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

Sep 1999

September 21, 1999

A Report Prepared for:

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

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

Kleinfelder Job No. 10-3006-13/013

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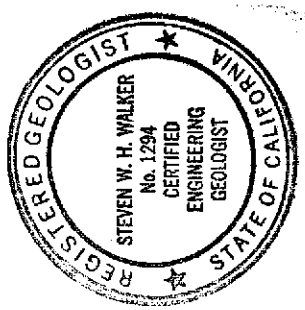

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September 21, 1999

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

TABLE OF CONTENTS

LIST OF PLATES

LIST OF TABLES

LIST OF APPENDICES

1. INTRODUCTION

This report describes the results of the Second Quarter 1999 Groundwater Monitoring Event performed at the Friesman Ranch Property, Livermore, California (Plate 1). The Second Quarter 1999 Groundwater Monitoring Event is the third 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 first 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; and
- Evaluate the number, type and condition of wells in the vicinity of the site and their potential to act as conduits for subsurface chemical transport.

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

- Implementation of a regularly scheduled groundwater monitoring event;
- Performance of a well survey within a radius of approximately 2,000 feet of the project site; and
- Preparation of this quarterly groundwater monitoring report.

2. FIELD ACTIVITES

2.1 INTRODUCTION

This section summarizes the field activities performed for the quarterly groundwater monitoring program. All field activities were performed on June 21, 1999. Plate 2 shows the locations of the existing groundwater monitoring wells.

2.2 GROUNDWATER MONITORING ACTIVITES

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 June 21, 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-millilter [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. All of these samples are analyzed for TPH-g and BTEX.

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

- A trip blank; and
- A blind duplicate.

Because only dedicated equipment was used to purge the wells and 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.

2.7 WELL SURVEY ACTIVITIES

In accordance with a request from ACHCSA, Kleinfelder conducted a well survey in the vicinity of the Friesman Ranch property. The purpose of this survey was to evaluate the potential for impacts to wells in the vicinity of the property due to chemicals detected in the groundwater. Three wells that were identified by ACHCSA were 3S/IE2P3, 3S/IE2N2 and 3S/IE3N3 (ACHCSA, 1999). The Alameda County Flood Control and Water Conservation district – Zone 7 (Zone 7) and the California Department of Water Resources (DWR) were contacted concerning wells within a radius of approximately 2,000 feet of the site.

3. SUMMARY OF RESULTS

3.1 INTRODUCTION

Water-level and free-product thickness measurements were recorded on June 21, 1999. Groundwater samples were also collected from the three wells monitored for this event on June 21, 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 hydochemical 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 June 21, 1999. Depths to water ranged from 12.86 to 14.56 feet bgs (Table 1). In June 1999, groundwater flow was to the northwest with a hydraulic gradient of 0.007 foot per foot (ft/ft). These results are consistent with the previous groundwater monitoring event in March 1999 (Appendix C) (Kleinfelder, 1999).

3.3 FREE-PRODUCT THICKNESS

No sheen was observed on any of the samples; however, a strong hydrocarbon order 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, 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 3,800 micrograms per liter (µg/L) in KMW-6 and 1,300 µg/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 of this magnitude no free product was detected (see Section 3.3).

3.4.2 Total Petroleum Hydrocarbons as Diesel

TPH-d was detected at concentrations of 1,500 µg/L in KMW-6 and 1,300 µg/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 in excess of its drinking water maximum contaminant level (MCL), 1 µg/L, at concentrations of 170 µg/L in KMW-6 and 6.5 µg/L in KMW-7. Toluene was not detected in the primary samples collected from KMW-6, KMW-7 and KMW-8; however, it was detected below its MCL (150 µg/L) at a concentration of 6.7 µg/L in a duplicate sample collected from KMW-7. Ethylbenzene was detected below its MCL (700 µg/L) at concentrations of 260 µg/L in KMW-6 and 21 µg/L in KMW-7. Total xylenes were detected below the MCL (1,750 µg/L) at concentrations of 160 µg/L in KMW-6 and 62 µg/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 concentrations detected (Appendix D).

3.4.5 Polynuclear Aromatic Hydrocarbons

Naphthalene was the only PAH detected at concentrations of 200 µg/L in KMW-6 and 27 µg/L in KMW-7. KMW-8 was not analyzed for PAHs.

There is neither a Federal nor California MCL for naphthalene. The EPA National Ambient Water Quality Criteria for the Fresh Water Life Protection is 2,300 µg/L (acute) and 620 µg/L (chronic), based on additional toxicity information.

3.4.6 Dissolved Lead

This event marks the second time that dissolved lead (samples filtered with a 0.45-micron filter prior to analysis) was analyzed for in 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 June 1999 groundwater monitoring event. The trip blank contained no detectable concentrations of TPH-g, TPH-d, MTBE or BTEX.

3.5.2 Blind Duplicate Sample

One blind duplicate sample (KMW-7A) was collected from monitoring well KMW-6 on June 21, 1999. This duplicate sample was analyzed for TPH-g, TPH-d, BTEX, MTBE and PAHs.

The Relative Percent Differences (RPD) for TPH-g, TPH-d, benzene, ethylbenzene, total xylenes and naphthalene (the analytes detected) were 51.9, 8.0, 1.6, 13.3, 20.3 and 45.5 percent, respectively (Table 3). The RPDs for TPH-g, total xylenes and naphthalene exceeded the typical QA/QC goal of less than 20 percent; however, these results were within the same order of magnitude. The differences may be attributed to volatilization of the sample during sampling and/or transit to the laboratory as well as natural variation in groundwater and differences between laboratory instruments.

3.6 WELL SURVEY RESULTS

A total of 34 wells have been located within approximately 2,000 feet of the project site (Appendix E). Of these 34 wells, 13 have reportedly been abandoned. The active wells are used for municipal and domestic water supply, agricultural and monitoring purposes.

The wells range in total depth from 50 feet to 410 feet. The shallowest well (with a total depth of 102 feet), located downgradient (northwest) with respect to the project site, is 3S/1E2M2 (domestic water supply). The construction details for this well were not available from Zone 7 or DWR.

ACHCSA identified three water supply wells (3S/1E2P3, 3S/1E2N2 and 3S/1E3N3) within 2,000 feet of the project site (ACHCSA, 1999). Kleinfelder received information for two of these wells (3S/1E2P3 and 3S/1E2N2), but not for the third well (3S/1E3N3). According to both Zone 7 and the DWR, well 3S/1E3N3 does not exist; however, well 3S/1E2N3 does exist and information regarding this well was provided. The information regarding the three identified and apparently existing wells is contained in Appendix E.

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 June 1999. The summary and conclusions that follow are presented in the categories of field activities, groundwater chemistry and well survey.

4.1 FIELD ACTIVITIES

- Field activities performed consisted of the second 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 3,800 µg/L in KMW-6 and 1,300 µg/L in KMW-7. TPH-d was detected at 1,500 µg/L in KMW-6 and 1,300 µg/L in KMW-7. Benzene was detected in excess of its MCL (1 µg/L) at 170 µg/L in KMW-6 and 6.5 µg/L in KMW-7. Ethylbenzene was detected below its MCL (700 µg/L) in KMW-6 at 260 µg/L and in KMW-7 at 21 µg/L. Total xylenes were detected below the MCL (1,750 µg/L) in KMW-6 at 160 µg/L and in KMW-7 at 62 µg/L. Naphthalene was the only PAH detected at 200 µg/L in KMW-6 and 27 µg/L in KMW-7. Neither toluene nor MTBE were detected in any of the groundwater samples;

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

4.3 WELL SURVEY

- A survey of wells within a 2,000 foot radius of the site was performed;
- A total of 34 wells have been plotted on Zone 7 maps within the specified search radius; however, construction details were not available for all of these wells. A total of 13 of these wells have been identified as abandoned;
- Well 3S 1E/2M2 is a domestic supply well located approximately 600 feet downgradient (northwest) of the project site boundary. It is the closest, shallow well with respect to the property that is reportedly used for water supply (domestic) purposes. The well had a reported depth of 102 feet, but neither Zone 7 nor DWR had construction details for the well.

