July 22, 2000

Alameda County Department of
Environmental Health
1131 Harbor Bay Parkway, 2nd Floor
Alameda, CA 94502-6577

Attention: Ms. Susan Hugo

Subject: Report of Fourth Quarterly Groundwater Monitoring
And Risk-Based Corrective Action Assessment
Liquid Sugars UST Site, 1275 66th Street
Emeryville, California
GA Project No. 149-01-03

Ladies and Gentlemen:

Gribi Associates is pleased to submit this report on behalf of Liquid Sugars, Inc. for the subject site in Emeryville, California. This letter report documents the monitoring of five groundwater monitoring wells (MW-1 through MW-5) at the site on March 23, 2000 and provides a Risk-Based Corrective Action (RBCA) assessment for the site. On the basis of the RBCA assessment, this report also requests regulatory closure for the site.

While shallow groundwater southwest from the former Liquid Sugars USTs appears to be both gasoline- and diesel-impacted, hydrocarbon impacts appear to decrease markedly in median downgradient wells MW-5 and MW-4. Thus, it appears that the combination of past source removal activities and ongoing natural attenuation have resulted in limited hydrocarbon impacts.

Based on model risk estimates, it appears that there is no significant risk of exposure from any identified hydrocarbon constituents present at the project site. The total pathway individual and cumulative carcinogenic risk (risk from benzene exposure) associated with both outdoor and indoor vapor exposure for the southwest project site area are well below the individual and cumulative target risk levels of 1.0×10^{-5} and 1.0×10^{-4}, respectively. Also, the total pathway individual and cumulative toxic risk (risk from toluene, ethylbenzene, and xylenes exposure) associated with both outdoor and indoor vapor exposure for the southwest project site area are well below the individual and cumulative risk target level of 1.0.

Based on results of site investigations and the RBCA assessment, we request that regulatory closure be granted for this site. We believe that this site should be closed as a low-risk soil and groundwater case based on the following known conditions:

- **There is no free product present in project site wells.** There has been no free product measured in groundwater in any of the project site wells. Slight to moderate hydrocarbon sheens have been observed in groundwater purged from well MW-2, located about five feet southwest from the former UST excavation. However, these sheens are strictly seasonal, and seem to occur only when groundwater depths are relatively low (i.e. in the summer and fall months). These hydrocarbon sheens are not measurable and clearly do not represent free product.

- **The hydrocarbon plume is stable.** Historical groundwater monitoring results from median plume wells MW-2, MW-1, MW-5, and MW-4 clearly define a stable hydrocarbon plume, extending about 100 feet in a downgradient (southwesterly) direction from the former USTs.

- **No ongoing hydrocarbon sources are present at the site.** The three subject USTs were removed from the site in November 1990, and approximately 70 cubic yards of hydrocarbon-impacted soil was removed from the site in September 1991. Subsequent soil boring data indicates that only moderate levels of hydrocarbon-impacted soils are present in a relatively narrow layer southwest from the former USTs.

- **Results of RBCA assessment activities indicate no significant risk posed by residual hydrocarbons.** Calculated risk estimates for both outdoor and indoor air exposure pathways are below target risk levels for both carcinogenic and toxic risk. Also, there are no groundwater or surface water receptors within close proximity to the site, and there is no evidence of significant hydrocarbon impacts to near-surface soils at the site.

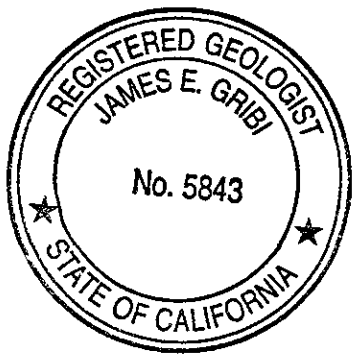
Subject to concurrence from Alameda County Department of Environmental Health, a Risk Management Plan (RMP) will be prepared for the site. This RMP will address potential risks associated with possible future site development.

Note that the RBCA assessment was conducted using both residential and commercial receptors. Due to the apparent high degree of natural attenuation, the concentrations of BTEX constituents in soil and groundwater are relatively low, and thus, the RBCA assessment indicates no significant risk for both residential and commercial receptors. For this reason, we do not believe that a deed restriction is warranted as a condition of site closure.

We appreciate the opportunity to present this report for your review. Please call if you have questions or require additional information.

Very truly yours,

James E. Gribi
Registered Geologist
California No. 5843



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Enclosure

c Mr. Rory Campbell, Hansen, Bridgett, Marcus, Vlahos & Rudy, LLP
Mr. Mike Alo, Liquid Sugars, Inc.
Mr. Bill Warren

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1.0 INTRODUCTION

Gribi Associates is pleased to submit this report on behalf of Liquid Sugars, Inc. for the underground storage tank (UST) site located at 1275 66th Street in Emeryville, California (see Figure 1 and Figure 2). This letter report documents the monitoring of five groundwater monitoring wells at the site on March 23, 2000 and provides a Risk-Based Corrective Action (RBCA) assessment for the site. On the basis of the RBCA assessment, this report also requests regulatory closure for the site.

1.1 Site Background

Mohawk Petroleum Company operated a bulk fuel facility on the project site from the late 1940s until the mid-1970s. This bulk fuel facility included three to four steel above ground storage tanks (ASTs) on concrete bases located within a concrete-bermed enclosure on the west side of the project site, in the approximate current location of the LSI boiler room.

Liquid Sugars, Inc. has occupied part or all of the project site parcel since the early 1960s. The Liquid Sugars facility formerly contained two 1,000-gallon gasoline USTs and one 10,000-gallon diesel UST located on the southwest side of the project site parcel. The three USTs were removed in November 1990, and soil samples collected beneath the removed USTs indicated both gasoline and diesel releases from the USTs.

Several investigations were conducted by Liquid Sugars to assess the nature and extent of releases from the former USTs. These investigations included: (1) The drilling and sampling of eight soil borings at the site in November 1991; (2) The drilling, installation, and sampling of two groundwater monitoring wells at the site in April 1993; and (3) The purging and sampling of the two site wells on nine occasions between July 1993 and February 1998. Results of these investigations seem to indicate limited hydrocarbon impact to subsurface soils immediately adjacent to the south and northeast sides of the former UST excavation cavity, with little downgradient (west to southwest) soil impacts. Groundwater monitoring results from the two site wells have shown both gasoline and diesel impacts to groundwater, with diesel-range hydrocarbons in the well closer to the former USTs (MW-2) and gasoline-range hydrocarbons in the well further southwest from the former USTs (MW-1). Groundwater samples from MW-1 collected in November 1998 and February 1999 showed significant decreases in Total Petroleum Hydrocarbons as Gasoline (TPH-G) and Benzene from historical TPH-G and Benzene levels between 1993 and 1995.

As part of pending property transactions on four Liquid Sugars, Inc. (LSI) land parcels in Emeryville, Phase I and Phase II Environmental Site Assessments (ESAs) were conducted by consultants for both potential buyers and seller (LSI). Phase II ESAs were conducted on the project site and on the adjacent west LSI office/warehouse parcel by Aqua Science Engineers, Inc. and All Environmental, respectively (see Figure 2 and Figure 3). Results of these investigations, along with previous investigation results, indicate that hydrocarbon impacts to subsurface soils are limited to two main areas: (1) An area extending a short distance southwest from the former USTs; and (2) An area immediately west from the former Mohawk bulk fuel plant ASTs. Groundwater impacts have not been fully defined.

On April 12, 1999, Gribi Associates submitted the *Workplan to Conduct Soil and Groundwater Investigation* to Alameda County Department of Environmental Health. This workplan, which proposed the drilling and sampling of approximately six investigative soil borings at the site, was approved by Alameda County Department of Environmental Health on April 27, 1999. On June 17,

1999, Gribi Associates submitted the *Workplan to Conduct Site Closure Activities*, proposing the installation of three groundwater monitoring wells at the site, conducting quarterly groundwater monitoring for the site, and conducting a risk assessment for the site. This workplan was approved by Alameda County Department of Environmental Health on June 18, 1999. The soil boring investigation, which included the drilling and sampling of seven investigative borings (IB-1 through IB-7), was conducted on Thursday and Friday, May 27 and 28, 1999. On Wednesday, June 23, 1999, Gribi Associated installed three groundwater monitoring wells (MW-3, MW-4, and MW-5) at the site. Results of this investigation were reported in *Report of Soil and Groundwater Investigation And Partial Risk Assessment* (Gribi Associates, August 4, 1999).

Soil results from both previous and current investigative activities are summarized in Figure 3. Results of this and previous investigations indicated that soil and groundwater hydrocarbon plumes appeared to be adequately defined, with one small plume extending to the northwest from the former Mohawk above ground tanks and another plume extending approximately 100 feet southwest from the former Liquid Sugars underground storage tanks (USTs). Based on results from this investigation, Alameda County Department of Environmental Health indicated that closure of the UST site as a low-risk soil and groundwater case would be likely, provided:

- There is no free product present in project site wells.
- The hydrocarbon plume is stable.
- No ongoing hydrocarbon sources are present at the site.
- A long-term Risk Management Plan and a Deed Restriction are in place.
- Results of RBCA assessment activities indicate no significant risk posed by residual hydrocarbons.
- The site is used for commercial purposes only.

This previous investigation also included a RBCA assessment for the adjacent northwest LSI building, located at 1285 66th Street, where previous results indicated shallow hydrocarbon impacts. Results of the RBCA assessment indicated that risks associated with residual hydrocarbons remaining in this portion of the site were acceptable for commercial receptors. Based on these results, regulatory closure was granted for this portion of the site.

1.2 Scope of Work

This report documents the following activities, for which Gribi Associates was contracted by Liquid Sugars, Inc.:

- **Task 1** **Conduct fourth quarterly groundwater monitoring.**
- **Task 2** **Conduct RBCA assessment.**
- **Task 3** **Prepare report of findings.**

These tasks were conducted in accordance with the approved workplans and with generally accepted investigative methods and guidelines.

1.3 Limitations

The services provided under this contract as described in this report include professional opinions and judgments based on data collected. These services have been provided according to generally accepted environmental protocol. The opinions and conclusions contained in this report are typically based on information obtained from:

1. Observations and measurements made by our field staff.
2. Contacts and discussions with regulatory agencies and others.
3. Review of available hydrogeologic data.

2.0 DESCRIPTION OF FIELD ACTIVITIES

On March 23, 2000, Mr. Stanton Stubbs of Gribi Associates conducted groundwater monitoring activities for five site wells (MW-1 through MW-5). Groundwater monitoring was conducted in accordance with California LUFT Field Manual guidelines as follows:

- After unlocking and opening the monitoring wells, water levels were measured to the nearest 0.01 foot with an electronic probe.

- Using a disposable PVC bailer, a single bail of groundwater was taken from each well to check for the presence or absence of floating free product.

- The wells were purged of approximately three well volumes using a 12-volt purge pump. During purging, temperature, pH, conductivity, and turbidity of the well water were periodically monitored and recorded until they stabilized. All purged water was stored onsite in sealed 55-gallon metal drums. Groundwater sampling data sheets for each well are contained in Appendix A.

- After purging the required volume of water, groundwater was poured directly from the pump outlet or bailer into laboratory supplied containers. Each container was then tightly sealed with teflon-lined septa, making sure that no air bubbles were present in the containers. Each container was then labeled and placed in cold storage for transport to the analytical laboratory under formal chain-of-custody.

3.0 RESULTS OF INVESTIGATION

3.1 Hydrologic Conditions

No free product was encountered in any of the five wells. Purged groundwater from MW-2 exhibited moderate to strong hydrocarbon odors, with slight hydrocarbon sheens. Purged groundwater from MW-1, MW-4, and MW-5 exhibited moderate hydrocarbon odors, with no hydrocarbon sheens. Purged groundwater from MW-3 exhibited no hydrocarbon odors and no hydrocarbon sheens.

During the March 23, 2000 monitoring activities, groundwater was measured in the five site wells at a depth of about five feet below surface grade. Groundwater flow gradient, which is shown in Figure 4, was about 0.013 feet/feet to the southwest.

3.3 Results of Laboratory Analyses

Groundwater samples from the five wells were analyzed for the following parameters with standard method turn around time on results.

USEPA 8015M Total Petroleum Hydrocarbons as Gasoline (TPH-G)
USEPA 8020/602 Benzene, Toluene, Ethylbenzene, Xylenes (BTEX)
USEPA 8020/602 Methyl-t-butyl Ether (MTBE)
USEPA 8015M Total Petroleum Hydrocarbons as Diesel (TPH-D/MO)

Groundwater analytical results are summarized in Table 1 and on Figure 5. The laboratory data report, which includes laboratory chromatograms for all analyses, is contained in Appendix B.

