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December 27, 2002
File No.: 10-3006-13/13

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

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

Dear Ms. Chu:

Attached is the Fourth Quarter 2002 Groundwater Monitoring Report for the Friesman Ranch Property, 1600 Friesman Road, Livermore, California (site). 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).

ATC Associates Inc is planning to perform the next groundwater-monitoring event in January, 2003. During this upcoming event, we plan to collect samples from wells KMW-6, KMW-7 and KMW-8 and analyze them for chemicals of concern.

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

Very truly yours,
ATC ASSOCIATES INC.

Tina Berry
Senior Project Manager

Attachment

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

DEC 2002

QUARTERLY
GROUNDWATER MONITORING REPORT
FOURTH QUARTER 2002
FRIESMAN RANCH PROPERTY
LIVERMORE, CALIFORNIA

December 27, 2002

A Report Prepared for:

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

QUARTERLY GROUNDWATER MONITORING REPORT
FOURTH QUARTER 2002
FRIESMAN RANCH PROPERTY
LIVERMORE, CALIFORNIA

ATC Project No. 75.23909.0001

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December 27, 2002

QUARTERLY
GROUNDWATER MONITORING REPORT
FOURTH QUARTER 2002
FRIESMAN RANCH PROPERTY
LIVERMORE, CALIFORNIA

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 OBJECTIVES AND SCOPE OF WORK 1

2. FIELD ACTIVITIES 1

2.1 INTRODUCTION 1
2.2 GROUNDWATER MONITORING ACTIVITIES 1
2.2.1 Water Level Measurement 2
2.2.2 Free-Product Thickness Measurement 2
2.2.3 Groundwater Sample Collection 2
2.3 ANALYTICAL LABORATORY PARAMETERS 2
2.4 QUALITY ASSURANCE/QUALITY CONTROL SAMPLE COLLECTION 3
2.5 INVESTIGATION-DERIVED WASTE HANDLING PROCEDURES 3
2.6 SITE RESTORATION 3

3. SUMMARY OF RESULTS 3

3.1 INTRODUCTION 3
3.2 WATER LEVELS 4
3.3 FREE-PRODUCT THICKNESS 4
3.4 GROUNDWATER MONITORING WELL SAMPLES 4
3.4.1 Chemicals of Concern 4
3.4.2 Bio-attenuation Parameters 5
3.4.3 Alkalinity 5
3.4.4 Nitrate 6
3.4.5 Sulfate 6
3.4.6 Total Organic Carbon (TOC) 6
3.5 QUALITY ASSURANCE/QUALITY CONTROL SAMPLES 6
3.5.1 Trip Blank 6
3.5.2 Blind Duplicate Sample 6

4. SUMMARY, CONCLUSIONS AND RECOMMENDATIONS 7

4.1 FIELD ACTIVITIES 7
4.2 GROUNDWATER CHEMISTRY 7
4.3 RECOMMENDATIONS 7

5. REFERENCES 8

TABLES

Table 1	Groundwater Elevation Data – October 16, 2002
Table 2	Groundwater Monitoring Well Sample Analytical Results
Table 3	Bioattenuation Parameter Analytical Results
Table 4	Quality Assurance/Quality Control Sample Analytical Results

FIGURES

Figure 1	Site Location Map
Figure 2	Site Map (Showing Groundwater Monitoring Well Locations)
Figure 3	Groundwater Elevation Contours (October 16, 2002)
Figure 4	Groundwater Analytical Results (October 16, 2002)

APPENDICES

APPENDIX A	FIELD MONITORING NOTES
	Record of Water Level Measurements – October 16, 2002
	Field Purge/Sampling Logs – October 16, 2002
APPENDIX B	CHAIN-OF-CUSTODY RECORDS AND CERTIFIED ANALYTICAL LABORATORY REPORTS
APPENDIX C	HISTORICAL WATER LEVEL MEASUREMENTS
APPENDIX D	HISTORICAL GROUNDWATER CHEMISTRY
APPENDIX E	WORKPLAN FOR GROUNDWATER REMEDIATION AND WELL DESTRUCTION

QUARTERLY GROUNDWATER MONITORING REPORT
FOURTH QUARTER 2002
FRIESMAN RANCH PROPERTY
LIVERMORE, CALIFORNIA

1. INTRODUCTION

This report describes the results of the Fourth Quarter 2002 Groundwater Monitoring Event performed at the Friesman Ranch Property, Livermore, California (hereinafter the site) (Figure 1). The Fourth Quarter 2002 Groundwater Monitoring Event is the first groundwater monitoring event implemented at the Site since September 1999. Preparation of this report is a key task of our proposal dated September 26, 2002 (ATC Associates Inc. [ATC], 2002).

1.1 Objectives and Scope of Work

The objectives of the activities performed were to:

- Reinitiate a regularly scheduled groundwater monitoring program to track spatial and temporal variations in groundwater conditions; and
- Assess current Site groundwater conditions.

To meet these objectives, the following scope of work was implemented:

- Implement a scheduled groundwater monitoring event, which included water-level measurements, an evaluation of free-product thickness (if any); and collection of water quality samples for chemicals-of-concern (COCs);
- Evaluate biological degradation parameters; and
- Prepare 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 October 16, 2002. Figure 2 shows the locations of the existing groundwater monitoring wells.

2.2 Groundwater Monitoring Activities

The eight site wells (KMW-1 through KMW-8) were monitored for this event. The goal of these activities was to measure water levels, assess free-product thickness (if any), and collect water quality samples that accurately represent stabilized aquifer conditions.

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 (Appendix A).

2.2.2 Free-Product Thickness Measurement

Prior to purging each well, the free-product thickness was assessed by inserting a bailer into a well at the water/air interface, removing the bailer and observing the surface water in the bailer for free-product thickness and/or hydrocarbon sheen (Appendix A).

2.2.3 Groundwater Sample Collection

Upon completion of the water-level measurements, ATC purged the monitoring wells by using an air diaphragm pump and dedicated tubing. 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). In addition to the normal aquifer stabilization parameters, the bio-attenuation parameters dissolved oxygen (DO) and oxidation-reduction potential (ORP) were measured in each well prior to purging. The wells were purged until a minimum of three casing volumes of water were removed, aquifer parameters appeared to stabilize, and water levels were allowed to recover to near static levels before sampling. However, no more than five casing volumes were removed from a well.

Water from each well was collected using disposable polyvinyl chloride (PVC) bailers. 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 or 250-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;
- Benzene, toluene, ethylbenzene and total xylenes (BTEX) using EPA Method 8021B;
- Methyl tertiary-butyl ether (MTBE) using EPA Method 8021B. Any detections of MTBE could be confirmed using EPA Method 8260B;
- Alkalinity using Standard Methods for Water and Wastewater (SM) 2320B;
- Total Organic Carbon using SM 5310C;

- Ferrous Iron (Fe^{+2}) using EPA Method 200.7;
- Sulfate (SO_4^{-2}) and Nitrate (NO_3^-) using EPA Method 300.1.

2.4 Quality Assurance/Quality Control Sample Collection

Normal quality assurance/quality control (QA/QC) sampling activities include the laboratory preparation and analysis of a trip blank that accompanies the ice chest to and from the laboratory. In addition, a blind duplicate was submitted for well KMW-6.

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

- A trip blank; and
- A blind duplicate.

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

2.5 Investigation-Derived Waste Handling Procedures

Investigation-derived wastes (IDW – 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 measurements were recorded on October 16, 2002. Groundwater samples were also collected from seven of the eight wells on the site and submitted for analysis. KMW-2 was obstructed such that water-level measurements, free-product thickness observations and water quality samples could not be collected from it. The monitoring well samples were analyzed at McCampbell Analytical, Inc., a laboratory certified by the California Department of Health Services (DHS) Environmental Laboratory Accreditation Program (ELAP) for the specific analyses performed.

Tables 1, 2 and 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 is contained in Appendix D.

3.2 Water Levels

As part of the groundwater monitoring event, water levels were measured in monitoring wells KMW-1, KMW-3, KMW-4, KMW-5, KMW-6, KMW-7 and KMW-8 on October 16, 2002. Depths to water ranged from 13.69 to 16.45 feet below ground surface (bgs) in wells KMW-3 and KMW-5 respectively (Table 1). In October 2002, groundwater flow was to the northwest with a hydraulic gradient of 0.009 foot per foot (ft/ft). These results are consistent with the previous groundwater monitoring event in September 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 free product was observed or detected in the wells. Historically, no free product has been detected in any of the wells (Appendix C).

3.4 Groundwater Monitoring Well Samples

A total of seven wells (KMW-1 and KMW-3 through KMW-8) were sampled and analyzed for TPH-g, TPH-d, BTEX, and MTBE. 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 Chemicals of Concern

3.4.1.1 Total Petroleum Hydrocarbons as Gasoline

TPH-g was detected at concentrations of 4,600 micrograms per liter (µg/L) in KMW-6 and 270 µg/L in KMW-7, but was not detected in any of the other wells. These results are consistent with historical concentrations detected (Appendix D).

3.4.1.2 Total Petroleum Hydrocarbons as Diesel

TPH-d was detected at concentrations of 1,600 µg/L in KMW-6 and 480 µg/L in KMW-7. It was not detected in any of the other wells. These results are consistent with historical concentrations detected (Appendix D).

3.4.1.3 Aromatic Hydrocarbons

Aromatic hydrocarbons were detected in monitoring wells KMW-6 and KMW-7, but were not detected in the other wells. Benzene was detected in excess of its drinking water maximum contaminant level (MCL), 1 µg/L, at concentrations of 100 µg/L in KMW-6 and 1.3 µg/L in KMW-7. Toluene was detected in the primary and duplicate samples collected from KMW-6. However, it was detected below its MCL (150 µg/L) at a concentration of 8.4 µg/L in KMW-6. Ethylbenzene was detected below its MCL (700 µg/L) at concentrations of 190 µg/L in KMW-6 and 4 µg/L in KMW-7. Total xylenes were detected below their MCL (1,750 µg/L) at concentrations of 110 µg/L in KMW-6 and 15 µg/L in KMW-7. These results are consistent with historical concentrations detected (Appendix D).