4.4 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 September 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.

5. LIMITATIONS

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

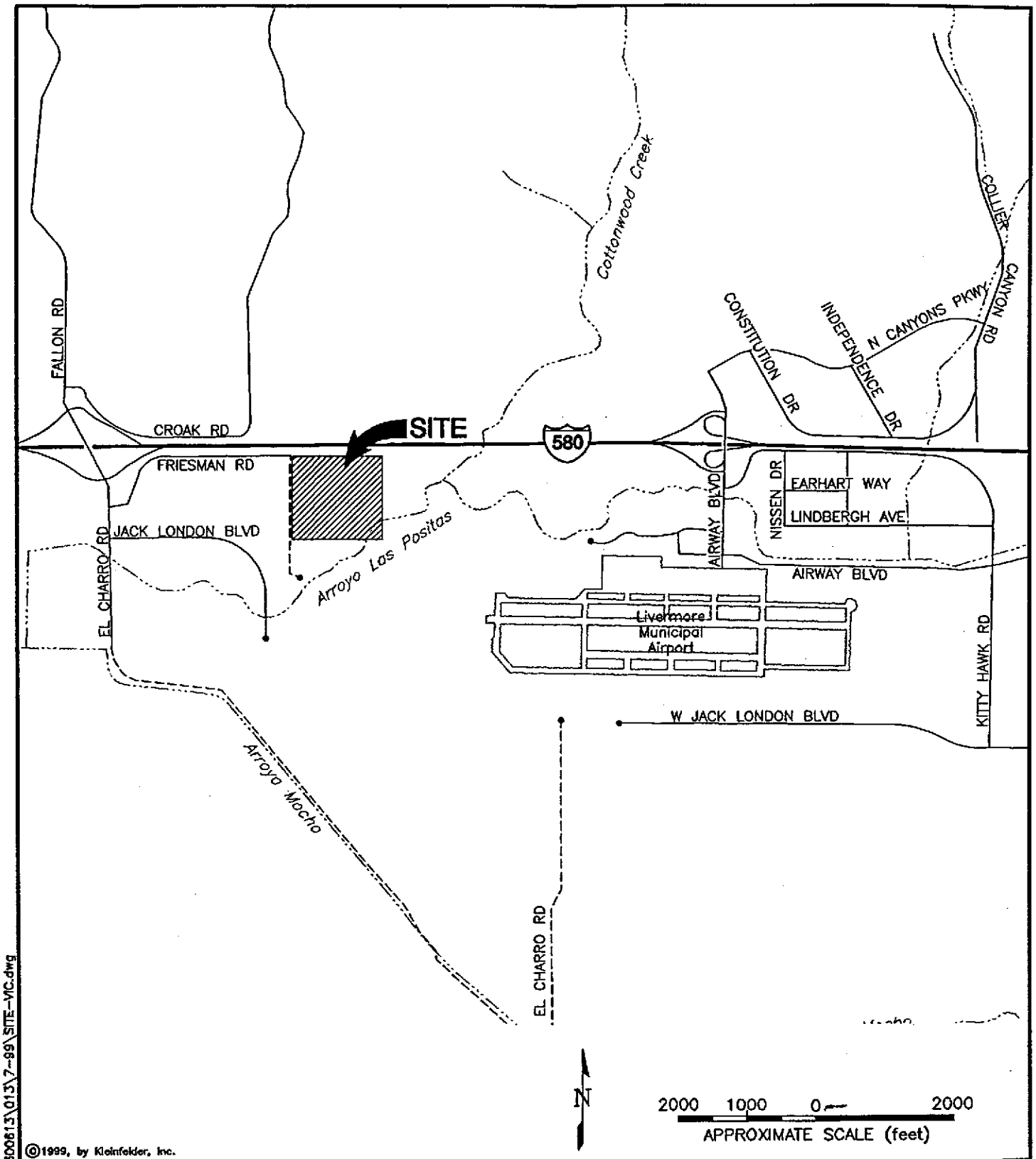
Alameda County Health Care Services Agency, 1999, Letter from Ms. Eva Chu of Alameda County Health Care Services Agency to Ms. Leah Goldberg of Hanson, Bridgett, Marcus, Vlahos and Rudy – LLP Regarding *QMR at 1600 Friesman Road, Livermore, CA.* June 15

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, First Quarter 1999, Friesman Ranch Property, Livermore, California.* June 11

PLATES



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DRAFTED BY: L. Sue	DATE: 7-22-99
CHECKED BY: N. Siler	DATE: 7-22-99

SITE VICINITY MAP

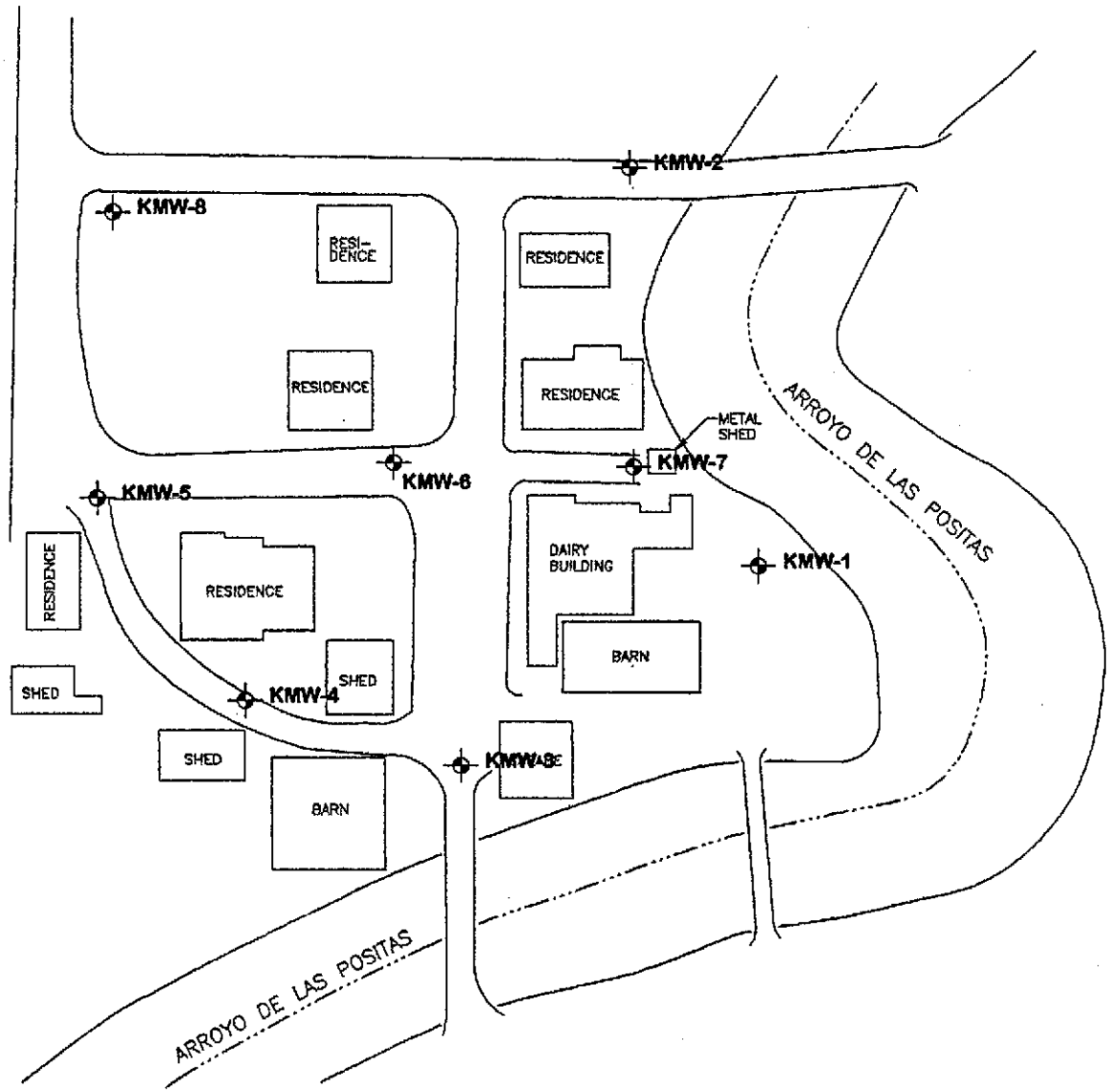
FRIESMAN RANCH PROPERTY
1600 FRIESMAN ROAD
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

