Jakub, Barbara, Env. Health

From:
Sent:
Jakub, Barbara, Env. Health
Friday, June 20, 2008 9:17 AM
To:
'Daniel Davis'; 'Borgh, Bill:'
Subject:
RE: COP Site No. 1871 Oakland

Bill,

In the e-mail below I requested that Daniel perform a preferential pathway study before we can evaluate where to place borings. I should have included you on this e-mail since I requested work from your consultant. In addition to the request below, I also request that a well survey be performed for this area. Figures in the East Bay Plain Groundwater Basin Beneficial Use Evaluation Report indicate that there may be wells in the area. As part of the preferential pathway evaluation please perform a ¼-mile well survey. Regards,

Barbara Jakub, P.G. Alameda County Environmental Health (510) 639-1287 (direct) (510) 337-9335 (fax) barbara.jakub@acgov.org

Online case files are available at the website below http://www.acgov.org/aceh/index.htm

From: Jakub, Barbara, Env. Health **Sent:** Thursday, June 19, 2008 5:02 PM

To: 'Daniel Davis'

Subject: RE: COP Site No. 1871 Oakland

Daniel,

It does seem like the location and distance of your proposed CPT boring will not give us much information. I am wondering why MTBE is present in MW-9. Has there been a utility survey for the site and are there cross-sections that would perhaps explain why MTBE is present in this well? It seems that a way to proceed would be to determine if the MTBE in MW-9 travelled along a preferential pathway. In addition to this evaluation, can you determine the travel time of the MTBE given the data that you have? With the distance being so far, if a boring is advanced now along Stanley Place as per your map, there may be a possibility that the plume has not advanced that far yet. Please submit your evaluation by September 19, 2008 so we can evaluate if off-site borings are necessary. Regards,

Barbara Jakub, P.G. Alameda County Environmental Health (510) 639-1287 (direct) (510) 337-9335 (fax) barbara.jakub@acgov.org

Online case files are available at the website below http://www.acgov.org/aceh/index.htm

From: Daniel Davis [mailto:DDavis@deltaenv.com]

Sent: Thursday, June 19, 2008 2:54 PM

To: Jakub, Barbara, Env. Health **Subject:** COP Site No. 1871 Oakland

June 19, 2008

Dear Barbara -

I am currently preparing a work plan for downgradient assessment at <u>COP Site No. 1871</u> (<u>96 MacArthur St., Oakland</u>). The issue is the MTBE concentrations present in groundwater samples from downgradient monitoring well MW-9 and the need to assess potential migration further downgradient. Attached is a map of the site showing a proposed CPT drilling location; also attached is a rose diagram showing the groundwater gradient direction.

As shown on the map, MW-9 is adjacent to elevated Highway 580. Finding a suitable location for downgradient assessment from MW-9 is difficult because of the highway. In addition, the site is located in what appears to be a depression relative to the surrounding topography. However, a site for drilling a CPT boring was decided and is located directly downgradient from the site on the western side of Highway 580.

Groundwater samples from monitoring wells MW-6, MW-7, and MW-8, each located on the west downgradient side of the site, have shown elevated concentrations of MTBE in the past; MTBE concentrations in samples from these wells are now not elevated (see attached historical groundwater analytical results). Monitoring well MW-9, located 150 feet west of the site, has shown increasing concentrations of MTBE over time but the concentrations are now declining. Monitoring well MW-10, located 220 feet downgradient from the site, has shown MTBE concentrations up to 48 ug/L (September 27, 2006); the latest groundwater sample from MW-10 showed 1.3 ug/L MTBE (March 25, 2008).

The rose diagram shows that the gradient at the site is southwest (21 measurements out of 24) with a minor south-southwest component (3 out of 24 measurements). However, the gradient direction measurement is based on an interpretation of groundwater elevation contours and there is likely a component of groundwater flow west from the site. Therefore, although monitoring well MW-9 is not exactly downgradient from the site as defined by the rose diagram, the highest offsite downgradient concentration of MTBE has been present in samples collected from this well (2,800 ug/L, December 20, 2005). Monitoring well MW-10 is directly downgradient from the site based on the rose diagram; however, as indicated above, the highest MTBE concentration present in samples from this well is two orders of magnitude less than the highest concentration in samples from MW-9.

The proposed CPT boring location is 460 feet downgradient from the site; this is as close to the site as possible and still downgradient from monitoring well MW-9. Given the large distance from the site due to the presence of the highway, I am concerned that little will be achieved by drilling this borehole and collecting groundwater samples from this location. This is the best location for a downgradient assessment; however, I am not certain that the effort is worth the potential return. As such, I would appreciate your input.

