

FAX Transmission Cover Sheet

TO: Jennifer Eberle

FROM: Keith Beury

NUMBER OF PAGES TO FOLLOW: 8
(Not including this cover sheet)

ORIGINAL WILL NOT BE MAILED

MESSAGE: Following are the results for insitu bioremediation pilot testing at 901 Jefferson Street (Salter property). The most recent water quality measurements show a dramatic decrease in TPH-gasoline and BTEX in the dosing well (PTW-1) and the closest well downgradient (MW-5). We are optimistic that the improvement is attributable to bioremediation. Bacteria counts in the dosing well are elevated and pH in the dosing well is decreasing; both these factors suggest active bioremediation.

Streamborn has proposed to the Salters that the pilot test be continued for another ± 3 months. The Salters have agreed. Accordingly, we will continue dosing and update you as additional sample results are obtained.

Call if you have any questions or comments.

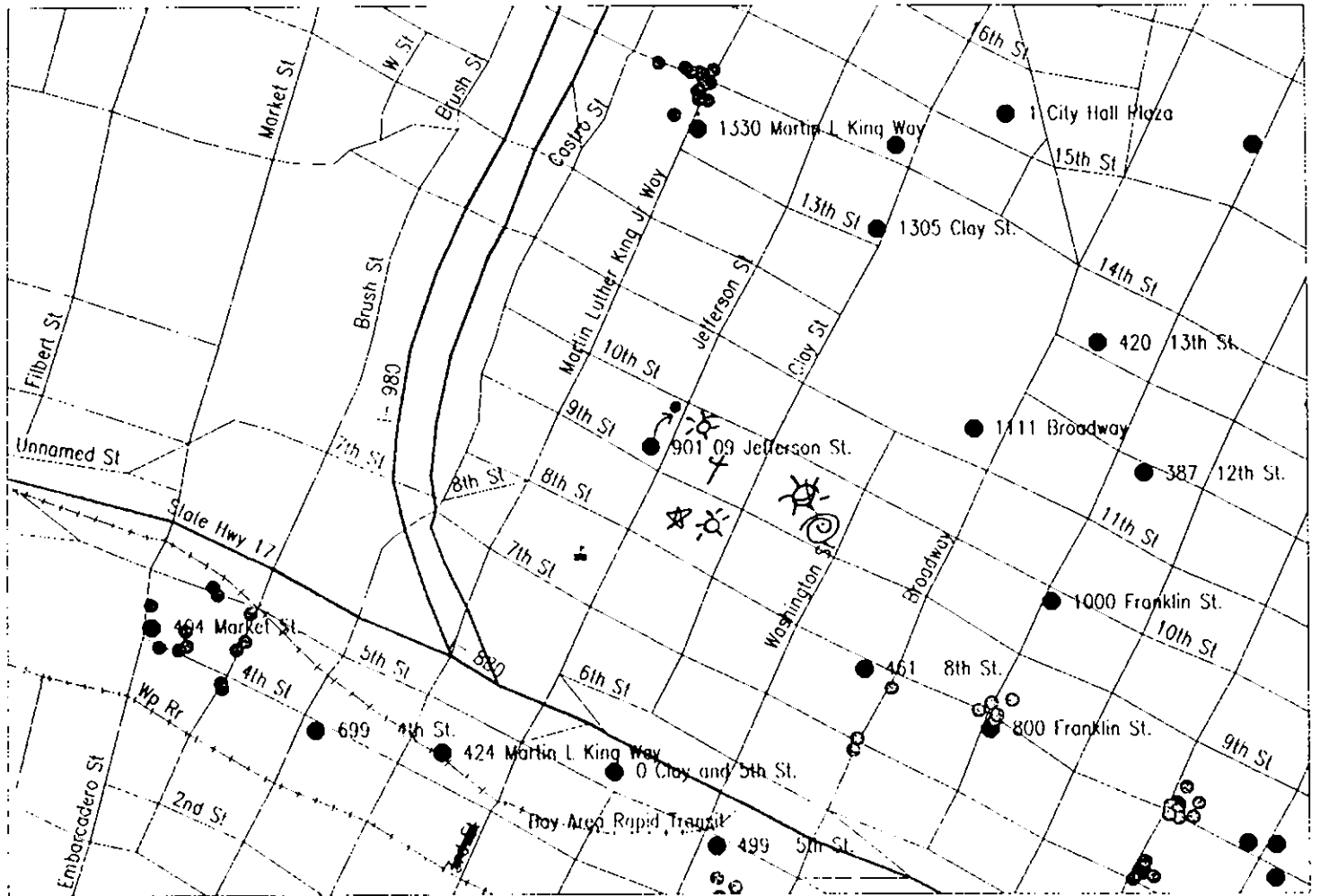
STREAMBORN

Mail: P.O. Box 8330, Berkeley CA 94707-8330

Office: 900 Santa Fe Avenue, Albany CA 94706

510/528-4234

FAX 528-2613



← .0921 mi →

* Housewife's Market

+ vacant lot

⊛ city owns these 3 blocks

© Swan's Mkt

Table 1
Chronology of Environmental Activities

Date of Activity	Activity Performed By	Description
Unknown	Unknown	<ul style="list-style-type: none"> Four 550 gallon underground tanks installed at property.
1946 to 1953	Unknown	<ul style="list-style-type: none"> Property used as automotive service station. Four 550 gallon underground fuel tanks used to store gasoline.
Circa 1953	Unknown	<ul style="list-style-type: none"> Automotive service station demolished and the property paved. The property subsequently used as a parking lot.
Circa 1978	Douglas Salter	<ul style="list-style-type: none"> Douglas N. Salter purchased property. The property continued to be used as a parking lot.
19 and 20 April 1989	WCC	<ul style="list-style-type: none"> 6 borings drilled (Borings 1 through 6). Analytical results of composite soil samples revealed elevated TPH-Gasoline and BTEX in one boring. The remaining TPH-Gasoline, BTEX, and lead results were not remarkable.
21 April 1989	WCC	<ul style="list-style-type: none"> Boring 5 completed as groundwater monitoring well (MW-5).
24 April 1989	WCC	<ul style="list-style-type: none"> Groundwater level measured and groundwater sample collected at MW 5. Analytical results revealed elevated concentrations of TPH-Gasoline and BTEX.
4 and 7 August 1989	WCC	<ul style="list-style-type: none"> 10 borings drilled (Borings 7 through 10, and 12 through 17). Samples exhibiting gasoline odor were analyzed for TPH-Gasoline and BTEX. Analytical results revealed elevated TPH-Gasoline and BTEX concentrations near the northeast corner of the property. Borings 18 and 19 completed as groundwater monitoring wells (MW 18 and MW-19).
14 August 1989	WCC	<ul style="list-style-type: none"> Groundwater levels measured and groundwater samples collected at MW-5, MW 18, and MW-19. Groundwater samples analyzed for TPH-Gasoline and BTEX. Samples collected from MW 5 were also analyzed for volatile organic compounds by EPA Method 8240. Analytical results generally revealed elevated TPH-Gasoline and BTEX. The remaining volatile organic compounds were nondetect.
