



Chevron

Health, Environment and Safety

March 18, 1997

Ms. Eva Chu
Alameda County Health Care Services
Department of Environmental Services
1131 Harbor Bay Parkway, Suite 250
Alameda, CA 94502-6577

97 APR 10 PM 11:10
ENVIRONMENTAL
PROTECTION

Re: Tier 2 RBCA Risk Evaluation
Former Chevron Service Station #9-1723
9757 San Leandro Blvd.
San Leandro, California

Dear Ms. Chu:

Attached is the Draft Tier 2 Risk-Based Corrective Action (RBCA) Site Evaluation for Former Service Station #9-1723 located in Oakland, California. This RBCA evaluation incorporates comments from your office regarding acceptable risk ranges, exposure pathway considered, site-specific parameters and methods of data evaluation for the soil and groundwater analyses for this site. Site-specific target levels (SSTL's) for a 1×10^{-5} health risk for potential onsite commercial workers exposed to benzene vapors from soil and groundwater in indoor air were calculated using the GSI RBCA software package. Based on the calculated SSTL's, an estimated risk was then calculated for potential onsite commercial worker receptors. Results of this site evaluation indicate the following:

1) The calculated SSTL soil concentration at a 1×10^{-5} risk level for exposure to benzene vapors from soil was 0.45 mg/Kg. The calculated SSTL groundwater concentration at a 1×10^{-5} risk level for exposure to benzene vapors from groundwater was 6.7 mg/L. The arithmetic average soil concentration for the site was 5.8 mg/Kg, resulting in a 1.3×10^{-4} risk estimate for indoor commercial worker exposure to benzene vapors from site soils. The arithmetic average of benzene groundwater concentrations in individual monitor wells was 0.137 mg/L, resulting in a 2×10^{-7} risk estimate for indoor commercial worker exposure to benzene vapors from site groundwater. The total estimated risk for commercial worker exposure to indoor benzene vapors from site soils and groundwater is 1.3×10^{-4} , which is above the 1×10^{-5} guideline provided by your office.

2) The soil contamination throughout the site is predominantly concentrated in the capillary and water saturated zone at 10' below ground surface. With an average depth to groundwater for the site of 12.64 feet and an average thickness of the capillary zone of 3.37 feet, the vadose zone would extend to 9.27 feet below ground surface. The highest detected concentrations of benzene in soil were detected in the 10' sample in 21 of the 23 samples taken during the April, 1996 site assessment activities. Because of the location of the benzene soil detection's, direct worker exposure to these concentrations would not be expected.

3) The dissolved hydrocarbon plume at the site can be characterized as a stable to decreasing plume. The groundwater concentrations of TPH-g and BTEX at the site have decreased with time and currently indicate that the plume is defined in the downgradient direction

It seems this is out from below by 10' - 15' Gwl. Some - 11' (1996)

by wells MW-2, MW-6 and MW-9. Onsite wells MW-5 and MW-8 have decreasing TPH-g and BTEX concentrations as compared to initial analytical data collected three years ago. These data would indicate a stable to decreasing hydrocarbon plume.

Recommendation

Based on the site soils and groundwater data and this health risk evaluation, it is recommended that Chevron, in conjunction with the lead regulatory agency, place institutional controls on the development of this site. These controls may range from restricting development directly above the maximum detected benzene soil concentrations to placing a vapor barrier beneath any future commercial development at the site to proposing that only a parking lot may be placed over the benzene impacted soils. Complete excavation of the impacted soils would be prohibitively expensive and is not recommended as a method to reduce the adverse health risk potential identified for this site.

Please contact me at 510-242-7086 with questions or comments regarding my review of this site.