Regards,

Daniel J. Davis, R.G.
Senior Project Manager
Delta Consultants
11050 White Rock Road, Suite 110
Rancho Cordova, California 95670
Direct (916) 503-1260
Cell (916) 425-2424
ddavis@deltaenv.com

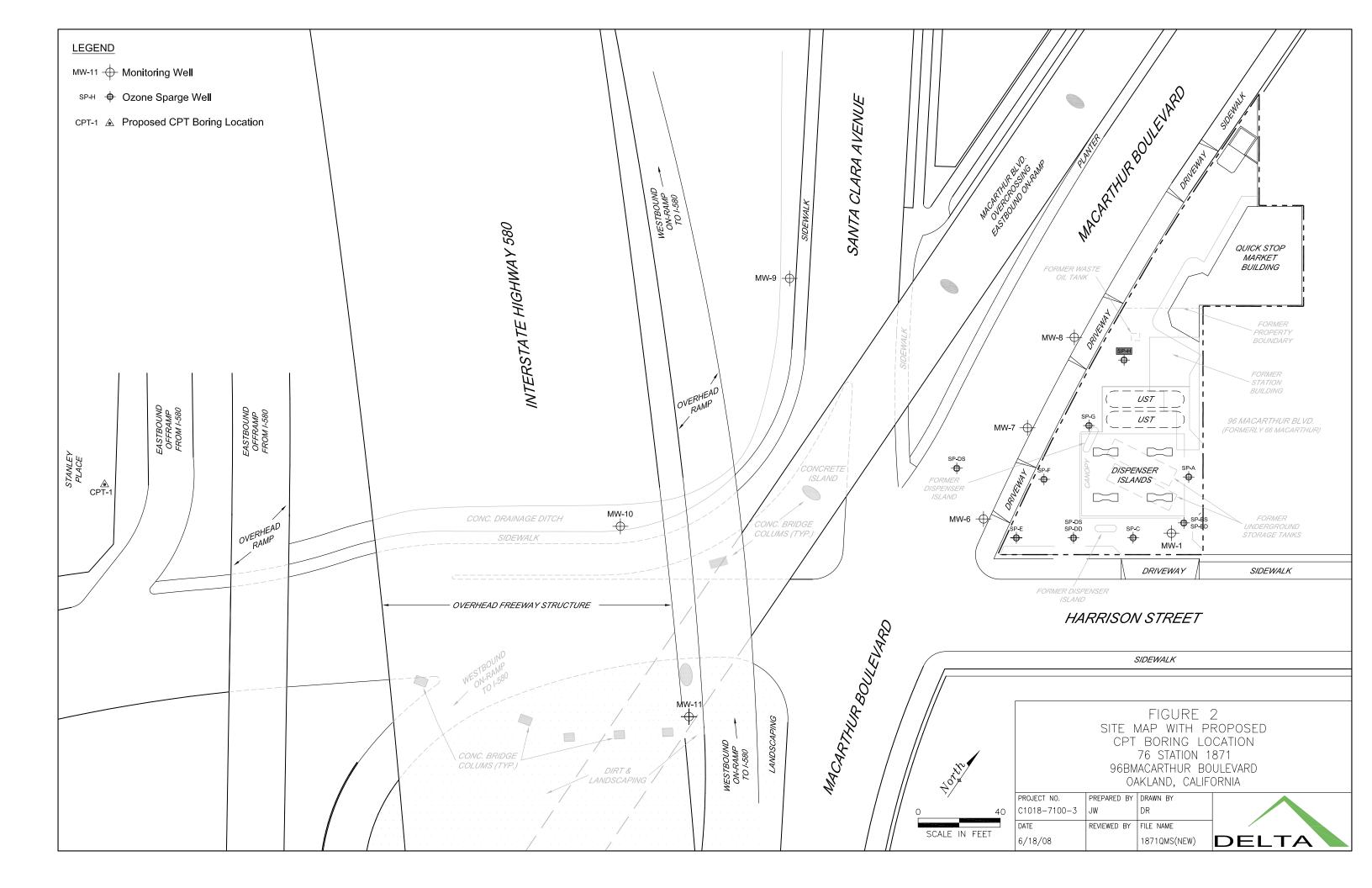


Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	
MW-1	G	Screen Inte	erval in feet	t: 9.5-24.5)										•
11/03/9	2			<u> </u>		260000		2300	4600	3700	17000			
01/25/9	3 81.18		0.00			120000		2100	4600	4900	22000			
04/29/9	3 81.18	13.71	0.00	67.47		100000	=-	850	2000	4300	19000	~-		
07/16/9	3 81.18	14.51	0.00	66.67	-0.80	29000		590	560	980	4200			
10/19/9	3 81.18	15.20	0.00	65.98	-0.69	67000		1400	2600	2900	5000			
01/20/9	4 81.18	15.17	0.00	66.01	0.03	92000		1200	3000	3400	17000			•
04/13/9	4 81.18	14.44	0.00	66.74	0.73	51000	:	1000	2600	3200	15000			
07/13/9	4 81.18	14.88	0.00	66.30	-0.44	35000		550	150	1400	5700			
10/10/9	4 81.18	15.55	0.00	65.63	-0.67	52000		1000	810	. 3300	12000	~~		
01/10/9	5 81.18	12.44	0.00	68.74	3.11	810		16	18	59	250			
04/17/9	5 81.18	12.68	0.00	68.50	-0.24	48000		880	530	2500	11000			
07/24/9	5 81.18	13.97	0.00	67.21	-1.29	48000		1500	420	2700	9700			
10/23/9	5 81.18	14.85	0.00	66.33	-0.88	47000		780	210	2100	11000	270		
01/18/9	6 81.18	14.21	0.00	66.97	0.64	30000		1500	500	3500	13000	2400		
04/18/9	6 86.24	13.40	0.00	72.84	5.87	66000		2700	2200	3100	13000	57000		
07/24/9	6 86.24	14.15	0.00	72.09	-0.75	5600		2100	ND	160	160	24000		
10/24/9	6 86.24	14.85	0.00	71.39	-0.70	110000		7500	8000	3300	14000	58000	·	
01/28/9	7 86.24	11.25	0.00	74.99	3.60	94000		7700	19000	3100	15000	120000		
07/29/9	7 86.24	14.67	0.00	71.57	-3.42	ND	-	ND	ND	ND	ND	70000		t.
01/14/9	8 86.24	12.27	0.00	73.97	2.40	85000		6100	10000	3000	17000	110000		
07/01/9	8 86.24	14.32	0.00	71.92	-2.05	110000		8700	12000	2700	15000	110000		
06/18/9	9 86.24	13.93	0.00	72.31	0.39	49000		6900	6500	380	12000	72000	47000	
01/21/0	0 86.24	15.05	0.00	71.19	-1.12	63700		5520	2000	2640	13100	57100		•