10 and 11 April 1990	WCC	<ul style="list-style-type: none"> 10 borings drilled (Borings 20 through 29). Samples exhibiting gasoline odor were analyzed for TPH-Gasoline and BTEX. Analytical results generally revealed elevated TPH-Gasoline and BTEX concentrations near the northeast corner of the property.
15 February 1991	WCC	<ul style="list-style-type: none"> Groundwater levels measured and groundwater samples collected at MW 5, MW-18, and MW-19. Groundwater samples analyzed for TPH-Gasoline and BTEX. Analytical results generally revealed elevated TPH-Gasoline and BTEX.
20 February 1991	WCC	<ul style="list-style-type: none"> Vapor extraction pilot test performed. Analytical results from soil vapor samples revealed detectable levels of BTEX and elevated concentrations of total volatile organic vapors.
2 March 1993	WCC	<ul style="list-style-type: none"> Groundwater levels measured and groundwater samples collected at MW 5, MW-18, and MW-19. Groundwater samples analyzed for TPH-Gasoline and BTEX. Analytical results generally revealed elevated TPH-Gasoline and BTEX. Floating product observed in MW 19.
15 December 1993	Streamborn	<ul style="list-style-type: none"> Groundwater levels measured and groundwater samples collected at MW 5 and MW-18. Groundwater sample collected at well MW 19 for use in treatability study. Groundwater samples analyzed for TPH-Gasoline and BTEX. Analytical results generally revealed elevated TPH-Gasoline and BTEX. Floating product observed in well MW 19.
15 April 1994	Streamborn	<ul style="list-style-type: none"> Bench-scale treatability testing completed. Bench scale testing performed to assess the feasibility of insitu bioremediation. Results confirmed the feasibility of insitu bioremediation. Pilot-scale treatability testing proposed.
14 October 1994	Streamborn	<ul style="list-style-type: none"> Well PTW-1 installed (for use in pilot scale testing).
26 October 1994	Streamborn	<ul style="list-style-type: none"> Groundwater levels measured and groundwater samples collected at MW 5 and PTW-1 to establish pre-pilot-scale treatability testing conditions. Groundwater samples analyzed for TPH-Gasoline and BTEX. Pilot testing initiated. Well PTW-1 dosed with solution consisting of 10 gallons water, 55 ml 35% H₂O₂ (equivalent H₂O₂ concentration of 500 mg/L), 3.6 grams NH₃Cl, 0.7 grams Ca(NO₃)₂, and 0.4 grams KH₂PO₄.
4 November 1994	Streamborn	<ul style="list-style-type: none"> 2nd dosing event. Same as initial pilot test event, except H₂O₂ dose increased to 110 ml (equivalent H₂O₂ concentration of 1,000 mg/L).
11 November 1994	Streamborn	<ul style="list-style-type: none"> 3rd dosing event. Same as initial pilot test event, except H₂O₂ dose increased to 165 ml (equivalent H₂O₂ concentration of 1,500 mg/L).
16 November 1994	Streamborn	<ul style="list-style-type: none"> 4th dosing event. Same as initial pilot test event, except H₂O₂ dose increased to 220 ml (equivalent H₂O₂ concentration of 2,000 mg/L).