3.4.1.4 Methyl Tertiary-Butyl Ether

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

3.4.2 Bio-attenuation Parameters

3.4.2.1 Dissolved Oxygen

DO is the most thermodynamically favored electron acceptor used in the biodegradation of fuel hydrocarbons. During aerobic biodegradation, DO concentrations decrease.

DO ranged from 0.31 milligrams per liter (mg/L) in Well KMW-6 to 1.08 mg/L in Well KMW-7 (Table 3) for wells in which COCs were detected. DO ranged from 0.38 mg/L (KMW-8) to 0.61 mg/L (KMW-5) in the wells in which COCs were not detected. The average DO concentration was 0.54 mg/L, which indicates that the subsurface environment underlying the site is depleted in DO.

3.4.2.2 Oxidation-Reduction Potential

The ORP of groundwater is a measure of electron activity and is an indicator of the relative tendency of a solution of accept or transfer electrons. It influences and is influenced by the nature of biologically mediated degradation of COCs.

ORP ranged from less than 100 millivolts (mV) to –75 mV in wells in which COCs were detected (Table 3). DO ranged from 25 to 125 mV in wells in which COCs were not detected. These values indicated oxidizing conditions outside the COC plume and reducing conditions inside the COC plume.

3.4.2.3 Hydrogen-ion Index (pH) and Temperature

The pH and temperature of the shallow groundwater were at levels conducive for the metabolic activity of bacteria capable of degrading fuel hydrocarbons (Table 3).

3.4.2.4 Ferrous Iron

In some cases, Ferric Iron (Fe^{+3}) is used as an electron acceptor during anaerobic biodegradation of petroleum hydrocarbons. During this process, Fe^{+3} is reduced to Fe^{+2}. Ferrous iron can thus be used as an indicator of anaerobic degradation of petroleum compounds.

Ferrous Iron (Fe^{+2}) was detected in KMW-6 at a concentration of 2.49 milligrams per liter (mg/L) (Table 4). It was not detected in any other well sample. It appears that anaerobic degradation of the COCs is occurring in the vicinity of KMW-6.

3.4.3 Alkalinity

In general, areas impacted by petroleum hydrocarbons exhibit a total alkalinity higher than that seen in background areas. This is expected because microbially-mediated reactions causing biodegradation of these compounds will cause an increase in total alkalinity of the system.

Alkalinity was reported at levels ranging from 274 mg/L in KMW-3 to 397 mg/L in KMW-6 (Table 3). In the impacted areas, the average alkalinity was 389 mg/L. In areas outside the petroleum hydrocarbon plume, the average alkalinity was 322 mg/L.

3.4.4 Nitrate

After DO has been depleted in the petroleum hydrocarbon impacted area, nitrate may be used as an electron acceptor for anaerobic biodegradation via denitrification. Nitrate concentrations are used to estimate the mass of petroleum hydrocarbons that can be degraded by this process.

Nitrate was reported above the detection limit (1.0 mg/L) in KMW-8 at 2.20 mg/L (Table 3). It was not detected in any other well.

3.4.5 Sulfate

After DO, nitrate and Fe+3 have been depleted in the impacted area, sulfate may be used as an electron acceptor for anaerobic degradation. The process is termed sulfate reduction and results in the production of sulfide.

Sulfate concentrations ranged from 3.6 in well KMW-6 to 770 in well KMW-8 (Table 3). The average sulfate concentration in the impacted area was 35 mg/L, whereas the average sulfate concentration outside the impacted area was 227 mg/L. Thus, it appears that sulfate is being reduced in the impacted area.

3.4.6 Total Organic Carbon (TOC)

TOC provides data on the amount of carbon that can be used as an energy source by the microbial population. TOC ranged from 1.8 mg/L in KMW-8 to 5.2 mg/L in KMW-6 (Table 3).

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 4 and certified analytical laboratory reports are contained in Appendix B.

3.5.1 Trip Blank

One trip blank was prepared and analyzed for the October 2002 groundwater monitoring event. TPH-g, BTEX and MTBE were not detected in the trip blank.

3.5.2 Blind Duplicate Sample

One blind duplicate sample (KMW-6A) was collected from monitoring well KMW-6 on October 16, 2002. This duplicate sample was analyzed for TPH-g, TPH-d, BTEX, and MTBE.

The Relative Percent Differences (RPD) for TPH-d, TPH-g, benzene, toluene, ethylbenzene and total xylenes (the analytes detected) were 17.1, 10.31, 9.25, 17.39, 10.0 and 0.0 percent, respectively (Table 4). The RPDs for all the analytes detected were below the typical QA/QC goal of less than 20 percent.

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 ATC during October 2002. 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 Fourth Quarter 2002 groundwater monitoring event;
- Water-level measurements, an evaluation of free-product thickness and the collection of water quality samples were conducted. The samples collected were analyzed for COCs (TPH-g, TPH-d, BTEX and MTBE) and bioattenuation parameters (DO, ORP, alkalinity, Fe^{+2}, nitrate and sulfate);
- 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

- 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;
- The plume is confined to the site and appears to be stable. Concentrations of COCs continue to decrease with time indicating that natural processes are working to remediate the plume;
- The subsurface environment appears to be not well oxygenated. It appears that other anaerobic processes (iron and sulfate reduction) are operating to decrease the concentrations of COCs in groundwater.

4.3 Recommendations

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

- Evaluate ways of enhancing biodegradation of the plume and implement a program prior to the next quarterly sampling event (January 2003);
- Because the plume is stable and appears to be decreasing in concentration, several wells in the wellfield are superfluous. COCs have never been detected in these wells and relevant information is not being obtained. In addition, one of the wells appears to be damaged (KMW-

2). Therefore, it is recommended that wells KMW-2, KMW-3, KMW-4 and KMW-5 be properly abandoned;

- Continue the regularly scheduled quarterly groundwater monitoring program, with the next event being implemented in January 2003;
- 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; and
- Groundwater quality samples collected from the three monitoring wells should be analyzed for TPH-g, TPH-d, and BTEX. In addition, bioattenuation parameters should be analyzed from the remaining four wells (KMW-1, KMW-6, KMW-7, KMW-8) in the wellfield.
- Develop and prepare a Workplan recommending additional investigation activities as provided above. See **Appendix E for new Workplan dated December 27, 2002.**

5. REFERENCES

ATC Associates Inc., 2002, *Proposal for Environmental Consulting Services, Friesman Road Property, Livermore, California.* September 26.

Kleinfelder, Inc., 1999, *Quarterly Groundwater Monitoring Report, Third Quarter 1999, Friesman Ranch Property, Livermore, California.* October 30.

TABLE 1
GROUNDWATER ELEVATION DATA
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
OCTOBER 2002

PERSONNEL: P. ARROYO **DATE: October 16, 2002**

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	14.27	NM	23.47	0.53	14.80	370.12	355.85
KMW-2	NM	NM	NM	0.43	NM	370.72	NC
KMW-3	13.69	NM	23.46	0.54	14.23	369.10	355.41
KMW-4	15.92	NM	23.69	0.31	16.23	369.80	353.88
KMW-5	16.45	NM	23.58	0.42	16.87	369.52	353.07
KMW-6	16.27	0.00	23.47	0.53	16.80	370.08	353.81
KMW-7	14.63	0.00	23.70	0.58	15.21	370.04	355.41
KMW-8	15.85	0.00	23.90	0.58	16.43	368.61	352.76

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

TABLE 2
GROUNDWATER MONITORING WELL SAMPLE ANALYTICAL RESULTS
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
October 2002

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)
KMW-1	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
KMW-2	10/16/02	-	-	-	-	-	-	-
KMW-3	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
KMW-4	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
KMW-5	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
KMW-6	10/16/02	1,600,d	4,600,a	100	8.4	190	110	<50
KMW-7	10/16/02	480,d	270,a	1.3	<0.5	4	15	<5.0
KMW-8	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
MCL				1.0	150	700	1,750	13

Notes:

TPH-D	Total Petroleum Hydrocarbons as Diesel
TPH-G	Total Petroleum Hydrocarbons as Gasoline
MTBE	Methyl Tertiary-Butyl Ether
MCL	California Environmental Protection Agency (Cal/EPA) Maximum Contaminant Level
µg/L	Micrograms per Liter (approximately equivalent 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
-	Not Sampled or Analyzed

TABLE 3
BIOATTENUATION PARAMETER ANALYTICAL RESULTS
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
October 2002

Analyte	KMW-1	KMW-2	KMW-3	KMW-4	KMW-5	KMW-6	KMW-7	KMW-8
Field Measurements								
DO (mg/L)	0.53	NM	0.42	0.46	0.61	0.31	1.08	0.38
ORP (mV)	110.0	NM	70.0	110.0	125.0	<-100	-75.0	25.0
Temperature (°C)	18.1	NM	17.5	16.5	16.4	18.9	17.4	16.9
pH	8.1	NM	8.4	8.0	8.1	7.9	7.9	8.2
Laboratory Measurement								
Alkalinity (mg/L)	328	NA	274	288	381	397	382	341
TOC (mg/L)	2.4	NA	2.6	2.2	2.2	5.2	3.1	1.8
Ferrous Iron, FE (II) (mg/L)	<0.05	NA	<0.05	<0.05	<0.05	2.49	<0.05	<0.05
Nitrate (mg/L)	<1.0	NA	<1.0	<1.0	<1.0	<1.0	<1.0	2.2
Sulfate (mg/L)	84	NA	100	91	92	3.6	66	77

Notes:

1. DO = Dissolved Oxygen.
2. ORP = Oxidation-Reduction Potential (measured in millivolts [mV]).
3. TOC = Total Organic Carbon.
4. NA = Not Analysed.
5. <5.0 = Analyte not present at or above indicated reporting limit.
6. NM = Not Measured. Obstruction in well.

