

ENVIRONMENTAL  
PROTECTION

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**QUARTERLY  
GROUNDWATER MONITORING REPORT  
THIRD QUARTER 1999  
FRIESMAN RANCH PROPERTY  
LIVERMORE, CALIFORNIA**

*Nov 1999*

**November 15, 1999**



**KLEINFELDER**

*An employee owned company*

November 15, 1999  
File No.: 10-3006-13/013

Ms. Eva Chu  
Alameda County Health  
Care Services Agency  
1131 Harbor Bay Parkway, Suite 250  
Alameda, California 94502-9335

**Subject: Third Quarter Groundwater Monitoring Report for Friesman Ranch  
Property, Livermore, California**

Dear Ms. Chu:

Attached is the Third Quarter 1999 Groundwater Monitoring Report for the Friesman Ranch Property, 1600 Friesman Road, Livermore, California (site). This is the second groundwater monitoring event in which only a subset of the wells and not all of the wells have been monitored. The results of this report are consistent with the results of the previous groundwater monitoring events that have been performed at the site, with chemicals of concern only being detected in monitoring wells KMW-6 and KMW-7. No chemicals of concern were detected in the other well sample collected (KMW-8).

We are in receipt of your letter dated September 27, 1999, and are working to schedule the bioparameter sampling event prior to December 1, 1999. Based on the results of that event we will evaluate the feasibility of using Oxygen-Releasing Compound<sup>TM</sup> as a corrective action.

We trust that the attached submittal meets your requirements. Should you require any additional information and/or clarification, please call.

Very truly yours,

**KLEINFELDER, INC.**

Neal E. Siler, R. E. A.  
Project Manager

Attachment

cc: Mr. George Kwong, Children's Hospital Medical Foundation  
Ms. Leah Goldberg, Hansen, Bridgett, Marcus, Vlahos and Rudy, LLP

204

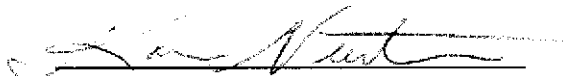
A Report Prepared for:

Children's Hospital Medical Foundation  
5225 Dover Street  
Oakland, California 94609

**QUARTERLY GROUNDWATER MONITORING REPORT  
THIRD QUARTER 1999  
FRIESMAN RANCH PROPERTY  
LIVERMORE, CALIFORNIA**

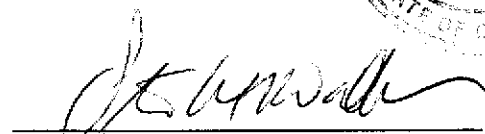
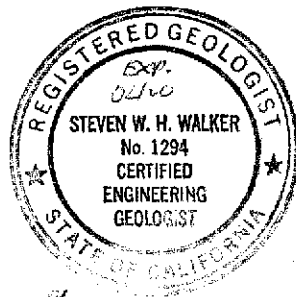
Kleinfelder Job No. 10-3006-13/013

Prepared by:

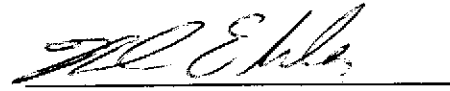


Karen Newton  
Staff Engineer

Approved by



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November 15, 1999

**QUARTERLY  
GROUNDWATER MONITORING REPORT  
THIRD QUARTER 1999  
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LIVERMORE, CALIFORNIA**

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## 1. INTRODUCTION

This report describes the results of the Third Quarter 1999 Groundwater Monitoring Event performed at the Friesman Ranch Property, 1600 Friesman Road, Livermore, California (Plate 1). The Third Quarter 1999 Groundwater Monitoring Event is the fourth consecutive quarterly monitoring event performed under the current scope of work. In addition, as directed by the Alameda County Health Care Services Agency, Environmental Health Service Division (ACHCSA), this is the second event in which only a subset of the wells have been monitored.

The work performed was based on our report entitled *Remedial Investigation, RBCA Tier 2 Evaluation and Remedial Action Plan, Friesman Ranch Property, Livermore, California* dated October 17, 1997, the Alameda County Health Care Services Agency, Environmental Health Services Division's (ACHCSA's) letter regarding *QMR at 1600 Friesman Road, Livermore, CA* dated June 15, 1999 (ACHCSA, 1999). Preparation of this report is a key task of our Workplan dated November 18, 1998 [Kleinfelder, Inc. (Kleinfelder), 1998]

### 1.1 OBJECTIVES AND SCOPE OF WORK

The objective of the activities performed were to:

- Continue a regularly scheduled groundwater monitoring program initiated in December 1998 to track spatial and temporal variations in groundwater conditions.

To meet this objective, the following scope of work was implemented:

- Implementation of a regularly scheduled groundwater monitoring event;
- Preparation of this quarterly groundwater monitoring report.

## 2. FIELD ACTIVITIES

### 2.1 INTRODUCTION

This section summarizes the field activities performed for the quarterly groundwater monitoring program. All field activities were performed on September 16, 1999. Plate 2 shows the locations of the existing groundwater monitoring wells.

### 2.2 GROUNDWATER MONITORING ACTIVITIES

In accordance with ACHCSA's direction (ACHCSA, 1999), only three (KMW-6, KMW-7 and KMW-8) of the eight wells were monitored. The goal of these activities was to measure water levels and free-product thicknesses, and collect water quality samples that accurately represent stabilized aquifer conditions in the vicinity of the selected wells. Two of the wells have had historical detections of petroleum hydrocarbons (KMW-6 and KMW-7) and one well (KMW-8) monitors the leading edge of the plume. To this end, the wells were purged until stabilization of aquifer parameters was achieved.

Prior to sampling, field instrumentation was calibrated and/or checked before opening the monitoring wells. All instruments were successfully calibrated or checked (Appendix A).

#### 2.2.1 Water Level Measurement

The wells were opened and ventilated for a minimum of 0.5 hour. Prior to purging, the depth to water was measured in the wells to the nearest 0.01 foot using a clean, calibrated electronic water-level indicator. Water-level data were used to calculate the required purge volumes for sampling. Measurements were recorded on Water-Level Measurement Records and Well Development and Sampling Logs (Appendix A).

#### 2.2.2 Free-Product Thickness Measurement

On September 16, 1999, prior to purging each well, the free-product thickness, if any, was measured using a clean oil/water interface probe (Appendix A).

#### 2.2.3 Groundwater Sample Collection

Upon completion of the water-level measurements, Kleinfelder purged the monitoring wells by bailing them with dedicated polyvinyl chloride (PVC) bailers. During purging, aquifer parameters (hydrogen ion index [pH], temperature, and electrical conductivity) were measured to evaluate whether the water in each well had stabilized prior to sampling (Appendix A). The wells were purged until a minimum of three casing volumes of water were removed, and aquifer parameters appeared to stabilize. Water levels were allowed to recover to near static levels before sampling. After sampling, the dedicated bailers were re-hung inside each well to be used for the next sampling event.

Water from each well was collected using the same dedicated PVC bailers used for purging. Groundwater monitoring well samples were placed in appropriate containers (either 40-milliliter [ml] glass volatile organic analysis [VOA] vials, 1-liter amber glass bottles and/or 500-ml polyethylene bottles), labeled and the containers were then placed in Ziploc™ plastic bags. The samples were then placed in an ice chest packed with loose water-based ice to 4 +/- 2 degrees Celsius (°C) for delivery to the laboratory.