Table 1 (continued)

Date of Activity	Activity Performed By	Description
23 November 1994	Streamborn	• 5th dosing event Same solution as previous event
30 November 1994	Streamborn	• 6th dosing event Same solution as previous event.
9 December 1994	Streamborn	• 7th dosing event Same solution as previous event
13 December 1994	Streamborn	• 8th dosing event Same solution as previous event.
23 December 1994	Streamborn	• Groundwater sample collected from MW 5. Groundwater samples analyzed for TPH-gasoline and BTEX. Field analyses performed for ammonia, nitrate, and phosphate. • Groundwater sample collected from PTW 1. Field analyses performed for ammonia, nitrate, and phosphate. • Well casing elevations surveyed for MW 5, MW 18, PTW-1, and MW-19. • 9th dosing event. Same solution as previous event.
29 December 1994	Streamborn	• 10th dosing event. Same solution as previous event.
5 January 1995	Streamborn	• 11th dosing event Increase dosing volume from 10 to 20 gallons. Dosing solution now consists of 20 gallons distilled water, 440 ml 35% H ₂ O ₂ (equivalent H ₂ O ₂ concentration of 2,000 mg/L), 7.2 grams NH ₃ Cl, 1.4 grams Ca(NO ₃) ₂ , and 0.8 grams KH ₂ PO ₄ .
12 January 1995	Streamborn	• 12th dosing event Same solution as previous event
18 January 1995	Streamborn	• 13th dosing event Same solution as previous event
25 January 1995	Streamborn	• 14th dosing event Same solution as previous event
30 January 1995	Streamborn	• 15th dosing event Same solution as previous event
8 February 1995	Streamborn	• 16th dosing event Same solution as previous event.
17 February 1995	Streamborn	• Groundwater samples collected from MW-5 and PTW 1. Groundwater samples analyzed for TPH-gasoline and BTEX. Field analyses performed for ammonia, nitrate, and phosphate. • 17th dosing event Same solution as previous event
23 February 1995	Streamborn	• 18th dosing event. Same solution as previous event.
1 March 1995	Streamborn	• 19th dosing event Increase dosing volume from 20 to 40 gallons. Dosing solution now consists of 40 gallons distilled water, 880 ml 35% H ₂ O ₂ (equivalent H ₂ O ₂ concentration of 2,000 mg/L), 14.4 grams NH ₃ Cl, 2.8 grams Ca(NO ₃) ₂ , and 1.6 grams KH ₂ PO ₄
7 March 1995	Streamborn	• 20th dosing event Same solution as previous event.
17 March 1995	Streamborn	• 21th dosing event Same solution as previous event
24 March 1995	Streamborn	• 22th dosing event Same solution as previous event.
30 March 1995	Streamborn	• 23th dosing event Same solution as previous event
7 April 1995	Streamborn	• 24th dosing event Same solution as previous event.
18 April 1995	Streamborn	• Groundwater samples collected from MW-5 and PTW 1. Groundwater samples analyzed for TPH-gasoline and BTEX. Field analyses performed for ammonia, nitrate, and phosphate.