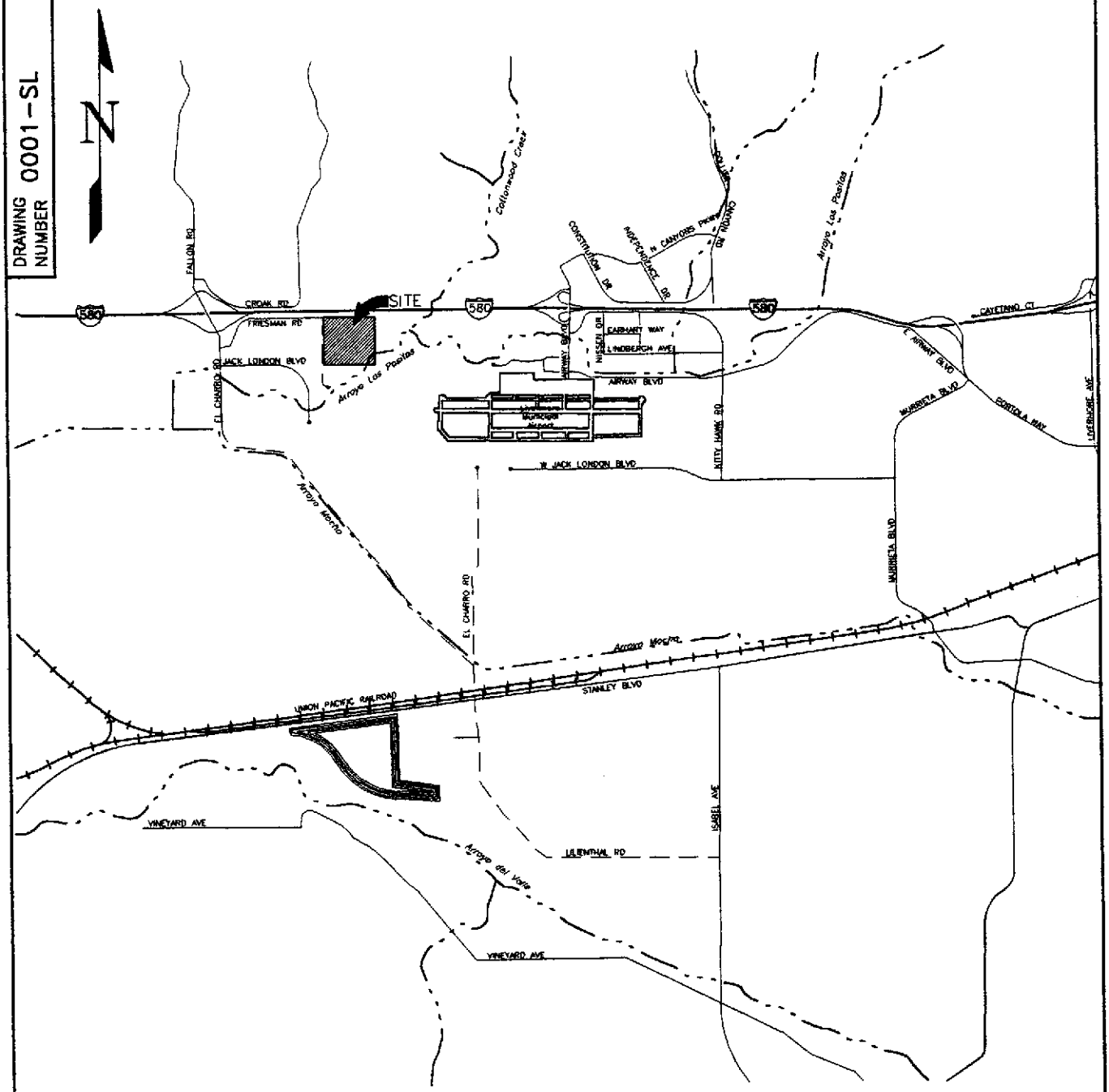
TABLE 4
QUALITY ASSURANCE/QUALITY CONTROL SAMPLE ANALYTICAL RESULTS
FRIESMAN RANCH PROPERTY
LIVERMORE, ALAMEDA COUNTY, CALIFORNIA
October 2002

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)
Primary Sample	KMW-6	10/16/02	1,600, a	4,600, b	100	8.4	190	110	<50
Duplicate Sample	KMW-6A	10/16/02	1,900, a	5,100, b	110	10	210	110	<50
Trip Blank	Trip Blank	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0
	RPD		17.1%	10.31%	9.52%	17.39%	10.00%	0.00%	NC

Notes:

TPH-D	Total Petroleum Hydrocarbons as Diesel
TPH-G	Total Petroleum Hydrocarbons as Gasoline
MTBE	Methyl Tertiary-Butyl Ether
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	Gasoline range compounds are significant
d	Gasoline range compounds are significant
NC	Not calculable
-	Not Analyzed

DRAWING NUMBER 0001-SL



SCALE

4000 0 4000 FEET

SITE LOCATION MAP
FRIESMAN RANCH PROPERTY
1600 FRIESMAN ROAD
LIVERMORE, CALIFORNIA

PREPARED FOR

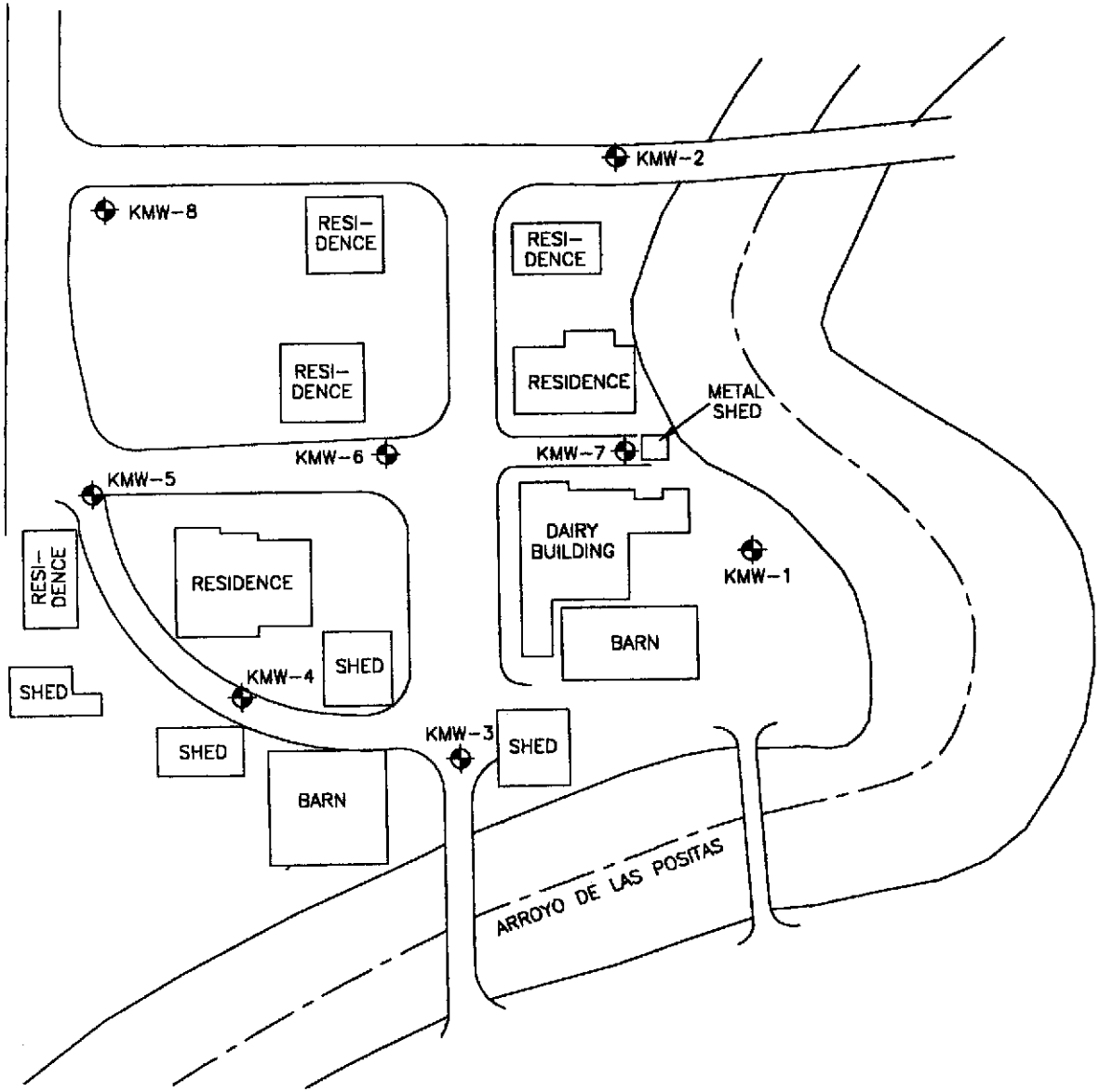
No.	DATE	ISSUE / REVISION	DWN. BY	CK'D BY	AP'D BY
1	02/07/01	ISSUED FOR REPORT	ES		

ATC ASSOCIATES INC.

