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Environmental Restoration Contractor **ERC Team**

Meeting Minutes

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OU: 200-ZP-1, 200-ZP-2
TSD: N/A
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SUBJECT 200-ZP-1/2 UNIT MANAGER MEETING

TO Distribution

FROM M. A. Buckmaster

DATE November 17, 1998

ATTENDEES	DISTRIBUTION
M. A. Buckmaster H0-19, w/a	Attendees
D. A. Faulk B5-01, w/a	R. L. Jackson H9-02, w/a
C. Cameron B5-01, w/a	L. C. Swanson H9-02, w/a
V. J. Rohay H9-02, w/a	C. Ward H9-01, w/a
A. C. Tortoso H0-12, w/a	Document and Information Services H0-09

A meeting on the above subject was held on October 8, 1998, at 3350 GW Way, Room 2B32. The agenda to this meeting is included as Attachment 1.

200-ZP-2 Soil Vapor Extraction System

The 14.2 m^3/min soil vapor extraction (SVE) system was operated at the Z-9 site from July 7, 1998 through September 30, 1998 to remove carbon tetrachloride from the vadose zone. V. J. Rohay provided a graph of the daily carbon tetrachloride concentrations observed at the SVE inlet during this time and corresponding maps showing the changes in the mix of on-line wells (Attachment 2). Initial on-line wells were selected close to the Z-9 source crib; as extraction continued, wells further away from the crib were brought on-line. The daily carbon tetrachloride concentrations are compared to the daily mass removed and daily flowrates in Attachment 3. The daily mass removal rate increased significantly twice during the three months of extraction as a result of changes in extraction wells: (1) Two additional wells were brought on-line on July 29, 1998 (Attachment 2). The mass removal rate increased, despite a continued decline in concentrations, because the flowrate increased (Attachment 3). (2) The mix of on-line wells was changed again on September 1, 1998. The mass removal rate increased, despite a constant flowrate, because the inlet concentrations increased.

A plot of carbon tetrachloride inlet concentrations extracted from Z-9 wells from July 18, 1997 through September 30, 1997, following the rebound study, is presented in Attachment 4. During this time, the 42.5 m^3/min SVE system was being used to extract from all the Z-9 wells simultaneously. Comparison of the 1998 and 1997 data (Attachments 2 and 4) indicates that the initial concentrations extracted from Z-9 wells in July 1998 were slightly higher than the initial concentrations extracted in July 1997. The lower 1997 concentrations are probably the result of dilution of the higher concentration wells by the inclusion of all wells on-line; initial 1998 extraction was only from the higher concentration wells. Carbon tetrachloride concentrations had approached similar values (20-25 ppmv) by the time extraction was concluded in September 1998 and September 1997.

During 86 days of operation at the Z-9 site in 1998, 523 kg of carbon tetrachloride were removed from the vadose zone. During a total of 178 days of operation at both the Z-9 and Z-1A/Z-18/Z-12 sites in 1998, 777 kg of carbon tetrachloride were removed from the vadose zone (Attachment 5).

Characterization data were collected at individual on-line wells during extraction. Characterization data are provided for initial 1997 and 1998 on-line wells in Attachment 6. All of the characterization data for Z-9 wells during 1998 is provided in Attachment 7.

Soil vapor monitoring, including monitoring near the groundwater and ground surface, was conducted at the Z-1A/Z-18/Z-12 and Z-9 sites from October 1997 through March 1998 while the SVE system was shut down. Monitoring was continued at the Z-9 site from April through June 1998 while SVE was ongoing at the Z-1A site. Monitoring was focused at Z-1A/Z-18/Z-12 from July through September 1998 while SVE was ongoing at the Z-9 site. As requested by A. C. Tortoso and D. A. Faulk, monitoring locations were added, from April 1998 through September 1998, near the lower permeability silt/caliche zone where rebound concentrations are expected to be highest. V. J. Rohay provided a table comparing the maximum concentration at each monitoring location to the maximum observed at that location during the rebound study (November 1996 through July 1997) and a table of all the non-operational monitoring data as of September 30, 1998 (Attachment 8). The maximum concentrations observed since October 1997 are generally slightly lower than those observed during the rebound study.

A draft vadose zone monitoring plan for October 1998 through March 1999 was presented by V. J. Rohay. A. C. Tortoso and D. A. Faulk agreed to the monitoring plan as presented. The monitoring plan is included as part of the 200-ZP-2 FY99 operating plan (Attachment 9). Results of the vapor monitoring will continue to be reported, and unexpected trends will continue to be discussed, at the Unit Managers Meetings. Monthly monitoring is planned for FY99; changes to the monitoring frequency will be considered for FY00 based on trends observed in FY98 and FY99.

The operating plan for FY99 will be similar to that for FY98. Between October 1998 and March 1999, the 14.2 m^3/min SVE system will be off-line and will remain at the Z-9 site. The system will then be operated at Z-9 from April through June 1999 and at Z-1A/Z-18/Z-12 from July through September 1999. As a consequence of this alternating schedule, 6 months (10/98-3/99) will elapse between operation of SVE at the Z-9 site and 12 months (7/98-6/99) will elapse between operation of SVE at the Z-1A site. Soil vapor monitoring will be continued at vadose zone locations near the groundwater, the caliche layer, and the ground surface at the Z-1A/Z-18/Z-12 and Z-9 sites while they are not being actively remediated using SVE. The FY99 operating plan is included as Attachment 9.

A. C. Tortoso and D. A. Faulk agreed to indicate their approval of the FY99 operating plan for 200-ZP-2 through use of a signature page attached to these minutes. The approval page will be signed at the next ZP-2 Unit Managers Meeting. The meeting minutes with the signed approval page will then be submitted to the administrative record.

The 14.2 m^3/min SVE system has been placed in standby mode for the winter. The hoses have been rolled up. The blower will be operated (on ambient air) as necessary to keep the moving parts lubricated. M. A. Buckmaster stated that the other two SVE systems (28.3 m^3/min and 42.5 m^3/min) will be decommissioned and excessed this summer. A. C. Tortoso and D. A. Faulk agreed to this disposition of these SVE systems.

However, D. A. Faulk encouraged BHI to consider maintaining the full SVE capacity for future use on Hanford projects.

A. C. Tortoso gave D. A. Faulk a copy of the letter that RL sent to J. A. Wright, DOE EM-50, on July 21, 1998 to request assistance with the process of evaluating remedial technologies for the carbon tetrachloride plume and to request that the carbon tetrachloride site be considered for the Innovative Treatment Remediation Demonstration (ITRD) program. A more detailed proposal will be presented by RL to DOE EM-50 at the October mid-year review meeting in Augusta, GA. A. C. Tortoso and D. A. Faulk have agreed that ITRD is the preferred approach for reviewing the available remedial technologies to find the best match with the project needs.

V. J. Rohay provided copies of the PNNL report on FY98 geophysical logging of ZP-2 wells to A. C. Tortoso and D. A. Faulk. The report is: "Results of 1998 Spectral Gamma-Ray Monitoring of Boreholes at the 216-Z-1A Tile Field, 216-Z-9 Trench, and 216-Z-12 Crib" by D. G. Horton and R. R. Randall, PNNL-11978, September 1998.

A meeting between Unit Managers Meeting attendees and J. W. Massmann, University of Washington representative for the Consortium for Risk Evaluation and Stakeholder Participation (CRESP), was held immediately following the Unit Managers Meeting. The purpose of the meeting was to discuss the scope of work that CRESP is planning for September 1998 to March 2000 in support of the carbon tetrachloride site. The proposed activities are aimed at addressing the extent of carbon tetrachloride migration within the vadose zone and the amount of carbon tetrachloride that can be left in the vadose zone without posing an unacceptable risk to on-site workers. The approach that will be used to evaluate these issues involves combining field data with a numerical model that simulates subsurface vapor transport.

200-ZP-1 Pump and Treat System

M. A. Buckmaster reported that the 200-ZP-1 pump-and-treat system is operating with no problems. As a result of an investigation into the recurrent leak detection problem, which had occasionally shut down the system unnecessarily, a hole in the containment pipe was discovered. The hole has been patched.

Between April and June 1998, the total pumping rate for ZP-1 extraction wells was 743 L/min (Attachment 10). The pumping rate continues to be highest from well W15-35, east of the 231-Z building and north of the Z-9 trench. Carbon tetrachloride concentrations continue to be highest at wells W15-33, near the northwest corner of the 231-Z building at PFP, and W15-32, at the northeast corner of the Z-9 trench. The source of the high concentrations at W15-33 is uncertain. Three wells (W15-29, W18-36, and W18-37) are being used for injection of clean, treated water to the aquifer. The hydraulic capture modeled through June 1998 indicates that the 6 extraction wells are containing the high concentration core of the carbon tetrachloride plume (Attachment 10). Between August 1994 and June 1998, the pump-and-treat system removed 1,778 kg of carbon tetrachloride and treated nearly 500,000,000 liters of water (Attachment 10).

Attachment 1

AGENDA

UNIT MANAGERS MEETING

200-ZP-1 AND 200-ZP-2

OCTOBER 8, 1998

200-ZP-2 SOIL VAPOR EXTRACTION REMEDIATION

- Summary of Z-9 Operations
- Summary of Non-Operational Monitoring
- Status of 14.2 m^3/min SVE System
- Status of 28.3 m^3/min and 42.5 m^3/min SVE Systems
- Plan for FY 99 Operations

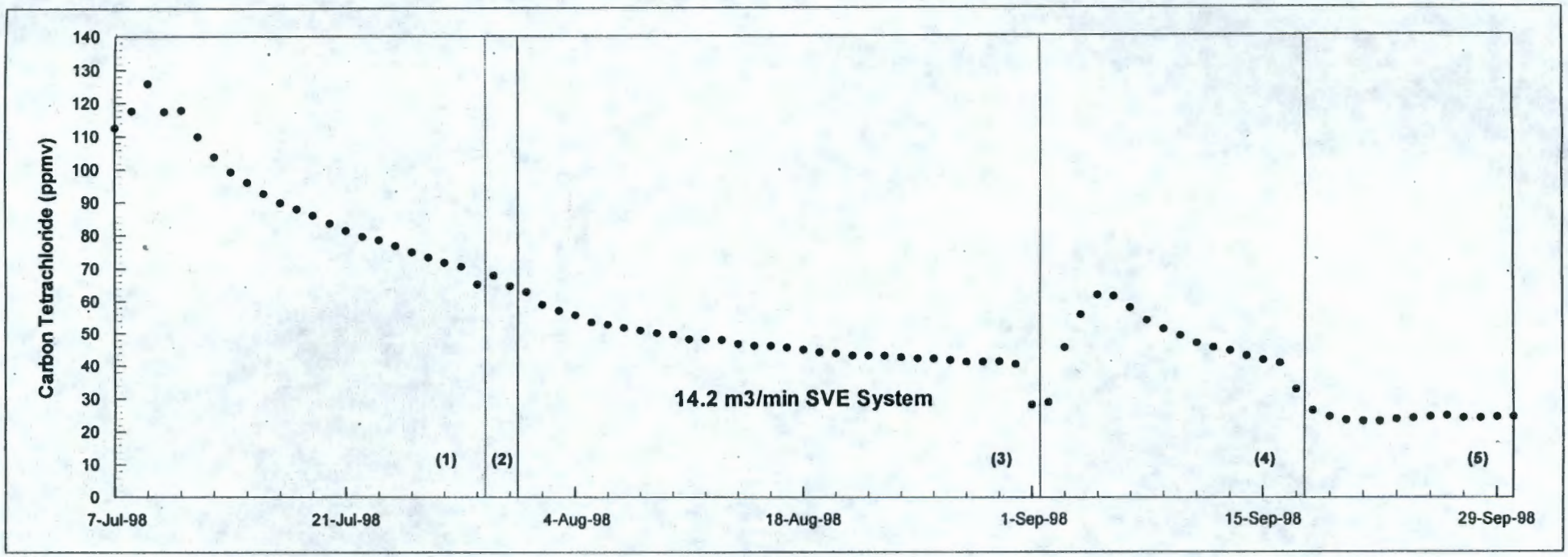
  Operations: Active Extraction
  Operations: Passive Extraction
  Non-Operational Monitoring