General Notes.

- (a) WCC - Woodward Clyde Consultants, Oakland CA.
 (b) BTEX - benzene, toluene, ethylbenzene, and xylenes
 (c) TPH (Gasoline - total petroleum hydrocarbons as gasoline)

Table 2
Groundwater Elevation Measurements

Date or Parameter	Measured By	Comments	MW-5		MW-18		MW-19		PTW-1	
			Measuring Point = Top of Well Casing at North Side, Elevation = 999.50		Measuring Point = Top of Well Casing at North Side, Elevation = 999.67		Measuring Point = Top of Well Casing at North Side, Elevation = 1,000.00		Measuring Point = Top of Well Casing at North Side, Elevation = 999.89	
			Depth	Elevation	Depth	Elevation	Depth	Elevation	Depth	Elevation
14 August 1989	WWC			974.58		974.47		974.77	NM	NM
15 February 1991	WWC			973.58		973.43		973.60	NM	NM
27 March 1991	WWC			974.24		974.07		974.45	NM	NM
2 March 1993	WWC			976.60		976.32		976.50	NM	NM
15 December 1993	Streamborn		24.31	975.19	24.70	974.97	25.02	974.98	NM	NM
26 October 1994	Streamborn	Immediately prior to start of pilot testing.	24.49	975.01	24.91	974.76	25.11	974.89	24.71	975.18
4 November 1994	Streamborn	One week after 1st dosing event, immediately before 2nd dosing event.	24.64	974.86	25.02	974.65	24.97	975.03	24.89	975.00
16 November 1994	Streamborn	One week after 3rd dosing event, immediately before 4th dosing event.	24.33	975.17	24.73	974.94	24.65	975.35	24.60	975.29
30 November 1994	Streamborn	One week after 5th dosing event, immediately before 6th dosing event.	24.00	975.50	24.46	975.21	24.35	975.65	24.33	975.56
23 December 1994	Streamborn	One week after 8th dosing event, immediately before sampling, prior to 9th dosing event.	23.75	975.75	24.18	975.49	24.07	975.93	24.02	975.87
25 January 1995	Streamborn	One week after 13th dosing event, immediately before 14th dosing event.	22.99	976.51	23.49	976.18	23.37	976.63	23.27	976.62
17 February 1995	Streamborn	One week after 16th dosing event, immediately before sampling, prior to 17th dosing event.	22.27	977.23	22.80	976.87	22.44	977.56	22.56	977.33
7 March 1995	Streamborn	One week after 19th dosing event, immediately before 20th dosing event.	22.02	977.48	22.57	977.10	22.21	977.79	22.34	977.55
30 March 1995	Streamborn	One week after 22nd dosing event, immediately before 23rd dosing event.	21.36	978.14	21.93	977.74	21.58	978.42	21.68	978.21
7 April 1995	Streamborn	One week after 23rd dosing event, immediately before 24th dosing event.	21.26	978.24	21.78	977.89	21.38	978.62	21.57	978.32
18 April 1995	Streamborn	One week after 24th dosing event, immediately before sampling.	21.13	978.37	21.71	977.96	21.25	978.75	21.44	978.45
Total Depth (last measurement)	Streamborn		29.0		29.2		29.9		29.8	

General Notes:

- (a) WWC = Woodward-Clyde Consultants Oakland CA
- (b) NM = Not measured
- (c) Groundwater elevations referenced to site-specific datum (top of casing at MW-19 = 1,000.00). Well elevations re-surveyed by Streamborn on 23 December 1994. Streamborn measurements have been adjusted to the re-surveyed elevations. WWC elevations have not been adjusted to the re-surveyed elevations.
- (d) Measurements in units of feet