Table 1
SUMMARY OF ANALYTICAL RESULTS FROM GROUNDWATER MONITORING
Liquid Sugars UST Site, 1275 66th Street Site

Well Number	Sample Date	Groundwater Elevation	Constituent (ppm)									
			TPH-D	TPH-MO	TPH-G	B	T	E	X	MTBE	SVOCs	PB
MW-1	04/23/93	21.22 ft	**0.99**	--	**0.64**	**0.0063**	<0 0005	**0.0056**	**0.0025**	--	--	--
<27 94>	07/13/93	19.94 ft	**1.50**	--	**0.70**	**0.032**	**0.0012**	**0.0033**	**0.0110**	--	--	--
	11/02/93	18.99 ft	**1.70**	--	**0.87**	**0.019**	<0.0005	**0.0066**	**0.0044**	--	--	--
	02/15/94	20 03 ft	**2.00**	--	**1.20**	**0.022**	**0.0018**	**0.01**	**0.0064**	--	--	--
	05/18/94	20.29 ft	**2.60**[1]	--	**1.70**	**0.057**	**0.021**	**0.30**	**0.13**	--	--	--
	08/17/94	19 43 ft	**2.20**[1]	--	**1.20**	**0.013**	**0.0019**	**0.0008**	**0.0082**	--	--	--
	12/22/94	21 36 ft	**2.40**[2,3]	--	**1.10**	**0.027**	**0.0069**	**0.0014**	**0.0059**	--	--	--
	05/09/95	21.21 ft	**2.00**[2,3]	--	**1.20**	**0.014**	**0.0082**	**0.0120**	**0.0062**	--	--	--
	11/05/98	18.86 ft 9.08	<0.050	<0.100	**0.380**	**0.0040**	**0.0064**	**0.0042**	**0.0019**	<0.0050	--	--
	2/05/99	20.66 ft	<0 050	<0.100	**0.490**	**0.0012**	**0.0061**	**0.0046**	**0.0019**	<0.0050	--	--
	06/02/99	19 61 ft	**0.770**	<0.100	**0.340**	**0.029**	**0.0040**	**0.0058**	**0.0015**	<0 0050	--	--
	06/28/99	19.08 ft	<0.050	<0 100	**0.460**	**0.0073**	**0.0049**	**0.0026**	**0.0022**	<0.0050	--	--
	09/28/99	18.93 ft	**0.099**	<0.100	**0.580**	**0.0015**	**0.0025**	**0.0053**	**0.0055**	<0.0050	--	--
	12/28/99	--	<0 050	<0.100	**0.490**	**0.0012**	**0.012**	**0.0023**	**0.0023**	<0.0050	--	--
	3/23/00	22.05 ft 5.89	1.6	<0.100	**0.690**	**0.013**	**0.0015**	**0.0058**	**0.0028**	<0.0050	--	--
MW-2	04/23/93	21.14 ft	**2.10**	--	**1.10**	**0.320**	**0.0065**	**0.0082**	**0.013**	--	--	--
<27.87>	07/13/93	19.49 ft	**0.21**	--	**0.48**	**0.033**	**0.0025**	**0.0052**	**0.0047**	--	--	--
	11/02/93	18.82 ft 9.05	**1.80**	--	**0.43**	**0.016**	**0.0009**	**0.0019**	**0.0021**	--	--	--
	02/15/94	21 05 ft	**2.80**	--	**1.40**	**0.056**	**0.0029**	**0.0075**	**0.0071**	--	--	--
	05/18/94	20.31 ft	**3.00**	--	**0.54**	**0.024**	**0.0013**	**0.0026**	**0.0034**	--	--	--
	08/17/94	19.37 ft	**2.20**[1]	--	**0.88**	**0.025**	**0.0030**	**0.0028**	**0.0086**	--	--	--
	12/22/94	21.64 ft	**3.10**[2,3]	--	**0.61**[4]	**0.0036**	**0.0033**	**0.0054**	**0.0016**	--	--	--
	05/09/95	21.16 ft	**5.20**	--	**2.30**	**0.0150**	**0.0060**	**0.0110**	**0.0130**	--	--	--
	11/05/98	19.04 ft	**9.10**	**0.200**	**1.20**[5]	**0.0065**	**0.0018**	**0.0059**	**0.0014**	<0 010	--	--

Table 1
SUMMARY OF ANALYTICAL RESULTS FROM GROUNDWATER MONITORING
Liquid Sugars UST Site, 1275 66th Street Site

Well Number	Sample Date	Groundwater Elevation	Constituent (ppm)									
			TPH-D	TPH-MO	TPH-G	B	T	E	X	MTBE	SVOCs	PB
	2/05/99	20.96 ft	3.50	<0.100	0.790[5]	0.017	0.0049	0.0064	0.0016	<0 0050	--	--
	06/02/99	19.84 ft	21.0	<0 500	0.480	0.032	0.0040	0.0059	0.0016	<0 0050	<0 010[6]	0.008
	06/28/99	19.29 ft	0.650	<0.100	0.380	0.010	0.0020	0.0033	0.00077	<0 0050	--	--
	09/28/99	19.23 ft	7.00	<0 100	1.6	<0 0025	0.0079	0.0091	0.013	<0.025	--	--
	12/28/99	20 36 ft.	0.640	<0.100	1.1[5]	0.0075	0.012	0.0056	0.0053	0.0086	--	--
	3/23/00	22.67 ft 5.2	1.2	<0.100	1.4	0.027	0.0012	0.0058	<0.0010	<0.010	--	--
MW-3	06/28/99	18.77 ft 7.42	0.300	<0 100	0.066	<0 00050	<0.00050	<0.00050	<0.00050	<0.0050	--	--
<26.19>	09/28/99	19.05 ft	0.350	<0.100	<0.050	<0.00050	<0.00050	<0.00050	<0.00050	<0.0050	--	--
	12/28/99	20.07 ft.	0.220	<0.100	<0.050	<0 00050	0.013	<0.00050	<0.00050	<0.0050	--	--
	3/23/00	21.91 ft 4.28	<0 050	<0 100	0.052	<0.00050	<0.00050	<0.00050	<0.00050	<0 0050	--	--
MW-4	06/28/99	18.49 ft	0.320	<0.100	0.110	0.00052	0.0011	0.0022	<0.00050	<0.0050	--	--
<24.90>	09/28/99	18 45 ft 6.45	0.060	<0 100	0.110	0.0034	<0.00050	0.0018	<0.00050	0.0068	--	--
	12/28/99	19.24 ft	<0.050	<0 100	0.086	0.0033	0.0069	0.00064	<0 00050	<0.0050	--	--
	3/23/00	21.01 ft 3.89	<0.050	<0.100	0.240	0.017	<0 00050	0.015	<0.00050	<0.0050	--	--
MW-5	06/28/99	18 64 ft	<0.050	<0.100	0.140	0.0030	0.0017	<0.00050	<0.00050	0.024[7]	--	--
<25.90>	09/28/99	18.56 ft 7.34	<0.050	<0.100	0.140	0.010	0.00083	0.00081	0.00084	0.034[7]	--	--
	12/28/99	18.98 ft.	<0 050	<0 100	0.190	0.048	0.00062	0.0018	0.0015	0.040	--	--
	3/23/00	21.24 ft 4.64	<0.050	<0.100	0.420	0.130	<0 0010	<0.0010	0.0028	0.030	--	--

Groundwater Elevation = Groundwater mean sea level elevation
TPH-G = Total Petroleum Hydrocarbons as Gasoline
TPH-D = Total Petroleum Hydrocarbons as Diesel
TPH-MO = Total Petroleum Hydrocarbons as Motor Oil
B = Benzene
T = Toluene
E = Ethylbenzene
X = Xylenes
MTBE = Methyl-t-Butyl Ether
SVOCS = Semi-Volatile Organic Compounds
Pb = Total Lead

<27 94> = Top of casing mean sea level elevation
<0 0005 = Not detected above the expressed detection level
-- = Not analyzed for this analyte
1 = Lab report states "The positive result has an atypical pattern for Diesel analysis "
2 = Lab report states "The positive result appears to be a heavier hydrocarbon than Diesel "
3 = Lab report states "The positive result appears to be a lighter hydrocarbon than Diesel "
4 = Lab report states "The positive result appears to be a heavier hydrocarbon than Gasoline "
5 = Lab report states "Product is not typical gasoline "
6 = No detectable levels of 69 SVOC analytes
7 = MTBE result confirmed using USEPA Method 8260B

4.0 CONCLUSIONS AND RECOMMENDATIONS

While shallow groundwater southwest from the former Liquid Sugars USTs appears to be both gasoline- and diesel-impacted, hydrocarbon impacts appear to decrease markedly in median downgradient wells MW-5 and MW-4. Thus, it appears that the combination of past source removal activities and ongoing natural attenuation have resulted in limited hydrocarbon impacts.

5.0 RISK-BASED CORRECTIVE ACTION ASSESSMENT

In order to assess potential risk associated with residual hydrocarbons encountered in soil and grab groundwater samples, Gribi Associates conducted Tier 2 Risk-Based Corrective Action (RBCA) modeling for the soil and groundwater hydrocarbon plumes extending downgradient (southwest) from the former USTs. The RBCA modeling included: (1) Conducting preliminary exposure pathway screening for the site to eliminate incomplete exposure pathways; (2) Conducting RBCA risk calculations for complete exposure pathways; and (3) Evaluating results of RBCA modeling.

5.1 Preliminary Exposure Pathway Screening

Gribi Associates conducted a preliminary evaluation of all potential exposure pathways for the southwest soil and groundwater hydrocarbon plume area. The purpose of this evaluation was to eliminate those exposure pathways which are not complete and, hence, do not apply to the project site. Results of this evaluation are summarized in Table 2. Note that even though the site is zoned for commercial use, we evaluated exposure using residential receptors, in the event that the site is ever converted to residential use.

Table 2
PRELIMINARY EXPOSURE PATHWAY SCREENING
Liquid Sugars North Parcel, 1266 66th Street

Exposure Pathway	Complete?	Discussion
Air Exposure Pathway		
Surface soil volatilization. to ambient air	No	No evidence of surface soil impacts;
Subsurface soil volatilization to ambient air	Possible	Residential and commercial receptors
Subsurface soil volatilization to enclosed space	Possible	Residential and commercial receptors
Groundwater volatilization to ambient air	Possible	Residential and commercial receptors
Groundwater volatilization to enclosed space	Possible	Residential and commercial receptors
Soil Exposure Pathway		
Dermal contact/ingestion of surface soils	No	No evidence of surface soil impacts
Dermal contact/ingestion of subsurface soils	Possible	Construction worker only
Groundwater Exposure Pathway		
Soil leaching to groundwater, ingestion	No	No nearby water use wells.
Dissolved/free phase groundwater ingestion	No	No nearby water use wells
Surface Water Exposure Pathway		
Soil leaching to surface water	No	No nearby surface water bodies.
Groundwater plume discharge to surface water	No	No nearby surface water bodies.

5.2 RBCA Model Calculations

Gribi Associates conducted Tier 2 RBCA calculations using the *Tier 1 and Tier 2 RBCA Spreadsheet System*, Version 1.01 computer model developed by Groundwater Services, Inc. This model provides for Tier 2 RBCA calculations in accordance with and using default values contained in ASTM Standard E-1739. Based on preliminary exposure pathway screening, as summarized above, Gribi Associates ran RBCA calculations for the southwest project site plume area for: (1) Outdoor and enclosed space inhalation of hydrocarbon vapors via subsurface soil and groundwater volatilization; and (2) Construction worker dermal exposure to residual hydrocarbons in subsurface soils, in the event of construction-related excavation.

The RBCA modeling process can generally be divided into the following tasks: (1) Input of site specific and general parameters; (2) Calculation of baseline intake rates and risk levels associated with actual site conditions; and (3) Calculation of Site-Specific Target Levels (SSTLs) for individual and multiple constituent health risks (only if necessary). These activities are summarized in the following sections.

5.2.1 Model Input Parameters

Input data tables generated as part of the computer model output are contained in Appendix C. These tables summarize general input parameters, chemical and toxicological data for specific site constituents, and user-specified values for key model parameters. Some of these specified values include the following:

- **Contaminants of concern (COC):** Benzene, toluene, ethylbenzene, and xylenes. Based on investigative results.
- **Onsite and offsite groundwater ingestion exposure:** No receptors.
- **Onsite surface soil direct ingestion/dermal contact exposure:** No evidence of surface soil contamination.
- **Onsite and offsite outdoor air exposure:** Residential and commercial receptors.
- **Indoor onsite air exposure:** Residential and commercial.
- **Contaminated soil area:** 6,250 square feet. Calculated based on a rectangular area measuring approximately 125 feet by 50 feet.
- **Depth to top of affected subsurface soils:** 3.5 feet. Based on soil laboratory analytical results from plume area borings.
- **Depth to base of affected subsurface soils:** 12.0 feet. Based on boring logs and soil laboratory analytical results from plume area borings.
- **Vadose zone thickness:** 12.0 feet.

- **Representative subsurface soil COC concentrations:** The upper 95% confidence limit (UCL) of the mean concentration from soil samples from soil borings within the southwest plume area (TB-1 through TB-8; IB-1, IB-5, IB-7, MW-1, MW-2, MW-4 and MW-5). These concentrations are:

Benzene	0.031 mg/kg
Toluene	0.033 mg/kg
Ethylbenzene	0.0091 mg/kg
Xylenes	0.062 mg/kg

- **Representative groundwater COC concentrations:** The upper 95% confidence limit (UCL) of the mean concentration from groundwater samples from wells MW-1, MW-2, MW-4, and MW-5 for the last four quarters of monitoring. These concentrations are:

Benzene	0.012 mg/L
Toluene	0.0056 mg/L
Ethylbenzene	0.0032 mg/L
Xylenes	0.0020 mg/L

- **Target Risk Levels:** For benzene, which is a Class A carcinogen, we used Individual and Cumulative Carcinogenic Risk Goals of 10^{-5} and 10^{-4}, respectively, which represent upperbound excess lifetime risks from chronic exposure to individual and multiple constituents. The Individual Carcinogenic Risk Goal of 10^{-5} was used, rather than the ASTM value of 10^{-6}, based on our understanding of Alameda County Department of Environmental Health requirements. In order to evaluate individual and cumulative risk from non-carcinogenic effects, we used default Hazard Quotient and Hazard Index values of 1 for both, which represent the ratio of the exposure level to established hazard threshold levels for the COCs.

- **Slope Factor for Benzene Oral and Inhalation Exposure:** Slope factor of 0.10 (State value), rather than the EPA slope factor of 0.029.

For other parameters, such as exposure parameters and building parameters, we used default values, which conform to ASTM E-1739 default parameter values and are conservative.

5.2.2 Model Calculations of Baseline Risk

Tabulated model calculations of site-specific constituent baseline intake rates and risk levels for each exposure pathway are contained in Appendix D. The baseline risk represents the excess risk to which the receptor would be exposed under current or anticipated future site conditions if no remedial measures are implemented. Total carcinogenic risk and toxic effects risk for each complete pathway are summarized in Table 3.

Table 3
TOTAL PATHWAY RISK ESTIMATES
West-Northwest Area, Liquid Sugars UST Site, 1275 66th Street

Exposure Pathway	Carcinogenic Risk				Toxic Effects Risk			
	Individual COC Risk		Cumulative COC Risk		Individual COC Risk		Cumulative COC Risk	
	Maximum Value	Target Risk	Total Value	Target Risk	Hazard Index	Applicable Limit	Hazard Quotient	Applicable Limit
Outdoor air exposure pathways	9.5×10^{-9}	1×10^{-5}	9.5×10^{-9}	1×10^{-4}	1.3×10^{-4}	1	1.3×10^{-4}	1
Indoor air exposure pathways	6.2×10^{-6}	1×10^{-5}	6.2×10^{-6}	1×10^{-4}	8.5×10^{-2}	1	8.6×10^{-2}	1

5.3 Evaluation of RBCA Model Results

Based on model risk estimates, it appears that there is no significant risk of exposure from any identified hydrocarbon constituents present at the project site. The total pathway individual and cumulative carcinogenic risk (risk from benzene exposure) associated with both outdoor and indoor vapor exposure for the southwest project site area are well below the individual and cumulative target risk levels of 1.0×10^{-5} and 1.0×10^{-4}, respectively. Also, the total pathway individual and cumulative toxic risk (risk from toluene, ethylbenzene, and xylenes exposure) associated with both outdoor and indoor vapor exposure for the southwest project site area are well below the individual and cumulative risk target level of 1.0.

6.0 REQUEST FOR REGULATORY SITE CLOSURE

Based on results of site investigations and the RBCA assessment, we request that regulatory closure be granted for this site. We believe that this site should be closed as a low-risk soil and groundwater case based on the following known conditions:

- **There is no free product present in project site wells.** There has been no free product measured in groundwater in any of the project site wells. Slight to moderate hydrocarbon sheens have been observed in groundwater purged from well MW-2, located about five feet southwest from the former UST excavation. However, these sheens are strictly seasonal, and seem to occur only when groundwater depths are relatively low (i.e. in the summer and fall months). These hydrocarbon sheens are not measurable and clearly do not represent free product.