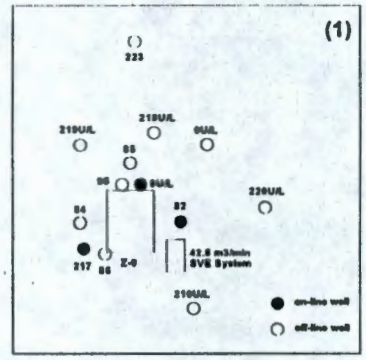
- Geophysical Logging
- Other

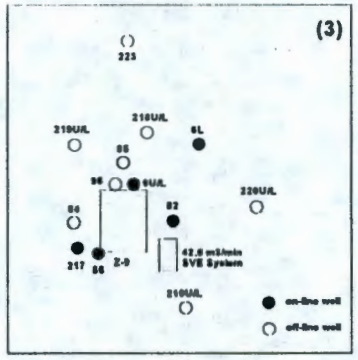
  CRESP Project
  ITRD Proposal

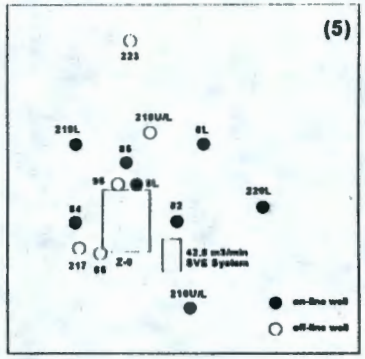
200-ZP-1 PUMP-AND-TREAT REMEDIATION

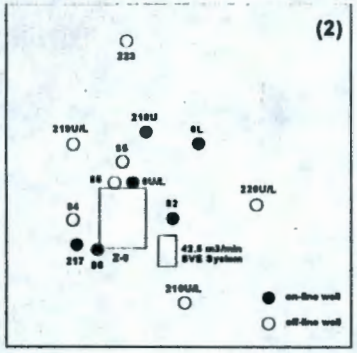
- Status of Pump-and-Treat Operations

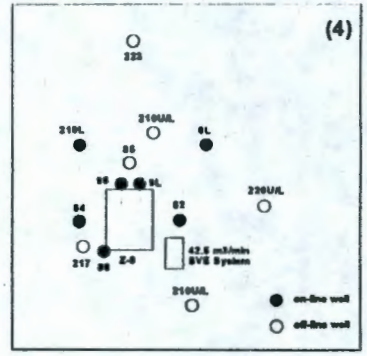




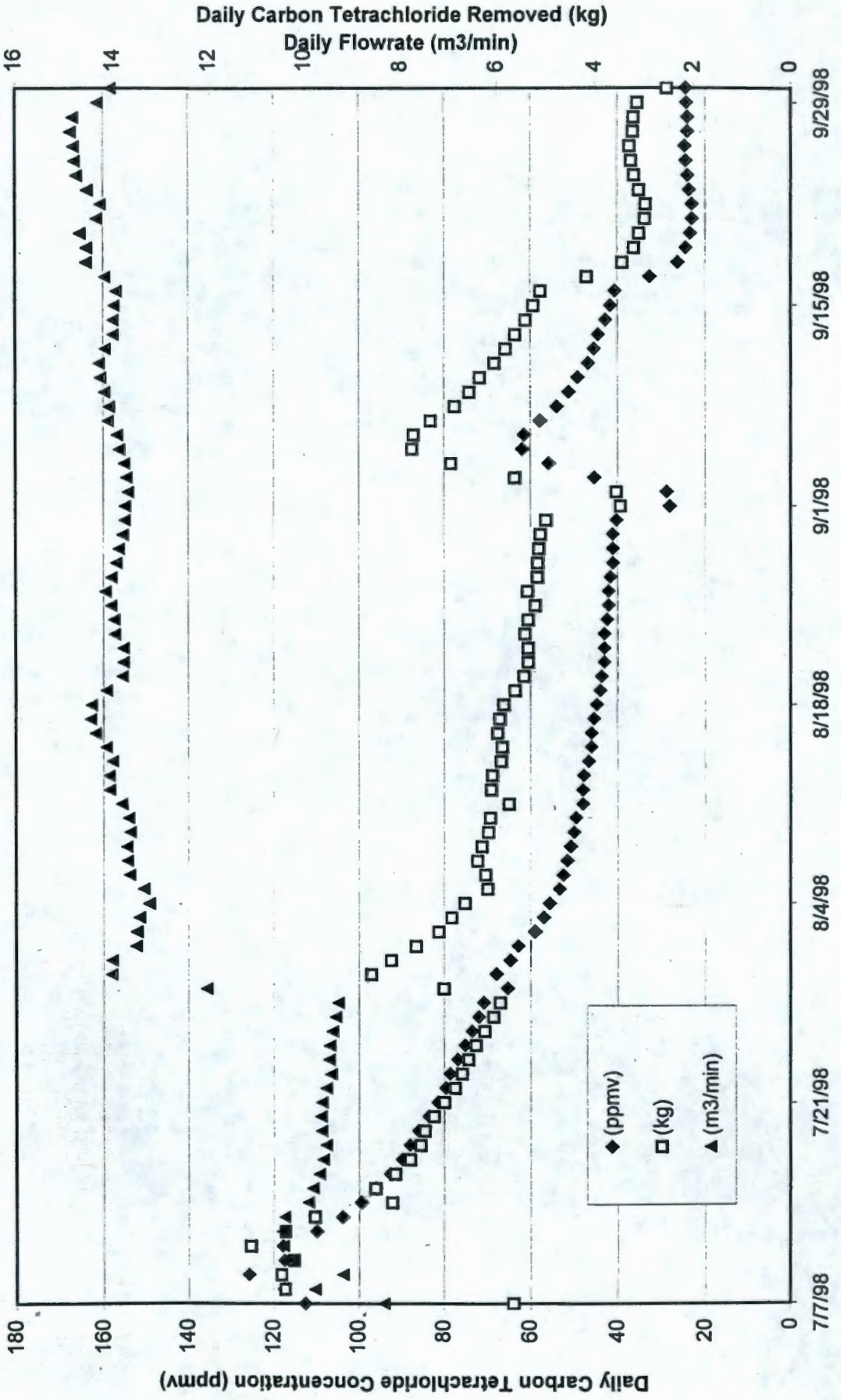


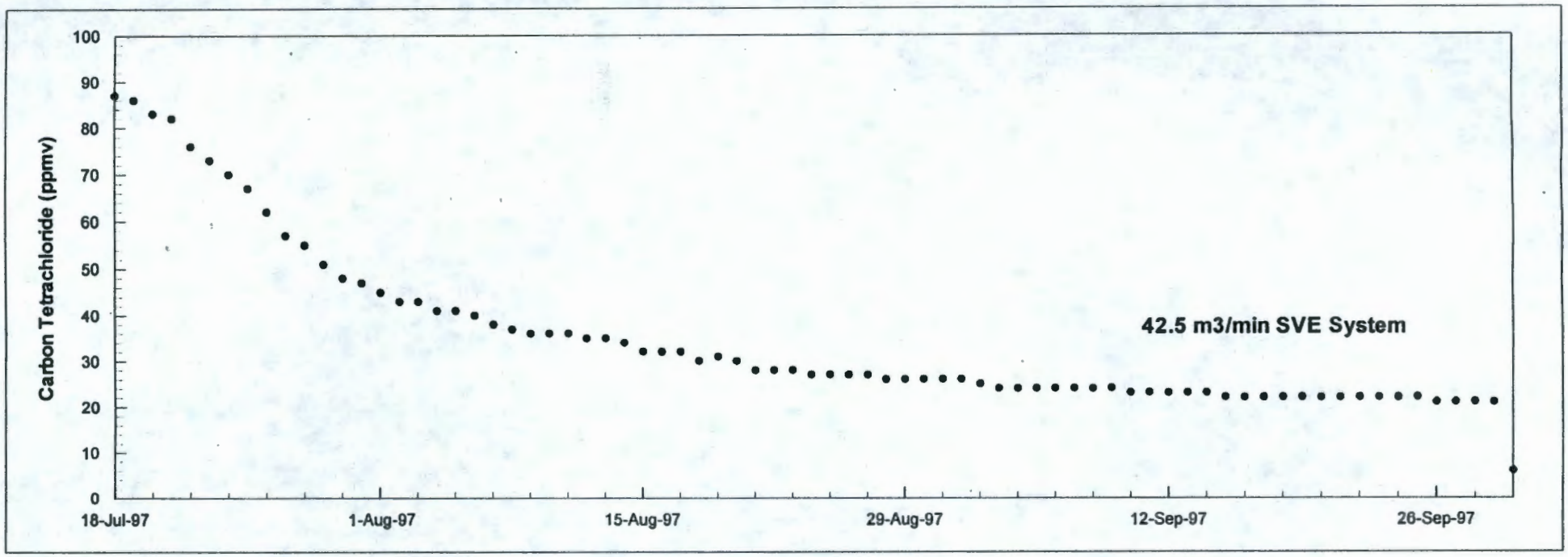


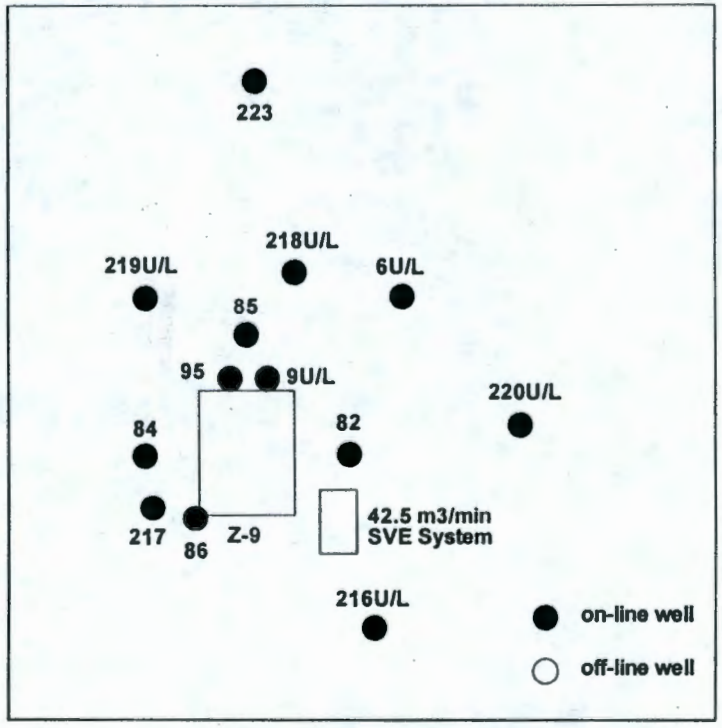




Attachment 2

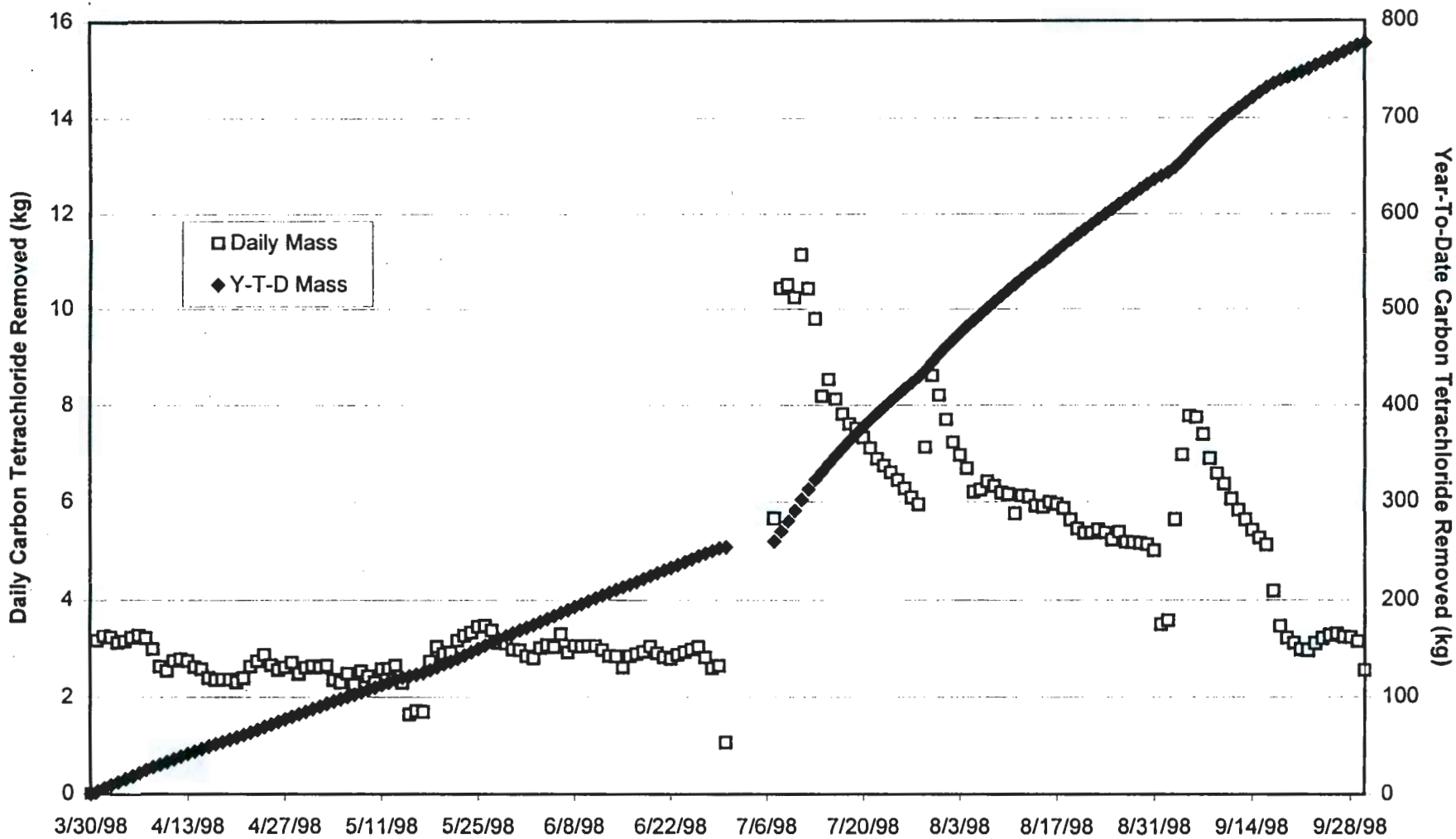

Daily Carbon Tetrachloride Removed (kg)
Daily Flowrate (m3/min)
Daily Carbon Tetrachloride Concentration (ppmv)
180
160
140
120
100
80
60
40
20
0
16
14
12
10
8
6
4
2
0
7/7/98
7/21/98
8/4/98
8/18/98
9/1/98
9/15/98
9/29/98
(ppmv)
(kg)
(m3/min)