PROJECT NO. 10-300613-013

PLATE 1

LEGEND

GROUNDWATER MONITORING WELL



NOTES:

1. Locations are approximate.

N

80 0 80

APPROXIMATE SCALE (feet)

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DRAFTED BY: L. Sue	DATE: 7-22-99
CHECKED BY: N. Siler	DATE: 7-22-99

SAMPLING LOCATIONS

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

PROJECT NO. 10-300613-013

PLATE

2

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LEGEND

⊕	GROUNDWATER MONITORING WELL
TPH	TOTAL PETROLEUM HYDROCARBONS
TPH–g	TPH AS GASOLINE
TPH–d	TPH AS DIESEL
BTEX	BENZENE, TOLUENE, ETHYLBENZENE AND TOTAL XYLENES
MTBE	METHYL TERTIARY BUTYL ETHER
PAH	POLYNUCLEAR AROMATIC HYDROCARBON COMPOUNDS
Pb	DISSOLVED LEAD
<50	NOT DETECTED above laboratory reporting limit

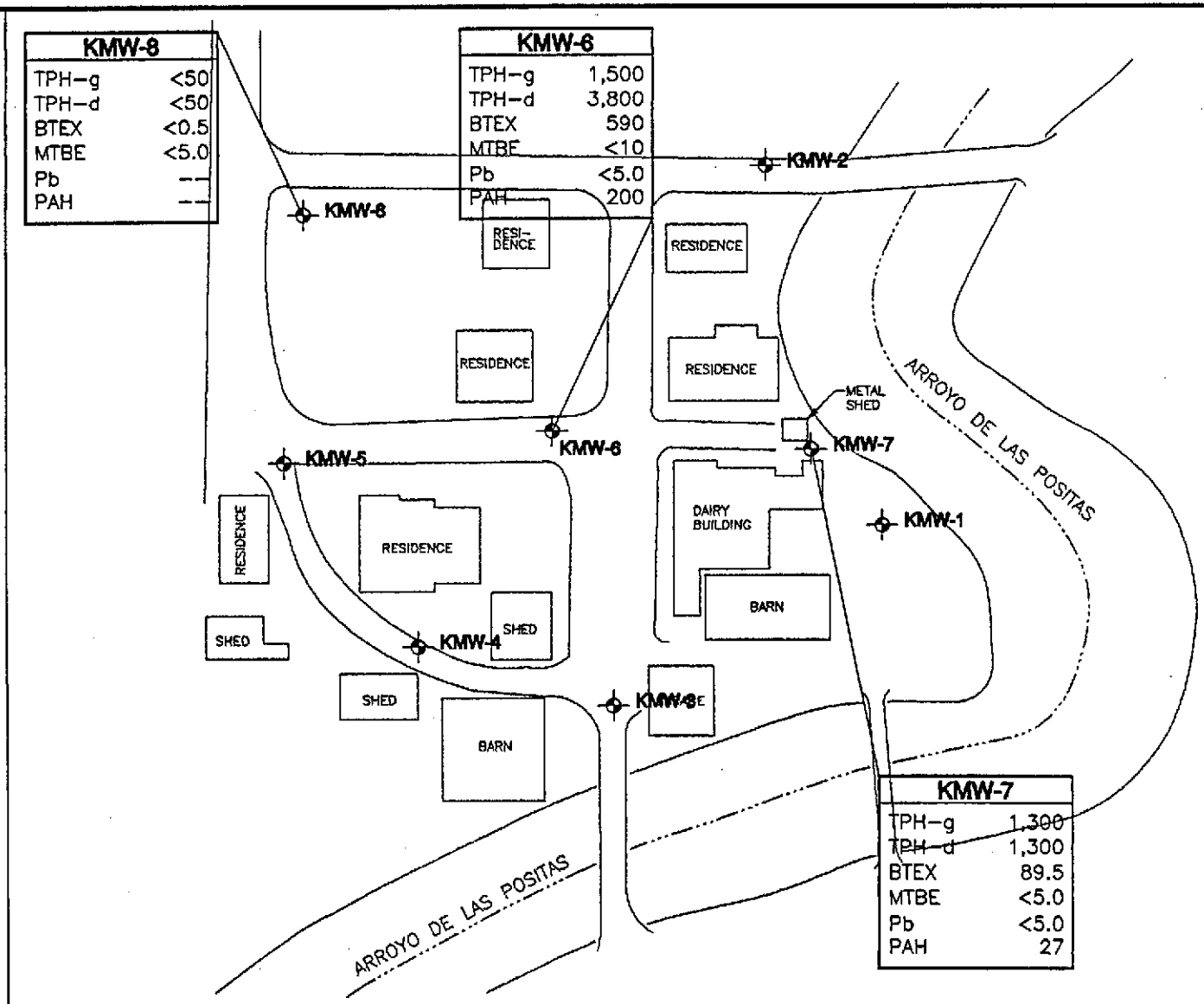
NOTES:

1. Locations are approximate.
2. All concentrations are reported in micrograms per liter (μg/L), approximately equivalent to parts per billion (ppb).