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Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

	Date Sampled	TOC Elevation	Depth to Water	LPH Thickness		Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
_		(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	(μg/l)	
		continued													
	07/10/0				72.27	1.08	67800		9910	4120	3330	16100	67400	54000	
	01/04/0				71.32	-0.95	63900		6270	784	2670	12900		38100	
	07/16/0		14.32		71.92	0.60	66000		7100	330	2300	9800	36000	41000	
	01/31/0		13.54	0.00	73.45	1.53	42000	****	5800	1800	2000	8200	26000	26000	•
	04/11/0	2 86.99	13.64	0.00	73.35	-0.10	58000		2900	1200	1800	10000	19000	 `	
	07/11/0	2 86.99	13.96	0.00	73.03	-0.32		5900	330	ND<10	230	600		3400	•
	10/15/0	2 86.99	14.71	0.00	72.28	-0.75		470	16	ND<2.5	14	16		390	
	01/14/0	3 86.99	. 12.77	0.00	74.22	1.94		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		49	
	04/16/0	3 86.99	13.18	0.00	73.81	-0.41	-	510	57	0.62	29	61		160	
	07/16/0	3 86.99	14.26	0.00	72.73	-1.08		27000	260	23	730	3200		1200	
	10/02/0	3 86.99	14.95	0.00	72.04	-0.69		45000	1400	32	2900	7600		3200	
	01/07/0	4 86.99	12.30	0.00	74.69	2.65		34000	690	41	1600	5200	·	2600	
	04/02/0	4 86.99	13.18	0.00	73.81	-0.88		350	1.8	ND<0.50	6.2	30		19	•
	07/29/0	4 86.99	14.61	0.00	72.38	-1.43		41000	550	ND<20	2000	6100		1200	
	11/24/0	4 86.99	14.98	0.00	72.01	-0.37	 .	55000	910	28	3100	11000		1600	
	01/24/0	5 86.99	12.98	0.00	74.01	2.00		24000	240	ND<20	1100	3600		1800	
	06/23/0	5 86.99	13.39	0.00	73.60	-0.41		24000	140	ND<25	1100	2900		600	
	09/28/0	5 86.99	14.63	0.00	72.36	-1.24		8200	22	0.97	290	660		320	
	12/20/0	5 86.99	11.42	0.00	75.57	3.21		10000	17	29	180	840		2400	
	03/10/0	6 86.99	10.98	0.00	76.01	0.44		10000	35	ND<5.0	470	1300		960	
	06/23/0	6 86.99	11.85	0.00	75.14	-0.87		11000	110	ND<5.0	610	1600		780	
	09/27/0	6 86.99	14.11	0.00	72.88	-2.26		8500	22	ND<10	270	740		460	
	12/22/0	6 86.99	13.66	0.00	73.33	0.45		7300	35	ND<5.0	370	850		210	
	03/23/0	7 86.99	13.25	0.00	73.74	0.41		8800	28	ND<2.5	440	910		170	•

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Table 2 HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS November 1992 Through March 2008 **76 Station 1871**