Attachment 4

Z-1A / Z-9 SVE Operations 4/98-9/98



Attachment 5

200-ZP-2 Soil Vapor Extraction Well Characterization Data

Z-1A	Restart 7/18/97				Restart 3/30/98			
Well/Interval	Date	Well Vacuum (in. w.c.)	Flow (ft3/min)	CCl4 (ppmv)	Date	Well Vacuum (in. w.c.)	Flow (ft3/min)	CCl4 (ppmv)
W18-6L	7/21/97	6	19	27	3/30/98	24	0	26
W18-7	7/21/97	10	98	31	3/30/98	5	23	15
W18-167	7/21/97	7	170	21	4/1/98	1	35	27
W18-174	7/21/97	10	15	7	4/1/98	2	0	8
W18-248	7/21/97	13	3	59	3/30/98	10	0	1
W18-252U	7/21/97	15	150	42	3/30/98	36	59	36
W18-152					3/30/98	26	15	21
W18-96					3/30/98	37	55	16
W18-12					3/30/98	35	15	29
W18-89					3/30/98	5	15	28
W18-246U					3/30/98	35	43	30
W18-252L					3/30/98	48	19	29
W18-249					3/30/98	28	94	33
W18-168					4/1/98	2	0	1
W18-165					4/1/98	1	0	6

Z-9	Restart 7/18/97								Restart 7/7/98			
Well/Interval	Date	Well Vacuum (in. w.c.)	Flow (ft3/min)	CCl4 (ppmv)	Date	Well Vacuum (in. w.c.)	Flow (ft3/min)	CCl4 (ppmv)	Date	Well Vacuum (in. w.c.)	Flow (ft3/min)	CCl4 (ppmv)
W15-9L	7/18/97	65	59	20	7/21/97	78	63	21	7/10/98	78	82	17
W15-82	7/18/97	64	55	106	7/21/97	55	74	47	7/10/98	70	75	196
W15-217	7/18/97	63	166	256	7/21/97	50	205	86	7/10/98	60	156	135
W15-6L	7/18/97	40	95	20	7/21/97	32	86	20	7/30/98	38	75	18
W15-86	7/18/97	61	170	138	7/21/97	50	180	111	7/30/98	52	146	107
W15-218L	7/18/97	80	106	20	7/21/97	51	86	22				
W15-218U	7/18/97	70	213	21	7/21/97	46	162	22	7/30/98	48	83	6
W15-9U									7/10/98	80	71	30

Attachment 6

Z-9 Wells, July - September 1998

Attachment 7

Z-9 Well/Interval	Date	Well Vacuum (in. w.c.)	SVE Vacuum (in. w.c.)	Flow (ft3/min)	CCl4 (ppmv)	CCl4 Flux (kg/day)	CHCl3 (ppmv)	CH2Cl2 (ppmv)	MEK (ppmv)
W15-6L	7/30/98	38	89	75	18	0.37	2	2	0
W15-6L	8/25/98	42	91	102	18	0.52	1	1	0
W15-6L	9/3/98	18	56	55	18	0.28	2	1	0
W15-6L	9/14/98	18	57	59	17	0.28	1	1	0
W15-6L	9/22/98	12	46	47	15	0.19	1	2	0
W15-6L	9/30/98	10	42	51	18	0.26	1	2	0
W15-9L	7/10/98	78	88	82	17	0.38	2	0	0
W15-9L	7/30/98	78	89	59	19	0.32	2	1	1
W15-9L	8/25/98	71	91	69	15	0.29	1	0	0
W15-9L	9/3/98	40	56	47	15	0.20	1	0	0
W15-9L	9/14/98	40	57	51	13	0.19	1	0	0
W15-9L	9/22/98	22	46	31	9	0.08	1	0	0
W15-9L	9/30/98	22	42	31	12	0.10	1	0	0
W15-9U	7/10/98	80	88	71	30	0.59	2	0	0
W15-9U	7/30/98	74	89	71	34	0.67	2	0	1
W15-9U	8/25/98	78	91	63	16	0.29	1	0	0
W15-82	7/10/98	70	88	75	196	4.11	3	11	0
W15-82	7/30/98	50	90	55	153	2.35	4	0	0
W15-82	8/25/98	51	91	58	90	1.46	2	0	0
W15-82	9/3/98	25	56	27	70	0.53	2	0	0
W15-82	9/14/98	26	57	31	41	0.35	2	0	0
W15-82	9/22/98	16	46	19	41	0.22	2	0	0
W15-82	9/30/98	15	42	19	57	0.30	1	0	0
W15-84	9/3/98	12	56	150	15	0.64	1	1	0
W15-84	9/14/98	17	57	162	13	0.60	2	0	0
W15-84	9/22/98	13	46	146	13	0.52	1	1	0
W15-84	9/30/98	9	42	150	39	1.64	1	5	0
W15-85	9/22/98	16	46	77	1	0.02	1	0	0
W15-85	9/30/98	13	42	122	1	0.03	1	0	0
W15-86	7/30/98	52	89	146	107	4.37	2	0	0
W15-86	8/25/98	56	91	152	37	1.58	1	0	0
W15-86	9/3/98	30	56	11	2	0.00	0	0	0
W15-86	9/14/98	33	57	9	0	0.00	1	0	0
W15-95	9/3/98	22	56	178	7	0.34	1	0	0
W15-95	9/14/98	26	57	170	0	0.02	1	0	0
W15-216L	9/22/98	19	46	39	5	0.06	1	0	0
W15-216L	9/30/98	18	42	39	6	0.06	0	0	0
W15-216U	9/22/98	13	46	96	6	0.17	1	0	0
W15-216U	9/30/98	12	42	98	5	0.13	1	0	0
W15-217	7/10/98	60	88	156	135	5.89	3	6	0
W15-217	7/30/98	50	89	142	50	2.00	2	1	0
W15-217	8/25/98	42	91	99	6	0.16	1	0	0
W15-218U	7/30/98	48	89	83	6	0.13	1	0	0
W15-219L	9/3/98	19	56	35	18	0.18	1	1	0
W15-219L	9/14/98	19	57	35	17	0.16	1	2	0
W15-219L	9/22/98	12	46	35	12	0.12	1	2	0
W15-219L	9/30/98	11	42	35	13	0.12	1	1	0
W15-220L	9/22/98	10	46	39	10	0.11	1	0	0
W15-220L	9/30/98	10	42	39	10	0.11	1	0	0

Comparison of Maximum Carbon Tetrachloride Rebound Concentrations Monitored at 200-ZP-2 Soil Vapor Extraction Sites 1997 and 1998

200-ZP-2 Location (Well or Probe) /feet bgs	Site	Zone	November 1996 - July 1997 Maximum Rebound Carbon Tetrachloride (ppmv)	October 1997 - March 1998 Maximum Rebound Carbon Tetrachloride (ppmv)	October 1997 - June 1998 Maximum Rebound Carbon Tetrachloride (ppmv)	October 1997 - September 1998 Maximum Rebound Carbon Tetrachloride (ppmv)
79-11/ 5 ft	Z-1A	1	0	0	deleted April 1998	0
86-06/ 5 ft	Z-9	1	1.3	0	0	deleted July 1998
87-01R/ 5 ft	Z-12	1	3.5	0	deleted April 1998	0
87-09/ 5 ft	Z-1A	1	not measured	0	deleted April 1998	1.5
94-09/ 5 ft	Z-9	1	1.4	1.3	1.3	1.3
95-11/ 5 ft	Z-9	1	0	1.2	2.1	deleted July 1998
95-12/ 5 ft	Z-9	1	1.1	0	1.5	deleted July 1998
N-6/ 5 ft	Z-1A	1	not measured	0	deleted April 1998	deleted April 1998
CPT-13A/ 9 ft	Z-1A	2	not measured	0	0	0
CPT-16/ 10 ft	Z-9	2	not measured	0	0	deleted July 1998
CPT-17/ 10 ft	Z-9	2	not measured	1.2	4.2	deleted July 1998
CPT-18/ 15 ft	Z-9	2	not measured	0	6.5	deleted July 1998
CPT-31/ 25 ft	Z-1A	2	not measured	0	deleted April 1998	0
CPT-32/ 25 ft	Z-1A	2	not measured	9.1	deleted April 1998	9.1
CPT-7A/ 32	Z-1A	2	not measured	2.3	deleted April 1998	2.3
CPT-1A/ 35 ft	Z-1A	2	2.0	1.2	1.3	1.4
CPT-28/ 40 ft	Z-9	2	40.1	21.6	21.6	21.6
CPT-33/ 40 ft	Z-1A	2	not measured	1.8	deleted April 1998	2.0
CPT-21A/ 45 ft	Z-9	2	65.6	42.9	52.7	deleted July 1998
CPT-9A/ 60 ft	Z-9	2	45.5	40.9	40.9	41.1
W15-216L/ 180 ft	Z-9	5	16.7	17.3	17.3	deleted July 1998
W15-6L/ 189 ft	Z-9	6	22.6	16.3	17.8	deleted July 1998
W15-9L/ 189 ft	Z-9	6	18.3	14.6	15.0	deleted July 1998
W18-6L/ 208 ft	Z-1A	6	36.0	31.3	deleted April 1998	31.3
W18-7/ 200 ft	Z-1A	6	28.5	15.8	deleted April 1998	17.3
added April 1998						
CPT-28/ 60 ft	Z-9	2	not measured		1.3	1.5
CPT-24/ 70 ft	Z-9	2	not measured		3.2	deleted July 1998
W15-82/ 82 ft	Z-9	2	28.9		5.5	deleted July 1998
W15-95/ 82 ft	Z-9	2	not measured		15.3	deleted July 1998
CPT-21A/ 86 ft	Z-9	2	221		206	deleted July 1998
CPT-28/ 87 ft	Z-9	2	280		230	deleted July 1998
CPT-9A/ 91 ft	Z-9	2	103		34.5	deleted July 1998
W15-218U/ 108 ft	Z-9	3	41.4		0	deleted July 1998
W15-223/ 108 ft	Z-9	3	31.2		2.2	deleted July 1998
W15-217/ 115 ft	Z-9	3	797		630	deleted July 1998
CPT-24/ 118 ft	Z-9	3	44.6		37.7	deleted July 1998
added July 1998						
79-01/ 5 ft	Z-18	1	not measured			destroyed
79-03/ 5 ft	Z-18	1	0			0
87-05/ 5 ft	Z-1A	1	not measured			0
87-03/ 5 ft	Z-12	1	0			0
CPT-34/ 86 ft	Z-18	2	36.3			5.9
CPT-4A/ 91 ft	Z-1A	2	not measured			7.7
W18-252SST/ 100 ft	Z-1A	2	38.2			17.8
CPT-4F/ 109 ft	Z-1A	2	26.8			13.8
W18-152/ 113 ft	Z-12	2	46.8			11.1
W18-158L/ 123 ft	Z-1A	3	not measured			143
W18-167/ 123 ft	Z-1A	3	322.8			79.7
W18-174/ 124 ft	Z-1A	3	573			not measured
W18-249/ 134 ft	Z-18	3	206			20.4
W18-248/ 136 ft	Z-1A	3	288			86.3
W18-12/ 210 ft	Z-18	6	not measured			3.8

Carbon Tetrachloride Rebound Concentrations
Monitored at 200-ZP-2 Soil Vapor Extraction Sites
October 1997 - September 1998