### 2.3 ANALYTICAL LABORATORY PARAMETERS

Groundwater monitoring well samples were analyzed for the following parameters:

- Total petroleum hydrocarbons as gasoline (TPH-g) using modified United States Environmental Protection Agency (EPA) Method 8015;
- Total petroleum hydrocarbons as diesel (TPH-d) using modified EPA Method 8015 following filtering with a 0.45-micron filter and preparation using silica-gel cleanup;
- Benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8020;
- Methyl tertiary-butyl ether (MTBE) using EPA Method 8020; any detections of MTBE were confirmed using EPA Method 8260;
- Polynuclear aromatic hydrocarbons (PAHs) using EPA Method 8270 (KMW-6, KMW-7 only); and
- Dissolved lead using EPA Method 6010/7000 (KMW-6 and KMW-7 only) following filtering with a 0.45-micron filter.

### 2.4 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE COLLECTION

Normal quality assurance/quality control (QA/QC) sampling activities includes the laboratory preparation and analysis of a trip blank that accompanies the ice chest to and from the laboratory. In addition, a blind duplicate and an equipment rinsate blank are collected and analyzed. The trip blank and equipment blank are analyzed for TPH-g and BTEX only. The duplicate is commonly analyzed for TPH-g, BTEX, and TPH-d.

For this event, the following QA/QC samples were prepared or collected:

- A trip blank; and
- A blind duplicate.



Because only dedicated and/or disposable equipment was used to purge the wells and/or collect the samples, no equipment rinsate blank was collected.

## **2.5 INVESTIGATION-DERIVED WASTE HANDLING PROCEDURES**

Investigation-derived waste (IDW) consisting of purge water and decontamination rinsate liquids were containerized onsite in labeled, United States Department of Transportation (DOT)-approved 55-gallon drums.

Drums were inspected prior to use for physical integrity and condition. Each drum was labeled to identify the waste source location, physical contents, date collected and generator's name. A total of two drums (containing monitoring well purge water and decontamination rinsate liquids) of IDW were generated during this quarter's monitoring activities.

## **2.6 SITE RESTORATION**

Following completion of monitoring activities, the work area was left in a presentable and workable condition as near as practicable to original conditions.

### 3. SUMMARY OF RESULTS

#### 3.1 INTRODUCTION

Water-level and free-product thickness measurements were recorded on September 16, 1999. Groundwater samples were also collected from the three wells monitored for this event on September 16, 1999, and submitted for analysis. The monitoring well samples were analyzed at McCampbell Analytical, Inc., of Pacheco, California, a laboratory certified by the California Environmental Protection Agency (Cal/EPA), Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP) for the specific analyses performed.

Tables 1 through 3 summarize the data measured and/or analyzed. Appendix B contains certified analytical laboratory reports and chain-of-custody records. Appendix C contains historical water level and free-product thickness measurements. Historical hydrochemical data for the wells are contained in Appendix D.

#### 3.2 WATER LEVELS

As part of the groundwater monitoring event, water levels were measured in monitoring wells KMW-6, KMW-7 and KMW-8 on September 16, 1999. Depths to water ranged from 13.00 to 14.29 feet below ground surface (bgs) (Table 1). In September 1999, groundwater flow was to the northwest with a hydraulic gradient of 0.008 foot per foot (ft/ft). These results are consistent with the previous groundwater monitoring event in June 1999 (Appendix C) (Kleinfelder, 1999).

#### 3.3 FREE-PRODUCT THICKNESS

No sheen was observed on any of the samples; however, a strong hydrocarbon odor was noted in wells KMW-6 and KMW-7. No measurable free product was detected using either a bailer or the oil/water interface probe. Historically, no free product has been detected in any of the wells (Appendix C).

#### 3.4 GROUNDWATER MONITORING WELL SAMPLES

A total of three wells (KMW-6 through KMW-8) were sampled and analyzed for TPH-g, TPH-d, BTEX, and MTBE. Two of these wells (KMW-6 and KMW-7) were also analyzed for dissolved lead and PAHs. These results are summarized in Table 2. Certified analytical laboratory reports are included in Appendix B. Historical groundwater monitoring analytical results are contained in Appendix D.

### 3.4.1 Total Petroleum Hydrocarbons as Gasoline

TPH-g was detected at concentrations of 7,100 micrograms per liter ( $\mu\text{g/L}$ ) in KMW-6 and 950  $\mu\text{g/L}$  in KMW-7, but was not detected in KMW-8. These results are consistent with historical concentrations detected (Appendix D). Although, free product has been associated with concentrations in the thousands of  $\mu\text{g/L}$ , no free product has ever been detected (see Section 3.3).

### 3.4.2 Total Petroleum Hydrocarbons as Diesel

TPH-d was detected at concentrations of 1,900  $\mu\text{g/L}$  in KMW-6 and 1,100  $\mu\text{g/L}$  in KMW-7. It was not detected in KMW-8. These results are consistent with historical concentrations detected (Appendix D).

### 3.4.3 Aromatic Hydrocarbons

Aromatic hydrocarbons were detected in monitoring wells KMW-6 and KMW-7, but were not detected in KMW-8. Benzene was detected at concentrations of 230  $\mu\text{g/L}$  in KMW-6 and 3.3  $\mu\text{g/L}$  in KMW-7. Toluene was detected at concentrations of 9.8  $\mu\text{g/L}$  and 2.0  $\mu\text{g/L}$  in the samples collected from KMW-6 and KMW-7, respectively. Ethylbenzene was detected at concentrations of 300  $\mu\text{g/L}$  in KMW-6 and 19  $\mu\text{g/L}$  in KMW-7. Total xylenes were detected at concentrations of 210  $\mu\text{g/L}$  in KMW-6 and 33  $\mu\text{g/L}$  in KMW-7. These results are consistent with historical concentrations detected (Appendix D).

### 3.4.4 Methyl Tertiary-Butyl Ether

MTBE was not detected in any of the wells sampled. These results are consistent with historical data (Appendix D).

### 3.4.5 Polynuclear Aromatic Hydrocarbons

For KMW-6 and KMW-7, no PAHs were detected at concentrations above the reporting limit. Future monitoring events will be used to evaluate the significance of these results. KMW-8 was not analyzed for PAHs.

### 3.4.6 Dissolved Lead

This event marks the third time that dissolved lead (samples filtered with a 0.45-micron filter prior to analysis) was analyzed for samples collected from KMW-6 and KMW-7. It was not detected in either sample (Table 2).

### **3.5 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES**

The QA/QC samples collected and analyzed for this groundwater monitoring event included a trip blank and a blind duplicate sample. The results for these QA/QC samples are summarized on Table 3 and certified analytical laboratory reports are contained in Appendix B.

#### **3.5.1 Trip Blank**

One trip blank was prepared and analyzed for the September 1999 groundwater monitoring event. The trip blank contained no detectable concentrations of TPH-g, MTBE or BTEX.

#### **3.5.2 Blind Duplicate Sample**

One blind duplicate sample (KMW-8A) was collected from monitoring well KMW-8 on September 16, 1999. This duplicate sample was analyzed for TPH-g, TPH-d, BTEX, and MTBE.