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)		Comments
• .	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(µg/l)	(µg/l)	(μg/l)		
MW-1	continued			,											
06/29/0	7 86.99	13.47	0.00	73.52	-0.22		6300	16	ND<2.5	300	650		50		
09/28/0	7 86.99	13.92	0.00	73.07	-0.45		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		1.2		
12/17/0	7 86.99	14.57	0.00	72.42	-0.65		4700	ND<5.0	ND<5.0	71	160		18		·
03/25/0	86.99	13.56	0.00	73.43	1.01		7400	28	ND<2.5	430	540		170		
MW-2	(5	Screen Inte	erval in fee	t: DNA)				•							
11/03/9	76.61					140		2.2	ND	ND	2.0			•	
01/25/9	76.61			 .		2100		56	1.1	90	140				
04/29/9	76.61	9.73	0.00	66.88		1500		290	ND	33	11				
07/16/9	76.61	10.17	0.00	66.44	-0.44	510		17	0.60	3.2	2.5				
10/19/9	76.61	11.18	0.00	65.43	-1.01	670		24	1.1	7.7	23				
01/20/9	76.61	11.12	0.00	65.49	0.06	820	·	97	ND	12	ND				
04/13/9	76.61	10.12	0.00	66.49	1.00	550		71	ND	5.1	1.3				
07/13/9	76.61	10.86	0.00	65.75	-0.74	2000	 .	490	ND	17	13				
10/10/9	76.61	11.48	0.00	65.13	-0.62	2300		340	ND	25	ND			•	
01/10/9	76.61	8.71	0.00	67.90	2.77	850		3.8	ND	8.5	1.3				
04/17/9	76.61	8.90	0.00	67.71	-0.19	1300		4.7	ND	8.3	1.2				
07/24/9	76.61	9.94	0.00	66.67	-1.04	960		20	ND	4.2	6.2		~-		
10/23/9	76.61	10.70	0.00	65.91	-0.76	ND		ND	ND	ND	ND	19	uu.		
01/18/9	6 76.61	10.11	0.00	66.50	0.59	900		300	86	7.6	18	4300			
04/18/9	81.66	9.27	0.00	72.39	5.89	18000		3600	680	890	4100	19000			·
07/24/9	81.66	10.02	0.00	71.64	-0.75	100000		13000	21000	2700	16000	120000			•
10/24/9	81.66	10.78	0.00	70.88	-0.76	800		110	17	11	20	20000			
01/28/9	7 81.66	7.70	0.00	73.96	3.08	45000		2400	2900	2000	7600	29000			
07/29/9	7 81.66	10.28	0.00	71.38	-2.58	ND		1.2	0.72	0.63	0.62	17000			
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Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(µg/l)	(µg/l)	(μg/l)	(µg/l)	(μg/l)	(µg/l)	
MW-2	continued										÷			
01/14/9	81.66	8.63	0.00	73.03	1.65	14000		1000	150	790	3300	23000		
07/01/9	81.66	9.53	0.00	72.13	-0.90	2700		100	ND	180	78	7100		
06/18/9	99													Well was destroyed
MW-3	(5	Screen Int	erval in feet	t: DNA)										
11/03/9	77.48					2100		120	15	38	200			
01/25/9	93 77.48				·	2300		80	1	55	52			
04/29/9	77.48	11.37	0.00	66.11		4500		1700	ND	200	140			
07/16/9	93 <i>7</i> 7.48	12.09	0.00	65.39	-0.72	4000		1100	28	52	70			
10/19/9	77.48	12.69	0.00	64.79	-0.60	3800		42	ND	50	56			
01/20/9	77.48	12.65	0.00	64.83	0.04	4200		11	ND	21	15			
04/13/9	77.48	12.02	0.00	65.46	0.63	4200		210	ND	36	53			
07/13/9	77.48	12.46	0.00	65.02	-0.44	1800		16	16	ND	21			
10/10/9	77.48	12.98	0.00	64.50	-0.52	4300		11	ND	12	ND			
01/10/9	77.48	10.42	0.00	67.06	2.56	310		4.6	ND	3.5	2.1			
04/17/9	77.48	10.42	0.00	67.06	0.00	7800		ND	4.6	300	450			
07/24/9	77.48	11.76	0.00	65.72	-1.34	3200		170	ŃD	22	16			
10/23/9	77.48	12.50	0.00	64.98	-0.74	3900	,	55	ND	19	11	4500		
01/18/9	6 77.48	11.79	0.00	65.69	0.71	2200		270	33	26	18	5500		
04/18/9	6 82.55	11.30	0.00	71.25	5.56	6000	·	1800	ND	100	230	48000		
07/24/9	82.55	12.17	0.00	70.38	-0.87	ND		2500	ND	ND	ND	71000		
10/24/9	6 82.55	12.65	0.00	69.90	-0.48	3800		660	ND	15	ND	65000		
01/28/9	82.55	9.50	0.00	73.05	3.15	4400		250	13	87	47	54000		
07/29/9	7 82.55	11.99	0.00	70.56	-2.49	ND		3500	ND	220	ND	75000		
01/14/9	82.55	10.30	0.00	72.25	1.69	ND		430	ND	100	380	37000		
1871								Page 4	of 12					

Table 2
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November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(µg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	
MW-3	continued													
07/01/9		11.70	0.00	70.85	-1.40	ND		430	ND	ND	ND	45000		
06/18/9	9													Well was destroyed
MW-4	(5	Screen Inte	erval in feet	:: DNA)										
04/18/9	82.04	9.83	0.00	72.21		ND		630	ND	ND	ND	18000		
07/24/9	6 82.04	10.47	0.00	71.57	-0.64	ND		ND	ND	ND	5.2	3900		
10/24/9	82.04	11.14	0.00	70.90	-0.67	ND	· 	ND	ND	ND	ND	6300		
01/28/9	7 82.04	7.94	0.00	74.10	3.20	1200		490	. ND	17	6.8	16000		
07/29/9	7 82.04	10.86	0.00	71.18	-2.92	50 -		1.5	0.61	0.73	0.78	15000		
01/14/9	82.04	8.73	0.00	73.31	2.13	ND		ND	ND	ND	ND	5200		
07/01/9	82.04	10.51	0.00	71.53	-1.78	ND		ND	ND .	ND	ND	640		
06/18/9	9 82.04													Well was destroyed
MW-5	(5	Screen Inte	erval in feet	:: DNA)										
04/18/9	6 81.80	9.65	0.00	72.15		31000		5500	1400	1700	8100	66000		
07/24/9	6 81.80	10.80	0.00	71.00	-1.15	32000		6400	ND	1600	6100	120000		
10/24/9	6 81.80	11.40	0.00	70.40	-0.60	17000		6900	ND	970	130	84000		
01/28/9	7 81.80	7.76	0.00	74.04	3.64	19000		6100	62	82	310	160000	==	
07/29/9	7 81.80	11.58	0.00	70.22	-3.82	ND		ND	ND	ND	ND	71000		
01/14/9	81.80	9.08	0.00	72.72	2.50	ND		3600	ND	ND	ND	80000		
07/01/9	81.80	11.25	0.00	70.55	-2.17	6400		2100	21	120	330	61000		
06/18/9	9 81.80					·								Well was destroyed
MW-6	(5	Screen Int	erval in feet	: 5.0-25.0)										
06/18/9	•	9.30	0.00	69.61		2100		21	29	ND	47	97000	71000	
01/21/0	00 78.91	9.37	0.00	69.54	-0.07	1880		143	31.2	106	196	41200	48800	

