APPENDIX A

Operational Data

Figure A-1
Production Data Well No. 1

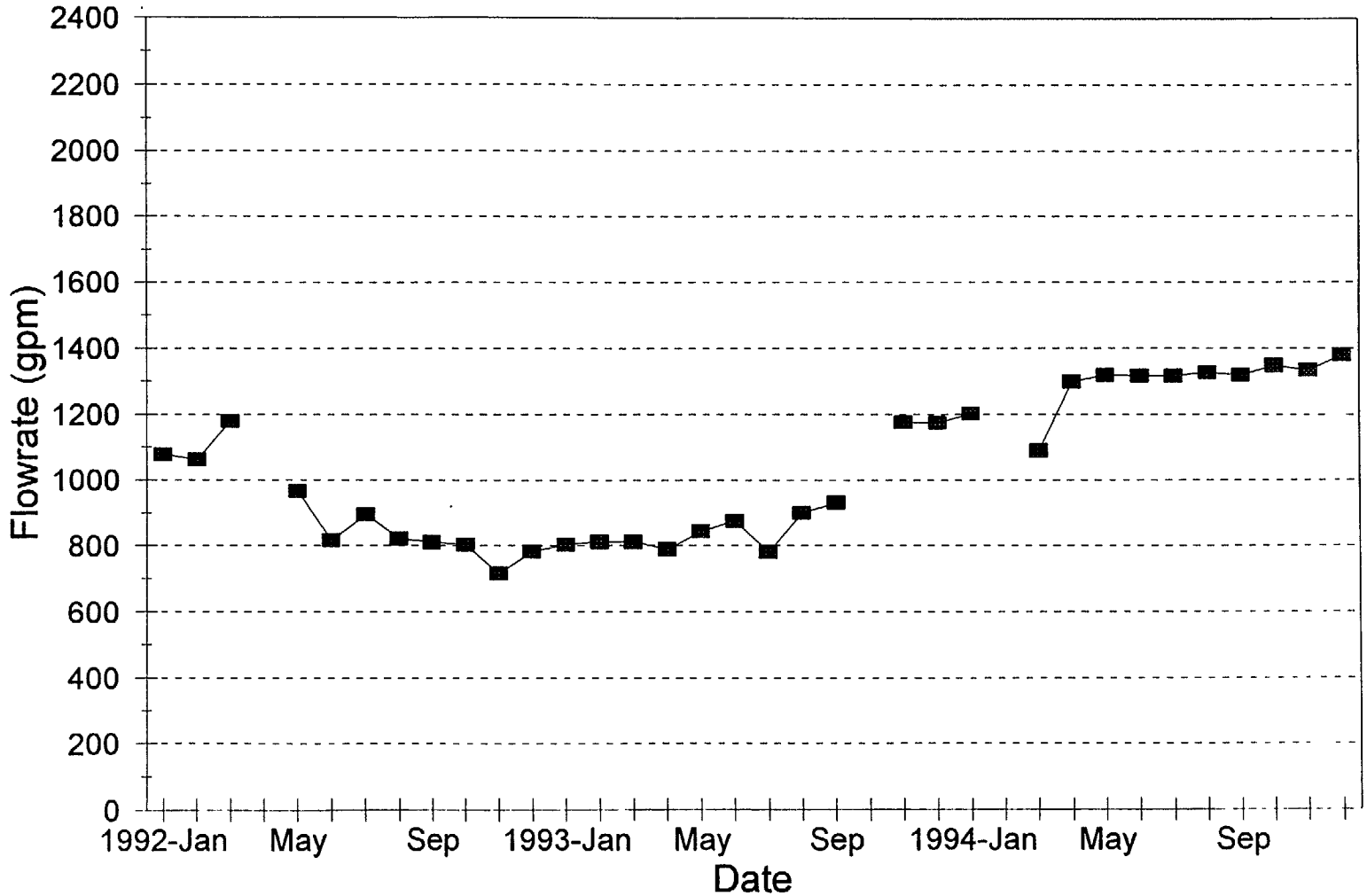


Figure A-2
Production Data Well No. 2

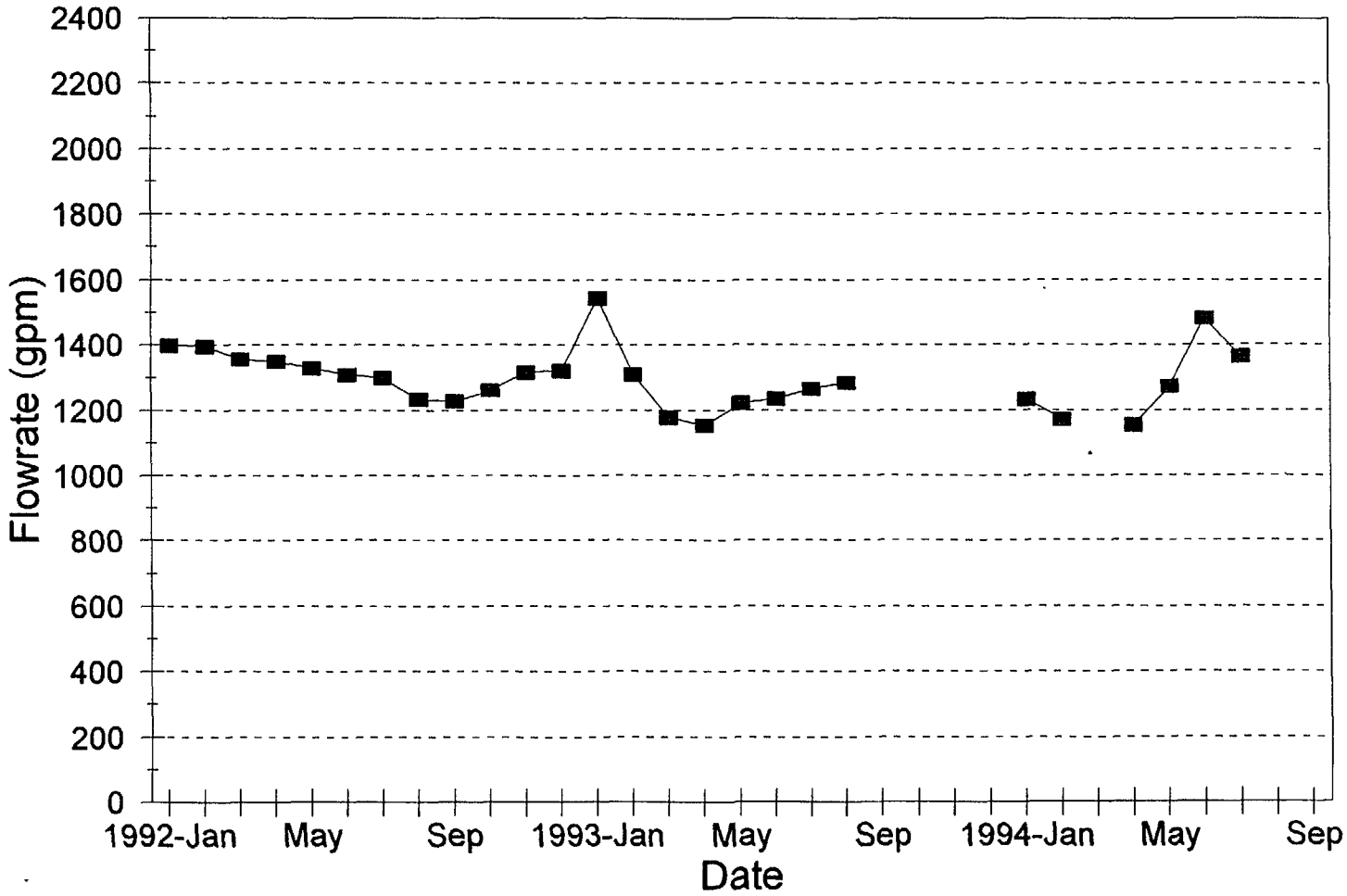


Figure A-3
Production Data Well No. 3

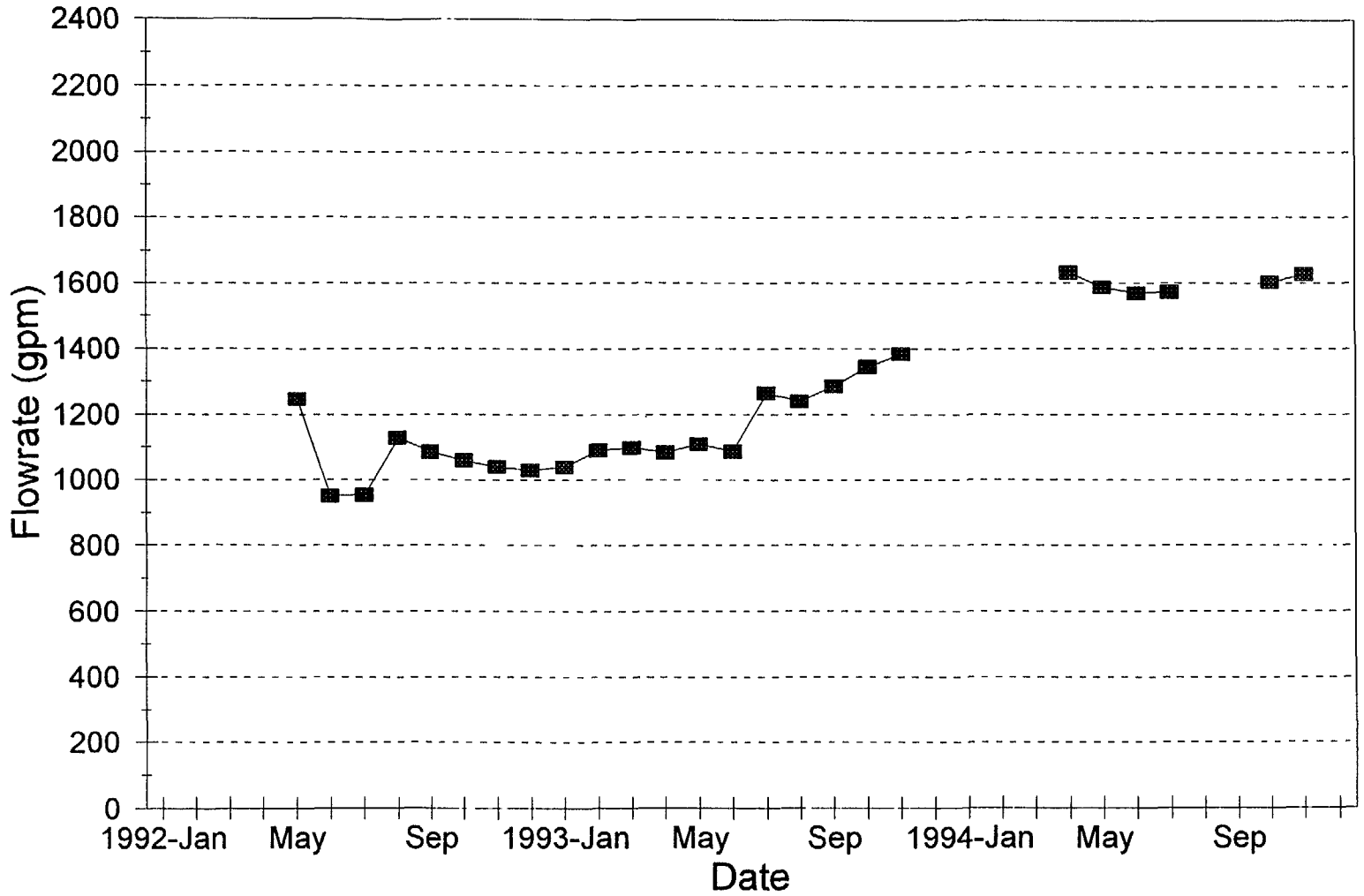
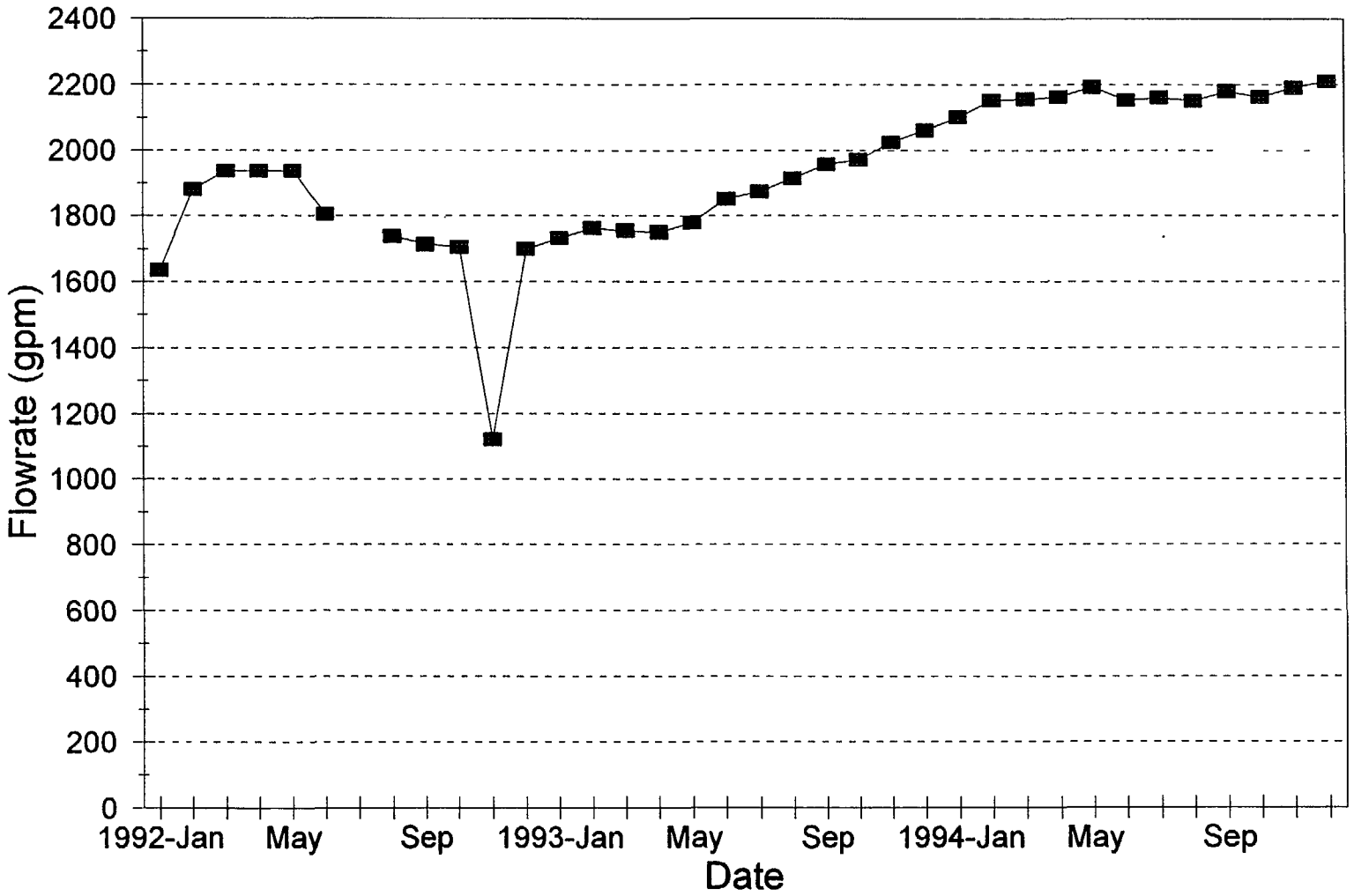


Figure A-4
Production Data Well No. 4



SEP 14 1994

ECEIVE

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPING TOWER LOG SHEET

MONTH:	FEB 1994		WELL CU.PT						CL2		
DAY	TIME	S.T.HRS.	2	3	S.T. GPM	S.T. CP.	AIR SCFM	RATIO A/W	RESID.	LBS/DAY	OPR
3.	9:50	11994	0	0	0	0	0	OFF	0	0	LM
10.	8:00	11994	0	0	0	0	0	OFF	0	0	LM
17.	10:30	11994	0	0	0	0	0	OFF	0	0	LM
24.	9:30	11994	0	0	0	0	0	OFF	0	0	SS

WEST STRIPING TOWER LOG SHEET

			1	4							
3.	9:50	9796	0	0	2400	1258900	17800	55:1	.55	17	LM
10.	8:00	9853	0	2014000	0	1009100	0	0:1	0	0	LM
17.	10:30	9963	0	0	2400	1098700	11200	30:1	.5	15	LM
24.	9:30	9929	0	2371900	0	288700	0	0:1	0	0	SS

TO: STATE HEALTH

CHEMICAL READS/TOWERS

MONTH: FEB 1994

	EAST							WEST						
		RESULTS				LBS REMOVED			RESULTS				LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
3.	OFF	0	0	0	0			9.42	ND	<.5	ND	ND	016	035
10.	OFF	0	0	0	0			7.55	ND	<.5	ND	ND	.013	031
17.	OFF	0	0	0	0			8.22	ND	<.5	ND	ND	014	034
24.	OFF	0	0	0	0			2.16	ND	<.5	ND	ND	004	009
								27.35					.047	109
						YTD TOTAL						YTD TOTAL	.339	1 05

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPING TOWER LOG SHEET

MONTH: MAR 1994

DAY	TIME	S.T.HRS.	WELL CU.FT 2	3	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	CL2 RESID.	LBS/DAY	OPR
1.	1:40	11994	0	0	0	0	0	OFF	0	0	DH
8.	11:40	11994	0	0	0	0	0	OFF	0	0	LM
15.	10:30	11994	0	0	0	0	0	OFF	0	0	LM
22.	10:20	11994	0	0	0	0	0	OFF	0	0	LM
29.	8:54	11994	0	0	0	0	0	OFF	0	0	MG

WEST STRIPING TOWER LOG SHEET

			1	4							
1.	1:40	10024	0	0	3700	1974500	14300	28:1	.5	25	DH
8.	11:40	10087	0	0	0	1202200	0	0	0	0	LM
15.	10:30	10178	393400	2731500	3600	2667200	15300	30:1	.6	27	LM
22.	10:20	10275	0	0	0	2109700	0	0	0	0	LM
29.	8:55	10311	1224200	3250200	2400	642500	19800	61:1	.55	20	MG