DATE: 11/12/02
SCALE: AS SHOWN

FIGURE 1

DRAWING NUMBER
75.23909.0001



LEGEND

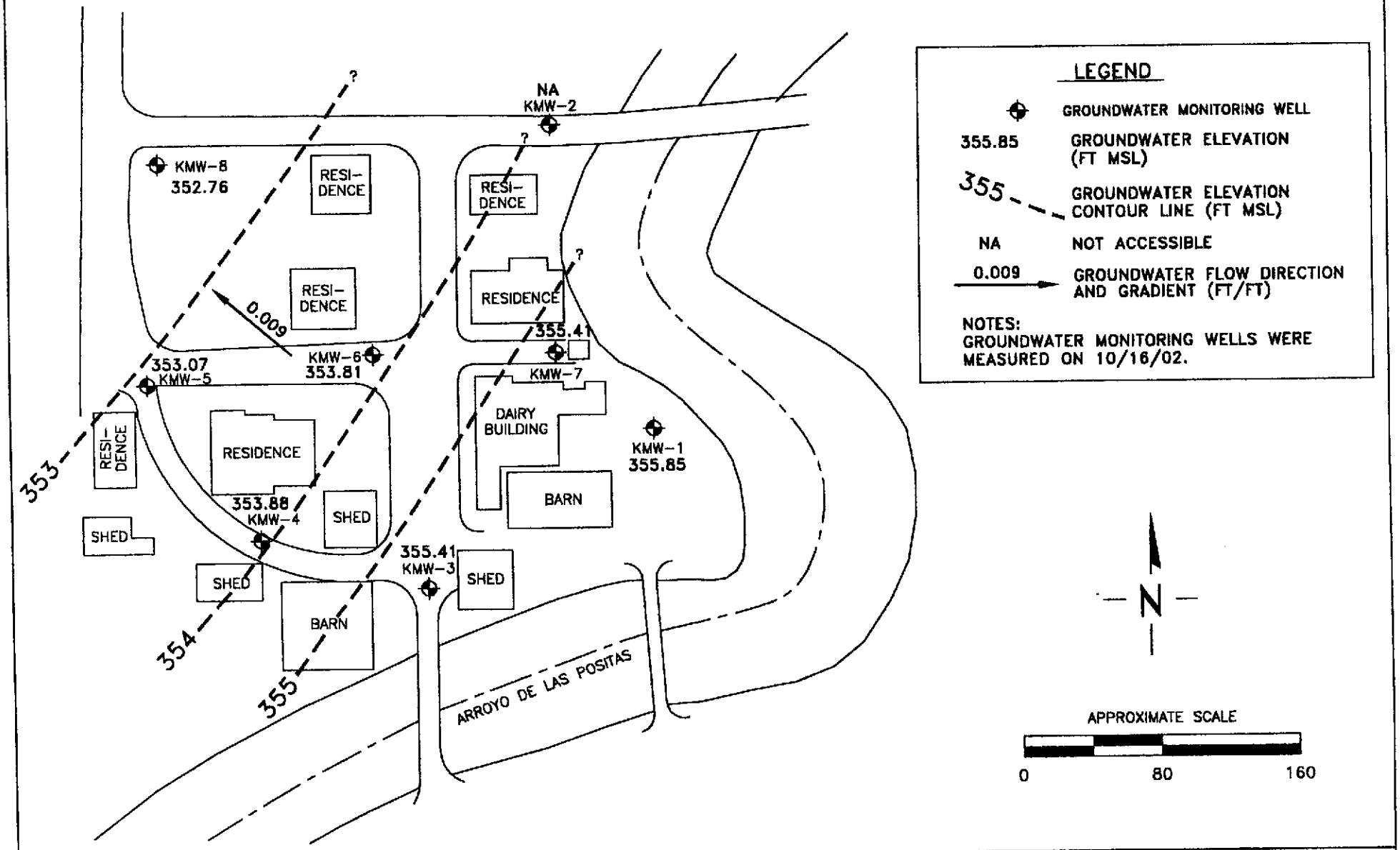
GROUNDWATER MONITORING WELL

N

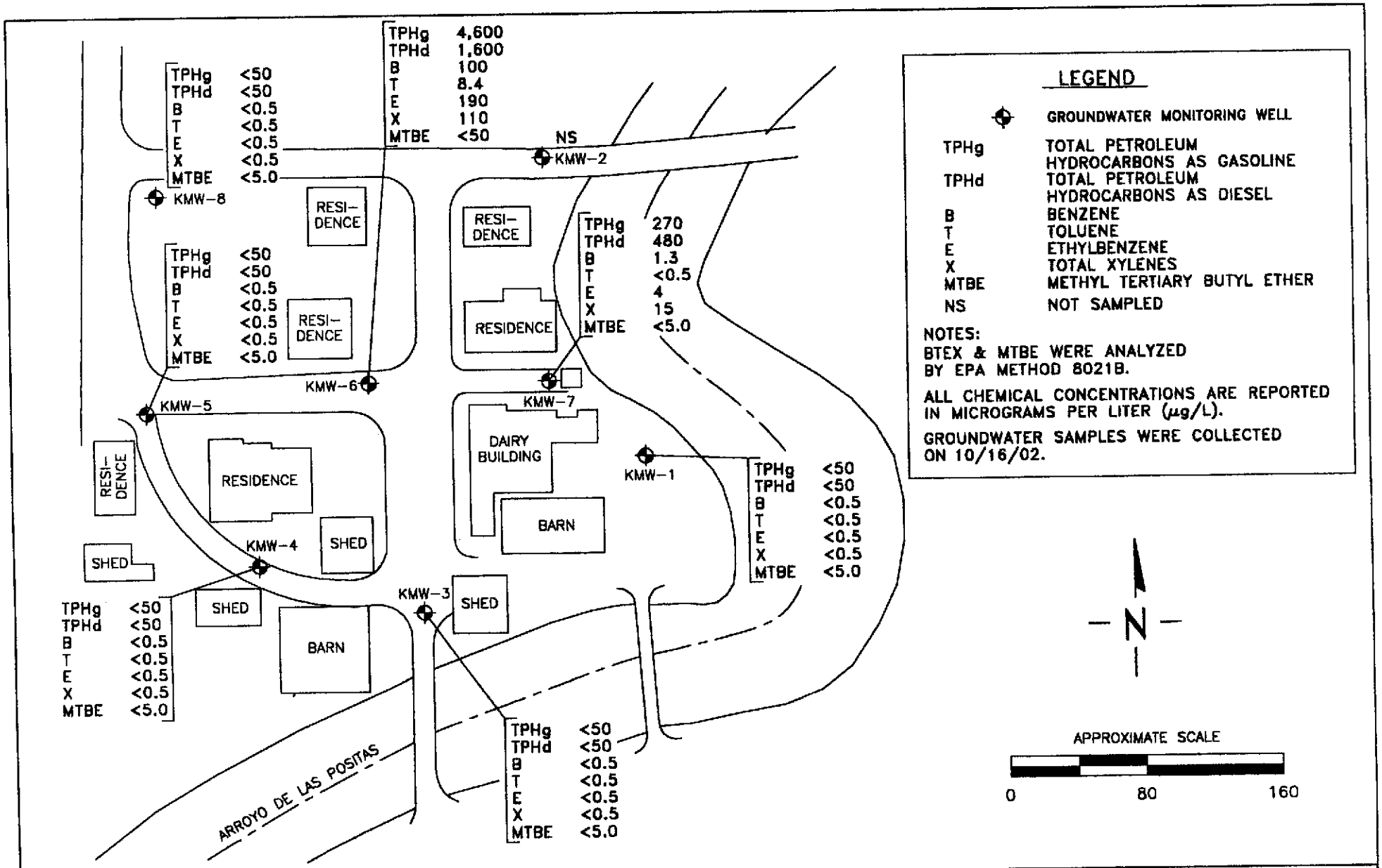
APPROXIMATE SCALE

0 80 160

VATC ASSOCIATES INC	REVISED EC 11/12/02 8X11 0001-SP	REVIEWED BY TB/NES REVIEW DATE 11/14/02	SITE MAP Friesman Ranch Property 1600 Friesman Road Livermore, California	FIGURE 2 PROJECT 75.23909.0001



VATC ASSOCIATES INC.	REVISED EC 11/12/02 8X11 0001-GW1002	REVIEWED BY TB/NES REVIEW DATE 11/14/02	GROUNDWATER ELEVATION CONTOURS (October 16, 2002) Friesman Ranch Property 1600 Friesman Road Livermore, California	FIGURE 3 PROJECT 75.23909.0001



LEGEND

- ⊕ GROUNDWATER MONITORING WELL
- TPHg TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
- TPHd TOTAL PETROLEUM HYDROCARBONS AS DIESEL
- B BENZENE
- T TOLUENE
- E ETHYLBENZENE
- X TOTAL XYLENES
- MTBE METHYL TERTIARY BUTYL ETHER
- NS NOT SAMPLED

NOTES:

BTEX & MTBE WERE ANALYZED BY EPA METHOD 8021B.

ALL CHEMICAL CONCENTRATIONS ARE REPORTED IN MICROGRAMS PER LITER (µg/L).

GROUNDWATER SAMPLES WERE COLLECTED ON 10/16/02.

ATC ASSOCIATES INC.	REVISED EC 11/12/02 8X11 0001-AR1002	REVIEWED BY TB/NES REVIEW DATE 11/14/02	GROUNDWATER ANALYTICAL RESULTS (October 16, 2002) Friesman Ranch Property 1600 Friesman Road Livermore, California	FIGURE 4 PROJECT 75.23909.0001

RECORD OF WATER LEVEL MEASUREMENTS – OCTOBER 16, 2002

FIELD REPORT/DATA SHEET

Date: 10/16/02

Day: M Tu (W) Th F

Project Number: 75.23909.0001

Field Technician: P. Arroyo

DTW Order	Well ID	Diam.	Lock	Exp. Cap	Total Depth	DTW Initial	DTW Final	Time Sampled	Comments
	KMW-1	4	Good	Good	23.40	14.27	14.27	1500	
	KMW-2	4	~~Bolt~~ Good	Good	14.00	Dry	DRY	N/A	TOTAL Depth 14.00 / Previous 23.57
	KMW-3	4	Good	Good	23.90	13.69	13.74	1400	
	KMW-4	4	Good	Good	23.65	15.92	15.92	1415	
	KMW-5	4	Good	Good	23.40	16.45	16.45	1435	
	KMW-6	4	Good	Good	23.40	16.27	16.27	1605	
	KMW-7	4	Good	Good	23.50	14.63	14.63	1525	
	KMW-8	4	Good	Good	23.65	1585	15.85	1335	

NOTES:

Number of Drums Onsite

Full	Empty	TOTAL

Estimated Value: _____

ARE ALL DRUMS LABELLED WITH THE LABELS FACING OUT

FIELD PURGE/SAMPLING LOGS – OCTOBER 16, 2002

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 1600 Friesman Rd.
Livermore, CA
Well Number: KMW-1
Development/Purge/Sampler(s): D. Arroyo

Project Number: 75.23909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: Cloudy

Pre-Purge DO (mg/L) ________

Screened at ________

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Goundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.40	-	14.27	=	9.13	X	0.66	=	6.02
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft.) (in.): None Sheen/Iridescence: None Odor: None

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other ________

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1134	8.3	1144	16.7	Cloudy
1	6.0	1136	8.3	1109	16.7	CLEAR
2	12.0	1137	8.2	1114	17.8	↓
3	18.0	1139	8.1	1125	18.1	↓
4						
5						
6						
7						
8						
9						
10						

Recovery Rate: (Fast) / Medium / Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft.)	
(I) Initially	14.27	
(P) After Purging	16.70	
P - 0.8 (P-I) =	14.75	80% Recovery
(S) Before Sampling	14.27	
(P-S) / (P-I) X 100 =	100	% Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1500 Turbidity (NTU): 7.3

Calibrate Date/Time: 10/16/02 0730 EH (MEV): 110.

