LACO ASSOCIATES
ENGINEERS · GEOLOGISTS · ENVIRONMENTAL CONSULTANTS

LEONARD M. OSBORNE · CE 38573
DAVID R. GERVAN · CE 57282
DAVID N. LINDBERG · PG 5581/CEG 1895
FRANK R. BICKNER · PG 7428
RONALD C. CHANEY, Ph.D · CE 29027/GE 00934

October 26, 2005

4870.00

Humboldt County Department of Health and Human Services
Division of Environmental Health
100 H Street, Suite 100
Eureka, California 95501

Attention: Mr. Mark Verhey

Subject: Groundwater Monitoring Report; First, Second, and Third Quarters 2005 and Request for Closure; Dibble's Campton Heights Service Station 1500 Ronald Avenue, Fortuna, California; LOP No. 12729

Dear Mr. Verhey:

LACO ASSOCIATES (LACO) is pleased to present to the Humboldt County Department of Health and Human Services (HCDEH) the results of groundwater monitoring for the first, second, and third quarters of 2005, and a request for closure. The request for closure will include decay rates, natural attenuation, migration analyses, and fate and transport modeling for sorbed-phase and dissolved-phase petroleum hydrocarbons onsite. This report has been prepared for Mr. Ronald Kendall.

Please call or email if you have any questions or concerns.

Sincerely,
LACO ASSOCIATES

Caroline Levenda
Staff Geologist

Christopher J. Watt
PG 7586, Exp. 3/31/06

PROFESSIONAL GEOLOGIST
CHRISTOPHER JOHN WATT
No. 7586
Exp.03/31/
STATE OF CALIFORNIA

CJL:jg

Attachments

cc: Mr. Ronald Kendall, Dibble Campton Heights Service Station

P:\4800\4870 Ron Kendall\SUBMITTALS\GMR\2005\VTS additions to 1st and 2nd Q05 GMR & RFC.doc

21 W. 4th Street · P.O. Box 1023 · Eureka, California 95502 · 707-443-5054 · 1-800-515-5054 · FAX 707-443-0553
www.lacoassociates.us

GROUNDWATER MONITORING REPORT
FIRST, SECOND, AND THIRD QUARTERS 2005
and REQUEST FOR CLOSURE

Dibble's Campton Heights Service Station
1500 Ronald Avenue, Fortuna, California
LOP No. 12729; LACO Project No. 4870.00

INTRODUCTION

Field activities were conducted on *March 22, 2005*, *June 28, 2005*, and *September 15, 2005*, in accordance with generally accepted practices at this or similar locations. Please refer to Tables A, B, and C below for the current groundwater monitoring regime and to the updated Standard Operating Procedures (SOP), on file at your office, for details. A location and site map are provided as Figures 1 and 2, respectively. A key to abbreviations is included as Attachment 1.

SITE CHRONOLOGY

- December 29, 1999: One 250-gallon, single-walled steel waste oil underground storage tank (UST) and two 3,000-gallon, single-walled steel USTs were removed from the site.
- 2000: Seven temporary soil borings were installed.
- 2001: *Additional Subsurface Investigation Workplan* submitted and five temporary soil borings were installed.
- 2003: Temporary soil borings B8 through B11 were installed.
- 2004: Three monitoring wells were installed onsite.
- 2004 through present: Groundwater monitoring conducted onsite.
- 2005: *Subsurface Investigation Status Report* submitted.

SITE HISTORY SUMMARY

The USTs removed in December 1999 were operated for approximately 45 years and were last operated in 1991. According to field notes obtained at HCDEH, no groundwater was pumped from the tank cavity and excavated soils were used to backfill the cavities. The three USTs were single-walled steel, and only the waste oil UST was observed to have been compromised. Laboratory analytical results from samples collected during boring installation in March 2003 identified sorbed- and dissolved-phase total petroleum hydrocarbons as motor oil (TPHmo) in the southwest portion of the subject property and total petroleum hydrocarbons as gasoline (TPHg) north of the former UST cavity.

Table A: Sampling Event for March 22, 2005							
MONITORING WELL ID	SCREENED INTERVAL (feet)	DTW (feet)	PURGE METHOD	WATER QUALITY PARAMETERS	ANALYTICALS		SAMPLING SCHEDULE
					ORGANICS	INORGANICS	
MW1	5-15	13.58	3/4"Bailer	NA	TPHg, TPHd, TPHmo, BTEX, MTBE, TBA, DIPE, ETBE, TAME	NA	Quarterly
MW2	5-15	13.18	DHP	pH, T, ECw, ORP, DO			
MW3	5-15	13.36	3/4" Bailer	NA			

Table B: Sampling Event for June 28, 2005							
MONITORING WELL ID	SCREENED INTERVAL (feet)	DTW (feet)	PURGE METHOD	WATER QUALITY PARAMETERS	ANALYTICALS		SAMPLING SCHEDULE
					ORGANICS	INORGANICS	
MW1	5-15	14.42	3/4" Bailer	NA	TPHg, BTEX, MTBE, TBA, DIPE, ETBE, TAME	NA	Quarterly
MW2	5-15	14.14					
MW3	5-15	12.73					

Table C: Sampling Event for September 15, 2005							
MONITORING WELL ID	SCREENED INTERVAL (feet)	DTW (feet)	PURGE METHOD	WATER QUALITY PARAMETERS	ANALYTICALS		SAMPLING SCHEDULE
					ORGANICS	INORGANICS	
MW1	5-15	DRY	NA	NA	NA	NA	Quarterly
MW2	5-15	DRY					
MW3	5-15	14.18					

HYDRAULIC GRADIENT AND HYDROGEOLOGY

The site comprises a shallow aquifer with sandy silts, clayey silty sands, and gravels (Figures 3 and 4). Sandy, gravely silts comprise the deeper, saturated zone onsite. Silts and clays comprise the shallower subsurface geology onsite. Groundwater flows in the northern direction. Potentiometric surface contours for the site were generated using Surfer 7.0 software and the hydraulic head elevations calculated for each monitoring event.

Hydraulic Gradient

- The hydraulic gradient for the March 22, 2005, monitoring event, using monitoring wells MW1, MW2, and MW3 and the three-point method, was determined to have a *N12°E* trend with a *1.3* percent slope (Figure 5).
- The hydraulic gradient for the June 28, 2005, monitoring event, using monitoring wells MW1, MW2, and MW3 and the three-point method, was determined to have a *N43°W* trend with a *3.6* percent slope (Figure 6).

The hydraulic gradients for the March 22, 2005, and June 28, 2005, monitoring events are consistent with historic hydraulic gradient data. The hydraulic gradient for the September 15, 2005, sampling was not determined due to the presence of groundwater in only one well. Historic hydraulic gradient data are presented in Table 1, and copies of the field sampling data sheets are included as *Attachment 2*.

LABORATORY RESULTS

Laboratory analytical results from the March 22, 2005, and June 28, 2005, quarterly sampling events are included below in Tables D and E. Groundwater samples were not collected for the September 15, 2005, event due to the lack of groundwater present in the monitoring wells (Table F). Current and historical groundwater analytical data are included in Table 2, and copies of the laboratory analytical report are included as Attachment 3.

Table D: Analytical Results for March 22, 2005, Quarterly Sampling Event

WELL	TPHg (µg/l)	TPHd (µg/l)	TPHmo (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	Other Analytes (µg/l)
MW1	**340**	ND<50	ND<170	**0.87**	**0.56**	ND<0.50	**7.5**	**340**	**TAME = 140**; ND<1.0 - 120
MW2	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<1.0 - 10
MW3	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	**0.50**	ND<1.0	ND<1.0 - 10

Table E: Analytical Results for June 28, 2005, Quarterly Sampling Event

WELL	TPHg (µg/l)	TPHd (µg/l)	TPHmo (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	Other Analytes (µg/l)
MW1	ND<50	NA	NA	ND<0.50	ND<0.50	ND<0.50	ND<0.50	**40**	**TAME = 14**; ND<1.0 - 10
MW2	ND<50	NA	NA	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<1.0 - 10
MW3	ND<50	NA	NA	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0	ND<1.0 - 10

Table F: Analytical Results for September 15, 2005, Quarterly Sampling Event									
WELL	TPHg (µg/l)	TPHd (µg/l)	TPHmo (µg/l)	Benzene (µg/l)	Toluene (µg/l)	Ethylbenzene (µg/l)	Total Xylenes (µg/l)	MTBE (µg/l)	Other Analytes (µg/l)
MW1	Dry								
MW2	Dry								
MW3	Insufficient Amount of water for sample								

DISCUSSION OF GROUNDWATER RESULTS

Groundwater samples collected from monitoring wells MW2 and MW3 have been non-detect (ND) and/or below the California Regional Water Quality Control Board (CRWQCB) water quality objectives (WQOs) for TPHg, total petroleum hydrocarbons as diesel (TPHd), TPHmo, benzene, toluene, ethylbenzene, and xylenes (BTEX), methyl tertiary butyl ether (MTBE), and other fuel oxygenates since sampling was initiated in March 2004. Groundwater samples were not collected from monitoring MW1 through MW3 during the April 2004 through August 2004 sampling events due insufficient amounts of water to sample in the monitoring wells. However, groundwater samples were collected from monitoring well MW3 during the June 2004 sampling event.

March 22, 2005 (First Quarter Sampling Event)

Groundwater analytical results appear to indicate that the petroleum hydrocarbons detected are of older, weathered, and/or degraded fuel range material. Lack of BTEX in groundwater samples suggests the presence of older or degraded petroleum hydrocarbons. The laboratory noted that the gasoline value reported for the groundwater sample collected from monitoring well MW1 is primarily from the gasoline additives. Additional laboratory notes are included in the case narrative of the laboratory analytical results in Attachment 3.

June 28, 2005 (Second Quarter Sampling Event)

The groundwater sample collected from monitoring well MW1 indicates a decrease of one order of magnitude in MTBE and tertiary amyl methyl ether (TAME) concentrations from the previous sampling event. Additional laboratory notes are included in the case narrative of the laboratory analytical results in Attachment 3.

REQUEST FOR CLOSURE

The request for closure includes decay rate, bulk attenuation analyses, and fate and transport modeling of petroleum hydrocarbon concentrations onsite:

- Decay rate analyses were completed using:
  1. Laboratory analytical results for determining site-specific decay rates and the approximate year the WQO will be met.
  2. Degradation rates derived from half-lives from Howard's *Handbook of Environmental Degradation Rates* (Howard, 1991) for determining the approximate year the WQOs will be met.
  3. Comparisons of site specific decay rates to decay rates of a nearby site in Fortuna.
- Migration and bulk attenuation analyses were completed using:
  1. Discussion of vertical extent of sorbed-phase and dissolved-phase petroleum hydrocarbons, as defined by historical laboratory analytical results collected from the monitoring wells and borings.
  2. Calculated attenuation rates of the horizontal extent of sorbed-phase and dissolved-phase petroleum hydrocarbons, as defined by historical laboratory analytical results collected from the monitoring wells and borings.
- Fate and Transport Modeling of MTBE using:
  1. MTBE concentrations in groundwater, site hydrogeology and soil conductivities.
- Mass Calculations of TPHmo in soil using:
  1. TPHmo concentrations and volumes in shallow and deep soils. The mass calculations for TPHmo in soil was determined for the soil contingency plan to be developed upon site closure.

DECAY RATES ANALYSES

Time-series plots of groundwater elevations and laboratory analytical results of TPHg, benzene, and MTBE concentrations for monitoring well MW1 are included in Charts 1 through 3. Decay rates for TPHg and benzene concentrations are derived from the time-series plots and analytical results. The decay rates were calculated using a first order decay rate equation:

Concentration Final (C_f) = Concentration Initial (C_i) * e^(-decay constant ($-k_{point}$)*time(t))

- Concentration Final (C_f) is the most recent of two concentrations or end concentration of

TPHg, benzene, or MTBE in groundwater samples collected from a monitoring well or boring location; this is to determine site specific decay rates. C_f is set to equal the WQO required for each constituent to calculate the time to reach WQOs. The degradation rates taken from Howard's *Handbook of Environmental Degradation Rates* (Howard, 1991) were used to determine when the WQO will be met.

- Concentration Initial (C_i) is the least recent of two concentrations or beginning concentration of TPHg, benzene, or MTBE in groundwater samples collected from a monitoring well or boring location.
- Decay constant (k_{point}) is the value derived from either site specific concentrations or calculated from the half-lives found in Howard, 1991, for TPHg (*see cyclohexane discussion below*), benzene, or MTBE.
- Time (t) is the amount of time determined for TPHg, benzene, and MTBE concentrations to reach the WQOs using the decay rates.

Table G below summarizes TPHg, benzene, and MTBE decay rate derivations and WQO achievement date estimates for on-site monitoring well MW1 using the laboratory analytical results for monitoring well MW1. Table H presents "fast" and "slow" degradation rates, based on published cyclohexane half-life data, to compare to observed decay rates for TPHg.

Table G. Decay Rates Derived From Laboratory Analytical Results-Site Specific

Monitoring Well ID / Constituent	Concentration Final (C_f) (µg/L)	C_f Date	Concentration Initial (C_i) (µg/L)	C_i Date	time (t) days between C_f and C_i	k (point)= decay rate constant (days)	Water Quality Objective (WQO)		Using Decay rate (k point). Obtain (t in days) to reach WQO	year WQO reached from chart
							WQO TPHg (µg/L) ⇨	50.0		
TPHg										
MW1	50	6/28/2005	350	12/20/2004	190	0.01024			190	2005
							WQO Benzene (µg/L) ⇨	1.0		
Benzene										
MW1	0.5	6/28/2005	2.1	12/20/2004	190	0.00755			98	2005
							WQO MTBE (µg/L) ⇨	5		
MTBE										
MW1	40	6/28/2005	340	3/22/2005	98	0.02184			193	2005

Due to insufficient water volumes and access issues in monitoring well MW1, groundwater samples were not collected for the April 7, 2004 through the December 13, 2004, sampling events. Therefore, the decay rate analyses for TPHg, benzene, and MTBE were determined by using the most recent sampling events in which groundwater samples were collected.

Discussion for Using Decay Rate Values of Cyclohexane for TPHg Decay Rate Analyses

Half-lives of TPHg are not available due to the complex formulations of TPHg mixtures; however, cyclohexane is a major component in standard gasoline formulation, making up to approximately 32 percent by volume of the formulation (Nyer et al., 1996). Cyclohexanes were also reported as a major component in a groundwater sample collected at another UST site impacted by weathered/degraded gasoline in Fortuna, California. Attachment 4 presents a data sheet from Agricultural and Priority Pollutants Laboratories, Inc (APPL) illustrating the relative concentrations of separate analytes making up degraded and dissolved TPHg. Based on data presented in Attachment 4, cyclohexanes comprise approximately 36 percent of the TPHg from the Fortuna site. This supports Nyer's estimate; therefore, we conclude that cyclohexane is a representative proxy when calculating a decay rate for TPHg.

Cyclohexane "fast" and "slow" half-lives for aqueous biodegradation under anaerobic conditions were obtained from Howard's *Handbook of Environmental Degradation Rates* (Howard, 1991). The degradation rates were determined using the first order decay equation presented above. Comparisons of decay rates for TPHg (using cyclohexane decay rates), benzene, and MTBE from site-specific laboratory analytical results to those calculated from half-lives present in Howard are included as Table H below.

Table H. Comparisons of Decay Rates Constants

MW ID	Derived from Laboratory Analytical	Howard, 1991	
		slow	fast
TPHg MW1	0.01024	0.0010315	0.0061888
Benzene MW1	0.00755	0.0009627	0.0061888
MTBE MW1	0.02184	0.0009627	0.0061888

Comparison of Site Specific Decay Rates to the Literature Decay Rates

Site specific decay rates for TPHg, benzene, and MTBE using laboratory analytical results appear to be higher than the decay rates found in the literature (Table H); higher decay rates result in earlier achievement of WQOs.

Table I below summarizes the results of TPHg, benzene, and MTBE degradation rate derivations, and WQO achievement date estimates for on-site monitoring well MW1, using decay rates from the literature (Howard, 1991).

Table I. Decay Rates Derived From Literature

Monitoring Well ID / Constituent	Concentration Final (C_f) (µg/L)	C_f Date	Concentration Initial (C_i) (µg/L)	C_i Date	time (t) days between C_f and C_i	k_{point} = decay rate constant taken from literature (**slow**)	k_{point} = decay rate constant taken from literature (**fast**)	Water Quality Objective (WQO)	Using SLOW Decay rate (k_{point}). Obtain (t in days) to reach WQO	Approximate year WQO reached from using **SLOW** decay rates from literature	Using FAST Decay rate (k_{point}). Obtain (t in days) to reach WQO	Approximate year WQO reached from using **FAST** decay rates from literature
								WQO TPHg (µg/L) ⇨ 50.0				
TPHg												
MW1	50	6/28/2005	350	12/20/2004	190	0.00103	0.0062		1887	**2010**	314	**2006**
								WQO Benzene (µg/L) ⇨ 1.0				
Benzene												
MW1	0.5	6/28/2005	2.1	12/20/2004	190	0.00096	0.0062		773	**2007**	120	**2005**
								WQO MTBE (µg/L) ⇨ 5				
MTBE												
MW1	40	6/28/2005	340	3/22/2005	98	0.00096	0.0062		4395	**2017**	681	**2007**

Decay Rate Analyses from Literature for Monitoring Well MW1

The slow and fast degradation/decay rates from the literature (Howard, 1991) for TPHg, benzene, and MTBE were used to determine the dates when WQOs will be reached using initial concentration (C_i) values. The approximate year the WQO will be reached was determined by using the first order decay rate equation presented above. The WQO goal for each constituent was used for the C_f value. WQOs for TPHg and benzene will be reached within the next 5 years per the calculations using slow decay rates. The WQO for MTBE will be reached within the next 12 years per the calculations using slow decay rates.

Comparison of Decay Rates to Nearby Site in Fortuna

The UST site LOP No. 12219, LACO Project No. 3347.01, Haberstock Construction, located on

Rohnerville Road in Fortuna, was used to compare site-specific decay rate values with the Dibbles Campton Heights Service Station (Dibbles site). The nearby site was chosen based on proximity to the Dibbles site and similar hydrogeologic conditions. Both sites appear to have interbedded silty clays, silts, sands, and gravels typical of floodplain and ancient river bed deposits comprising the surrounding strata. Table J below shows site-specific decay rates based on laboratory analytical results for the Haberstock site. Table K below compares decay rate constants between the Dibbles site, the Haberstock site, and the literature. Table L below demonstrates a decay rate analysis using the Haberstock site decay rate constants and applying it to the Dibbles site analytical data.

Table J. Decay Rates Derived From Laboratory Analytical Results from Haberstock Site, Fortuna, CA

Monitoring Well ID / Constituent	Concentration Final (C_f) (µg/L)	C_f Date	Concentration Initial (C_i) (µg/L)	C_i Date	time (t) days between C_f and C_i	k = decay rate constant (days)	Water Quality Objective (WQO)		Using Decay rate (k). Obtain (t in days) to reach WQO	year WQO reached from analytical
							WQO TPHg (µg/L) ⇨	50.0		
TPHg										
MW1A	50	3/18/2005	4,100	5/22/2001	1396	0.00316			1396	2005
MW2	50	3/18/2005	230,000	9/17/1993	4200	0.00201			WQO	2004
							WQO Benzene (µg/L) ⇨	1.0		
Benzene										
MW1A	0.83	3/18/2005	460	5/22/2001	1396	0.00453			1355	2005
MW2	0.5	8/21/1997	230	9/17/1993	1434	0.00428			WQO	2004
MW3	0.5	11/25/1995	0.9	9/17/1993	799	0.00074			Already	2004
							WQO MTBE (µg/L) ⇨	5		
MTBE										
MW1A	0.5	3/18/2005	4.9	5/15/2003	673	0.00339			-6	2005
MW3	2	3/18/2005	5.4	12/11/1997	2654	0.00037			206	2005

Table K. Comparisons of Decay Rates Constants

MW ID	Derived from Laboratory Analytical			Literature	
	Dibbles Site	**Haberstock Site**		Howard, 1991	
	MW1	low	high	low	high
TPHg	0.01024	0.00201	0.00316	0.0010315	0.0061888
Benzene	0.00755	0.00074	0.00453	0.0009627	0.0061888
MTBE	0.02184	0.00037	0.00339	0.0009627	0.0061888

Table L. Decay Rates Derived From Haberstock site and applied to Dibbles site													
Monitoring Well ID / Constituent	Concentration Final (C_f) (µg/L)	C_f Date	Concentration Initial (C_i) (µg/L)	C_i Date	time (t) days between C_f and C_i	k_{point} = decay rate constant taken from Haberstock site (**slow**)	k_{point}= decay rate constant taken from Haberstock site (**fast**)	Water Quality Objective (WQO)	Using SLOW Decay rate (k_{point}). Obtain (t in days) to reach WQO	Approximate year WQO reached from using **SLOW** decay rates from Haberstock site	Using FAST Decay rate (k_{point}). Obtain (t in days) to reach WQO	Approximate year WQO reached from using **FAST** decay rates from Haberstock site
								WQO TPHg (µg/L) ⇨ 50.0				
TPHg												
MW1	50	6/28/2005	350	12/20/2004	190	0.00201	0.00316		968	**2010**	616	**2006**
								WQO Benzene (µg/L) ⇨ 1.0				
Benzene												
MW1	0.5	6/28/2005	2.1	12/20/2004	190	0.00074	0.00453		1003	**2007**	164	**2005**
								WQO MTBE (µg/L) ⇨ 5				
MTBE												
MW1	40	6/28/2005	340	3/22/2005	98	0.00037	0.00339		11404	**2017**	1245	**2007**

DISCUSSION OF DECAY RATES OF TWO SITES

The decay rates for the Haberstock site appear to be slower than the decay rates for the Dibbles site for TPHg, benzene, and MTBE. The site-specific decay rates calculated in Table G for the Dibbles site appear not to be representative of site conditions due to the lack of historical analytical data. The more reasonable decay rate analyses would include literature decay rates and those derived from the nearby site in Fortuna. Using the literature derived decay rates (Table I) and the decay rates from the nearby site (Table L), the WQOs appear to be met at the same years and within a reasonable amount of time.