N

80 0 80

APPROXIMATE SCALE (feet)



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DRAFTED BY: L. Sue	DATE: 7–22–99
CHECKED BY: N. Siler	DATE: 7–22–99

GROUNDWATER ANALYTICAL RESULTS: JUNE 1999

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

PROJECT NO. 10–300613–013

PLATE 3

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TABLES

TABLE 1
GROUNDWATER ELEVATION DATA
JUNE 21, 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	14.56	0.00	23.47	0.53	15.09	370.08	355.52
KMW-7	12.86	0.00	23.70	0.58	13.44	370.04	357.18
KMW-8	13.30	0.00	23.90	0.58	13.88	368.61	355.31

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
JUNE 21, 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	6/21/99	1,500, d,b	3,800, a	170	<0.5	260	160	<10	200*	<5.0
KMW-7	6/21/99	1,300, d,b	1,300, a	6.5	<0.5	21	62	<5.0	27*	<5.0
KMW-8	6/21/99	<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	Diesel range compounds are significant; no recognizable pattern
d	Gasoline range compounds are significant
*	Naphthalene only, all other chemicals were < 2.5 µg/L
***	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 (ug/L)	Dissolved Lead (ug/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	<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

APPENDIX A – FIELD MONITORING NOTES

RECORD OF WATER LEVEL MEASUREMENTS – JUNE 21, 1999

KA KLEINFELDER

RECORD OF WATER LEVEL MEASUREMENTS

Date: 10/21/99 Weather: clear & breezy Sheet 1 of 1

Project: 10-3006-13/012 Submitted By: Michele Mahoney Date: 10/21/99

Project No.: _____ Reviewed By: _____ Date: _____

Instrument Number:

Well Number	Time (opened/measured)	Sensitivity Setting	Measuring Point	Measurement	Replicate Measurements (if requested)		Notes			(locked? ✓)
	(24-hr)	(est. %)	(M.P.)	1	2	3				
KMW-7	1100			12.86						
KMW-6	1105			14.56						
KMW-8	1110			13.30						

M.P.: TOC, GS, Cover ring, Other:

All Wells Locked -- YES / NO

WELL DEVELOPMENT AND SAMPLING LOGS – JUNE 21, 1999

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. 6

Date: 6/21/99 Weather: clear

Sheet 1 of

Project: Friesman Ranch Submitted By: Michele Mahoney Date: 6/21/99

Project No.: 10-3006-13/012 Reviewed By: [signature] Date: 6/22/99

Purpose of Log ☐ Development ☑ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other: Dedicated Bailer
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other: "

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		KA 90575	KA 90293	
Calibration Date/Time	NA			

Decontamination Methods (TSP, Alconox, Other:)	Wash: DI Tap Other / Steam Hot Cool	Rinse I: DI Tap Other / Steam Hot Cool	Rinse II: DI Tap Other / Steam Hot Cool	Rinse III: DI Tap Other / Steam Hot Cool
Vol. (gal):		NA		
Source:				
Decon. Notes:				

Development / Purge Record

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. − DTW × Factor × 1 C.V = 5.9 gal

Well Diam.: ☐ 2" ☐ 4" 23.47 ft. − 14.56 ft. × (2"=0.175, 4"=0.663) × = 17.7 gal

Free Product?: Odor: no (yes) Floating Product: (none) sheen film feet thick

								Replicate Goals
Time (24-hr)	12:40	1245	1255	1310				(dev. only)
Gallons Purged	0	5.9	11.8	17.7				
Surged (minutes)	↑	NA	→	→				
pH	S	6.5	6.57	6.6				±0.10
Temperature (°C)	T	25	22	21				±1°C
Cond. (µmhos/cm)	A	1790	1700	1700				±10%
Salinity (‰)	R	1.1	1.1	1.1				±10%
Turbidity (NTU's)	T	NA	→	→				<50 NTUs
Color	↓	clear						Colorless
Depth to Water				(14.42)				±0.01'

Reference Point: TOC Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-6	1315	3	40 ml	VOA	HCl		TPHg, BTEX, MTBE	McCampbell
KMW-6	1315	1	liter	Amber	∅		TPH-d	
KMW-6	1315	1	500 ml	Poly	∅		Total lead	
KMW-6	1315	1	liter	Amber	∅		PAHs	

Misc

Other Observations: odor

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

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. 7

Date: 6/21/99 Weather: clear + breezy Sheet ___ of ___

Project: Friesman Ranch Submitted By: Michele Mahoney Date: 6/21/99

Project No.: 10-3006-13/011 Reviewed By: E. Lee Date: 6/22/99

Purpose of Log ☐ Development ☒ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other: Dedicated Bailer
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other:

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		KA 90575	KA 90293	
Calibration Date/Time	NA			

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
TSP / Alconox / Other:	DI / Tap / Other	Steam / Hot / Cool	DI / Tap / Other	Steam / Hot / Cool	DI / Tap / Other	Steam / Hot / Cool	DI / Tap / Other	Steam / Hot / Cool
Vol. (gal):			N/A					
Source:								
Decon. Notes:								

Development / Purge Record

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. − DTW × Factor × 1 C.V = 7.2 gal

Well Diam.: ☐ 2" ☒ 4" 23.7 ft. − 12.86 ft. × (2"=0.175, 4"=0.663) × 3 = 21.6 gal

Free Product?: Odor: no (yes) Floating Product: (none) sheen film ___ feet thick

								Replicate Goals
Time (24-hr)	11:20	11:25	1135	1145				
Gallons Purged	0	7.2	14.4	21.6				(dev. only)
Surged (minutes)	↑	NA →	→	→				±0.10
pH	S	6.75	7.0	7.1				±1°C
Temperature (°C)	T	21	19	18				±10%
Cond. (µmhos/cm)	A	1400	1330	1390				±10%
Salinity (‰)	R	0.9	0.9	0.9				<50 NTUs
Turbidity (NTU's)	T	NA →	→	→				Colorless
Color	↓	clear						±0.01'
Depth to Water				(13.81)				

Reference Point: TOC Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-7	1150	3	VOAs	40ml	HCl		TPH-g, BTEX, MTBE	
KMW-7		1	liter	Amber	8		TPH-d	
KMW-7		1	500ml	Poly	8		total lead	
KMW-7		1	1	liter	8		PAHs	
KMW-7A	1155	3			HCl		TPH-g, BTEX, MTBE	
KMW-7A		1			8		TPH-d	
KMW-7A		1			8		PAH	

Misc.

Other Observations: odor

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

KA KLEINFELDER

WELL DEVELOPMENT & SAMPLING LOG

WELL NO. 8

Date: 6/21/99 Weather: Clear

Sheet ___ of ___

Project: Friesman Ranch Submitted By: Michele Mahoney Date: 6/21/99

Project No.: 10-3006-13/012 Reviewed By: [signature] Date: 6/22/99

Purpose of Log ☐ Development ☑ Sampling

Equipment & Decontamination

Purging Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other: Dedicated bailer
Sampling Equipment	Bailer	Disposable Bailer	Suction Pump	Submersable Pump	Dedicated Pump	Other: "

Test Equipment	Water Level	pH	Conductivity	Turbidity
Meter No.		KA 90575	KA 90293	
Calibration Date/Time	NA			

Decontamination Methods	Wash		Rinse I		Rinse II		Rinse III	
TSP / Alconox / Other:	DI / Tap / Other	Steam / Hot / Cool	DI / Tap / Other	Steam / Hot / Cool	DI / Tap / Other	Steam / Hot / Cool	DI / Tap / Other	Steam / Hot / Cool
Vol. (gal):			NA					
Source:								
Decon. Notes:								

Development / Purge Record

Well Security: good fair poor Well Integrity: good fair poor Locked: yes no

Purge Volume (CV) T.D. – DTW × Factor × 1 C.V = 7.0 gal

Well Diam.: ☐ 2" ☐ 4" 23.9 ft. – 13.30 ft. × (none) 2"=0.175 4"=0.663 × = 2.1 gal