PURGED WATER CONTAINMENT

Total drums at site: Water ________ Soil ________ Water pump through treatment system ________

Remarks: 1.37 D.O. After purge

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 11600 Friesman Rd. Livermore, CA
Well Number: KMW-3
Development/Purge/Sampler(s): P. Arroyo

Project Number: 75.23909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: Cloudy

Pre-Purge DO (mg/L) .42

Screened at _____

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Goundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.90	-	13.69	=	10.21	X	0.66	=	6.73
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft.) (in.): None Sheen/Iridescence: None Odor: None

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other _____

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1011	8.8	1146	17.5	Turbid
1	6.5	1013	8.5	1133	17.8	Cloudy
2	13.0	1015	8.4	1128	17.5	↓ Dry
3	19.5					
4						
5						
6						
7						
8						
9						
10						

Recovery Rate: Fast (Medium) Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft.)
(I) Initially	13.69
(P) After Purging	23.90 (Dry)
P - 0.8 (P-I) =	15.73 80% Recovery
(S) Before Sampling	13.74
(P-S) / (P-I) X 100 =	98 % Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1400 Turbidity (NTU): _____

Calibrate Date/Time: 10/16/02 0730 EH (MEV): 70.

PURGED WATER CONTAINMENT

Total drums at site: Water _____ Soil _____ Water pump through treatment system _____

Remarks: 3.63 D.O. AFTER PURGE

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 11600 Friesman Rd. Livermore, CA
Well Number: KMW-4
Development/Purge/Sampler(s): P. Arcaya

Project Number: 75.23909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: CLOUDY

Pre-Purge DO (mg/L) 2.46

Screened at _____

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Groundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.65	-	15.92	=	7.73	X	0.66	=	5.10
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft.) (in.): None Sheen/Iridescence: None Odor: None

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other _____

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1031	8.5	1166	17.2	Cloudy
1	5.0	1033	8.3	1097	17.5	CLEARING
2	10.0	1034	8.1	1080	16.9	
3	15.0	1051	8.0		16.5	
4						
5						
6						
7						
8						
9						
10						

Recovery Rate: Fast (Medium) Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft.)
(I) Initially	15.92
(P) After Purging	23.00
P - 0.8 (P-I) =	17.33 80% Recovery
(S) Before Sampling	15.92
(P-S) / (P-I) X 100 =	100 % Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1415 Turbidity (NTU): 15.8

Calibrate Date/Time: 10/16/02 0730 EH (MEV): 110.

PURGED WATER CONTAINMENT

Total drums at site: Water _____ Soil _____ Water pump through treatment system _____

Remarks: 1.72 D.O. After Purge

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 11600 Friesman Rd. Livermore, CA
Well Number: KMW-5
Development/Purge/Sampler(s): P. Arroyo

Project Number: 75.23909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: Cloudy

Pre-Purge DO (mg/L) .161

Screened at _____

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Groundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.40	-	16.45	=	6.95	X	0.66	=	4.58
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft) (in.): None Sheen/Iridescence: None Odor: None

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other _____

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1108	8.3	1195	16.2	Brown
1	4.5	1110	8.2	1228	16.7	↓
2	9.0	1112	8.1	1227	17.0	light brown
3	13.5	1114	8.1	1216	16.4	↓
4						
5						
6						
7						
8						
9						
10						

Recovery Rate:
(Fast)
Medium
Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft)
(I) Initially	16.45
(P) After Purging	20.80
P - 0.8 (P-I) =	17.32 80% Recovery
(S) Before Sampling	16.45
(P-S) / (P-I) X 100 =	100 % Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1435 Turbidity (NTU): 77.2

Calibrate Date/Time: 10/16/02 0730 EH (MEV): 125

PURGED WATER CONTAINMENT

Total drums at site: Water _____ Soil _____ Water pump through treatment system _____

Remarks: 1.52 D.O. After Purge

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 11600 Friesman Rd. Livermore, CA
Well Number: KMW-10
Development/Purge/Sampler(s): P. Arroyo

Project Number: 7523909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: Sunny

Pre-Purge DO (mg/L) 1.31

Screened at _____

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Groundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.40	-	16.27	=	7.13	X	0.66	=	4.70
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft.) (in.): None Sheen/Iridescence: None Odor: Yes

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other _____

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1230	8.1	1281	18.7	CLEAR
1	4.5	1231	8.1	1288	19.1	↓
2	9.0	1232	8.0	1314	19.0	
3	13.5	1234	7.9	1312	18.9	↓
4						
5						
6						
7						
8						
9						
10						

Recovery Rate: (Fast) Medium Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft.)
(I) Initially	16.27
(P) After Purging	19.20
P - 0.8 (P-I) =	16.85 80% Recovery
(S) Before Sampling	16.27
(P-S) / (P-I) X 100 =	100 % Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1605 Turbidity (NTU): 13.2

Calibrate Date/Time: 10/16/02 0730 EH (MEV): <-100

PURGED WATER CONTAINMENT

Total drums at site: Water _____ Soil _____ Water pump through treatment system _____

Remarks: .97 DO AFTER Purge

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 11600 Friesman Rd. Livermore, CA
Well Number: KMW-7
Development/Purge/Sampler(s): P. Arroyo

Project Number: 75.23909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: Sunny

Pre-Purge DO (mg/L) 1.08

Screened at _____

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Groundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.50	-	14.63	=	8.87	X	0.66	=	5.85
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft.) (in.): None Sheen/Iridescence: None Odor: Yes

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other _____

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1158	8.3	1238	17.6	Turbid
1	5.5	1200	8.1	1296	17.8	CLEARING
2	11.0	1203	7.9	1232	17.4	↓
3	16.5	1205	7.9	1237	17.4	CLEAR
4						
5						
6						
7						
8						
9						
10						

Recovery Rate: (Fast) Medium Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft.)
(I) Initially	14.63
(P) After Purging	18.10
P - 0.8 (P-I) =	15.32 80% Recovery
(S) Before Sampling	14.63
(P-S) / (P-I) X 100 =	100 % Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1525 Turbidity (NTU): 45.2

Calibrate Date/Time: 10/16/02 0730 EH (MEV): -75

PURGED WATER CONTAINMENT

Total drums at site: Water _____ Soil _____ Water pump through treatment system _____

Remarks: 1.79 D.O AFTER Purge

GROUNDWATER MONITORING WELL PURGE/SAMPLING WORK SHEET

Project Name: Friesman Ranch
Address: 11600 Friesman Rd. Livermore, CA
Well Number: KMW-8
Development/Purge/Sampler(s): P. Arroyo

Project Number: 75.23909.0001
Date: 10/16/02
Well Lock Number:
Well Integrity: Good
Ambient Conditions: Sunny

Pre-Purge DO (mg/L) .38

Screened at _____

WELL VOLUME CALCULATION

Well Casing Diameter (in.)	Total Well Depth (ft.)		Depth to Groundwater (GW)		Linear Feet of GW		Gallons Per Linear Foot		1 Well Volume (gal.)
2		-		=		X	0.17	=	
3		-		=		X	0.38	=	
(4)	23.65	:	15.85	=	7.80	X	0.66	=	5.14
4.5		-		=		X	0.83	=	
6		-		=		X	1.5	=	

GROUNDWATER SURFACE INSPECTION (BAILER CHECK)

Floating Product (ft.) (in.): None Sheen/Iridescence: None Odor: None

GROUNDWATER PURGING PURGE METHOD

☐ Stainless Steel Bailer; ☐ Submersible Pump; ☒ Air Diaphragm Pump; ☐ Honda Pump; ☐ Other _____

Stagnant Volumes Purged	Volume Purged (gal.)	Time	pH	Conductivity (µs/umhos)	Temp. (°C)	Color/Turbidity (other)
0	0	1310	8.1	1066	17.7	Brown
1	5.0	1312	8.2	1015	17.5	CLEAR
2	10.0	1313	8.2	1003	16.8	↓
3	15.0	1315	8.2	1003	16.9	↓
4						
5						
6						
7						
8						
9						
10						

Recovery Rate:
Fast
(Medium)
Slow

GROUNDWATER SAMPLING

Sampling Equipment: Disposable Bailer

Water Level Recovery

	Depth to GW (ft.)
(I) Initially	15.85
(P) After Purging	17.90
P - 0.8 (P-I) =	16.26 80% Recovery
(S) Before Sampling	15.85
(P-S) / (P-I) X 100 =	100 % Total Recovery

Sample Containers

	No.	Preservation Method/pH
1 liter (L), amber glass	2	None
40 ml VOA	3	HCL
500 ml polypropylene	1	None
~~Trip Blank~~ 250 poly	1	None
40 ml VOA	2	H_2SO_4

Sample Date/Time: 10/16/02 1335 Turbidity (NTU): 185.3

Calibrate Date/Time: 10/16/02 0730 EH (MEV): 25

PURGED WATER CONTAINMENT

Total drums at site: Water _____ Soil _____ Water pump through treatment system _____