TO: STATE HEALTH

CHEMICAL READS/TOWERS

MONTH: MAR 1994

	EAST							WEST						
		RESULTS				LBS REMOVED			RESULTS				LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
1.	OFF							14.77	ND	<.5	ND	ND	.000	.062
8.	OFF							8.99	ND	<.5	ND	ND	.000	.037
15.	OFF							19.95	ND	<.5	ND	ND	.000	.083
22.	OFF							15.78	ND	<.5	ND	ND	.000	.066
29.	OFF							4.81					.000	.020
								64.30					.000	268
					YTD TOTAL							YTD TOTAL	.329	1.325

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPING TOWER LOG SHEET

MONTH:	APRIL 94		WELL CU.FT						CL2		
DAY	TIME	S.T.HRS.	2	3	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	RESID.	LBS/DAY	OPR
7.	8:00	11994	0	0	0	0	0	OFF	0	0	LP
14.	10;00	11994	0	0	0	0	0	OFF	0	0	SS
21.	9:30	12018	0	0	3100	526700	15000	36:1	.65	27	SS
28.	11:00	12026	257100	980900	1600	120900	16700	31:1	.6	17	SS

WEST STRIPING TOWER LOG SHEET

			1	4							
7.	8:00	10517	0	0	0	5012700	0	0:1	0	0	LP
14.	10:00	10565	1865900	4279600	3770	1188300	15000	29:1	.4	20	SS
21.	9:30	10715	0	0	3700	4201900	15100	30:1	.5	30	SS
28.	11:00	10732	1155000	2783300	0	453300	0	0	0	0	SS

TO: *STATE HEALTH* — *CHEMICAL READS/TOWERS*

MONTH: APRIL 94

	EAST							WEST						
		RESULTS				LBS REMOVED			RESULTS				LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
7.	OFF							37.49	ND	0.6	ND	ND	.000	.188
14.	OFF							8.88	ND	0.6	ND	ND	.000	.044
21.	3.94	ND	0.6	ND	ND	.000	.020	31.43	ND	0.6	ND	ND	.000	.157
28.	.90	ND	0.6	ND	ND	.000	.005	3.39	ND	0.6	ND	ND	.000	.017
	4.84					.000	.025	81.19					.000	.406
					YTD TOTAL	.000	.025					YTD TOTAL	.339	1.731

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPING TOWER LOG SHEET

MONTH: MAY 94

DAY	TIME	S.T.HRS.	WELL CU.FT 2	3	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	CL2 RESID.	LBS/DAY	OPR
3.	10:00	12074	0	0	0	575700	0	0:1	0	0	SS
10.	10:00	12075	0	0	0	18200	0	0:1	0	0	GS
17.	10:00	12116	7400	539900	0	484000	0	0:1	0	0	GS
24.	10:00	12146	0	0	0	354500	0	0:1	0	0	DH
31.	10:00	*NA	434000	1926800	3200	1508200	0	0:1	.4	0	LM

