

Environmental  
Restoration  
Contractor

## Meeting Minutes

**SUBJE** 200-ZP-1/2 Unit Manager Meeting

**TO** Distribution

**FROM** M. A. Buckmaster

**DATE** June 2, 1998



### ATTENDEES

M. A. Buckmaster H0-19  
D. A. Faulk B5-01  
V. J. Rohay H9-02  
A. C. Tortoso H0-12

### DISTRIBUTION

Attendees  
R. L. Jackson H9-02  
C. Ward H9-01  
L. C. Swanson H9-02  
Document and Information Services H0-09

A 200-ZP-1 and 200-ZP-2 Unit Manager Meeting was held on June 1, 1998, in conference room 2C58 at 3350 George Washington Way. The agenda is included as Attachment 1.

### 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. Between August 5, 1996 and May 25, 1998, the pump-and-treat system removed 1,622 kg of carbon tetrachloride and treated nearly 500,000,000 liters of water (Attachment 2). The process data for the six extraction wells indicates that carbon tetrachloride concentrations are highest at wells W15-33 ("Ext. #1"), near the northwest corner of the 231-Z building at PFP, and W15-32 ("Ext. #4"), at the northeast corner of the Z-9 trench (Attachment 3). These highest concentrations (approximately 7,000 µg/L) are approaching one percent of the aqueous solubility of carbon tetrachloride (800,000 µg/L), which some researchers regard as the rule-of-thumb indication of the presence of DNAPL in the aquifer. The measured radius of influence of the extraction wells indicates that contaminated water is being extracted from nearly all of the target area of highest dissolved concentrations in the aquifer.

A. C. Tortoso and D. A. Faulk agreed that planning must take place now to prepare FY01 budgets that include additional characterization to address issues such as the potential presence of DNAPL. Although existing data and future pump-and-treat data can be compiled, it is anticipated that the DNAPL issue (is a DNAPL source present in the aquifer? if so, where? are we remediating the aquifer effectively using pump-and-treat?) will remain a data gap in FY01. D. A. Faulk noted that his 5-year-review of the pump-and-treat

operations will occur in the FY01 timeframe and that he will be considering whether the DNAPL data gap needs to be addressed. A. C. Tortoso suggested that useful support to carbon tetrachloride characterization and remediation efforts could be provided through mechanisms such as the Innovative Treatment Remediation Demonstration (ITRD) program. D. A. Faulk agreed with this approach of reviewing the available remedial technologies to find the best match with the project needs.

V. J. Rohay reported on the results of her correspondence with J. W. Massmann at the University of Washington regarding CRESF support for future studies at ZP-2 (action item from the 3/3/98 ZP-1/ZP-2 meeting). J. W. Massmann wrote that he has funding for a student for at least the next year to continue work at the carbon tetrachloride site. He pointed out that because the funding is from CRESF, the work would need to be tied into risk evaluation. D. A. Faulk indicated that it would be useful to determine the groundwater concentrations that could exist at the future site uses working group boundary and still be protective of the Columbia River. V. J. Rohay will contact J. W. Massmann again to continue discussions of future work. D. A. Faulk noted his continued interest in retesting the impact of an impermeable surface cover on soil vapor extraction operations.

### **200-ZP-2 Soil Vapor Extraction Systems**

Soil vapor extraction (SVE) to remove carbon tetrachloride from the vadose zone resumed 3/30/98 at the Z-1A/Z-18/Z-12 site using the 14.2 m<sup>3</sup>/min SVE system. Fifteen extraction wells were selected to optimize both protection of groundwater and mass removal of contaminant. V.J. Rohay provided a table indicating that restart concentrations at individual extraction wells in 3/98 were generally similar to those observed in 7/97 (Attachment 4). She also reported that the combined carbon tetrachloride inlet concentration at the SVE system during 3/98 restart was generally similar to, but slightly lower than, the inlet concentration measured during 7/97 restart (25 ppmv and 38 ppmv, respectively).

Initial characterization of the 15 on-line wells indicated that the SVE system was extracting soil vapor effectively from only the closest wells and that the applied vacuum at the distant wells was insufficient to produce flow. Tests showed that the SVE system could, however, extract soil vapor effectively from isolated distant wells. Therefore, the mix of on-line extraction wells is being periodically switched among one set of 7 relatively nearby wells and two sets of 4 relatively distant wells. Each set includes wells open near the groundwater and wells open near the silt/caliche layer.