Free Product?: Odor: no yes Floating Product: none sheen film feet thick

								Replicate Goals
Time (24-hr)	1330	1340	1345	1350				
Gallons Purged	0	7.0	14.0	21.0				(dev. only)
Surged (minutes)	↑	NA →	→	→				±0.10
pH	S	7.45	7.06	7.0				±1°C
Temperature (°C)	T	21	19	19				±10%
Cond. (µmhos/cm)	A	1590	1530	1520				±10%
Salinity (‰)	R	0.9	0.9	0.9				<50 NTUs
Turbidity (NTU's)	T	NA →	→	→				Colorless
Color	↓	brownish						±0.01'
Depth to Water				13.33				

Reference Point: TOC Other:

Sample Log

Sample #	Time	Quantity	Volume	Type	Preserv.	Filtration	Analysis	Lab
KMW-8	1345	3	40 ml	VOA	HCl		TPH-g, BTEX, MTBE	McCampbell
KMW-8	1345	1	1 liter	Amber	Ø		TPH-d	

Misc

Other Observations: brownish water

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

PROJECT NO. 10-3006-13/012 | PROJECT NAME Friesman Ranch | L.P. NO. (P.O. NO.) | SAMPLERS: (Signature/Number) Michele Mahoney -1260

RECEIVING LAB: McCampbell

INSTRUCTIONS/REMARKS:

	DATE MM/DD/YY	SAMPLE I.D. TIME HH-MM-SS	SAMPLE I.D.	MATRIX	NO OF CONTAINERS	TYPE OF CONTAINERS	ANALYSIS: TPH-g, BTEX, MTBE *	TPH-d *	Total Lead (7420) *	PAHs only (8270) *
1	6/21/99	1315	KMW-6	water	10	liter VOA	X	X	X	X
2		1150	KMW-7		6	"	X	X	X	X
3		1155	KMW-7A		5		X	X		X
4		1345	KMW-8		4	liter VOA	X	X		
5			Trip Blank				X	X		
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

[redacted]

Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Michele Mahoney	6/21/99 1505	
Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)
	6/21/99 1815	Elma A Butler

Instructions/Remarks:

* Filter and prep. w/ silica gel cleanup prior to analysis

** Filter w/ 0.45 micron filter prior to analysis

Send Results To: Neal Siler
KLEINFELDER
7133 KOLL CENTER PARKWAY
SUITE 100
PLEASANTON, CA 94566
925 (510) 484-1700
Attn: fax (925) 484-5838

M-80 White - Sample Canary - Return Copy To Shipper Pink - Lab Copy

CHAIN OF CUSTODY Nº 3115

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

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 06/21/99
		Date Received: 06/21/99
	Client Contact: Neal Siler	Date Extracted: 06/22-06/23/99
	Client P.O:	Date Analyzed: 06/22-06/23/99

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)*	MTBE	Benzene	Toluene	Ethylben-zene	Xylenes	% Recovery Surrogate
13882	KMW-6	W	3800,a	ND<10	170	ND	260	160	107
13883	KMW-7	W	1300,a	ND	6.5	ND	21	62	92
13884	KMW-7A	W	2000,a	ND	6.4	6.7	24	76	94
13885	KMW-8	W	ND	ND	ND	ND	ND	ND	101
13886	Trip Blank	W	ND	ND	ND	ND	ND	ND	104
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.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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http://www.mccampbell.com E-mail: main@mccampbell.com

Kleinfelder, Inc. 7133 Koll Center Pkwy, #100 Pleasanton, CA 94566	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 06/21/99
		Date Received: 06/21/99
	Client Contact: Neal Siler	Date Extracted: 06/21-06/25/99
	Client P.O:	Date Analyzed: 06/23-06/25/99

Diesel Range (C10-C23) Extractable Hydrocarbons as Diesel *

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)[+]	% Recovery Surrogate
13882	KMW-6	W	1500,d,b	97
13883	KMW-7	W	1300,d,b	95
13884	KMW-7A	W	1200,d	99
13885	KMW-8	W	ND	98
13886	Trip Blank	W	ND	97
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.

[+]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.

DHS Certification No. 1644

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 Ranch	Date Sampled: 06/21/99
		Date Received: 06/21/99
	Client Contact: Neal Siler	Date Extracted: 06/21/99
	Client P.O:	Date Analyzed: 06/22/99

Lead*

EPA analytical methods 6010/200.7, 239.2+

Lab ID	Client ID	Matrix	Extraction °	Lead*	% Recovery Surrogate
13882	KMW-6	W	Dissolved	ND	NA
13883	KMW-7	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.

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Kleinfelder, Inc.	Client Project ID: #10-3006-13/012; Friesman Ranch	Date Sampled: 06/21/99
7133 Koll Center Pkwy, #100		Date Received: 06/21/99
Pleasanton, CA 94566	Client Contact: Neal Siler	Date Extracted: 06/21/99
	Client P.O:	Date Analyzed: 06/29/99

Polynuclear Aromatic Hydrocarbons (PAH / PNA) by GC-MS
EPA methods 625 (modified 610) and 3510 or 8270 (modified 8100) and 3550

Lab ID	13882	13883	13884			Reporting Limit	
Client ID	KMW-6	KMW-7	KMW-7A			S	W, STLC TCLP
Matrix	W	W	W				
Compound	Concentration*					mg/kg	ug/L
Acenaphthene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Acenaphthylne	ND<2.5	ND<2.5	ND<2.5			0.33	10
Anthracene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Benzo(a)anthracene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Benzo(b)fluoranthene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Benzo(k)fluoranthene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Benzo(g,h,i)perylene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Benzo(a)pyrene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Chrysene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Dibenzo(a,h)anthracene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Fluoranthene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Fluorene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Indeno(1,2,3-cd)pyrene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Naphthalene	200	27	17			0.33	10
Phenanthrene	ND<2.5	ND<2.5	ND<2.5			0.33	10
Pyrene	ND<2.5	ND<2.5	ND<2.5			0.33	10
% Recovery Surrogate 1	84	85	80				
% Recovery Surrogate 2	125	128	127				
Comments	j	j	j				

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

ND means not detected above the reporting limit; N/A means analyte not applicable to this analysis

* surrogate diluted out of range or surrogate coelutes with another peak

(h) a lighter than water immiscible sheen is present; (i) liquid sample that contains >~5 vol. % sediment; (j) sample diluted due to high organic content.

DHS Certification No. 1644

Edward Hamilton, Lab Director

APPENDIX C – HISTORICAL WATER LEVEL MEASUREMENTS

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 (Ft. Above MSL)
KMW-1	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	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	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	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	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	355.35
	9/8/97	14.24	0.00	355.28
KMW-6	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	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	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