Sincerely,



Curtis A. Peck
Lead Hydrogeologist

cc: U. Kelmser/CRTC (w/o)
T. E. Buscheck/CRTC (w/o)
J. N. Stambolis/CRTC (w/o)

Attachments

- 1) RBCA Tier 1/Tier 2 - Table of Parameters
- 2) RBCA Baseline Risk Summary - Arithmetic Average of Soil and Groundwater
- 3) RBCA Baseline Risk Summary - 95% UCL Geometric Mean of Soil and Groundwater
- 4) Representative COC Concentrations in Source Media
- 5) Subsurface Soil SSTL Values
- 6) Groundwater SSTL Values
- 7) Subsurface Soil Concentration Data Summary
- 8) Groundwater Concentration Data Summary
- 9) GSI RBCA Summary Report Document
- 10) Groundwater Monitoring Data
- 11) Calculation Sheet - Groundwater Concentrations, Elevations and Capillary Thickness
- 12) Site Plan (Figure 3)
- 13) Soil Boring Location Plan (Figure 2)
- 14) Soil Boring Analytical Results
- 15) Soil Sample - Physical Parameter Results

Former Chevron Station #9-1723
 Groundwater Concentrations, Groundwater Elevations and Capillary Zone Thickness

Well	Date	GW elev. feet	Benzene ppb	Toluene ppb	E-Benzene ppb	Xylenes ppb
MW-2	5/12/94	11.94	6.8	2	6.3	14
	2/1/95	13.76	10	1.2	0.25	0.51
	8/2/95	11.53	3.5	0.25	2.6	4.1
	1/31/96	14.38	0.25	0.25	0.25	0.25
	8/1/96	11.49	0.25	0.25	0.25	0.25
	12/17/96	12.75				
arith. avg		12.64	4.16	0.79	1.93	3.822
capillary		2.89				
Well	Date	GW elev. feet	Benzene ppb	Toluene ppb	E-Benzene ppb	Xylenes ppb
MW-5	11/2/93	11.15	43	3.4	22	12
	2/10/94	13.10	52	3	50	40
	5/12/94	12.40	87	6.2	77	66
	11/11/94	13.50	18	0.5	18	11
	2/1/95	14.32	36	0.59	21	11
	5/18/95	12.87	29	1	16	9.8
	8/2/95	11.98	9.2	0.25	4	1.2
	11/1/95	11.58	5.6	0.25	1.9	0.25
	1/31/96	14.72	50	2.5	19	29
	5/16/96	14.22	14	0.25	17	8.6
	8/1/96	11.86	1.4	0.25	0.25	0.25
	12/17/96	13.13	9.7	0.25	11	6.3
	arith avg		12.90	29.58	1.54	21.43
capillary		3.57				
Well	Date	GW elev. feet	Benzene ppb	Toluene ppb	E-Benzene ppb	Xylenes ppb
MW-6	11/2/93	10.93	19	1.8	2.5	5
	2/10/94	12.86	10	0.9	2	4
	5/12/94	12.08	10	1.1	1.2	3.1
	8/26/94	10.82	16	1.4	2.3	7.1
	11/11/94	13.25	1.3	0.25	0.25	1
	2/1/95	14.02	1.9	0.25	0.25	0.51
	5/18/95	12.43	8.2	0.25	0.25	0.25
	8/2/95	11.64	2.3	0.25	0.25	0.25
	11/1/95	11.31	0.25	0.25	0.25	0.25
	1/31/96	13.63	0.98	0.25	0.25	0.25
	5/16/96	13.91	1.6	0.25	0.25	0.25
	8/1/96	11.56	0.82	0.25	0.25	0.25
	12/17/96	13.26	2.6	0.25	0.25	0.25
arith avg		12.44	5.77	0.57	0.79	1.73
capillary		3.20				
Well	Date	GW elev. feet	Benzene ppb	Toluene ppb	E-Benzene ppb	Xylenes ppb
MW-8	11/2/93	10.82	2000	440	420	1400
	2/10/94	12.97	1200	380	250	7900
	5/12/94	12.19	1400	2900	800	3800
	8/26/94	10.90	720	200	330	930
	11/11/94	13.38	250	170	190	650
	2/1/95	14.36	68	2.8	2.7	4.3
	5/18/95	12.54	120	12	11	3
	8/2/95	11.73	150	9.7	20	40
	11/1/95	11.36	120	15	16	39
	1/31/96	14.64	5.3	0.25	0.25	0.25
	5/16/96	13.99	260	43	56	130
	8/1/96	11.59	45	0.92	8.9	25
	12/17/96	12.95	280	30	51	88
arith avg		12.57	509.10	323.36	165.83	1154.58
capillary		3.82				
Well	Date	GW elev. feet	Benzene ppb	Toluene ppb	E-Benzene ppb	Xylenes ppb
site avg		12.64	137.15	81.56	47.50	294.10
capillary		3.37				

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SAN LEANDRO BLVD.