WEST STRIPING TOWER LOG SHEET

DAY	TIME	S.T.HRS.	WELL CU.FT 1	4	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	CL2 RESID.	LBS/DAY	OPR
3.	10:00	10732	0	0	0	0	0	0:1	0	0	SS
10.	10:00	10735	0	0	0	21900	0	0:1	0	0	GS
17.	10:00	*10826	584900	1565700	2200	2247600	0	0:1	0	0	GS
24.	10:00	10995	0	0	0	3692700	0	29:1	.5	0	DH
31.	10:00	*11165	2650600	6431200	3800	4941200	0	29:1	.6	0	LM

TO: STATE HEALTH

MONTH: MAY 94

CHEMICAL READS/TOWERS

	EAST							WEST						
		RESULTS				LBS REMOVED			RESULTS				LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
3.	4.31	ND	ND	ND	ND	.000	.000	0	ND	ND	ND	ND	.000	.000
10.	.14	ND	ND	ND	ND	.000	.000	.16	ND	ND	ND	ND	.000	.000
17.	3.62	ND	ND	ND	ND	.000	.000	16.81	ND	ND	ND	ND	.000	.000
24.	2.65	ND	ND	ND	<.5	.000	.000	27.62	ND	ND	ND	<.5	.000	.00
31.	11.28	ND	ND	ND	ND	.000	.000	36.96	ND	ND	ND	ND	.000	.000
	22.00					.000	.000	81.55					.000	.000
					YTD TOTAL	.000	.025					YTD TOTAL	.339	1.731

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPPING TOWER LOG SHEET

MONTH:	JUNE 94		WELL CU.FT						CL2		
DAY	TIME	S.T.HRS.	2	3	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	RESID.	LBS/DAY	OPR
7.	10:00	12383	0	0	OFF	2236100	OFF	OFF	OFF	OFF	FD
14.	10:00	12496	1313000	2988600	OFF	2034000	OFF	OFF	OFF	OFF	SS
21.	10:00	12649	0	0	1650	1808200	8700	39:1	.5	15	SS
28.	10:00	12819	1557700	4852100	2700	3597800	14300	40:1	.6	30	FD

WEST STRIPPING TOWER LOG SHEET

			1	4							
7.	10:00	11343	0	0	3850	4339800	14900	27:1	.5	36	FD
14.	10:00	11500	3470300	5803200	3900	4586700	15000	28:1	.5	22	SS
21.	10:00	11666	0	0	3800	4686700	15700	31:1	.6	30	SS
28.	10:00	11836	3943900	6608800	3800	4882600	15700	31:1	.5	32	FD

TO: STATE HEALTH

MONTH: JUNE 94

CHEMICAL READS/TOWERS

	EAST							WEST						
		RESULTS				LBS REMOVED				RESULTS			LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
7.	16.73	1.2	8.7	ND	ND	.167	1.214	32.46	<.5	3.5	ND	ND	.108	.948
14.	15.21	1.2	8.7	ND	ND	.152	1.104	34.31	<.5	3.5	ND	ND	.114	1.002
21.	13.52	1.2	8.7	ND	ND	.135	.981	35.06	<.5	3.5	ND	ND	.117	1.023
28.	26.91	1.2	8.7	ND	ND	.269	1.953	36.52	<.5	3.5	ND	ND	.122	1.066
	72.37					.723	5.252	138.35					.461	4.039
					YTD TOTAL	.723	5.277					YTD TOTAL	.800	5.770

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

PPB X 1000 = PPM

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPPING TOWER LOG SHEET

MONTH:	JULY 94		WELL CU.PT						CL2		
DAY	TIME	S.T.HRS.	2	3	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	RESID.	LBS/DAY	OPR
5.	10:00	12892	0	0	OFF	1188600	OFF	OFF	OFF	OFF	SS
12.	10:00	13043	1525700	2374900	3200	3430500	14100	33:1	.55	NA	FD
19.	10:00	13137	0	0	2800	1699100	14200	37:1	.5	NA	LM
26.	10:00	13186	517100	3087400	1600	676900	18100	85:1	.45	13	DH

WEST STRIPPING TOWER LOG SHEET

			1	4							
5.	10:00	11962	0	0	OFF	3231100	OFF	OFF	OFF	OFF	SS
12.	10:00	12112	2231400	4709100	3800	4300100	17400	34:1	.5	NA	FD
19.	10:00	12277	0	0	3900	4244700	16800	32:1	.6	NA	LM
26.	10:00	12442	4055600	7062400	3700	4792700	16400	33:1	.5	31	DH

TO: STATE HEALTH

MONTH: JULY 94

CHEMICAL READS/TOWERS

	EAST							WEST						
		RESULTS				LBS REMOVED			RESULTS				LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
5.	8.89	1.2	8.9	ND	ND	.089	.660	24.17	<.5	4.3	ND	0.5	.099	.86
12.	25.66	1.2	8.9	ND	ND	.257	1.905	32.16	<.5	4.3	ND	ND	.131	1.153
19.	12.71	1.2	8.9	ND	ND	.127	.943	31.75	<.5	4.3	ND	ND	.130	1.139
26.	5.06	1.2	8.9	ND	ND	.051	.376	35.85	<.5	4.3	ND	ND	.147	1.28
	52.32					.524	3.884	123.93					.507	4.445
						YTD TOTAL	1.247	9.161					YTD TOTAL	1.307 10.215

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

PPB X 1000 = PPM

NEWMARK 8.6 M.G.

WELL HEAD TREATMENT PLANT

EAST STRIPPING TOWER LOG SHEET

MONTH: AUG 1994

DAY	TIME	S.T.HRS.	WELL CU.FT 2	3	S.T. GPM	S.T. CF.	AIR SCFM	RATIO A/W	CL2 RESID.	LBS/DAY	OPR
2.	10:00	13350	0	0	2700	2000100	14800	41:1	.45	13	DH
9.	10:00	13518	0	0	1625	2434200	14800	68:1	.45	13	SS
16.	10:00	13626	812800	3535500	1600	1700000	15500	72:1	.4	14	BL
23.	10:00	13747	0	0	OFF	1809300	OFF	OFF	OFF	28	LM
30.	10:00	13867	544700	3895400	1600	1546000	14800	74:1	.6	35	LM

WEST STRIPPING TOWER LOG SHEET

			1	4							
2.	10:00	12612	0	0	3800	4862800	16600	33:1	.45	21	DH
9.	10:00	12765	0	0	3800	4772300	17400	34:1	.5	31	SS
16.	10:00	12947	3536900	5764800	3850	4865300	17300	34:1	.35	31	BL
23.	10:00	13116	0	0	3800	4864400	17100	34:1	.6	28	LM
30.	10:00	13285	4247100	6863000	3800	4650800	17100	32:1	.6	35	LM

TO: STATE HEALTH

CHEMICAL READS/TOWERS

MONTH: AUG 94

	EAST							WEST						
		RESULTS				LBS REMOVED			RESULTS				LBS REMOVED	
	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE	M.G.	TCE IN	PCE IN	TCE OUT	PCE OUT	TCE	PCE
2.	14.96	1.2	8.9	ND	ND	.150	1.110	36.37	<.5	4.3	ND	0.5	.151	1.304
9.	18.21	1.2	8.9	ND	ND	.182	1.352	35.70	<.5	4.3	ND	ND	.149	1.280
16.	12.72	1.2	8.9	ND	ND	.127	.944	36.39	<.5	4.3	ND	ND	.151	1.305
23.	13.53	1.2	8.9	ND	ND	.135	1.004	36.38	<.5	4.3	ND	ND	.151	1.305
30.	11.56	1.2	8.9	ND	ND	.116	.858	34.79	<.5	4.3	ND	ND	.145	1.248
	70.98					.710	5.268	179.63					.747	6.442
					YTD TOTAL	1.957	14.428					YTD TOTAL	2.054	16.657

NOTE:<.5PPB IS TAKEN AS (0.0 MG/L) *SAMPLING RESULTS USED TO CALCULATE DATE FOR ONE WEEK

N.D. = <0.5 PPB **TCE/PCE TEST WAS NOT TAKEN USED RESULTS FROM PREVIOUS WEEK

PPB X 1000 = PPM

APPENDIX B

Summary of Groundwater Analyses Results

Table B-1
Groundwater Concentrations at Various City Water Plant Inlets
San Bernardino, California

Waterman Facility

Date	PCE	TCE	Freon 12	Freon 11
	Concentrations (ug/L)			
01/01/93	16.4	2.7	NA	NA
02/01/93	14.4	2.9	NA	NA
03/04/93	23.1	5.3	17.4	0
04/01/93	22.6	3.9	NA	NA
05/06/93	22.1	4.2	NA	NA
06/03/93	24.8	5.4	0	0
07/01/93	11.3	2	NA	NA
08/05/93	7.5	1.6	NA	NA
09/02/93	15.8	3	1.4	1.5
10/07/93	22.4	4.2	NA	NA
11/04/93	19.6	3.9	NA	NA
12/02/93	18.5	2.8	11.3	2.7
01/01/94	16.5	3.1	NA	NA
02/01/94	13.6	3.4	NA	NA
03/01/94	9.5	1.2	5.3	1.8
04/12/94	7.5	0.8	NA	NA
05/03/94	14.8	3	NA	NA
05/31/94	14.8	2.8	0	3.1
07/12/94	11.2	2.9	NA	NA
08/03/94	16.8	4.4	NA	NA
09/06/94	11.9	2.1	7.7	2
10/04/94	13.9	2.4	NA	NA

17th Street Facility

Date	PCE	TCE	Freon 12	Freon 11
	Concentrations (ug/L)			
01/01/93	3.2	1.6	NA	NA
02/01/93	3	1.4	NA	NA
03/04/93	3	1.8	3.3	0
04/19/93	2.7	1.3	NA	NA
05/06/93	2.9	1.3	NA	NA
06/03/93	3.6	2.1	0	0
07/01/93	2.1	0.9	NA	NA

Table B-1
Groundwater Concentrations at Various City Water Plant Inlets
San Bernardino, California

continued

08/05/93	1.2	0.6	NA	NA
09/02/93	3.5	1.4	3.2	1.2
09/16/93	1.9	0.9	0	0
10/07/93	3.9	1.6	NA	NA
11/04/93	2.1	0.8	NA	NA
12/02/93	4.8	1.5	2.9	1.1
02/01/94	1.2	0.5	NA	NA
03/01/94	0	0	0	0
04/12/94	0	0	NA	NA
05/03/94	2.8	1.1	NA	NA
05/31/94	2.5	1	0	0.6
07/12/94	5.7	1.9	NA	NA
08/03/94	5.5	1.7	NA	NA
09/01/94	2.5	1	NA	NA
09/06/94	2.9	0.9	1.5	0.7
10/04/94	2.7	1.5	NA	NA