The Relative Percent Differences (RPD) were not calculable because none of the constituents of concern were detected in either the primary or duplicate sample.

## 4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The summary and conclusions presented in this section are based on research implemented, information collected, and interpretations developed during this and previous investigations performed at the property. The information evaluated in this report was collected by Kleinfelder during September 1999. The summary and conclusions that follow are presented in the categories of field activities and groundwater chemistry.

### 4.1 FIELD ACTIVITIES

- Field activities performed consisted of the third quarterly groundwater monitoring event for 1999. In accordance with ACHCSA instructions, only three groundwater wells (KMW-6, KMW-7 and KMW-8) were monitored for this event;
- Water level and free-product thickness measurements and the collection of water quality samples were conducted. The samples collected were analyzed for TPH-g, TPH-d, BTEX, MTBE, PAHs, and dissolved lead;
- Prior to the initiation of field activities, and between sampling locations, all equipment was decontaminated;
- Purge water and decontamination rinsate liquids were containerized and stored on-site in DOT-approved 55-gallon drums;
- Following completion of field activities the work area was left in a presentable and workable condition, as nearly as practicable to original conditions.

### 4.2 GROUNDWATER CHEMISTRY

- No free product was present nor has it been measured in any of the wells installed since monitoring was initiated in 1997;
- Only two groundwater monitoring well samples (KMW-6 and KMW-7) contained detectable concentrations of petroleum hydrocarbon compounds. The groundwater sample collected from KMW-8 did not contain detectable concentrations of petroleum hydrocarbon compounds;
- TPH-g was detected at 7,100 µg/L in KMW-6 and 950 µg/L in KMW-7. TPH-d was detected at 1,900 µg/L in KMW-6 and 1,100 µg/L in KMW-7. Benzene was detected at 230 µg/L in KMW-6 and 3.3 µg/L in KMW-7. Toluene was detected at 9.8 µg/L in KMW-6 and 2.0 µg/L in KMW-7. Ethylbenzene was detected in KMW-6 at 300 µg/L and in KMW-7 at 19 µg/L. Total xylenes were detected in KMW-6 at 210 µg/L and in KMW-7 at 33 µg/L. Neither PAHs nor MTBE were detected in any of the samples collected; and

- Dissolved lead was not detected in either sample collected from KMW-6 or KMW-7.

#### 4.3 RECOMMENDATIONS

Kleinfelder makes the following recommendations concerning further investigations and remedial actions at the property:

- The regularly scheduled groundwater monitoring program should be continued, with the next event being scheduled for December 1999;
- Water levels and free-product thickness should be measured in and groundwater quality samples should be collected from monitoring wells KMW-6, KMW-7 and KMW-8;
- Groundwater quality samples collected from the three monitoring wells should be analyzed for TPH-g, TPH-d, BTEX and MTBE. Groundwater quality samples collected from KMW-6 and KMW-7 should also be analyzed for PAHs, but not for dissolved lead;
- Prior to the implementation of the December 1999 event, a special groundwater monitoring event should be implemented to collect information on biodegradation and natural attenuation parameters; including dissolved oxygen, oxidation-reduction potential, nitrate, sulfate, ferrous iron and alkalinity. These parameters will be analyzed for samples collected for wells KMW-6, KMW-7, KMW-8, KMW-2 and KMW-3; and
- These data will be analyzed and, if site-specific conditions support aerobic degradation, the feasibility of placing or injecting Oxygen-Releasing Compound (ORC™) into and/or near wells KMW-6 and KMW-7 will be evaluated.

## 5. LIMITATIONS

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The scope of services described here is not intended to be inclusive, to identify all potential concerns, or to eliminate the possibility of environmental problems. Within current technology, no level of assessment can show conclusively that a property or its structures are completely free of contaminated and/or hazardous substances. Therefore, Kleinfelder cannot offer a certification that the recommendations made in this report will clear the property of environmental liability.

During the course of the performance of Kleinfelder's services, contaminated and/or hazardous materials were discovered. Our client or the property owner are solely responsible for notifying all governmental agencies, and the public at large, of the existence, release, treatment or disposal of any contaminated and/or hazardous materials observed at the project site, either before or during performance of Kleinfelder's services. Kleinfelder will assume no responsibility or liability whatsoever for any claim, loss of property value, damage, or injury which results from pre-existing hazardous materials being encountered or present on the project site, or from the discovery of such hazardous materials.

Kleinfelder performed the investigative activities and evaluations in accordance with generally accepted standards of care that existed in Northern California at the time the work was performed. No warranty, expressed or implied, is made.

## 6. REFERENCES

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- Alameda County Health Care Services Agency, 1999, Letter from Ms. Eva Chu of Alameda County Health Care Services Agency to Ms. Leah Goldberg of Hanson, Bridgett, Marcus, Vlahos and Rudy – LLP Regarding *QMR at 1600 Friesman Road, Livermore, CA*. June 15
- Kleinfelder, Inc., 1997, *Remedial Investigation, RBCA Tier 2 Evaluation and Remedial Action Plan, Friesman Ranch Property, Livermore, California*. October 17
- Kleinfelder, Inc., 1998, *Well Installation and Quarterly Groundwater Monitoring Workplan for, Friesman Ranch Property, Livermore, California*. November 18
- Kleinfelder, Inc., 1999, *Quarterly Groundwater Monitoring Report, Second Quarter 1999, Friesman Ranch Property, Livermore, California*. September 21