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November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	
	continued													
07/10/0		8.94	0.00	69.97	0.43	5710		869	209	301	1430	22200	19500	
01/04/0	78.91	9.21	0.00	69.70	-0.27	ND	er 10	ND	ND	ND	ND		9510	
.07/16/0	78.91	9.42	0.00	69.49	-0.21	4800		200	21	150	440	29000	34000	
01/31/0	78.91	8.50	0.00	70.41	0.92	12000		250	92	500	1500	26000	31000	
04/11/0	2 79.67	9.08	0.00	70.59	0.18	3600		42	32	39	280	120000		
07/11/0	2 79.67	9.70	0.00	69.97	-0.62		12000	ND<100	ND<100	ND<100	ND<200		15000	
10/15/0	79,67	9.96	0.00	69.71	-0.26		1300	ND<10	ND<10	ND<10	ND<20		3200	
01/14/0	3 79.67	8.31	0.00	71.36	1.65		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		120	
04/16/0	3 79,67	8.21	0.00	71.46	0.10		270	ND<0.50	ND<0.50	ND<0.50	1.3		15	
07/16/0	3 79.67	9.43	0.00	70.24	-1.22		290	39	0.60	ND<0.50	15		150	
10/02/0	3 79.67	9.92	0.00	69.75	-0.49		200	ND<1.0	ND<1.0	ND<1.0	ND<2.0		220	
01/07/0	94 79.67	8.08	0.00	71.59	1.84		140	2.4	ND<1.0	8.6	13		86	
04/02/0	94 79.67	8.63	0.00	71.04	-0.55		3200	ND<20	ND<20	ND<20	ND<40		5900	
07/29/0	94 79.67	9.75	0.00	.69.92	-1.12	·	170	ND<1.0	ND<1.0	ND<1.0	ND<2.0		160	
11/24/0	94 . 79.67	9.59	0.00	70.08	0.16		80	ND<0.50	ND<0.50	ND<0.50	ND<1.0		45	
01/24/0	79.67	8.33	0.00	71.34	1.26		100	1.1	ND<0.50	0.60	1.1		40	•
06/23/0	5 79.67	8.33	0.00	71.34	0.00		230	0.52	ND<0.50	3.6	9.6		200	
09/28/0	5 79.67	9.56	0.00	70.11	-1.23		500	ND<0.50	ND<0.50	ND<0.50	1.2		980	
12/20/0	5 79.67	7.82	0.00	71.85	1.74		640	0.79	ND<0.50	0.68	2.3	20	2400	
03/10/0	6 79.67	6.83	0.00	72.84	0.99		970	1.2	ND<0.50	1.3	5.0		3600	
06/23/0	6 79.67	8.13	0.00	71.54	-1.30		1700	ND<12	ND<12	ND<12	ND<25		1100	
09/27/0	6 79.67	9.44	0.00	70.23	-1.31		ND<1200	ND<12	ND<12	ND<12	ND<12		620	
12/22/0	6 79.67	8.60	0.00	71.07	0.84		9100	ND<10	ND<10	ND<10	ND<10		600	
03/23/0	79.67	8.39	0.00	71.28	0.21		330	ND<0.50	ND<0.50	0.82	ND<0.50		680	

