c.
5. FRVS motor volume = 9.42 ft^3. Surface area = 18.85 ft^2. Density = $\frac{1950}{9.42}=207\frac{lb_m}{ft^3}$. Heat rate = $\frac{7.56}{9.42}=0.803\frac{Btu}{ft^3 s}$	5. Corrected	v.c.
6. Page 18: 1782 should be 2782	6. Corrected	v.c.
7. Include a reference for geometrical data for concrete and heat sinks.	7. Done	v.c.
8. Include a reference for torus water temperature and an expression for H.T. from torus.	8. Done	v,c.
9. Section 3.5, page 6: Torus H.T. rate is also an exception and was not obtained from Ref. 4.1.6.	9. Corrected	v.c.

10. Please include a reference for setpoint of room coolers. Vijay Chandra 28 APR 1999 SUBMITTED BY DATE	10. Done MAM 5/3/99 RESOLVED BY DATE	V.C. Acceptance of Resolution

FORM NC.NA-AP.ZZ-0059-2
10 CFR 50.59 APPLICABILITY REVIEW

I.D. Numbers/Reference/Revision: Design Calculation GU-0013

Title: Filtration, Recirculation, And Ventilation System Exhaust Rate

Applicability:

____ Salem 1	____ Salem 3 (Gas Turbine)
____ Salem 2	X Hope Creek
____ Common to Salem 1 & 2	____ Common to Hope Creek & Salem

1.0 10 CFR 50.59 APPLICABILITY REVIEW
Identify the applicable SAR sections that were reviewed to make the determinations:

Sections 6.2, 6.3, 6.8 and 15.6
Technical Specifications Section 3/4.6.5
Safety Evaluation Report Supplement No. 2

a. Does the proposal change the facility as described in the SAR?

YES ____ NO X

Explain:

UFSAR Section 15.6.5.5.1.2 and 15.6.5.5.3 describe the design basis reactor building in-leakage and vent rate post-accident. The current UFSAR sections (Revision 0) state that the design basis for reactor building in-leakage is 10% per day, with 168 seconds required to draw the building down to –0.25 in.w.g. post-accident; however, the SER was amended in 1985 to change the design basis to 100% per day, with an associated drawdown time of 375 seconds. 3324 cfm is the steady-state portion of the vent rate expression corresponding to a reactor building in-leakage rate of 100% per day, as calculated in design calculation GU-0013, Revision 3. 3324 cfm is the value used as the acceptance criterion specified in Technical Specification 4.6.5.1.c.2. for 18-month surveillance testing. The UFSAR expression has been corrected in UFSAR Change Notice 99-037 to: $E(t) = 3324 + 5637 \exp(-1.18t)$, where t is the time after drawdown. This is the licensing basis vent rate.

The expression for the secondary containment vent rate derived in GU-0013, Revision 4, from the as-built heat loading, is conservative with respect to the licensing basis vent rate. No change is sought to this basis, or to any portion of the SAR.

FORM NC.NA-AP.ZZ-0059-2
10 CFR 50.59 APPLICABILITY REVIEW

I.D. Numbers/Reference/Revision: Design Calculation GU-0013

Title: Filtration, Recirculation, And Ventilation System Exhaust Rate

Therefore, the proposal does not change the facility as described in the SAR.

b. Does the proposal change procedures as described in the SAR?

YES _____ NO X

Explain:

The is no change to any part of the SAR necessitated by the proposal; therefore, the proposal does not change the procedures as described in the SAR.

c. Does the proposal involve a test or experiment not described in the SAR?

YES _____ NO X

Explain:

There is no test or experiment required as a result of this proposal, and no change is required to any portion of the SAR; therefore, the proposal does not involve a test or experiment not described in the SAR.

If ALL answers are "NO," 10 CFR 50.59 does NOT apply.

2.0 TECHNICAL SPECIFICATION REVISION DETERMINATION - Does the proposal require a Technical Specification change?

YES _____ NO X

Identify the pertinent Technical Specification sections that were reviewed to make the determination:

The TS sections reviewed include sections 3/4.6.

The vent rate expression derived in the proposal is conservative with respect to the Technical Specifications, and does not require a change to them.

FORM NC.NA-AP.ZZ-0059-2
10 CFR 50.59 APPLICABILITY REVIEW

I.D. Numbers/Reference/Revision: Design Calculation GU-0013

Title: Filtration, Recirculation, And Ventilation System Exhaust Rate

3.0 CONCLUSION

Does 10 CFR 50.59 apply?