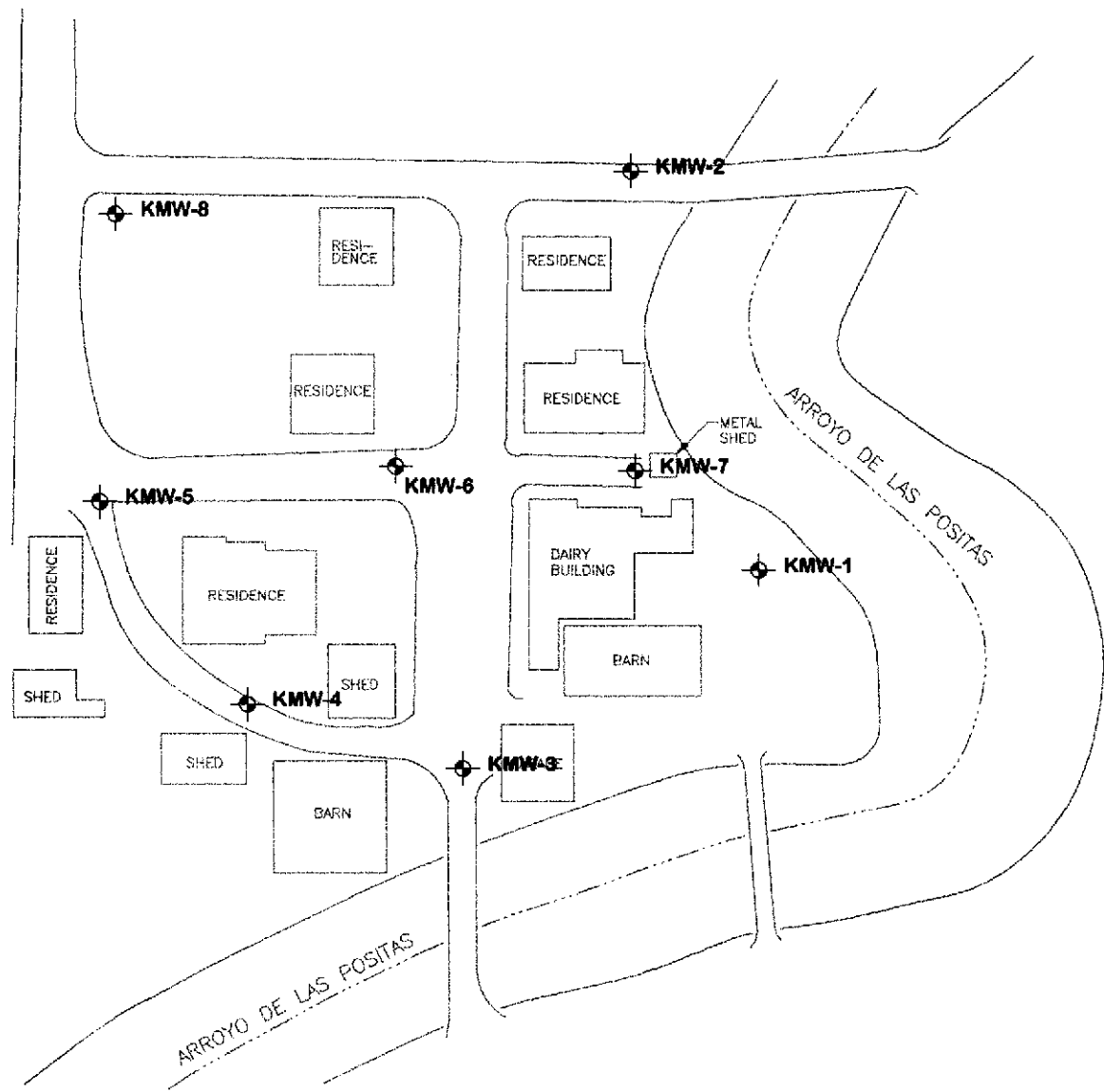
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**PLATES**

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LEGEND


 GROUNDWATER MONITORING WELL



NOTES:  
1. Locations are approximate.



80      0      80  
 APPROXIMATE SCALE (feet)

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**SAMPLING LOCATIONS**

FRIESMAN RANCH PROPERTY  
1600 FRIESMAN ROAD  
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

PROJECT NO. 10-300613-013

PLATE

**2**

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## TABLES

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**TABLE 1**  
**GROUNDWATER ELEVATION DATA**  
**SEPTEMBER 16, 1999**  
**FRIESMAN RANCH PROPERTY**  
**LIVERMORE, ALAMEDA COUNTY, CALIFORNIA**

PERSONNEL: M. MAHONEY

WELL NUMBER	WATER LEVEL FROM T.O.C. (feet)	FREE-PRODUCT THICKNESS (feet)	WELL DEPTH FROM T.O.C. (feet)	G.S. HEIGHT FROM T.O.C. (feet)	WATER LEVEL FROM G.S. (feet)	T.O.C. ELEV. USGS Datum (Ft. Above MSL)	GROUNDWATER ELEVATIONS USGS Datum (Ft. Above MSL)
KMW-1	NM	NM	23.47	0.53	NM	370.12	NC
KMW-2	NM	NM	23.57	0.43	NM	370.72	NC
KMW-3	NM	NM	23.46	0.54	NM	369.10	NC
KMW-4	NM	NM	23.69	0.31	NM	369.80	NC
KMW-5	NM	NM	23.58	0.42	NM	369.52	NC
KMW-6	14.29	0.00	23.47	0.53	14.82	370.08	355.79
KMW-7	13.00	0.00	23.70	0.58	13.58	370.04	357.04
KMW-8	13.57	0.00	23.90	0.58	14.15	368.61	355.04

**NOTES:**

G.S. = Ground Surface

NC = Not Calculable

NM = Not Measured

T.O.C. = Top of casing. All measurements in feet relative to top of casing.

USGS = United States Geological Survey

All wells have 4" ID casing = 0.65 gallon per casing length (foot).

**TABLE 2**  
**GROUNDWATER MONITORING WELL SAMPLE ANALYTICAL RESULTS**  
**SEPTEMBER 16, 1999**  
**FRIESMAN RANCH PROPERTY**  
**LIVERMORE, ALAMEDA COUNTY, CALIFORNIA**

WELL NUMBER	SAMPLE COLLECTION DATE	TPH-d (µg/L)	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	PAHs (µg/L)	Dissolved Lead (µg/L)
KMW-1	NS	-	-	-	-	-	-	-	-	-
KMW-2	NS	-	-	-	-	-	-	-	-	-
KMW-3	NS	-	-	-	-	-	-	-	-	-
KMW-4	NS	-	-	-	-	-	-	-	-	-
KMW-5	NS	-	-	-	-	-	-	-	-	-
KMW-6	9/16/99	1,900, b	7,100, a	230	9.8	300	210	<120	<10	<5.0
KMW-7	9/16/99	1,100, b	950, a	3.3	2.0	19	33	<10	<10	<5.0
KMW-8	9/16/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
MCL		--	--	1.0	150	700	1,750	--	--	15***

**Notes:**

- TPH-d Total Petroleum Hydrocarbons as Diesel
- TPH-g Total Petroleum Hydrocarbons as Gasoline
- MTBE Methyl Tertiary-Butyl Ether
- PAHs Polynuclear Aromatic Hydrocarbons
- MCL California Environmental Protection Agency (Cal/EPA) Maximum Contaminant Level
- µg/L Micrograms per Liter (approximately equal to parts per billion)
- <0.5 Not detected at or above the laboratory method reporting limit
- a Unmodified or weakly modified gasoline is significant
- b Gasoline range compounds are significant
- \*\*\* Federal MCL
- Not Sampled or Analyzed

TABLE 3  
 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE ANALYTICAL RESULTS  
 JUNE 21, 1999  
 FRIESMAN RANCH PROPERTY  
 LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

QA/QC SAMPLE TYPE	SAMPLE ID	SAMPLE COLLECTION DATE	TPH-d (µg/L)	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl Benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	PAHs (µg/L)	Dissolved Lead (µg/L)
Primary Sample	KMW-7	6/21/99	1,300, d,b	1,300, a	6.5	<0.5	21	62	<5.0	27 *	<5.0
Duplicate Sample	KMW-7A	6/21/99	1,200, d	2,000, a	6.4	6.7	24	76	<5.0	17 *	-
Trip Blank		6/21/99	-	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	RPD		8.0%	51.9%	1.6%	NC	13.3%	20.3%	NC	45.5%	NC

**Notes:**

- TPH-d Total Petroleum Hydrocarbons as Diesel
- TPH-g Total Petroleum Hydrocarbons as Gasoline
- MTBE Methyl Tertiary-Butyl Ether
- PAHs Polynuclear Aromatic Hydrocarbons
- RPD Relative Percent Difference
- µg/L Micrograms per Liter (approx. equal to parts per billion)
- <0.5 Not detected at or above the laboratory method reporting limit
- a Unmodified or weakly modified gasoline is significant
- b Diesel range compounds are significant; no recognizable pattern
- d Gasoline range compounds are significant
- \* Naphthalene only, all other chemicals were < 2.5 µg/L
- NC Not calculable
- Not Analyzed