Remarks: D.O. After Purge 1.78

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

ATC Associates	Client Project ID: #75.23909.0001; Friesman Ranch	Date Sampled: 10/16/02
6602 Owens Drive, #100		Date Received: 10/17/02
Pleasanton, CA 94588	Client Contact: Tina Berry	Date Extracted: 10/19/02-10/23/02
	Client P.O.:	Date Analyzed: 10/19/02-10/23/02

Gasoline Range (C6-C12) Volatile Hydrocarbons as Gasoline with BTEX and MTBE*

Extraction method: SW5030B Analytical methods: SW8021B/8015Cm Work Order: 0210325

Lab ID	Client ID	Matrix	TPH(g)	MTBE	Benzene	Toluene	Ethylbenzene	Xylenes	DF	% SS
001A	KMW-1	W	ND	ND	ND	ND	ND	ND	1	100
002A	KMW-3	W	ND	ND	ND	ND	ND	ND	1	100
003A	KMW-4	W	ND	ND	ND	ND	ND	ND	1	100
004A	KMW-5	W	ND	ND	ND	ND	ND	ND	1	101
005A	KMW-6	W	4600,a	ND<50	100	8.4	190	110	10	--#
006A	KMW-6A	W	5100,a	ND<50	110	10	210	110	10	--#
007A	KMW-7	W	270,a	ND	1.3	ND	4.0	15	1	97.2
008A	KMW-8	W	ND	ND	ND	ND	ND	ND	1	101
009A	TRIP BLANK	W	ND	ND	ND	ND	ND	ND	1	101
Reporting Limit for DF =1; ND means not detected at or above the reporting limit		W	50	5.0	0.5	0.5	0.5	0.5	1	µg/L
		S	NA	NA	NA	NA	NA	NA	1	mg/Kg

*water and vapor samples are reported in ug/L, soil and sludge samples in mg/kg, wipe samples in ug/wipe, product/oil/non-aqueous liquid samples in mg/L, and TCLP 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 (stoddard solvent); f) one to a few isolated non-target peaks present; g) strongly aged gasoline or diesel range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) reporting limit raised due to high MTBE content; k) TPH pattern that does not appear to be derived from gasoline (aviation gas). m) no recognizable pattern.

DHS Certification No. 1644

Edward Hamilton, Lab Director

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

ATC Associates	Client Project ID: #75.23909.0001; Friesman Ranch	Date Sampled: 10/16/02
6602 Owens Drive, #100		Date Received: 10/17/02
Pleasanton, CA 94588	Client Contact: Tina Berry	Date Extracted: 10/17/02
	Client P.O.:	Date Analyzed: 10/18/02-10/21/02

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

Extraction method: SW3510C Analytical methods: SW8015C Work Order: 0210325

Lab ID	Client ID	Matrix	TPH(d)	DF	% SS
0210325-001B	KMW-1	W	ND	1	99.4
0210325-002B	KMW-3	W	ND	1	99.2
0210325-003B	KMW-4	W	ND	1	104
0210325-004B	KMW-5	W	ND	1	95.0
0210325-005B	KMW-6	W	1600,d	1	98.8
0210325-006B	KMW-6A	W	1900,d	1	100
0210325-007B	KMW-7	W	480,d	1	107
0210325-008B	KMW-8	W	ND	1	105
Reporting Limit for DF =1; ND means not detected at or above the reporting limit	W		50		µg/L
	S		NA		NA

* water and vapor samples are reported in ug/L, wipe samples in ug/wipe, soil/solid/sludge samples in mg/kg, product/oil/non-aqueous liquid samples in mg/L, 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) unknown medium boiling point pattern that does not appear to be derived from diesel (corn oil?); f) one to a few isolated peaks present; g) oil range compounds are significant; h) lighter than water immiscible sheen/product is present; i) liquid sample that contains greater than ~2 vol. % sediment; j) sample diluted due to high organic content; k) kerosene/kerosene range; l) bunker oil; m) fuel oil; n) stoddard solvent; o) sample diluted due to matrix interference.

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ATC Associates	Client Project ID: #75.23909.0001; Friesman Ranch	Date Sampled: 10/16/02
6602 Owens Drive, #100		Date Received: 10/17/02
Pleasanton, CA 94588	Client Contact: Tina Berry	Date Extracted: 10/17/02
	Client P.O.:	Date Analyzed: 10/21/02

Ferrous Iron, Fe(II)*

Extraction method: E200.7 Analytical methods: E200.7 Work Order: 0210325

Lab ID	Client ID	Matrix	Extraction	Iron	DF	% SS
0210325-001D	KMW-1	W	DISS.	ND	1	N/A
0210325-002D	KMW-3	W	DISS.	ND	1	N/A
0210325-003D	KMW-4	W	DISS.	ND	1	N/A
0210325-004D	KMW-5	W	DISS.	ND	1	N/A
0210325-005D	KMW-6	W	DISS.	2.49	1	N/A
0210325-006D	KMW-6A	W	DISS.	1.98	1	N/A
0210325-007D	KMW-7	W	DISS.	ND	1	N/A
0210325-008D	KMW-8	W	DISS.	ND	1	N/A
Reporting Limit for DF =1; ND means not detected at or above the reporting limit		W	DISS.	0.05		mg/L
		S	TTLC	NA		mg/kg

* water samples are run as total dissolved iron and reported in mg/L, soil/sludge/solid/product samples in mg/kg, wipes in ug/wipe and all TCLP / STLC / DISTLC / SPLP extracts in mg/L.

ND means not detected above the reporting limit; N/A means not applicable to this sample or instrument.

Analytical Methods: EPA 6010C/200.7 for all elements except: 200.9 (water- Sb, As, Pb, Se, Tl); 245.1 (Hg); 7010 (sludge/soil/solid/oil/product/wipes - As, Se, Tl); 7471B (Hg).

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; z) reporting limit raised due to matrix interference.

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ATC Associates	Client Project ID: #75.23909.0001; Friesman Ranch	Date Sampled: 10/16/02
6602 Owens Drive, #100		Date Received: 10/17/02
Pleasanton, CA 94588	Client Contact: Tina Berry	Date Extracted: 10/17/02
	Client P.O.:	Date Analyzed: 10/17/02-10/18/02

Inorganic Anions by IC*

Extraction method: E300.1 Analytical methods: E300.1 Work Order: 0210325

Lab ID	Client ID	Matrix	Nitrate as N	Sulfate	DF	% SS
0210325-001C	KMW-1	W	ND	84	1	95
0210325-002C	KMW-3	W	ND	100	1	116
0210325-003C	KMW-4	W	ND	91	1	94
0210325-004C	KMW-5	W	ND	92	1	95
0210325-005C	KMW-6	W	ND	3.6	1	93
0210325-006C	KMW-6A	W	ND	3.9	1	95
0210325-007C	KMW-7	W	ND	66	1	99
0210325-008C	KMW-8	W	2.2	77	10	97
Reporting Limit for DF =1; ND means not detected at or above the reporting limit		W	1.0	1.0		mg/L
		S	NA	NA		mg/Kg

* water samples are reported in mg/L, liquid and soil samples in mg/kg, wipe samples in ug/wipe.

surrogate diluted out of range or surrogate coelutes with another peak; N/A means surrogate not applicable to this analysis.

(j) sample diluted due to high inorganic content.

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Edward Hamilton, Lab Director

McCampbell Analytical Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

WorkOrder: 0210325

Client:
ATC Associates
6602 Owens Drive, #100
Pleasanton, CA 94588

TEL: (925) 460-5300
FAX: (925) 463-2559
ProjectNo: #75.23909.0001;
PO:

17-Oct-02

Sample ID	ClientSampID	Matrix	Collection Date	Hold	Requested Tests					
					Alkalinity	E200_7	E300_1	SW8015C	8021B/8015	TOC
0210325-001	KMW-1	Water	10/16/02		C	D	C	B	A	E
0210325-002	KMW-3	Water	10/16/02		C	D	C	B	A	E
0210325-003	KMW-4	Water	10/16/02		C	D	C	B	A	E
0210325-004	KMW-5	Water	10/16/02		C	D	C	B	A	E
0210325-005	KMW-6	Water	10/16/02		C	D	C	B	A	E
0210325-006	KMW-6A	Water	10/16/02		C	D	C	B	A	E
0210325-007	KMW-7	Water	10/16/02		C	D	C	B	A	E
0210325-008	KMW-8	Water	10/16/02		C	D	C	B	A	E
0210325-009	TRIP BLANK	Water	10/16/02		C	D	C	B	A	E

Comments:

	Date/Time		Date/Time
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	
Relinquished by:		**Received by:**	

NOTE: Samples are discarded 60 days after results are reported unless other arrangements are made. Hazardous samples will be returned to client or disposed of at client expense.

Bottle Type: L-Liter V-Voa S-Soil Jar O-Orbo T-Tedlar B-Brass P-Plastic OT-Other

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# N291-22

QC REPORT

McCampbell Analytical
110 2nd Ave. South #D7
Pacheco CA 94553

Analyte	Method	Batch #	Dates Analyzed	Orig.	Dupl.	MS %Rec	MSD %Rec		RPD	LCS %Rec	Blank	Comments
Total Organic Carbon	SM5310C	108858	10/21/02			102.2	102.6	*	0.4		ND	Not enough sample for MS/MSD
Total Alkalinity	SM2320B	109005	10/25/02			82.4	84.2		0.4	103.6	ND	

* LCS/LCSD (see comments)

Rohit Bombaywala
Inorganic Supervisor

Certification # 1157

Donna Keller
Laboratory Director

NOV 25 2002

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

CERTIFICATE OF ANALYSIS

Report # N291-22 **Date:** 10/28/02

McCampbell Analytical
110 2nd Ave. South #D7
Pacheco CA 94553

Project: 0210325

PO#

Date Rec'd: 10/18/02
Date Started: 10/24/02
Date Completed: 10/25/02

Date Sampled: 10/16/02
Time:
Sampler:

Sample ID	Lab ID	RL	Method	Analyte	Results	Units
MW-1	N310775	20	SM2320B	Total Alkalinity	328	mg/L
		1.0	SM5310C	Total Organic Carbon	2.4	mg/L
KMW-3	N310776	20	SM2320B	Total Alkalinity	274	mg/L
		1.0	SM5310C	Total Organic Carbon	2.6	mg/L
KMW-4	N310777	20	SM2320B	Total Alkalinity	288	mg/L
		1.0	SM5310C	Total Organic Carbon	2.2	mg/L
MW-5	N310778	20	SM2320B	Total Alkalinity	381	mg/L
		1.0	SM5310C	Total Organic Carbon	2.2	mg/L
MW-6	N310779	20	SM2320B	Total Alkalinity	397	mg/L
		1.0	SM5310C	Total Organic Carbon	5.2	mg/L
KMW-6A	N310780	20	SM2320B	Total Alkalinity	512	mg/L
		1.0	SM5310C	Total Organic Carbon	5.4	mg/L
KMW-7	N310781	20	SM2320B	Total Alkalinity	382	mg/L
		1.0	SM5310C	Total Organic Carbon	3.1	mg/L
MW-8	N310782	20	SM2320B	Total Alkalinity	341	mg/L
		1.0	SM5310C	Total Organic Carbon	1.8	mg/L

Rohit Bombaywala
Inorganic Supervisor

Certification # 1157

Donna Keller
Laboratory Director

GeoAnalytical Laboratories, Inc.