MIGRATION AND BULK ATTENUATION

Extent of Soil and Groundwater Petroleum Hydrocarbons

Historical soil and groundwater analytical results present a defined subsurface area impacted by petroleum hydrocarbons. A cross-section of the subsurface geology and sorbed-phase TPHg isoconcentration map is included in Figure 3. A sorbed-phase TPHmo isoconcentration map is included in Figure 4. Historical groundwater analytical results collected from the borings are included in Table 3. Historical soil analytical results collected from borings and the installation of monitoring wells are included in Table 4. Soil analytical results collected from the gasoline UST and waste oil UST cavities are included in Table 5.

1. Vertical Extent

The vertical extent of sorbed-phase and dissolved-phase petroleum hydrocarbons is defined by

the historical soil and groundwater samples collected. Sorbed-phase petroleum hydrocarbons are present at 0.5 to 19 feet below ground surface (bgs) based on April 2000 and June 2004 historical soil analytical results. Sorbed-phase concentrations of TPHg below the monitoring well screen intervals are less than 10 μg/g. Soil samples collected from boring B8 at a depth of 0.5 to 1.0 feet reported concentrations of TPHg at 38 μg/g, TPHd at 420 μg/g, and TPHmo 9,100 μg/g. The historic depth-to-water (DTW) measurements in monitoring well MW1 range between 11.17 to 14.54 feet bgs with groundwater concentrations of MTBE detected above the WQO at DTW measurements between 13.58 to 14.42 feet bgs. Monitoring wells MW1 through MW3 are screened at an interval of 5 to 15 feet bgs. The following list of subsurface investigations discusses the vertical soil concentrations of total petroleum hydrocarbons:

- *April 11, 2000, Subsurface Investigation*: TPHg in soil was detected in temporary soil borings B1-00, B2-00, B3-00, B5-00, and B6-00 at depths ranging between 4 and 13 feet bgs. TPHd in soil was detected in temporary soil borings B3-00 and B5-00 at depths of 4 and 13 feet. TPHmo in soil was detected in temporary soil boring B3-00 at a depth of 13 feet bgs. Benzene in soil was detected in temporary soil borings B3-00 and B5-00 at depths ranging between 4 and 9 feet bgs.
- *June 13, 2000, SubsurfaceIinvestigation*: TPHg in soil was detected in temporary soil boring B1-00 at a depth of 17 feet. TPHd in soil was detected in temporary soil borings B5-00 and B6-00 at depths of 9 and 14 feet bgs. TPHmo in soil was detected in temporary soil borings B5-00, B6-00, and B7-00 at depths ranging between 9 and 14 feet bgs.
- *February 6, 2001, Subsurface Investigation*: TPHg in soil was detected in temporary soil boring B3-01 at depths of 15 and 19 feet bgs. TPHmo in soil was detected in temporary soil boring B4-01 at a depth of 5 feet bgs.
- *March 18, 2003, Subsurface Investigation*: TPHg in soil was detected in temporary soil boring B8 at a depth of 0.5 to 1.0 feet bgs, and in temporary soil boring B12 at 10 to 11 feet bgs. TPHd and TPHmo in soil were detected in temporary soil boring B8 at a depth of 0.5 to 1.0 feet bgs.
- *February 4, 2004, Subsurface Investigation*: All analytes in soil were ND for this sampling event.

Based on historical soil analytical data from the 2000, 2001, and 2003 subsurface investigations, the monitoring well screens of 5 through 15 feet bgs capture the vertical extent of sorbed-phase

petroleum hydrocarbons.

2. Horizontal Extent

Monitoring well MW1 is located hydraulically downgradient of the former tank cavity. Monitoring well MW2 is located hydraulically cross-gradient of the former waste oil tank. Monitoring well MW3 is located in the southeast corner of the property. The horizontal extent of dissolved-phase petroleum hydrocarbons was calculated using site-specific decay rates. *Calculation and Use of First-Order Rate Constants for Monitored Natural Attenuation Studies* (Newell, 2002) describes the calculation methods used to determine bulk attenuation rates of the horizontal extent of TPHg in groundwater.

The general equation for determining bulk attenuation constants follows:

STEP 1:

$$\text{Bulk Attenuation Constant } [\mathbf{k}] = \frac{[\ln(\text{Concentration B } (C_B) \text{ (downgradient point)} / (\text{Concentration A } (C_A) \text{ (upgradient point)})]}{(\text{Approximate Distance between } C_A \text{ and } C_B)}$$

STEP 2:

$$\text{Distance} = \frac{[\ln(\text{Water quality objective} / C_B))]}{(\mathbf{k})}$$

The analysis of distance of migration for TPHg, benzene, and MTBE are presented below:

TPHg

Historical groundwater analytical results indicate that TPHg concentrations were detected in groundwater samples collected from monitoring well MW1. The groundwater analytical results for temporary borings installed in the years 2000, 2001, and 2003 indicate that TPHg was present in groundwater samples B1-00 (7,900 μg/L in 2000) and B3-01 (1,700 μg/L in 2001) at concentrations above the WQO of 50 μg/L. Soil boring B3-01 is located hydraulically downgradient of soil boring B1-00 assuming a general northern hydraulic gradient.

The following equations and steps were used for locations B1-00 and B3-01:

STEP 1:

$$\text{Bulk Attenuation Rate Constant [k]} = \frac{[\ln(\text{Concentration at B3-01/ Concentration at B1-00})]}{(\text{Approximate Distance between B3-01 and B1-00})}$$

$$\mathbf{k} = [\ln(1700\ \mu g/L\ /\ 7900\ \mu g/L)]\ /\ (20\ \text{feet}) = \mathbf{-0.07681}$$

STEP 2:

$$\text{Distance (feet)} = \frac{[\ln(\text{WQO of } 50\ \mu g/L/\ \text{Concentration at B3-01 (end-point)})]}{(\mathbf{k})}$$

$$\mathbf{Distance} = [\ln(50\ \mu g/L\ /\ 1700\ \mu g/L)]\ /\ -0.07681 = \mathbf{45.9\ feet}$$

At an estimated distance of 45.9 feet from boring B3-01, the concentration of TPHg should reach the WQO of 50 μg/L (Figure 7). The groundwater sample collected from B16 indicates that TPHg is not detected at levels of 50 μg/L or greater. Boring location B16 is located approximately 50 feet from boring B3-01 in the downgradient direction.

Benzene

Historical groundwater analytical results indicate that benzene concentrations were detected in groundwater samples collected from monitoring well MW1. The groundwater analytical results for temporary borings installed in the years 2000, 2001, and 2003 indicate that benzene was present in groundwater samples B1-00 (11 μg/L in June 2000) and B3-01 (2.0 μg/L in February 2001) at concentrations above the WQO of 1 μg/L. Boring B3-01 is located hydraulically downgradient of boring B1-00 assuming a northern hydraulic gradient direction.

The following equations and steps were used for borings B1-00 and B3-01:

STEP 1:

$$\text{Bulk Attenuation Rate Constant[k]} = \frac{[\ln(\text{Concentration at B3-01/ Concentration at B1-00})]}{(\text{Approximate distance between B3-01 and B1-00})}$$

$$\mathbf{k} = [\ln(2.0\ \mu g/L\ /\ 11\ \mu g/L)]\ /\ (20\ \text{feet}) = \mathbf{-0.08527}$$

STEP 2:

$$\text{Distance (feet)} = \frac{[\ln(\text{WQO of } 1\ \mu g/L\ /\ \text{end concentration point at B3-01})]}{(k)}$$

Distance = [ln (1 μg/L / 2.0 μg/L)] / -0.08527 = **8.1 feet**

The WQO for benzene of 1 μg/L should be reached at 8.1 feet from soil boring B3-01 (Figure 8). The groundwater sample collected from boring B16 indicates that benzene is not detected at concentrations of 0.50 μg/L or greater. Soil boring location B16 is located approximately 50 feet from boring B3-01 in the downgradient direction.

MTBE

Historic groundwater analytical data indicates that MTBE concentrations were detected in the groundwater samples collected from monitoring well MW1. The groundwater analytical results for the temporary soil borings installed in the years 2000, 2001, and 2003 indicate that MTBE is not present. MTBE concentrations in the groundwater samples collected from monitoring well MW1 for the two most recent sampling events were 340 μg/L and 40 μg/L for the March 22, 2005, and June 28, 2005, sampling events, respectively. Due to the detection of MTBE concentrations at one source location (monitoring well MW1), the lateral extent of dissolved-phase MTBE could not be determined using the bulk attenuation analyses. An investigation using fate and transport modeling to determine the potential lateral extent of dissolved-phase MTBE follows.

FATE AND TRANSPORT OF MTBE

Determining the lateral extent of MTBE impacts to groundwater at this site, and consequently the potential for MTBE impacts to sensitive receptors, requires an investigation of the site's hydrogeology. Calculations were performed to determine the fate and transport of MTBE in groundwater, using hydrologic information obtained from previous site investigations, historic groundwater monitoring analytical results, and decay/biodegradation rates obtained from site information and literature. Calculations to determine the velocity of groundwater, and consequently that of dissolved-phase MTBE, were performed to assist in our understanding of the lateral extent of MTBE impacts to groundwater at this site. Assumptions used in these calculations are contained in Table M, included below.

Table M: Constituent Velocity Calculation Assumptions							
Soil Type	Gradient (dimensionless)		Porosity (dimensionless) (American Petroleum Institute)		Hydraulic Conductivity (m/s) [1] Freeze and Cherry, 1979 [2] EPA, 1986		MTBE Retardation Factor (dimensionless)
	Hi	Low	Hi	Low	Hi	Low	
Sandy Silt [1]			0.492	0.394	1.00E-03	1.00E-06	
Clayey Silty Sands [2]	0.036	0.006	0.500	0.341	4.44E-05	1.27E-05	1
Gravels [1]			0.634	0.200	1.00E+00	1.00E-03	

Additional assumptions include the disregarding of advection and dispersion. Using the assumptions in Table M, the velocity of MTBE in groundwater was calculated using the following equation:

$$V_S = \frac{\frac{K\,i}{\rho}}{R_{MTBE}}$$

where:

V_S = solute velocity (length*time^{-1}), in this case MTBE

K = hydraulic conductivity (length*time^{-1})

i = hydraulic gradient (dimensionless)

ρ = porosity (dimensionless)

R_{MTBE} = retardation factor for MTBE (dimensionless)

To obtain a range of values, the most conservative parameters were used to produce the most conservative solute velocity estimates, and vice versa. The results are contained in Table N, included below.

Table N: MTBE Velocity in Groundwater Calculation Results				
	MTBE Velocity (m/s)		MTBE Velocity (feet/year)	
Soil Type	Hi	Low	Hi	Low
Sandy Silt	7.32E-05	1.52E-08	7,575.51	1.58
Clayey Silty Sands	3.20E-06	1.34E-06	330.97	138.81
Gravels	5.68E-02	1.80E-04	5,878,786.53	18,635.75

Because gravels are present solely in the area of the former UST pit, MTBE velocity in groundwater through gravels are included for informational purposes only. However, it is important to note the differences in hydraulic conductivity and porosity between gravel and the

other soil types. These differences represent the potential for groundwater to be attracted to the different units, in that groundwater, as well as constituents such as MTBE transported by groundwater, is more likely to flow towards soils with higher hydraulic conductivities and porosities.

These groundwater velocities may be used to calculate the potential distances MTBE may be transported along groundwater gradients. However, no sorbed-phase MTBE has been reported in soil laboratory results for any soil samples obtained to date. A review of groundwater laboratory analytical results hydraulically downgradient of the site indicates MTBE has not been detected in borings installed in the hydraulically downgradient direction. Groundwater samples collected from temporary borings B14 through B16, installed in March 2003, were reported as ND and below the detection limits shown in Table 3. MTBE has not been reported in groundwater for borings installed dating to June 2000, and has only been reported in laboratory analytical results for monitoring well MW1. Accordingly, we surmise that dissolved-phase MTBE reported in laboratory analytical results for monitoring well MW1 are a result of groundwater flow through the relatively higher-conductivity gravels of the former UST pit. This groundwater flow appears to be mobilizing sorbed-phase hydrocarbons, which is reflected in the laboratory analytical results for monitoring well MW1. However, with the current data and alignment of monitoring wells, it is difficult to discern the lateral extent of dissolved-phase MTBE with any certainty.

In the pursuit for site closure, the mass of TPHmo onsite is calculated below. The following estimates are provided for the soil contingency plan.

MASS CALCULATIONS

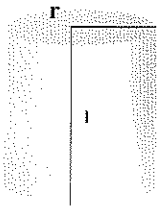
Shallow Soil

The mass was calculated using a point concentration around boring B8 where the TPHmo concentration is 9,100 μg/g at a depth of 0.5 to 1.0 feet. The mass of sorbed-phase TPHmo in the former waste oil tank area is an estimated amount determined by mass calculations using approximate soil volume, soil density, soil porosity, and average concentration of TPHmo. A sorbed-phase TPHmo isoconcentration map is included as Figure 9. The mass of TPHmo is calculated below:

Mass = Volume of soil * Soil density * Concentration of TPHmo in soil

Volume (cylinder) = $\Pi r^2 * l$, where $\Pi = 3.14$, r = radius, and l = length
Volume is then multiplied by porosity to get pore space volume;
Volume - pore space volume = **Volume of soil.**

g = gram
µg = microgram
kg = kilogram
ft - foot
m = meter



The value of porosity is 0.3; this is an approximate value for aggregate soil type (API, 2004).

Soil density = [Mass/Actual Volume of soil]

The average soil density = 1.5g/cm³ = 1,500,000 g/m³ (PRP, 2005)

Concentration of TPHmo = [Mass/Mass]

TPHmo concentration at boring B8 = 9,100µg/g = 0.0091g/g
Assumed concentration of 4050 ug/g is averaged from 9,100 ug/g from boring B8 and 1,000 from isoconcentration lines in Figure 9.

Note: The volume of a cylinder was used to determine mass of TPHmo since the surface area of the TPHmo concentration is approximately a circle for the area around boring B8 in the shallow soil (**Figure 9**).

Approximate Volume of TPHmo for Concentration of 9,100 µg/g for Area in Boring B8

(Dimensions for volume determined from isoconcentration lines in Figure 9)
Volume = $\Pi * r^2 * l$ = Pi * radius² * length

Volume 1 = 3.14* (0.0885 ft)² * 0.5 ft = 0.0123 ft³ = 0.000348m³

Volume 2= 3.14* (2 ft)² * 4 ft = 50.24 ft³ = 1.43 m³ *

Volume of soil = 1.43 m³ - 0.000348 m³ = 1.429 m³ * 0.7 =1.00 m³

Note: Used dimension of geoprobe to determine volume TPHmo collected from boring B8, where diameter = 2.125 inches and the depth of sample is 0.5 foot. Radius = 0.0885 foot. * This volume is determined within 1000 ug/g concentration line from Figure 9.

Approximate Mass of TPHmo Total for Shallow Soil

Volume = 3.14* (2 ft)² * 4 ft = 50.24 ft³ = **1.43 m³ - 0.000348 m³ = 1.429 m³ * 0.7 =1.00 m³**

Mass = 1.00 m³ * 1,500,000 g/m³ * 0.00405 g/g = 6075 g = **6.08 kg of TPHmo with an average concentration of 4050 ug/g or 13.40 pounds of TPHmo.**

Note: Used dimension determined from sorbed phase TPHmo isoconcentration lines in the former waste oil tank area.

Deeper Soil

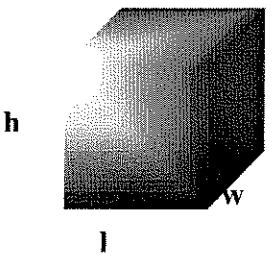
The mass was calculated using TPHmo isoconcentration lines from Figure 10.

The depths of TPHmo sorbed-phase concentrations range from 4 to 14 feet in silty sands and clays.

Mass = Volume of soil * Soil density * Concentration of TPHmo in soil

Volume = l*w*h, l = length, w= width, h=height
Volume is then multiplied by porosity to get pore space volume;
Volume - pore space volume = **Volume of soil**.

The value of porosity is 0.45; this is an approximate value for silty sands and silty clays. (API, 2004)



Soil density = [Mass/Actual Volume of soil

The average soil density = 1.5g/cm³ = 1,500,000 g/m³

Concentration of TPHmo = [Mass/Mass

TPHmo concentration= 45μg/g = 0.000045g/g * Average concentration from 100 μg/g and 10 μg/g is [(100 μg/g - 10 μg/g)/2] = 45 μg/g; Assumed concentration of 45ug/g from isoconcentration lines in Figure 10.

Note: The volume of a cube was used to determine mass of TPHmo since the surface area of the TPHmo concentration can be divided into areas for the deeper soil.

Approximate Volume Calculations for Averaged Concentrations of TPHmo of 45 μg/g

(Dimensions for volume determined from isoconcentration lines in Figure 10.)

Volume for concentration of 100 μg/g = 9 feet * 4 feet * 10 feet = 360 ft³ = 10.19m³

Volume for concentration of 10 μg/g = (13 feet*7 feet *15 feet) + (8 feet * 7 feet * 14 feet)= 1365 ft³ + 784 ft³ = 2149 ft³ = 60.85 m³

Volume for concentration of 45 μg/g = 60.85 m³ - 10.19m³ = 50.66 m³

Volume of soil = 50.66 m³ * 0.55 = **27.86 m³**

Approximate Mass of TPHmo Total for Deeper Soil

Mass = 27.86 m³ * 1,500,000 g/m³ * 0.000045 g/g = 1880.6 g = **1.88 kg of TPHmo with an averaged concentration of 45 ug/g or 4.14 pounds of TPHmo.**

Note: Used dimension determined from sorbed phase TPHmo isoconcentration lines determined from laboratory analytical results in the former waste oil tank area.

Summary of Mass Calculations

- The approximate total mass of sorbed-phase TPHmo in the former waste oil tank area is 6.08 kg + 1.88 kg = **7.96 kg**.
- The majority of mass of TPHmo exists in the shallow soil at a depth of approximately 0.5 to 1.0 feet bgs.
- Migration of TPHmo to groundwater is unlikely since the majority of the TPHmo mass is found at 0.5 to 1.0 feet.

CONCLUSIONS

The delineation of vertical and horizontal extent of sorbed-phase and dissolved-phase impact of TPHg and benzene appears to be defined and complete. However, MTBE lateral delineation appears to be not complete due to the lack of analytical data for various monitoring events. The WQOs for TPHg, benzene, and MTBE appear to be met by natural attenuation in a reasonable amount of time. A contingency plan will be developed for the former waste oil area for sorbed-phase TPHd and TPHmo upon site closure.

RECOMMENDATIONS

Based on the conclusions presented above, LACO recommends site closure. LACO will continue with quarterly groundwater monitoring, with the next sampling event scheduled for December 2005.

LIMITATIONS

LACO ASSOCIATES has exercised a standard of care equal to that generated for this industry to ensure that the information contained in this report is current and accurate. LACO ASSOCIATES disclaims any and all liability for any errors, omissions, or inaccuracies in the information and data presented in this report and/or any consequences arising there from, whether attributable to inadvertence or otherwise. LACO ASSOCIATES makes no representations or warranties of any kind, including but not limited to any implied warranties with respect to the accuracy or interpretations of the data furnished. LACO ASSOCIATES assumes no responsibility of any third party reliance on the data presented and that data generated for this report represents information gathered at that time and at the indicated locations. It should not be utilized by any third party to represent data for any other time or location. The report is valid solely for the purpose, site, and project described in this document.

Any alteration, unauthorized distribution, or deviation from this description will invalidate this report.