YES ____ NO X

Is a Technical Specification change required?

YES ____ NO X

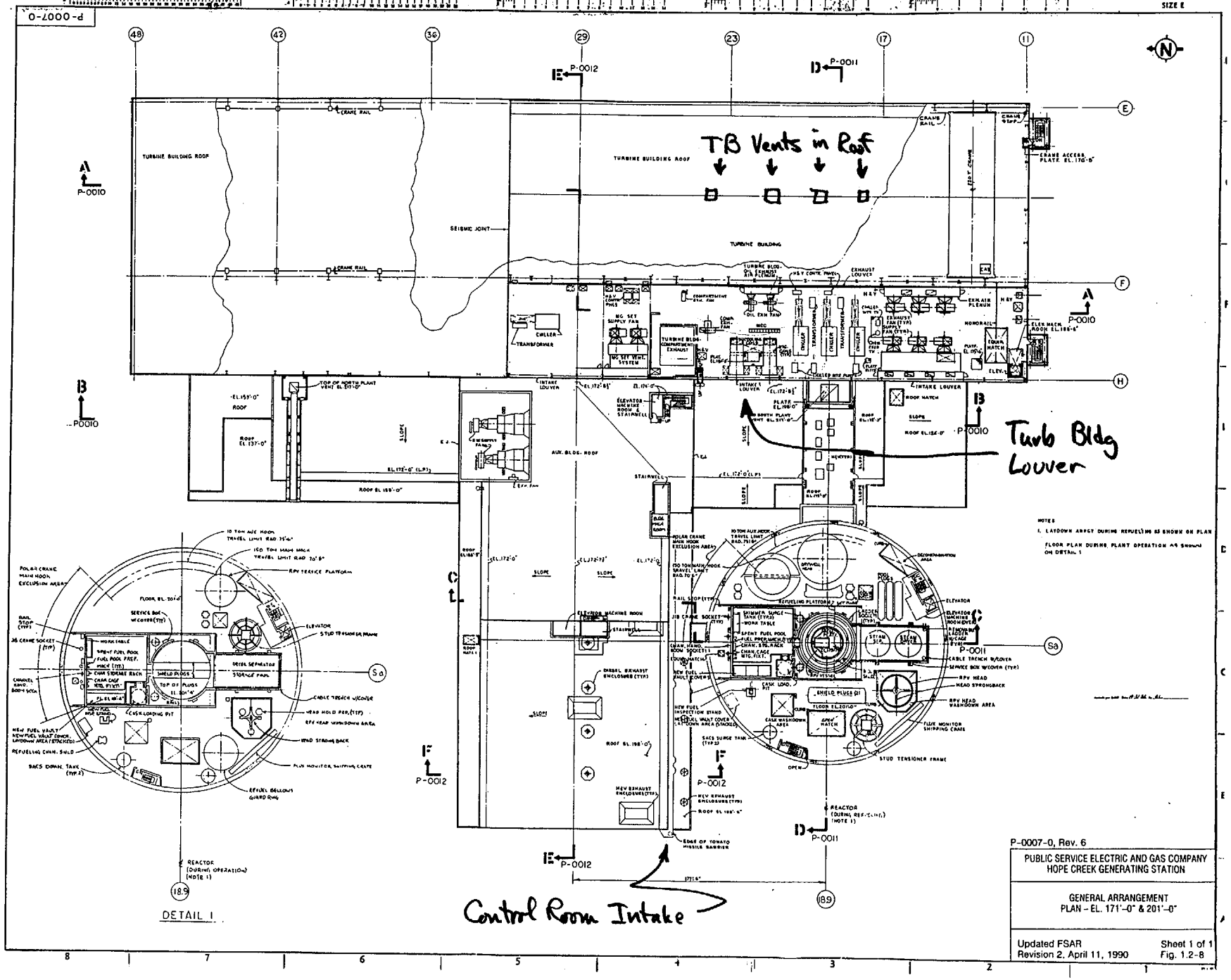
If a Technical Specification change is required to implement this proposed activity **STOP**. Contact Nuclear Licensing for assistance in preparation of a License Change Request.