- **The hydrocarbon plume is stable.** Historical groundwater monitoring results from median plume wells MW-2, MW-1, MW-5, and MW-4 clearly define a stable hydrocarbon plume, extending about 100 feet in a downgradient (southwesterly) direction from the former USTs.

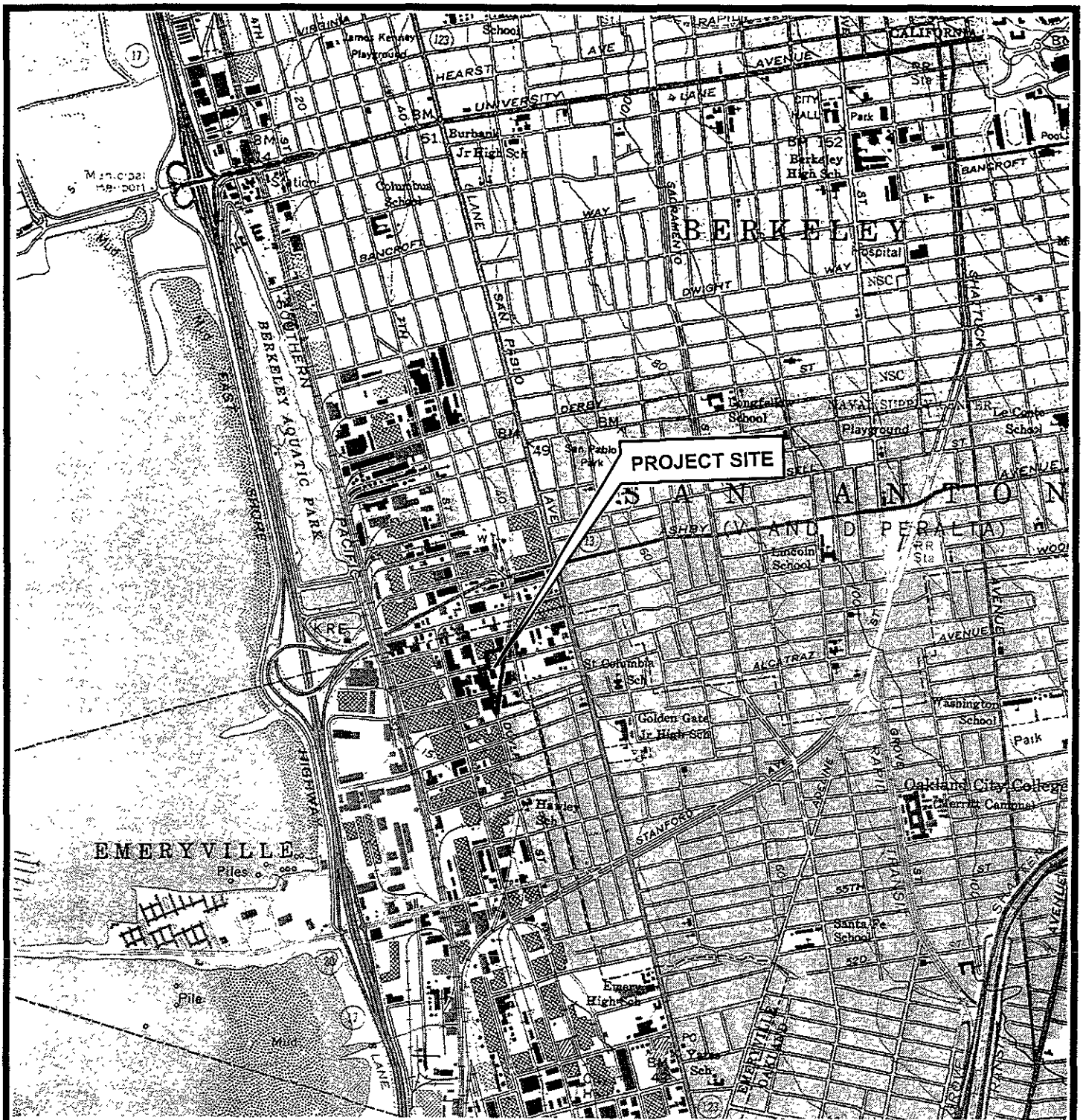
- **No ongoing hydrocarbon sources are present at the site.** The three subject USTs were removed from the site in November 1990, and approximately 70 cubic yards of hydrocarbon-impacted soil was removed from the site in September 1991. Subsequent soil boring data indicates that only moderate levels of hydrocarbon-impacted soils are present in a relatively narrow layer southwest from the former USTs.

- **Results of RBCA assessment activities indicate no significant risk posed by residual hydrocarbons.** Calculated risk estimates for both outdoor and indoor air exposure pathways are below target risk levels for both carcinogenic and toxic risk. Also, there are no groundwater or surface water receptors within close proximity to the site, and there is no evidence of significant hydrocarbon impacts to near-surface soils at the site.

Subject to concurrence from Alameda County Department of Environmental Health, a Risk Management Plan (RMP) will be prepared for the site. This RMP will address potential risks associated with possible future site development.

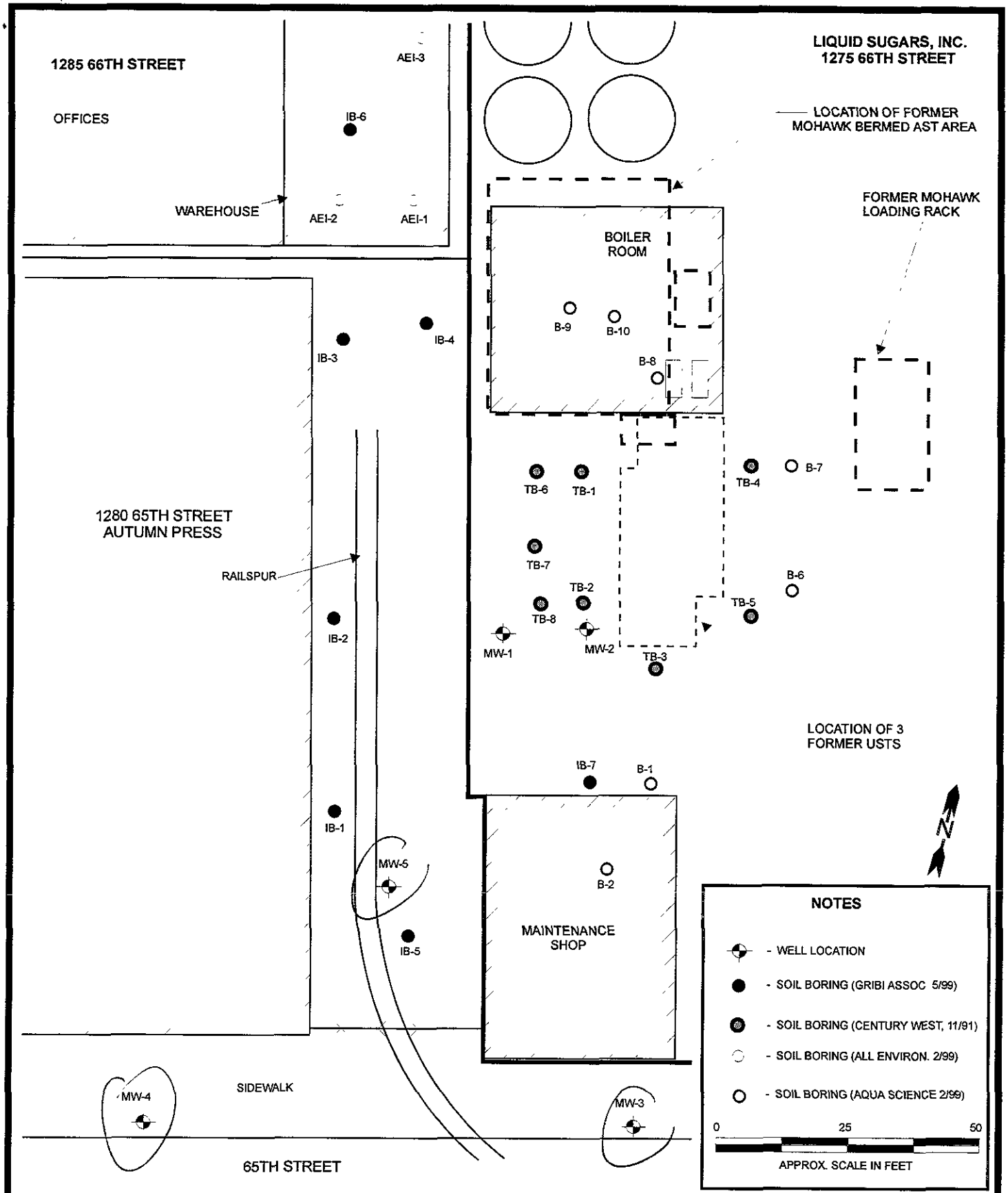
Note that the RBCA assessment was conducted using both residential and commercial receptors. Due to the apparent high degree of natural attenuation, the concentrations of BTEX constituents in soil and groundwater are relatively low, and thus, the RBCA assessment indicates no significant risk for both residential and commercial receptors. For this reason, we do not believe that a deed restriction is warranted as a condition of site closure.

FIGURES

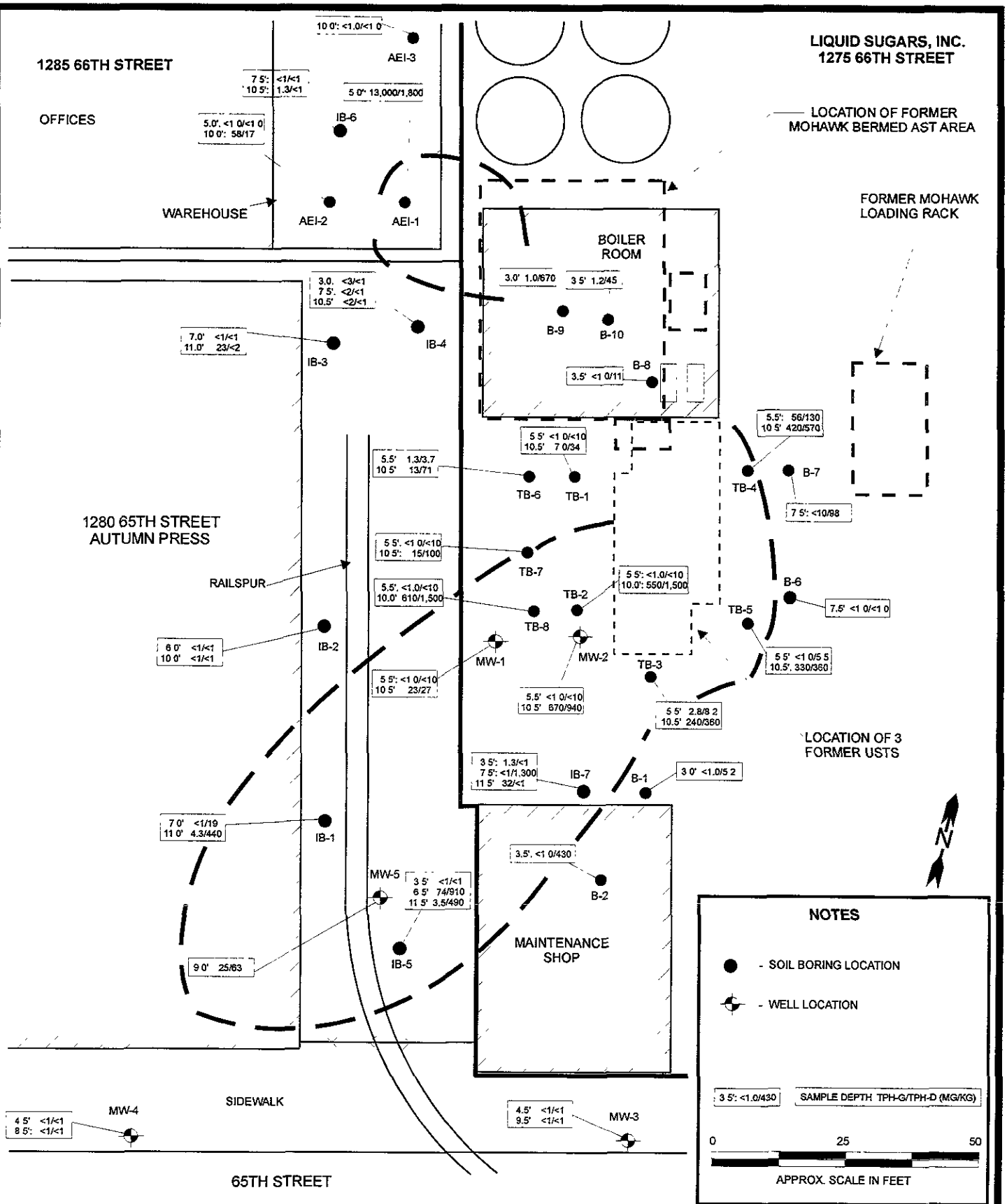


TOPOGRAPHY FROM USGS OAKLAND, WEST, CALIFORNIA
7.5-MINUTE QUADRANGLE MAPS, (TOPO! 1997).