LIST OF FIGURES, TABLES, CHARTS AND ATTACHMENTS

Figure 1: Location Map
Figure 2: Site Map with Cross-Section Line
Figure 3: Stratigraphic Cross-Section A-A' and Sorbed-phase TPHg Isoconcentration in Soil
Figure 4: Stratigraphic Cross-Section A-A' and Sorbed-phase TPHmo Isoconcentration in Soil
Figure 5: Hydraulic Gradient Map (3/22/05)
Figure 6: Hydraulic Gradient Map (6/28/05)
Figure 7: TPHg Bulk Attenuation Map
Figure 8: Benzene Bulk Attenuation Map
Figure 9: Sorbed-phase TPHmo Isoconcentration Map (Shallow)
Figure 10: Sorbed-phase TPHmo Isoconcentration Map (Deep)

Table 1: Historic Hydraulic Gradient Data
Table 2: Historic Groundwater Monitoring Results
Table 3: Historic Groundwater Analytical Results from Borings
Table 4: Historic Soil Analytical Results
Table 5: Soil Analytical Results for UST Cavities

Chart 1: TPHg Concentrations in Groundwater and Groundwater Elevations
Chart 2: Benzene Concentrations in Groundwater and Groundwater Elevations
Chart 3: MTBE Concentrations in Groundwater and Groundwater Elevations

Attachment 1: Key to Abbreviations
Attachment 2: Groundwater Sampling Field Data Sheets
Attachment 3: Laboratory Analytical Reports
Attachment 4: APPL Analytical Data

REFERENCES

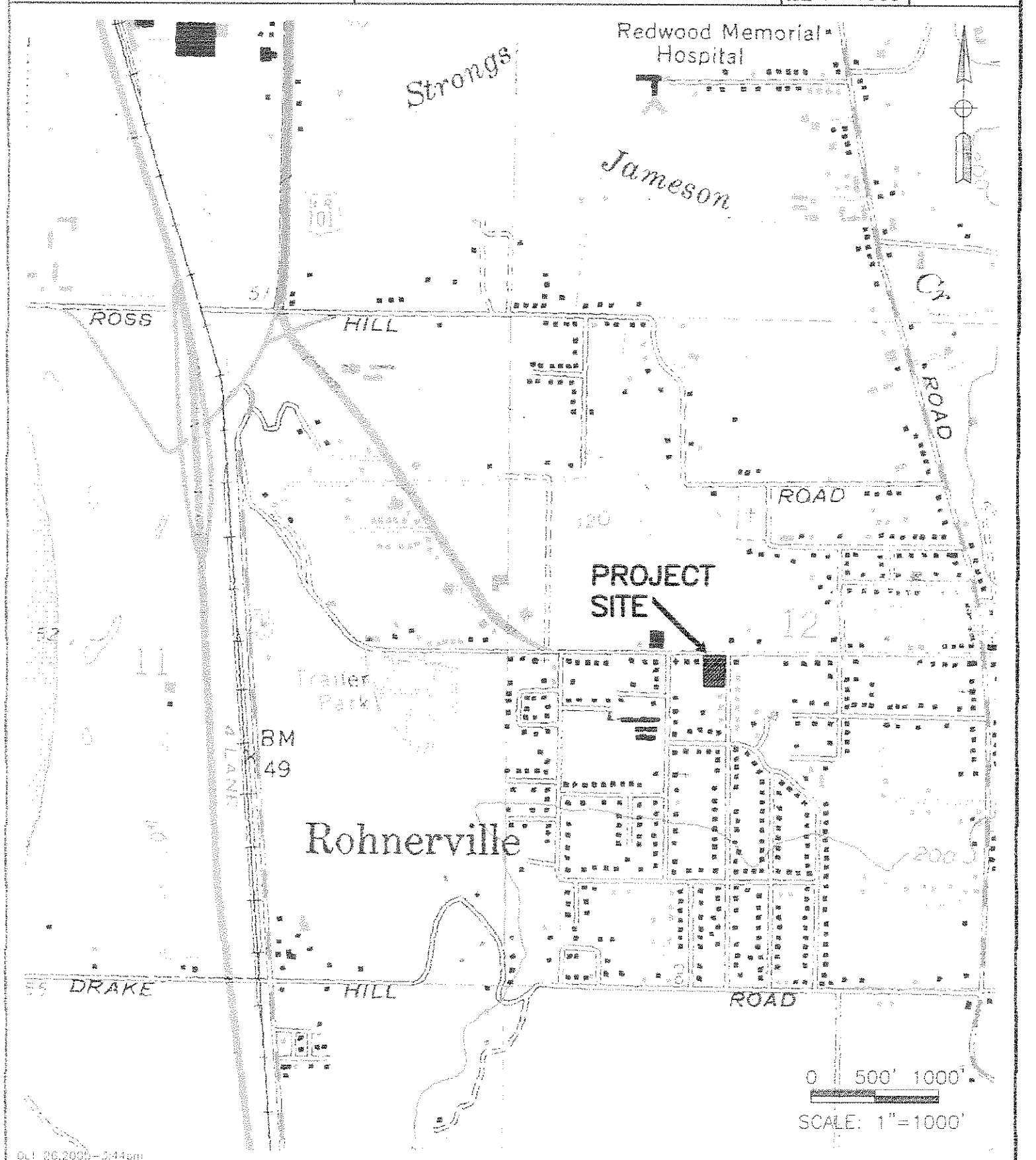
American Petroleum Institute, 2004. *API Interactive LNAPL Guide Version 2.0* captured from http://api-ec.api.org on June 16, 2005.

Howard, P.H., R.S. Boethling, et al. Handbook of Environmental Degradation Rates. Printup, H.T., ed. Lewis Publishers, New York. pp. 111, 422, 653. 1991.

Newell, C.J., H.S. Rifai, et al. "Calculation and Use of First Order Rate Constants for Monitored Natural Attenuation Studies", EPA Ground Water Issue, November 2002.

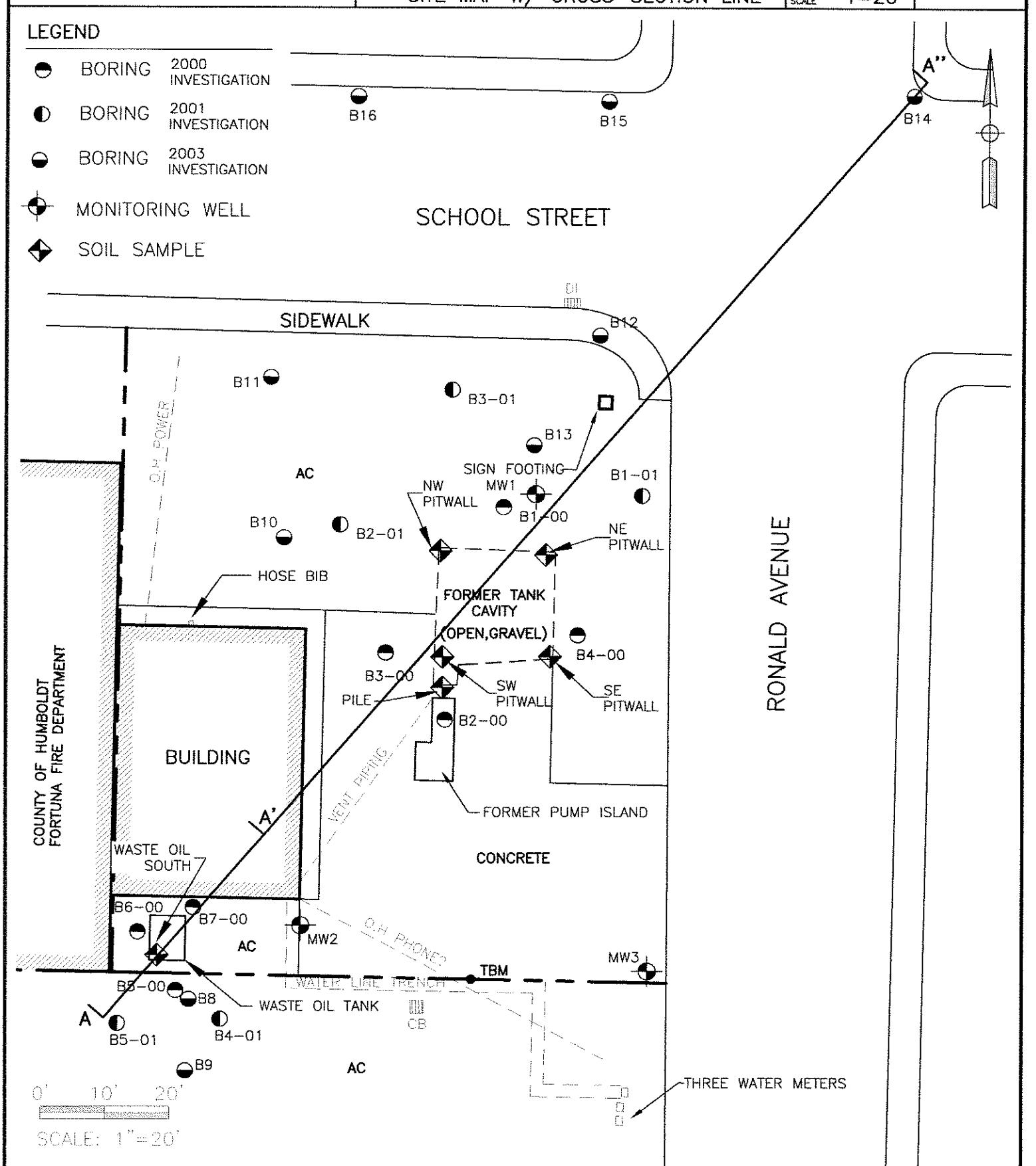
Petroleum Remediation Program, Minnesota Pollution Control Agency (www.pca.state.mn.us/programs/lust_p.html), 2005. *Assessment of Natural Biodegradation at Petroleum Release Sites, Guidance Document 4-03* captured from www.pca.state.mn.us/publications/c-prp4-03.pdf on September 23, 2005.

LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 1
	CLIENT RON KENDALL	DATE 8/11/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	LOCATION MAP	SCALE 1"=1000'	

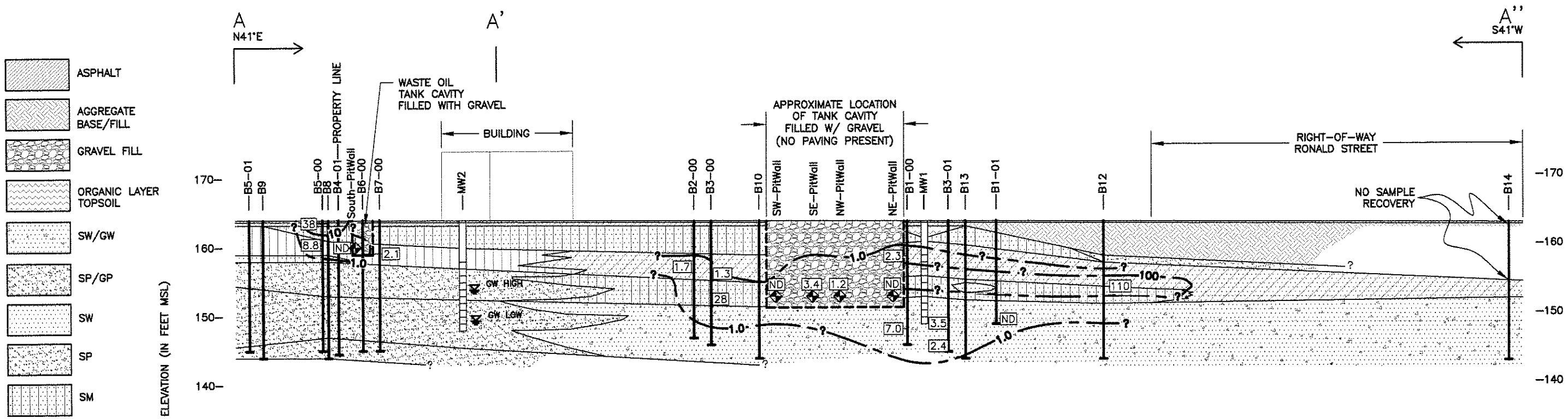


Oct 26,2005-5:44pm
T:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-LOC.dwg

LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY BAB	FIGURE 2
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	SITE MAP W/ CROSS-SECTION LINE	SCALE 1=20'	



Oct 26,2005-3:16pm
T:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-SITE.dwg



SOIL SAMPLE

BORING

MONITORING WELL

W/ SCREENED INTERVAL

GROUNDWATER LEVEL

SORBED-PHASE TPHg ISOCONCENTRATION LINE

28 TPHg CONCENTRATION REPORTED IN MICROGRAMS PER GRAM (µg/g)

ND = BELOW DETECTION LIMITS (<1.0)

NOTE: CROSS-SECTIONS ARE MEANT TO BE REPRESENTATIONAL OF SITE GEOLOGY. DUE TO THE SCALE AND THE LIMITATIONS OF THE DATA, TEXTURAL VARIATIONS AT ANY PARTICULAR POINT ON THE CROSS-SECTION MAY NOT BE SHOWN. PLEASE REFER TO THE BORING LOG FOR SOIL CHARACTERISTIC DESCRIPTIONS AT INDIVIDUAL BORING LOCATIONS.

NO.	REVISION	BY	CHK	DATE

LACO ASSOCIATES
CONSULTING ENGINEERS
21 E. 4TH ST. EUREKA, CA 95501 (707)443-5054

GROUNDWATER MONITORING REPORT
STRATIGRAPHIC CROSS-SECTION A-A''
TPHg ISOCONCENTRATIONS IN SOIL

RON KENDALL
1500 RONALD AVENUE, FORTUNA

SCALE	1"=10'
DRAWN	BAB
CHECK	
APPV'D	
DATE	8/24/05
JOB NO.	4870.00
FIGURE	3

Oct 27 2005-11:15am
T:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-X-SECT.dwg

REDUCED COPY

ASPHALT

AGGREGATE BASE/FILL

GRAVEL FILL

SP/GP

SW

SP

SM

ML

BORING

MONITORING WELL

W/ SCREENED INTERVAL

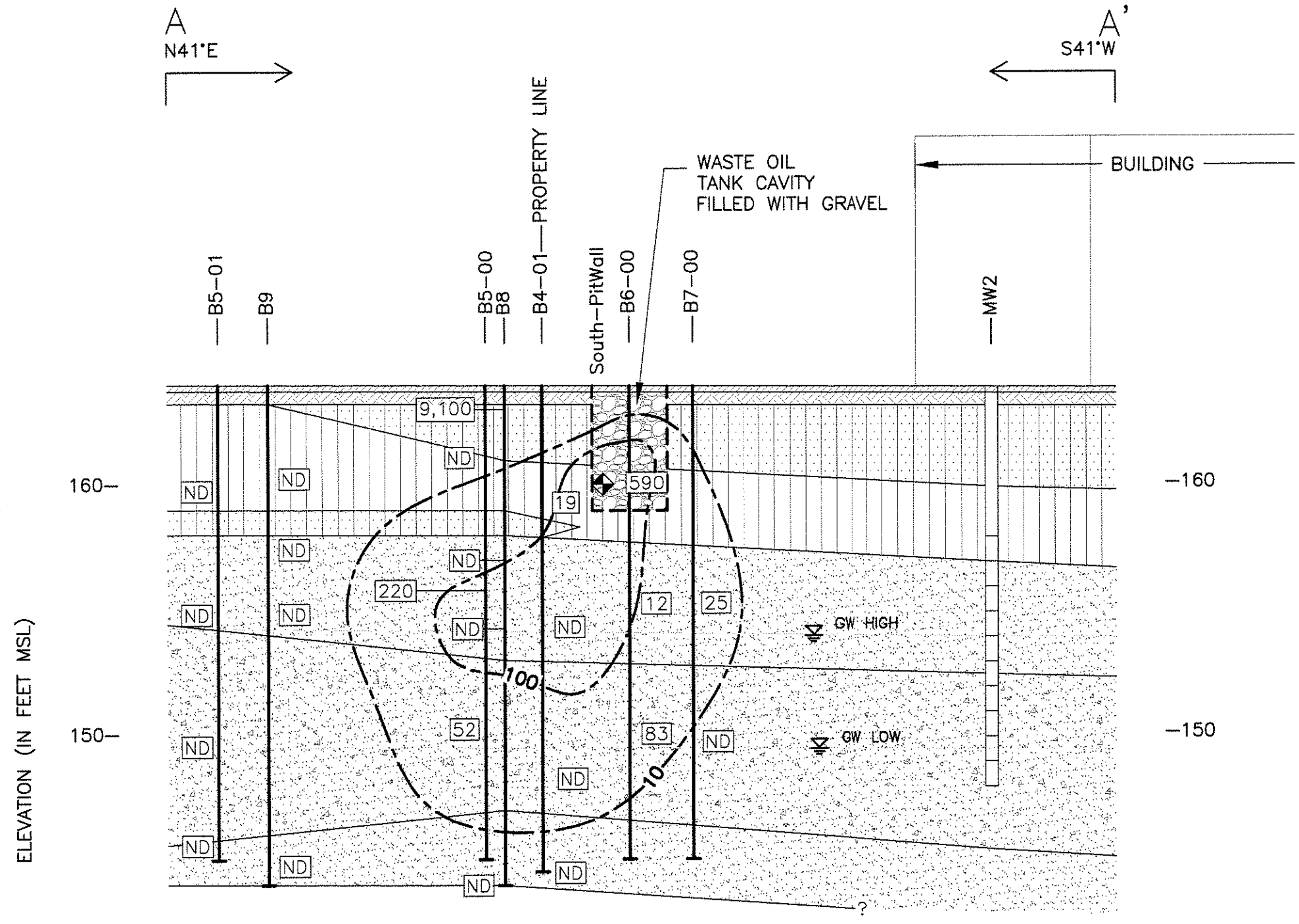
SOIL SAMPLE

GROUNDWATER LEVEL

SORBED-PHASE TPHmo ISOCONCENTRATION LINES

28 TPHmo CONCENTRATION REPORTED IN MICROGRAMS PER GRAM (µg/g)

ND = BELOW DETECTION LIMITS (<10)



NOTE: CROSS-SECTIONS ARE MEANT TO BE REPRESENTATIONAL OF SITE GEOLOGY. DUE TO THE SCALE AND THE LIMITATIONS OF THE DATA, TEXTURAL VARIATIONS AT ANY PARTICULAR POINT ON THE CROSS-SECTION MAY NOT BE SHOWN. PLEASE REFER TO THE BORING LOG FOR SOIL CHARACTERISTIC DESCRIPTIONS AT INDIVIDUAL BORING LOCATIONS.