4.0 COMPLETION AND APPROVAL

Preparer:	[signature]	Date	5/6/99
Peer Reviewer:	[signature]	Date	5/12/99
Approval:	[signature]	Date	5/12/99

Attachment 10

Figures



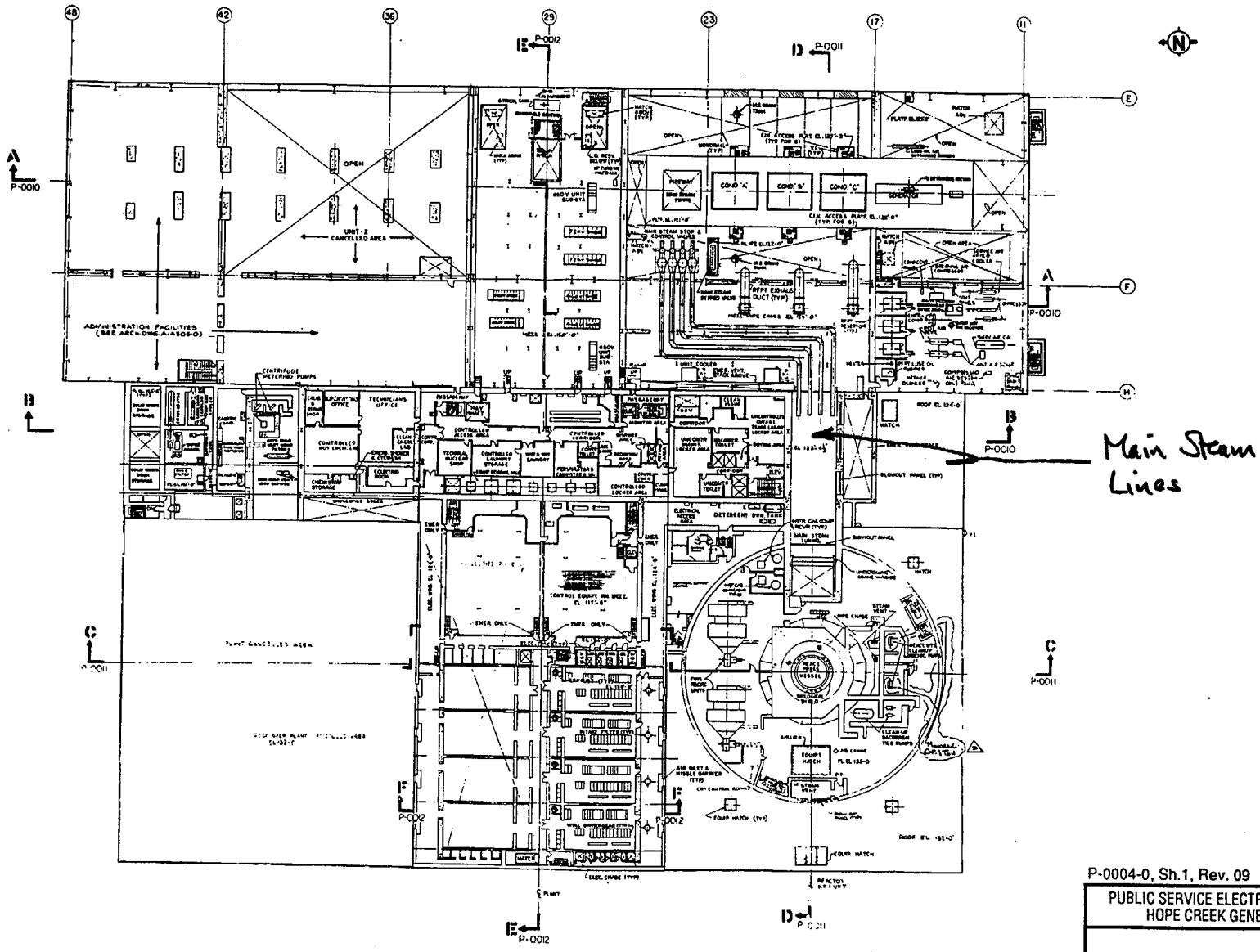
P-0007-0, Rev. 6

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
HOPE CREEK GENERATING STATION

GENERAL ARRANGEMENT
PLAN – EL. 171'-0" & 201'-0"

Updated FSAR
Revision 2, April 11, 1990

Sheet 1 of 1
Fig. 1.2-8



P-0004-0, Sh.1, Rev. 09

PUBLIC SERVICE ELECTRIC AND GAS COMPANY
HOPE CREEK GENERATING STATION

GENERAL ARRANGEMENT
PLAN - EL.120'-0" & 132'-0"

Updated FSAR
Revision 4, April 11, 1992

Sheet 1 of 1
Figure 1.2-5

THIS PAGE IS AN OVERSIZED DRAWING OR FIGURE,

THAT CAN BE VIEWED AT THE RECORD TITLED: DWG. NO. A-0221-0 SH-1 GENERAL PLANT ROOF PLAN WITHIN THIS PACKAGE...OR, BY SEARCHING USING THE DOCUMENT/REPORT DWG. NO. A-0221-0 SH-1

NOTE: Because of this page's large file size, it may be more convenient to copy the file to a local drive and use the Imaging (Wang) viewer, which can be accessed from the Programs/Accessories menu.