1405 Kansas Avenue Modesto, CA 95351 Phone (209) 572-0900 Fax (209) 572-0916

Report# N291-22

QC REPORT

McCampbell Analytical
110 2nd Ave. South #D7
Pacheco CA 94553

Analyte	Method	Batch #	Dates Analyzed	Orig.	Dupl.	MS %Rec	MSD %Rec		RPD	LCS %Rec	Blank	Comments
Total Alkalinity	SM2320B	I09005	10/25/02			82.4	84.2		0.4	103.6	ND	
Total Organic Carbon	SM5310C	i08858	10/21/02			102.2	102.6	*	0.4		ND	Not enough sample for MS/MSD

* LCS/LCSD (see comments)

Rohit Bombaywala
Inorganic Supervisor

Certification # 1157

Donna Keller
Laboratory Director

N291-22

McCampbell Analytical Inc.
110 Second Avenue South, #D7
Pacheco, CA 94553-5560
(925) 798-1620

CHAIN-OF-CUSTODY RECORD

Subcontractor:
GEO ANALYTICAL LABORATORIES
1405 Kansas Avenue
Modesto, CA 95351

TEL: (209) 572-0900
FAX: (209) 572-0916

Acct #: N/A

17-Oct-02

Sample ID	Matrix	Collection Date	Bottle Type	Requested Tests: Alkalinity	TOC					
0210325-001C	W / Water	10/16/02	500HDPE	1						
0210325-001E	Water	10/16/02	VOAHCL		1					N310775
0210325-002C	Water	10/16/02	500HDPE	1						
0210325-002E	Water	10/16/02	VOAHCL		1					N310776
0210325-003C	Water	10/16/02	500HDPE	1						
0210325-003E	Water	10/16/02	VOAHCL		1					N310777
0210325-004C	Water	10/16/02	500HDPE	1						
0210325-004E	Water	10/16/02	VOAHCL		1					N310778
0210325-005C	Water	10/16/02	500HDPE	1						
0210325-005E	Water	10/16/02	VOAHCL		1					N310779
0210325-006C	Water	10/16/02	500HDPE	1						
0210325-006E	Water	10/16/02	VOAHCL		1					N310780
0210325-007C	Water	10/16/02	500HDPE	1						
0210325-007E	Water	10/16/02	VOAHCL		1					N310781
0210325-008C	Water	10/16/02	500HDPE	1						
0210325-008E	Water	10/16/02	VOAHCL		1					N310782

Comments: USE CLIENT ID'S AS FOLLOWS: #001= KMW-1, 002=KMW-3, 003=KMW-4, 004=KMW-5, 005=KMW-6, 006=KMW-6A, 007=KMW-7,008=KMW-8.... SAMPLES ARE ON A 5DAY TAT; PLEASE FAX RESULTS WHEN COMPLETED.

the matrix is groundwater, not haz or drinking water.

		Date/Time			Date/Time
Relinquished by:	Vhian Vuong	10/17	**Received by:**	CALOVERNIGHT	
Relinquished by:	California Overnight	10/18	**Received by:**	Lidia Padilla	10/18

CHAIN OF CUSTODY FORM

ATC ASSOCIATES INC.
[redacted]2 Ov[redacted]Drive[redacted]te 10[redacted]
Pleasanton, CA 94588
Main Line: (925) 460-5300
Facsimile: (925) 463-2559

Turnaround Time: (working days) ☒ 10 day ☐ 7 day ☐ 5 day ☐ 3 day ☐ 2 day ☐ 24 hr ☐ 2-8 hr ☐ other ( )

Project Name: FRIESMAN RANCH
Project Number: 75 23909.0001
Client: CHILDREN'S Hospital foundation.
Task: 132
Global I.D.:
Project Address: 1600 FRIESMAN Rd. Livermore, CA
Laboratory: McCampbell Analytical
Contact:
Lab Address/Phone: (925) 798-1620
ATC Project Manager: TINA BERRY
ATC PM Ph. No.: (925) 225-
Email: BERRY75 @atc-enviro.com
ATC Sampler: P. Arroyo
Phone: (925) 225-7813

ATC Sample ID	Sample Information: Date	Time	Matrix: Soil	Water	Vapor	Container Information: No.	Type	Preservative	Field Pt. I.D.- Check if same as Sample I.D.	Analyses Requested: TPHg/BTEX/MTBE (8015M/8021)	TOTAL ORGANIC CARBON Confirm MTBE by GCMS	Fuel Oxygenates (8260B)	TPHd (8015M)	HVOCs (8010)	SVOC's (8270)	VOCs (8260)	B2 Metals Hexavalent Chromium (7196/3060) FERROUS IRON	Cyanide, Total (335.2)	TPHg/BTEX/MTBE (8015M/8260B)	TPHg/BTEX/5 Fuel Oxy's (8260B)	TPHg/BTEX/5 Fuel Oxy's/1,2 DCA & EDB (8260B)	ALKALINITY	SULFATE	NITRATE
KMW-1	10/16/02			X		3	VOA	HCL		X														
						2	L.A.G	None					X											
						1	500ml poly	None														X	X	X
						1	250ml poly	None									X							
						2	VOA	H_2SO_4			X													
KMW-2						3	VOA	HCL		X														
						2	L.A.G	None					X											
						1	500 poly	None														X	X	X
						1	250 poly	None									X							
						2	VOA	H_2SO_4			X													
KMW-3						3	VOA	HCL		X														
						2	L.A.G.	None					X											
						1	500 poly	None														X	X	X
						1	250 poly	None									X							
						2	VOA	H_2SO_4			X													

VOAs | O&G | METALS | OTHER

ICE/t ____
GOOD CONDITION ✓
HEAD SPACE ABSENT ____
DECHLORINATED IN LAB ____
PRESERVATION APPROPRIATE ✓
CONTAINERS ✓
PRESERVED IN LAB ____

Additional Comments: FILTER AND PRESERVE IRON SAMPLES IRON LAB ARRANGE

EDF Format ☐ INVOICE CHILDRENS HOSPITAL DIRECTLY

Relinquished By:	Date/Time: 10/17/02 0715	Received By:	Date/Time: 10/17/02 0715
Relinquished By:	Date/Time: 10/17/02 1335	Received By:	Date/Time: 10/17/02 1335
Relinquished By:	Date/Time: 10/17/02 1725	Received By:	Date/Time: 10/17/02 1725

Sample Condition. Good? Yes ___ No ___ On Ice? Yes ___ No ___ Cooler Temp ____ Transportation Method: ____

Page 1 of 2

White - Lab
L:/Admin/Subsurface Group/EDF COC 4-22-02.xls; revised 05/08/01

Yellow - Lab

Pink - ATC

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	10/16/02	14.27	0.00	355.85
	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
	10/16/02	14.27	0.00	NC
KMW-2	10/16/02	*	*	*
	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	10/16/02	13.69	0.00	355.41
	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	10/16/02	15.92	0.00	353.88
	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	10/16/02	16.45	0.00	353.07
	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	355.35
	9/8/97	14.24	0.00	355.28
KMW-6	10/16/02	16.27	0.00	353.81
	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	10/16/02	14.63	0.00	355.41
	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	10/16/02	15.85	0.00	352.76
	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).
Wells KMW-7 and KMW-8 installed on December 23, 1998
* Well obstructed, no water level measurement taken

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	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-2	10/16/02	NS	NS	NS	NS	NS	NS	NS	-	-
	9/16/02	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-3	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	9/16/02	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-4	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	9/16/02	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
	9/8/97	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	<10	-
KMW-5	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	9/16/02	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
	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	10/16/02	1,600, d	4,600, a	100	8.4	190	110	<50	-	-
dup.	10/16/02	1,900, d	5,100, a	110	10	210	110	<50	-	-
	9/16/02	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*	-
	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	10/16/02	480, d	270, a	1.3	<0.5	4	15	<5.0	-	-
	9/16/02	1,100, d	950, a	3.3	2	19	33	<10	<10	<10
	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	10/16/02	<50	<50	<0.5	<0.5	<0.5	<0.5	<5.0	-	-
	9/16/02	<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
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
**	Reporting limit raised due to high presence of TPH-g
-	Not analyzed
NS	Not Sampled

WORK PLAN FOR GROUNDWATER REMEDIATION AND WELL DESTRUCTION FRIESMAN RANCH PROPERTY LIVERMORE, CALIFORNIA

December 27, 2002

A Workplan Prepared for:

Children's Hospital Foundation
C/o Ms. Leah S. Goldberg, Esq.
Hanson, Bridgett, Marcus, Vlahos and Rudy, LLP
333 Market Street, 23rd Floor
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WORKPLAN FOR GROUNDWATER REMEDIATION AND WELL DESTRUCTION ACTIVITIES FRIESMAN RANCH PROPERTY 1600 FRIESMAN ROAD LIVERMORE, CALIFORNIA