NO.	REVISION	BY	CHK	DATE

LACO ASSOCIATES
CONSULTING ENGINEERS
216 J ST. EUREKA, CA 95501 (707)443-5054

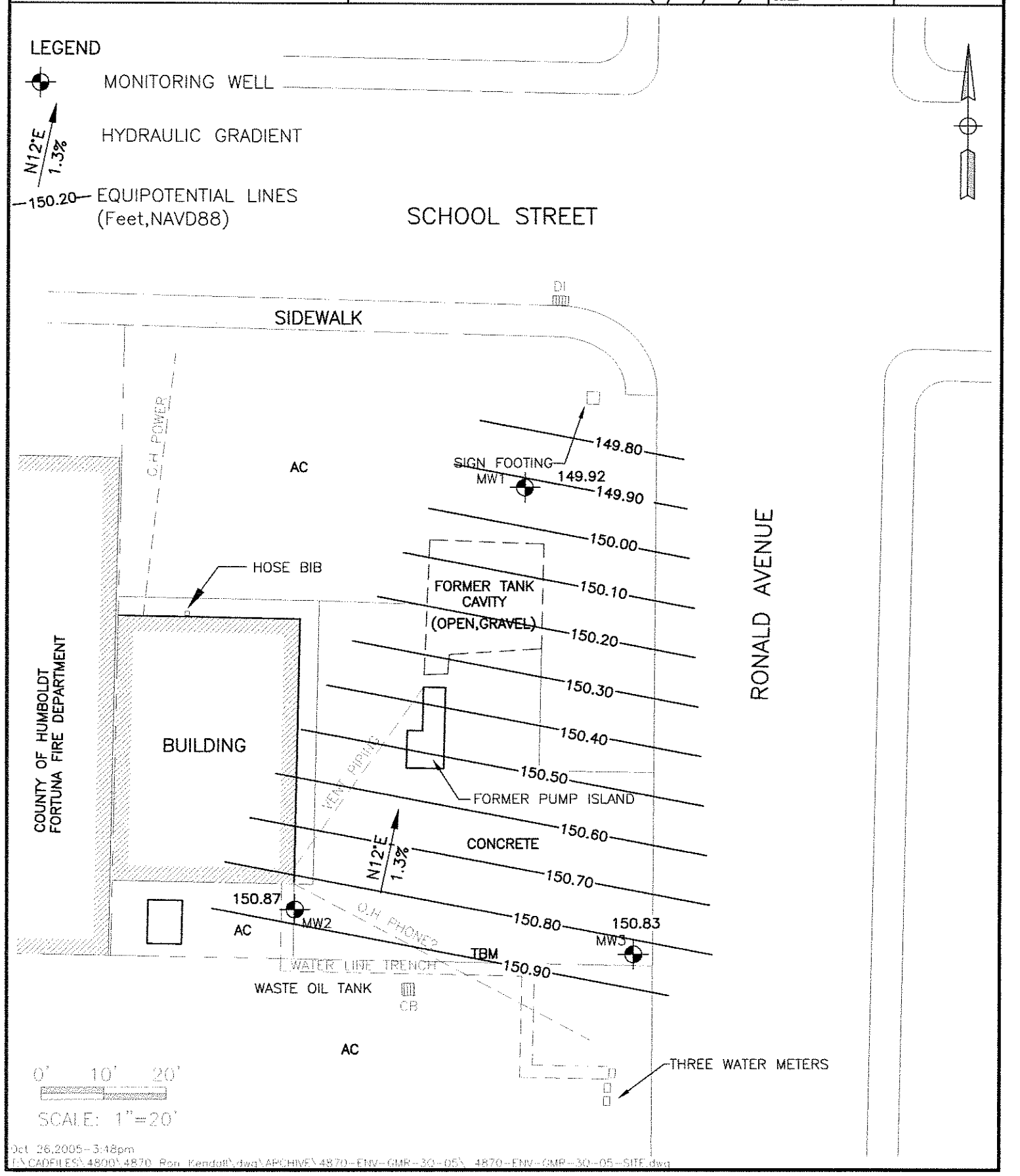
GROUNDWATER MONITORING REPORT
STRATIGRAPHIC CROSS-SECTION A-A'
TPHmo ISOCONCENTRATIONS IN SOIL

RON KENDALL
1500 RONALD AVENUE, FORTUNA

SCALE	1"=5'
DRAWN	BAB
CHECK	
APPVD	
DATE	8/25/05
JOB NO.	4870.00
FIGURE	4

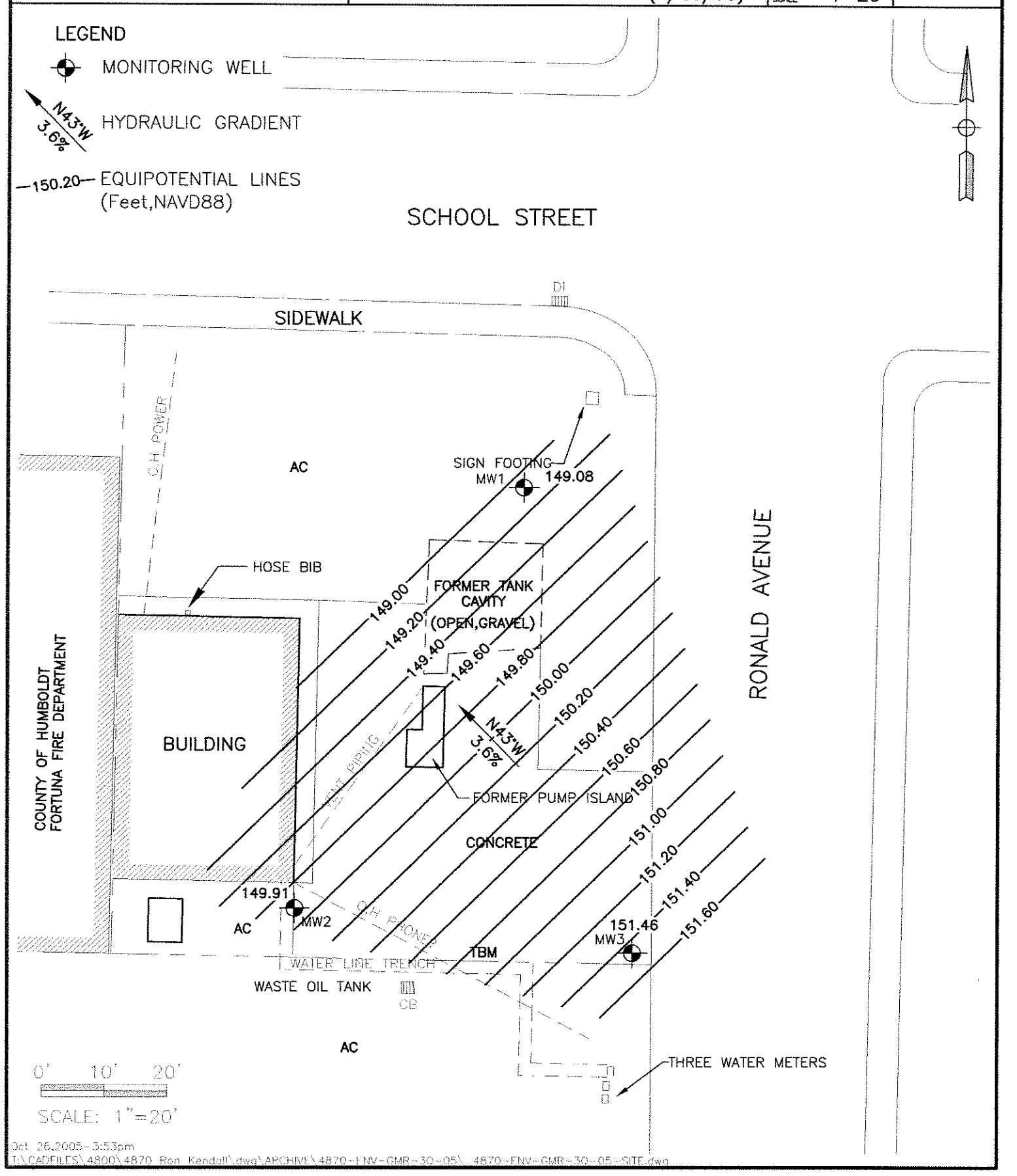
Oct 27,2005-11:21am T:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-X-SECT.dwg

LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 5
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	HYDRAULIC GRADIENT MAP (3/22/05)	SCALE 1=20'	

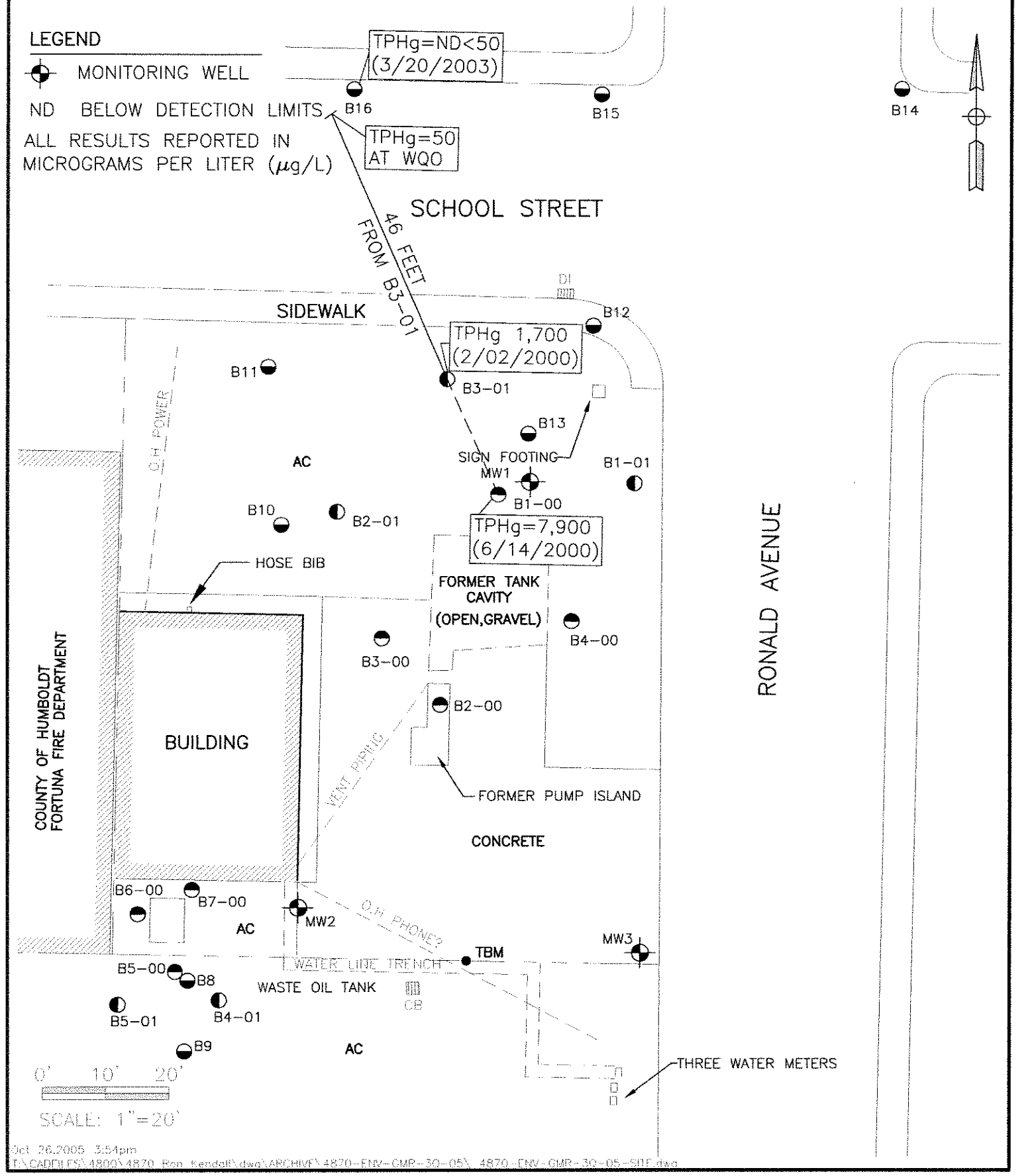


Oct 26,2005-3:48pm
I:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-SITE.dwg

LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 6
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	HYDRAULIC GRADIENT MAP (6/28/05)	SCALE 1"=20'	

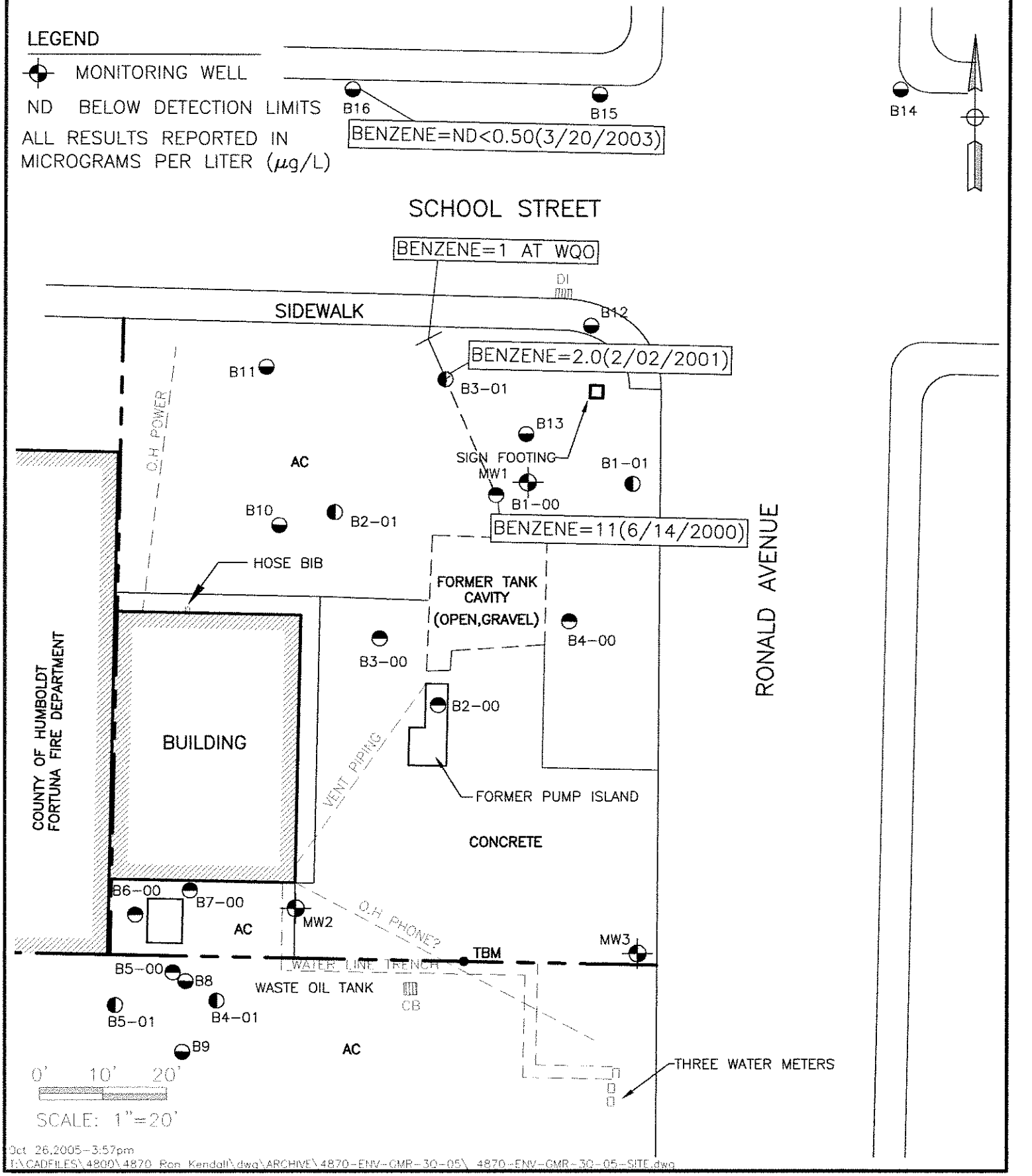


LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 7
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	TPHg BULK ATTENUATION MAP	SCALE 1=20'	



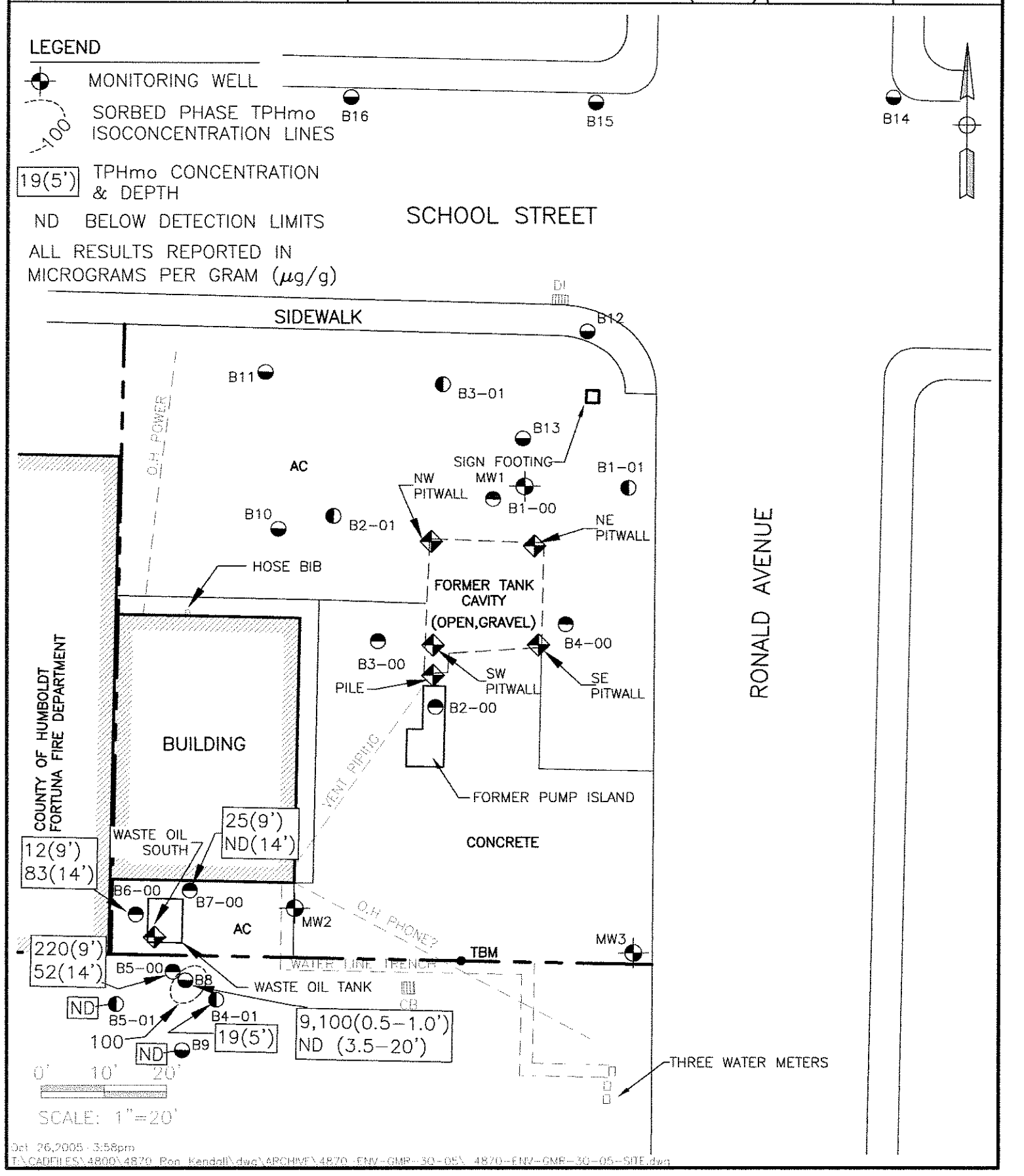
Oct 26,2005 3:54pm
T:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-SITE.dwg

LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 8
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	BENZENE BULK ATTENUATION MAP	SCALE 1=20'	



Oct 26,2005-3:57pm
I:\CADFILES\4800\4870 Ron Kendall\dwg\ARCHIVE\4870-ENV-GMR-30-05\ 4870-ENV-GMR-30-05-SITE.dwg

LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 9
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	SORBED PHASE TPHmo ISOCONCENTRATION MAP (SHALLOW)	SCALE 1=20'	



LACO ASSOCIATES CONSULTING ENGINEERS 21 W 4TH ST. EUREKA, CA 95501 (707)443-5054	PROJECT GROUNDWATER MONITORING REPORT	BY RJM	FIGURE 10
	CLIENT RON KENDALL	DATE 9/29/05	
	LOCATION 1500 RONALD AVENUE, FORTUNA	CHECK	JOB NO. 4870.00
	SORBED PHASE TPHmo ISOCONCENTRATION MAP (DEEP)	SCALE 1=20'	

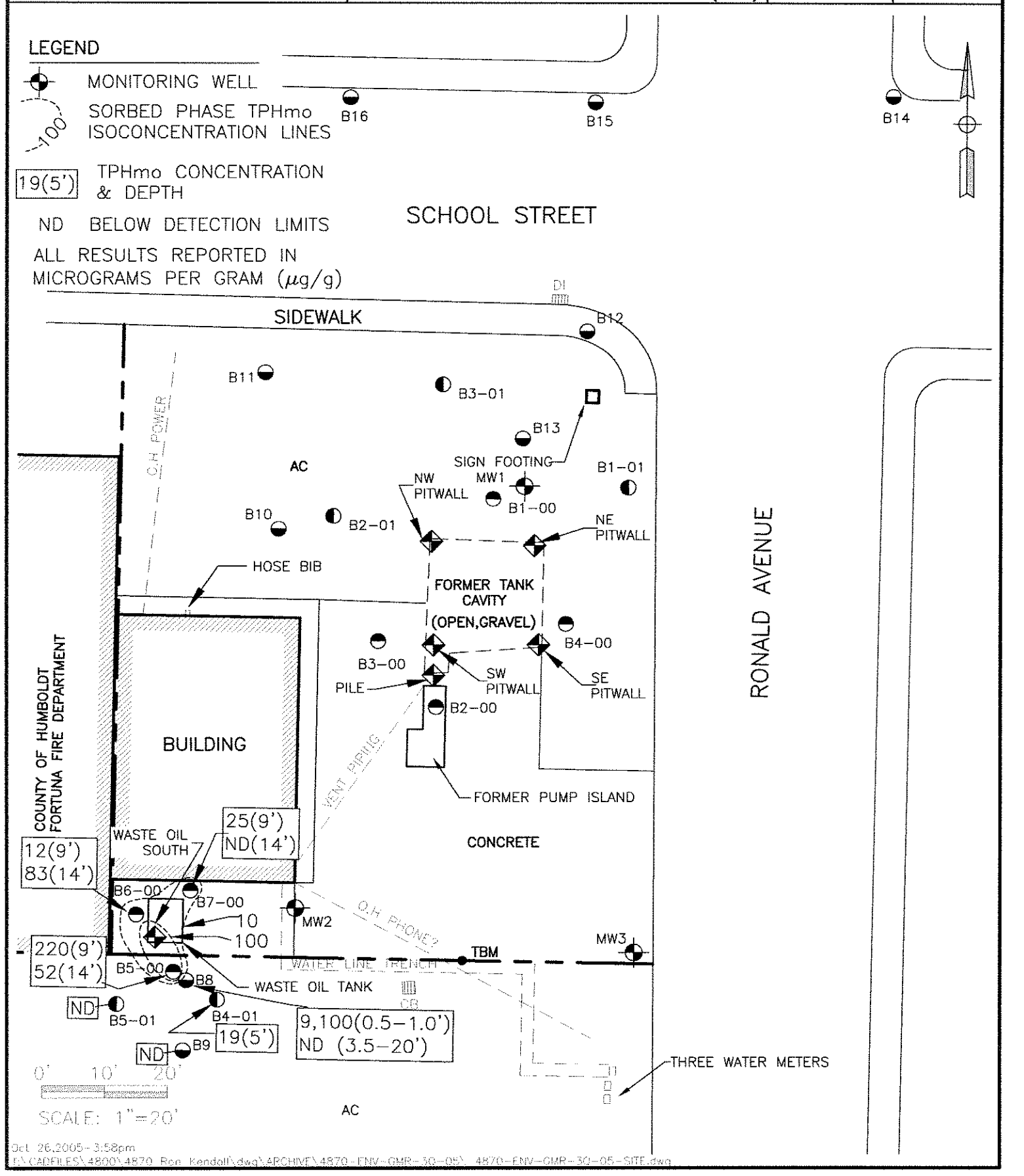


Table 1. Historic Hydraulic Gradient Data
Ron Kendall
1500 Ronald Avenue, Fortuna, CA
LACO Project No. 4870.00
LOP No. 12729