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Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	
MW-6	continued													•
06/29/	79.67	9.02	0.00	70.65	-0.63		180		ND<0.50	ND<0.50			290	
09/28/	79.67	9.65	0.00	70.02	-0.63		ND<50		ND<0.50	ND<0.50			ND<0.50	
12/17/	79.67	9.62	0.00	70.05	0.03		ND<50	ND<0.50		ND<0.50	ND<1.0		21	
03/25/	08 79.67	8.63	0.00	71.04	0.99		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		12	
MW-7	•		erval in fee		ı									•
06/18/			0.00	71.22		ND		ND	ND	ND	ND	16000	13000	
01/21/	00 79.92	9.30	0.00	70.62	-0.60	ND		ND	ND	ND	ND	12300	18200	
07/10/	00 79.92	8.72	0.00	71.20	0.58	ND	~-	ND	ND	ND	ND	16900	13800	
01/04/	01 79.92	9.17	0.00	70.75	-0.45	ND		ND	ND	ND	0.719		37.3	
07/16/	01 79.92	9.02	0.00	70.90	0.15	ND		ND	ND	ND	ND	7200	4700	
01/31/	02 79.92	7.91	0.00	72.01	1.11	ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	8900	9900	
04/11/	02 80.67													Inaccessible
07/11/	02 80.67													Inaccessible
10/15/	02 80.67	9.81	0.00	70.86			ND<5000	ND<50	ND<50	ND<50	ND<100		12000	
01/14/	03 80.67	7.89	0.00	72.78	1.92		ND<25000	ND<250	ND<250	ND<250	ND<500		33000	
04/16/	03 80.67	8.04	0.00	72.63	-0.15		ND<25000	ND<250	ND<250	ND<250	ND<500		37000	
07/16/	03 80.67	9.19	0.00	71.48	-1.15	·	25000	ND<250	ND<250	ND<250	ND<500		38000	
10/02/	03 80.67	9.89	0.00	70.78	-0.70		17000	ND<100	ND<100	ND<100	ND<200		22000	
01/07/	04 80.67	7.27	0.00	73.40	2.62		ND<20000	ND<200	460	ND<200	540		19000	
04/02/	04 80.67	8.09	0.00	72.58	-0.82		3400	ND<20	ND<20	ND<20	ND<40		5100	
07/29/	04 80.67	9.40	0.00	71.27	-1.31		7400	ND<50	ND<50	ND<50	ND<100		11000	
11/24/	04 80.67	9.65	0.00	71.02	-0.25		6200	ND<50	ND<50	ND<50	ND<100		6800	
01/24/	05 80.67	7.92	0.00	72.75	1.73		ND<5000	ND<0.50	ND<0.50	ND<0.50	ND<1.0		13000	
06/23/	05 80.67	8.56	0.00	72.11	-0.64		8700	ND<25	ND<25	ND<25	ND<50		12000	
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Table 2 HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS November 1992 Through March 2008 76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	181.18
09/28/0		9.37	0.00	71.30	-0.81		1200	ND<0.50			ND<1.0		5700	
12/20/0		6.31	0.00	74.36	3.06		1100	0.90	ND<0.50	24	37		8200	
03/10/0	6 80.67	5.84	0.00	74.83	0.47		1200	24	ND<0.50	3.6	ND<1.0		4700	
06/23/0	6 .80.67	6.83	0.00	73.84	-0.99		1800	21	ND<12	ND<12	ND<25		1500	•
09/27/0	6 80.67	8.95	0.00	71.72	-2.12		ND<1200	ND<12	ND<12	ND<12	ND<12		350	
12/22/0	6 80.67	8.35	0.00	72.32	0.60	. 	24000	ND<50	ND<50	ND<50	ND<50	***	190	
03/23/0	7 80.67	8.01	0.00	72.66	0.34		85	ND<0.50	ND<0.50	ND<0.50	ND<0.50		92	
06/29/0	7 80.67													Car parked over well
09/28/0	7 80.67	9.05	0.00	71.62			50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		37	
12/19/0	7 80.67	9.23	0.00	71.44	-0.18		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		5.2	
03/25/0	80.67	8.45	0.00	72.22	0.78		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		7.3	
MW-8	(9	Screen Int	erval in fee	t: 5.0-25.0)	-									
06/18/9	99 80.96	9.10	0.00	71.86		ND		ND	ND	ND	ND	290	160	
01/21/0	00 80.96	10.00	0.00	70.96	-0.90	ND		ND	ND	ND	1.09	224	221	
07/10/0	00 80.96	7.94	0.00	73.02	2.06	ND		ND	ND	ND	ND	234	223	
01/04/0	1 80.96	9.76	0.00	71.20	-1.82	3790		141	8.92	128	375	<u></u>	34200	
07/16/0	1 80.96	9.15	0.00	71.81	0.61	ND	-	ND	ND	ND	ND	66	. 70	
01/31/0	2 80.96	7.99	0.00	72.97	1.16	5900		86	ND<10	630	390	670	700	
04/11/0	81.71	9.00	0.00	72.71	-0.26	250		2.0	ND<0.50	38	2.2	410		
07/11/0	2 81.71	9.60	0.00	72.11	-0.60	. ==	110	ND<0.50	ND<0.50	ND<0.50	ND<1.0		120	
10/15/0	2 81.71	10.60	0.00	71.11	-1.00		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		21	
01/14/0	3 81.71	8.63	0.00	73.08	1.97		ND<250	2.6	ND<2.5	18	ND<5.0		430	
04/16/0	3 81.71	8.98	0.00	72.73	-0.35		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		18	
07/16/0	3 81.71	9.63	0.00	72.08	-0.65		110	ND<0.50	ND<0.50	ND<0.50	ND<1.0		. 140	
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Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	
MW-8	continued													
10/02/0	81.71	10.41	0.00	71.30	-0.78		75	ND<0.50	ND<0.50	ND<0.50	ND<1.0		78	
01/07/0	81.71	8.21	0.00	73.50	2.20		ND<5000	ND<50	ND<50	ND<50	340		3700	
04/02/0	81.71	8.51	0.00	73.20	-0.30		3000	ND<20	ND<20	ND<20	ND<40		5200	•
07/29/0	81.71	9.78	0.00	71.93	-1.27		3200	ND<25	ND<25	ND<25	ND<50		5500	
11/24/0	81.71	10.19	0.00	71.52	-0.41		2100	ND<10	ND<10	ND<10	ND<20		2400	
01/24/0	5 81.71	8.49	0.00	73.22	1.70		ND<2500	4.0	0.52	ND<0.50	29		1800	
06/23/0	95 81.71	8.34	0.00	73.37	0.15		490	ND<0.50	ND<0.50	1.5	ND<1.0		980	
09/28/0	81.71	9.61	0.00	72.10	-1.27		270	ND<0.50	ND<0.50	ND<0.50	ND<1.0		520	
12/20/0	5 81.71	7.35	0.00	74.36	2.26		2700	ND<0.50	ND<0.50	78	82		86	
03/10/0	6 81.71	6.63	0.00	75.08	0.72		190	ND<0.50	ND<0.50	ND<0.50	ND<1.0		51	
06/23/0	6 81.71	6.56	0.00	75.15	0.07		3600	ND<0.50	ND<0.50	100	57		ND<0.50	·
09/27/0	6 81.71	9.64	0.00	72.07	-3.08		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	·	18	
12/22/0	6 81.71	9.42	0.00	72.29	0.22		ND<50	ND<0.50	ND<0.50	ND<0.50	0.50		16	
03/23/0	7 81.71	8.68	0.00	73.03	0.74		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		12	
06/29/0	7 81.71	9.10	0.00	72.61	-0.42		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		17	
09/28/0	7 81.71	9.89	0.00	71.82	-0.79		99	ND<0.50	ND<0.50	ND<0.50	ND<0.50		21	
12/17/0	7 81.71	9.81	0.00	71.90	0.08		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		16	
03/25/0	81.71	8.40	0.00	73.31	1.41		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		14	
MW-9	(Screen Int	erval in fee	t: DNA)										
01/31/0	2 82.07	14.72	0.00	67.35		ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	680	910	
04/11/0	2 82.07	14.85	0.00	67.22	-0.13	ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	620		
07/11/0	2 82.07	15.39	0.00	66.68	-0.54		580	ND<5.0	ND<5.0	ND<5.0	ND<10		580	
10/15/0	2 82.07	16.16	0.00	65.91	-0.77		570	ND<5.0	ND<5.0	ND<5.0	ND<10		1400	
01/14/0	3 82.07	14.75	0.00	67.32	1.41		ND<200	ND<2.0	ND<2.0	ND<2.0	ND<4.0		220	
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Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	
	continued									· .				•
04/16/0		14.51		67.56	0.24		ND<500	ND<5.0	ND<5.0	ND<5.0	ND<10		860	
07/16/0		15.54		66.53	-1.03		ND<2500	ND<25	ND<25	ND<25	ND<50		1300	
10/02/0		16.28		65.79	-0.74		820	ND<5.0	ND<5.0	ND<5.0	ND<10		990	
01/07/0)4 82.07	14.65		67.42	1.63		ND<1000	ND<10	ND<10	ND<10	ND<20		1200	
04/02/0	04 82.07	15.08		66.99	-0.43		510	ND<5.0	ND<5.0	ND<5.0	ND<10		850	
07/29/0	94 82.07	15.81	0.00	66.26	-0.73		ND<1000	ND<10	ND<10	ND<10	ND<20		1300	
11/24/0	94 82.07	16.25		65.82	-0.44		1100	ND<5.0	ND<5.0	ND<5.0	ND<10		1300	
01/24/0	95 82.07	14.96	0.00	67.11	1.29		ND<1000	ND<0.50	ND<0.50	ND<0.50	ND<1.0		2300	
06/23/0	95 82.07	14.40	0.00	67.67	0.56		1500	ND<5.0	ND<5.0	ND<5.0	ND<10	'	2000	
09/28/0)5 82.07	15.67	0.00	66.40	-1.27		ND<2500	ND<25	ND<25	ND<25	ND<50	;-	2400	
12/20/0)5 82.07	14.61	0.00	67.46	1.06		560	ND<0.50	ND<0.50	ND<0.50	ND<1.0		2800	
03/10/0	6 82.07	13.39	0.00	68.68	1.22		1100	ND<5.0	ND<5.0	ND<5.0	ND<10		2100	
06/23/0	6 82.07	13.68	0.00	68.39	-0.29		1700	ND<12	ND<12	ND<12	ND<25		1700	
09/27/0	6 82.07	14.83	0.00	67.24	-1.15		ND<1200	ND<12	ND<12	ND<12	ND<12		1400	
12/22/0	6 82.07	14.75	0.00	67.32	0.08		680	ND<0.50	ND<0.50	ND<0.50	ND<0.50		1100	•
03/23/0	7 82.07	14.52	0.00	67.55	0.23		240	ND<0.50	ND<0.50	ND<0.50	ND<0.50		660	
06/29/0	7 82.07	14.89	0.00	67.18	-0.37		210	ND<0.50	ND<0.50	ND<0.50	0.52		410	
09/28/0	7 82.07	15.48	0.00	66.59	-0.59		390	ND<2.5	ND<2.5	ND<2.5	ND<2.5		430	
12/17/0	7 82.07	15.72	0.00	66.35	-0.24	<u> </u>	190	ND<0.50	ND<0.50	ND<0.50	ND<1.0	22	480	·
03/25/0	82.07	14.91	0.00	67.16	0.81		250	ND<2.5	ND<2.5	ND<2.5	ND<5.0		340	
MW-10	(5	Screen Inte	erval in feet	t: DNA)									•	
01/31/0	2 74.98	8.02	0.00	66.96		ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<5.0	1.2	
04/11/0	74.98	7.60	0.00	67.38	0.42	ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5		
07/11/0	74.98	8.91	0.00	66.07	-1.31		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		1.1	
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Table 2
HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS
November 1992 Through March 2008
76 Station 1871