FORMER CHEVRON SITE

WORMINGTON WAREHOUSE

WAREHOUSE

COLD STORAGE BUILDING

CANOPY

PUMP HOUSE

SCALE HOUSE

FORMER CAFETERIA

P1

200,000 GAL AST

WASTE DISPOSAL BUILDING

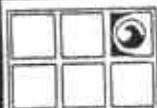
P3

PRODUCTION FACILITY

98th AVE.

LEGEND

■ WELL PUMP (SEE TEXT)



GROUNDWATER TECHNOLOGY



CLIENT:

FORMER CHEVRON STATION # 9-1723

LOCATION:

9757 SAN LEANDRO BLVD. OAKLAND, CALIFORNIA

WELL PUMP LOCATIONS FORMER GERBER FACILITY

FILE: WLF596

PROJECT NO.: 020700080

PM:

PE/RG:

FIGURE:

3

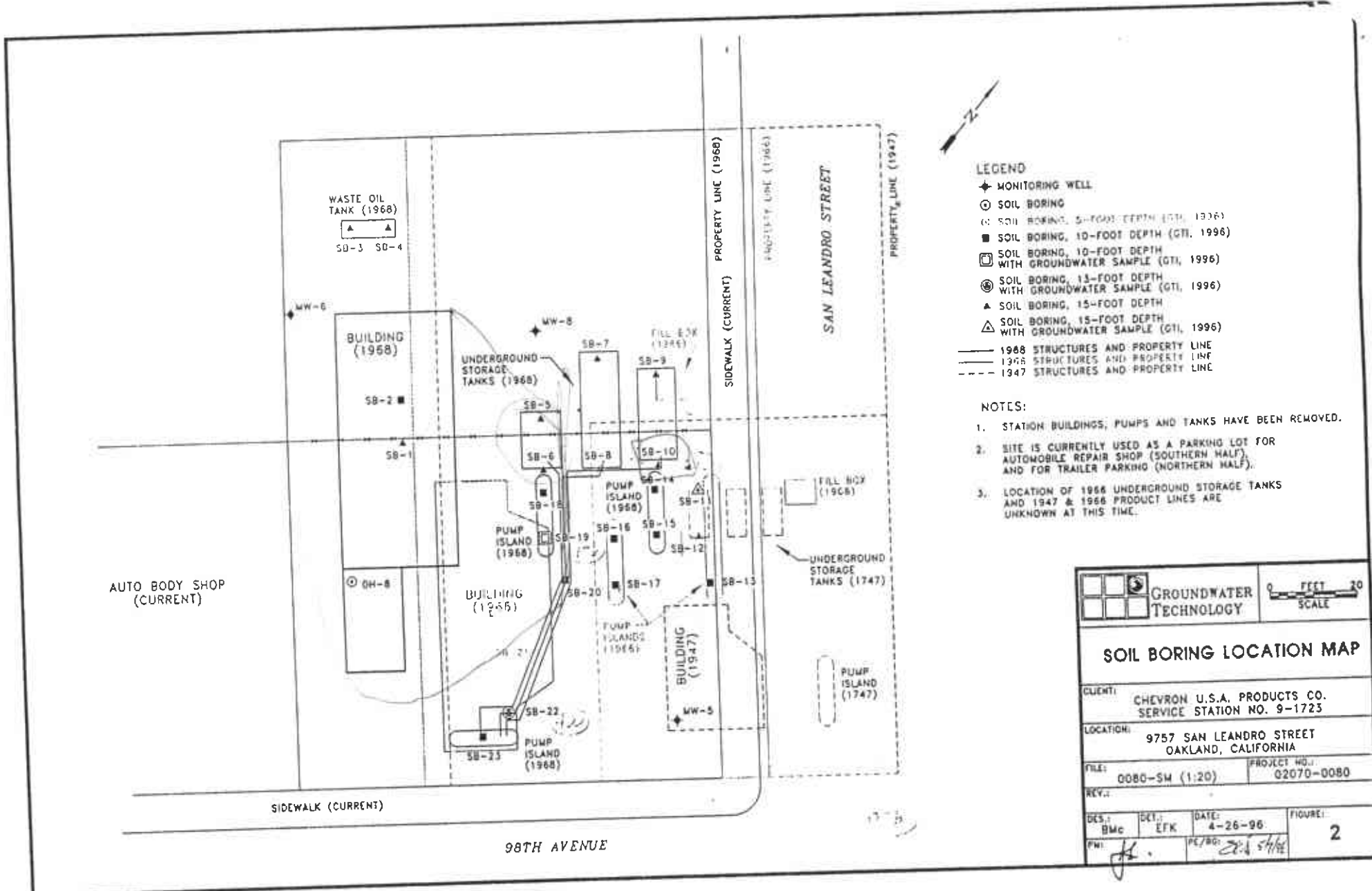
REV.: 1

DES.: BM

DET.: CY

DATE: 5/6/96

ZCS 5/9/96



LEGEND

- ◆ MONITORING WELL
- SOIL BORING
- SOIL BORING, 5-FOOT DEPTH (GTL, 1968)
- SOIL BORING, 10-FOOT DEPTH (GTL, 1996)
- SOIL BORING, 10-FOOT DEPTH WITH GROUNDWATER SAMPLE (GTL, 1996)