19th Street Facility

Date	PCE	TCE	Freon 12	Freon 11
	Concentrations (ug/L)			
02/09/93	2.9	0	0	0
08/19/93	4.6	0	0	0
09/02/93	2.9	0	0	0
10/07/93	5	0	0	0
11/04/93	1.8	0	0	0
12/02/93	2.9	0	0.8	0
01/06/94	7	0	NA	NA
02/02/94	2.5	0	NA	NA
03/01/94	7.4	0.6	7.5	0.5
04/12/94	7.2	0.6	NA	NA
05/03/94	5.2	2	NA	NA
06/01/94	6.6	0.7	NA	NA
07/12/94	5	0	NA	NA
08/03/94	5	0	NA	NA
09/06/94	2.9	0.9	NA	NA
10/04/94	9.5	0.9	NA	NA

\NEWMARK\PLANTSIN.WK1/gp

Table B-2
Loading Rates for LPGAC System
Newmark RD North
San Bernardino, California

Constituent	MW	McLaren Hart Data 1)		URS GW Monitoring Data 4)			Air Stripper Inlet Data 7)	Newmark FS Data 8)	Average Concentration	MCL Fed/CA
		Stripper Air Data 2) (ppb)	PURUS Test Data 3) (ppb)	Max. Results 4) (ppb)	Avg. A-layer 5) (ppb)	Avg. B-layer 6) (ppb)	(ppb)	(ppb)	(ppb)	(ppb)
PCE	165.8	3.6	100	35	2.9	14.8	19.5	75	36	5/5
TCE	131.4	0.7	50	7	0.6	2.4	4.2	10	11	5/5
cis-1,2-DCE	97	0.0	10	3	0.4	1.1			3	70/6
Chloroform	119.4	0.7	5	0.2	0.0	0.1			1	100/100
Chloroethane	64.5	1.5	5	0.4	0.0	0.0			1	NE/NE
Methylene Chloride	84.9	4.1	10	0.2	0.1	0.1			3	5/NE
Toluene	92.1	2.4	5	2	0.2	0.3			2	1000/NE
Freon 11	137.4	1.2	50	7	0.5	2.8			12	NE/150
Freon 12	120.9	11.7	50	51	0.9	22.6			27	NE/NE
TOTALS		26	285	106	6	44	24	85	96	
lbs VOC/day:			16.69							

Assumptions:

4875 gpm total groundwater flow

1) McLaren Hart Emission Control Pilot Study at PURUS, March 1994
2) Analytical data (average of both Wellfield towers) from air stripper off-gas samples analyzed by Truesdail Laboratories in March 1993.
   Assumed air flow rate = 28350 cfm 41 :1 Air : Water Ratio
   Assumed GW flow rate = 5135 gpm
3) Used during pilot study at PURUS
4) Data from URS' groundwater monitoring in 04/05-1993 of monitoring wells in the Newmark study area.
5) Data from A-layer of wells in the vicinity of the Newmark study area (MW-2 through 8).
6) Data from B-layer of wells in the vicinity of the Newmark study area (MW-2 through 8).
7) Quarterly Wellfield air stripper groundwater influent test data collected by City of San Bernardino during 1993 and 1994, highest values.
8) Data used in Newmark FS was based on monitoring well data from municipal wells in the Newmark study area during the priod of 1988 to present.

NE = no MCL yet established

Table B-3
PCE and TCE Concentrations at Air Stripper Inlet
Newmark North RD
San Bernardino, California

Date	PCE	TCE
	Concentrations (ug/L)	
03/04/93	7.6	1.4
03/19/93	19.5	4.2
06/03/93	7.6	1.4
09/02/93	10.2	1.7
12/02/93	0	0
03/01/94	0	0
05/31/94	8.7	1.2
09/06/94	15.8	2.1