Date Sampled	TOC Elevation	Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	$(\mu g/l)$	(µg/l)	(μg/l)	(µg/l)	(µg/l)	(µg/l)	(µg/l)	
MW-10	continue	d												
10/15/0	2 74.98	11.49	0.00	63.49	-2,58		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	
01/14/0	3 74.98	8.47	0.00	66.51	3.02		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	·	ND<2.0	
04/16/0	74.98	7.92	0.00	67.06	0.55		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	•
07/16/0	3 74.98	7.03	0.00	67.95	0.89		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	<u></u>	ND<2.0	
10/02/0	74.98	7.63	0.00	67.35	-0.60		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	
01/07/0)4 74.98	6.22	0.00	68.76	1.41		54	ND<0.50	ND<0.50	1.3	4.5	•••	ND<2.0	
04/02/0)4 74.98	7.49	0.00	67.49	-1.27		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		1.0	
07/29/0	74.98	7.41	0.00	67.57	0.08		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
11/24/0	74.98	7.55	0.00	67.43	-0.14	Marine	ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		3.5	
01/24/0	5 74.98	6.40	0.00	68.58	1.15		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		0.71	
06/23/0	5 74.98	6.46	0.00	68.52	-0.06		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
09/28/0	5 74.98	7.52	0.00	67.46	-1.06		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
12/20/0	5 74.98	6.04	0.00	68.94	1.48		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		0.57	•
03/10/0	6 74.98	5.86	0.00	69.12	0.18		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
06/23/0	6 74.98	6.42	0.00	68.56	-0.56		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		0.50	
09/27/0	6 74.98	6.92	0.00	68.06	-0.50		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		48	
12/22/0	6 74.98	5.90	0.00	69.08	1.02		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		8.5	
03/23/0	74.98	6.48	0.00	68.50	-0.58		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		0.54	•
06/29/0	74.98	6.78	0.00	68.20	-0.30		ND<50	ND<0.50	ND<0.50	0.76	1.6		5.6	
09/28/0	74.98	7.24	0.00	67.74	-0.46		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		15	
12/17/0	74.98	6.92	0.00	68.06	0.32		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		5.6	
03/25/0	8 74.98	6.74	0.00	68.24	0.18		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		1.3	
MW-11	(5	Screen Into	erval in feet	: DNA)										
01/31/0	77.31	11.71	0.00	65.60		ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<5.0	ND<1.0	
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Table 2 HISTORIC FLUID LEVELS AND SELECTED ANALYTICAL RESULTS November 1992 Through March 2008 76 Station 1871