200-ZP-2		November 1996 -										
Location		July 1997	12/1/97	1/10/98	1/29/98	2/26/98	3/24/98	4/30/98	5/26/98	6/29/98	8/14/98	9/29/98
(Well or Probe)	Zone	Maximum Rebound									(j)	
/feet bgs		Carbon Tetrachloride	CCl4	CCl4	CCl4	CCl4	CCl4	CCl4	CCl4	CCl4	CCl4	CCl4
		(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
79-11/ 5 ft	1	0	0	0	0	0	0	del 4/98	del 4/98	del 4/98	0	0
86-06/ 5 ft	1	1.3	0	0	0	0	0	0	0	0	del 7/98	
87-01R/ 5 ft	1	3.5	0	0	0	0	0	del 4/98	del 4/98	del 4/98	0	(k)
87-09/ 5 ft	1	not measured	0	0	0	0	0	del 4/98	del 4/98	del 4/98	0	1.5
94-09/ 5 ft	1	1.4	1.3	0	0	1.3	0	0	0	0	0	0
95-11/ 5 ft	1	0	0	0	0	0	1.2	0	2.1	1.8	del 7/98	
95-12/ 5 ft	1	1.1	0	0	0	0	0	1.4	1.5	1.2	del 7/98	
N-6/ 5 ft	1	not measured	0				0	del 4/98	del 4/98	del 4/98	del 4/98	
CPT-13A/ 9 ft	2	not measured	0	0	0	0	0	0	0	0	0	0
CPT-16/ 10 ft	2	not measured	0	0	0	0	0	0	0	0	del 7/98	
CPT-17/ 10 ft	2	not measured	0	0	0	0	1.17	3.6	4.2	4.1	del 7/98	
CPT-18/ 15 ft	2	not measured	0	0	0	0	0	1.0	4.3	6.5	del 7/98	
CPT-31/ 25 ft	2	not measured	0	0	0	0	0	del 4/98	del 4/98	del 4/98	0	0
CPT-32/ 25 ft	2	not measured	0	0	5.1	6.6	9.1	del 4/98	del 4/98	del 4/98	0	0
CPT-7A/ 32	2	not measured	0	0	1.9	2.3	2.2	del 4/98	del 4/98	del 4/98	1.4	1.7
CPT-1A/ 35 ft	2	2.0	0	0	0	0	1.2	1.2	1.3	0	1.4	1.1
CPT-28/ 40 ft	2	40.1	17.0	19.1	21.6	19.2	11.7	13.3	(e)			
CPT-33/ 40 ft	2	not measured	0	1.8	1.8	1.3	1.4	del 4/98	del 4/98	del 4/98	1.1	2.0
CPT-21A/ 45 ft	2	65.6	18.5	30.5	37.1	21.5	42.9	41.4	52.7	33.7	del 7/98	
CPT-9A/ 60 ft	2	45.5	35.8	37.5	39.1	40.9	38.9	39.1	38.8	38.0	30.4	41.1
W15-216L/ 184 ft	5	16.7		14.1	15.5	15.0	17.3	15.0	15.3	12.8	del 7/98	
W15-6L/ 189 ft	6	22.6		15.2	16.1	16.1	16.3	16.4	17.8	17.6	del 7/98	
W15-9L/ 189 ft	6	18.3		13.3	14.6	8.7	14.6	14.0	15.0	8.6	del 7/98	
W18-6L/ 208 ft	6	36.0		24.0	25.8	31.3	0 (a)	del 4/98	del 4/98	del 4/98	4.3	14.5
W18-7/ 200 ft	6	28.5		12.6	14.4	15.7	15.8	del 4/98	del 4/98	del 4/98	0	17.3
added April 1998												
CPT-28/ 60 ft (e)	2	not measured							1.3	0	1.3	1.5
CPT-24/ 70 ft (b)	2	not measured						1.8	3.2	2.9	del 7/98	
W15-82/ 82 ft (c)	2	28.9						0	5.54	0	del 7/98	
W15-95/ 82 ft (c)	2	not measured						11.9	15	15.3	del 7/98	
CPT-21A/ 86 ft	2	221						169	168	206	del 7/98	
CPT-28/ 87 ft	2	280						229	229	230	del 7/98	
CPT-9A/ 91 ft	2	103						27.6	34.5	33.6	del 7/98	
W15-218U/ 108 ft	3	41.4						0 (d)	0 (d)	0 (c)	del 7/98	
W15-223/ 108 ft (c)	3	31.2						0	2.18	0	del 7/98	
W15-217/ 115 ft	3	797					64.9 (c)	25.4 (d)	630	504	del 7/98	
CPT-24/ 118 ft	3	44.6						37.7	36.5	37.5	del 7/98	
added July 1998												
79-01/ 5 ft	1	not measured									— (f)	(m)
79-03/ 5 ft (m)	1	0										0
87-05/ 5 ft	1	not measured									0	0
87-03/ 5ft (k)	1	0										0
CPT-34/ 86 ft	2	36.3									4.5	5.9
CPT-4A/ 91 ft	2	not measured									6.9	7.7
W18-252SST/ 100 ft	2	38.2									8.9	17.8
CPT-4F/ 109 ft	2	26.8									6.3	13.8
W18-152/ 113 ft	2	46.8									11.1	0
W18-158L/ 123 ft	3	not measured									— (g)	143
W18-167/ 123 ft	3	322.8									— (g)	79.7
W18-174/ 124 ft	3	573									— (h)	— (h)
W18-249/ 134 ft	3	206									— (h)	20.4
W18-248/ 136 ft	3	288									7.1	86.3
W18-12/ 210 ft	6	not measured									1.2	3.8

(a) sampling tube removed, SVE wellhead adapter installed prior to sampling;
sample from wellhead after well had been open to atmosphere for wellhead assembly changeout
(b) unable to pull sample from CPT-24/95 ft; substitute CPT-24/70 ft
(c) sampled from wellhead without tubing after 3 minute purge
(d) sampled from wellhead without tubing after 10 minute purge
(e) unable to pull sample from CPT-28/40 ft; substitute CPT-28/60 ft
(f) sample probe destroyed or not found
(g) access to Z-1A unavailable (no key)
(h) not in service
(j) sampled 8/14/98; analyzed 8/15/98
(k) probe 87-01R destroyed; substitute probe 87-03 after 7/98
(m) probe 79-01 destroyed; substitute probe 79-03

Attachment 9

APPROVAL OF 200-ZP-2 OPERATING PLAN FOR FY 1999

The Unit Managers for the 200-ZP-2 Operable Unit approve the attached FY 1999 Soil Vapor Extraction System Operating Plan for 200-ZP-2.

Arlene C. Tortoso 11/18/98

A. C. Tortoso Date
U.S. Department of Energy
Richland Operations Office

11-18-98

D. A. Faulk Date
U.S. Environmental Protection Agency
Region X, Hanford Office

FY 1999 SOIL VAPOR EXTRACTION SYSTEM OPERATING PLAN FOR 200-ZP-2

Soil vapor extraction will be used at the 200-ZP-2 Operable Unit during FY99 to remove carbon tetrachloride from the vadose zone. The primary objectives for this remediation are protection of the groundwater and mass removal. Only the 14.2 m^3/min soil vapor extraction (SVE) system will be operated. Two sites will be remediated using SVE: the Z-9 site and the Z-1A/Z-18/Z-12 (Z-1A) site. Specific on-line wells will be selected prior to start-up at each site based on vapor monitoring, previous concentration trends, and location. These site-specific plans will be presented to the Unit Managers for approval prior to implementation. Based on characterization data collected at on-line wells during operation, the mix of on-line wells may be reconfigured during operations to optimize removal. Passive soil vapor extraction will be implemented at selected wells. The passive SVE plan will be presented to the Unit Managers for approval prior to implementation.

Soil vapor monitoring will be conducted at vadose zone locations near the groundwater, the Plio-Pleistocene layer, and the ground surface at the Z-1A and Z-9 sites while they are not being actively remediated using SVE. The soil vapor monitoring plan for both sites from October 1998 through March 1999 is included with this operating plan. Soil vapor monitoring plans for just the Z-9 and Z-1A sites from April 1999 through September 1999 will be presented to the Unit Managers for approval prior to implementation. If carbon tetrachloride vapor concentrations increase such that the carbon tetrachloride contamination may impact human health or the environment (including groundwater), the Unit Managers will decide on the appropriate response to mitigate the problem (e.g., relocating the vapor extraction system to address the problem).

The schedule for SVE operations and soil vapor monitoring is:

October 1998 through March 1999:

- Maintain the SVE system in standby mode at the Z-9 site
- Monitor soil vapor concentrations at the Z-9 and Z-1A sites

April 1999 through June 1999:

- Operate the SVE system at the Z-9 site
- Monitor soil vapor concentrations at the Z-1A site

July 1999 through September 1999:

- Operate the SVE system at the Z-1A site
- Monitor soil vapor concentrations at the Z-9 site

VADOSE ZONE MONITORING PLAN FOR 200-ZP-2, OCTOBER 1998 THROUGH MARCH 1999

Scope: Monitor carbon tetrachloride soil gas concentrations at selected probes and wells during the winter shutdown of the soil vapor extraction (SVE) systems. The components of this scope are:

- collect soil gas samples using the rebound study sampling method and sampling pump
- analyze soil gas samples for carbon tetrachloride using B&K at field screening level
- evaluate concentration trends
- report results to 200-ZP-2 Unit Managers

Purpose: (1) To be cognizant of carbon tetrachloride concentrations and trends at the vadose-atmosphere and vadose-groundwater interfaces to ensure that non-operation of SVE systems is not negatively impacting groundwater or atmosphere. (2) To be cognizant of carbon tetrachloride concentrations and trends near the lower permeability Plio-Pleistocene layer to provide an indication of concentrations that can be expected during restart of SVE operations and to support selection of on-line wells.

Duration: Six months, October 1998 through March 1999.

Monitoring Frequency: Monthly. It is assumed that a sampler will spend 8 hrs/month for collection and analysis of samples and that a project scientist will spend 4 hrs/month for evaluation and reporting of results. Based on the rebound study and FY98 monitoring experiences, sampling and analysis of 25-30 samples is reasonable for an 8-hour day.

Monitoring Locations: Locations were selected to focus carbon tetrachloride monitoring near the vadose-atmosphere and vadose-groundwater interfaces and near the Plio-Pleistocene layer. At the recommendation of the project scientist, and with approval from the BHI task lead, these monitoring locations could be revised based on developing trends, accessibility, and/or recommendations of the sampler.

Target Zone	Z-1A	Z-9	Total
Shallow (1.5 m)	3	3	6
Near surface (3-10 m)	3	3	6
Plio-Pleistocene (25-45 m)	6	7	13
Groundwater (55-65 m)	3	2	5
Total	15	15	30

Target Zone	Z-9	Depth (m)	Comment	Z-1A	Depth (m)	Comment
shallow	86-07R	1.5	east of Z-9	87-09	1.5	northeast corner of Z-1A
shallow	95-11	1.5	northwest of Z-9	79-06	1.5	west of Z-1A (middle of Z-1A/Z-18/Z-12 field)
shallow	95-12	1.5	southwest of Z-9	79-11	1.5	southeast corner of Z-1A
near-surface	CPT-16 10 ft (white)	3	northeast of Z-9	CPT-32 25 ft (green)	8	west of Z-1A
near-surface	CPT-17 10 ft (blue)	3	southwest of Z-9	CPT-30 28 ft (green)	9	west of Z-1A (middle of Z-1A/Z-18/Z-12 field)
near-surface	CPT-18 15 ft (white)	5	northwest of Z-9	CPT-7A 32 ft (yellow)	10	farfield northeast of Z-1A
Plio-Pleisto	W15-82	25	east side of Z-9	W18-252SST 100 ft (red)	31	west of Z-1A (middle of Z-1A/Z-18/Z-12 field)
Plio-Pleisto	W15-95	25	north side of Z-9	W18-152	34	northwest corner of Z-12
Plio-Pleisto	CPT-21A 86 ft (red)	26	south of Z-9	W18-158L	37	within Z-1A
Plio-Pleisto	CPT-28 87 ft (red)	27	farfield south of Z-9	W18-167	37	within Z-1A
Plio-Pleisto	CPT-9A 91 ft (red)	28	farfield north of Z-9	W18-249	41	northeast corner of Z-18
Plio-Pleisto	W15-217	35	southwest corner of Z-9	W18-248	41	east side of Z-1A
Plio-Pleisto	CPT-24 118 ft (red)	36	north of Z-9			
gw				W18-7	61	east side of Z-1A
gw	W15-6L	57	northeast of Z-9 (still has water)	W18-6L	63	west side of Z-1A
gw	W15-9L	57	north of Z-9, 11 m from W15-32 extraction well	W18-12	64	north within Z-18

Location of Shallow Probes Selected for Monitoring at 200-ZP-2,
October 1998 through March 1999