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**APPENDIX A – FIELD MONITORING NOTES**

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**RECORD OF WATER LEVEL MEASUREMENTS –  
SEPTEMBER 16, 1999**

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# KA KLEINFELDER

## RECORD OF WATER LEVEL MEASUREMENTS

Date: 9/16/99 Weather: Clearing ~75°F Sheet 1 of 1  
 Project: Frisman 3rd floor 1999 ERM Submitted By: Keith Powers Date: 9/16/99  
 Project No.: 15-3000-13 Reviewed By: W E L Date: 9/20/99  
 Instrument Number: 1011 Equipto Rental, Solinst OW interfac probe # 122.09

Well Number	Time <small>(opened/measure)</small> (24-hr)	Sensitivity Setting (est. %)	Measuring Point (M.P.)	Measurement	Replicate Measurements (if requested)			Notes	(locked?)
					1	2	3		
					Product thickness.				
KMW-6	10:40 10:45	NA	TOC	14.29	No product measured.				Y
KMW-7	13:20 13:35	NA	TOC	13.00	No measured product.				N
KMW-8	11:45 11:52	NA	TOC	13.57	No measurable product				N

M.P.: TOC, GS, Cover ring, Other: All Wells Locked -- YES/NO

**WELL DEVELOPMENT AND SAMPLING LOGS –  
SEPTEMBER 16, 1999**

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**WELL DEVELOPMENT & SAMPLING LOG** **WELL NO. KMW-8**

Date: 9/16/99 Weather: Clear 75°F Sheet 2 of 2

Project: Frisman Submitted By: Kathy Powers Date: 9/16/99

Project No.: 10-3006-13/011 Reviewed By: [Signature] Date: 9/20/99

Purpose of Log  Development  Sampling

Equipment & Decontamination	Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other: <u>Dedicated Bailer</u>		
	Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other: <u>Dedicated Bailer</u>		
	Test Equipment	Water Level		pH		Conductivity		Turbidity	
	Meter No.	<u>see DTW log</u>		<u>KA 90292</u>		<u>KA 02154</u>		<u>Not well</u>	
	Calibration Date/Time	<u>NA</u>		<u>9/16/99 12:00</u>		<u>9/16/99 12:00 red lined</u>			
	Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
	Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
	Other:	Other	Cool	Other	Cool	Other	Cool	Other	Cool
	Vol. (gal):			<u>NA</u>					
Source:									
Decon. Notes:									

Well Security:	good	<u>(fair)</u>	poor	Well Integrity:	good	fair	poor	Locked:	yes	<u>(no)</u>
Purge Volume (CV)	T.D.	-	DTW	x	Factor	x	1 CV	=	<u>6.8</u>	gal
Well Diam.: $\square$ 2" $\square$ 4"	<u>23.9</u> ft.	-	<u>13.57</u> ft.	x	<u>2.9-3.5</u> <u>r=0.663</u>	x	<u>3</u>	=	<u>20.4</u>	gal
Free Product?:	Odor:	<u>(no)</u> yes	Floating Product:	<u>(none)</u>	<u>sheen</u>		film			feet thick
Time (24-hr)	<u>12:15</u>	<u>12:20</u>	<u>12:27</u>	<u>12:32</u>						Replicate Goals
Gallons Purged	<u>0</u>	<u>6.8</u>	<u>13.6</u>	<u>20.4</u>						(dev. only)
Surged (minutes)	<u>↑</u>	<u>NA</u>								
pH	<u>S</u>	<u>7.13</u>	<u>7.12</u>	<u>7.14</u>			<u>stable.</u>			$\pm 0.10$
Temperature (°C)	<u>T</u>	<u>17.1</u>	<u>16.8</u>	<u>16.8</u>						$\pm 1^\circ\text{C}$
Cond. ( $\mu\text{mhos/cm}$ )	<u>A</u>	<u>1650</u>	<u>1610</u>	<u>1610</u>						$\pm 10\%$
Salinity (%)	<u>R</u>	<u>1.0</u>	<u>1.0</u>	<u>1.0</u>						$\pm 10\%$
Turbidity (NTU's)	<u>T</u>	<u>Not measured</u>								<50 NTUs
Color	<u>↓</u>	<u>light yellow</u>								Colorless
Depth to Water				<u>13.65</u>						$\pm 0.01'$
Reference Point:	<u>TOC</u>	Other:								

Sample Log	Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
		<u>KMW-8</u>	<u>12:40</u>	<u>3</u>	<u>40ml</u>	<u>VOA</u>	<u>HCl</u>	<u>-</u>	<u>TPHs/BTEX/MTBE</u>
			<u>1</u>	<u>1L</u>	<u>Amber</u>	<u>-</u>	<u>-</u>	<u>TPH-D</u>	<u>C</u>
			<u>1</u>	<u>1L</u>	<u>Amber</u>	<u>-</u>	<u>-</u>	<u>PAHs RP</u>	<u>A</u>
									<u>M</u>
	<u>KMW-8A</u>	<u>12:15</u>		<u>Same</u>	<u>as above</u>				<u>P</u>
									<u>B</u>
									<u>ELL</u>

Other Observations: \_\_\_\_\_

Final Check: VOAs free of bubbles? (yes) / no / NA Well Locked? (yes) / (no) / NA

KA KLEINFELDER

KMW-6

WELL DEVELOPMENT & SAMPLING LOG

WELL NO: KA-6-6

Date: 9/16/99 Weather: Clear ~85°F Sheet of  
 Project: Fiosman Submitted By: Keith Powers Date: 9/16/99  
 Project No.: 10-3006-13/011 Reviewed By: [Signature] Date: 9/29/99  
 Purpose of Log  Development  Sampling

Equipment & Decontamination	Purging Equipment	Bailer	Disposable	Suction Pump	Submersible Pump	Dedicated Pump	Other: Dedicated Bailer		
	Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other: Dedicated Bailer - KP		
	Test Equipment	Water Level		pH		Conductivity		Turbidity	
	Meter No.	See DTW Log		KA90292		KA 02154		not used	
	Calibration Date/Time	NA		9/16/99 12:00		9/16/99 Red lined Terped			
	Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
	Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
	Other:	Other	Cool	Other	Cool	Other	Cool	Other	Cool
	Vol. (gal):	NA							

Well Security:	good	fair	poor	Well Integrity:	good	fair	poor	Locked:	yes	no
Purge Volume (CV)	T.D.	DTW	x	Factor	x	1 C.V.	=	6 gal		
Well Diam.: 2" 4"	23.47 ft	14.79 ft	x	2-0.125 4-0.663	x	3	=	18 gal		
Free Product?: Odor:	no	yes	floating	Product:	none	sheen	film			feet thick
Time (24-hr)	14:50	14:55	15:00	15:05						Replicate Goals
Gallons Purged	0	6	18	18						(dev. only)
Surged (minutes)	↑	NA		→						±0.10
pH	S	6.70	6.71	6.70			stable			±1°C
Temperature (°C)	T	19.5	20.1	19.9						±10%
Cond. (µmhos/cm)	A	1900	1900	1850						±10%
Salinity (‰)	R	1.1	1.1	1.1						<50 NTUs
Turbidity (NTU's)	T	Not measured								Colorless
Color	↓	clear	clear	slightly cloudy						±0.01'
Depth to Water										
Reference Point:	TOC	Other:		14.5						