Soil vapor monitoring, including monitoring near the groundwater and near-surface, is being continued at the Z-9 site during April through June while it is not undergoing active SVE. Additional soil vapor monitoring locations were added to measure carbon tetrachloride concentrations near the lower permeability silt/caliche zone to provide an indication of the potential magnitude of the inlet concentrations that could be expected when SVE begins (Attachment 5). V. J. Rohay provided a table comparing the maximum concentration at each 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 4/30/98 (Attachment 6). The concentrations monitored since October 1997 are similar to those monitored during the rebound study.

It is anticipated that the SVE system will be moved to the Z-9 site after the July 4 holiday. During July – September, non-operational soil vapor monitoring will be conducted at the Z-1A/Z-18/Z-12 site.

The 28.3 m<sup>3</sup>/min and 42.5 m<sup>3</sup>/min SVE systems remain in standby mode.

D. A. Faulk expressed interest in continuing to evaluate enhancements for SVE operations and long-term performance of the system. A. C. Tortoso suggested that measurements could be taken while the SVE system is operational to support additional modeling of the area of influence. M. A. Buckmaster stated that he is incorporating operation of passive venting at a limited number of sites into next year's budget. All meeting participants agreed that plans and costs need to be established now to lay the groundwork for long term characterization and remediation needs.

#### **Action Items**

1. V. J. Rohay will contact J. W. Massmann at the University of Washington regarding CRESF support for future studies at 200-ZP-2.

**AGENDA**

**200-ZP-1 AND 200-ZP-2 UNIT MANAGER'S MEETING**

**June 1, 1998**

**200-ZP-2 Soil Vapor Extraction Remediation**

- Status

**200-ZP-1 Pump and Treat Remediation**

- Status

# WEEKLY STATUS REPORT FOR WEEK ENDING MAY 25, 1998

<b>WEEKLY OPERATION SUMMARY 05/25/98</b>					
OPERABLE UNIT	WEEKLY OPERATIONAL PERIOD	WEEKLY MAXIMUM HOURS AVAILABLE	ACTUAL SYSTEM AVAILABILITY (%)**	AVERAGE GPM	TOTAL VOLUME TREATED (L)
100-HR-3	05/19/98 to 05/25/98	168	100	N/A	6,066,000
100-KR-4	05/19/98 to 05/25/98	168	18.5	N/A	1,623,000
100-NR-2	05/19/98 to 05/25/98	168	100	62	2,366,000
200-UP-1	05/19/98 to 05/25/98	168	100	49	1,884,000
200-ZP-1	05/19/98 to 05/25/98	168	93.5	196	6,989,000
200-ZP-2	05/19/98 to 05/25/98	168	100	*482	***138,000

\* Average cfm

\*\* System availability not toward PBCI.

\*\*\* Volume air treated in K meters<sup>3</sup>

<b>START-UP TO DATE OPERATIONS SUMMARY</b>			
OPERABLE UNIT	OPERATIONAL PERIOD	VOLUME (L)	MASS REMOVED
100-HR-3	7/01/97 to date	■310,399,000	N/A
100-KR-4	10/01/97 to date	134,966,000	N/A
100-NR-2	9/01/95 to date	263,285,000	.256 Ci

# WEEKLY STATUS REPORT FOR WEEK ENDING MAY 25, 1998

START-UP TO DATE OPERATIONS SUMMARY			
200-UP-1	3/31/97 to date	103,243,000	N/A
200-ZP-1	8/5/96 to date	■■■487,471,000	■■■1,622 kg
200-ZP-2	3/30/98 to date	■■1,198,000	150 kg

- Includes 58M Liters from prior treated D Area Transfer
- Volume treated recalculated in K meters<sup>3</sup>
- Includes updated prior totals from Phase I and Phase II