Groundwater Gradient

Date	Flow Direction	Gradient Slope
3/4/2004	N80E	0.60%
4/7/2004	N30W	1.40%
5/6/2004	N28W	2.10%
3/22/2005	N12E	1.30%
6/28/2005	N43W	3.60%
9/15/2005	NA	NA

Table 2: Historical Groundwater Monitoring Results
Ron Kendall
1500 Ronald Avenue, Fortuna CA
LACO Project No. 4870.00
LOP No. 12729

Well/ Date	Hydraulic Head (NAVD88)	Top of Casing (NAVD88)	Depth-to-Water (feet bgs)	TPHg (µg/L)	TPHd (µg/L)	TPHmo (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)	Fuel Oxygenates (µg/L)
MW1		163.50									
3/4/2004	152.33		11.17	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10.0
4/7/2004	149.54		13.96	---	---	---	---	---	---	---	---
5/6/2004	148.96		14.54	---	---	---	---	---	---	---	---
6/11/2004	---		Dry	Sample not collected due to dry well							
7/12/2004	---		Dry	---	---	---	---	---	---	---	---
8/10/2004			Dry	---	---	---	---	---	---	---	---
12/13/2004	---			Well not accessible							
12/20/2004	149.28		14.22	**350**	ND<50	ND<170	**2.1**	**1.8**	ND<0.50	**70**	ND<1.0-10.0
3/22/2005	149.92		13.58	**340**	ND<50	ND<170	**0.87**	**0.56**	ND<0.50	**7.5**	**MTBE=340; TAME = 140**; Other analytes NA<1.0-10
6/28/2005	149.08		14.42	ND<50	NA	NA	ND<0.50	ND<0.50	ND<0.50	ND<0.50	**MTBE = 40, TAME = 14**; Other Analytes = ND<1.0-10
9/15/2005	---		Dry	---	---	---	---	---	---	---	---
MW2		164.05									
3/4/2004	153.80		10.25	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10.0
4/7/2004	150.08		13.97	---	---	---	---	---	---	---	---
5/6/2004	149.84		14.21	---	---	---	---	---	---	---	---
6/11/2004	149.35		14.70	Sample not collected due to presence of mud							
7/12/2004	---		Dry	---	---	---	---	---	---	---	---
8/10/2004	---		Dry	---	---	---	---	---	---	---	---
12/13/2004	150.40		13.65	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-240
3/22/2005	150.87		13.18	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10
6/28/2005	149.91		14.14	ND<50	NA	NA	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10
9/15/2005	---		Dry	---	---	---	---	---	---	---	---
MW3		164.19									
3/4/2004	152.92		11.27	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10.0
4/7/2004	150.55		13.64	---	---	---	---	---	---	---	---
5/6/2004	150.54		13.65	---	---	---	---	---	---	---	---
6/11/2004	150.54		13.65	ND<50	---	---	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10.0
7/12/2004	150.23		13.96	---	---	---	---	---	---	---	---
8/10/2004	150.20		13.99	---	---	---	---	---	---	---	---
12/13/2004	150.45		13.74	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-45
3/22/2005	150.83		13.36	ND<50	ND<50	ND<170	ND<0.50	ND<0.50	ND<0.50	**0.50**	ND<1.0-10
6/28/2005	151.46		12.73	ND<50	NA	NA	ND<0.50	ND<0.50	ND<0.50	ND<0.50	ND<1.0-10
9/15/2005	150.01		14.18	---	---	---	---	---	---	---	---

Table 3: Historical Groundwater Analytical Results
Ron Kendall
1500 Ronald Avenue, Fortuna, CA
Project No. 4870.00; LOP No. 12729

Boring	Date	TPHg (µg/L)	TPHd (µg/L)	TPHmo (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-benzene (µg/L)	Total Xylenes (µg/L)	Fuel Oxygenates (µg/L)
B1-00	6/14/2000	**7,900**	---	---	**11**	**41**	**71**	**237**	ND <10
B2-00	6/14/2000	---	---	---	---	---	---	---	---
B3-00	6/14/2000	ND <50	---	---	ND <0.50	ND <0.50	ND <0.50	ND <0.50	ND <0.50
B4-00	6/14/2000	---	---	---	---	---	---	---	---
B5-00	6/14/2000	ND <50	ND <50	ND <170	ND <50	ND <50	ND <50	ND <50	ND <50
B6-00	6/14/2000	ND <50	ND <50	ND <170	ND <50	ND <50	ND <50	ND <50	ND <50
B7-00	6/14/2000	ND <50	ND <50	ND <170	ND <50	ND <50	ND <50	ND <50	ND <50
B1-01	2/2/2001	ND < 50	---	---	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5
B2-01	2/2/2001	ND < 50	---	---	**0.65**	**0.60**	ND < 0.5	ND < 0.5	ND < 0.5
B3-01	2/2/2001	**1,700**	---	---	**2.0**	**1.9**	**5.0**	**21.1**	ND < 0.5
B4-01	2/2/2001	ND < 50	ND < 50	ND < 170	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5
B5-01	2/2/2001	ND < 50	ND < 50	**650**	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5	ND < 0.5
B8	3/20/2003	ND < 50	**88**	**2,000**	ND < 0.50	ND < 0.50	ND < 0.50	ND < 0.50	ND<0.50
B9	3/20/2003	ND < 50	**50**	**860**	ND < 0.50	ND < 0.50	ND < 0.50	ND < 0.50	ND<0.50
B10	3/20/2003	ND < 50	---	---	ND < 0.50	ND < 0.50	**1.1**	**0.58**	ND<0.50
B11	3/20/2003	ND < 50	---	---	ND < 0.50	ND < 0.50	ND < 0.50	**0.62**	ND<0.50
B12	3/19/2003	ND < 50	ND<50	**450**	**0.60**	**0.82**	ND < 0.50	**1.51**	ND<0.50
B14	3/20/2003	ND < 50	---	---	ND < 0.50	**0.70**	ND < 0.50	**1.44**	ND<0.50
B15	3/20/2003	ND < 50	---	---	**0.97**	**1.9**	ND < 0.50	**1.50**	ND<0.50
B16	3/20/2003	ND < 50	---	---	ND < 0.50	ND < 0.50	ND < 0.50	ND < 0.50	ND<0.50

Table 4: Historical Soil Analytical Results
Ron Kendall
1500 Ronald Ave., Fortuna, CA
Project No. 4870.00; LOP No. 12729

Boring	Sample Depth (feet, bgs)	Date	TPHg (µg/g)	TPHd (µg/g)	TPHmo (µg/g)	Benzene (µg/g)	Toluene (µg/g)	Ethyl-benzene (µg/g)	Total Xylenes (µg/g)	MTBE (µg/g)
B1-00 @ 6'	6	4/11/2000	**2.3**	ND < 1.0	ND < 10	ND <0.005	**0.11**	ND <0.005	ND <0.005	ND <0.050
B2-00 @ 5'	5	4/11/2000	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-00 @ 7'	7	4/11/2000	**1.7**	ND < 1.0	ND < 10	ND <0.005	ND <0.020	ND <0.005	ND <0.005	ND <0.050
B2-00 @ 9'	9	4/11/2000	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-00 @ 5'	5	4/11/2000	**2.2**	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-00 @ 5' (Orig.)	5	4/11/2000	---	**1.1**	ND < 10	---	---	---	---	---
B3-00 @ 9'	9	4/11/2000	**1.3**	ND < 1.0	ND < 10	**0.011**	ND <0.020	ND <0.020	ND <0.010	ND <0.050
B3-00 @ 13'	13	4/11/2000	**28**	ND < 1.0	**14**	ND <0.020	ND <0.20	ND <0.20	ND <0.10	ND <0.050
B3-00 @ 13' (Orig.)	13	4/11/2000	---	**1.5**	**15**	---	---	---	---	---
B4-00 @ 4'	4	4/11/2000	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-00 @ 4'	4	4/11/2000	**8.8**	ND < 1.0	ND < 10	**0.022**	ND <0.10	ND <0.040	ND <0.020	ND <0.050
B5-00 @ 4' (Orig.)	4	4/11/2000	---	**1.5**	ND < 10	---	---	---	---	---
B6-00 @ 4.5'	4.5	4/11/2000	**2.1**	ND < 1.0	ND < 10	ND <0.005	ND <0.040	ND <0.005	ND <0.010	ND <0.050
B7-00 @ 4.5'	4.5	4/11/2000	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B8-00 @ 4.5'	4.5	4/11/2000	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050

Table 4: Historical Soil Analytical Results
Ron Kendall
1500 Ronald Ave., Fortuna, CA
Project No. 4870.00; LOP No. 12729

Boring	Sample Depth (feet, bgs)	Date	TPHg (µg/g)	TPHd (µg/g)	TPHmo (µg/g)	Benzene (µg/g)	Toluene (µg/g)	Ethyl-benzene (µg/g)	Total Xylenes (µg/g)	MTBE (µg/g)
B1-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B1-00 @ 9'	9	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B1-00 @ 14'	14	6/13/2000	ND < 1.0	---	---	ND <0.005	**0.0072**	**0.0099**	**0.025**	ND <0.050
B1-00 @ 17'	17	6/13/2000	**7**	---	---	ND <0.005	**0.011**	**0.011**	**0.054**	ND <0.050
B2-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-00 @ 9'	9	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-00 @ 14'	14	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-00 @ 9'	9	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-00 @ 14'	14	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-00 @ 19'	19	6/13/2000	ND < 1.0	---	---	ND <0.005	**0.0071**	ND <0.005	**0.039**	ND <0.050
B4-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B4-00 @ 9'	9	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B4-00 @ 14'	14	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	**0.022**	ND <0.050
B5-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-00 @ 9'	9	6/13/2000	ND < 1.0	**12**	**220**	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-00 @14'	14	6/13/2000	ND < 1.0	**2**	**52**	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B6-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B6-00 @ 9'	9	6/13/2000	ND < 1.0	ND<1.0	**12**	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B6-00 @ 14'	14	6/13/2000	ND < 1.0	**3**	**83**	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B7-00 @ 5'	5	6/13/2000	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B7-00 @ 9'	9	6/13/2000	ND < 1.0	ND<1.0	**25**	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B7-00 @ 14'	14	6/13/2000	ND < 1.0	ND<1.0	ND<10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050

Table 4: Historical Soil Analytical Results
Ron Kendall
1500 Ronald Ave., Fortuna, CA
Project No. 4870.00; LOP No. 12729

Boring	Sample Depth (feet, bgs)	Date	TPHg (µg/g)	TPHd (µg/g)	TPHmo (µg/g)	Benzene (µg/g)	Toluene (µg/g)	Ethyl-benzene (µg/g)	Total Xylenes (µg/g)	MTBE (µg/g)
B1-01 @ 5 '	5	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B1-01 @ 9'	9	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B1-01 @ 15'	15	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-01 @ 5'	5	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-01 @ 10'	10	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-01 @ 15'	15	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B2-01 @ 19'	19	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-01 @ 5'	5	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-01 @ 10'	10	2/6/2001	ND < 1.0	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-01 @ 15'	15	2/6/2001	**3.5**	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B3-01 @19'	19	2/6/2001	**2.4**	---	---	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B4-01 @ 5'	5	2/6/2001	ND < 1.0	ND < 1.0	**19**	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B4-01 @ 10'	10	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B4-01 @ 15'	15	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B4-01 @ 19'	19	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-01 @ 5'	5	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-01 @ 10'	10	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-01 @ 15'	15	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050
B5-01 @ 19'	19	2/6/2001	ND < 1.0	ND < 1.0	ND < 10	ND <0.005	ND <0.005	ND <0.005	ND <0.005	ND <0.050

Table 4: Historical Soil Analytical Results
Ron Kendall
1500 Ronald Ave., Fortuna, CA
Project No. 4870.00; LOP No. 12729

Boring	Sample Depth (feet, bgs)	Date	TPHg (µg/g)	TPHd (µg/g)	TPHmo (µg/g)	Benzene (µg/g)	Toluene (µg/g)	Ethyl-benzene (µg/g)	Total Xylenes (µg/g)	MTBE (µg/g)
B8	0.5'-1.0'	3/18/2003	**38**	**420**	**9,100**	ND <0.005	ND <0.10	ND <0.10	ND <0.15	ND <0.050
B8	3.5'-4.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B8	7.0'-8.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B8	10.0'-11.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B8	19.0'-20.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B9	3.0'-4.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B9	6.0'-7.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B9	9.0'-10.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B9	18.0'-19.0'	3/18/2003	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B10	3.0'-4.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B10	6.0'-7.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B10	10.0'-11.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B10	18.0'-19.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B11	3.0'-4.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B11	6.0'-7.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B11	11.0'-12.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B11	18.0'-19.0'	3/18/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B12	3.0'-4.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B12	6.0'-7.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B12	10.0'-11.0'	3/19/2003	**110**	---	---	ND<0.050	ND<0.050	ND<0.050	ND<0.050	ND<0.50
B13	10.0'-12.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B13	17.0'-18.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B14	8.0'-10.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B14	13.0'-14.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050
B14	17.0'-18.0'	3/19/2003	ND<1.0	---	---	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND <0.050

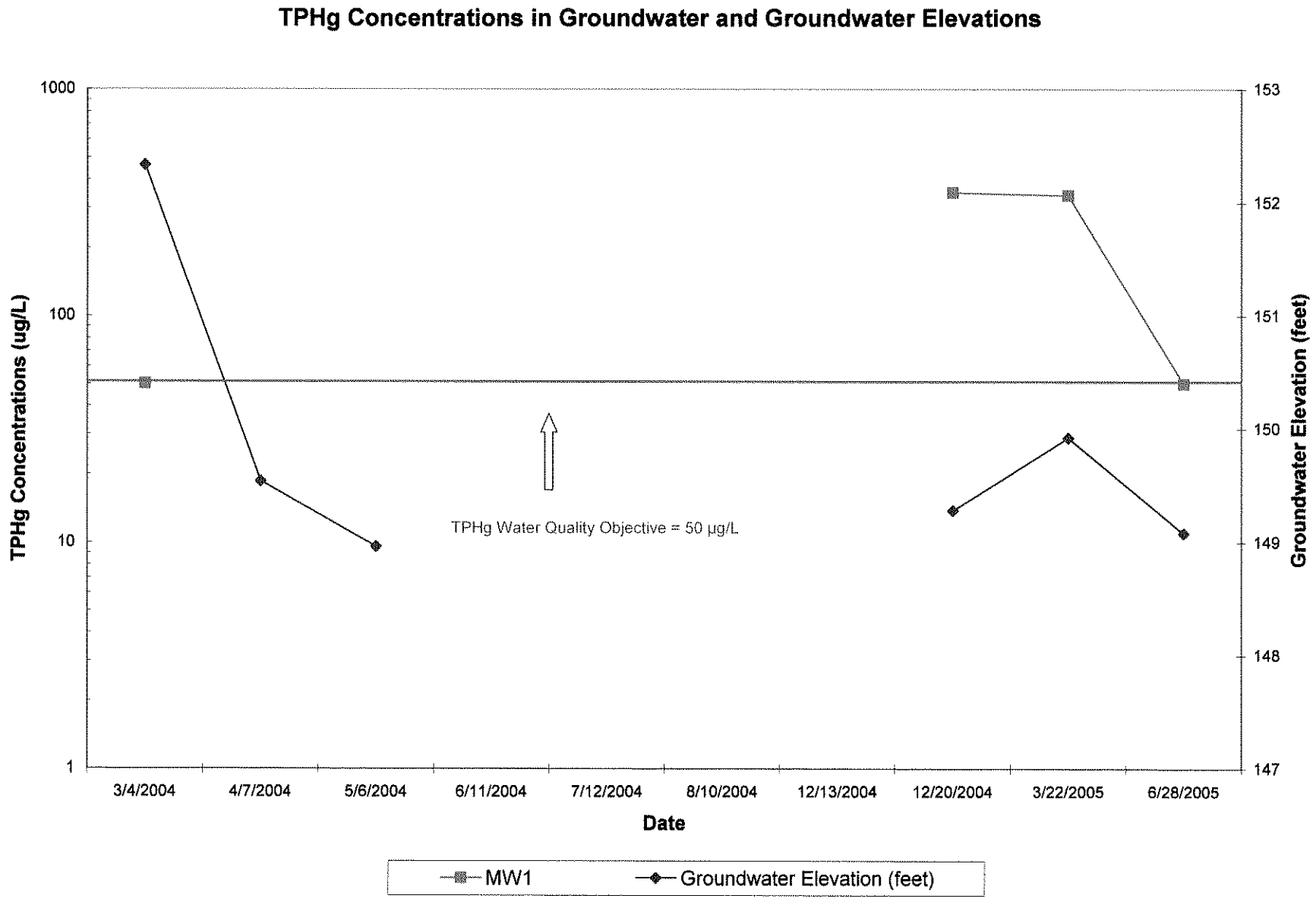
Table 4: Historical Soil Analytical Results
Ron Kendall
1500 Ronald Ave., Fortuna, CA
Project No. 4870.00; LOP No. 12729

Boring	Sample Depth (feet, bgs)	Date	TPHg (µg/g)	TPHd (µg/g)	TPHmo (µg/g)	Benzene (µg/g)	Toluene (µg/g)	Ethyl-benzene (µg/g)	Total Xylenes (µg/g)	MTBE (µg/g)
MW1-S5.0	5	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW1-S10.0	10	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW1-S15.0	15	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW2-S5.0	5	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW2-S10.0	10	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW2-S15.0	15	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW3-S5.0	5	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW3-S10.0	10	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
MW3-S15.0	15	2/24/2004	ND<1.0	ND<1.0	ND<10	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050

Table 5. Soil Analtyical Results for UST cavities
Ron Kendall
1500 Ronald Avenue, Fortuna, CA
Project NO. 4870.00; LOP No. 12729

Sample ID	Location	Date	TPHg (µg/g)	TPHd (µg/g)	TPHmo (µg/g)	Benzene (µg/g)	Toluene (µg/g)	Ethylbenzene (µg/g)	Total Xylenes (µg/g)	MTBE (µg/g)
Pile	excavated soil	12/29/1999	**1.3**	NA	NA	ND<0.0050	**0.0077**	ND<0.0050	**0.034**	ND<0.050
SW Pitwall	Southwest side of gasoline UST pitwall	12/29/1999	ND<1.0	NA	NA	ND<0.0050	**0.0059**	ND<0.0050	ND<0.0050	ND<0.050
NE Pitwall	Northeast side of gasoline UST pitwall	12/29/1999	ND<1.0	NA	NA	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050
NW Pitwall	Northwest side of gasoline UST pitwall	12/29/1999	**1.2**	NA	NA	ND<0.0050	**0.0083**	ND<0.0050	**0.0061**	ND<0.050
SE Pitwall	Southeast side of gasoline UST pitwall	12/29/1999	**3.4**	NA	NA	ND<0.0050	**0.014**	ND<0.0050	ND<0.0050	ND<0.050
Waste Oil South	South side of waste oil tank cavity	1/13/2000	ND<1.0	ND<10	**590**	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.0050	ND<0.050

Chart 1. TPHg Concentrations in Groundwater and Groundwater Elevations
Ron Kendall
1500 Ronald Avenue, Fortuna, CA
LACO Project No. 4870.00
LOP No.12729



P:\4800\4870 Ron Kendall\SUBMITTALS\GMR\2005\ANALYTICALTABLES\GW Results2-trend analysis2.xls

Chart 2. Benzene Concentrations in Groundwater and Groundwater Elevations
Ron Kendall
1500 Ronald Avenue, Fortuna, CA
LACO Project No. 4870.00
LOP No. 12729