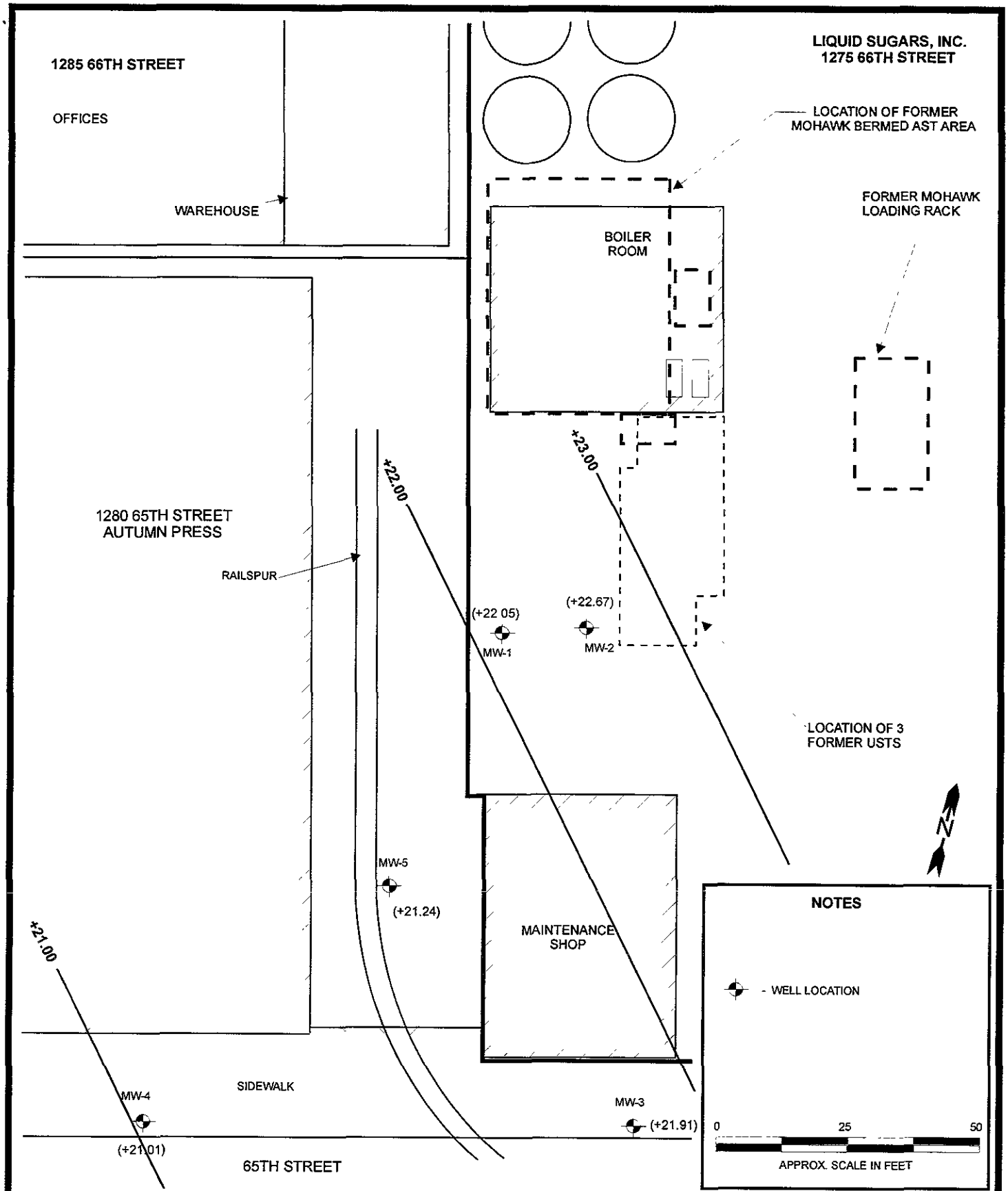
DESIGNED BY:	CHECKED BY:	**SITE VICINITY MAP**	DATE: 11/09/98	FIGURE: 1
DRAWN BY: JG	SCALE: 1:24,000	LIQUID SUGARS, INC. EMERYVILLE, CALIFORNIA	**GRIBI Associates**	
PROJECT NO: 149-01-01				



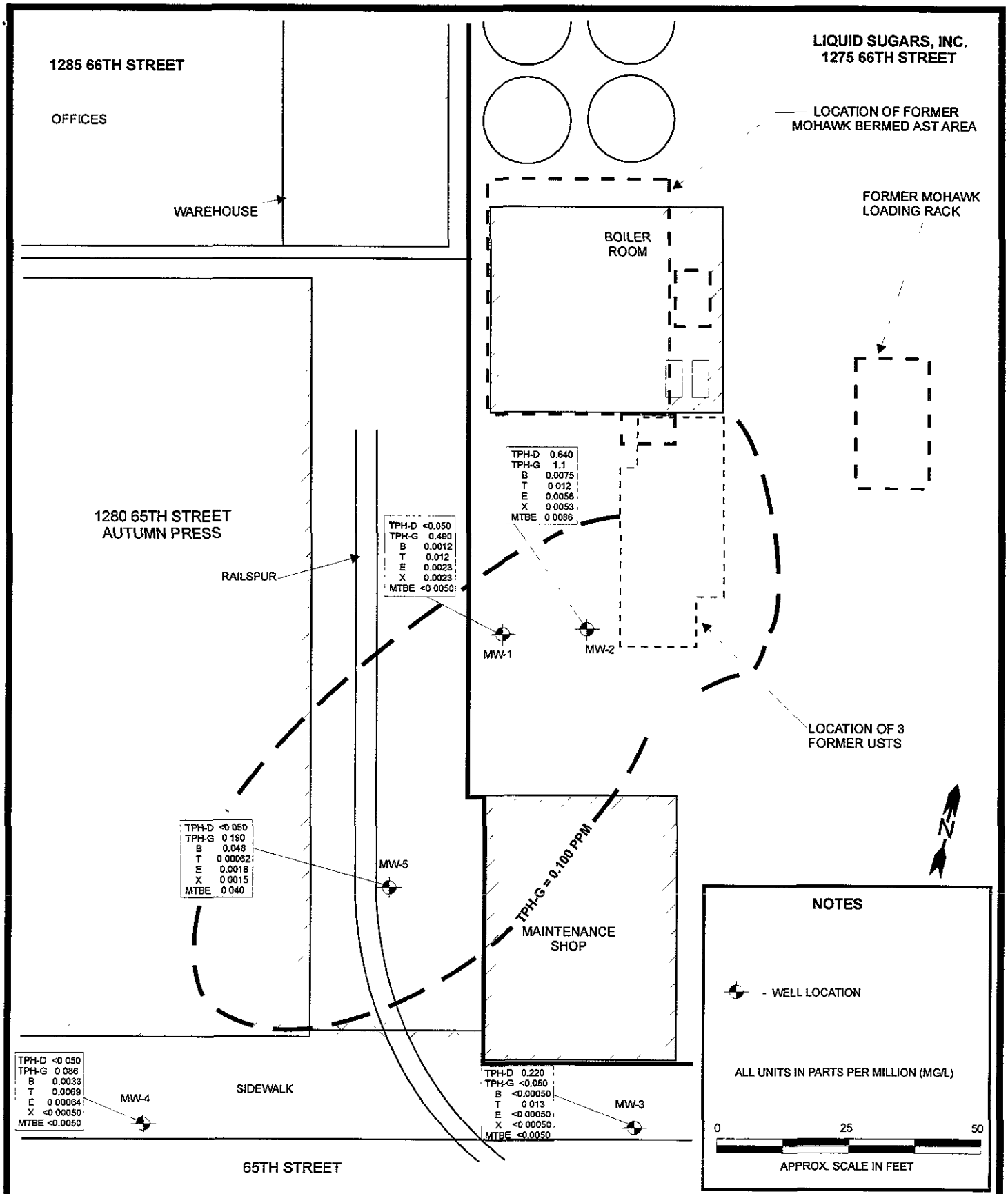
DESIGNED BY:	CHECKED BY: SS	**SITE PLAN**	DATE: 07/14/00	FIGURE: 2
DRAWN BY: JG	SCALE:	LIQUID SUGARS, INC. SITE 1275 & 1285 66TH STREET EMERYVILLE, CALIFORNIA	GRIBI Associates	
PROJECT NO: 149-01-03				



DESIGNED BY:	CHECKED BY: SS	**SOIL TPH-G AND TPH-D RESULTS**	DATE: 07/14/00	FIGURE: 3
DRAWN BY: JG	SCALE:	LIQUID SUGARS, INC. SITE 1275 & 1285 66TH STREET EMERYVILLE, CALIFORNIA	**GRIBI Associates**	
PROJECT NO: 149-01-03				



DESIGNED BY:	CHECKED BY: SS	**GROUNDWATER GRADIENT MAP** **03/23/00**	DATE: 07/14/00	FIGURE: **4**
DRAWN BY. JG	SCALE:	LIQUID SUGARS, INC. SITE 1275 & 1285 66TH STREET EMERYVILLE, CALIFORNIA	**GRIBI Associates**	
PROJECT NO: 149-01-03				



DESIGNED BY:	CHECKED BY: SS	**GROUNDWATER HYDROCARBON RESULTS**	DATE: 07/14/00	FIGURE: 5
DRAWN BY: JG	SCALE:	LIQUID SUGARS, INC. SITE 1275 & 1285 66TH STREET EMERYVILLE, CALIFORNIA	GRIBI Associates	
PROJECT NO: 149-01-03				

APPENDIX A

GROUNDWATER SAMPLING DATA SHEETS

GROUNDWATER SAMPLING RECORD	GRIBI Associates
Well No. MW-1	Well Loc.
Project Name LSI - Middle	Project No.
Date 3/23 Time	TOC Elevation GW Elevation
Depth to Water 5.89'	Well Depth Well Diameter
Purge Water, 2": Wtr Column X 0.163 X 3 =	Purge Water, 4": Wtr Column X 0.653 X 3 =
Purge/Sample Method Pump	Lab Analyses
Weather Conditions Overcast ~~~~ ~65	Laboratory

Time	Volume Purged	Temp.	Cond.	pH	Visual
1530	0	63.5	5.57	4.60	SL Gray, mod itc, no sh
~~1540~~	3	62.1	5.80	4.48	" " "
	6	62.3	7.98	4.52	" " "
1545	9	62.1	8.62	4.60	" " "

Remarks

GROUNDWATER SAMPLING RECORD	GRIBI Associates
Well No. MW-2	Well Loc.
Project Name LSI-Middle	Project No.
Date 3/23 Time	TOC Elevation GW Elevation
Depth to Water 5.20'	Well Depth Well Diameter
Purge Water, 2": Wtr Column X 0.163 X 3 =	Purge Water, 4": Wtr Column X 0.653 X 3 =
Purge/Sample Method	Lab Analyses
Weather Conditions	Laboratory

Time	Volume Purged	Temp.	Cond.	pH	Visual
1600	0	61.4	6.74	4.78	SL Gray, mod HC0, no sh
	5	60.8	5.36	4.71	" , Strong HC0, SL SH
	10	60.3	4.71	4.68	" , " , MOD SH
1620	16	60.8	4.97	4.78	" , " , "

Remarks

GROUNDWATER SAMPLING RECORD	GRIBI Associates
Well No. MW-3	Well Loc.
Project Name LSI-Middle	Project No.
Date 3/23 Time	TOC Elevation GW Elevation
Depth to Water 4.28	Well Depth Well Diameter
Purge Water, 2": Wtr Column X 0.163 X 3 =	Purge Water, 4": Wtr Column X 0.653 X 3 =
Purge/Sample Method Pump	Lab Analyses
Weather Conditions Overcast ~65°	Laboratory

Time	Volume Purged	Temp.	Cond.	pH	Visual
1305	0	64.5	3.89	4.47	Clear, no HC o/s H
	3	65.9	4.81	4.37	" "
	6	67.1	5.01	5.29	" "
1440	9	64.6	4.64	5.30	" "

Remarks

GROUNDWATER SAMPLING RECORD	GRIBI Associates
Well No. MW-4	Well Loc.
Project Name LSI-Middle	Project No.
Date 3/23 Time	TOC Elevation GW Elevation
Depth to Water 3.89'	Well Depth Well Diameter
Purge Water, 2": Wtr Column X 0.163 X 3 =	Purge Water, 4": Wtr Column X 0.653 X 3 =
Purge/Sample Method Pump	Lab Analyses
Weather Conditions	Laboratory

Time	Volume Purged	Temp.	Cond.	pH	Visual
1345	0	68.9	11.82	4.38	Murky Gray, SL HC0, no SH
	3	67.5	11.32	4.43	" , MOD HC0, "
	6	65.4	13.20	4.69	" , Strong HC0, "
1355	9	65.8	12.74	4.80	" , " , "

Remarks

GROUNDWATER SAMPLING RECORD	GRIBI Associates
Well No. MW-5	Well Loc.
Project Name LSI-Middle	Project No.
Date 3/23 Time	TOC Elevation GW Elevation
Depth to Water 4.66'	Well Depth Well Diameter
Purge Water, 2": Wtr Column X 0.163 X 3 =	Purge Water, 4": Wtr Column X 0.653 X 3 =
Purge/Sample Method Pump	Lab Analyses
Weather Conditions	Laboratory

Time	Volume Purged	Temp.	Cond.	pH	Visual
1415	0	67.5	13.05	4.84	inv ky Brn, SL HCO, mos H
	3	64.1	10.19	4.86	" , " , "
	6	64.0	11.14	5.05	" , mod HCO, mos H
1430	9	64.3	11.10	5.15	" , " , "

Remarks

APPENDIX B

LABORATORY DATA REPORT AND CHAIN OF CUSTODY RECORD

ACCULABS, INC.

Sample Log 21175
April 03, 2000

Jim Gribi
Gribi Associates
1350 Hayes Street, #C-14
Benicia, CA 94510

Subject : 5 Water samples
Project Name : LSI-MIDDLE
Project Number : 149-01-03

Dear Mr. Gribi,

Chemical analysis on the samples referenced above has been completed. Summaries of the data are contained on the following pages. Sample(s) were received under documented chain-of-custody. USEPA protocols for sample storage and preservation were followed.

Acculabs - Davis is certified by the State of California (# 2330), the State of Arizona (AZ0583) and the State of Nevada. If you have any questions regarding procedures or results, please call me at 530-757-0920.

Sincerely,

Tom Kwoka

Tom Kwoka

1046 Olive Drive, Davis, California 95616
Telephone (530)757-0920 Fax (530)753-6091 www.acculabs.com

ACCULABS, INC.

March 28, 2000
Sample Log 21175

MTBE (Methyl-t-butyl ether) By EPA Method 8020/602

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Received : 03/24/00
Matrix : Water

SAMPLE	Date Analyzed	(MRL) ug/L	Measured Value ug/L
MW-1	03/28/00	(5.0)	<5.0
MW-2	03/29/00	(10)	<10
MW-3	03/29/00	(5.0)	<5.0
MW-4	03/28/00	(5.0)	<5.0
MW-5	03/29/00	(10)	30

Approved By:

Tom Kwoka
Lab Director

ACCULABS, INC.