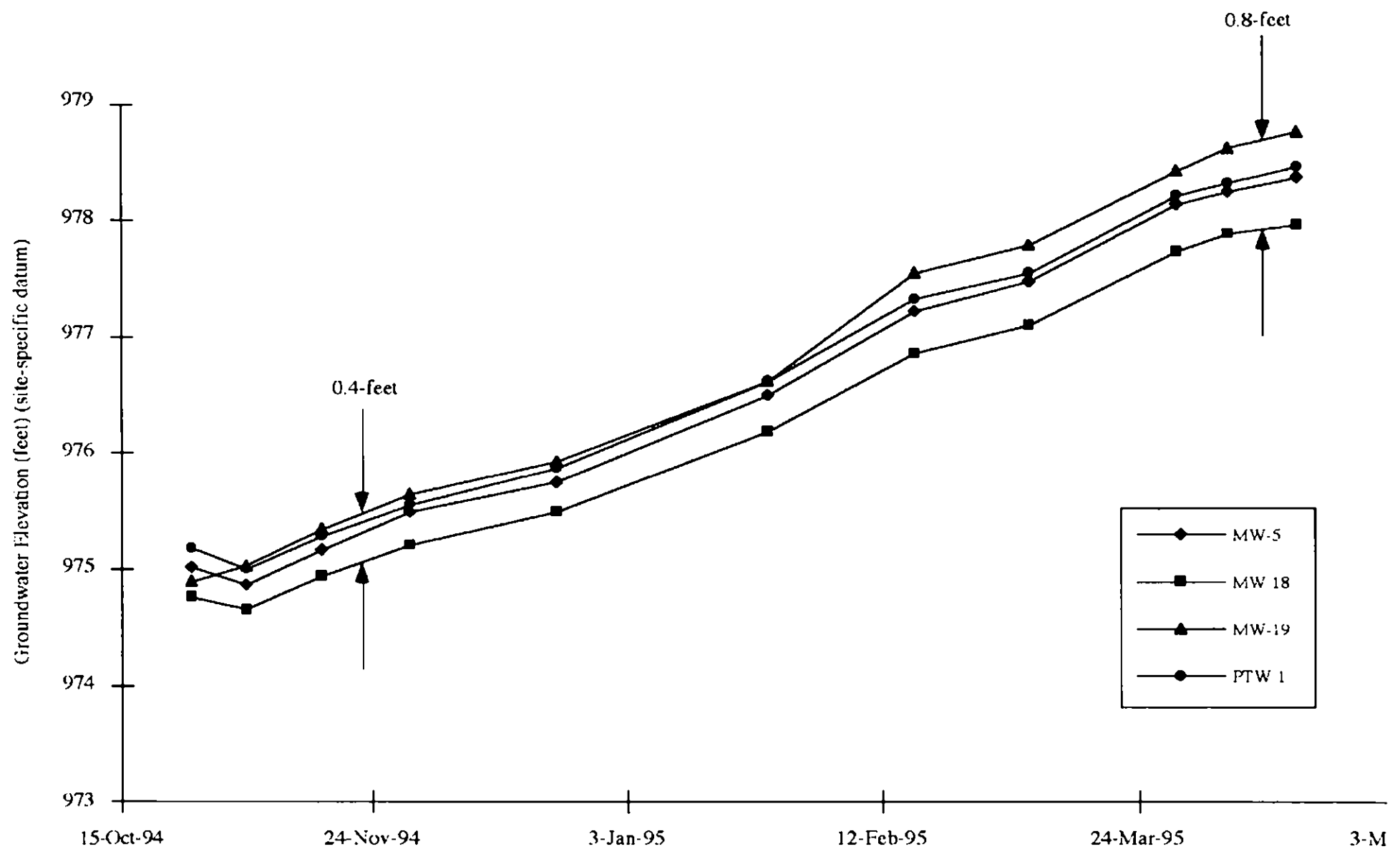


Table 3
Groundwater Analytical Results

Sample Location	Sample Date	Sampled By	Analyzed By	Sample Identification	Sample Type	TPH - Gasoline (mg/L)	Benzene (mg/L)	Toluene (mg/L)	Ethylbenzene (mg/L)	Xylenes (mg/L)	Volatile Organic Compounds (ug/L)	Ammonia as nitrogen (mg/L)	Nitrate as nitrogen (mg/L)	Phosphate as PO ₄ (mg/L)	Bacteria Analyses (cfu/ml)	Comments
MW-5	24 Apr 89	WCC	Sequoa		Grab (bottle)	24	7.5	0.22	0.99	0.73	AceTone = 2.1 Others - ND	NM	NM	NM	NM	
	14 Aug 89	WCC	Sequoa		Grab (bottle)	19	5.4	0.21	0.77	0.44	Others - ND	NM	NM	NM	NM	
	15 Feb 91	WCC	Sequoa		Grab (bottle)	13	7.5	0.25	1.0	0.34	NM	NM	NM	NM	NM	
	2 Mar 93	WCC	Sequoa		Grab (bottle)	32	4.4	0.17	0.62	0.26	NM	NM	NM	NM	NM	
	15 Dec 93	Storn	Chroma	MW-5 (15 Dec 93)	Grab (bottle)	20	4.4	0.18	0.76	0.24	NM	NM	NM	NM	NM	
	26 Oct 94	Storn	AEN	MW-5 (26 Oct 94)	Grab (bottle)	22	4.2	0.16	0.63	0.24	NM	NM	NM	NM	NM	Sampling conducted immediately prior to start of pilot study.
	23 Dec 94	Storn	AEN	MW-5 (23 Dec 94)	Grab (bottle)	20	3.2	0.15	0.62	0.24	NM	<2.5 (lab)	<0.1 (field)	<2.5 (field)	NM	Sampling conducted during pilot study. Prior to sampling, 8 dosing events completed at PTW-1.
	17 Feb 95	Storn	AEN	MW-5 (17 Feb 95)	Grab (bottle)	22	2.6	0.13	0.41	0.25	NM	<2.5 (lab)	<0.1 (field)	<2.5 (field)	NM	Sampling conducted during pilot study. Prior to sampling, 16 dosing events completed at PTW-1.
18 Apr 95	Storn	AEN, C&T, Medina	MW-5 (18 Apr 95)	Grab (bottle)	3.4	0.15	0.007	0.009	0.007	NM	<2.5 (lab)	<0.1 (field)	<2.5 (field)	Heterotrophic = 2×10^6 Gas/BTEX Degrading = 2×10^4 TPH Degrading = 3×10^4	Sampling conducted during pilot study. Prior to sampling, 24 dosing events completed at PTW-1.	
MW-18	14 Aug 89	WCC	Sequoa		Grab (bottle)	7.6	0.16	0.021	0.21	0.014	NM	NM	NM	NM	NM	