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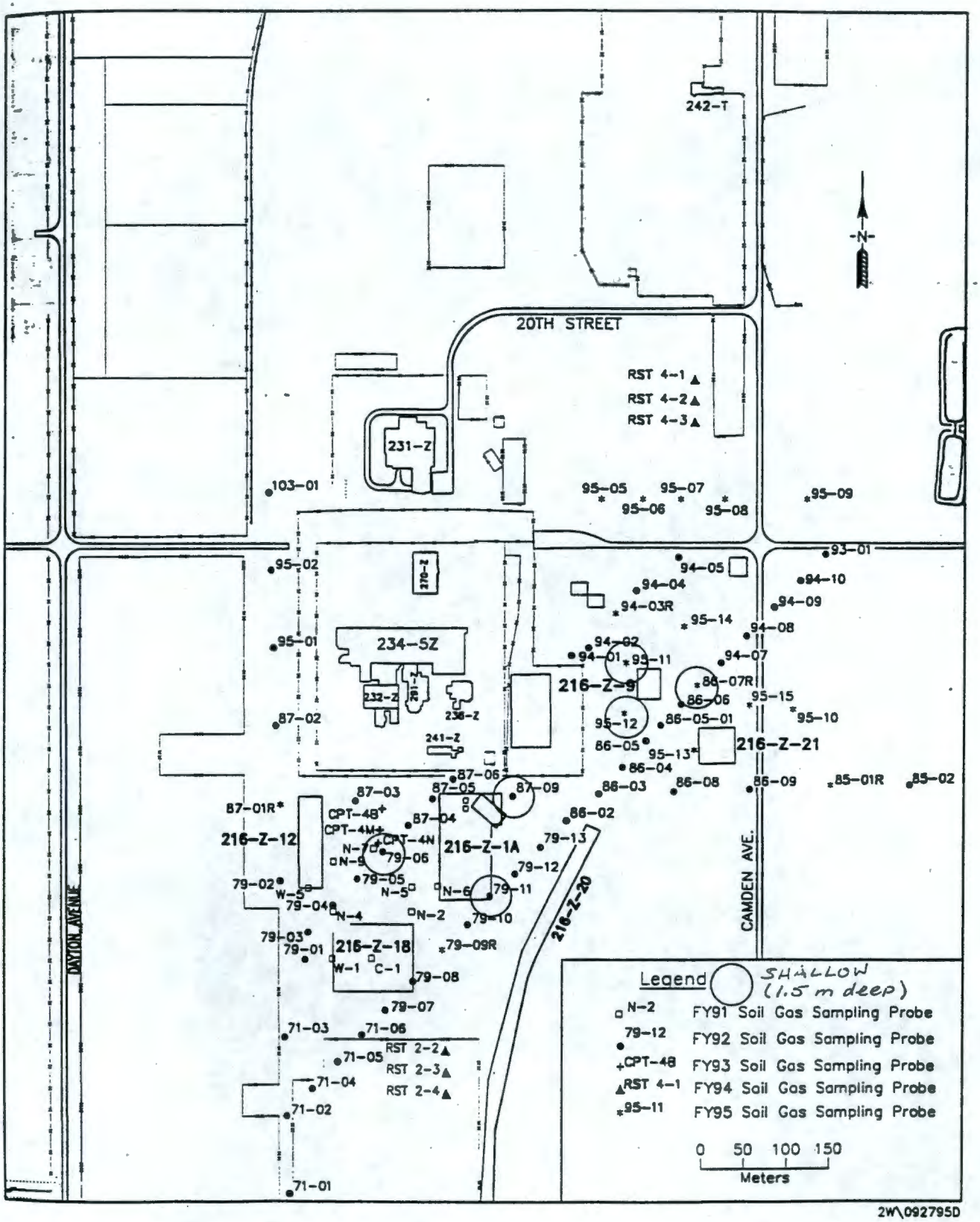

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Location of Near-Surface, Plio-Pleistocene, and Groundwater Probes and Wells Selected for Monitoring at 200-ZP-2, October 1998 through March 1999

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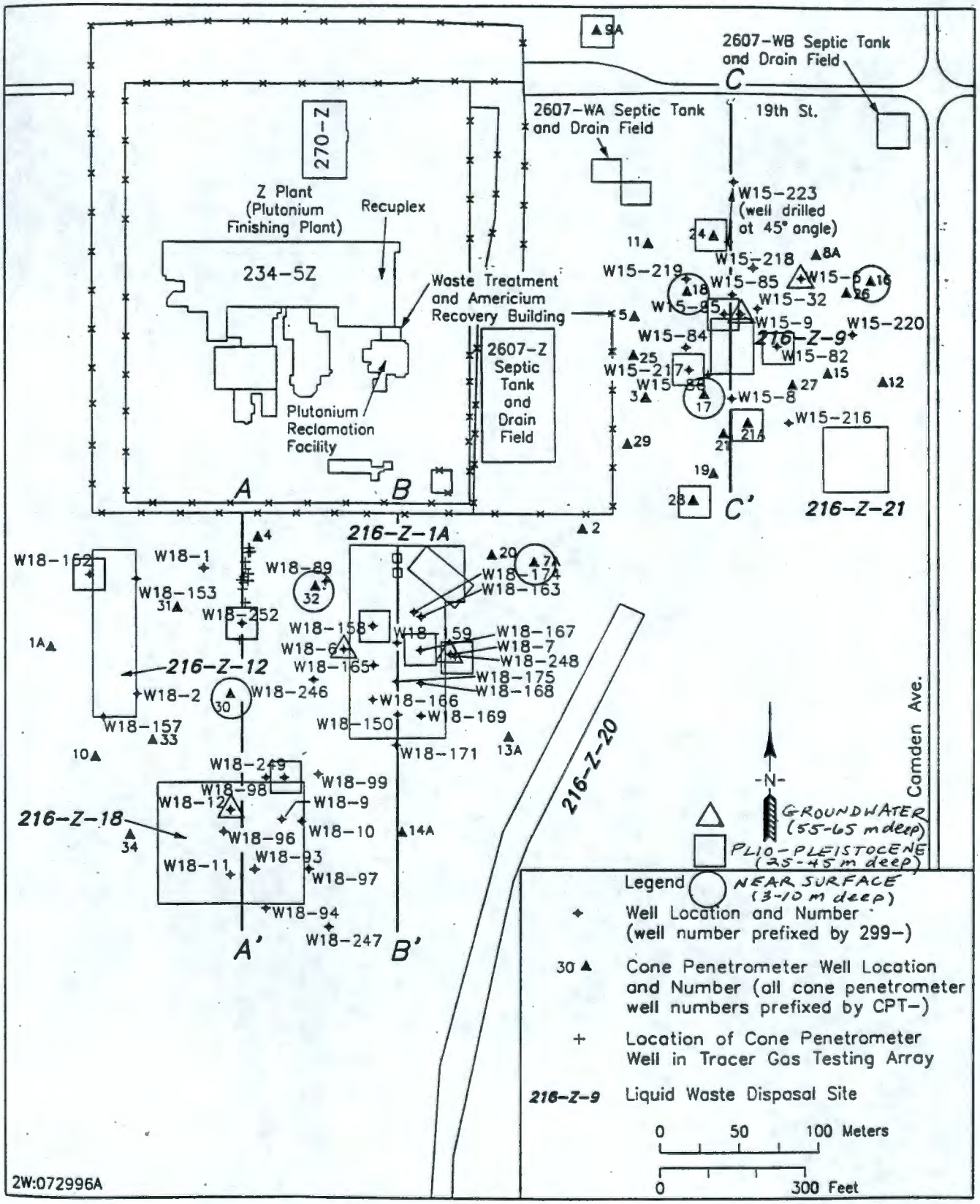


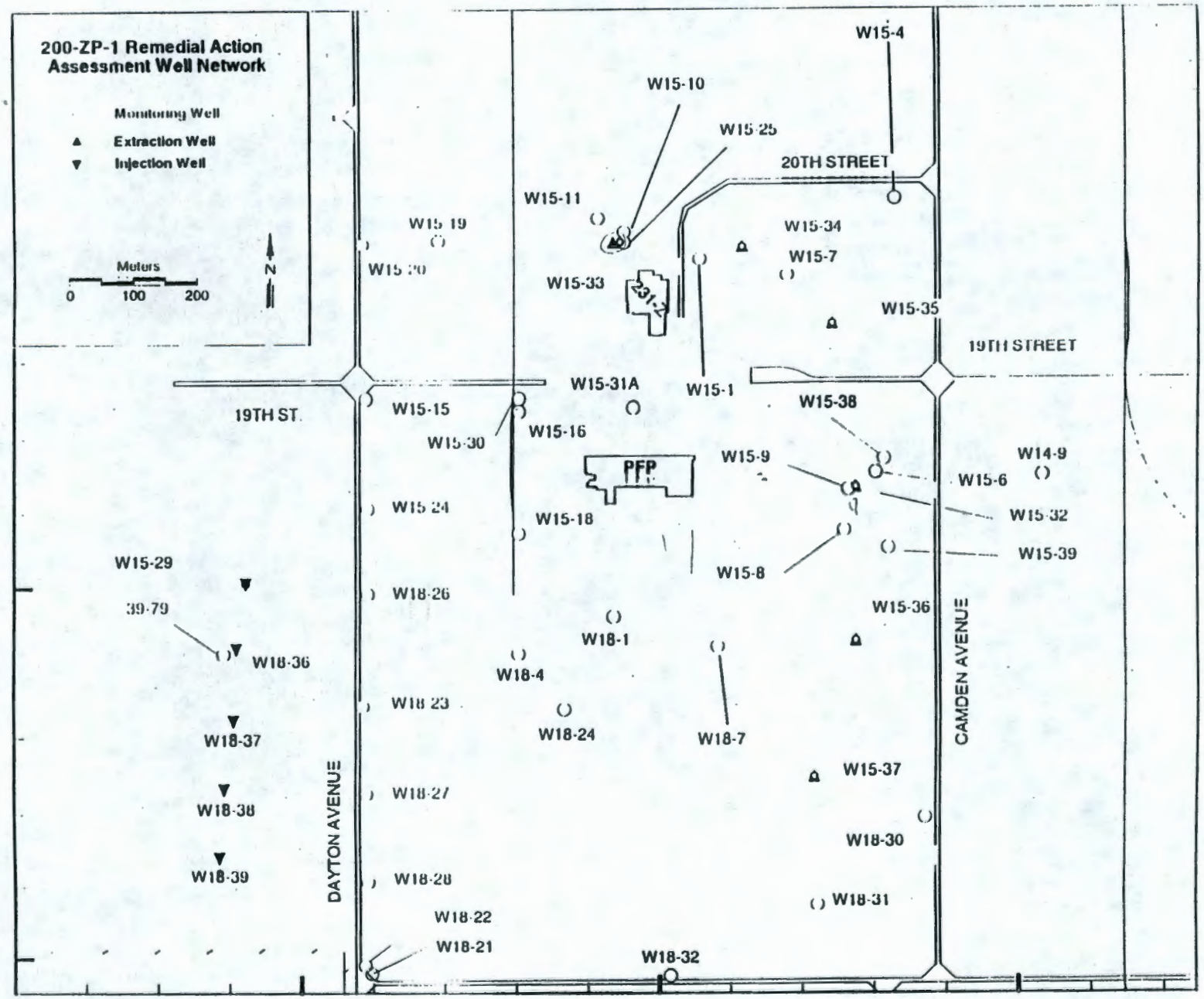


Figure 3-1. Plan View of the 200-ZP-1 Pump-and-Treat Site Showing Extraction, Injection, and Monitoring Well Locations.

Figure 3-3. 200-ZP-1 Extraction Well Flow Rates from April 1, 1998 to June 30, 1998.