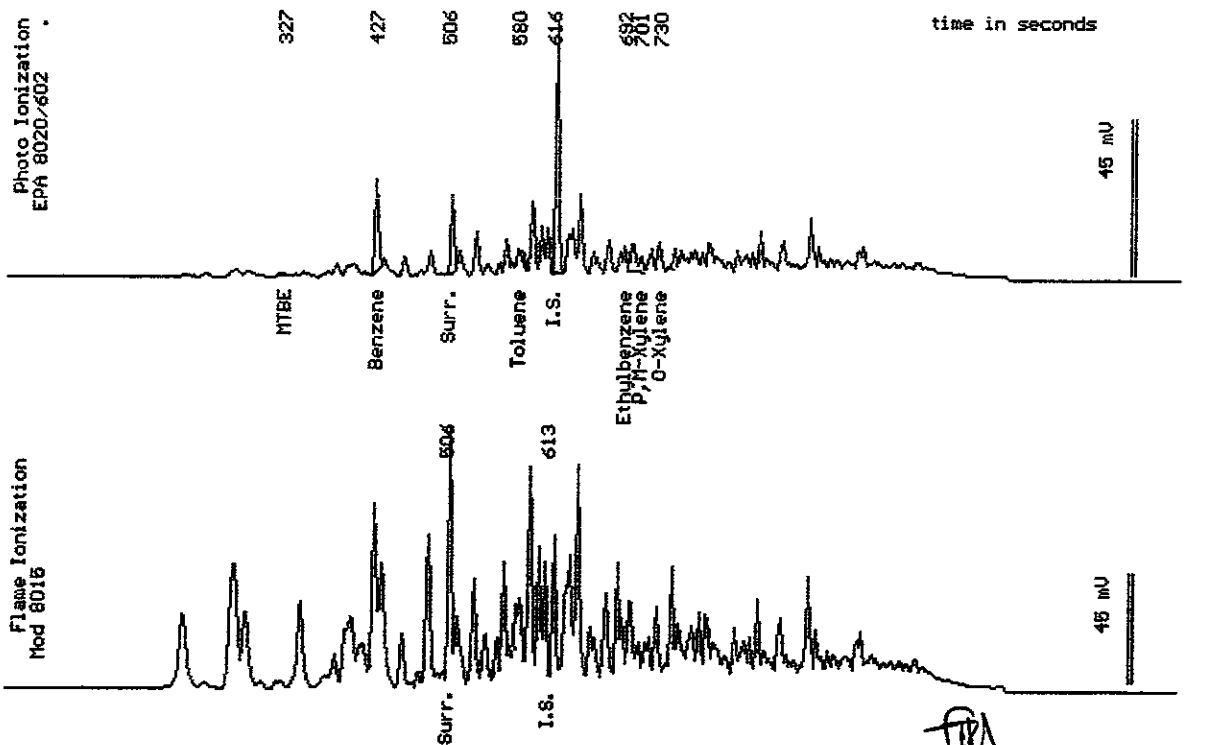
Sample Log 21175

21175-01

Sample: **MW-1**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Dilution : 1:1 Run Log : 2188R
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	13
Toluene	(.50)	1.5
Ethylbenzene	(.50)	5.8
Total Xylenes	(.50)	2.8
TPH as Gasoline	(50)	690
Surrogate Recovery		116 %



Date Analyzed: 03-28-00
Column : 0.53mm X 60m Restek Rtx-1301

Stewart Podolsky
Senior Chemist

ACCULABS, INC.

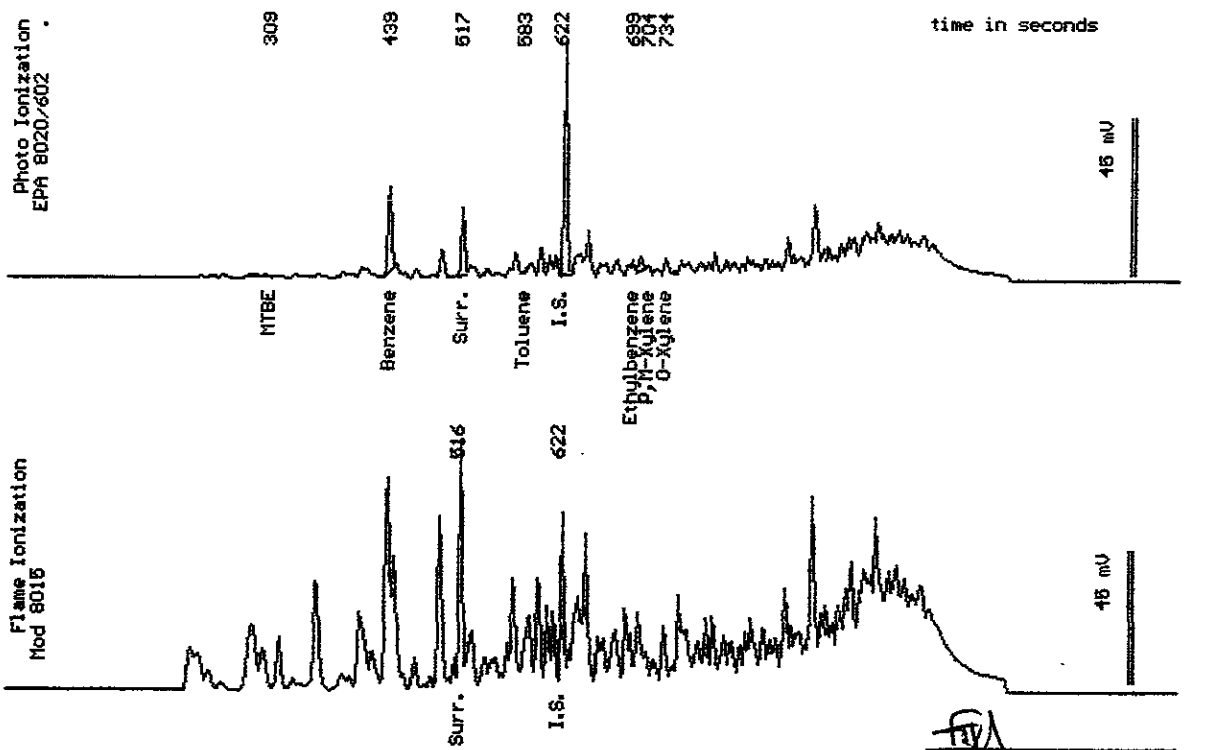
Sample Log 21175

21175-02

Sample: **MW-2**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Dilution : 1:2 Run Log : 2188T
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(1.0)	27
Toluene	(1.0)	1.2
Ethylbenzene	(1.0)	5.8
Total Xylenes	(1.0)	<1.0
TPH as Gasoline	(100)	1400
Surrogate Recovery		110 %



Date Analyzed: 03-29-00
Column : 0.53mm X 60m Restek Rtx-1301

Stewart Podolsky
Senior Chemist

ACCULABS, INC.

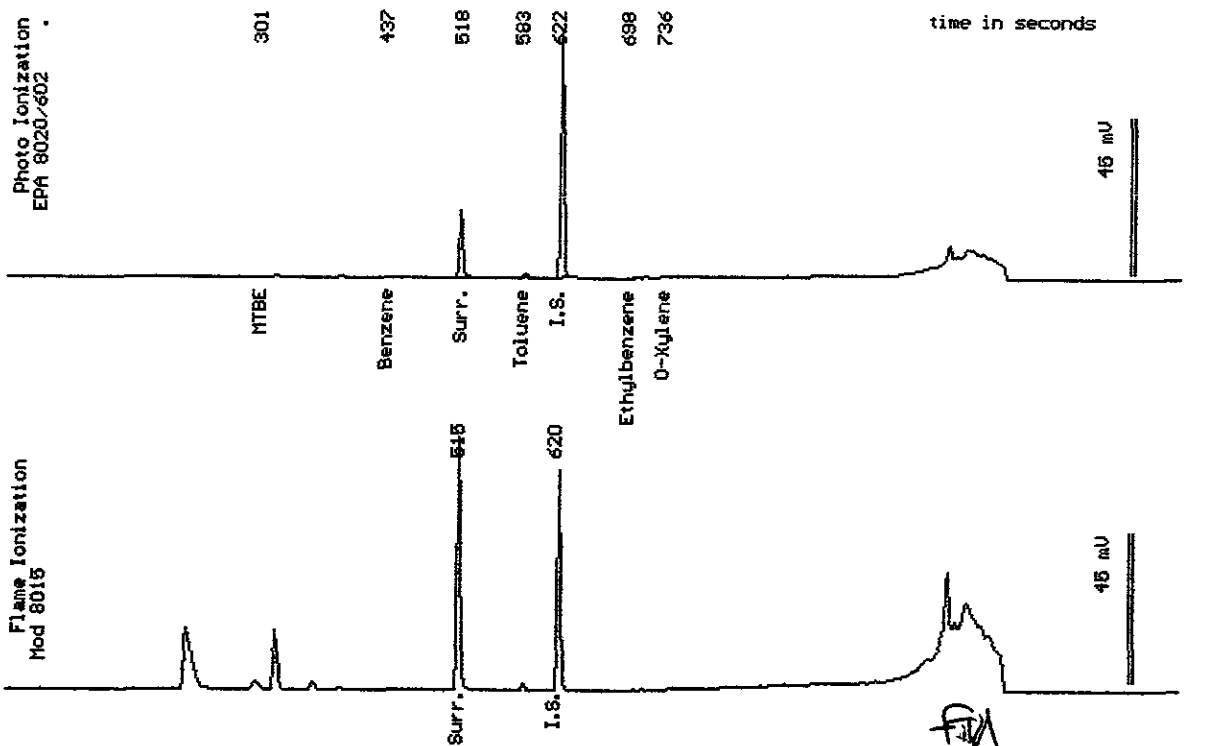
Sample Log 21175

21175-03

Sample: **MW-3**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Dilution : 1:1 Run Log : 2188T
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	<.50
Toluene	(.50)	<.50
Ethylbenzene	(.50)	<.50
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	52
Surrogate Recovery		107 %



Date Analyzed: 03-29-00
Column : 0.53mm X 60m Restek Rtx-1301

Steuart Podolsky
Senior Chemist

ACCULABS, INC.

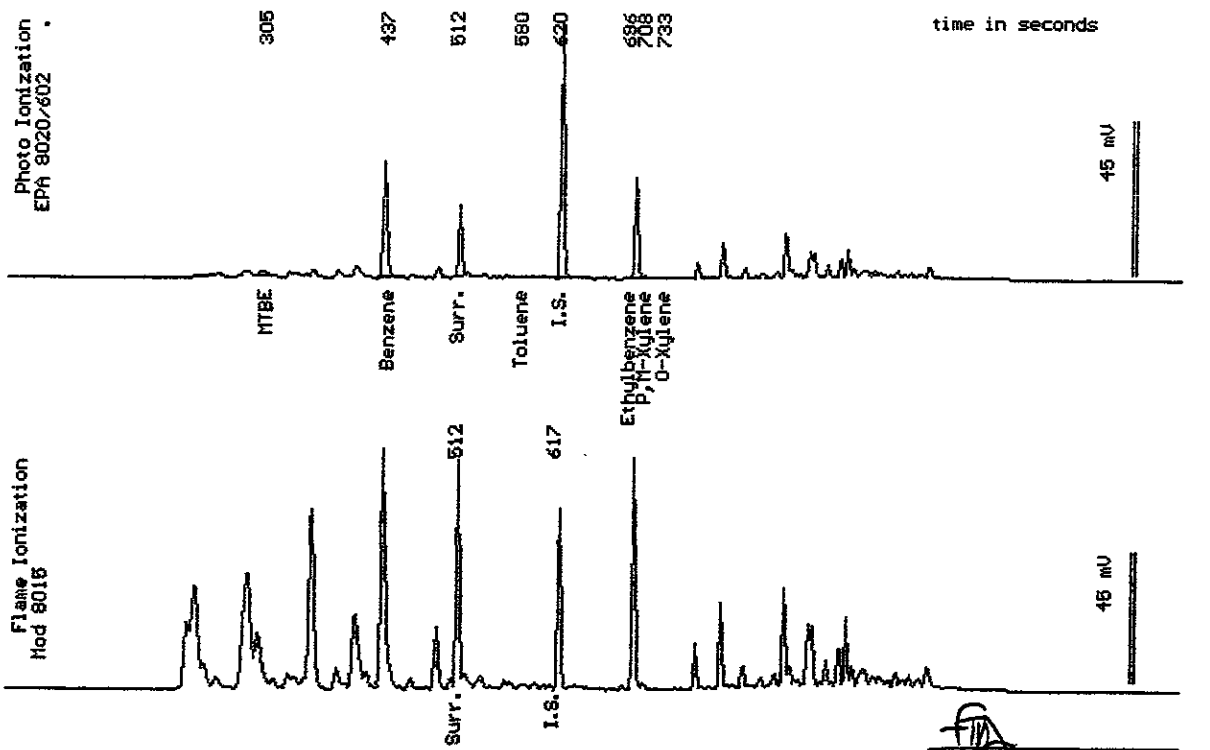
Sample Log 21175

21175-04

Sample: **MW-4**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Dilution : 1:1 Run Log : 2188R
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(.50)	17
Toluene	(.50)	<.50
Ethylbenzene	(.50)	15
Total Xylenes	(.50)	<.50
TPH as Gasoline	(50)	240
Surrogate Recovery		97 %



Date Analyzed: 03-28-00
Column : 0.53mm X 60m Restek Rtx-1301

Steuart Podolsky
Senior Chemist

ACCULABS, INC.

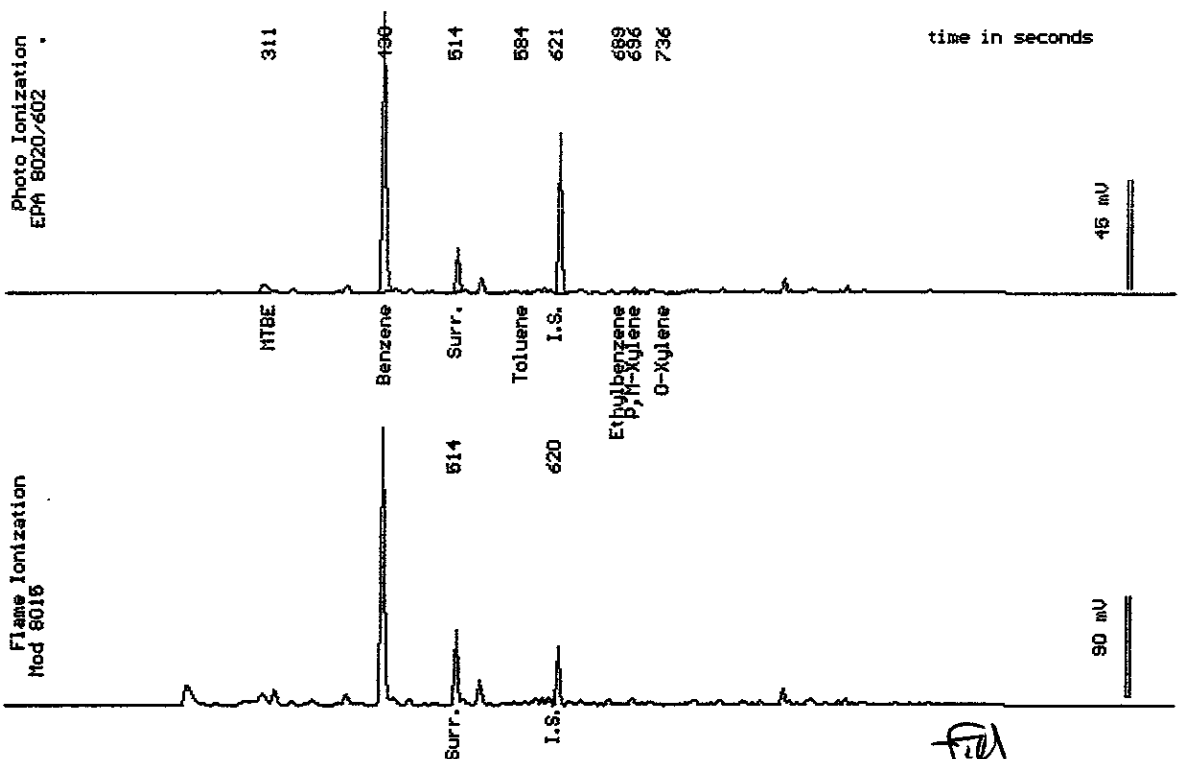
Sample Log 21175

21175-05

Sample: **MW-5**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Dilution : 1:2 Run Log : 2188T
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
Benzene	(1.0)	130
Toluene	(1.0)	<1.0
Ethylbenzene	(1.0)	<1.0
Total Xylenes	(1.0)	2.8
TPH as Gasoline	(100)	420
Surrogate Recovery		100 %



Date Analyzed: 03-29-00
Column : 0.53mm X 60m Restek Rtx-1301

Stewart Podolsky
Senior Chemist

ACCULABS, INC.