	15 Feb 91	WCC	Sequoa		Grab (bottle)	2.7	0.056	0.022	0.094	0.02	NM	NM	NM	NM	NM	
	2 Mar 93	WCC	Sequoa		Grab (bottle)	3.2	0.011	0.026	0.017	0.019	NM	NM	NM	NM	NM	
	15 Dec 93	Storn	Chroma	MW-18 (15 Dec 93)	Grab (bottle)	5.9	0.0079	0.039	0.019	0.028	NM	NM	NM	NM	NM	
PTW-1	26 Oct 94	Storn	AEN	PTW-1 (26 Oct 94)	Grab (bottle)	23	1.7	0.44	0.88	2.1	NM	<0.1 (lab)	<0.1 (field)	<0.5 (lab)	NM	Sampling conducted immediately prior to start of pilot study.
	23 Dec 94	Storn		PTW-1 (23 Dec 94)	Grab (bottle)	NM	NM	NM	NM	NM	NM	3 (field)	<0.1 (field)	<2.5 (field)	NM	Sampling conducted during pilot study. Prior to sampling, 16 dosing events completed at PTW-1.
	17 Feb 95	Storn	AEN	PTW-1 (17 Feb 95)	Grab (bottle)	5.8	0.11	0.012	0.023	0.04	NM	3 (field)	<0.1 (field)	<2.5 (field)	NM	Sampling conducted during pilot study. Prior to sampling, 24 dosing events completed at PTW-1.
	18 Apr 95	Storn	AEN, C&T, Medina	PTW-1 (18 Apr 95)	Grab (bottle)	2.7 (1)	0.035	0.003	0.005	0.01	NM	5 (field)	<0.1 (field)	<2.5 (field)	Heterotrophic = 7×10^6 Gas/BTEX Degrading = 9×10^5 TPH Degrading = 1×10^6	Sampling conducted during pilot study. Prior to sampling, 24 dosing events completed at PTW-1.
MW-19	14 Aug 89	WCC	Sequoa		Grab (bottle)	26	4.3	0.69	0.98	2.6	NM	NM	NM	NM	NM	
	15 Feb 91	WCC	Sequoa		Grab (bottle)	13	1.8	0.64	0.51	2.6	NM	NM	NM	NM	NM	
	2 Mar 93	WCC	Sequoa		Grab (bottle)	46	10	1.1	1.7	4.3	NM	NM	NM	NM	NM	1/4-inch floating product observed during sampling. Sample results may not be representative of dissolved concentrations.
	15 Dec 93	Storn	Not Analyzed	Not Analyzed	Grab (bottle)	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	Approximately 1/3-inch floating product observed in well. Accordingly, well not sampled.