\NMK\STRIPIN1 WB1/gp

Figure B-1
Waterman Plant Influent Concentrations

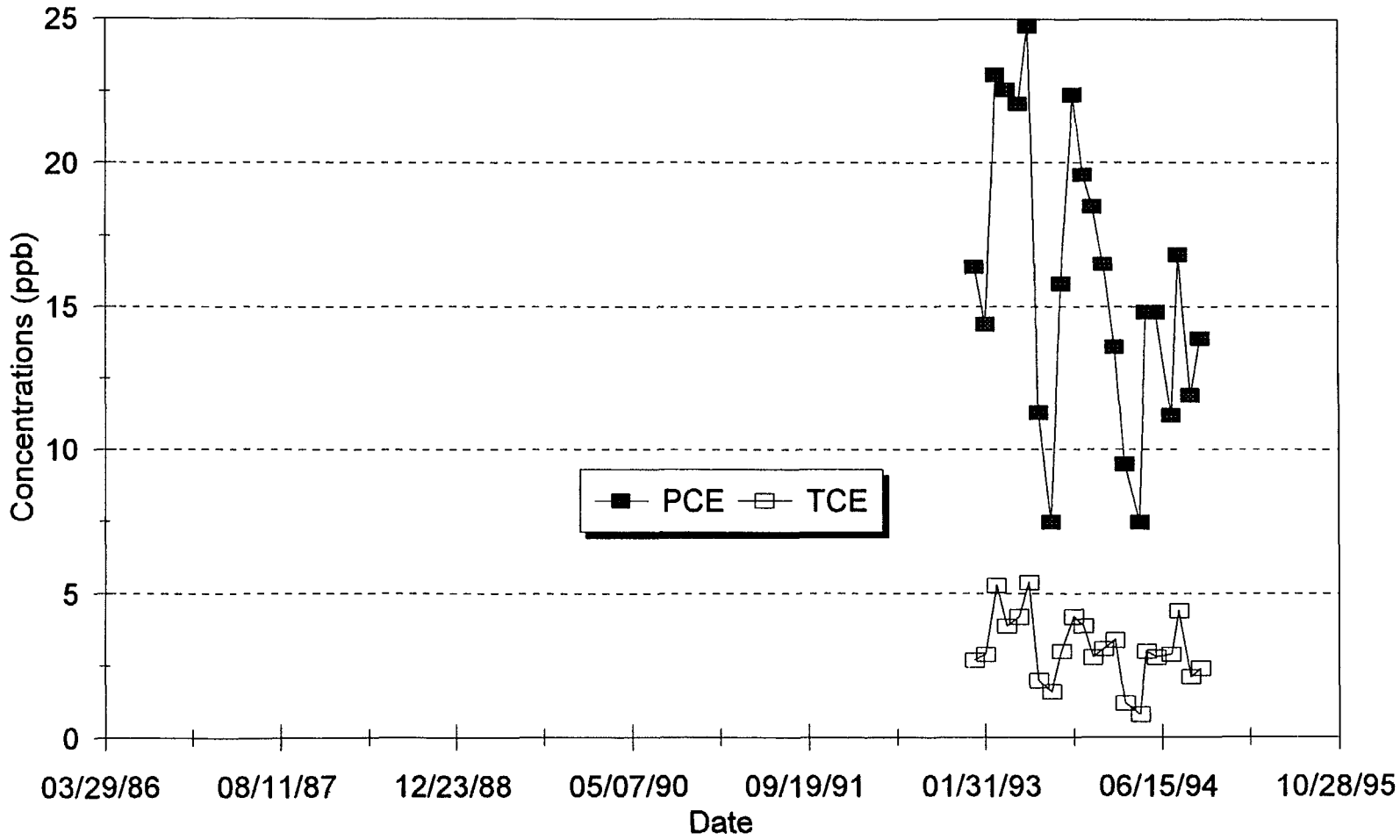


Figure B-2
17th St. Plant Influent Concentrations

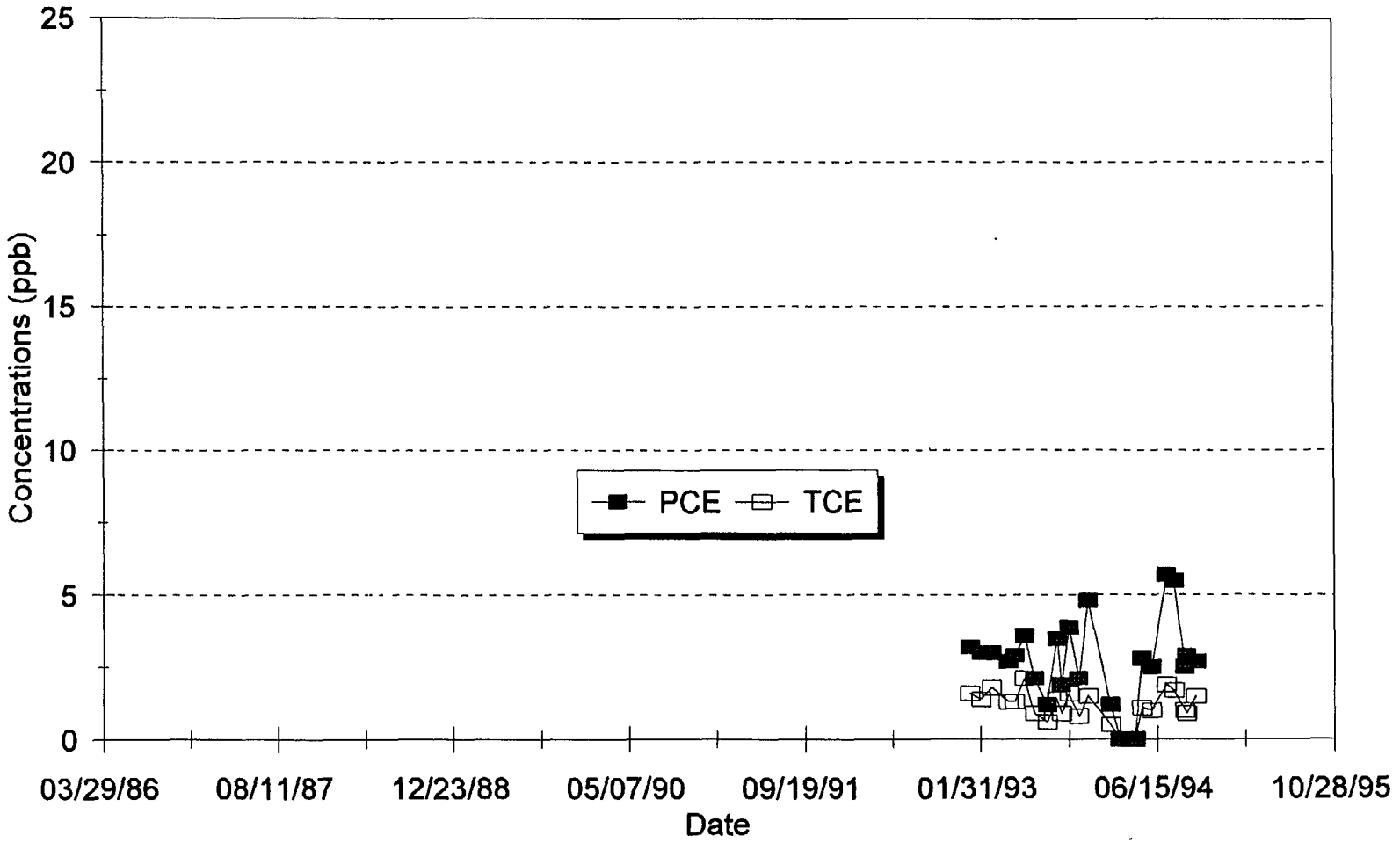


Figure B-3
19th St. Plant Influent Concentrations

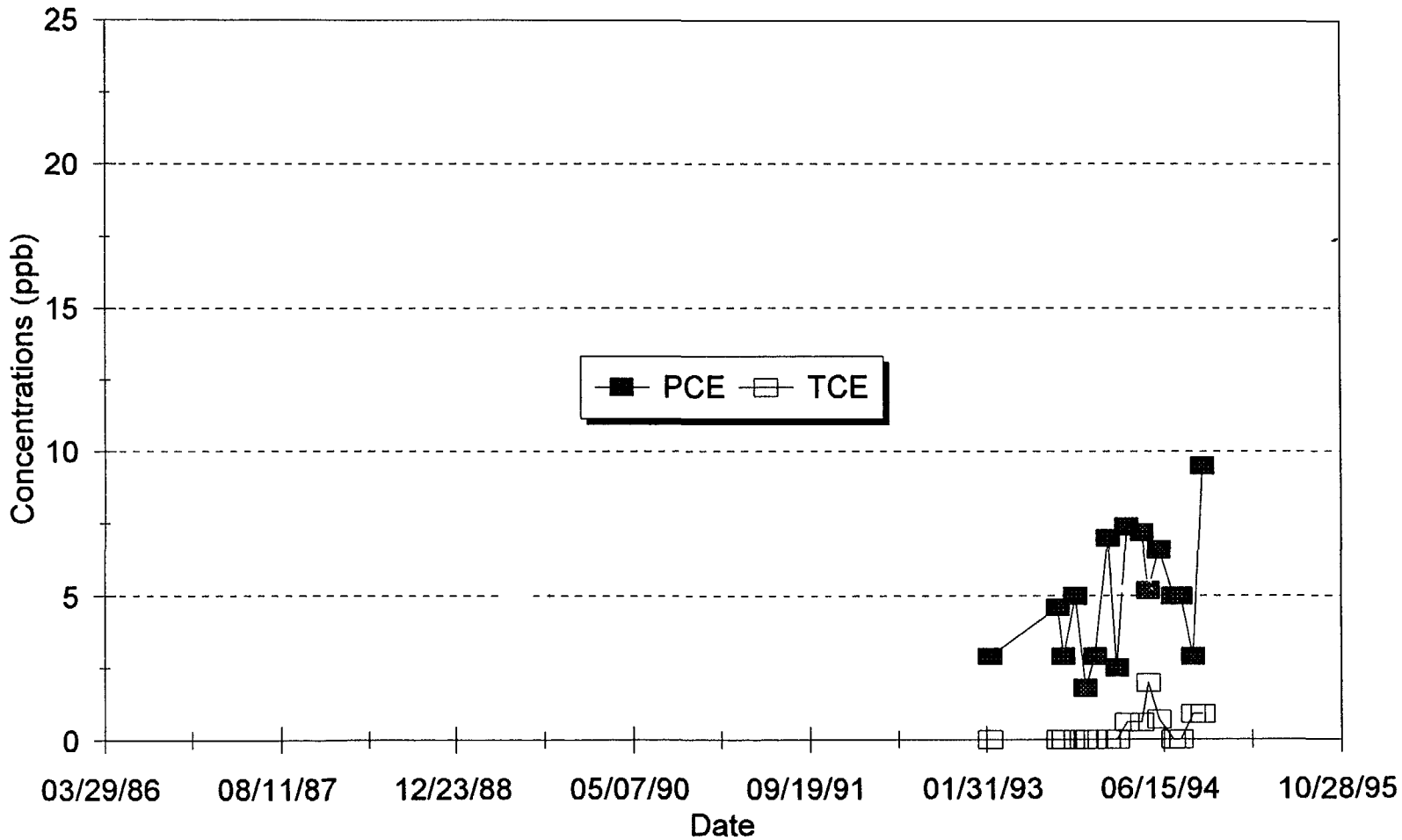


Figure B-4
North Plant Influent Concentrations

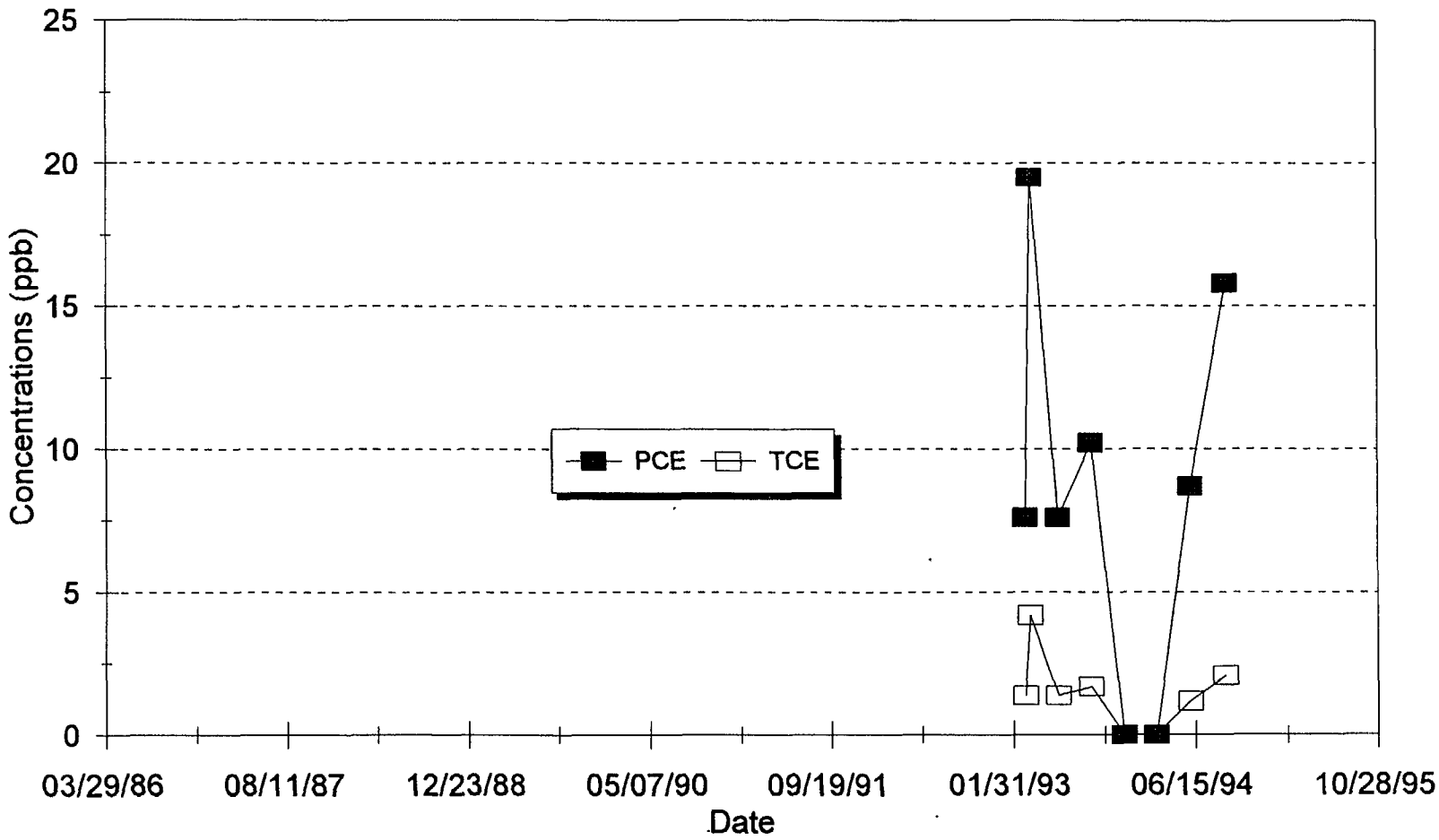


Table B-4
PCE and TCE Concentrations at Wells #1, 2, 3, and 4
Newmark North RD
San Bernardino, California

Date	PCE Concentrations Well #1 (ug/L)	TCE
Sep-87	15.3	0.5
Dec-87	64.9	12
Feb-88	73.2	10.6
Jul-88	38	3.4
Jul-88	38	3.4
Sep-88	15.3	0.5
Dec-88	1.3	0
Jan-89	41.5	4.2
Jul-89	2.8	0
Apr-90	39.8	7.7
Jul-90	25.9	4.3
Jun-91	13.1	1.6
Feb-92	14.2	2.1

Date	PCE Concentrations Well #2 (ug/L)	TCE
Oct-87	24.1	4
Dec-87	38.9	5.2
Feb-88	30.1	7.3
May-88	1.7	0
Sep-88	2.8	0
Dec-88	11.6	1.4
Jan-89	3.3	0
Jul-89	9.2	1.5
Oct-89	8.4	1.2
Apr-90	10.4	2.9
Jul-90	26	4.2

Date	PCE Concentrations Well #3 (ug/L)	TCE
Jul-87	71.8	11.3
Oct-87	63.1	8.9
May-88	61.4	8.2
Sep-88	45.3	4.8
Dec-88	50.5	6.8
Jul-89	13.8	1.4
Oct-89	28	4.3
Apr-90	28.1	4.7
Jul-90	14.9	2.4
Jun-91	33.5	4.5