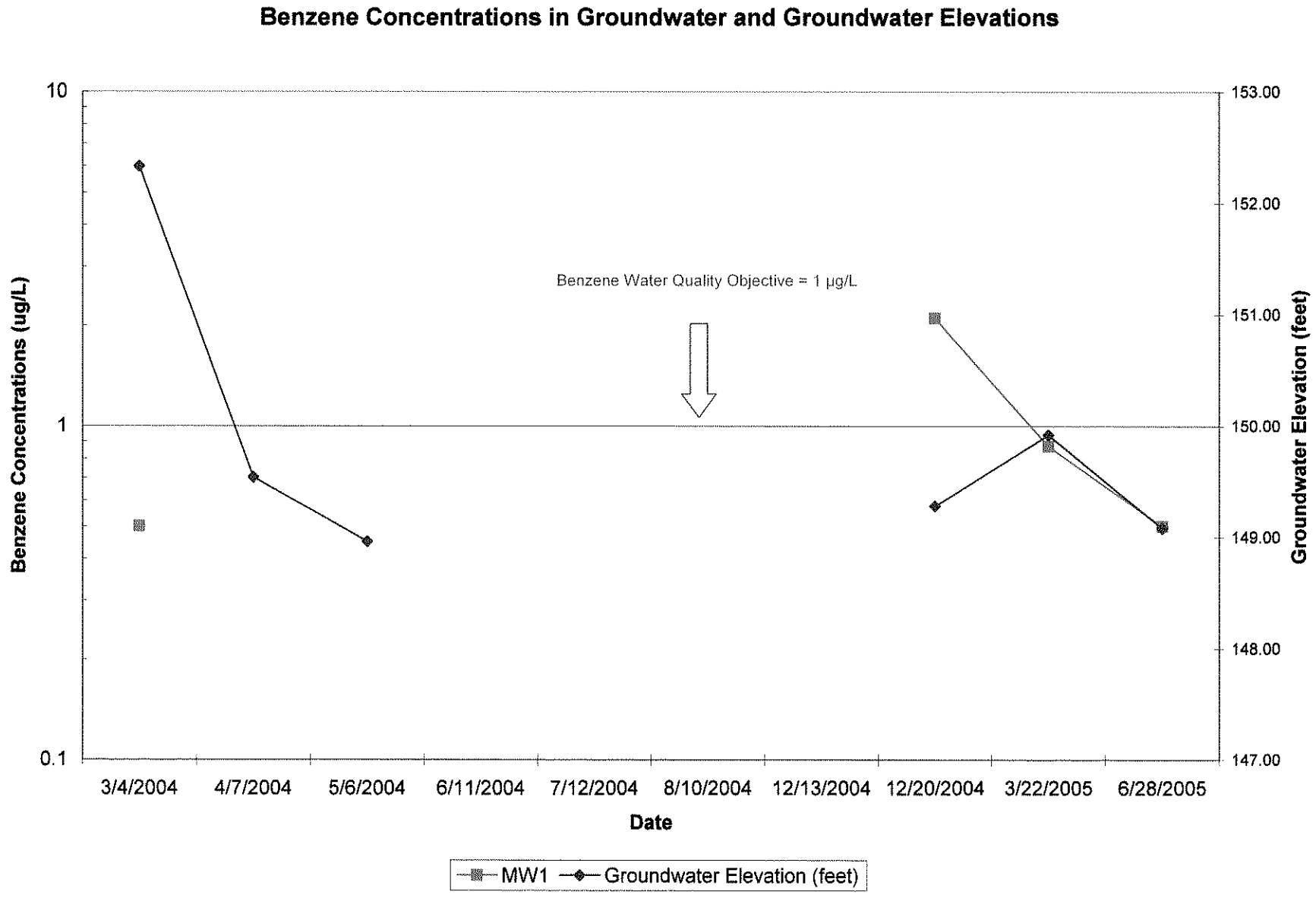
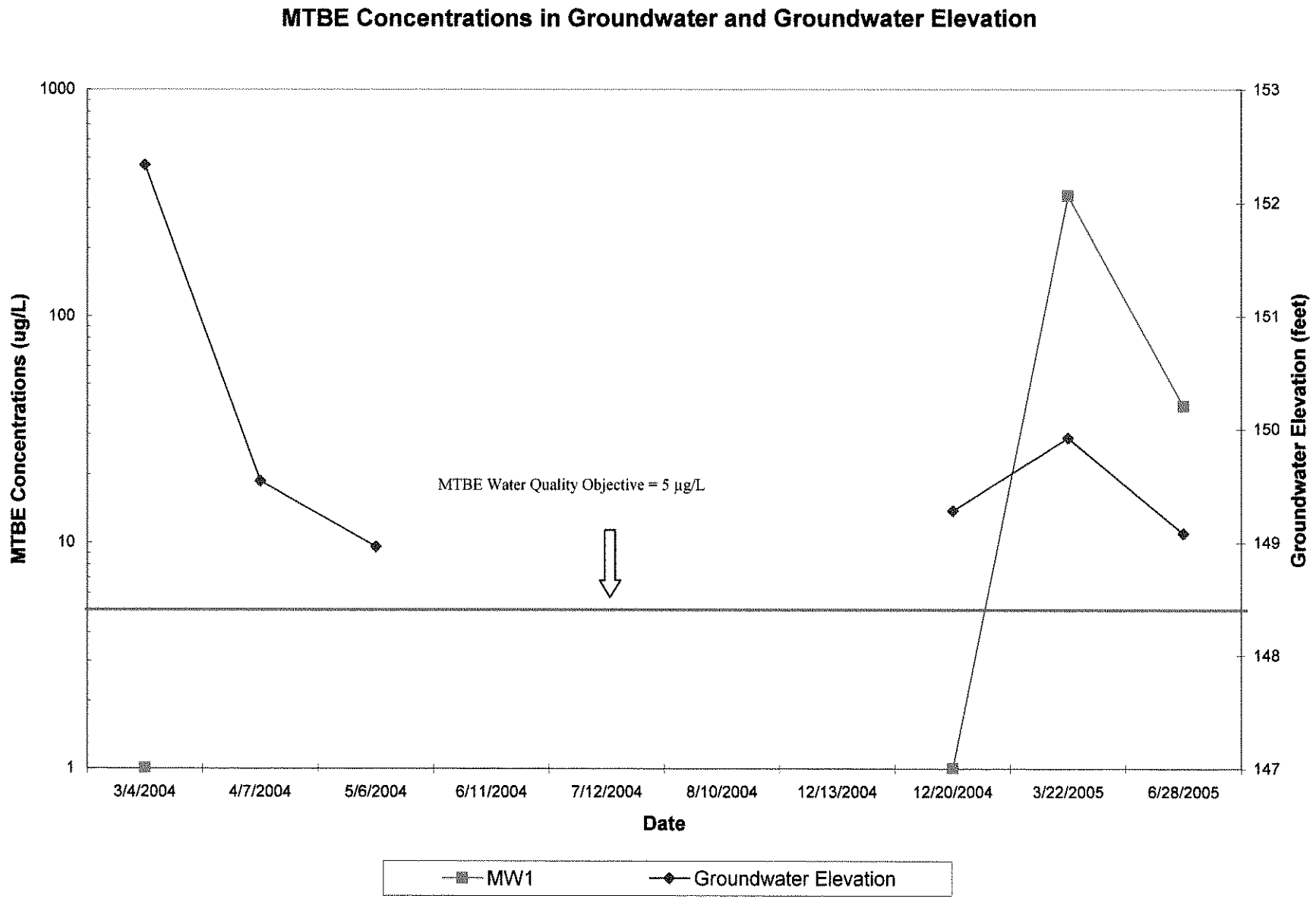


Chart 3. MTBE Concentrations in Groundwater and Groundwater Elevations
Ron Kendall
1500 Ronald Avenue, Fortuna, CA
LACO Project No. 4870.00
LOP No. 12729



Attachment 1

Key to Abbreviations
Dibble's Campton Heights Service Station
1500 Ronald Avenue, Fortuna
LACO Project No. 4870.00
LOP No. 12729

KEY TO TECHNICAL ABBREVIATIONS		
Alk	--	Alkalinity
BTEX	--	Benzene; Toluene; Ethylbenzene; m,p- and o- Xylenes
CO_2	--	Carbon dioxide
COC	--	Chain of custody
Cr	--	Chromium
DHP	--	Down-hole-pump (submersible pump)
DIPE	--	Di-isopropyl Ether
Dis	--	Dissolved
DO	--	Dissolved Oxygen
DTW	--	Depth-to-Water
ECw	--	Electrical Conductivity in water
ETBE	--	Ethyl Tertiary Butyl Ether
Fe	--	Iron
FP	--	Free Product
HCDEH	--	Humboldt County Division of Environmental Health
kW	--	Kilowatt (s)
kWh	--	Kilowatt Hour(s)
Mn	--	Manganese
MTBE	--	Methyl Tertiary Butyl Ether
N	--	Nitrogen
NA	--	Not Applicable
NCRWQCB	--	North Coast Regional Water Quality Control Board
ND<50	--	non-detect at reporting limits shown
NO_3	--	Nitrate
NOT ACTIVE	--	Sample not analyzed for parameter during current sampling event
ORP	--	Oxidation Reduction Potential
P	--	Phosphorous
PCP/TCP	--	penta- tetra- tri- chlorophenols
pH	--	Potential of hydrogen
SGC	--	Silica gel cleanup
SO_4	--	Sulfate
T	--	Temperature
T&P	--	Tape and Paste
TAME	--	Tertiary Amyl Methyl Ether
TBA	--	Tetiary Butyl Alcohol
TBF	--	Tertiary Butyl Formate
TIC	--	Total Inorganic Carbon
TOC	--	Total Organic Carbon
Tot	--	Total
TPHd	--	Total Petroluem Hydrocarbons as Diesel
TPHg	--	Total Petroluem Hydrocarbons as Gasoline
TPHk	--	Total Petroluem Hydrocarbons as Kerosene
TPHmo	--	Total Petroluem Hydrocarbons as Motor Oil
TPHs	--	Total Petroluem Hydrocarbons as Solvent
UST(s)	--	Underground Storage Tank (s)
µg/L	--	Micro grams per liter (parts per billion)

Note: Not all abbreviations in this key are used in this report.

Attachment 2

LACO ASSOCIATES
CONSULTING ENGINEERS

21 West Fourth Street, Eureka, CA 95501
TEL 707.443.5054
FAX 707.443.0553

Project Name: Dibbles
Project No.: 4870.00
Date: 8-22-05
Golbal ID No.: T0602300517
PM: GLM

Tech: SJD
Mob/Demob time: .25 / .25
Travel time: .45
Time on site: 10:55
Time off site: 1:50
Mileage: 20

WELL No.:	MW1		MW2		MW3					
DIAMETER (in)	2.00		2.00		2.00					
SCREENED INTERVAL (ft)	5-15		5-15		5-15					
DEPTH TO WATER (ft)	13.58		13.18		13.36					
	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
DEPTH MEASUREMENTS ARE REFERENCED TO TOP OF CASING — FIELD INTRINSICS: pH			6.8	5.9						
TEMP (°C)			12.8	13.1						
Ecw (µmohs)			96	96						
ORP (mV)			191	214↑						
DO (mg/L)			8.14	7.52↓						
OTHER (units)										
PURGE: TIME	11:42	11:47	12:05	12:11	12:30	1:35				
METHOD (DHP/CB/B)	3/4" B		DHP		3/4" B					
RATE (Lpm)	0.10		0.16							
VOLUME (L)	0.50		1.0							
COLOR	LT. BROWN CLOUDY	DK. BROWN TURBID	LT. BROWN CLOUDY	LT. BROWN TURBID	CLOUDY	LT. BROWN CLOUDY				
ODOR	LIGHT SWEET/PINE		NONE		SLIGHT ORGANIC					
INTAKE DEPTH (FEET)			14.5							
SAMPLE: TIME	11:55		12:14		1:35					
METHOD (DHP/CB/B)	3/4" B		DHP		3/4" B					
ANALYTES	8260 List 1; TPHd/mo w/SGC		8260 List 1; TPHd/mo w/SGC		8260 List 1; TPHd/mo w/SGC					
TOTAL DRAWDOWN (FEET)			1.13							
REMARKS			WELL NOT RECHARGING UNABLE TO COMPLETE FI - PULLED SAMPLE		WELL NOT RECHARGING TOOK 1 HR. TO FILL					
WELL CONDITION	good		good		good	SAMPLE CONTAINERS				
WASTE DRUMS										

DHP=DOWN HOLE PUMP CB=CHECK BALL B=BAILER FD=FIELD DUPLICATE MB=METHOD BLANK FF=FIELD FILTERED

CONSULTING ENGINEERS

TEL 707.443.5054
FAX 7[illegible]43.0553

Project Name: DIBBLES

Project No.: 4870.00

Tech: SJD

Date: 3-22-05

WELL ID: MW2

METER ACCURACY RANGE

+/- 0.2 pH	+/- 0.5 °C	+/- 20 µmohs	+/- 2 mv	+/- 0.3 mg/L

TIME	pH	TEMP (°C)	Ecw (µmohs)	ORP (mV)	DO (mg/L)
12:07	6.1	12.9	95	204	8.02
12:09	5.9	13.1	95	211	7.70
12:11	5.9	13.1	96	214	7.52
	WELL NOT RECHARGING				
	UNABLE TO COMPLETE				
	INTRINSICS				

WELL ID:

TIME	pH	TEMP (°C)	Ecw (µmohs)	ORP (mV)	DO (mg/L)

WELL ID:

TIME	pH	TEMP (°C)	Ecw (µmohs)	ORP (mV)	DO (mg/L)

WELL ID:

TIME	pH	TEMP (°C)	Ecw (µmohs)	ORP (mV)	DO (mg/L)

WELL ID:

TIME	pH	TEMP (°C)	Ecw (µmohs)	ORP (mV)	DO (mg/L)

WELL ID:

TIME	pH	TEMP (°C)	Ecw (µmohs)	ORP (mV)	DO (mg/L)

CONSULTING.ENGINEERS
TEL 707.443.5054
FAX 707.443.0553

Project Name: DIBBLES
Project No.: 4870.00
Tech: SJD
Date: 3-22-05

WELL ID: MW1		WELL ID: MW2		WELL ID: MW3		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)
11:20	13.58	11:22	13.18	11:24	13.36						
11:30	13.58	11:32	13.18	11:34	13.36						

WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)

WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)

NORTH COAST LABORATORIES LTD.
5680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER:

Attention:
Results & Invoice to: Ron Kendall
Address: PO BOX 838, Fortuna, CA 95540

Phone: (707) 725-5626
Copies of Report to: LACO; Gary Manhart

Sampler (Sign & Print): SJD

TAT: ☐ 24 Hr ☐ 48 Hr ☐ 5 Day ☐ 5–7 Day
☑ STD (2–3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms ☐
Preliminary: FAX ☑ Verbal ☐ By:
Final Report: FAX ☐ Verbal ☐ By:

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_4$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

PROJECT INFORMATION

Project Number: 4870.00
Project Name: Dibbles
Purchase Order Number: Task 3020

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	ANALYSIS: 8260 List 1 (PRESERVATIVE: B)	ANALYSIS: TPHd/mo w/SGC (CONTAINER: 9 / 7)
	4870-MW1-W	3-22-05	PM	GW	3	1
	4870-MW2-W	↓	↓	↓	3	1
	4870-MW3-W				3	1
	4870-QCTB-W				1	

SAMPLE CONDITION/SPECIAL INSTRUCTIONS

GEOTRACKER

LIMITED VOLUME FOR TPHd/mo w/SGC

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME

SAMPLE DISPOSAL
☑ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

***MATRIX:** DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

LACO ASSOCIATES
CONSULTING ENGINEERS
21 West Fourth Street, Eureka, CA 95501
TEL 707.443.5054
FAX 707.443.0553

Project Name: DIBBLES
Project No.: 4870.00
Date: 12-20-04
Golbal ID No.: T0602300517
PM: GLM

Tech: SJD
Mob/Demob time: .25/.25
Travel time: 1.0
Time on site: 12:40
Time off site: 1:30
Mileage: 36

WELL No.:	MW1				
DIAMETER (in)	2.00				
SCREENED INTERVAL (ft)	5-15				
DEPTH TO WATER (ft)	14.22				

		INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
FIELD INTRINSICS	pH										
	TEMP (°C)										
	Ecw (µmohs)										
	ORP (mV)										
	DO (mg/L)										
	OTHER (units)										
PURGE	TIME	12:58	1:14								
	METHOD (DHP/CB/B)	3/4" B									
	RATE (Lpm)	—									
	VOLUME (L)	—									
	COLOR	CLOUDY	LT. BROWN TURBID								
	ODOR	SLIGHT MO									
	INTAKE DEPTH (FEET)	—									
SAMPLE	TIME	1:14									
	METHOD (DHP/CB/B)	3/4" B									
	ANALYTES	8260 LIST 1; TPHd/mo w/SGC									
	TOTAL DRAWDOWN (FEET)	—									
	REMARKS	NOT ENOUGH H2O TO FILL 1 liter									
WELL CONDITION		good									
WASTE DRUMS		5 soil 3 water									

DEPTH MEASUREMENTS ARE REFERENCED TO TOP OF CASING

DHP=DOWN HOLE PUMP CB=CHECK BALL B=BAILER FD=FIELD DUPLICATE MB=METHOD BLANK FF=FIELD FILTERED

NORTH COAST LABORATORIES LTD.
5680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER:

Attention:
Results & Invoice to: RON KENDALL
Address: PO BOX 838, FORTUNA, CA 95540
Phone: (707) 725-5626
Copies of Report to: LACO; GARY MANHART
Sampler (Sign & Print): SJD

TAT: ☐ 24 Hr ☐ 48 Hr ☐ 5 Day ☐ 5–7 Day
☑ STD (2–3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms ☐
Preliminary: FAX ☑ Verbal ☐ By: __/__/__
Final Report: FAX ☐ Verbal ☐ By: __/__/__

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

PROJECT INFORMATION

Project Number: 4870.00
Project Name: DIBBLES
Purchase Order Number: TASK 3017

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	CONTAINER	PRESERVATIVE	ANALYSIS: 8260B LIST 1	ANALYSIS: TPHd/mo w/SGC
	4870-MW1-W	12-20-04	PM	GW	9	b	3	1

SAMPLE CONDITION/SPECIAL INSTRUCTIONS

GEOTRACKER!
LIMITED VOLUME FOR TPHd/mo w/SGC

COD, intact

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
STEVE DAVIS	12-20-04 4:26 PM	[illegible]	12/20/04 1046

SAMPLE DISPOSAL
☑ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

MATRIX: DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

LACO ASSOCIATES
CONSULTING ENGINEERS
21 West Fourth Street, Eureka, CA 95501
TEL 707.443.5054
FAX 707.443.0553

Project Name: Dibbles
Project No.: 4870.00
Date: 6-28-05
Golbal ID No.: T0602300517
PM: GLM

Tech: SJD
Mob/Demob time: .25/.25
Travel time: .45
Time on site: 12:30
Time off site: 2:40
Mileage: 40

WELL No.:	MW1		MW2		MW3					
DIAMETER (in)	2.00		2.00		2.00					
SCREENED INTERVAL (ft)	5-15		5-15		5-15					
DEPTH TO WATER (ft)	14.42		14.14		12.73					
	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
FIELD INTRINSICS: pH	—	—	—	—	—	—				
TEMP (°C)	—	—	—	—	—	—				
Ecw (µmohs)	—	—	—	—	—	—				
ORP (mV)	—	—	—	—	—	—				
DO (mg/L)	—	—	—	—	—	—				
OTHER (units)	—		—		—					
PURGE: TIME	1:35	1:46	1:50	2:11	2:15	2:30				
METHOD (DHP/CB/B)	B		B		B					
RATE (Lpm)	—		—		—					
VOLUME (L)	3-VOA'S		1-VOA		2-VOA'S					
COLOR	ORANGE TURBID	ORANGE TURBID	CLOUDY	ORANGE TURBID	CLOUDY	ORANGE TURBID				
ODOR	NONE		NONE		NONE					
INTAKE DEPTH (FEET)	—		—		—					
SAMPLE: TIME	1:35		1:50		2:15					
METHOD (DHP/CB/B)	3/4" B		3/4" B		3/4" B					
ANALYTES	8260 List 1; TPHd/mo w/SGC		8260 List 1; TPHd/mo w/SGC		8260 List 1; TPHd/mo w/SGC					
TOTAL DRAWDOWN (FEET)	—		—		—					
REMARKS	UNABLE TO FILL 1 Hr BROWN		UNABLE TO FILL 2-VOA'S OR 1 Hr BROWN		UNABLE TO FILL 1 VOA OR 1 Hr BROWN					
WELL CONDITION	GOOD		GOOD		GOOD					
WASTE DRUMS										

DEPTH MEASUREMENTS ARE REFERENCED TO TOP OF CASING

DHP=DOWN HOLE PUMP CB=CHECK BALL B=BAILER FD=FIELD DUPLICATE MB=METHOD BLANK FF=FIELD FILTERED

LACO ASSOCIATES
CONSULTING ENGINEERS
21 West Fourth Street, Eureka, CA 95501
TEL 707.443.5054
FAX 707.443.0553