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-6	15:10	3	40ml	VOA	HCl	-	TPH-g/BTEX/MTBE	MC
		1	1L	Amber	-	-	TPH-d	C
		1	1L	Amber	-	-	PAHs	A
		1	1L	Poly	-	-	Total lead	M
								P
								B
								ELL

Other Observations: \_\_\_\_\_  
 Final Check: VOAs free of bubbles?  yes / no / NA Well Locked?  yes / no / NA

**WELL DEVELOPMENT & SAMPLING LOG** **WELL NO. Kmw-7**

Date: 9/16/99 Weather: Clear ~80°F Sheet 1 of 1

Project: Erasmus Submitted By: Keith Powers Date: 9/16/99

Project No.: 10-3006-13/011 Reviewed By: [Signature] Date: 9/20/99

Purpose of Log  Development  Sampling

Equipment & Decontamination	Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other: <u>Dedicated Bailer</u>		
	Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersible Pump	Dedicated Pump	Other: <u>Dedicated Bailer</u>		
	Test Equipment	Water Level		pH		Conductivity		Turbidity	
	Meter No.	<u>See DTW Log</u>		<u>KA 90292</u>		<u>KA 02154</u>		<u>Not used</u>	
	Calibration Date/Time	<u>NA</u>		<u>9/16/99 12:00</u>		<u>11/6/99 Red line / zeroed</u>			
	Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
	TSP	DI	Steam	DI	Steam	DI	Steam	DI	Steam
	Alconox	Tap	Hot	Tap	Hot	Tap	Hot	Tap	Hot
	Other:	Other	Cool	Other	Cool	Other	Cool	Other	Cool
	Vol. (gal):			<u>NA</u>					

Well Security:	good	<u>fair</u>	poor	Well Integrity:	good	fair	poor	Locked:	yes	no
Purge Volume (CV)	T.D.	-	DTW	x	Factor	x	1 CV	=	<u>7.1 gal</u>	
Well Diam.: $\square$ 2" $\square$ 4"	<u>23.7 ft.</u>		<u>13.00 ft.</u>	x	<u>0.175</u> <u>0.663</u>	x	<u>3</u>	=	<u>21.3 gal</u>	
Free Product?: Odor:	no	<u>yes moderate</u>	Floating Product:	<u>none</u>	sheen	film			feet thick	
Time (24-hr)	<u>13:40</u>	<u>13:45</u>	<u>13:53</u>	<u>14:00</u>					Replicate Goals	
Gallons Purged	0	<u>7.1</u>	<u>14.2</u>	<u>21.3</u>					(dev. only)	
Surged (minutes)	$\uparrow$	<u>NA</u>								
pH	S	<u>7.07</u>	<u>7.11</u>	<u>7.13</u>	<u>stable</u>				$\pm 0.10$	
Temperature (°C)	T	<u>17.5</u>	<u>17.5</u>	<u>17.3</u>					$\pm 1^\circ\text{C}$	
Cond. ( $\mu\text{mhos/cm}$ )	A	<u>1420</u>	<u>1390</u>	<u>1390</u>					$\pm 10\%$	
Salinity (%)	R	<u>0.9</u>	<u>0.9</u>	<u>0.9</u>					$\pm 10\%$	
Turbidity (NTU's)	T	<u>Not measured</u>							<50 NTUs	
Color	$\downarrow$	<u>light gray</u>			<u>gray</u>				Colorless	
Depth to Water				<u>13.7</u>					$\pm 0.01'$	
Reference Point:	TOC	Other:								

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
<u>Kmw-7</u>	<u>14:10</u>	<u>3</u>	<u>40ml</u>	<u>VOA</u>	<u>HCl</u>	-	<u>TATG/BTEX/MTBE</u>	<u>MC</u>
		<u>1</u>	<u>1L</u>	<u>Amber</u>	-	-	<u>TPH-d</u>	<u>C</u>
		<u>1</u>	<u>1L</u>	<u>Amber</u>	-	-	<u>PAHs</u>	<u>A</u>
		<u>1</u>	<u>1L</u>	<u>Poly</u>	-	-	<u>Total Lead</u>	<u>M</u>
								<u>P</u>
								<u>B</u>
								<u>ELL</u>

Other Observations: \_\_\_\_\_

Misc: \_\_\_\_\_

Final Check: VOAs free of bubbles? yes / no / NA Well Locked? yes / no / NA

**APPENDIX B – CHAIN OF CUSTODY RECORDS AND CERTIFIED  
ANALYTICAL LABORATORY REPORTS**

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PROJECT NO. 10-3006-13/012 PROJECT NAME 3rd Quarter Friesman 1999 Event

L.P. NO. (P.O. NO.) SAMPLERS: (Signature/Number) KBR (3014)

DATE MM/DD/YY SAMPLE I.D. TIME HH-MM-SS SAMPLE I.D. MATRIX

NO. OF CONTAINERS TYPE OF CONTAINERS

ANALYSIS  
 TPH-9 (8015)  
 BTEX/MTBE (8070)  
 PAHS ONLY (8070)  
 TPH-A\* (8015)  
 Total Lead (8015)

RECEIVING LAB: McCampbell

INSTRUCTIONS/REMARKS: Standard T.A.T.

(F)(F)(F)

NO.	DATE	SAMPLE I.D. TIME	SAMPLE I.D.	MATRIX	NO. OF CONTAINERS	TYPE OF CONTAINERS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	ANALYSIS	
1	9/16/99	12:00	Trip Blank	H2O	1	VDA	X	X												
2		12:40	KMW-8	H2O	4	VDA Amber	X	X	X											
3		12:50	KMW-8A	H2O	4	VDA Amber	X	X	X											
4		14:10	KMW-7	H2O	6	VDA Amber Poly	X	X	X	X	X									
5	✓	15:10	KMW-6	H2O	6	VDA Amber Poly	X	X	X	X	X									
6			END																	
7																				
8																				
9																				
10																				
11																				
12																				
13																				
14																				
15																				
16																				
17																				
18																				
19																				
20																				

\* Please do silica-gel cleanup on TPH-d samples  
 \*\* Please Filter with 0.45 micron and then preserve.

19439  
 19440  
 19441  
 19442  
 19443

ICE GOOD CONDITION HEAD SPACE ABSENT

VOAS LOG METALS OTHER  
 PRESERVATION APPROPRIATE CONTAINERS  
 Always preserved in lab upon arrival

Relinquished by: (Signature) KBR Date/Time 9/16/99 17:00 Received by: (Signature) [Signature]  
 Relinquished by: (Signature) [Signature] Date/Time 9/17/99 10:25 Received by: (Signature) Bill Butts  
 Relinquished by: (Signature) Bill Butts Date/Time 9-17/01:05 Received for Laboratory by: (Signature) [Signature]

Instructions/Remarks: Please ship back cooler and bubble wrap and ferris.