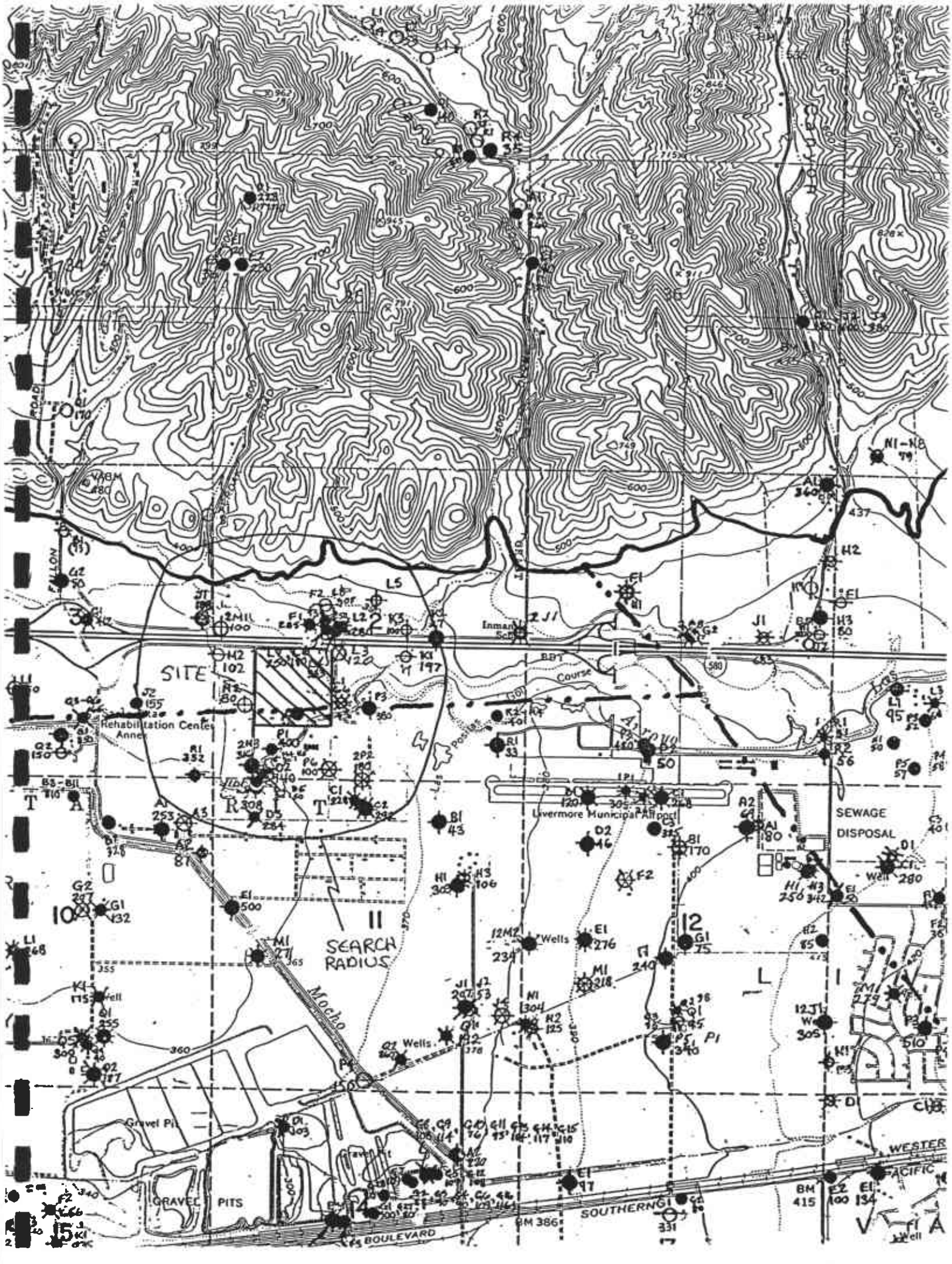
HISTORICAL GROUNDWATER CHEMISTRY
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA

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	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-2	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-3	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-4	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-5	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
dup.	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-6	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*	-
	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*	-
KMW-7	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 *	-
	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
KMW-8	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

APPENDIX E – WELL SURVEY INFORMAITON


SITE
SEARCH RADIUS
Rehabilitation Center Annex
Livermore Municipal Airport
SEWAGE DISPOSAL
Well
Mocho
Gravel Pit
GRAVEL PITS
SOUTHERN
PACIFIC
BOULEVARD
Wells
Course

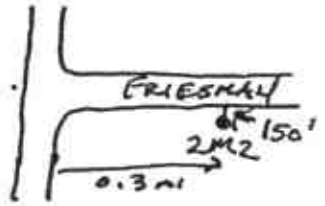
NOTE:

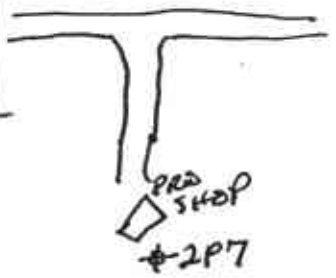
a) WELLS LISTED ABOVE ARE HIGH-LIGHTED

b) WELLS NOT LISTED BUT ARE SHALLOW IN DEPTH MOST LIKELY ARE MONITORING WELLS OR NO INFORMATION/ COULD BE OBTAINED AT ZONE 7. FOR EXAMPLE, $B1/_{43}$ + ⇒ WELL B1 - DEPTH OF 43 FT.

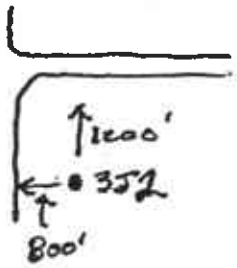
c) WELLS WITH AN "X" THROUGH THEM (✱) WAS ABANDONED OR DESTROYED. FOR EXAMPLE ✱ P6/100 WAS DESTROYED ON A CERTAIN DATE.

WELL NUMBER	LOCATION	DEPTH	SCREEN INTERVAL	USAGE	
[redacted]S-1E-2P3	1660 FRIESMAN	380	340' to 372'	DOMESTIC	SITE
[redacted]S-1E-2P1	909 CLUB HOUSE	400	50' to 376'	MUNICIPAL	
[redacted]S-1E-2F1	WEST END OF COLLIER CANYON	381	60' to 265'	MUNICIPAL	
[redacted]-1E-2F3	COLLIER CANYON	250	80' to 250'	MUNICIPAL	
[redacted]-1E-1P3	AIRWAY BLVD	480	245' to 265' 280' to 300' 360' to 400' 440' to 460'	MUNICIPAL	
[redacted]-1E-2L2	1880 COLLIER CANYON RD.	340	154' to 201' 283' to 290' 309' to 333'	DOMESTIC	
[redacted]S-1E-2M2	FRIESMAN RD	102'	?	DOMESTIC	
[redacted]-1E-2N3	FRIESMAN RD	316	157' to 167' 301' to 311'	MUNICIPAL	
[redacted]-1E-2N5	1800 FRIESMAN	50	30' to 50'	MONITORING	
[redacted]S-1E-2P7	TRI VALLEY GOLF 1780 FRIESMAN	425	270' to 410'	DOMESTIC IRRIGATION	





WELL NUMBER	LOCATION	DEPTH (ft.)	SCREEN INTERVAL	USAGE
[redacted]-1E-2R1	LAS POSITAS GOLF CLUBHOUSE DR.	33	21' to 26'	MONITORING
[redacted]-1E-2R2	909 CLUB HOUSE	40	29' to 40'	MONITORING
[redacted]-1E-2R3	909 CLUBHOUSE	40	29' to 40'	MONITORING
[redacted]-1E-2R4	909 CLUBHOUSE	40	29' to 40'	MONITORING
[redacted]-1E-3J1	3410 CROAK	188	?	MUNICIPAL
[redacted]-1E-3J2	EL CHARRO RD SOUTH OF FREEMAN	160	115' to 155'	MUNICIPAL
[redacted]-1E-3R1	1956 FREEMAN	352	164' to 176' 189' to 191' 214' to 219' 302' to 305'	MUNICIPAL



Zone 7
Alameda County Flood Control & Water Conservation District

5997 Parkside Drive ■ Pleasanton, California 94588-5127 ■ Phone (925) 484-2600 ■ Fax (925) 462-3914

Telefax Transmittal

Date: 6/22/99

Deliver To: Lita Freeman

Name of Firm: Kleinfelder

Fax Number: (925) 484-5838

From: Wyman Hong

Number of Pages: 4

(Including Cover Page)

For Voice Contact Call: (925) 484-2600, Extension:

For Return Fax: (925) 462-3914

Remarks: Well location data sheets for wells 3S/1E 2N2, 2N3 and 2P3. In your fax you wanted well 3S/1E 3N3 but I think you meant 2N3...