Date	PCE Concentrations Well #4 (ug/L)	TCE
Jun-87	108.6	36.8
Oct-87	81.8	14.8
Dec-87	89.4	14.2
Feb-88	81.6	12.6
Jul-88	42	5.6
Sep-88	55.9	7.6
Dec-88	73.5	10
Jul-89	0	0
Oct-89	37.3	5.9
Apr-90	18.8	4.7
Jun-91	7.4	1.2
Feb-92	16.5	2.8

Figure B-5

PCE and TCE Concentrations @ Well 1

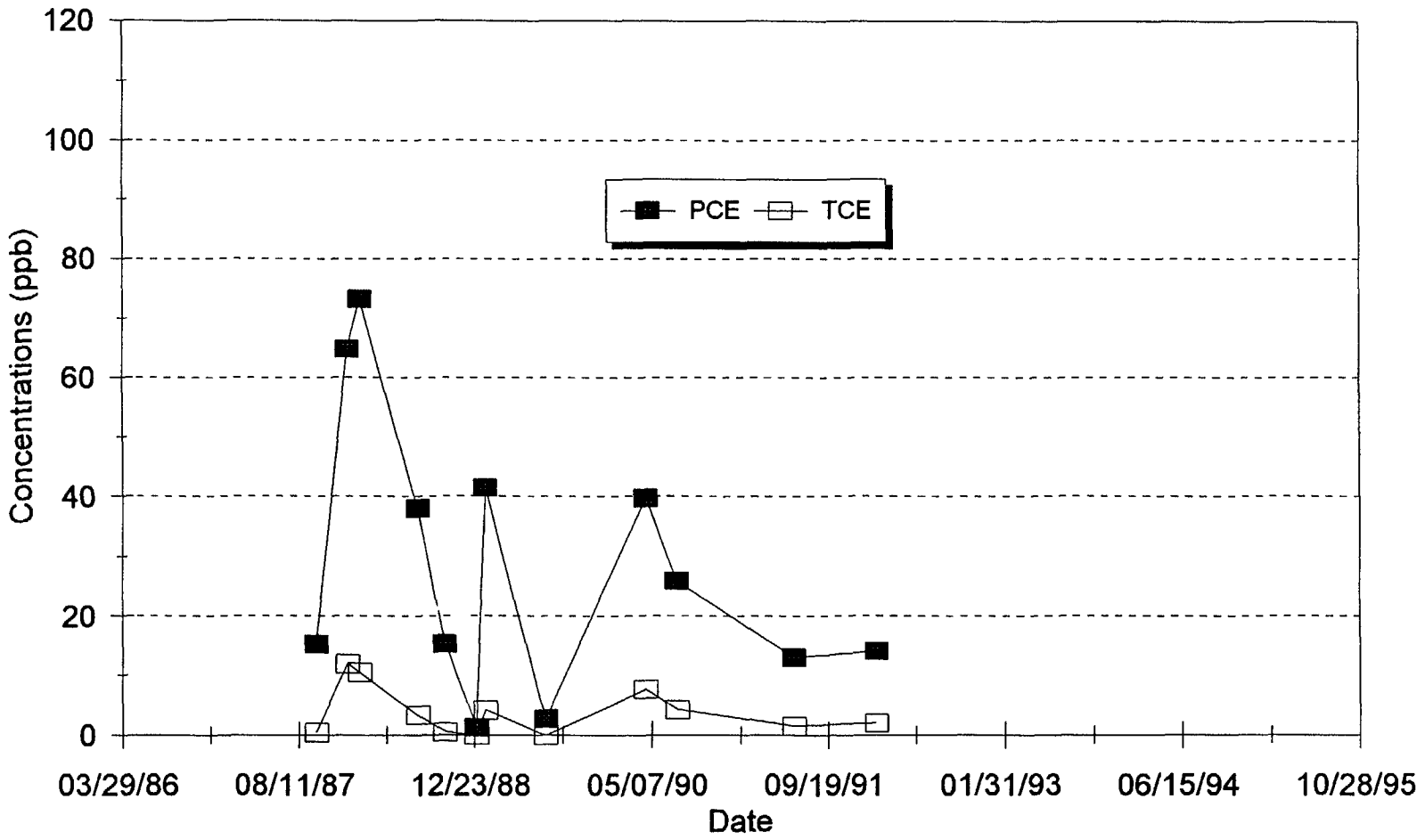


Figure B-7

PCE and TCE Concentrations @ Well 3

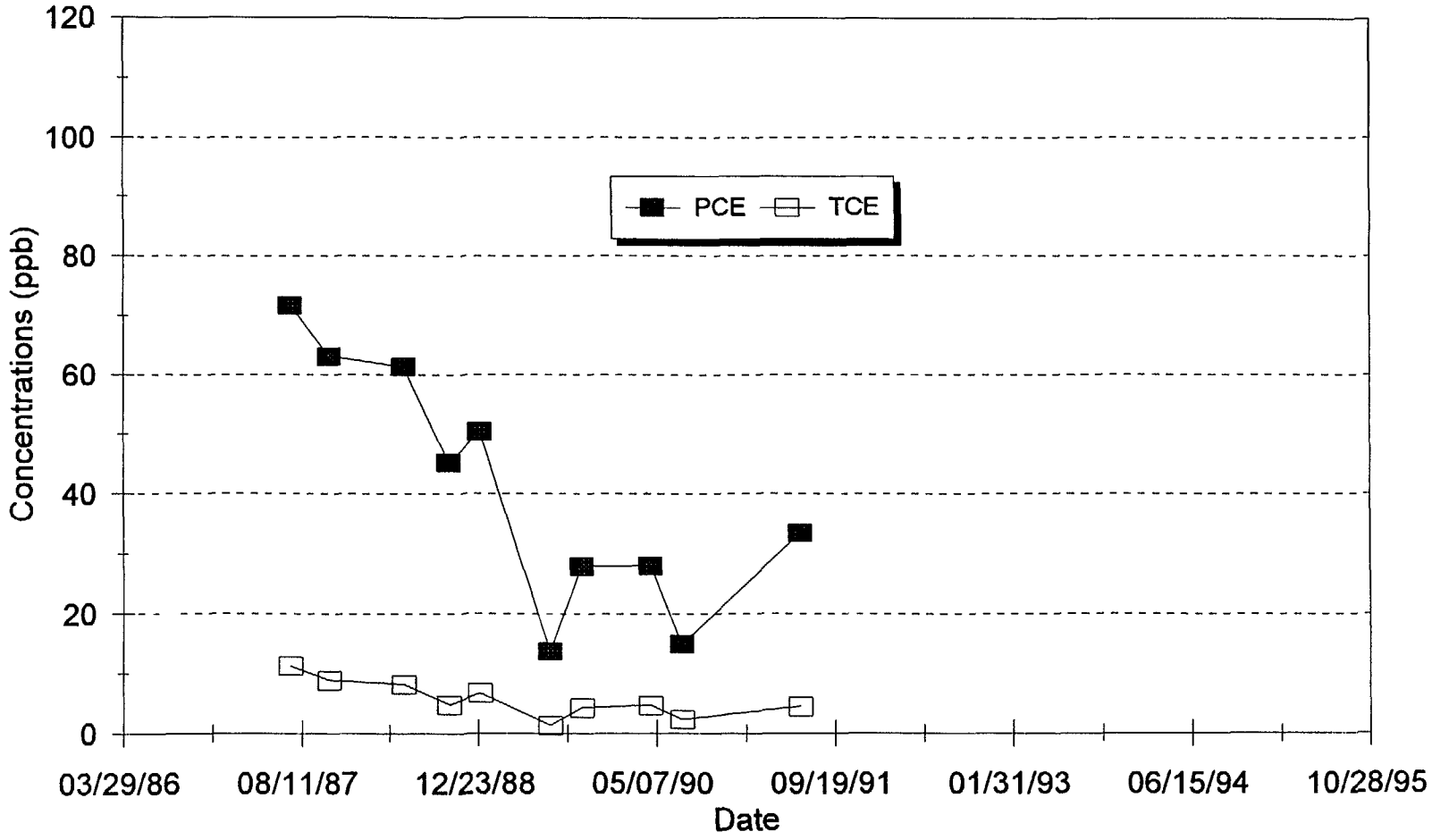


Figure B-6

PCE and TCE Concentrations @ Well 2

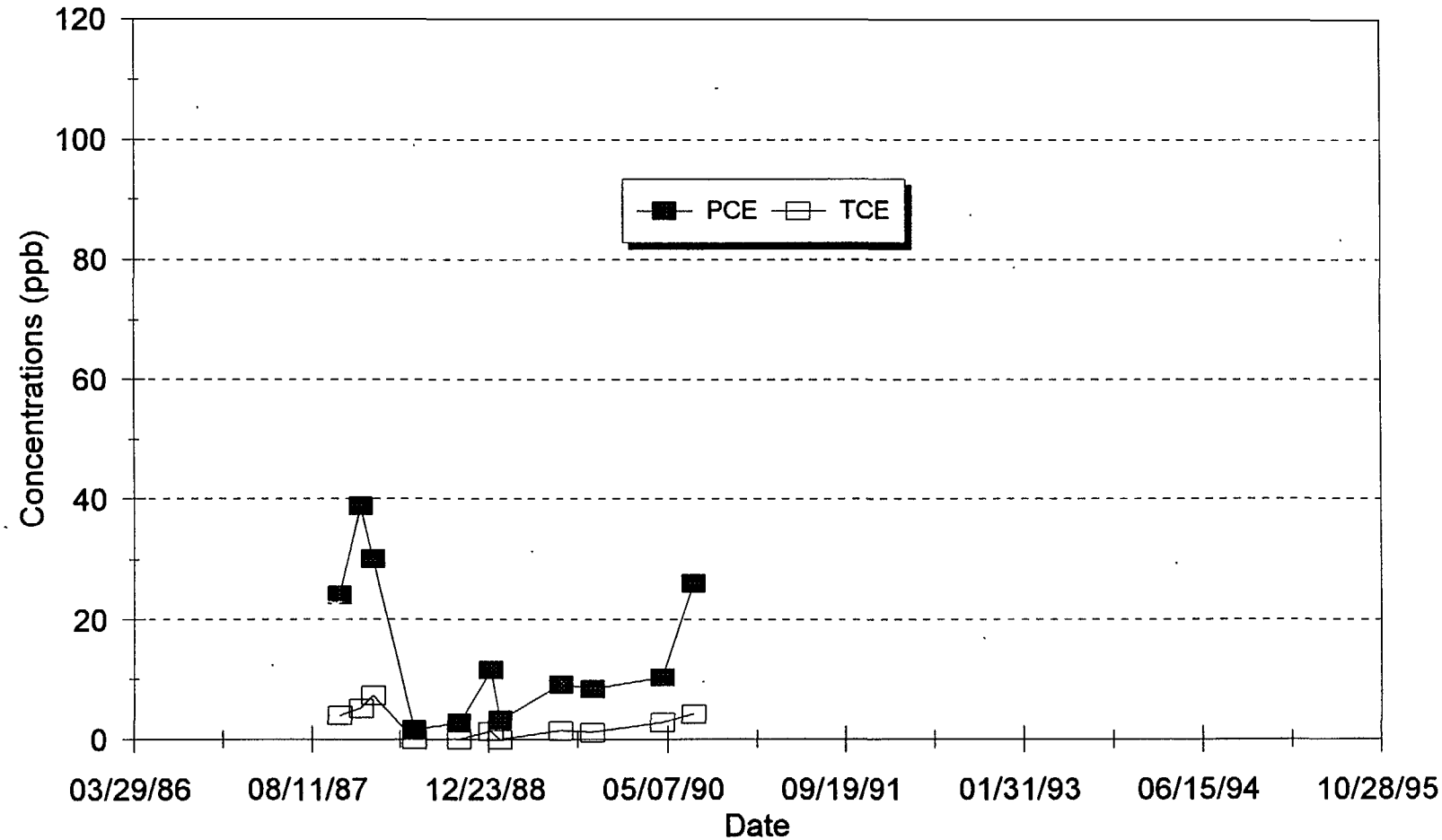
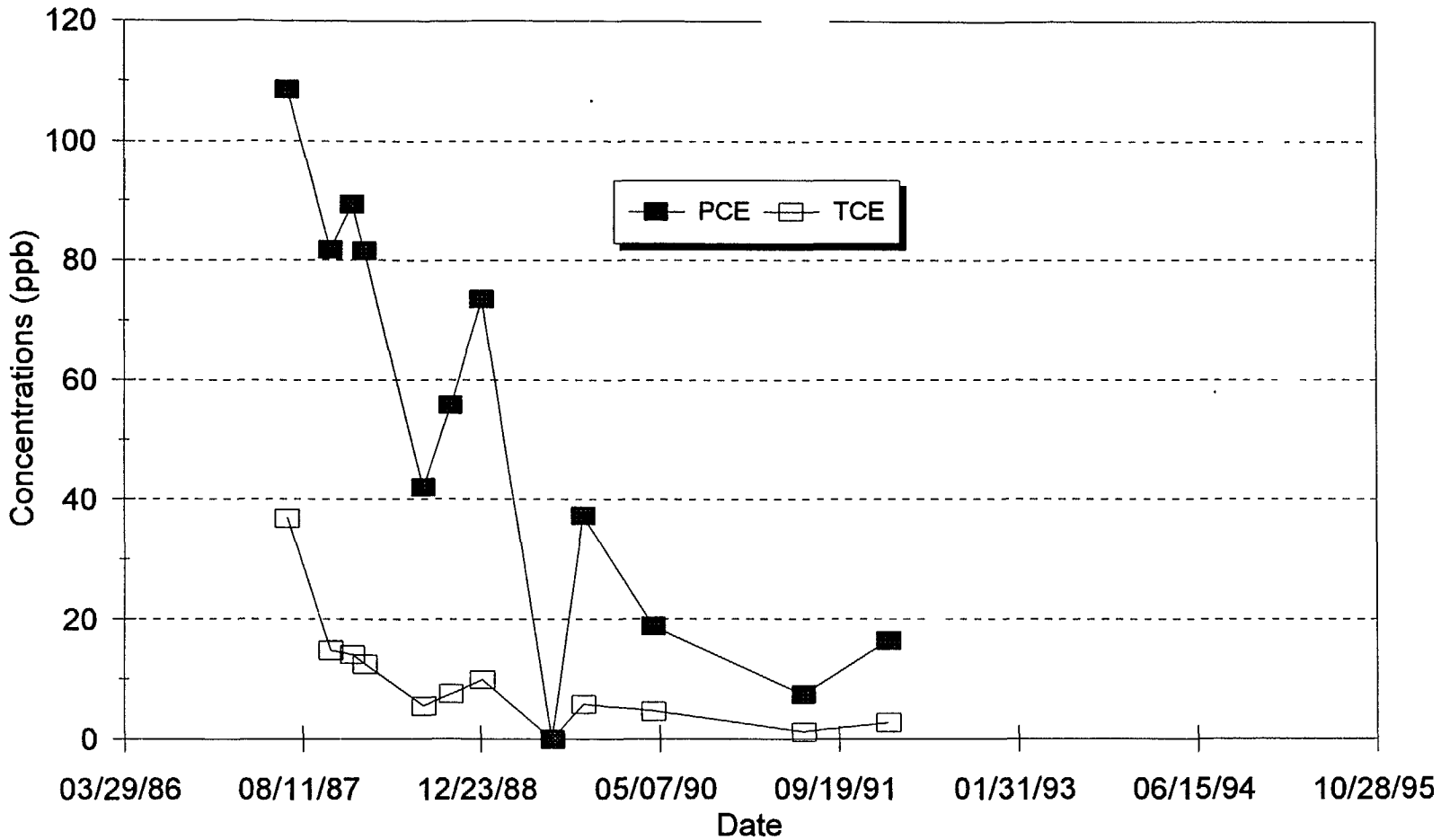


Figure B-8

PCE and TCE Concentrations @ Well 4



APPENDIX C

Design Calculations/Graphs

Table C-1
Loading Rates for GW Treatment System
Newmark RD
San Bernardino, California

Constituent	MW	Max. Results (ppb)	MCL Fed/CA
PCE	165.8	35	5/5
TCE	131.4	7	5/5
cis-1,2-DCE	97	3	70/6
Chloroform	119.4	0.2	100/100
Chloroethane	64.5	0.4	NE/NE
Methylene Chloride	84.9	0.2	5/NE
Toluene	92.1	2	1000/NE
Freon 11	137.4	7	NE/150
Freon 12	120.9	51	NE/NE
	Totals:	106	

\NEWMARK\DSGNBAS1.WB1/gp

Table C-2
Newmark RD North
Contact Time versus Flow Rate

Assumptions:

Vessel size =	20000	lbs
Carbon unit weight =	28	lbs/cuft
Carbon volume =	5342.86	gallons
Total design flow =	4875	gpm

Serial Configuration		
No. of Vessels required	Tot.Ret.Time (min)	Flow per Vessel (gpm)
8	8.8	1219
10	11.0	975
12	13.2	813
14	**15.3**	**696**
16	17.5	609
18	19.7	542

Parallel Configuration		
No. of Vessels required	Tot.Ret.Time (min)	Flow per Vessel (gpm)
8	8.8	609
9	9.9	542
10	11.0	488
11	12.1	443
12	13.2	406
13	14.2	375
14	**15.3**	**348**
15	16.4	325
16	17.5	305
17	18.6	287
18	19.7	271