## 200-ZP-1 Process Data - 5/20/98

Sample Location	TCM	CCl4	TCE
T-02	<2	<2	<2
V-01	<2	<2	<2
T-01	22	4000	7.9
Ext #1	30	6900	10
Ext #2	17	4200	13
Ext #3	18	4100	6.6
Ext #4	39	7100	6.4
Ext. #5	23	2000	8.0
Ext. #6	23	240	<2

200-ZP-2 Soil Vapor Extraction Well Characterization Data								
Well/Interval	Restart 7/18/97				Restart 3/30/98			
		Well Vacuum	Flow	CCI4		Well Vacuum	Flow	CCI4
	Date	(in. w.c.)	(ft3/min)	(ppmv)	Date	(in. w.c.)	(ft3/min)	(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

200-ZP-2			
Location		1997-1998	1998
(Well or Probe)	Zone	Sep-Mar	Apr-Jun
/feet bgs			
86-06/ 5 ft	1	X	X
94-09/ 5 ft	1	X	X
95-11/ 5 ft	1	X	X
95-12/ 5 ft	1	X	X
87-01R/ 5 ft	1	X	
N-6/ 5 ft	1	X	
79-11/ 5 ft	1	X	
87-09/ 5 ft	1	X	
CPT-28/ 40 ft	2	X	X
CPT-9A/ 60 ft	2	X	X
CPT-17/ 10 ft	2	X	X
CPT-18/ 15 ft	2	X	X
CPT-16/ 10 ft	2	X	X
CPT-21A/ 45 ft	2	X	X
CPT-1A/ 35 ft	2	X	X
CPT-7A/ 32	2	X	
CPT-13A/ 9 ft	2	X	X
CPT-31/ 25 ft	2	X	
CPT-32/ 25 ft	2	X	
CPT-33/ 40 ft	2	X	
W15-216L/ 184 ft	5	X	X
W15-6L/ 189 ft	6	X	X
W15-9L/ 189 ft	6	X	X
W18-6L/ 201 ft	6	X	
W18-7/ 203 ft	6	X	
added April 1998			
W15-82/ 82 ft	2		X
W15-95/ 82 ft	2		X
CPT-21A/ 86 ft	2		X
CPT-28/ 87 ft	2		X
CPT-9A/ 91 ft	2		X
CPT-24/ 95 ft	2		X
W15-218U/ 108 ft	3		X
W15-223/ 108 ft	3		X
W15-217/ 115 ft	3		X
CPT-24/ 118 ft	3		X

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

200-ZP-2		November 1996 -	October 1997 -	October 1997 -
Location		July 1997	March 1998	April 1998
(Well or Probe)	Zone	Maximum Rebound	Maximum Rebound	Maximum Rebound
/feet bgs		Carbon Tetrachloride	Carbon Tetrachloride	Carbon Tetrachloride
		(ppmv)	(ppmv)	(ppmv)
86-06/ 5 ft	1	1.3	0	0
94-09/ 5 ft	1	1.4	1.3	1.3
95-11/ 5 ft	1	0	1.2	1.2
95-12/ 5 ft	1	1.1	0	1.4
87-01R/ 5 ft	1	3.5	0	deleted April 1998
N-6/ 5 ft	1	not measured	0	deleted April 1998
79-11/ 5 ft	1	0	0	deleted April 1998
87-09/ 5 ft	1	not measured	0	deleted April 1998
CPT-28/ 40 ft	2	40.1	21.6	21.6
CPT-9A/ 60 ft	2	45.5	40.9	40.9
CPT-17/ 10 ft	2	not measured	1.2	3.6
CPT-18/ 15 ft	2	not measured	0	1.0
CPT-16/ 10 ft	2	not measured	0	0
CPT-21A/ 45 ft	2	65.6	42.9	42.9
CPT-1A/ 35 ft	2	2.0	1.2	1.2
CPT-7A/ 32	2	not measured	2.3	deleted April 1998
CPT-13A/ 9 ft	2	not measured	0	0
CPT-31/ 25 ft	2	not measured	0	deleted April 1998
CPT-32/ 25 ft	2	not measured	9.1	deleted April 1998
CPT-33/ 40 ft	2	not measured	1.8	deleted April 1998
W15-216L/ 184 ft	5	16.7	17.3	17.3
W15-6L/ 189 ft	6	22.6	16.3	16.4
W15-9L/ 189 ft	6	18.3	14.6	14.6
W18-6L/ 201 ft	6	36.0	31.3	deleted April 1998
W18-7/ 203 ft	6	28.5	15.8	deleted April 1998
added April 1998				
CPT-24/ 70 ft	2	not measured		1.8
W15-82/ 82 ft	2	28.9		0
W15-95/ 82 ft	2	not measured		11.9
CPT-21A/ 86 ft	2	221		169
CPT-28/ 87 ft	2	280		229
CPT-9A/ 91 ft	2	103		27.6
W15-218U/ 108 ft	3	41.4		0
W15-223/ 108 ft	3	31.2		0
W15-217/ 115 ft	3	797		64.9
CPT-24/ 118 ft	3	44.6		37.7