Attachment 11

Radiation Dose Profiles

Note on Radiation Energy Fields Calculated by STARpH Code for the Hope Creek Plant

Prepared by Polestar Applied Technology, Inc.
July, 2001

As part of alternate source term (AST) work, the post-accident pH must be determined. One of the inputs to pH determination is radiation level in containment. Table 1 provides the cumulative radiation energy vs. time which was calculated by the STARpH code [1] for the Hope Creek Plant (Mark I containment) and was used as an input to the evaluation of the rate of acid generation from radiolysis of water and cable. The units are Mrad deposited in the pool (column 2) and deposited in the containment gas space (gamma energy in column 3 and beta energy in column 4).

The source term for the radiation field in STARpH assumes a RG 1.183 release [2]. For the pool, the radiation field is based on fission product aerosol deposited in the pool. For the containment gas space, the radiation field is based on noble gases, fission product aerosol deposited on surfaces above the pool, and gamma shine from the pool.

The Table 1 30 day cumulative radiation energy deposition values have been compared to those from the NRC AST rebaselining study [3]. The NRC study was for a Mark III containment (larger volume), used a somewhat smaller aerosol source term, and did not consider the shine from the pool. When these effects are taken into account, the STARpH values compare reasonably well with reference [3].

Table 1 Cumulative Radiation Energy Deposition in Containment Pool and Free Volume

Time after Reactor Shutdown	Total Energy Deposition in Pool, MRad	Gamma Energy Deposition in Free Volume, MRad	Beta Energy Deposition in Free Volume, MRad
1 h	7.30E-1	6.75	5.04E1
2 h	1.00	1.28E1	9.57E1
5 h	1.56	2.80E1	2.03E2
12 h	2.48	5.39E1	3.82E2
1 d	3.70	8.63E1	6.07E2
3 d	7.15	1.71E2	1.22E3
10 d	1.35E1	2.70E2	2.10E3
20 d	1.76E1	2.97E2	2.41E3
30 d	2.03E1	3.07E2	2.53E3

References

1. PSAT C107.02, STARpH, A code for Evaluating Containment Water Pool pH During Accidents, Code Description and Validation and Verification Report, Revision 4, February 2000.

2. "Alternative Radiological Source Terms for Evaluating Design Basis Accidents at Nuclear Power Reactors," Regulatory Guide 1.183, July 2000.

3. M. Pilch et al, "Evaluation of Radiological Consequences of Design Basis Accidents at Operating Reactors using the Revised Source Term," Letter Report prepared by Sandia National Laboratories for NRC, September 28, 1998

Attachment 12

Dose Analysis

TABLE 1

DOSE ANALYSIS

Post-LOCA Activity Release Path	Post-LOCA TEDE Dose (Rem)		
	Receptor Location		
	Control Room	EAB	LPZ
Containment Leakage	4.29E-01	3.41E-01(3.2 hr)	1.10E-01
ESF Leakage	2.64E-01	3.51E-02 (0 hr)	1.19E-02
MSIV Leakage	3.40E+00	1.92E+00 (9.3 hr)	3.67E-01
Containment Purge	0.00E+00	0.00E+00	0.00E+00
Containment Shine	0.00E+00	0.00E+00	0.00E+00
External Cloud	0.00E+00	0.00E+00	0.00E+00
CR Filter Shine	2.46E-03*	0.00E+00	0.00E+00
Total	**4.10E+00**	**2.30E+00**	**4.89E-01**
Allowable TEDE Limit	**5.00E+00**	**2.50E+01**	**2.50E+01**

*CR filter shine dose due to the CR unfiltered inleakage of 1000 cfm with RADTRAD default nuclide inventory file (NIF) will bound that due to the CR unfiltered inleakage of 900 cfm with the plant-specific NIF.