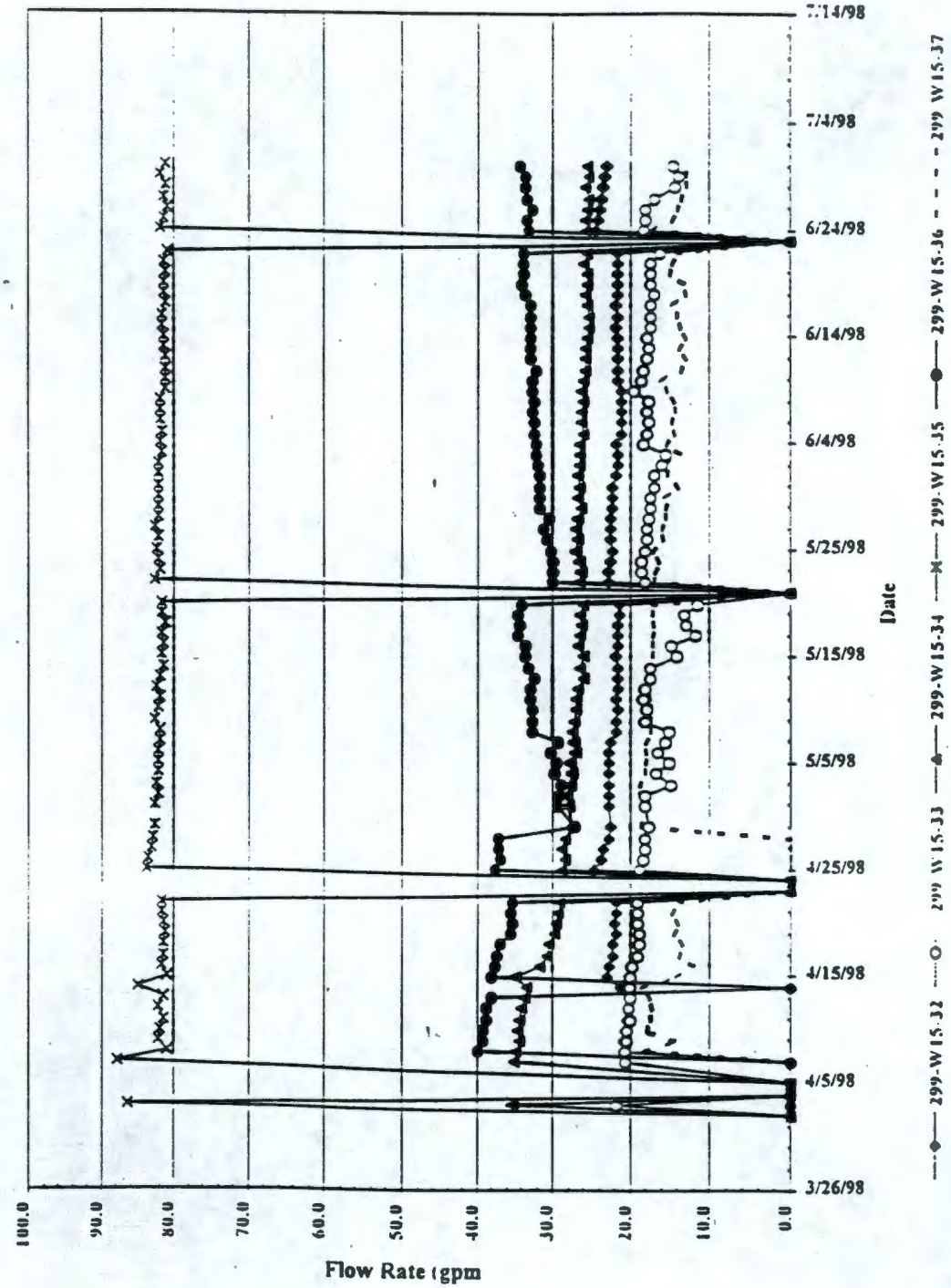


Figure 3-6. Influent and Effluent Tank Carbon Tetrachloride Concentration Trend Plots from April through June 1998.

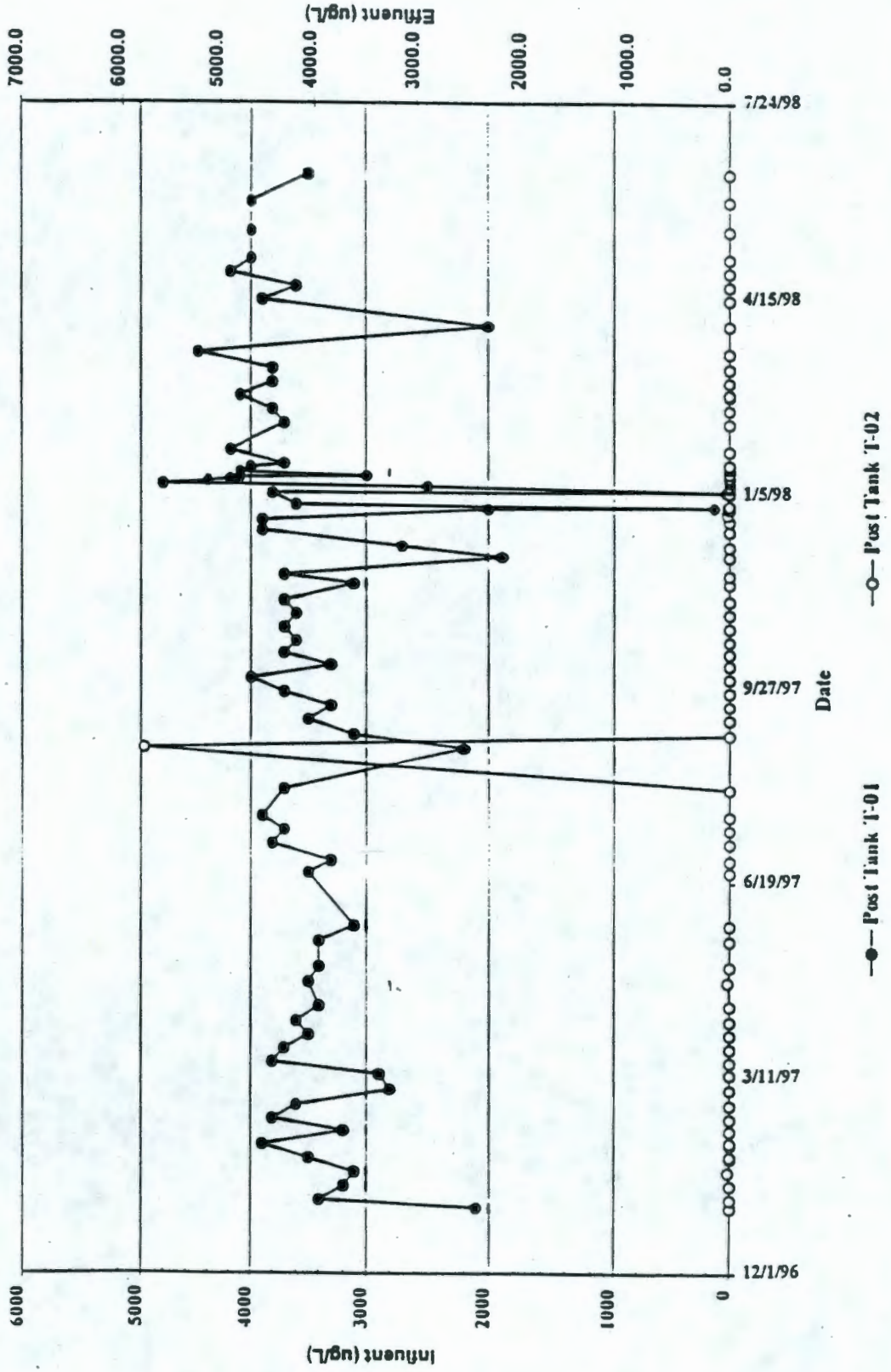


Figure 3-7. 200-ZP-1 Pump and Treat Concentration versus Time Plot: 299-W15-32.

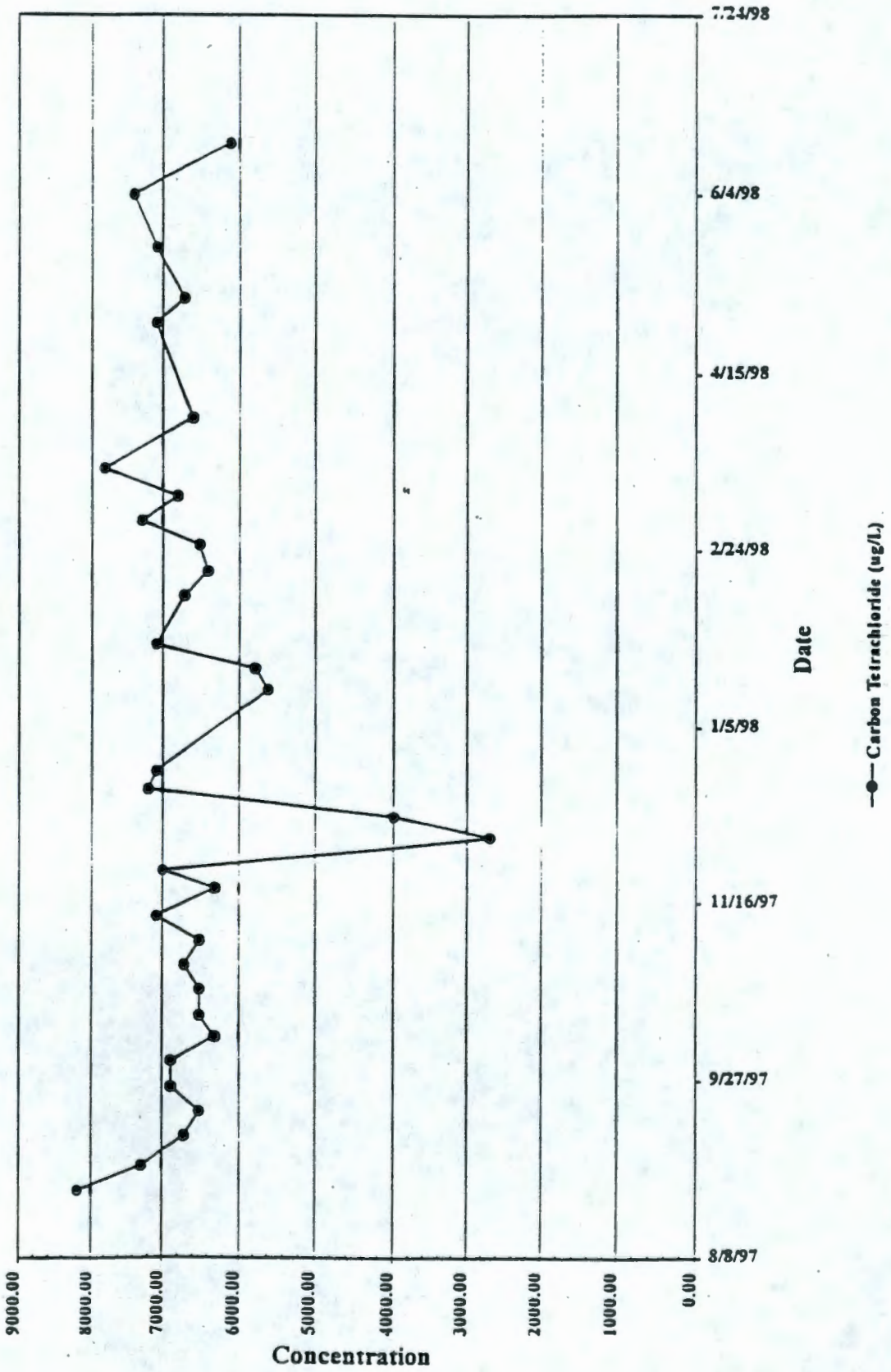


Figure 3-8. 200-ZP-1 Pump and Treat Concentration versus Time Plot: 299-W15-33.

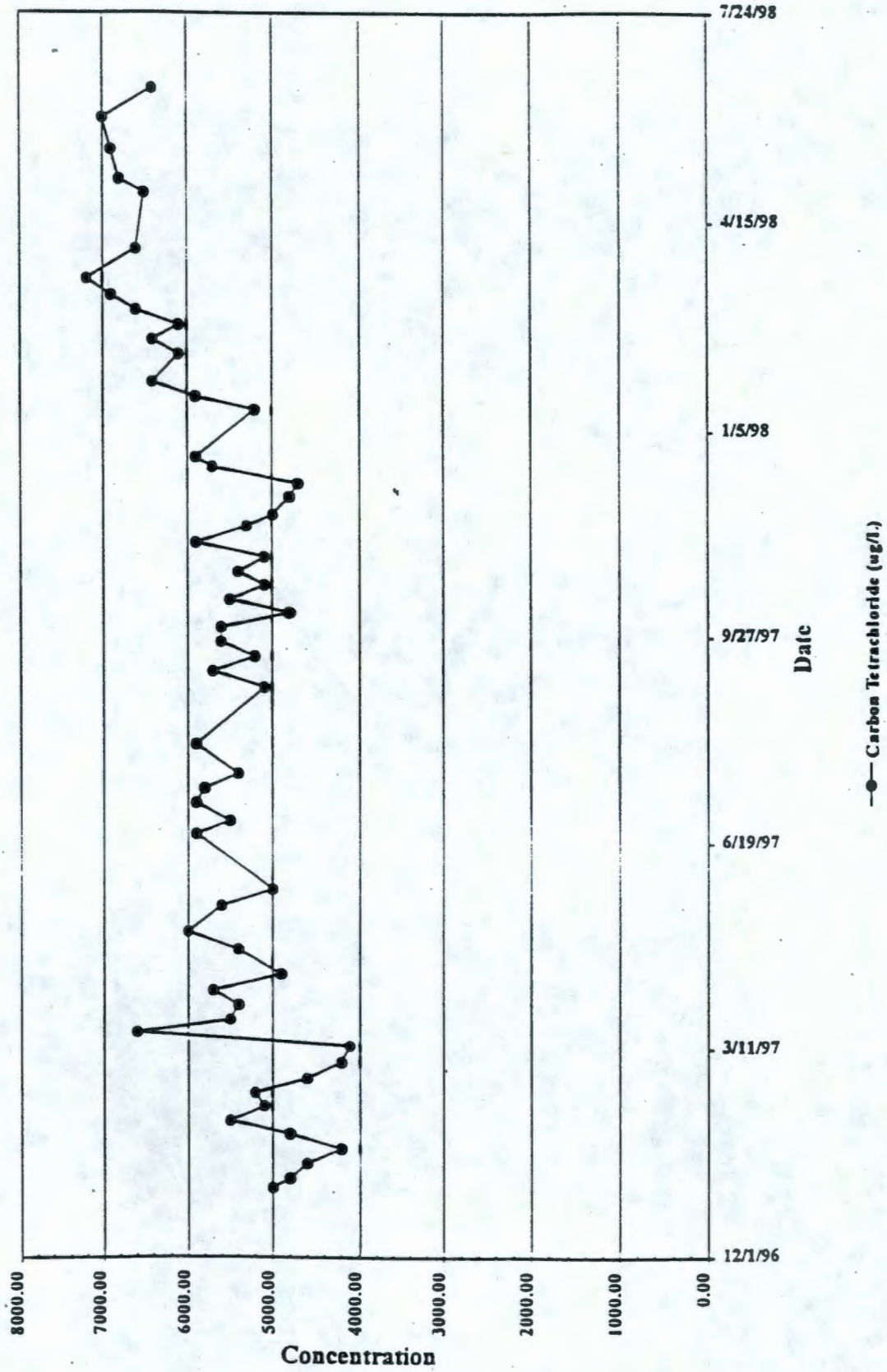


Figure 3-9. 200-ZP-1 Pump and Treat Concentration versus Time Plot: 299-W15-34.