Acculabs Inc.

March 28, 2000
Sample Log 21175

QC Report for EPA 602 & Modified EPA 8015
Run Log : 2188P,R
From : LSI-MIDDLE (Proj. # 149-01-03)
Sample(s) Received : 03/24/00

Parameter	Matrix Spike % Recovery	Matrix Spike Duplicate % Recovery	RPD *

Spiked sample too contaminated for spike recovery. See LCS data.

* RPD = Relative Percent Difference

Parameter	Laboratory Control Sample % Recovery
Benzene	104
Ethylbenzene	107
Gasoline	115

Parameter	Method Blank
Benzene	<0.50 ug/L
Toluene	<0.50 ug/L
Ethylbenzene	<0.50 ug/L
Total Xylenes	<0.50 ug/L
TPH as Gasoline	<50 ug/L

Tom Kwoka
Lab Director

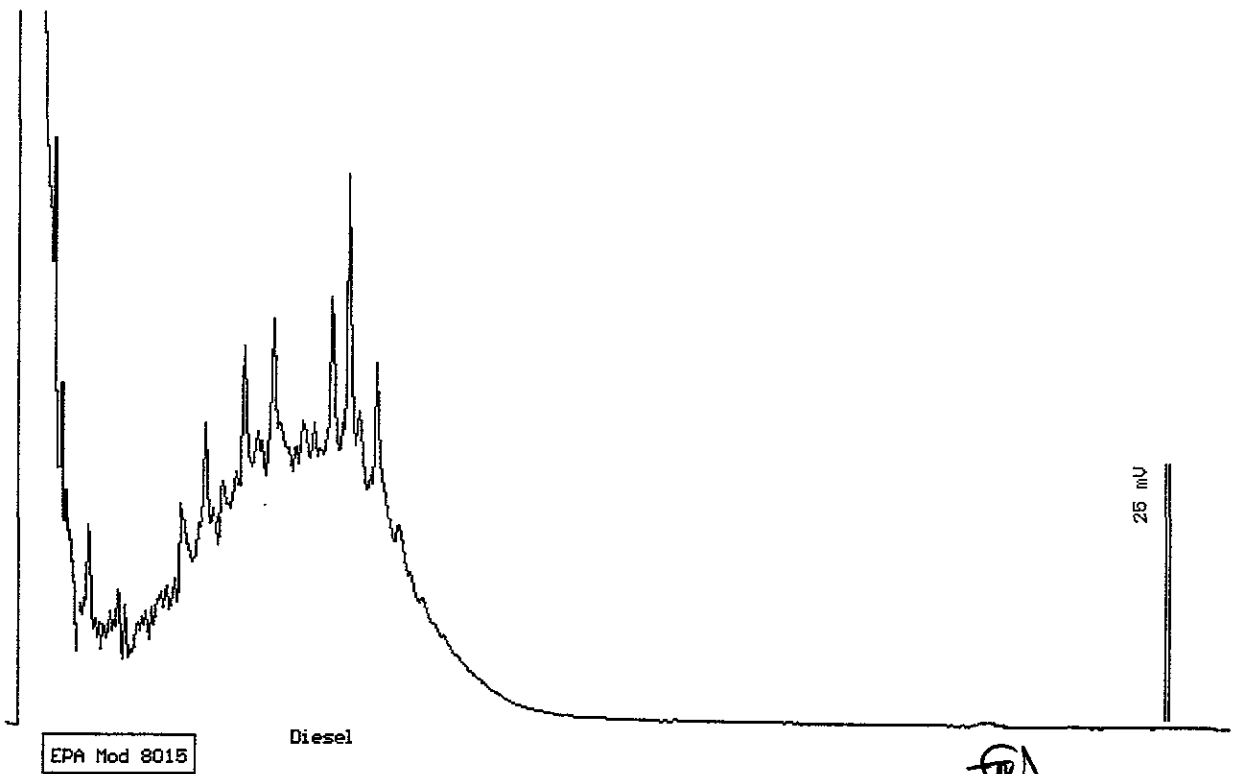
ACCULABS, INC.

Sample Log 21175
21175-01

Sample: **MW-1**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Extracted: 03/28/00 QC Batch : DW000304
Dilution : 1:1 Run Log : 7463H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	1600
TPH as Motor Oil	(100)	<100



Date: 03-28-00 Time: 14:31:10
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

Stewart Podolsky
Senior Chemist

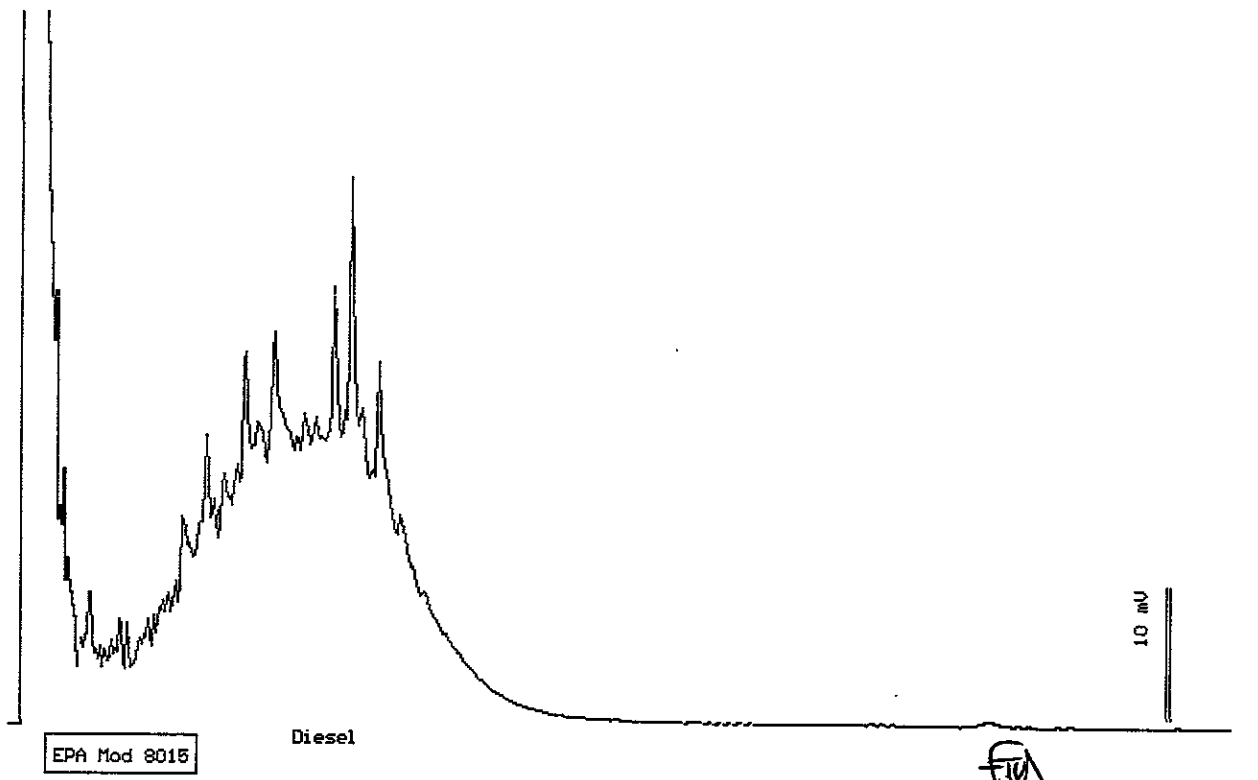
ACCULABS, INC.

Sample Log 21175
21175-02

Sample: **MW-2**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Extracted: 03/28/00 QC Batch : DW000304
Dilution : 1:1 Run Log : 7463H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	1200
TPH as Motor Oil	(100)	<100



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Stewart Podolsky
Senior Chemist

ACCULABS, INC.

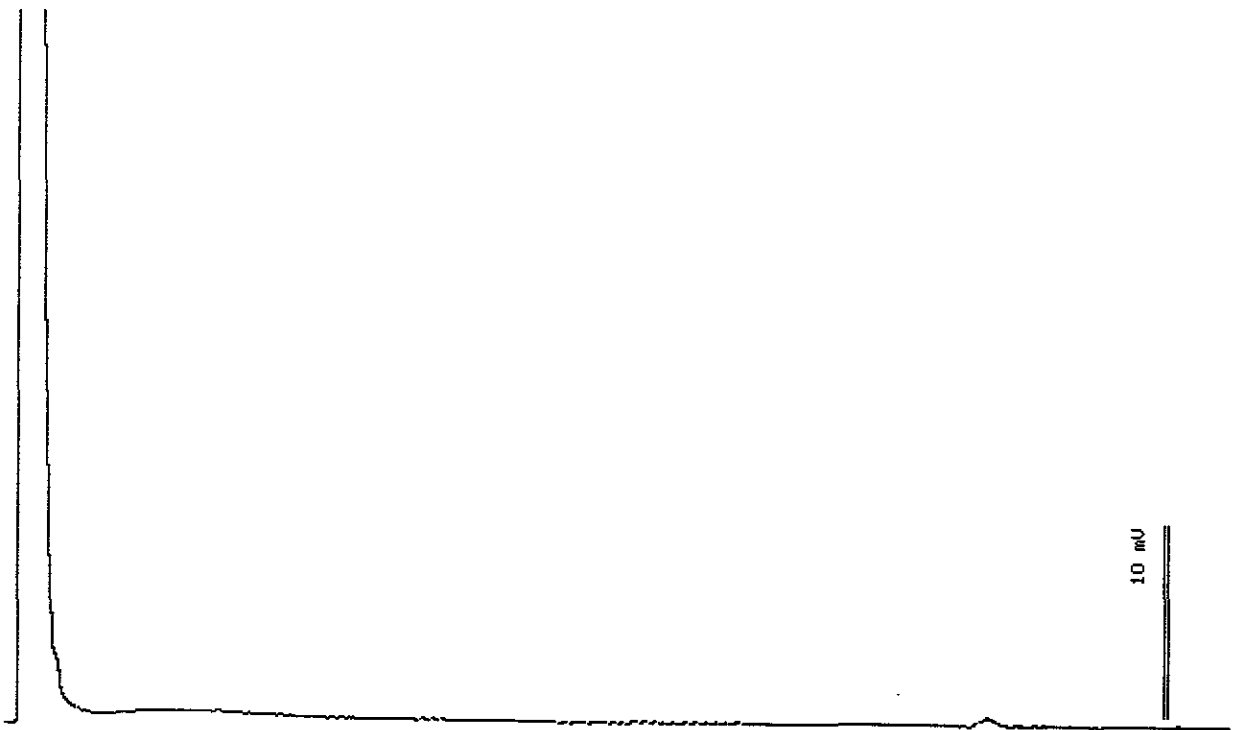
Sample Log 21175

21175-03

Sample: **MW-3**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Extracted: 03/28/00 QC Batch : DW000304
Dilution : 1:1 Run Log : 7463H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100



EPA Mod 8015

Date: 03-28-00 Time: 15:39:06
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

Stewart Podolsky
Senior Chemist

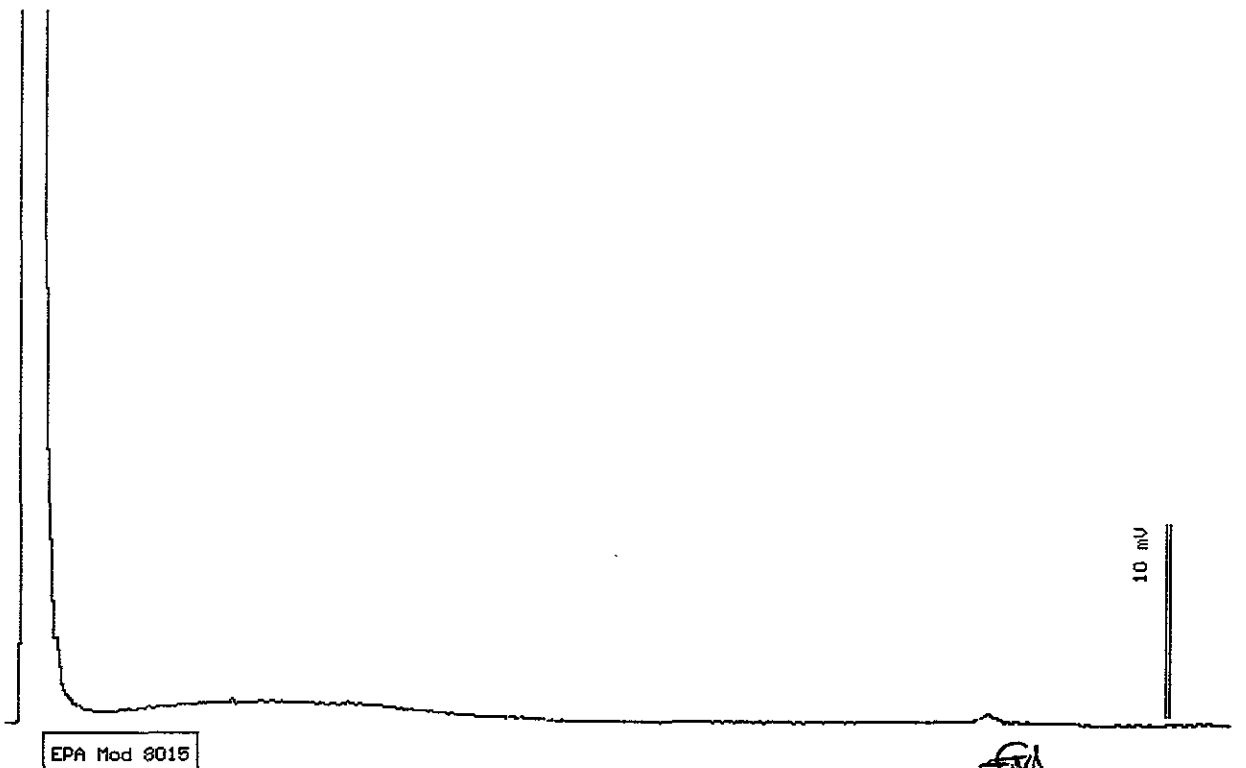
ACCULABS, INC.