Send Results To: KLEINFELDER 7133 KOLL CENTER PARKWAY SUITE 100 PLEASANTON, CA 94566 925(510)484-1700  
 Attn: Neal Siler



McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553-5560  
Telephone : 925-798-1620 Fax : 925-798-1622  
<http://www.mccampbell.com> E-mail: [main@mccampbell.com](mailto:main@mccampbell.com)

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman 3 <sup>rd</sup> Quarter 1999 Event	Date Sampled: 09/16/99
		Date Received: 09/17/99
	Client Contact: Neal Siler	Date Extracted: 09/17/99
	Client P.O:	Date Analyzed: 09/17/99

09/24/99


Dear Neal:

Enclosed are:

- 1). the results of 5 samples from your #10-3006-13/012; Friesman 3<sup>rd</sup> Quarter 1999 Event project,
- 2). a QC report for the above samples
- 3). a copy of the chain of custody, and
- 4). a bill for analytical services.

All analyses were completed satisfactorily and all QC samples were found to be within our control limits. If you have any questions please contact me. McCampbell Analytical Laboratories strives for excellence in quality, service and cost. Thank you for your business and I look forward to working with you again.

Yours truly,



Edward Hamilton, Lab Director





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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman 3 <sup>rd</sup> Quarter 1999 Event	Date Sampled: 09/16/99
	Client Contact: Neal Siler	Date Received: 09/17/99
	Client P.O:	Date Extracted: 09/19-09/20/99
		Date Analyzed: 09/19-09/20/99

**Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline\*, with Methyl tert-Butyl Ether\* & BTEX\***  
 EPA methods 5030, modified 8015, and 8020 or 602; California RWQCB (SF Bay Region) method GCFID(5030)

Lab ID	Client ID	Matrix	TPH(g) <sup>+</sup>	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	% Recovery Surrogate
19439	Trip Blank	W	ND	ND	ND	ND	ND	ND	109
19440	KMW-8	W	ND	ND	ND	ND	ND	ND	107
19441	KMW-8A	W	ND	ND	ND	ND	ND	ND	103
19442	KMW-7	W	950,a	ND<10	3.3	2.0	19	33	114
19443	KMW-6	W	7100,a	ND<120	230	9.8	300	210	111
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	5.0	0.5	0.5	0.5	0.5	
	S		1.0 mg/kg	0.05	0.005	0.005	0.005	0.005	

\* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP and SPLP extracts in ug/L

\* cluttered chromatogram; sample peak coelutes with surrogate peak

\*The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified gasoline is significant; b) heavier gasoline range compounds are significant(aged gasoline?); c) lighter gasoline range compounds (the most mobile fraction) are significant; d) gasoline range compounds having broad chromatographic peaks are significant; biologically altered gasoline?; e) TPH pattern that does not appear to be derived from gasoline (?); f) one to a few isolated peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment; j) no recognizable pattern.

Edward Hamilton, Lab Director



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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman 3 <sup>rd</sup> Quarter 1999 Event	Date Sampled: 09/16/99
	Client Contact: Neal Siler	Date Received: 09/17/99
	Client P.O:	Date Extracted: 09/17/99
		Date Analyzed: 09/17-09/20/99

**Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel with Silica Gel Clean-up\***  
EPA methods modified 8015, and 3550 or 3510; California RWQCB (SF Bay Region) method GCFID(3550) or GCFID(3510)

Lab ID	Client ID	Matrix	TPH(d) <sup>†</sup>	% Recovery Surrogate
19440	KMW-8	W	ND	99
19441	KMW-8A	W	ND	100
19442	KMW-7	W	1100,d	98
19443	KMW-6	W	1900,d	102
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	W		50 ug/L	
	S		1.0 mg/kg	

\* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil and sludge samples in mg/kg, and all TCLP / STLC / SPLP extracts in ug/L

\* cluttered chromatogram resulting in coeluted surrogate and sample peaks, or; surrogate peak is on elevated baseline, or; surrogate has been diminished by dilution of original extract.

<sup>†</sup>The following descriptions of the TPH chromatogram are cursory in nature and McCampbell Analytical is not responsible for their interpretation: a) unmodified or weakly modified diesel is significant; b) diesel range compounds are significant; no recognizable pattern; c) aged diesel? is significant; d) gasoline range compounds are significant; e) medium boiling point pattern that does not match diesel (?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen is present; i) liquid sample that contains greater than ~5 vol. % sediment.

*Edward Hamilton* Edward Hamilton, Lab Director



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Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman 3 <sup>rd</sup> Quarter 1999 Event	Date Sampled: 09/16/99
	Client Contact: Neal Siler	Date Received: 09/17/99
	Client P.O:	Date Extracted: 09/17/99
		Date Analyzed: 09/17/99


**Lead\***

EPA analytical methods 6010/200.7, 239.2\*

Lab ID	Client ID	Matrix	Extraction °	Lead*	% Recovery Surrogate
19442	KMW-7	W	Dissolved	ND	NA
19443	KMW-6	W	Dissolved	ND	NA
Reporting Limit unless otherwise stated; ND means not detected above the reporting limit	S	TTLC	3.0 mg/kg		
	W	Dissolved	0.005 mg/L		
	---	STLC,TCLP	0.2 mg/L		

\* soil and sludge samples are reported in mg/kg, wipe samples in ug/wipe, and water samples and all STLC / SPLP / TCLP extracts in mg/L  
 ° Lead is analysed using EPA method 6010 (ICP)for soils, sludges, STLC & TCLP extracts and method 239.2 (AA Furnace) for water samples  
 ° EPA extraction methods 1311(TCLP), 3010/3020(water,TTLC), 3040(organic matrices,TTLC), 3050(solids,TTLC); STLC - CA Title 22  
 \* surrogate diluted out of range; N/A means surrogate not applicable to this analysis  
 \* reporting limit raised due matrix interference  
 i) liquid sample that contains greater than ~2 vol. % sediment; this sediment is extracted with the liquid, in accordance with EPA methodologies and can significantly effect reported metal concentrations.

DHS Certification No. 1644

 Edward Hamilton, Lab Director

## QC REPORT FOR HYDROCARBON ANALYSES

Date: 09/17/99-09/18/99

Matrix: WATER

Analyte	Concentration (ug/L)			Amount Spiked	% Recovery		RPD
	Sample (#18261)	MS	MSD		MS	MSD	
TPH (gas)	0.0	102.8	100.0	100.0	102.8	100.0	2.8
Benzene	0.0	9.4	10.1	10.0	94.0	101.0	7.2
Toluene	0.0	9.5	10.2	10.0	95.0	102.0	7.1
Ethyl Benzene	0.0	9.9	10.4	10.0	99.0	104.0	4.9
Xylenes	0.0	30.0	31.0	30.0	100.0	103.3	3.3
TPH(diesel)	0.0	7622	7737	7500	102	103	1.5
TRPH (oil & grease)	0	23700	24100	23700	100	102	1.7

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = ((\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD})) \times 2 \times 100$$

McCAMPBELL ANALYTICAL INC.