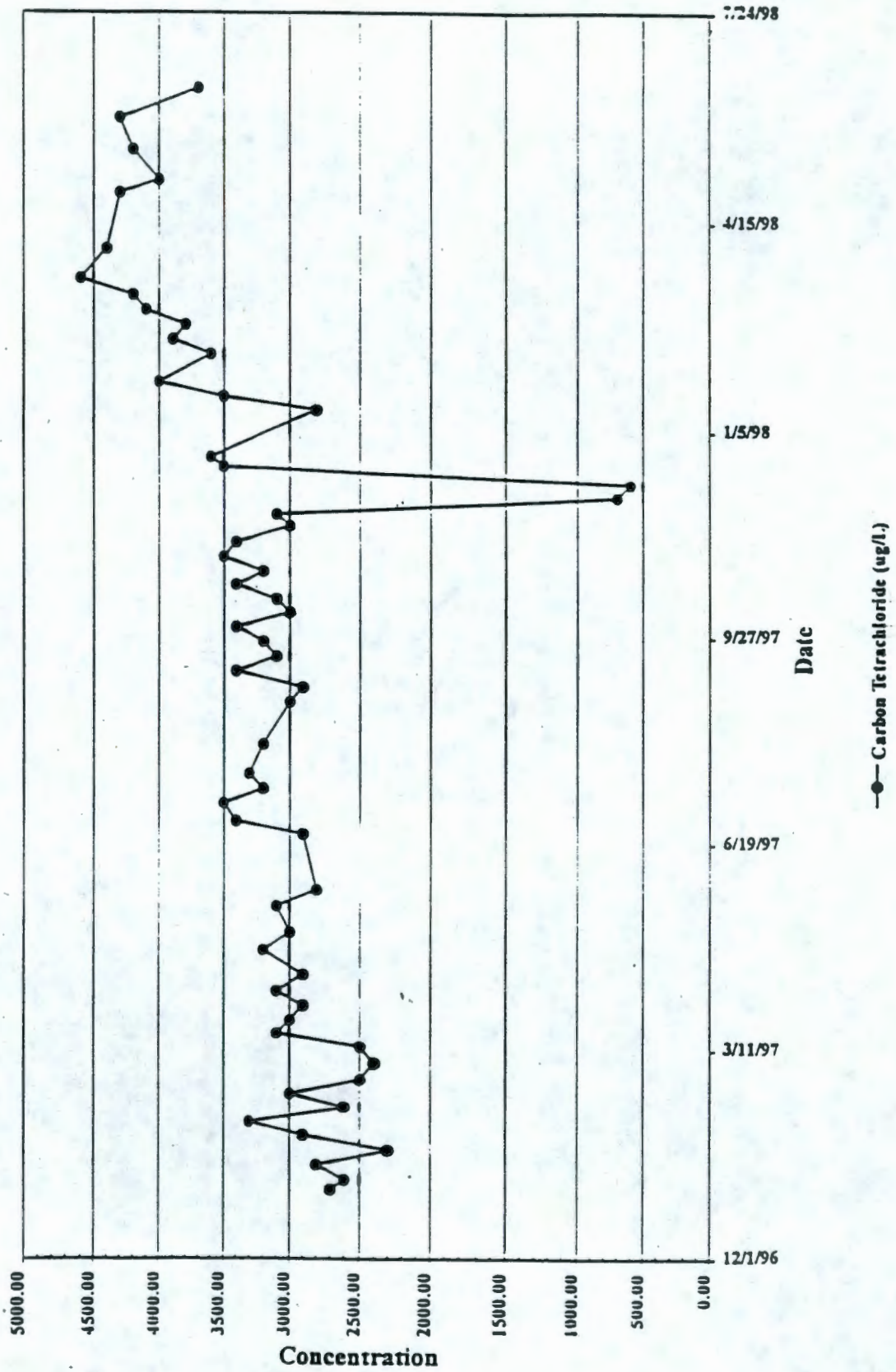


Figure 3-10. 200-ZP-1 Pump and Treat Concentration versus Time Plot: 299-W15-35.

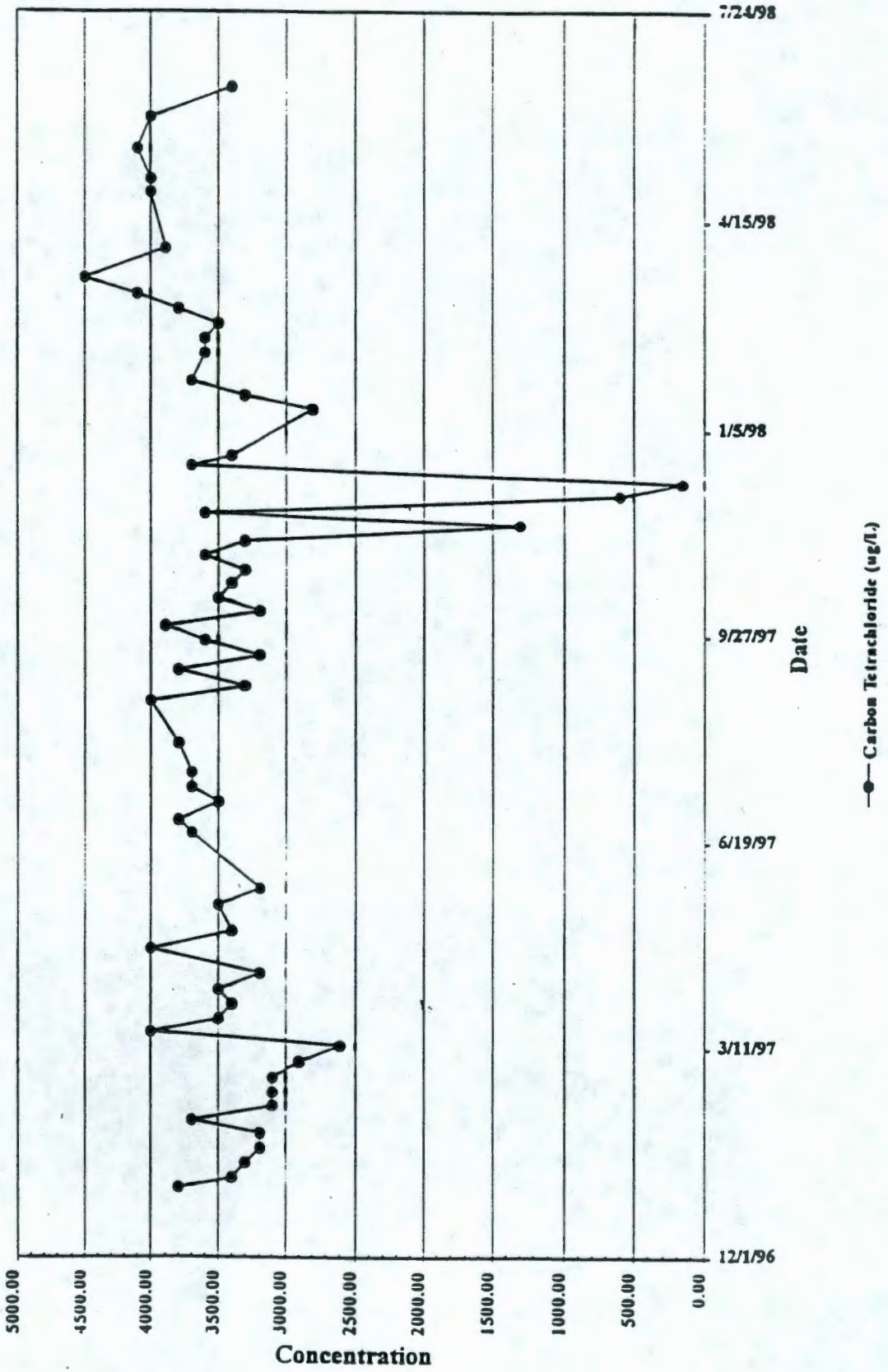


Figure 3-11. 200-ZP-1 Pump and Treat Concentration versus Time Plot: 299-W15-36.