Sample Log 21175
21175-04

Sample: **MW-4**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Extracted: 03/28/00 QC Batch : DW000304
Dilution : 1:1 Run Log : 7463H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100



EPA Mod 8015

Date: 03-28-00 Time: 16:13:03
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

Stewart Podolsky
Senior Chemist

ACCULABS, INC.

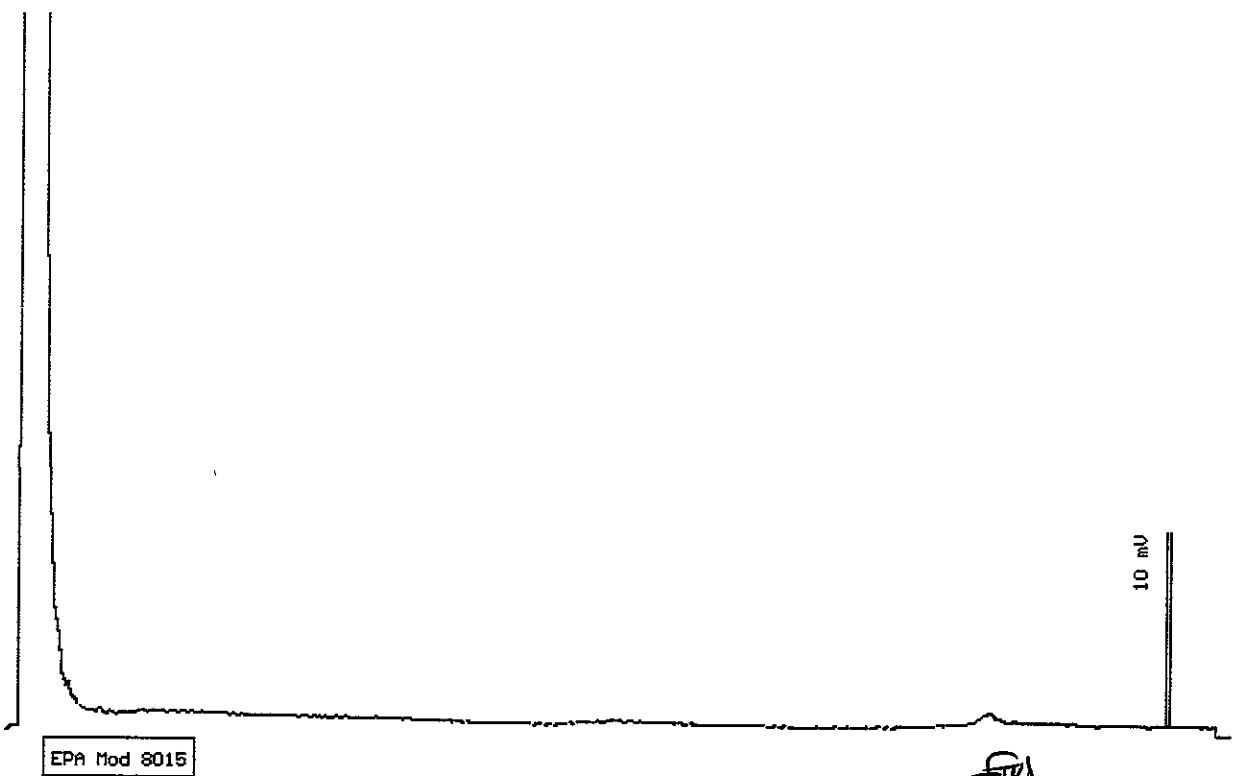
Sample Log 21175

21175-05

Sample: **MW-5**

From : LSI-MIDDLE (Proj. # 149-01-03)
Sampled : 03/23/00
Extracted: 03/28/00 QC Batch : DW000304
Dilution : 1:1 Run Log : 7463H
Matrix : Water

Parameter	(MRL) ug/L	Measured Value ug/L
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100



EPA Mod 8015

Date: 03-28-00 Time: 16:47:00
Column : 0.53mm ID X 15m DB1 (J&W Scientific)

Stewart Podolsky
Senior Chemist

Acculabs Inc. March 28, 2000

QC Report
TPH Diesel by 8015 Mod

QC Batch DW000304 Matrix: Water

Spike and Spike Duplicate Results

Parameter	Matrix Spike (%Rec)	Matrix Spike Dup. (%Rec)	RPD %
TPH as Diesel	Not enough sample for spiking. See duplicate LCS Data.		

Laboratory Control Spike

Parameter	Laboratory Control Spike (%Rec)	Laboratory Control Spike Dup. (%Rec)	RPD %
TPH as Diesel	95	102	7

Method Blank

Parameter	MDL(ug/L)	Measured Value(ug/L)
TPH as Diesel	(50)	<50
TPH as Motor Oil	(100)	<100

Tom Kwoka
Lab Director

Acculabs Inc.

[ ] 3902 E. University Dr. Phoenix AZ 85034 602-437-0979 Fax 437-0826
[ ] 710 E. Evans Blvd. Tucson AZ 85713 520-884-5811 Fax 884-5812
[ ] 2020 W. Lone Cactus Dr. Phoenix AZ 85027 602-780-4800 Fax 780-7695
[ ] 4663 Table Mountain Dr. Golden CO 80403 303-277-9514 Fax 277-9512
[ ] 992 Spice Islands Dr. Sparks NV 89431 702-355-0202 Fax 355-0817
[ ] 1046 Olive Drive #2 Davis CA 95616 530-757-0920 Fax 753-6091

Lab Number: 21175

Report Due Date:

Client	Gribi Associates	PUBLIC WATER SUPPLY INFORMATION	
Address	1350 Hayes Street, Ste C-14	System Name	
City, State & Zip	Benicia, CA 94510	PWS No	Report to State/EPA Y N
Contact	Jim Gribi	POE No.	DWR No.
Phone	707/748-7743	Project Name: LSI-MIDDLE	Collection Point
Fax	707/748-7763	Project Number: 149-01-03	Collector's Name
P.O. Number		Fax Results (Y) N	Page 1 of 1
			Location (City)

SAMPLE TYPE CODES

DW = drinking water TB = travel blank
WW = waste water SD = solid
MW = monitoring well SO = soil
HW = hazardous waste SL = sludge

Compliance Monitoring Y N

TURNAROUND TIME REQUESTED

(Standard)
RUSH
Special

Lab Director Approval

CLIENT'S SAMPLE ID/LOCATION	Date	Time	Sample Type	Containers	Analyses Requested: TPH-G/BTEX/MTBE	TPH-D/MO												HOLD	Spl. No.
MW-1	3/23/00		W	5	X	X													01
MW-2	3/23/00		W	5	X	X													02
MW-3	3/23/00		W	5	X	X													03
MW-4	3/23/00		W	5	X	X													04
MW-5	3/23/00		W	5	X	X													05

SAMPLE RECEIPT			Date	Time	Samples Relinquished By	Samples Received By
Received Cold	Y	N	3-24-00	0930		
Custody Seals	Y	N				
Seals Intact	Y	N				
No. of Containers						

Acculabs' terms are Net 40. (Payment must be received by the date shown on the invoice or any discount is void)

c:\excel\forms\chain.xls

APPENDIX C

RBCA MODEL INPUT TABLES

RBCA TIER 1/TIER 2 EVALUATION

Output Table 1

Site Name: LSI Middle Site, Southwest Area
Site Location: 1275 66th Street
Lab Identification: LSI-M-Southwest area
Date Completed: 7/14/00
Completed By: James E Gribi
Software: GSI RBCA Spreadsheet
Version: 1.0.1

NOTE: values which differ from Tier 1 default values are shown in bold italics and underlined

Exposure Parameter	Definition (Units)	Residential Adult	Residential (1-6yrs)	Residential (1-16 yrs)	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
ATc	Averaging time for carcinogens (yr)	70				
ATn	Averaging time for non-carcinogens (yr)	30	6	16	25	1
BW	Body Weight (kg)	70	15	35	70	
ED	Exposure Duration (yr)	30	6	16	25	1
t	Averaging time for vapor flux (yr)	30			25	1
EF	Exposure Frequency (days/yr)	350			250	180
EF.Derm	Exposure Frequency for dermal exposure	350			250	
IRgw	Ingestion Rate of Water (L/day)	2			1	
IRs	Ingestion Rate of Soil (mg/day)	100	200		50	100
IRadj	Adjusted soil ing. rate (mg-yr/kg-d)	1.1E+02			9.4E+01	
IRa.in	Inhalation rate indoor (m^3/day)	15			20	
IRa.out	Inhalation rate outdoor (m^3/day)	20			20	10
SA	Skin surface area (dermal) (cm^2)	5.8E+03		2.0E+03	5.8E+03	5.8E+03
SAadj	Adjusted dermal area (cm^2-yr/kg)	2.1E+03			1.7E+03	
M	Soil to Skin adherence factor	1				
AAFs	Age adjustment on soil ingestion	FALSE			FALSE	
AAFd	Age adjustment on skin surface area	FALSE			FALSE	
tox	Use EPA tox data for air (or PEL based)?	TRUE				
gwMCL?	Use MCL as exposure limit in groundwater?	FALSE				

Matrix of Exposed Persons to Complete Exposure Pathways		Residential	Commercial/Industrial Chronic	Commercial/Industrial Constrctn
Outdoor Air Pathways:				
SS v	Volatiles and Particulates from Surface Soils	FALSE	FALSE	FALSE
S.v	Volatilization from Subsurface Soils	TRUE	FALSE	
GW.v	Volatilization from Groundwater	TRUE	FALSE	
Indoor Air Pathways:				
S.b	Vapors from Subsurface Soils	TRUE	FALSE	
GW.b	Vapors from Groundwater	TRUE	FALSE	
Soil Pathways:				
SS.d	Direct Ingestion and Dermal Contact	FALSE	FALSE	TRUE
Groundwater Pathways:				
GW.I	Groundwater Ingestion	FALSE	FALSE	
S.I	Leaching to Groundwater from all Soils	FALSE	FALSE	

Matrix of Receptor Distance and Location On- or Off-Site		Residential Distance	Residential On-Site	Commercial/Industrial Distance	Commercial/Industrial On-Site
GW	Groundwater receptor (cm)		FALSE		FALSE
S	Inhalation receptor (cm)		TRUE		FALSE

Matrix of Target Risks		Individual	Cumulative
TRab	Target Risk (class A&B carcinogens)	***1.0E-05***	1.0E-04
TRc	Target Risk (class C carcinogens)	1.0E-05	
THQ	Target Hazard Quotient	1.0E+00	1.0E+00
Opt	Calculation Option (1, 2, or 3)	3	
Tier	RBCA Tier	2	

Surface Parameters	Definition (Units)	Residential	Constrctn
A	Contaminated soil area (cm^2)	***5.8E+06***	***5.8E+06***
W	Length of affect soil parallel to wind (cm)	***1.5E+03***	***1.5E+03***
W.gw	Length of affect. soil parallel to groundwater (cm	***3.8E+03***	
Uair	Ambient air velocity in mixing zone (cm/s)	2.3E+02	
delta	Air mixing zone height (cm)	2.0E+02	
Lss	Thickness of affected surface soils (cm)		
Pe	Particulate areal emission rate (g/cm^2/s)	6.9E-14	

Groundwater	Definition (Units)	Value
delta.gw	Groundwater mixing zone depth (cm)	2.0E+02
I	Groundwater Infiltration rate (cm/yr)	3.0E+01
Ugw	Groundwater Darcy velocity (cm/yr)	2.5E+03
Ugw.tr	Groundwater seepage velocity (cm/yr)	6.6E+03
Ks	Saturated hydraulic conductivity(cm/s)	
grad	Groundwater gradient (cm/cm)	
Sw	Width of groundwater source zone (cm)	
Sd	Depth of groundwater source zone (cm)	
phi eff	Effective porosity in water-bearing unit	3.8E-01
foc.sat	Fraction organic carbon in water-bearing unit	1.0E-03
BIO?	Is bioattenuation considered?	FALSE
BC	Biodegradation Capacity (mg/L)	

Soil	Definition (Units)	Value	capillary	vadose	foundation
hc	Capillary zone thickness (cm)	5.0E+00			
hv	Vadose zone thickness (cm)	***3.6E+02***			
rho	Soil density (g/cm^3)	1.7			
foc	Fraction of organic carbon in vadose zone	0.01			
phi	Soil porosity in vadose zone	0.38			
Lgw	Depth to groundwater (cm)	***3.7E+02***			
Ls	Depth to top of affected subsurface soil (cm)	***1.1E+02***			
Lsubs	Thickness of affected subsurface soils (cm)	***2.6E+02***			
pH	Soil/groundwater pH	6.5			
phi.w	Volumetric water content		0.342	0.12	0.12
phi.a	Volumetric air content		0.038	0.26	0.26

Building	Definition (Units)	Residential	Commercial
Lb	Building volume/area ratio (cm)	2.0E+02	3.0E+02
ER	Building air exchange rate (s^-1)	1.4E-04	2.3E-04
Lcrk	Foundation crack thickness (cm)	1.5E+01	
eta	Foundation crack fraction	0.01	

Transport Parameters	Definition (Units)	Residential	Commercial
Groundwater			
ax	Longitudinal dispersivity (cm)		
ay	Transverse dispersivity (cm)		
az	Vertical dispersivity (cm)		
Vapor			
dcy	Transverse dispersion coefficient (cm)		
dcz	Vertical dispersion coefficient (cm)		

RBCA CHEMICAL DATABASE

Physical Property Data

CAS Number	Constituent	type	Molecular Weight (g/mole) MW	ref	Diffusion Coefficients in air (cm2/s) Dair	ref	in water (cm2/s) Dwat	ref	log (Koc) or log(Kd) (@ 20 - 25 C) log(l/kg)	ref	Henry's Law Constant (@ 20 - 25 C) (atm-m3/mol)	(unitless)	ref	Vapor Pressure (@ 20 - 25 C) (mm Hg)	ref	Solubility (@ 20 - 25 C) (mg/L)	ref	acid pKa	base pKb	ref
71-43-2	Benzene	A	78.1	5	9.30E-02	A	1.10E-05	A	1.58	A	5.29E-03	2.20E-01	A	9.52E+01	4	1.75E+03	A			
100-41-4	Ethylbenzene	A	106.2	5	7.60E-02	A	8.50E-06	A	1.98	A	7.69E-03	3.20E-01	A	1.00E+01	4	1.52E+02	5			
108-88-3	Toluene	A	92.4	5	8.50E-02	A	9.40E-06	A	2.13	A	6.25E-03	2.60E-01	A	3.00E+01	4	5.15E+02	29			
1330-20-7	Xylene (mixed isomers)	A	106.2	5	7.20E-02	A	8.50E-06	A	2.38	A	6.97E-03	2.90E-01	A	7.00E+00	4	1.98E+02	5			