- ⊙ SOIL BORING, 15-FOOT DEPTH WITH GROUNDWATER SAMPLE (GTL, 1996)
- ▲ SOIL BORING, 15-FOOT DEPTH
- △ SOIL BORING, 15-FOOT DEPTH WITH GROUNDWATER SAMPLE (GTL, 1996)
- 1988 STRUCTURES AND PROPERTY LINE
- - - 1968 STRUCTURES AND PROPERTY LINE
- - - 1947 STRUCTURES AND PROPERTY LINE

NOTES:

1. STATION BUILDINGS, PUMPS AND TANKS HAVE BEEN REMOVED.
2. SITE IS CURRENTLY USED AS A PARKING LOT FOR AUTOMOBILE REPAIR SHOP (SOUTHERN HALF), AND FOR TRAILER PARKING (NORTHERN HALF).
3. LOCATION OF 1968 UNDERGROUND STORAGE TANKS AND 1947 & 1968 PRODUCT LINES ARE UNKNOWN AT THIS TIME.

SOIL BORING LOCATION MAP			
CLIENT: CHEVRON U.S.A. PRODUCTS CO. SERVICE STATION NO. 9-1723			
LOCATION: 9757 SAN LEANDRO STREET OAKLAND, CALIFORNIA			
FILE:	0080-SM (1:20)	PROJECT NO.:	02070-0080
REV.:			
DES.:	BMc	DET.:	EFK
		DATE:	4-26-96
FW:			FIGURE: 2