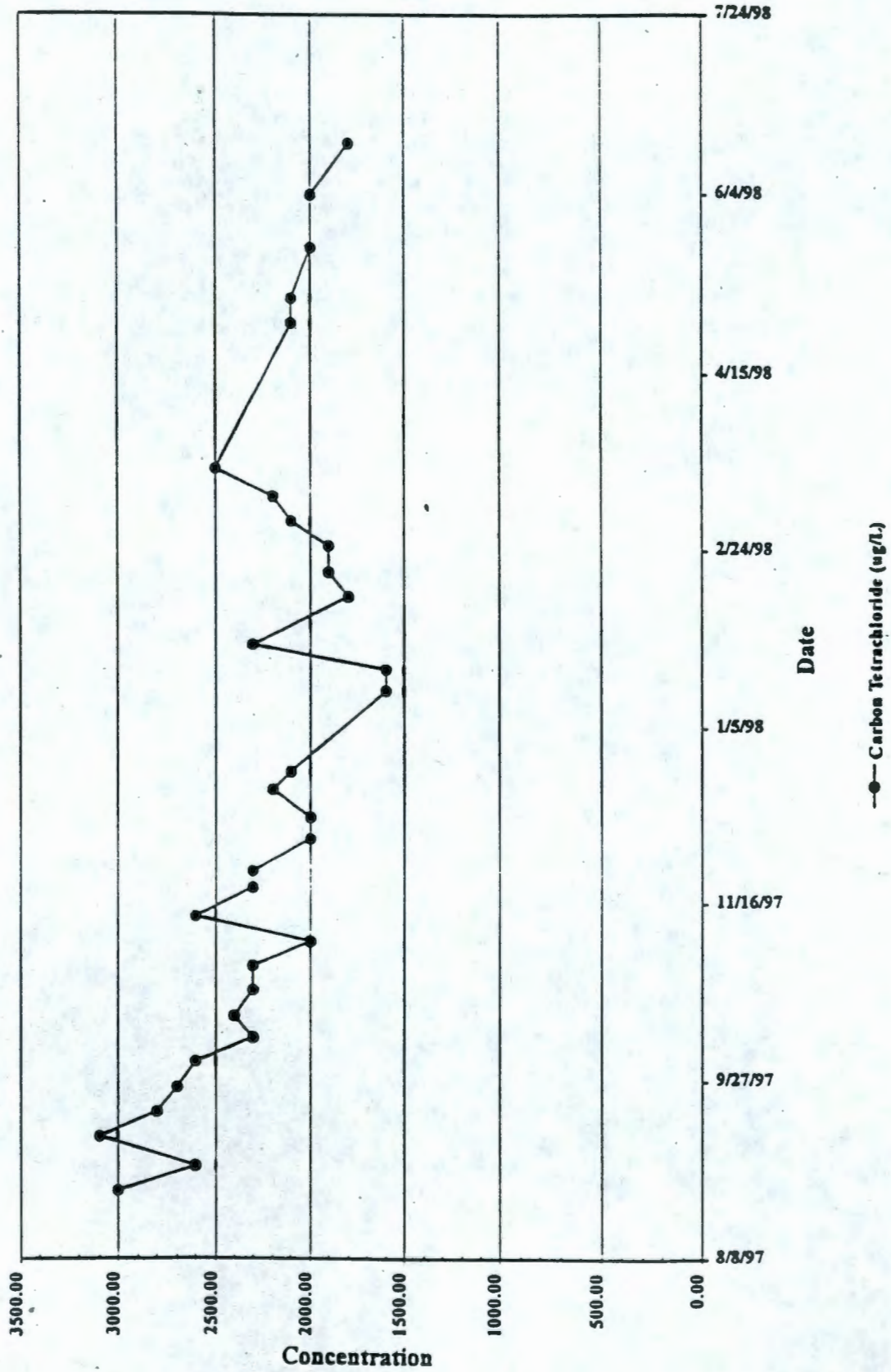
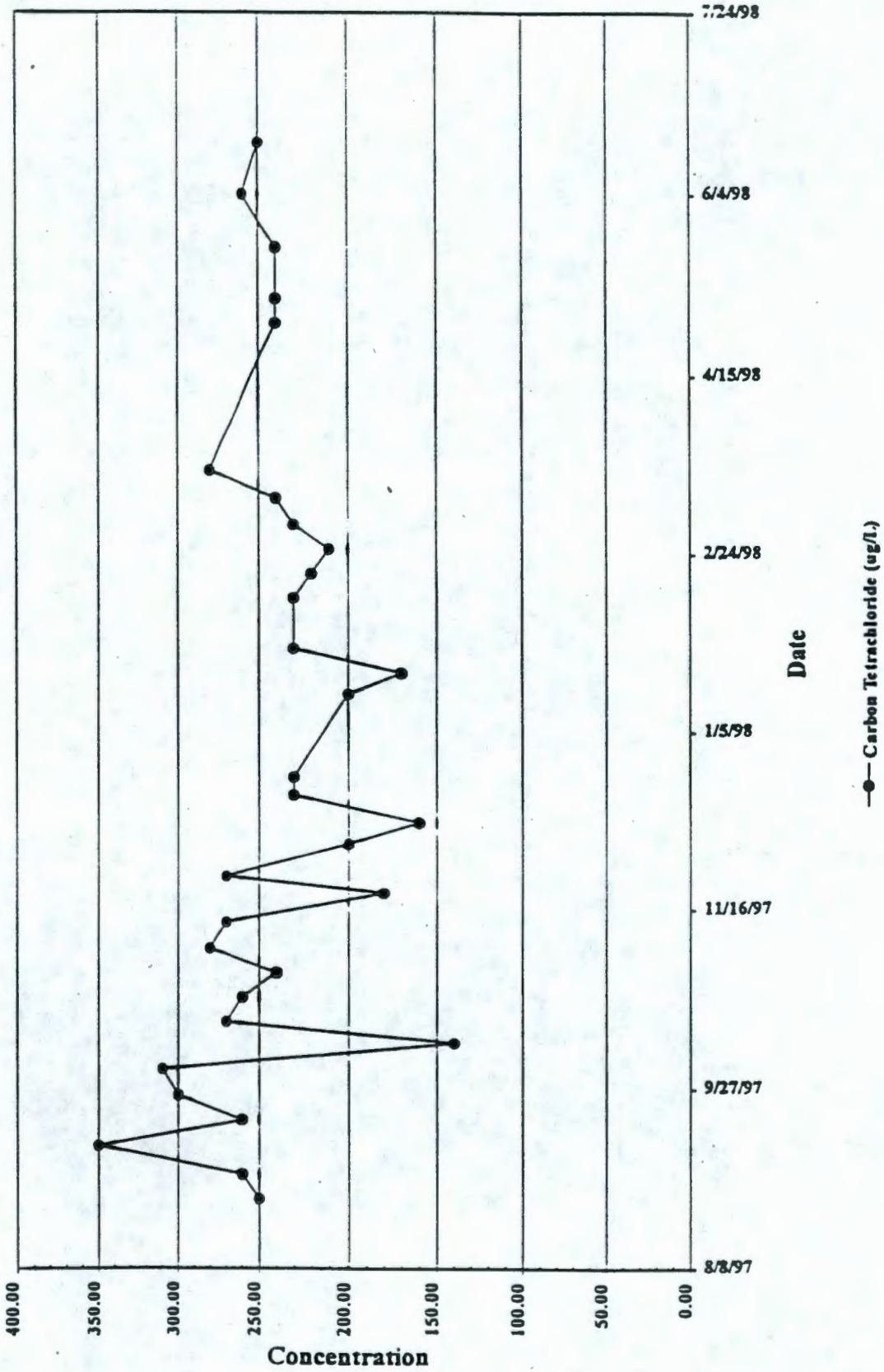


Figure 3-12. 200-ZP-1 Pump and Treat Concentration versus Time Plot: 299-W15-37.



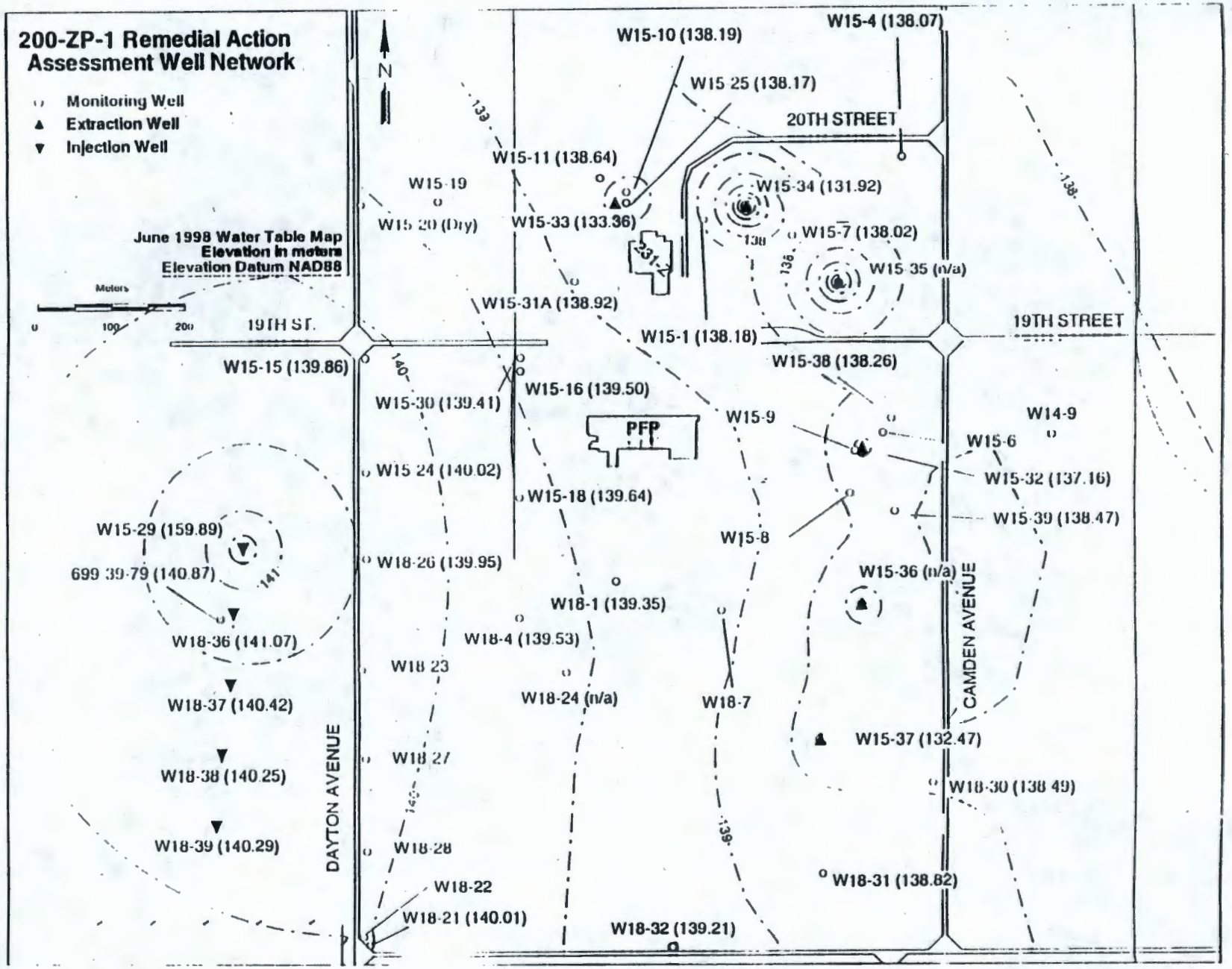


Figure 3-26. 200-ZP-1 Water Table Map, June 1998.

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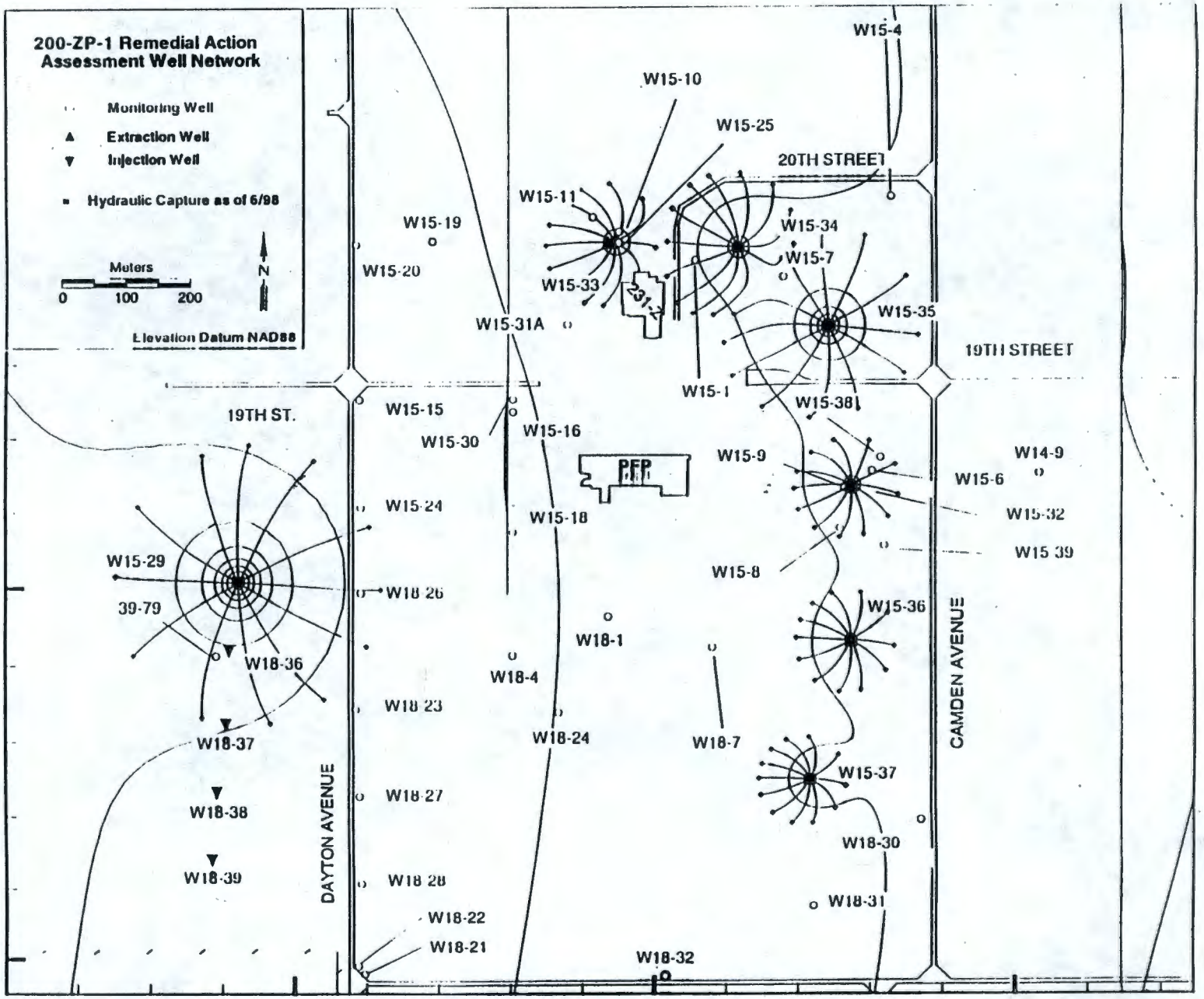

Figure 3-27. 200-ZP-1 Estimated Area of Capture through June 1998.

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Table 3-1. Volume of Groundwater Treated and Mass of Carbon Tetrachloride Removed Since Startup of Operations at 200-ZP-1.

Reporting Period	Liters Treated	Mass of Carbon Tetrachloride Removed (kg)
August 1994 – July 1996	26,676,000	75.85
August 1996 – September 1996	33,232,327	60.96
October 1996 – December 1996	44,583,715	143.54
January 1997 – March 1997	69,869,604	237.2
April 1997 – June 1997	41,877,094	140.8
July 1997 – September 1997	62,469,305	228.8
October 1997 – December 1997	77,192,021	262.6
January 1998 – March 1998	71,545,712	281.4
April 1998 – June 1998	90,843,000	346.5
Total	518,288,778	1,777.5

Table 3-2. Approximate Pumping Rates for 200-ZP-1 Extraction Wells from April 1, to June 30, 1998.

Well Name	Well Number	Flow Rate L/min
299-W15-33	1	66
299-W15-34	2	105
299-W15-35	3	310
299-W15-32	4	84
299-W15-36	5	123
299-W15-37	6	55
	Total	743