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

200-ZP-2		November 1996 -						
Location	Zone	July 1997	12/1/97	1/10/98	1/29/98	2/26/98	3/24/98	4/30/98
(Well or Probe)	Zone	Maximum Rebound						
/feet bgs		Carbon Tetrachloride	CCI4	CCI4	CCI4	CCI4	CCI4	CCI4
		(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)	(ppmv)
86-06/ 5 ft	1	1.3	0	0	0	0	0	0
94-09/ 5 ft	1	1.4	1.3	0	0	1.3	0	0
95-11/ 5 ft	1	0	0	0	0	0	1.2	0
95-12/ 5 ft	1	1.1	0	0	0	0	0	1.4
87-01R/ 5 ft	1	3.5	0	0	0	0	0	del 4/98
N-6/ 5 ft	1	not measured	0				0	del 4/98
79-11/ 5 ft	1	0	0	0	0	0	0	del 4/98
87-09/ 5 ft	1	not measured	0	0	0	0	0	del 4/98
CPT-28/ 40 ft	2	40.1	17.0	19.1	21.6	19.2	11.7	13.3
CPT-9A/ 60 ft	2	45.5	35.8	37.5	39.1	40.9	38.9	39.1
CPT-17/ 10 ft	2	not measured	0	0	0	0	1.17	3.6
CPT-18/ 15 ft	2	not measured	0	0	0	0	0	1.0
CPT-16/ 10 ft	2	not measured	0	0	0	0	0	0
CPT-21A/ 45 ft	2	65.6	18.5	30.5	37.1	21.5	42.9	41.4
CPT-1A/ 35 ft	2	2.0	0	0	0	0	1.2	1.2
CPT-7A/ 32	2	not measured	0	0	1.9	2.3	2.2	del 4/98
CPT-13A/ 9 ft	2	not measured	0	0	0	0	0	0
CPT-31/ 25 ft	2	not measured	0	0	0	0	0	del 4/98
CPT-32/ 25 ft	2	not measured	0	0	5.1	6.6	9.1	del 4/98
CPT-33/ 40 ft	2	not measured	0	1.8	1.8	1.3	1.4	del 4/98
W15-216L/ 184 ft	5	16.7		14.1	15.5	15.0	17.3	15.0
W15-6L/ 189 ft	6	22.6		15.2	16.1	16.1	16.3	16.4
W15-9L/ 189 ft	6	18.3		13.3	14.6	8.7	14.6	14.0
W18-6L/ 201 ft	6	36.0		24.0	25.8	31.3	0 (a)	del 4/98
W18-7/ 203 ft	6	28.5		12.6	14.4	15.7	15.8	del 4/98
added April 1998								
CPT-24/ 70 ft (b)	2	not measured						1.8
W15-82/ 82 ft	2	28.9						0 (c)
W15-95/ 82 ft	2	not measured						11.9 (c)
CPT-21A/ 86 ft	2	221						169
CPT-28/ 87 ft	2	280						229
CPT-9A/ 91 ft	2	103						27.6
W15-218U/ 108 ft	3	41.4						0 (d)
W15-223/ 108 ft	3	31.2						0 (c)
W15-217/ 115 ft	3	797					64.9 (c)	25.4 (d)
CPT-24/ 118 ft	3	44.6						37.7
(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; substituted CPT-24/70 ft								
(c) sampled from wellhead without tubing after 3 minute purge								
(d) sampled from wellhead without tubing after 10 minute purge								