**SOIL SAMPLE ANALYTICAL RESULTS
BTX AND PETROLEUM HYDROCARBONS**

APRIL 1-4, 1996

CHEVRON SERVICE STATION #9-1723
9757 SAN LEANDRO BOULEVARD, OAKLAND, CALIFORNIA

SAMPLE NUMBER		DATE	BENZENE (mg/kg)	TOLUENE (mg/kg)	ETHYL BENZENE (mg/kg)	TOTAL XYLENES (mg/kg)	TPH-G (mg/kg)	TOTAL OIL AND GREASE (mg/kg)
BORING	DEPTH (feet BGS)							
SB-1	5	04/02/96	1.4	0.44	8.9	28	400	78
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-2	5	04/01/96	0.18	0.12	0.79	0.59	51	24
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-3	5	04/01/96	0.54	0.68	2.3	3.3	190	35
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-4	5	04/01/96	0.59	0.52	0.14	1.1	170 a	940
	10	-	0.091	0.036	0.029	0.23	20 a	--
	15	-	--	--	--	--	--	--
SB-5	5	04/01/96	2.4	1.4	10	4.2	300	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-6	5	04/04/96	0.57	ND<0.0050	0.42	2.3	330 a	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-7	5	04/01/96	2.2	0.58	7.7	7.9	880	--
	10	-	1.3	1.6	7.0	27	500	--
	15	-	--	--	--	--	--	--
SB-8	5	04/04/96	1.6	ND<0.0050	ND<0.0050	0.79	110 a	--
	10	-	4.6	1.1	0.76	2.1	240 a	--
	15	-	0.0054	ND<0.0050	ND<0.0050	0.042	2.1 b	--
SB-9	5	04/01/96	0.60	0.16	0.14	0.82	67	--
	10	-	--	--	--	--	--	--
	15	-	3.8	7.4	17	69	610	--
SB-10	5	04/04/96	3.7	8.9	9.9	53	450	--
	10	-	99	40	150	210	1,300	--
	15	-	0.010	0.0051	ND<0.0050	0.016	ND<1.0	--
SB-11	5	04/04/96	0.012	0.040	0.019	0.056	7.5 a	--
	10	-	1.5	ND<0.0050	9.7	3.2	550	--
	15	-	--	--	--	--	--	--
SB-12	5	04/03/96	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<1.0	--
	10	-	1.1	4.1	19	85	750	--
	15	-	--	--	--	--	--	--
SB-13	5	04/03/96	--	--	7.4	24	340	--
	10	-	1.6	0.81	0.097	0.067	17 a	--
	15	-	0.066	0.050	16	82	820	--
SB-14	5	04/04/96	5.0	28	16	0.15	2.1 a	--
	10	-	0.011	0.0060	ND<0.0050	260	1,800	--
	15	-	17	68	53	0.026	1.9	--
SB-16	5	04/03/96	0.15	ND<0.0050	0.0069	0.026	760	--
	10	-	6.2	1.8	28	76	--	--
	15	-	--	--	--	--	--	--
SB-17	5	04/03/96	4.3	15	38	150	1,600	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-18	5	04/04/96	5.9	4.5	2.0	5.4	480	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-19	5	04/03/96	2.3	ND<0.0050	1.1	1.5	--	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-20	5	04/03/96	3.8	1.5	17	39	510	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--
SB-21	5	04/02/96	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	3.1 a	--
	10	-	0.027	0.0091	0.020	0.015	110	--
	15	-	0.72	0.47	4.7	0.39	--	--
SB-23	5	04/02/96	3.4	0.29	0.86	4.6	140	--
	10	-	--	--	--	--	--	--
	15	-	--	--	--	--	--	--

EXPLANATION

BGS = Below ground surface
 TPH-G = Total petroleum hydrocarbons-as-gasoline
 mg/kg = milligrams per kilogram, equivalent to parts per million (ppm)
 ND = Not detected at or above the minimum detection limit shown
 a = Gasoline and unidentified hydrocarbons >C8
 b = Unidentified hydrocarbons >C8

0080STA1 WK4

Table 2
SOIL SAMPLE ANALYTICAL RESULTS
PHYSICAL PARAMETERS AND TOTAL ORGANIC CARBON

APRIL 1-4, 1996

CHEVRON SERVICE STATION #9-1723
 9757 SAN LEANDRO BOULEVARD, OAKLAND, CALIFORNIA

SAMPLE NUMBER		DATE	PERCENT MOISTURE	BULK DENSITY (g/m ³)	POROSITY	TOTAL ORGANIC CARBON (mg/kg)
BORING	DEPTH (feet BGS)					
SB-3	5	04-01-96	16	2.1	34	1,100
SB-8	5	04-04-96	19	2.0	42	870
SB-10	5	04-04-96	20	1.9	44	3,300
	10	"	20	2.1	46	1,500
SB-20	10	04-03-96	18	2.0	42	870
	5	04-02-96	16	2.1	44	820

EXPLANATION

BGS = Below ground surface

g/m³ = grams per cubic meter

mg/kg = milligrams per kilogram, equivalent to parts per million (ppm)

00805TA2.VWK4