Project Name: DIBBLES
Project No.: 4870.00

Tech: RLD
Date: 6-28-05

WELL ID: MW1		WELL ID: MW 2		WELL ID: MW 3		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)
12:50	14.42	12:55	14.14	1:00	12.72						
1:10	14.42	1:20	14.14	1:30	12.72						

WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)

WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)

NORTH COAST LABORATORIES LTD.
5680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER:

Attention:
Results & Invoice to: Ron Kendall
Address: PO BOX 838, Fortuna, CA 95540

Phone: (707) 725-5626
Copies of Report to: LACO; Gary Manhart

Sampler (Sign & Print): RIK DANIELS

TAT: [ ] 24 Hr [ ] 48 Hr [ ] 5 Day [ ] 5–7 Day
[✓] STD (2–3 Wk) [ ] Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms [ ]
Preliminary: FAX [✓] Verbal [ ] By:
Final Report: FAX [ ] Verbal [ ] By:

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

PROJECT INFORMATION

Project Number: 4870.00
Project Name: Dibbles
Purchase Order Number: Task 3023

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	PRESERVATIVE	CONTAINER	ANALYSIS 8260 List 1
	4870-MW1-W	6-28-05	PM	GW	B	9	3
	4870-MW2-W	↓	↓	↓			1
	4870-MW3-W						2
	4870-QCTB-W						1

SAMPLE CONDITION/SPECIAL INSTRUCTIONS

GEOTRACKER

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME

SAMPLE DISPOSAL
[✓] NCL Disposal of Non-Contaminated
[ ] Return [ ] Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

***MATRIX:** DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

LACO ASSOCIATES
CONSULTING ENGINEERS

21 West Fourth Street, Eureka, CA 95501
TEL 707.443.5054
FAX 707.443.0553

Project Name: **Dibbles**
Project No.: **4870.00**
Date: 9-15-05
Golbal ID No.: **T0602300517**
PM: **GLM** MIRK

Tech: SJD
Mob/Demob time: .50/.25
Travel time: 1.0
Time on site: 10:45
Time off site: 11:25
Mileage: 39

WELL No.:	MW1		MW2		MW3					
DIAMETER (in)	2.00		2.00		2.00					
SCREENED INTERVAL (ft)	5-15		5-15		5-15					
DEPTH TO WATER (ft)	DRY		DRY		14.18					
	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL	INITIAL	FINAL
FIELD INTRINSICS: pH										
TEMP (°C)										
Ecw (µmohs)										
ORP (mV)										
DO (mg/L)										
OTHER (units)										
PURGE: TIME										
METHOD (DHP/CB/B)										
RATE (Lpm)										
VOLUME (L)										
COLOR										
ODOR										
INTAKE DEPTH (FEET)										
SAMPLE: TIME										
METHOD (DHP/CB/B)										
ANALYTES	8260 List 1; TPHd/mo w/SGC		8260 List 1; TPHd/mo w/SGC		8260 List 1; TPHd/mo w/SGC					
TOTAL DRAWDOWN (FEET)										
REMARKS					TD - 14.25					
WELL CONDITION	good		good		good					
WASTE DRUMS										

DEPTH MEASUREMENTS ARE REFERENCED TO TOP OF CASING

DHP=DOWN HOLE PUMP CB=CHECK BALL B=BAILER FD=FIELD DUPLICATE MB=METHOD BLANK FF=FIELD FILTERED

LACO ASSOCIATES
CONSULTING ENGINEERS

21 West Fourth Street, Eureka, CA 95501
TEL 707.443.5054
FAX 707.443.0553

Project Name: DIBBLES

Project No.: 4870.00

Tech: SJD

Date: 9-15-05

WELL ID: MW1		WELL ID: MW2		WELL ID: MW3		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)
10:56	DRY	10:59	DRY	11:03	14.15						
				11:13	14.15						

WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)

WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:		WELL ID:	
TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)	TIME	DTW (ft)

Attachment 3

NORTH COAST LABORATORIES LTD.

April 06, 2005

Pvt. cust. paying on pickup

,

Attn: Ron Kendall

RE: 4870.00, Dibbles

Order No.: 0503518
Invoice No.: 49151
PO No.: TASK 3020
ELAP No. 1247-Expires July 2006

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	4870-MW1-W
01D	4870-MW1-W
02A	4870-MW2-W
02D	4870-MW2-W
03A	4870-MW3-W
03D	4870-MW3-W
04A	4870-QCTB-W

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

All solid results are expressed on a wet-weight basis unless otherwise noted.

REPORT CERTIFIED BY

Laboratory Supervisor(s) | QA Unit | Jesse G. Chaney, Jr. Laboratory Director

5680 West End Road • Arcata California 95521-9202 • 707-822-4649 • FAX 707-822-6831

Printed on Recycled Paper

North Coast Laboratories, Ltd.

Date: *06-Apr-05*

CLIENT: Pvt. cust. paying on pickup
Project: 4870.00, Dibbles
Lab Order: 0503518

CASE NARRATIVE

All samples submitted for a silica gel cleanup were initially analyzed for diesel/motor oil. The samples showing no detectable levels of the analytes were not subjected to the cleanup procedure.

Gasoline Components/Additives:
The gasoline value for sample 4870-MW1-W is primarily from the reported gasoline additives.

Some reporting limits were raised for sample 4870-MW1-W due to matrix interference.

The laboratory control sample duplicate (LCSD) recoveries were above the upper acceptance limits for TBA, benzene, m,p-xylene and the surrogate. The laboratory control sample (LCS) recoveries were within the acceptance limits; therefore, the data were accepted.

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

Date: 05-Apr-05
WorkOrder: 0503518

ANALYTICAL REPORT

Client Sample ID: 4870-MW1-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-01A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	340	50	µg/L	50		3/31/05
Tert-butyl alcohol (TBA)	ND	120	µg/L	1.0		3/30/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		3/30/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		3/30/05
Benzene	0.87	0.50	µg/L	1.0		3/30/05
Tert-amyl methyl ether (TAME)	140	50	µg/L	50		3/31/05
Toluene	0.56	0.50	µg/L	1.0		3/30/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/30/05
m,p-Xylene	1.2	0.50	µg/L	1.0		3/30/05
o-Xylene	6.3	0.50	µg/L	1.0		3/30/05
Surrogate: 1,4-Dichlorobenzene-d4	94.4	80.8-139	% Rec	1.0		3/30/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	340	50	µg/L	1.0		3/30/05

Client Sample ID: 4870-MW1-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-01D

Test Name: TPH as Diesel/Motor Oil **Reference:** EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	3/28/05	3/29/05
TPHC Motor Oil	ND	170	µg/L	1.0	3/28/05	3/29/05

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

Date: 05-Apr-05
WorkOrder: 0503518

ANALYTICAL REPORT

Client Sample ID: 4870-MW2-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-02A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		3/30/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		3/30/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		3/30/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		3/30/05
Benzene	ND	0.50	µg/L	1.0		3/30/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		3/30/05
Toluene	ND	0.50	µg/L	1.0		3/30/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/30/05
m,p-Xylene	ND	0.50	µg/L	1.0		3/30/05
o-Xylene	ND	0.50	µg/L	1.0		3/30/05
Surrogate: 1,4-Dichlorobenzene-d4	82.7	80.8-139	% Rec	1.0		3/30/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		3/30/05

Client Sample ID: 4870-MW2-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-02D

Test Name: TPH as Diesel/Motor Oil **Reference:** EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	3/28/05	3/29/05
TPHC Motor Oil	ND	170	µg/L	1.0	3/28/05	3/29/05

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

Date: 05-Apr-05
WorkOrder: 0503518

ANALYTICAL REPORT

Client Sample ID: 4870-MW3-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-03A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		3/30/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		3/30/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		3/30/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		3/30/05
Benzene	ND	0.50	µg/L	1.0		3/30/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		3/30/05
Toluene	ND	0.50	µg/L	1.0		3/30/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/30/05
m,p-Xylene	0.50	0.50	µg/L	1.0		3/30/05
o-Xylene	ND	0.50	µg/L	1.0		3/30/05
Surrogate: 1,4-Dichlorobenzene-d4	86.4	80.8-139	% Rec	1.0		3/30/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		3/30/05

Client Sample ID: 4870-MW3-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-03D

Test Name: TPH as Diesel/Motor Oil **Reference:** EPA 3510/GCFID(LUFT)/EPA 8015B

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Diesel (C12-C22)	ND	50	µg/L	1.0	3/28/05	3/29/05
TPHC Motor Oil	ND	170	µg/L	1.0	3/28/05	3/29/05

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

Date: 05-Apr-05
WorkOrder: 0503518

ANALYTICAL REPORT

Client Sample ID: 4870-QCTB-W **Received:** 3/22/05 **Collected:** 3/22/05 0:00
Lab ID: 0503518-04A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		3/30/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		3/30/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		3/30/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		3/30/05
Benzene	ND	0.50	µg/L	1.0		3/30/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		3/30/05
Toluene	ND	0.50	µg/L	1.0		3/30/05
Ethylbenzene	ND	0.50	µg/L	1.0		3/30/05
m,p-Xylene	ND	0.50	µg/L	1.0		3/30/05
o-Xylene	ND	0.50	µg/L	1.0		3/30/05
Surrogate: 1,4-Dichlorobenzene-d4	87.5	80.8-139	% Rec	1.0		3/30/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		3/30/05

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

North Coast Laboratories, Ltd.

Date: 06-Apr-05

CLIENT: Pvt. cust. paying on pickup
Work Order: 0503518
Project: 4870.00, Dibbles

QC SUMMARY REPORT

Method Blank

Sample ID: **MB 033005** Batch ID: **R34131** Test Code: **8260OXYW** Units: **µg/L** Analysis Date: **3/30/05 6:21:00 AM** Prep Date:
Client ID: Run ID: **ORGCMS2_050330B** SeqNo: **493906**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	1.0									
Tert-butyl alcohol (TBA)	ND	10									
Di-Isopropyl ether (DIPE)	ND	1.0									
Ethyl tert-butyl ether (ETBE)	ND	1.0									
Benzene	0.1241	0.50									J
Tert-amyl methyl ether (TAME)	ND	1.0									
Toluene	ND	0.50									
Ethylbenzene	0.07592	0.50									J
m,p-Xylene	0.1160	0.50									J
o-Xylene	ND	0.50									
1,4-Dichlorobenzene-d4	0.852	0.10	1.00	0	85.2%	81	139	0			

Sample ID: **MB 033005** Batch ID: **R34130** Test Code: **GASW-MS** Units: **µg/L** Analysis Date: **3/30/05 6:21:00 AM** Prep Date:
Client ID: Run ID: **ORGCMS2_050330A** SeqNo: **493882**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	23.98	50									J

Sample ID: **MB-13230** Batch ID: **13230** Test Code: **TPHDMW** Units: **µg/L** Analysis Date: **3/29/05 12:01:16 PM** Prep Date: **3/28/05**
Client ID: Run ID: **ORGC7_050329A** SeqNo: **494635**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	18.94	50									J
TPHC Motor Oil	ND	170									

Qualifiers: ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 06-Apr-05

CLIENT: Pvt. cust. paying on pickup
Work Order: 0503518
Project: 4870.00, Dibbles

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **LCS-05215** Batch ID: **R34131** Test Code: **8260OXYW** Units: **µg/L** Analysis Date: **3/30/05 2:19:00 AM** Prep Date:

Client ID: Run ID: **ORGCMS2_050330B** SeqNo: **493903**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	19.97	1.0	20.0	0	99.9%	80	120	0			
Tert-butyl alcohol (TBA)	645.0	10	400	0	161%	25	162	0			
Di-isopropyl ether (DIPE)	20.81	1.0	20.0	0	104%	80	120	0			
Ethyl tert-butyl ether (ETBE)	19.69	1.0	20.0	0	98.4%	77	120	0			
Benzene	22.97	0.50	20.0	0	115%	78	117	0			
Tert-amyl methyl ether (TAME)	19.35	1.0	20.0	0	96.7%	64	136	0			
Toluene	20.58	0.50	20.0	0	103%	80	120	0			
Ethylbenzene	22.23	0.50	20.0	0	111%	80	120	0			
m,p-Xylene	46.07	0.50	40.0	0	115%	80	120	0			
o-Xylene	20.27	0.50	20.0	0	101%	80	120	0			
1,4-Dichlorobenzene-d4	1.29	0.10	1.00	0	129%	81	139	0			

Sample ID: **LCSD-05215** Batch ID: **R34131** Test Code: **8260OXYW** Units: **µg/L** Analysis Date: **3/30/05 2:50:00 AM** Prep Date:

Client ID: Run ID: **ORGCMS2_050330B** SeqNo: **493904**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	21.16	1.0	20.0	0	106%	80	120	20.0	5.76%	20	
Tert-butyl alcohol (TBA)	696.8	10	400	0	174%	25	162	645	7.73%	20	S
Di-isopropyl ether (DIPE)	22.11	1.0	20.0	0	111%	80	120	20.8	6.08%	20	
Ethyl tert-butyl ether (ETBE)	21.38	1.0	20.0	0	107%	77	120	19.7	8.25%	20	
Benzene	23.87	0.50	20.0	0	119%	78	117	23.0	3.84%	20	S
Tert-amyl methyl ether (TAME)	20.73	1.0	20.0	0	104%	64	136	19.4	6.90%	20	
Toluene	21.56	0.50	20.0	0	108%	80	120	20.6	4.66%	20	
Ethylbenzene	23.51	0.50	20.0	0	118%	80	120	22.2	5.59%	20	
m,p-Xylene	48.94	0.50	40.0	0	122%	80	120	46.1	6.04%	20	S
o-Xylene	21.45	0.50	20.0	0	107%	80	120	20.3	5.67%	20	
1,4-Dichlorobenzene-d4	1.43	0.10	1.00	0	143%	81	139	1.29	9.78%	20	S

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pvt. cust. paying on pickup
Work Order: 0503518
Project: 4870.00, Dibbles

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **LCS-05216** Batch ID: **R34130** Test Code: **GASW-MS** Units: **µg/L** Analysis Date: **3/30/05 4:21:00 AM** Prep Date:
Client ID: Run ID: **ORGCMS2_050330A** SeqNo: **493879**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	1,063	50	1,000	0	106%	80	120	0			

Sample ID: **LCSD-05216** Batch ID: **R34130** Test Code: **GASW-MS** Units: **µg/L** Analysis Date: **3/30/05 4:51:00 AM** Prep Date:
Client ID: Run ID: **ORGCMS2_050330A** SeqNo: **493880**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	1,015	50	1,000	0	101%	80	120	1,060	4.67%	20	

Sample ID: **LCS-13230** Batch ID: **13230** Test Code: **TPHDMW** Units: **µg/L** Analysis Date: **3/29/05 10:10:09 AM** Prep Date: **3/28/05**
Client ID: Run ID: **ORGC7_050329A** SeqNo: **494632**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	541.8	50	500	0	108%	81	156	0			
TPHC Motor Oil	1,212	170	1,000	0	121%	90	144	0			

Sample ID: **LCSD-13230** Batch ID: **13230** Test Code: **TPHDMW** Units: **µg/L** Analysis Date: **3/29/05 10:28:39 AM** Prep Date: **3/28/05**
Client ID: Run ID: **ORGC7_050329A** SeqNo: **494633**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Diesel (C12-C22)	576.2	50	500	0	115%	81	156	542	6.14%	15	
TPHC Motor Oil	1,170	170	1,000	0	117%	90	144	1,210	3.52%	15	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

NORTH COAST LABORATORIES LTD.
5680 West End Road • Arcata • CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

LABORATORY NUMBER: 0503578

Attention:
Results & Invoice to: Ron Kendall
Address: PO BOX 838, Fortuna, CA 95540
Phone: (707) 725-5626
Copies of Report to: LACO; Gary Manhart
Sampler (Sign & Print): SJD

TAT: ☐ 24 Hr ☐ 48 Hr ☐ 5 Day ☐ 5–7 Day
☑ STD (2–3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms ☐
Preliminary: FAX ☑ Verbal ☐ By:
Final Report: FAX ☐ Verbal ☐ By:

PROJECT INFORMATION
Project Number: 4870.00
Project Name: Dibbles
Purchase Order Number: Task 3020

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	CONTAINER	PRESERVATIVE	ANALYSIS: 8260 List 1	ANALYSIS: TPHd/mo w/SGC
	4870-MW1-W	3-22-05	PM	GW	3	1		
	4870-MW2-W	↓	↓	↓	3	1		
	4870-MW3-W				3	1		
	4870-QCTB-W				1			
					9	B		7

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

SAMPLE CONDITION/SPECIAL INSTRUCTIONS
GEOTRACKER
LIMITED VOLUME FOR TPHd/mo w/SGC
cold, intact

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
STEVE DAVIS	3-22-05 4:30pm	K. Thompson	3/22/05 16:30

SAMPLE DISPOSAL
☑ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

*MATRIX: DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

NORTH COAST LABORATORIES LTD.

July 11, 2005

Pvt. cust. paying on pickup

,

Attn: Ron Kendall

RE: 4870.00, Dibbles

Order No.: 0506725
Invoice No.: 51255
PO No.: TASK 3023
ELAP No. 1247-Expires July 2006

SAMPLE IDENTIFICATION

Fraction	Client Sample Description
01A	4870-MW1-W
02A	4870-MW2-W
03A	4870-MW3-W
04A	4870-QCTB-W

ND = Not Detected at the Reporting Limit

Limit = Reporting Limit

All solid results are expressed on a wet-weight basis unless otherwise noted.

RECEIVED
JUL 1 2 2005
VG

DRG
MRK

REPORT CERTIFIED BY

Laboratory Supervisor(s) | QA Unit | Jesse G. Chaney, Jr. Laboratory Director

5680 West End Road • Arcata California 95521-9202 • 707-822-4649 • FAX 707-822-6831

Printed on Recycled Paper

North Coast Laboratories, Ltd. **Date:** *11-Jul-05*

CLIENT: Pvt. cust. paying on pickup
Project: 4870.00, Dibbles
Lab Order: 0506725

CASE NARRATIVE

Gasoline Components/Additives:
The relative percent difference (RPD) for the laboratory control samples was above the upper acceptance limit for MTBE. This indicates that the results could be variable.

Date: 11-Jul-05
WorkOrder: 0506725

ANALYTICAL REPORT

Client Sample ID: 4870-MW1-W **Received:** 6/30/05 **Collected:** 6/28/05 0:00
Lab ID: 0506725-01A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	40	1.0	µg/L	1.0		7/6/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		7/6/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		7/6/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		7/6/05
Benzene	ND	0.50	µg/L	1.0		7/6/05
Tert-amyl methyl ether (TAME)	14	1.0	µg/L	1.0		7/6/05
Toluene	ND	0.50	µg/L	1.0		7/6/05
Ethylbenzene	ND	0.50	µg/L	1.0		7/6/05
m,p-Xylene	ND	0.50	µg/L	1.0		7/6/05
o-Xylene	ND	0.50	µg/L	1.0		7/6/05
Surrogate: 1,4-Dichlorobenzene-d4	100	80.8-139	% Rec	1.0		7/6/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		7/6/05

Client Sample ID: 4870-MW2-W **Received:** 6/30/05 **Collected:** 6/28/05 0:00
Lab ID: 0506725-02A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		7/6/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		7/6/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		7/6/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		7/6/05
Benzene	ND	0.50	µg/L	1.0		7/6/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		7/6/05
Toluene	ND	0.50	µg/L	1.0		7/6/05
Ethylbenzene	ND	0.50	µg/L	1.0		7/6/05
m,p-Xylene	ND	0.50	µg/L	1.0		7/6/05
o-Xylene	ND	0.50	µg/L	1.0		7/6/05
Surrogate: 1,4-Dichlorobenzene-d4	99.7	80.8-139	% Rec	1.0		7/6/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		7/6/05

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

Date: 11-Jul-05
WorkOrder: 0506725

ANALYTICAL REPORT

Client Sample ID: 4870-MW3-W **Received:** 6/30/05 **Collected:** 6/28/05 0:00
Lab ID: 0506725-03A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		7/6/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		7/6/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		7/6/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		7/6/05
Benzene	ND	0.50	µg/L	1.0		7/6/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		7/6/05
Toluene	ND	0.50	µg/L	1.0		7/6/05
Ethylbenzene	ND	0.50	µg/L	1.0		7/6/05
m,p-Xylene	ND	0.50	µg/L	1.0		7/6/05
o-Xylene	ND	0.50	µg/L	1.0		7/6/05
Surrogate: 1,4-Dichlorobenzene-d4	99.0	80.8-139	% Rec	1.0		7/6/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		7/6/05

Client Sample ID: 4870-QCTB-W **Received:** 6/30/05 **Collected:** 6/28/05 0:00
Lab ID: 0506725-04A

Test Name: Gasoline Components/Additives **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
Methyl tert-butyl ether (MTBE)	ND	1.0	µg/L	1.0		7/6/05
Tert-butyl alcohol (TBA)	ND	10	µg/L	1.0		7/6/05
Di-isopropyl ether (DIPE)	ND	1.0	µg/L	1.0		7/6/05
Ethyl tert-butyl ether (ETBE)	ND	1.0	µg/L	1.0		7/6/05
Benzene	ND	0.50	µg/L	1.0		7/6/05
Tert-amyl methyl ether (TAME)	ND	1.0	µg/L	1.0		7/6/05
Toluene	ND	0.50	µg/L	1.0		7/6/05
Ethylbenzene	ND	0.50	µg/L	1.0		7/6/05
m,p-Xylene	ND	0.50	µg/L	1.0		7/6/05
o-Xylene	ND	0.50	µg/L	1.0		7/6/05
Surrogate: 1,4-Dichlorobenzene-d4	98.3	80.8-139	% Rec	1.0		7/6/05

Test Name: TPH as Gasoline **Reference:** LUFT/EPA 8260B Modified

Parameter	Result	Limit	Units	DF	Extracted	Analyzed
TPHC Gasoline	ND	50	µg/L	1.0		7/6/05

NORTH COAST LABORATORIES
5680 West End Road • Arcata, California 95521-9202 • 707-822-4649 • FAX 707-822-6831
Printed on Recycled Paper

North Coast Laboratories, Ltd.