General Notes

- ND - Not detected. Detection limit varied according to compound, as is normal.
- cfu/ml = colony forming units per milliliter.
- B = benzene, E = ethylbenzene, T = toluene, X = xylenes.
- Volatile Organic Compounds = Compounds per EPA Method 8240 (GC/MS).
- NM = Not measured.
- Storn = Streamborn; WCC = Woodward-Clyde Consultants (Oakland CA).
- AEN = American Environmental Network (Pleasant Hill CA), Sequoa = Sequoia Analytical (Redwood City CA), Chroma = Chromalab (San Ramon CA), C&T = Curtis & Thompson (Berkeley CA), Medina = Medina Bioremediation Division (Hondo TX).
- Bacteria count analyses performed by Medina Bioremediation Division. Ammonia, nitrate, and phosphate analyses performed by Curtis & Thompson.
- Ammonia, nitrate, and phosphate concentrations measured in the laboratory (lab), as well as using field test kits (field).

Footnote

- (1) Laboratory reports that the chromatogram for this sample was not characteristic of gasoline. The uncharacteristic chromatogram may reflect the benefits of bioremediation.

□ /19

○ 5:29 PM

■ 5/4/95

■ 510-528-2613

Streamborn

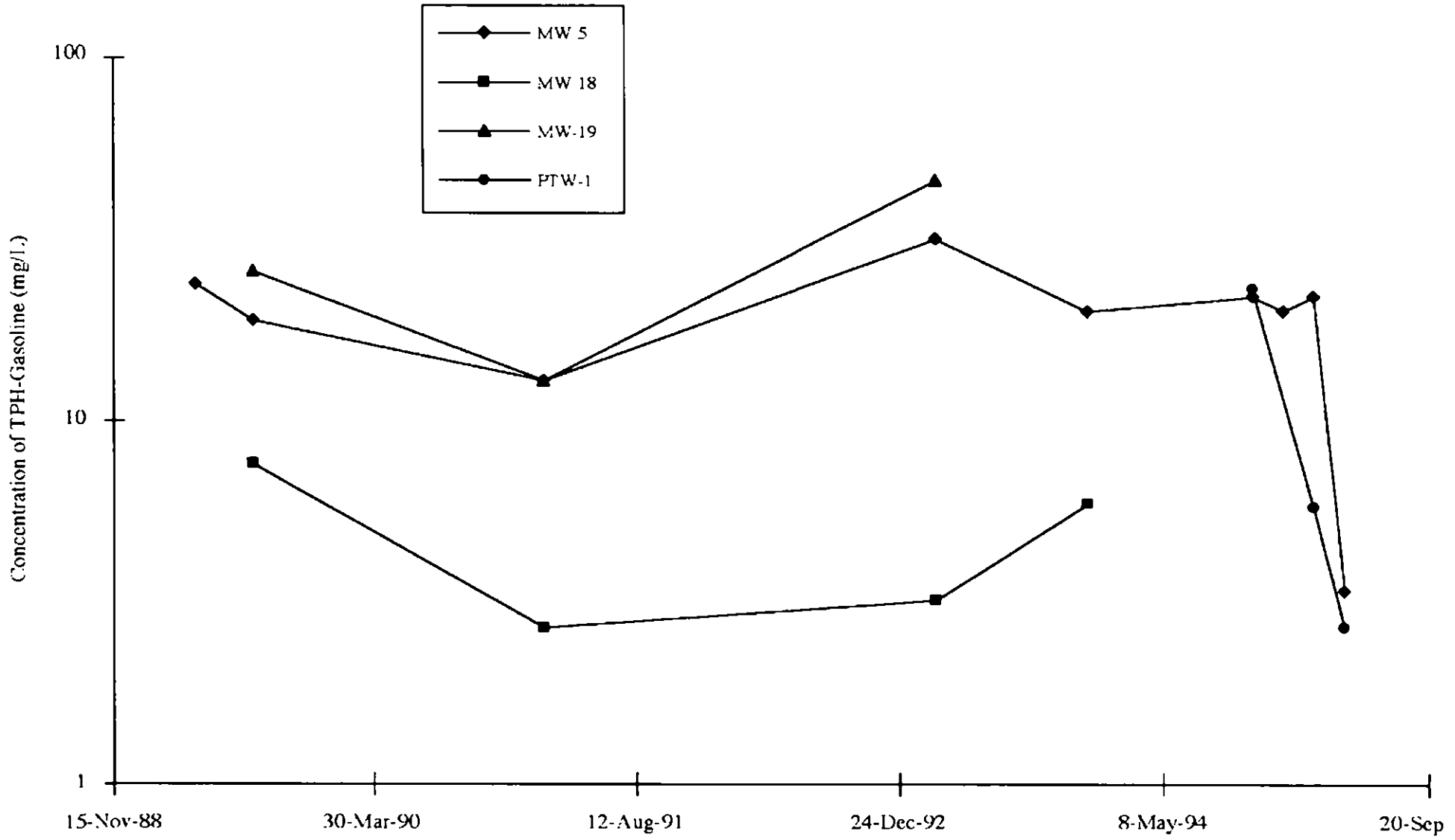


Table 4
Groundwater Purging and Sampling Data

Sample Location	Sample Identification	Date	Time	Type of Sample	Odor, Free Product, or Chemical Discoloration?	Specific Conductance ($\mu\text{mho}/\text{cm}^2$)	pH	Temp ($^{\circ}\text{C}$)	Oxidation Reduction Potential (mV)	Dissolved Oxygen (mg/L)	Purge Method	Purge Duration (min)	Volume Purged (gallons)	Purged Dry?	Static Casing Volumes Retrieved	Turbidity
MW-5	MW-5 (15Dec93)	15 Dec 1993	16:30	Grab (bailer)	OVM = ± 60 ppmv @ wellhead, no product	820	6.6	19.2	NM	1.9	Bailer	± 30 min	3.2	No	± 4	Opaque