110 2nd Avenue South, #D7, Pacheco, CA 94553  
 Tele: 925-798-1620 Fax: 925-798-1622

QC REPORT FOR HYDROCARBON ANALYSES

Date: 09/19/99-09/20/99

Matrix: WATER

Analyte	Concentration (ug/L)			Amount Spiked	% Recovery		RPD
	Sample (#18261)	MS	MSD		MS	MSD	
TPH (gas)	0.0	96.4	97.8	100.0	96.4	97.8	1.5
Benzene	0.0	9.3	9.9	10.0	93.0	99.0	6.2
Toluene	0.0	9.5	10.0	10.0	95.0	100.0	5.1
Ethyl Benzene	0.0	9.8	10.2	10.0	98.0	102.0	4.0
Xylenes	0.0	29.2	30.5	30.0	97.3	101.7	4.4
TPH(diesel)	0.0	7000	7575	7500	93	101	7.9
TRPH (oil & grease)	0	27400	28200	23700	116	119	2.9

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = ((\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD})) \times 2 \times 100$$

## QC REPORT FOR ICP and/or AA METALS

Date: 09/17/99-09/18/99

Matrix: WATER

Extraction:

DISSOLVED

Analyte	Concentration (mg/L)			Amount	% Recovery		
	Sample	MS	MSD		MS	MSD	RPD
Total Lead	0.00	5.28	5.30	5.00	106	106	0.3
Total Cadmium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Chromium	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Nickel	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Zinc	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Copper	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Total Silver	N/A	N/A	N/A	N/A	N/A	N/A	N/A

$$\% \text{ Rec.} = (\text{MS} - \text{Sample}) / \text{amount spiked} \times 100$$

$$\text{RPD} = (\text{MS} - \text{MSD}) / (\text{MS} + \text{MSD}) \times 2 \times 100$$

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**APPENDIX C – HISTORICAL WATER LEVEL MEASUREMENTS**

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**HISTORICAL GROUNDWATER ELEVATION DATA  
FRIESMAN RANCH PROPERTY  
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA**

WELL NUMBER	SAMPLING DATE	WATER LEVEL FROM T.O.C.  (feet)	FREE-PRODUCT THICKNESS  (feet)	GROUNDWATER ELEVATIONS USGS Datum
				(Fl. Above MSL)
KMW-1	9/16/99	NM	NM	NC
	6/21/99	NM	NM	NC
	3/25/99	11.99	0.00	358.13
	1/12/99	12.97	0.00	357.15
	12/28/98	12.72	0.00	357.40
	9/8/97	12.82	0.00	357.30
KMW-2	9/16/99	NM	NM	NC
	6/21/99	NM	NM	NC
	3/25/99	13.19	0.00	357.53
	1/12/99	14.32	0.00	356.40
	12/28/98	14.08	0.00	356.64
	9/8/97	14.28	0.00	356.44
KMW-3	9/16/99	NM	NM	NC
	6/21/99	NM	NM	NC
	3/25/99	11.59	0.00	357.51
	1/12/99	15.13	0.00	353.97
	12/28/98	12.39	0.00	356.71
	9/8/97	12.34	0.00	356.76
KMW-4	9/16/99	NM	NM	NC
	6/21/99	NM	NM	NC
	3/25/99	12.89	0.00	356.91
	1/12/99	14.40	0.00	355.40
	12/28/98	13.76	0.00	356.04
	9/8/97	13.76	0.00	356.04
KMW-5	9/16/99	NM	NM	NC
	6/21/99	NM	NM	NC
	3/25/99	13.27	0.00	356.25
	1/12/99	15.32	0.00	354.20
	12/28/98	14.17	0.00	355.33
	9/8/97	14.24	0.00	355.28
KMW-6	9/16/99	14.29	0.00	355.79
	6/21/99	14.56	0.00	355.52
	3/25/99	13.22	0.00	356.86
	1/12/99	14.47	0.00	355.61
	12/28/98	14.16	0.00	355.92
	9/8/97	14.28	0.00	355.80
KMW-7	9/16/99	13.00	0.00	357.04
	6/21/99	12.86	0.00	357.18
	3/25/99	12.12	0.00	357.92
	1/12/99	13.15	0.00	356.89
	12/28/98	12.91	0.00	357.13
KMW-8	9/16/99	13.57	0.00	355.04
	6/21/99	13.30	0.00	355.31
	3/25/99	12.48	0.00	356.13
	1/12/99	13.70	0.00	354.91
	12/28/98	13.37	0.00	355.24

**NOTES:**

G.S. = Ground Surface

NC = Not Calculable

NM = Not Measured

T.O.C. = Top of casing. All measurements in feet relative to top of casing.

USGS = United States Geological Survey

All wells have 4" ID casing = 0.65 gallons per casing length (foot).



**APPENDIX D – HISTORICAL GROUNDWATER CHEMISTRY**

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**HISTORICAL GROUNDWATER CHEMISTRY  
FRIESMAN RANCH PROPERTY  
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA**

WELL NUMBER	SAMPLE COLLECTION DATE	TPH-d (µg/L)	TPH-g (µg/L)	Benzene (µg/L)	Toluene (µg/L)	Ethyl-Benzene (µg/L)	Total Xylenes (µg/L)	MTBE (µg/L)	PAHs (µg/L)	Lead (µg/L)
KMW-1	9/16/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/21/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/25/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	7.8
	dup. 12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	5.9
KMW-2	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
	9/16/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/21/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/25/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	<5.0
KMW-3	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
	9/16/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/21/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/25/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	<5.0
KMW-4	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
	9/16/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/21/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/25/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	7.5
KMW-5	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
	9/16/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	6/21/99	NS	NS	NS	NS	NS	NS	NS	NS	NS
	3/25/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	8.5
KMW-6	dup. 9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
	9/16/99	1,900, d	7,100, a	230	9.8	300	210	<120	<10	<5.0
	6/21/99	1,500, d,b	3,800, a	170	<0.5	260	160	<10	200*	<5.0
	3/26/99	1,700, d,b	7,000, a	160	5.1	270	200	<100**	100*	<5.0
	dup. 3/26/99	1,700, d,b	6,700, a	170	6.5	270	200	<100**	100*	-
KMW-7	12/28/98	1,800, d	3,200, a	86	3.6	140	90	<50**	130*	15
	9/8/97	3,200, d	13,000, a	250	14	560	490	<150**	140*	-
	9/16/99	1,100, d	950, a	3.3	2.0	19	33	<10	<10	<5.0
	6/21/99	1,300, d,b	1,300, a	6.5	<0.5	21	62	<5.0	27 *	<5.0
	dup. 6/21/99	1,200, d	2,000, a	6.4	6.7	24	76	<5.0	17 *	-
KMW-8	3/25/99	1,200 d,b	4,300, a,h	19	16	56	270	<70**	23 *	22
	12/28/98	1,000, d,h	9,100, a,h	23	17	190	700	<70**	110*	38
	9/16/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	-	-
	6/21/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<0.5	-	-
	3/25/99	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
12/28/98	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	12	

**Notes:**

- TPH-d Total Petroleum Hydrocarbons as Diesel
  - TPH-g Total Petroleum Hydrocarbons as Gasoline
  - MTBE Methyl Tertiary-Butyl Ether
  - PAHs Polynuclear Aromatic Hydrocarbons
  - MCL Cal/EPA Maximum Contaminant Level
  - µg/L Micrograms per Liter (approx. equal to parts per billion)
  - <0.5 Not detected at or above the laboratory method reporting limit
  - a Unmodified or weakly modified gasoline is significant
  - b Diesel range compounds are significant; no recognizable pattern
  - d Gasoline range compounds are significant
  - h Lighter than water immiscible sheen is present
  - \* Naphthalene only, all other chemicals were < 20, 10 or 2.5 µg/L
  - \*\* Reporting limit raised due to high presence of TPH-g
  - Not analyzed
  - NS Not Sampled
- Wells KMW-7 and KMW-8 installed on December 23, 1998