P:\Share\FaxForm.wpd

ZONE 7
WATER RESOURCES ENGINEERING

WELL LOCATION DATA

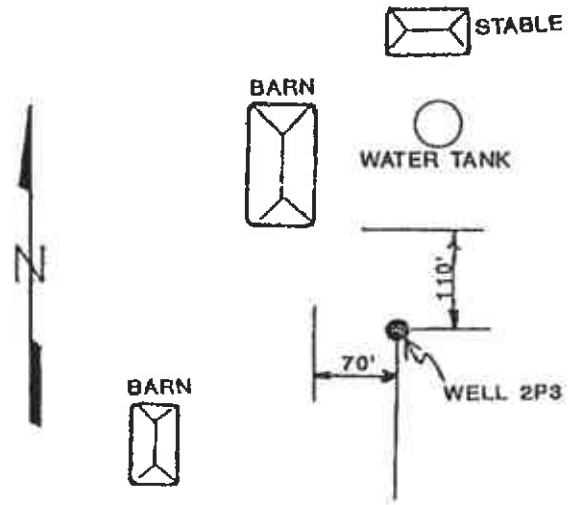
WELL NUMBER 3S / 1E - 2P3

ADDRESS 1660 Friesman Road, Livermore
OWNER Hugh Freisman
PRIMARY USE: WATER SUPPLY X
CATHODIC MONITORING
DRILLER DeLucchi Well and Pump
DATE COMPLETED 3 Oct 75
DEPTH: COMPLETED 380 FT
DRILLED 380 FT
DIAMETER 10 IN

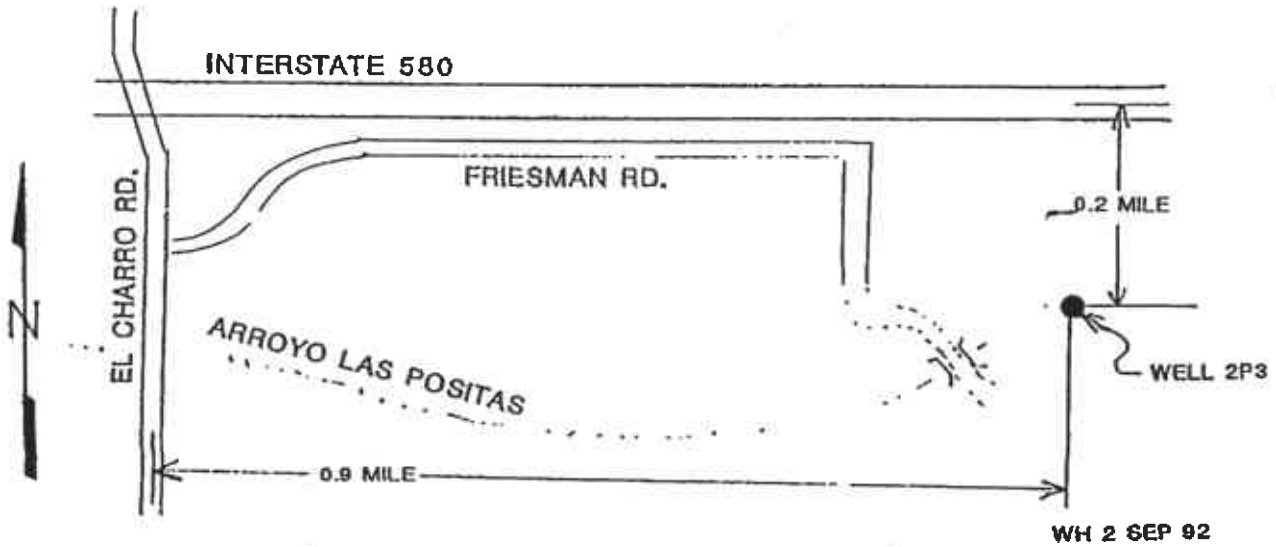
OTHER
DESIGNATION
PUMP: TYPE submersible
MAKE Franklin
HP 5
DISCHARGE 3 IN
METER NUMBER no separate meter
SOUNDED DEPTH 372 383 FT
DATE SOUNDED 26 Sep 77 13 Aug 92
DATE DESTROYED
DATE UNLOCATABLE

Site Detail

LOCATION SKETCH



Location



WH 2 SEP 92 71992

ZONE 7
WATER RESOURCES ENGINEERING

WELL LOCATION DATA

WELL NUMBER 3S / 1E - 2N3

ADDRESS Freisman Road, Livermore

OWNER Conrad Moldt

PRIMARY USE: WATER SUPPLY X
CATHODIC MONITORING

DRILLER V. Bassett

DATE COMPLETED 10-3-61

DEPTH: COMPLETED 316 FT
DRILLED 316 FT

DIAMETER 10 IN

OTHER DESIGNATION USGS# 374143121501601

PUMP: TYPE submersible
MAKE
HP

METER NUMBER

SOUNDED DEPTH FT

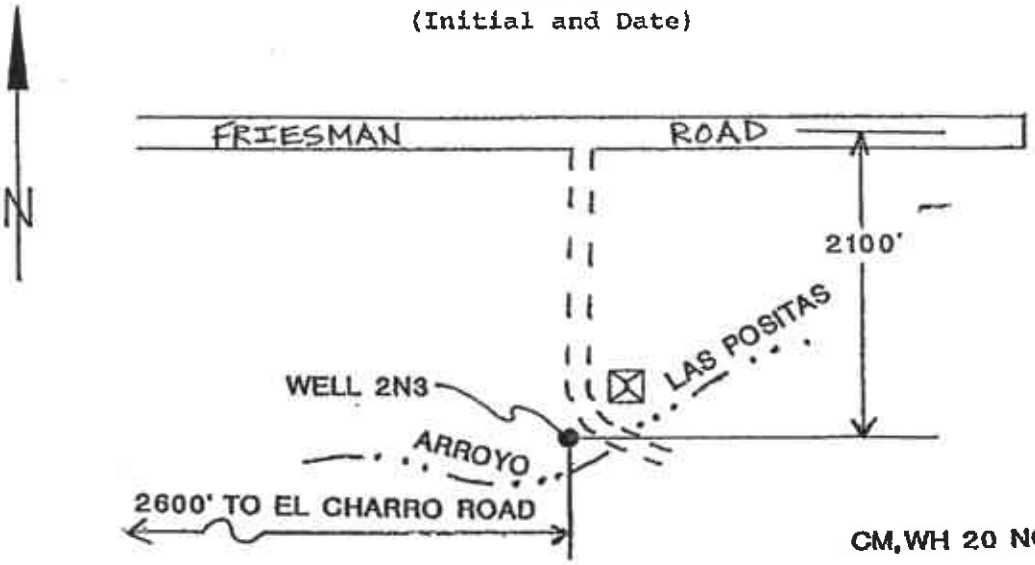
DATE SOUNDED

DATE DESTROYED

DATE UNLOCATABLE

REMARKS (Initial and date entry)

LOCATION SKETCH
(Initial and Date)