	MW-5 (26Oct94)	26 Oct 94	13:45	Grab (bailer)	OVM = ± 50 ppmv @ wellhead, gasoline odor, no product	740	6.6	21.2	70	1.2	Bailer	+ 30 min	3.7	No	± 5	Opaque
	MW-5 (23Dec94)	23 Dec 1994	9:35	Grab (bailer)	OVM = ± 213 ppmv @ wellhead, gasoline odor, no product	790	6.7	19.5	-80	1.7	Bailer	+ 30 min	3.2	No	+ 4	Opaque
	MW-5 (17Feb95)	17 Feb 1995	10:50	Grab (bailer)	OVM = ± 58 ppmv @ wellhead, gasoline odor, no product	890	6.7	19.8	-80	0.0	Bailer	- 35 min	4.0	No	± 3.5	Translucent
	MW-5 (18Apr95)	18 Apr 1995	11:10	Grab (bailer)	Gasoline odor, no product	1,150	6.6	20.2	-90	1.3	Bailer	± 35 min	5.2	No	+4	Translucent to Opaque
MW-18	MW-18 (15Dec93)	15 Dec 1993	15:20	Grab (bailer)	OVM = ± 10 ppmv @ wellhead, no odor, no product	860	6.6	19.5	NM	1.4	Bailer	- 35 min	3.2	No	± 4	Opaque
PTW-1	PTW-1 (26Oct94)	26 Oct 94	15:15	Grab (bailer)	OVM = ± 105 ppmv @ wellhead, gasoline odor, no product	590	6.8	20.9	-35	2.1	Bailer	+65 min	6.2	No	± 7	Opaque
	PTW-1 (23Dec94)	23 Dec 94	10:00	Grab (bailer)	OVM = ± 130 ppmv @ wellhead, gasoline odor, no product	NM	NM	NM	NM	NM	Bailer	- 5 min	± 1.5	No	± 1.5	Opaque
	PTW-1 (17Feb95)	17 Feb 1995	11:45	Grab (bailer)	OVM = ± 143 ppmv @ wellhead, gasoline odor, no product	550	6.3	20.5	125	9.8	Bailer	+30 min	4.5	No	± 4	Translucent to Opaque
	PTW-1 (18Apr95)	18 Apr 1995	12:50	Grab (bailer)	Gasoline odor, no product	590	6.1	20.6	95	5.4	Bailer	± 35 min	5.4	No	± 4	Translucent to Opaque

General Notes

(a) NM = Not measured.

(b) OVM = organic vapor meter Thermo Environmental Instruments Model 580B photoionization device, equipped with 10.0 eV lamp, calibrated to 100 ppmv isobutylene

05/30/95

01/19/95

510-528-2613

Streamborn