Date: 11-Jul-05

CLIENT: Pvt. cust. paying on pickup
Work Order: 0506725
Project: 4870.00, Dibbles

QC SUMMARY REPORT

Method Blank

Sample ID: **MB-7/6/05** Batch ID: R35723 Test Code: **8260OXYW** Units: **µg/L** Analysis Date: **7/6/05 5:09:00 AM** Prep Date:

Client ID: Run ID: **ORGCMS2_050706B** SeqNo: **515104**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	ND	1.0									
Tert-butyl alcohol (TBA)	ND	10									
Di-isopropyl ether (DIPE)	ND	1.0									
Ethyl tert-butyl ether (ETBE)	ND	1.0									
Benzene	ND	0.50									
Tert-amyl methyl ether (TAME)	ND	1.0									
Toluene	0.1769	0.50									J
Ethylbenzene	ND	0.50									
m,p-Xylene	ND	0.50									
o-Xylene	ND	0.50									
1,4-Dichlorobenzene-d4	1.02	0.10	1.00	0	102%	81	139	0			

Sample ID: **MB-7/6/05** Batch ID: **R35722** Test Code: **GASW-MS** Units: **µg/L** Analysis Date: **7/6/05 5:09:00 AM** Prep Date:

Client ID: Run ID: **ORGCMS2_050706A** SeqNo: **515089**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	ND	50									

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

North Coast Laboratories, Ltd.

Date: 11-Jul-05

CLIENT: Pvt. cust. paying on pickup
Work Order: 0506725
Project: 4870.00, Dibbles

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **LCS-05431** Batch ID: **R35723** Test Code: **8260OXYW** Units: **µg/L** Analysis Date: **7/6/05 12:59:00 PM** Prep Date:

Client ID: Run ID: **ORGCMS2_050706B** SeqNo: **515101**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	21.28	1.0	20.0	0	106%	80	120	0			
Tert-butyl alcohol (TBA)	410.3	10	400	0	103%	25	162	0			
Di-isopropyl ether (DIPE)	20.97	1.0	20.0	0	105%	80	120	0			
Ethyl tert-butyl ether (ETBE)	19.82	1.0	20.0	0	99.1%	77	120	0			
Benzene	18.79	0.50	20.0	0	94.0%	78	117	0			
Tert-amyl methyl ether (TAME)	19.24	1.0	20.0	0	96.2%	64	136	0			
Toluene	20.60	0.50	20.0	0	103%	80	120	0			
Ethylbenzene	19.34	0.50	20.0	0	96.7%	80	120	0			
m,p-Xylene	38.67	0.50	40.0	0	96.7%	80	120	0			
o-Xylene	19.58	0.50	20.0	0	97.9%	80	120	0			
1,4-Dichlorobenzene-d4	1.05	0.10	1.00	0	105%	81	139	0			

Sample ID: **LCSD-05431** Batch ID: **R35723** Test Code: **8260OXYW** Units: **µg/L** Analysis Date: **7/6/05 1:30:00 AM** Prep Date:

Client ID: Run ID: **ORGCMS2_050706B** SeqNo: **515102**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Methyl tert-butyl ether (MTBE)	17.30	1.0	20.0	0	86.5%	80	120	21.3	20.7%	20	R
Tert-butyl alcohol (TBA)	359.2	10	400	0	89.8%	25	162	410	13.3%	20	
Di-isopropyl ether (DIPE)	18.95	1.0	20.0	0	94.8%	80	120	21.0	10.1%	20	
Ethyl tert-butyl ether (ETBE)	19.45	1.0	20.0	0	97.2%	77	120	19.8	1.90%	20	
Benzene	18.62	0.50	20.0	0	93.1%	78	117	18.8	0.951%	20	
Tert-amylmethyl ether (TAME)	18.66	1.0	20.0	0	93.3%	64	136	19.2	3.06%	20	
Toluene	19.95	0.50	20.0	0	99.8%	80	120	20.6	3.21%	20	
Ethylbenzene	19.87	0.50	20.0	0	99.3%	80	120	19.3	2.73%	20	
m,p-Xylene	39.41	0.50	40.0	0	98.5%	80	120	38.7	1.88%	20	
o-Xylene	19.75	0.50	20.0	0	98.7%	80	120	19.6	0.832%	20	
1,4-Dichlorobenzene-d4	1.07	0.10	1.00	0	107%	81	139	1.05	2.40%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

CLIENT: Pvt. cust. paying on pickup
Work Order: 0506725
Project: 4870.00, Dibbles

QC SUMMARY REPORT

Laboratory Control Spike

Sample ID: **LCS-05431** Batch ID: **R35722** Test Code: **GASW-MS** Units: **µg/L** Analysis Date: **7/6/05 3:06:00 AM** Prep Date:
Client ID: Run ID: **ORGCMS2_050706A** SeqNo: **515086**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	996.4	50	1,000	0	99.6%	80	120	0			

Sample ID: **LCSD-05431** Batch ID: **R35722** Test Code: **GASW-MS** Units: **µg/L** Analysis Date: **7/6/05 3:37:00 AM** Prep Date:
Client ID: Run ID: **ORGCMS2_050706A** SeqNo: **515087**

Analyte	Result	Limit	SPK value	SPK Ref Val	% Rec	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TPHC Gasoline	995.2	50	1,000	0	99.5%	80	120	996	0.122%	20	

Qualifiers:
ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank

NORTH COAST LABORATORIES LTD.
5680 West End Road · Arcata · CA 95521-9202
707-822-4649 Fax 707-822-6831

Chain of Custody

0506725

LABORATORY NUMBER:

Attention:
Results & Invoice to: Ron Kendall
Address: PO BOX 838, Fortuna, CA 95540

Phone: (707) 725-5626
Copies of Report to: LACO; Gary Manhart

Sampler (Sign & Print): [signature] RIK DANIELS

TAT: ☐ 24 Hr ☐ 48 Hr ☐ 5 Day ☐ 5–7 Day
☑ STD (2–3 Wk) ☐ Other:
PRIOR AUTHORIZATION IS REQUIRED FOR RUSHES

REPORTING REQUIREMENTS: State Forms ☐
Preliminary: FAX ☑ Verbal ☐ By:
Final Report: FAX ☐ Verbal ☐ By:

CONTAINER CODES: 1—½ gal. pl; 2—250 ml pl; 3—500 ml pl; 4—1 L Nalgene; 5—250 ml BG; 6—500 ml BG; 7—1 L BG; 8—1 L cg; 9—40 ml VOA; 10—125 ml VOA; 11—4 oz glass jar; 12—8 oz glass jar; 13—brass tube; 14—other

PRESERVATIVE CODES: a—HNO_3; b—HCl; c—H_2SO_4; d—$Na_2S_2O_3$; e—NaOH; f—$C_2H_3O_2Cl$; g—other

PROJECT INFORMATION

Project Number: 4870.00
Project Name: Dibbles
Purchase Order Number: Task 3023

LAB ID	SAMPLE ID	DATE	TIME	MATRIX*	ANALYSIS: 8260 List 1	CONTAINER: 9	PRESERVATIVE: B
	4870-MW1-W	6-28-05	PM	GW	3		
	4870-MW2-W	↓	↓	↓	1		
	4870-MW3-W	↓	↓	↓	2		
	4870-QCTB-W	↓	↓	↓	1		

SAMPLE CONDITION/SPECIAL INSTRUCTIONS

GEOTRACKER

cooler temp = 5.8 C

RELINQUISHED BY (Sign & Print)	DATE/TIME	RECEIVED BY (Sign)	DATE/TIME
[signature], DSW	6/30/05	[signature]	6-30-05 1500

SAMPLE DISPOSAL
☑ NCL Disposal of Non-Contaminated
☐ Return ☐ Pickup

CHAIN OF CUSTODY SEALS Y/N/NA
SHIPPED VIA: UPS Air-Ex Fed-Ex Bus Hand

***MATRIX:** DW=Drinking Water; Eff=Effluent; Inf=Influent; SW=Surface Water; GW=Ground Water; S=Soil; O=Other.

ALL CONTAMINATED NON-AQUEOUS SAMPLES WILL BE RETURNED TO CLIENT

Attachment 4

appl
AGRICULTURE & PRIORITY POLLUTANTS LABORATORIES, INC.
4203 West Swift ▼ Fresno, California 93722 ▼ Phone 559.275-2175 ▼ Fax 559.275-4422

RECEIVED
JUL 13 2001
BY: AB

June 20, 2001

LMO
✓DRG
DNL
HWG
FRB
CWG
✓CSW
FILE 3422-05
Fork

North Coast Laboratories Ltd.
5680 West End Road
Arcata, California 95521

Attn: Loretta Tomlin

Subject: Report of Data: Case 35576

Results in this report apply to the sample analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Dear Ms. Tomlin:

One water sample for job # 0106100-1A was received June 06, 2001, in good condition. Written results are being provided on this June 20, 2001, for the requested analysis.

For the EPA 8260 analysis, the sample was extracted according to EPA method 5030. The sample was taken off hold June 12, 2001 and purged. The pH of the sample was 4. The tentatively identified peaks are reported. The results are based on a one to one response ratio to the nearest internal standard. The results are estimated values.

No unusual problems or complications were encountered with this sample set.

If you have any questions or require further information, please contact us at your convenience. Thank you for choosing APPL, Inc.

Sincerely,

Paula Young by DA

Paula Young, Laboratory Director
APPL, Inc.

PY/rp
Enclosure
cc: File

Number of pages in this report 7

EPA 8260B

lorth Coast Laboratories Ltd.
680 W. End Road
rcata, CA 95521

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

ttn: Loretta Tomlin
roject: 0106100-1A
ample ID: 3472 MW1
ample Collection Date: 6/1/01

ARF: 35576
APPL ID AP17625
QCG: $8260-010614AH-36588

Method	Analyte	Result	PQL	Units	Extraction Date	Analysis Date
PA 8260B	1,1,1,2-Tetrachloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,1,1-Trichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,1,2,2-Tetrachloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,1,2-Trichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,1-Dichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,1-Dichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,2-Dichlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,2-Dichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,2-Dichloropropane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,3-Dichlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1,4-Dichlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	1H-Indene, 2,3-dihydro-1-methyl-	65	TIC	ug/L	6/14/01	6/14/01
PA 8260B	1H-Indene, 2,3-dihydro-4-methyl-	60	TIC	ug/L	6/14/01	6/14/01
PA 8260B	1H-Indene, 2,3-dihydro-5-methyl-	23	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Benzene	12	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Benzene, (2-methyl-1-propenyl)-	26	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Benzene, propyl-	30	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Bromobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Bromodichloromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Bromoform	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Bromomethane	Not detected	1	ug/L	6/14/01	6/14/01
PA 8260B	Carbon tetrachloride	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Chlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Chloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Chloroform	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Chloromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	cis-1,2-Dichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	cis-1,3-Dichloropropene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Cyclohexane	130	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclohexane, 1-methyl	58	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclohexane, methyl	180	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclohexene, 4-methyl	22	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclopentane	43	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclopentane, 1,2,3	21	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclopentane, 1,2-di	76	TIC	ug/L	6/14/01	6/14/01

Run #: 0614H10
Instrument: HEWEY
Sequence: H010608
Dilution Factor: 1
Initials: RP

Printed: 6/18/01 1:57:45 PM

EPA 8260B

North Coast Laboratories Ltd.
5680 W. End Road
Arcata, CA 95521

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Attn: Loretta Tomlin
Project: 0106100-1A
Sample ID: 3472 MW1
Sample Collection Date: 6/1/01

ARF: 35576
APPL ID AP17625
QCG: $8260-010614AH-36588

Method	Analyte	Result	PQL	Units	Extraction Date	Analysis Date
PA 8260B	Cyclopentane, 1,3-di	50	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclopentane, ethyl	38	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Cyclopentane, methyl	170	TIC	ug/L	6/14/01	6/14/01
PA 8260B	Dibromochloromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Dibromomethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Dichlorodifluoromethane	Not detected	1	ug/L	6/14/01	6/14/01
PA 8260B	Ethylbenzene	25	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Freon 113	Not detected	1	ug/L	6/14/01	6/14/01
PA 8260B	Methylene chloride	Not detected	5	ug/L	6/14/01	6/14/01
PA 8260B	Tetrachloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Toluene	0.57	0.5	ug/L	6/14/01	6/14/01
PA 8260B	trans-1,2-Dichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	trans-1,3-Dichloropropene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Trichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Trichlorofluoromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Vinyl chloride	Not detected	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Xylenes	45	0.5	ug/L	6/14/01	6/14/01
PA 8260B	Surrogate recovery (BFB)	105	75-125	%	6/14/01	6/14/01
PA 8260B	Surrogate recovery (DBFM)	99.9	75-125	%	6/14/01	6/14/01
PA 8260B	Surrogate recovery (DCA)	102	75-125	%	6/14/01	6/14/01
PA 8260B	Surrogate recovery (TOL)	92.3	75-125	%	6/14/01	6/14/01

Run #: 0614H10
Instrument: HEWEY
Sequence: H010608
Dilution Factor: 1
Initials: RP

Printed: 6/18/01 1:57:45 PM

Method Blank
EPA 8260B

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Blank Name/QCG: **010614W - 36588**
Batch ID: $8260-010614AH

ple Type	Analyte	Result	PQL	Units	Extraction Date	Analysis Date
NK	1,1,1,2-Tetrachloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,1,1-Trichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,1,2,2-Tetrachloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,1,2-Trichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,1-Dichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,1-Dichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,2-Dichlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,2-Dichloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,2-Dichloropropane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,3-Dichlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	1,4-Dichlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Benzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Bromobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Bromodichloromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Bromoform	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Bromomethane	Not detected	1	ug/L	6/14/01	6/14/01
NK	Carbon tetrachloride	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Chlorobenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Chloroethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Chloroform	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Chloromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	cis-1,2-Dichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	cis-1,3-Dichloropropene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Dibromochloromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Dibromomethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Dichlorodifluoromethane	Not detected	1	ug/L	6/14/01	6/14/01
NK	Ethylbenzene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Freon 113	Not detected	1	ug/L	6/14/01	6/14/01
NK	Methylene chloride	Not detected	5	ug/L	6/14/01	6/14/01
NK	Tetrachloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Toluene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	trans-1,2-Dichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	trans-1,3-Dichloropropene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Trichloroethene	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Trichlorofluoromethane	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Vinyl chloride	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Xylenes	Not detected	0.5	ug/L	6/14/01	6/14/01
NK	Surrogate recovery (BFB)	100	75-125	%	6/14/01	6/14/01
NK	Surrogate recovery (DBFM)	97.5	75-125	%	6/14/01	6/14/01

Run #: 0614H04
Instrument: HEWEY
Sequence: H010608
Initials: RP

Printed: 6/18/01 1:58:47 PM

Method Blank
EPA 8260B

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Blank Name/QCG: **010614W - 36588**
Batch ID: $8260-010614AH

mple Type	Analyte	Result	PQL	Units	Extraction Date	Analysis Date
NK	Surrogate recovery (DCA)	98.2	75-125	%	6/14/01	6/14/01
NK	Surrogate recovery (TOL)	93.1	75-125	%	6/14/01	6/14/01

Run #: 0614H04
Instrument: HEWEY
Sequence: H010608
Initials: RP

Printed: 6/18/01 1:58:47 PM

Laboratory Control Spike Recoveries

EPA 8260B

PPL ID: **010614W-17625 LCS - 36588**
atch ID: $8260-010614AH

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
,2-Tetrachloroethane	10.00	9.96	9.68	99.6	96.8	75-125	2.9	25
-Trichloroethane	10.00	10.0	10.2	100	102	75-125	2.0	25
,2-Tetrachloroethane	10.00	9.50	9.20	95.0	92.0	75-125	3.2	25
-Trichloroethane	10.00	9.85	10.1	98.5	101	75-125	2.5	25
)ichloroethane	10.00	10.7	10.6	107	106	75-125	0.94	25
)ichloroethene	10.00	10.0	10.3	100	103	75-125	3.0	25
)ichlorobenzene	10.00	9.97	9.57	99.7	95.7	75-125	4.1	25
)ichloroethane	10.00	10.0	9.82	100	98.2	75-125	1.8	25
)ichloropropane	10.00	10.2	10.1	102	101	75-125	0.99	25
)ichlorobenzene	10.00	9.95	9.74	99.5	97.4	75-125	2.1	25
)ichlorobenzene	10.00	9.79	9.60	97.9	96.0	75-125	2.0	25
ene	10.00	10.0	9.84	100	98.4	75-125	1.6	25
obenzene	10.00	10.1	9.66	101	96.6	75-125	4.5	25
odichloromethane	10.00	10.2	10.0	102	100	75-125	2.0	25
oform	10.00	9.72	9.55	97.2	95.5	75-125	1.8	25
omethane	10.00	8.63	7.81	86.3	78.1	75-125	10.0	25
on tetrachloride	10.00	10.1	10.2	101	102	75-125	0.99	25
obenzene	10.00	9.90	9.68	99.0	96.8	75-125	2.2	25
oethane	10.00	9.40	9.35	94.0	93.5	75-125	0.53	25
oform	10.00	10.7	10.4	107	104	75-125	2.8	25
omethane	10.00	7.86	7.97	78.6	79.7	75-125	1.4	25
2-Dichloroethene	10.00	10.1	9.81	101	98.1	75-125	2.9	25
3-Dichloropropene	10.00	10.2	10.1	102	101	75-125	0.99	25
mochloromethane	10.00	9.82	9.61	98.2	96.1	75-125	2.2	25
momethane	10.00	10.0	9.92	100	99.2	75-125	0.80	25

mments: _____

Primary	SPK	DUP
Extraction Date :	6/14/01	6/14/01
Analysis Date :	6/14/01	6/14/01
Instrument :	HEWEY	HEWEY
Run :	0614H02	0614H03
Analyst :	RP	

Printed: 6/18/01 3:45:19 PM

Laboratory Control Spike Recoveries

EPA 8260B

PPL ID: **010614W-17625 LCS - 36588**
atch ID: $8260-010614AH

APPL Inc.
4203 West Swift Avenue
Fresno, CA 93722

Compound Name	Spike Lvl ug/L	SPK Result ug/L	DUP Result ug/L	SPK % Recovery	DUP % Recovery	Recovery Limits	RPD %	RPD Limits
orodifluoromethane	10.00	8.27	8.01	82.7	80.1	75-125	3.2	25
benzene	10.00	9.92	9.72	99.2	97.2	75-125	2.0	25
n 113	10.00	10.0	10.3	100	103	75-125	3.0	25
ylene chloride	10.00	9.80	9.78	98.0	97.8	75-125	0.20	25
chloroethene	10.00	9.48	9.55	94.8	95.5	75-125	0.74	25
ene	10.00	10.2	10.1	102	101	75-125	0.99	25
-1,2-Dichloroethene	10.00	9.62	9.48	96.2	94.8	75-125	1.5	25
-1,3-Dichloropropene	10.00	10.1	9.97	101	99.7	75-125	1.3	25
loroethene	10.00	9.78	9.80	97.8	98.0	75-125	0.20	25
lorofluoromethane	10.00	9.78	9.71	97.8	97.1	75-125	0.72	25
chloride	10.00	9.17	9.12	91.7	91.2	75-125	0.55	25
es	30.00	30.1	29.5	100	98.3	75-125	2.0	25
gate recovery (BFB)	30.888	30.8	31.1	99.7	101	75-125		
gate recovery (DBFM)	31.249	30.3	30.6	97.0	97.9	75-125		
gate recovery (DCA)	29.710	28.2	28.1	94.9	94.6	75-125		
gate recovery (TOL)	31.754	30.3	29.9	95.4	94.2	75-125		

mments: _____

Primary	SPK	DUP
Extraction Date :	6/14/01	6/14/01
Analysis Date :	6/14/01	6/14/01
Instrument :	HEWEY	HEWEY
Run :	0614H02	0614H03
Analyst :	RP	

Printed: 6/18/01 3:45:19 PM