CM,WH 20 NOV 89 101985

SOUNDING PURPOSES

ZONE 7
WATER RESOURCES ENGINEERING

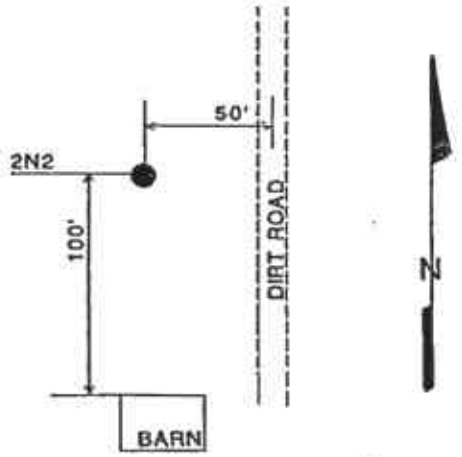
WELL LOCATION DATA

WELL NUMBER 3S/1E 2N 2

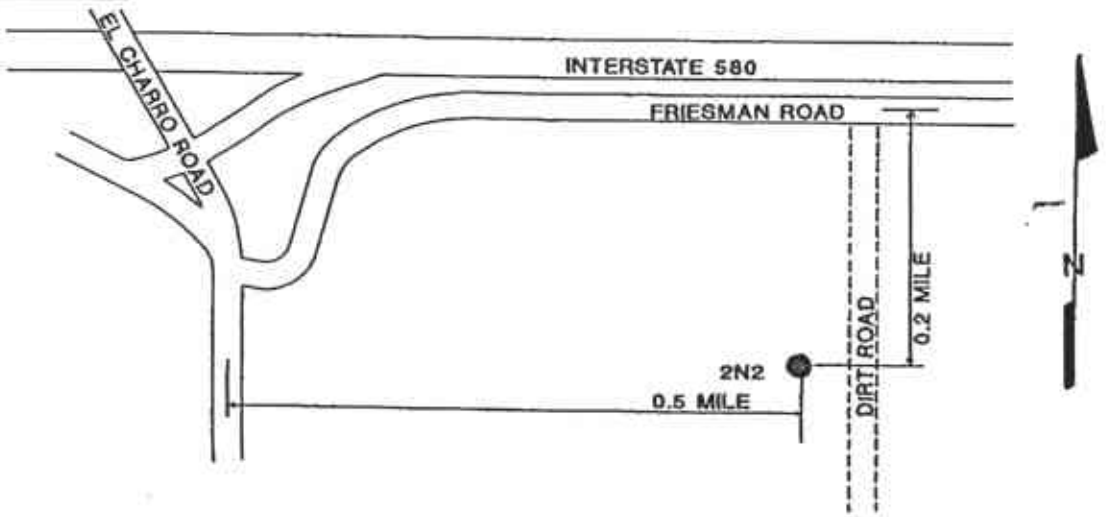
ADDRESS	1956 Friesman Road, Livermore	OTHER DESIGNATION	
OWNER	Rita Post, P.O. Box 819, Brownsville 95919	PUMP: TYPE	none
PRIMARY USE: WATER SUPPLY	X	MAKE	
CATHODIC	MONITORING	HP	
DRILLER		DISCHARGE	IN
DATE COMPLETED	02-Jan-30	METER NUMBER	none
DEPTH: COMPLETED	FT	SOUNDED DEPTH	42 55 FT
DRILLED	FT	DATE SOUNDED	04-Aug-77 20-Jan-94
DIAMETER	6 IN	DATE DESTROYED	
		DATE UNLOCATABLE	

DETAIL

LOCATION SKETCH



GENERAL



3S/1E 2N 2
25-Jan-94

STATE OF CALIFORNIA - THE RESOURCES AGENCY

GRAY DAVIS, *Governor*

DEPARTMENT OF WATER RESOURCES
CENTRAL DISTRICT
3251 S STREET
SACRAMENTO, CA 95816-7017

JUL 2 1999

JUL 0 6 1999

Ms. Lita Freeman
Kleinfelder
7133 Koll Center Parkway, Suite 100
Pleasanton, California 94566

Dear Ms. Freeman:

In response to your request, enclosed are the *Water Well Drillers Report* forms for the wells at the following locations:

Township 03 South, Range 01 East, Section 2-P3
Township 03 South, Range 01 East, Section 2-N3

We also searched for but were **unable to locate** reports for wells in the following areas:

Township 03 South, Range 01 East, Section 2-N2
Township 03 South, Range 01 East, Section 3-N3

If you have any questions, please contact Anne Roth at (916) 227-7632 or fax (916) 227-7600.

Sincerely,

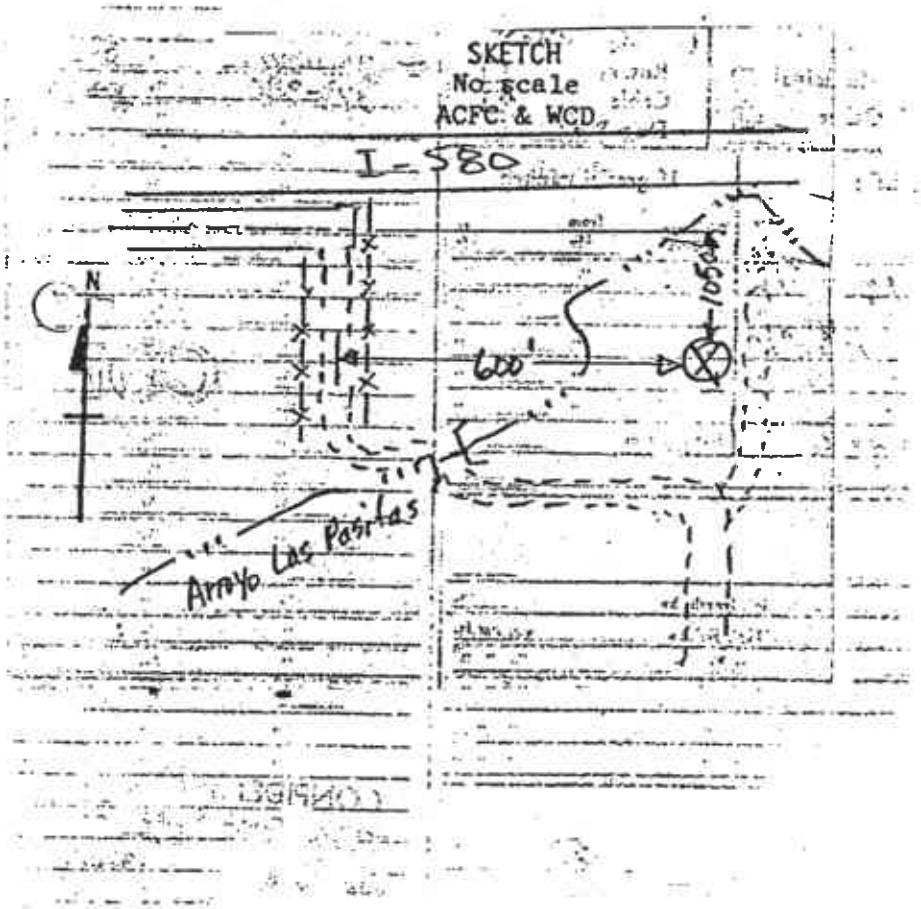
Emil R. Calzascia, Chief
Water Management Branch

Enclosures

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED


SKETCH
No scale
ACFC & WCD
I-580
N
600'
1050'
Arroyo Las Positas

CONFIDENTIAL

STATE OF CALIFORNIA DWR
WELL COMPLETION REPORT
(WELL LOGS)

REMOVED