Site Name: LSI Middle Site, Southwest Area Site Location: 1275 66th Street Completed By: James E. Gribi Date Completed: 7/14/2000

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Toxicity Data

CAS Number	Constituent	Reference Dose (mg/kg/day) Oral RfD_oral	ref	Inhalation RfD_inhal	ref	Slope Factors 1/(mg/kg/day) Oral SF_oral	ref	Inhalation SF_inhal	ref	EPA Weight of Evidence	Is Constituent Carcinogenic ?
71-43-2	Benzene	-		1 70E-03	R	1.00E-01	A	1.00E-01	A	A	TRUE
100-41-4	Ethylbenzene	1.00E-01	A	2.86E-01	A	-		-		D	FALSE
108-88-3	Toluene	2.00E-01	A,R	1.14E-01	A,R	-		-		D	FALSE
1330-20-7	Xylene (mixed isomers)	2.00E+00	A,R	2.00E+00	A	-		-		D	FALSE

Site Name: LSI Middle Site, Southwest /Site Location: 1275 66th Street Completed By: James E. Gribi Date Completed: 7/14/2000

Software version: 1.0.1

RBCA CHEMICAL DATABASE

Miscellaneous Chemical Data

CAS Number	Constituent	Maximum Contaminant Level MCL (mg/L)	Maximum Contaminant Level reference	Permissible Exposure Limit PEL/TLV (mg/m3)	Permissible Exposure Limit PEL/TLV ref	Relative Absorption Factors Oral	Relative Absorption Factors Dermal	Detection Limits Groundwater (mg/L)	Groundwater ref	Detection Limits Soil (mg/kg)	Soil ref	Half Life (First-Order Decay) (days) Saturated	Half Life (First-Order Decay) (days) Unsaturated	ref
71-43-2	Benzene	5 00E-03	52 FR 25690	3.20E+00	OSHA	1	0.5	0.002	C	0.005	S	720	720	H
100-41-4	Ethylbenzene	7 00E-01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.002	C	0.005	S	228	228	H
108-88-3	Toluene	1.00E+00	56 FR 3526 (30 Jan 91)	1.47E+02	ACGIH	1	0.5	0.002	C	0.005	S	28	28	H
1330-20-7	Xylene (mixed isomers)	1.00E+01	56 FR 3526 (30 Jan 91)	4.34E+02	ACGIH	1	0.5	0.005	C	0.005	S	360	360	H

Site Name: LSI Middle Site, Southwest /Site Location: 1275 66th Street Completed By: James E. Gribi Date Completed: 7/14/2000

Software version: 1.0.1

REPRESENTATIVE COC CONCENTRATIONS IN SOURCE MEDIA

(Complete the following table)

CONSTITUENT	Representative COC Concentration in Groundwater value (mg/L)	note	in Surface Soil value (mg/kg)	note	in Subsurface Soil value (mg/kg)	note
Benzene	1.2E-2	UCL			3.1E-2	UCL
Ethylbenzene	5.6E-3	UCL			3.3E-2	UCL
Toluene	3.2E-3	UCL			9.1E-3	UCL
Xylene (mixed isomers)	2.0E-3	UCL			6.2E-2	UCL

Site Name: LSI Middle Site, Southwest Area
Site Location: 1275 66th Street

Completed By: James E. Gribi
Date Completed: 7/14/2000

RBCA SITE ASSESSMENT | Input Screen 9.4

GROUNDWATER DAF VALUES

(Enter DAF values in the grey area of the following table)

CONSTITUENT	Dilution Attenuation Factor (DAF) in Groundwater	
	Residential Receptor	Comm./Ind. Receptor
Benzene	1.0E+0	1.0E+0
Ethylbenzene	1.0E+0	1.0E+0
Toluene	1.0E+0	1.0E+0
Xylene (mixed isomers)	1.0E+0	1.0E+0

Site Name: LSI Middle Site, Southwest Area
Site Location: 1275 66th Street

Completed By: James E. Gribi
Date Completed: 7/14/2000

RBCA SITE ASSESSMENT | Input Screen 9.1

CONSTITUENT HALF-LIFE VALUES

(Complete the following table)

CONSTITUENT	Half-Life of Constituent (day)
Benzene	720
Ethylbenzene	228
Toluene	28
Xylene (mixed isomers)	360

Site Name: LSI Middle Site, Southwest Ai Completed By: James E. Gribi
Site Location: 1275 66th Street Date Completed: 7/14/2000

APPENDIX D

RBCA MODEL BASELINE RISK TABLES

RBCA SITE ASSESSMENT | **Tier 2 Worksheet 8.3**

Site Name: LSI Middle Site, Southwest Area
Site Location: 1275 66th Street

Completed By: James E. Gribi
Date Completed: 7/14/2000

TIER 2 BASELINE RISK SUMMARY TABLE

	BASELINE CARCINOGENIC RISK					BASELINE TOXIC EFFECTS				
	Individual COC Risk		Cumulative COC Risk		Risk Limit(s) Exceeded?	Hazard Quotient		Hazard Index		Toxicity Limit(s) Exceeded?
EXPOSURE PATHWAY	Maximum Value	Target Risk	Total Value	Target Risk		Maximum Value	Applicable Limit	Total Value	Applicable Limit	
OUTDOOR AIR EXPOSURE PATHWAYS										
Complete:	9.5E-9	1.0E-5	9.5E-9	1.0E-4	☐	1.3E-4	1.0E+0	1.3E-4	1.0E+0	☐
INDOOR AIR EXPOSURE PATHWAYS										
Complete:	6.2E-6	1.0E-5	6.2E-6	1.0E-4	☐	8.5E-2	1.0E+0	8.6E-2	1.0E+0	☐
SOIL EXPOSURE PATHWAYS										
Complete:	NC	1.0E-5	NC	1.0E-4	■	NC	1.0E+0	NC	1.0E+0	■
GROUNDWATER EXPOSURE PATHWAYS										
Complete:	NC	1.0E-5	NC	1.0E-4	■	NC	1.0E+0	NC	1.0E+0	■
CRITICAL EXPOSURE PATHWAY (Select Maximum Values From Complete Pathways)										
	6.2E-6	1.0E-5	6.2E-6	1.0E-4	☐	8.5E-2	1.0E+0	8.6E-2	1.0E+0	☐

Site Name: LSI Middle Site, Southwest Area | Site Location: 1275 66th Street | Completed By: James E Gribi | Date Completed: 7/14/2000 | 1 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ☐ (CHECKED IF PATHWAY IS ACTIVE)

SURFACE SOILS: VAPOR AND DUST INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Surface Soil Conc (mg/kg)	2) NAF Value (m^3/kg) Receptor		3) Exposure Medium: Outdoor Air POE Conc. (mg/m^3) (1) / (2)		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day)		5) Average Daily Intake Rate (mg/kg-day) (3) X (4)	
Benzene	0.0E+0								
Ethylbenzene	0.0E+0								
Toluene	0.0E+0								
Xylene (mixed isomers)	0.0E+0								

NOTE. ABS = Dermal absorption factor (dim); AF = Adherance factor (mg/cm^2); AT = Averaging time (days); BW = Body weight (kg); CF = Units conversion factor; ED = Exposure duration (yrs); EF = Exposure frequencey (days/yr); ET = Exposure time (hrs/day); IR = Inhalation rate (m^3/day); POE = Point of exposure; SA = Skin exposure area (cm^2/day)

Site Name: LSI Middle Site, Southwest Area | Site Location: 1275 66th Street | Completed By: James E. Gribi | Date Completed: 7/14/2000 | 2 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: VAPOR INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Subsurface Soil Conc (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Residential		3) Exposure Medium: Outdoor Air POE Conc (mg/m^3) (1) / (2) On-Site Residential		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (3) X (4) On-Site Residential	
Benzene	3 1E-2	6.3E+4		4.9E-7		1.2E-1		5.7E-8	
Ethylbenzene	3 3E-2	6.3E+4		5 2E-7		2 7E-1		1.4E-7	
Toluene	9.1E-3	6.3E+4		1.4E-7		2.7E-1		4.0E-8	
Xylene (mixed isomers)	6.2E-2	6.3E+4		9.8E-7		2.7E-1		2.7E-7	

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposue area (cm^2/day)

Site Name: LSI Middle Site, Southwest Area | Site Location: 1275 66th Street | Completed By James E. Gribi | Date Completed. 7/14/2000 | 3 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER: VAPOR INHALATION

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc. (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Residential		3) Exposure Medium: Outdoor Air. POE Conc (mg/m^3) (1) / (2) On-Site Residential		4) Exposure Multiplier (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Residential		5) Average Daily Intake Rate (mg/kg-day) (3) X (4) On-Site Residential		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from surface, subsurface & groundwater routes.) On-Site Residential	
Benzene	1.2E-2	3.8E+4		3.2E-7		1.2E-1		3.7E-8		9.5E-8	
Ethylbenzene	5.6E-3	3.6E+4		1.5E-7		2.7E-1		4.2E-8		1.8E-7	
Toluene	3.2E-3	3.8E+4		8.5E-8		2.7E-1		2.3E-8		6.3E-8	
Xylene (mixed isomers)	2.0E-3	4.0E+4		4.8E-8		2.7E-1		1.3E-8		2.8E-7	

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequency (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: LSI Middle Site, Southwest Area Site Location. 1275 66th Street Completed By: James E. Gribi Date Completed. 7/14/2000

TIER 2 PATHWAY RISK CALCULATION

OUTDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAYS ARE ACTIVE)

		CARCINOGENIC RISK					TOXIC EFFECTS			
Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene	A	9.5E-8		1.0E-1	9.5E-9		2.2E-7		1.7E-3	1.3E-4	
Ethylbenzene	D						1.8E-7		2.9E-1	6.5E-7	
Toluene	D						6.3E-8		1.1E-1	5.5E-7	
Xylene (mixed isomers)	D						2.8E-7		2.0E+0	1.4E-7	

Total Pathway Carcinogenic Risk = 9.5E-9 | 0.0E+0

Total Pathway Hazard Index = 1.3E-4 | 0.0E+0

Site Name: LSI Middle Site, Southwest Area | Site Location: 1275 66th Street | Completed By: James E. Gribi | Date Completed: 7/14/2000 | 4 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

SUBSURFACE SOILS: Exposure Concentration

VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	1) Source Medium: Subsurface Soil Conc. (mg/kg)	2) NAF Value (m^3/kg) Receptor: On-Site Residential		3) Exposure Medium: Indoor Air POE Conc (mg/m^3) (1) / (2) On-Site Residential		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day) On-Site Residential		5) Average Daily Intake Rate: (mg/kg-day) (3) X (4) On-Site Residential	
Benzene	3.1E-2	6.0E+1		5.2E-4		8.8E-2		4.5E-5	
Ethylbenzene	3.3E-2	6.0E+1		5.5E-4		2.1E-1		1.1E-4	
Toluene	9.1E-3	6.0E+1		1.5E-4		2.1E-1		3.1E-5	
Xylene (mixed isomers)	6.2E-2	6.9E+1		9.0E-4		2.1E-1		1.8E-4	

NOTE
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: LSI Middle Site, Southwest Area | Site Location: 1275 66th Street | Completed By: James E. Gribi | Date Completed: 7/14/2000 | 5 OF 9

TIER 2 EXPOSURE CONCENTRATION AND INTAKE CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAY IS ACTIVE)

GROUNDWATER:
VAPOR INTRUSION TO BUILDINGS

Constituents of Concern	Exposure Concentration 1) Source Medium: Groundwater Conc (mg/L)	2) NAF Value (m^3/L) Receptor: On-Site Residential		3) Exposure Medium: Indoor Air POE Conc (mg/m^3) (1) / (2) — On-Site Residential		4) Exposure Multiplier: (IRxEFxED)/(BWxAT) (m^3/kg-day) — On-Site Residential		5) Average Daily Intake Rate: (mg/kg day) (3) X (4) — On-Site Residential		TOTAL PATHWAY INTAKE (mg/kg-day) (Sum intake values from subsurface & groundwater routes.) — On-Site Residential	
Benzene	1.2E-2	6.2E+1		1.9E-4		8.8E-2		1.7E-5		6.2E-5	
Ethylbenzene	5.6E-3	5.7E+1		9.9E-5		2.1E-1		2.0E-5		1.3E-4	
Toluene	3.2E-3	6.0E+1		5.3E-5		2.1E-1		1.1E-5		4.2E-5	
Xylene (mixed isomers)	2.0E-3	6.4E+1		3.1E-5		2.1E-1		6.3E-6		1.9E-4	

NOTE:
ABS = Dermal absorption factor (dim)
AF = Adherance factor (mg/cm^2)
AT = Averaging time (days)
BW = Body weight (kg)
CF = Units conversion factor
ED = Exposure duration (yrs)
EF = Exposure frequencey (days/yr)
ET = Exposure time (hrs/day)
IR = Inhalation rate (m^3/day)
POE = Point of exposure
SA = Skin exposure area (cm^2/day)

Site Name: LSI Middle Site, Southwest Area Site Location: 1275 66th Street | Completed By: James E. Gribi | Date Completed: 7/14/2000 | 2 OF 4

TIER 2 PATHWAY RISK CALCULATION

INDOOR AIR EXPOSURE PATHWAYS ■ (CHECKED IF PATHWAYS ARE ACTIVE)

	CARCINOGENIC RISK						TOXIC EFFECTS			
Constituents of Concern	(1) EPA Carcinogenic Classification	(2) Total Carcinogenic Intake Rate (mg/kg/day) On-Site Residential		(3) Inhalation Slope Factor (mg/kg-day)^-1	(4) Individual COC Risk (2) x (3) On-Site Residential		(5) Total Toxicant Intake Rate (mg/kg/day) On-Site Residential		(6) Inhalation Reference Dose (mg/kg-day)	(7) Individual COC Hazard Quotient (5) / (6) On-Site Residential	
Benzene	A	6.2E-5		1.0E-1	6 2E-6		1.5E-4		1.7E-3	8.5E-2	
Ethylbenzene	D						1.3E-4		2.9E-1	4.7E-4	
Toluene	D						4.2E-5		1 1E-1	3.7E-4	
Xylene (mixed isomers)	D						1.9E-4		2.0E+0	9.5E-5	
Total Pathway Carcinogenic Risk =					6.2E-6	0.0E+0	***Total Pathway Hazard Index =***			8.6E-2	0.0E+0