Figure C-1
Flowrate versus Total Contact Time

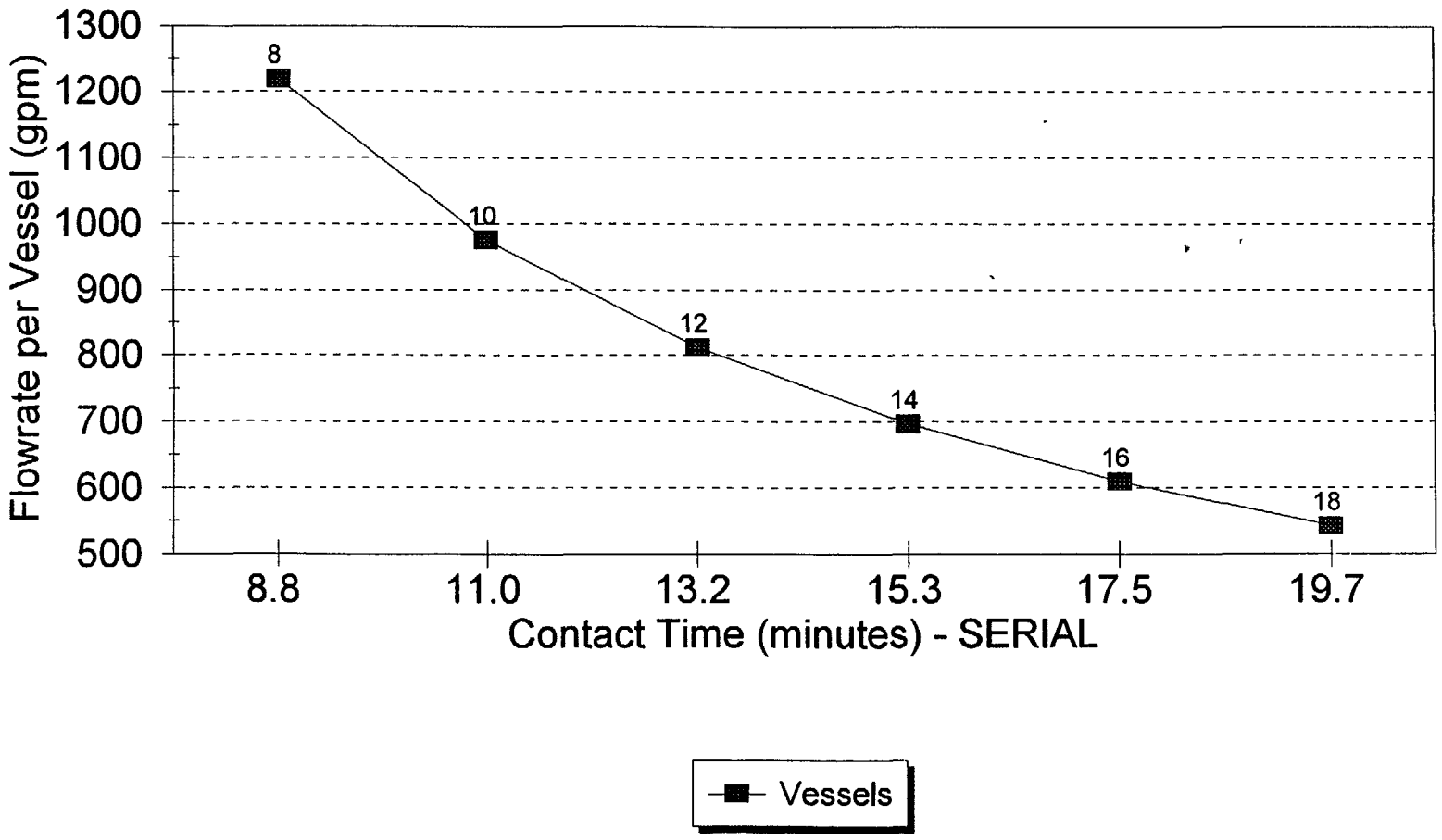
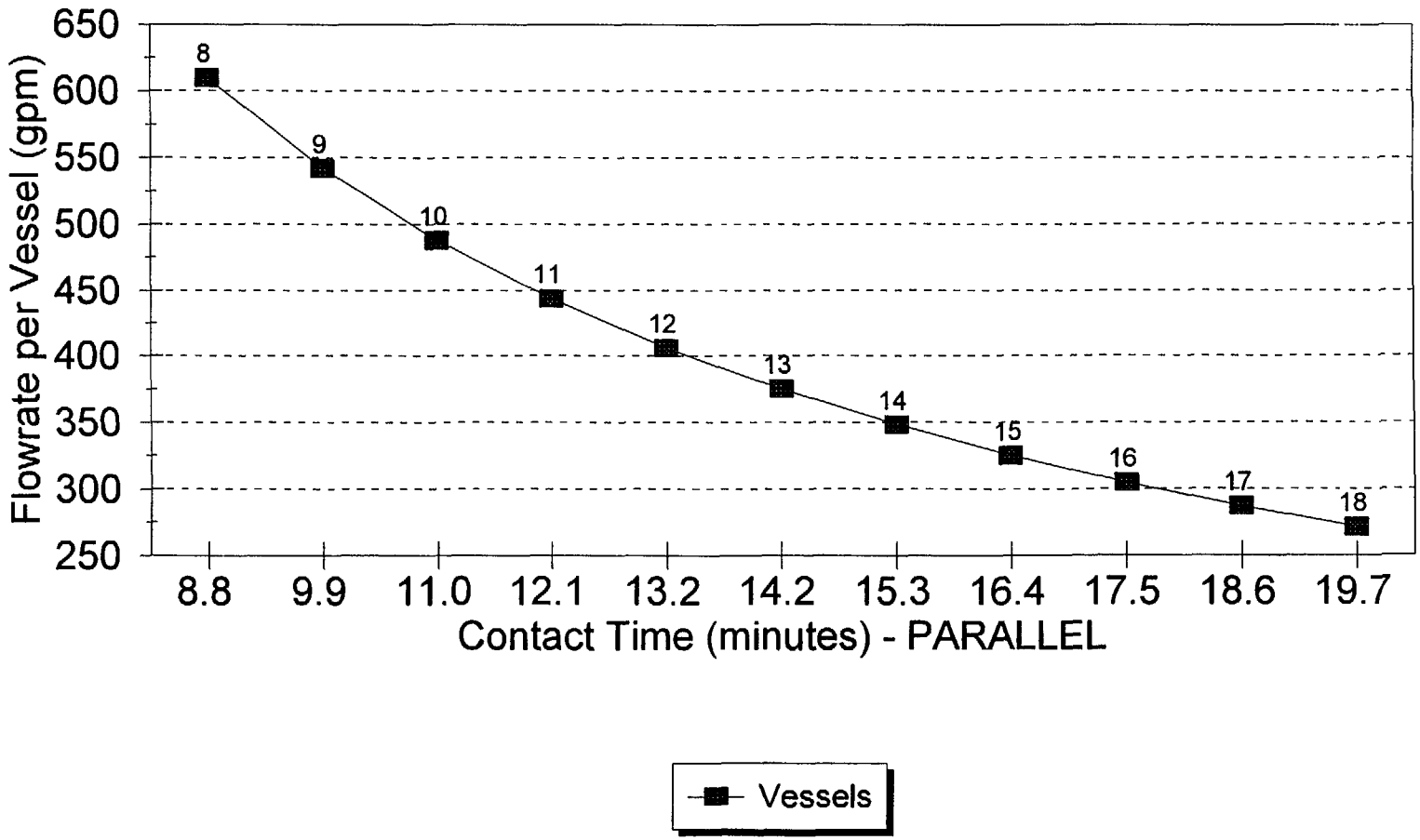


Figure C-2
Flowrate versus Total Contact Time



GP\NMK\123\CARBON1 WB1

LPGAC - usage calcs

Assumptions:

Flow = 4,875 gpm

*) Concentrations / Contaminants as described in Appendix C

20,000 lbs carbon per vessel

Serial (double-pass) configuration, 15 minutes retention time, or ~700 gpm per pair of vessels.

⇒ Required # of vessels = $\frac{4,875}{700}$ = 6.96, say 7 pairs = 14 vessels

⇒ Total Mass of carbon = 14 * 20,000 = 280,000 lbs

Average carbon consumption rate (based on vendor modeling) = 0.055 lbs GAC / 1000 gallons water treated.

Daily GAC consumption = $\frac{4,875 * 1,440}{1,000}$ * 0.055 = 386 lbs/day

Estimated Carbon Life:

Serial Configuration: $\frac{280,000 \text{ lbs GAC}}{2} * \frac{1}{386 \text{ lbs/d}}$ = 362.60 days ≅ 0.99 years

*) Only PCE & TCE are above MCL and need to be controlled.

URS CONSULTANTS — A PROFESSIONAL SERVICES ORGANIZATION	PROJECT Newmark RD North		JOB NO 62370 5040
	SUBJECT LPGAC Usage Estimates		DATE 4-4-95
	BY GP	CHECKED NN	SHEET NO. 1

Backwash Cycle = 15 min @ 1,500 gpm max = 22,500 gal ÷ 7.48 gal/ft³ ≙ 3,000 ft³

Size of Backwash Sumps:

Assume one sump along each GAC train (= 2 sumps).

Total Length of sumps = 200' (120' + 80')

Width of sumps = 5'

The sumps are connected with 24"Ø pipe ~ 20' long.

⇒ Required average depth of sump w/ 12" freeboard:

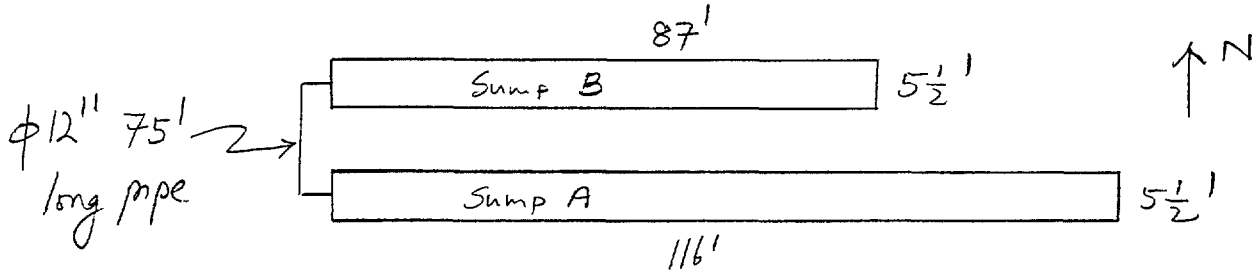
$$D = \frac{3000\,ft^3 - \left(\frac{24}{24}\right)^2 \pi * 20'}{200' * 5'} + 1' = \underline{\underline{4\ ft}}$$

Connect sumps with existing 24"Ø drain line; have to clear 30"Ø line when crossing. → hook up to 24" line near discharge point @ stormwater channel.

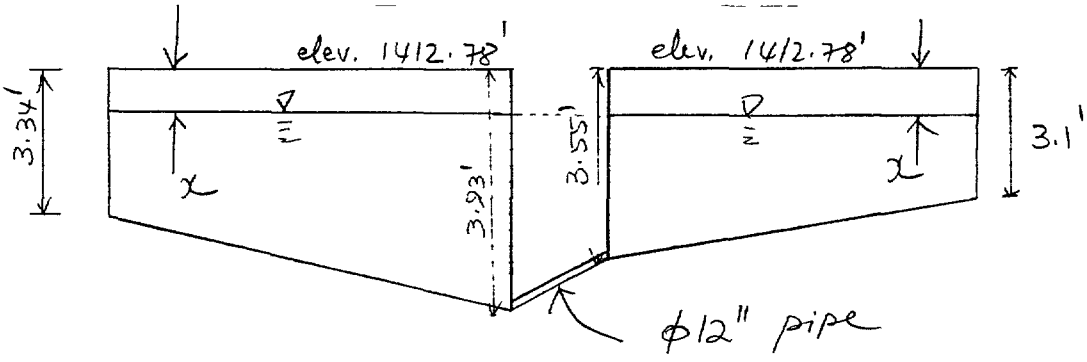
Install sluice valve @ sump where drain line exits sump.

Size grating for H-20 loading.

URS / URS CONSULTANTS — A PROFESSIONAL SERVICES ORGANIZATION	PROJECT Newmark RD North	JOB NO. 62370.5040
	SUBJECT Backwash Calcs	DATE 1-4-95
	BY [illegible] CHECKED NN	SHEET NO. 1



Backwash Sump Layout - North Plant



Backwash Sump Elevation - North Plant

Backwash Cycle per vessel = 15 min @ 1,500 gpm = 22,500 gallon
= 3,000 ft^3

Volume of φ12" 75' long pipe = $\frac{\pi}{4} \times \left(\frac{12}{12}\right)^2 \times 75'$ = 58.9 ft^3

Required volume of Sumps A & B = 3000 − 58.9 = 2941.1 ft^3

URS CONSULTANTS — A PROFESSIONAL SERVICES ORGANIZATION	PROJECT Newmark RD North	JOB NO 41-62370	
	SUBJECT Backwash Sump Capacity	DATE 9-18-97	
	BY NN	CHECKED	SHEET NO 1/2

let x' is the freeboard in Sumps A and B.

Volume of water in Sump A $= 116 \times 5\frac{1}{2}\left[\frac{3.93+3.34}{2} - x\right]$ ft^3

Volume of water in Sump B $= 87' \times 5\frac{1}{2}\left[\frac{3.55+3.1}{2} - x\right]$ ft^3

Vol of water in Sumps A & B $= 2941.1$ ft^3

$$116 \times 5\tfrac{1}{2}\left[\frac{3.93+3.34}{2} - x\right] + 87 \times 5\tfrac{1}{2}\left[\frac{3.55-3.1}{2} - x\right] = 2941.1$$

$$\Rightarrow x = 0.87'$$

$\therefore$ Freeboard in Sump A $= 0.87'$

Sump B $= 0.87'$

URS CONSULTANTS — A PROFESSIONAL SERVICES ORGANIZATION	PROJECT Newmark RD North		JOB NO 41-02370
	SUBJECT Backwash Sump Capacity		DATE 9-18-97
	BY NN	CHECKED	SHEET NO 2/2