Date Sampled		Depth to Water	LPH Thickness	Ground- water Elevation	Change in Elevation	TPH-G (8015M)	TPH-G (GC/MS)	Benzene	Toluene	Ethyl- benzene	Total Xylenes	MTBE (8021B)	MTBE (8260B)	Comments
	(feet)	(feet)	(feet)	(feet)	(feet)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(μg/l)	(µg/l)	(μg/l)	(µg/l)	
MW-11	continue	i												
04/11/0	2 77.31	11.95	0.00	65.36	-0.24	ND<50		ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<2.5		
07/11/0	2 77.31	12.79	0.00	64.52	-0.84		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
10/15/0	2 77.31	13.67	0.00	63.64	-0.88		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	
01/14/0	3 77.31	13.31	0.00	64.00	0.36		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	-	ND<2.0	
04/16/0	3 77.31	14.08	0.00	63.23	-0.77		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	
07/16/0	3 77.31	12.98	0.00	64.33	1.10		65	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	
10/02/0	3 77.31	12.96	0.00	64.35	0.02		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<2.0	
01/07/0	4 77.31	16.20	0.00	61.11	-3.24		63	ND<0.50	ND<0.50	0.68	2.2		ND<2.0	
04/02/0	4 77.31	18.01	0.00	59.30	-1.81		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	,
07/29/0	4 77.31	14.39	0.00	62.92	3.62		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
11/24/0	4 77.31	16.72	0.00	60.59	-2.33		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
01/24/0	5 77.31	17.44	0.00	59.87	-0.72		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
06/23/0	5 77.31	12.37	0.00	64.94	5.07		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	·
09/28/0	5 77.31	16.78	0.00	60.53	-4.41		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
12/20/0	5 77.31	17.06	0.00	60.25	-0.28		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
03/10/0	6 77.31	16.20	0.00	61.11	0.86		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
06/23/0	6 7 7.31	12.65	0.00	64.66	3.55		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<1.0		ND<0.50	
09/27/0	6 77.31	14.78	0.00	62.53	-2.13		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50		ND<0.50	
12/22/0	6 77.31	13.48	0.00	63.83	1.30		55	ND<0.50	ND<0.50	2.1	5.4		ND<0.50	
03/23/0	7 77.31	13.78	0.00	63.53	-0.30		ND<50	ND<0.50	ND<0.50	ND<0.50	ND<0.50	-	ND<0.50	
06/29/0		15.58	0.00	61.73	-1.80		ND<50	ND<0.50	ND<0.50	ND<0.50	0.62		ND<0.50	
09/28/0		16.02		61.29	-0.44		ND<50		ND<0.50		ND<0.50		ND<0.50	
12/17/0		15.75	0.00	61.56	0.27		ND<50		ND<0.50		1.0		ND<0.50	
03/25/0	8 77.31	15.74	0.00	61.57	0.01		ND<50		ND<0.50	ND<0.50	ND<1.0		ND<0.50	
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Historical Groundwater Flow Directions for Tosco (76) Service Station No. 1871 January 2001 through September 2007