ATC Job No. 75.23909.0001

Prepared by:

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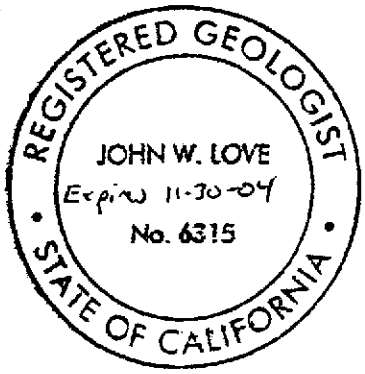

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December 27, 2002

WORKPLAN FOR
GROUNDWATER REMEDIATION AND WELL DESTRUCTION
FRIESMAN RANCH PROPERTY
1600 FRIESMAN ROAD
LIVERMORE, CALIFORNIA

TABLE OF CONTENTS

1. INTRODUCTION 1

1.1 PURPOSE, OBJECTIVES AND SCOPE OF WORK 1

2. SITE DESCRIPTION 3

2.1 LOCAL DESCRIPTION, SURROUNDING LAND USE AND CLIMATE 3
2.2 LOCAL GEOLOGY AND HYDROLOGY 3

3. PREVIOUS INVESTIGATIONS 5

3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT 5
3.2 PHASE I SOIL AND GROUNDWATER INVESTIGATION 5
3.3 PHASE II SOIL AND GROUNDWATER INVESTIGATION 5

4. PROPOSED WORK 7

4.1 INTRODUCTION 7
4.2 GROUNDWATER REMEDIATION/OXYGEN ENHANCEMENT 7
4.2.1 Field Preparation Activities 7
4.2.2 Oxygen Release Compound® 7
4.2.3 ORC Slurry Injection Program 7
4.2.4 Well Destruction 8
4.2.5 Investigation Derived Waste Management 8

5. FIELD QUALITY ASSURANCE/QUALITY CONTROL 9

5.1 FIELD DOCUMENTATION 9
5.1.1 Field Data Sheets 9
5.1.2 Photodocumentation Record 9
5.1.3 Sample Labels 9
5.1.4 Chain-of-Custody Records 9

6. LABORATORY QUALITY ASSURANCE/QUALITY CONTROL 10

7. PROPOSED SCHEDULE 11

8. SITE SPECIFIC HEALTH AND SAFETY PLAN 12

9. REFERENCES 13

FIGURES

FIGURE 1 Proposed ORC Injection Locations

1. INTRODUCTION

This Workplan describes the purpose, objectives, tasks and methods for ORC Injection and Well Destruction activities proposed for the Livermore Ranch Property located at 1600 Friesman Road, Livermore, California (the Site). The Site is currently known to have eight groundwater monitoring wells that were last sampled on October 16, 2002. Results of that sampling event are documented in the December 18, 2002 Quarterly Groundwater Monitoring Report, Fourth Quarter 2002 prepared for the Site by ATC Associates Inc. (ATC).

Preparation of this Workplan was included as a deliverable in ATC's *Proposal for Environmental Consulting Services* addressed to Ms. Leah S. Goldberg, Esq. dated September 26, 2002. Additionally, this Workplan is offered in accordance with the Recommendations noted in the December 27, 2002 Quarterly Groundwater Monitoring Report referenced above.

1.1 PURPOSE, OBJECTIVES AND SCOPE OF WORK

The purpose of the proposed ORC Injection Program is to assist in the reduction of dissolved petroleum hydrocarbons in groundwater at the Site such that the Site land use can be developed for unrestricted purposes. In addition to the ORC Injection Program, four groundwater monitoring wells (KMW-2 through KMW-5) are proposed to be properly destroyed, as they no longer provide meaningful data in the evaluation of site conditions. Additionally, casing for well KMW-2 appears to be damaged and the well cannot be properly sampled.

The objectives of the groundwater remediation and well destruction activities are to:

- Increase oxygen in the subsurface to assist in the anaerobic breakdown of petroleum hydrocarbons.
- Reduce concentrations of petroleum hydrocarbons in groundwater at the Site in the vicinity of groundwater monitoring wells KMW-6 and KMW-7.
- Reduce future impacts to groundwater through injection of Oxygen Release Compound (ORC®) into the subsurface at targeted locations (See Figure 1).
- Mitigate groundwater impact so that unrestricted development at the site can be implemented.
- Remove wells that are no longer providing meaningful data in the evaluation of Site conditions.
- Mitigate ongoing liabilities associated with maintaining groundwater monitoring wells.

In order to meet these objectives, the following scopes of work will be implemented:

- Advance approximately 30 boreholes to an approximate depth of 25 feet below ground surface (bgs). The approximate locations of the proposed boreholes are shown in Figure 1.
- Backfill each borehole location with ORC® from a depth of 25 to 10 feet bgs and complete each borehole with neat cement grout from 10 ft. depth to the ground surface.
- Obtain appropriate agency permits and destroy site wells KMW-2, KMW-3, KMW-4 and KMW-5.
- Permit and destroy wells KMW-2 through KMW-5.

- Generate and submit a report on the ORC Slurry Injection Program and Well Destruction Activities.
- Continue quarterly groundwater monitoring, sampling and reporting activities.

2. SITE DESCRIPTION

2.1 LOCAL DESCRIPTION, SURROUNDING LAND USE AND CLIMATE

The Friesman Ranch Property is located at 1600 Friesman Road, Livermore, Alameda County, California. The property covers an area of approximately 55 acres and is used for agricultural and residential purposes. Although the majority of the site is undeveloped and was used for grazing purposes, the southwest central portion of the site is occupied by six single-family residences, three detached garages, the former dairy building, seven barns and a stable.

The property was undeveloped until the 1910s when the buildings (barns, outbuildings, residences) associated with the dairy operation were constructed. The property was used as a dairy until operations ceased in 1971. The equipment used in the diary operations was powered by steam generated by two boilers located in the former dairy building. These boilers were reportedly fueled via a heating oil above ground storage tank (AST) that was in the metal shed located to the north of the dairy building. Open areas on the northern and southern portions of the property were and still are used as agricultural land and pastures for cattle and horses. Debris (tires, old furniture, scrap metal and lumber) is scattered across the property.

Several ASTs were present on the central portion of the site. All of these ASTs were located on concrete pads that appear to have only minor oil staining.

Surrounding land use is mixed (agricultural, recreational and residential) use. The site is bordered to the south by scattered residential buildings, Las Positas Golf Course and undeveloped grazing land; to the north by Interstate 580; to the west by Tri-Valley Golf Center's driving range; and to the east by Las Positas Golf Course.

The climate of the area is characterized by wet mild winters and dry, hot summers. Rainfall occurs intermittently, but is concentrated between September and March. Between 1990 and 1994, annual rainfall ranged from 8.96 to 19.67 inches, with an average of 13.88 inches (Kleinfelder, 1997).

2.2 LOCAL GEOLOGY AND HYDROLOGY

The site is located in the Livermore Basin portion of the Coast Range Geomorphic Province of California (Norris and Webb, 1990). Non-marine, Pleistocene and Holocene deposits of fluvial and lacustrine origin underlie the Livermore Basin, including the Friesman Ranch property. Most significant of these deposits is the Livermore Gravels, an approximately 4,000 foot thick sequence of gravels, sands, silts and clays, with scattered lake bed deposits. On the northern side of the basin, where the Friesman Road property is located, these deposits are commonly buried by younger alluvium.

The Livermore valley is drained by a number of small streams that originate in the surrounding hills and flow into larger drainages that ultimately discharge into Alameda Creek, through Niles Canyon, and into San Francisco Bay. One small drainage, Arroyo Las Positas, transects the southeastern portion of the site and flows into Alamo Creek to the west.

Subsurface site materials consist of stiff silty clays with minor silty sands to a depth of a least 24 feet. The sandy materials appear to be discontinuous across the site. These materials do not usually allow appreciable volumes of groundwater to migrate through them. Reported hydraulic conductivity values for these materials range from 10E5 to 1 gallon per day per square feet (gal/day/ft2).

Groundwater is encountered at depths ranging from 13 to 23 feet below ground surface (bgs) and stabilizes at depths ranging from 12 to 15 feet bgs. Groundwater conditions appear to range from unconfined to confined.

No measurable free-product was encountered in any of the groundwater monitoring wells, but a hydrocarbon sheen and odor was observed in the water purged and sampled from well KMW-6 (Kleinfelder, 1997).

Groundwater flow direction at the site typically is towards the northwest. The current groundwater gradient, as established during the October 2002 sampling event, was 0.009, consistent with historical flow directions and gradients.

3. PREVIOUS INVESTIGATIONS

3.1 PHASE I ENVIRONMENTAL SITE ASSESSMENT

In July 1997, a Phase I Environmental Site Assessment (Phase I ESA) and limited soil and groundwater investigation were performed at the site (Kleinfelder, 1997c). During the site reconnaissance portion of the Phase I ESA, a number of ASTs, reportedly used for fueling of vehicles and equipment and two 55-gallon drums used to store hydraulic fluid, were observed around the central part of the developed portion of the facility. A heating oil AST that supplied fuel to the boilers in the former dairy building and that was reportedly removed from the facility several years earlier, previously occupied the metal shed. Each of the ASTs was mounted on towers above concrete pads. No evidence of piping, either above or below ground, was observed (Kleinfelder, 1997).

3.2 PHASE I SOIL AND GROUNDWATER INVESTIGATION

In order to assess environmental impairment associated with these facilities, a soil and groundwater sampling program was implemented. Soil samples obtained at varying depth, and groundwater samples were collected using a truck-mounted Geoprobe sampling system. The samples were analyzed for total purgeable petroleum hydrocarbons (TPPH), total extractable petroleum hydrocarbons (TEPH), and aromatic hydrocarbons (benzene, toluene, ethylbenzene and total xylenes – BTEX).

TPPH, TEPH and BTEX were detected in the soil and groundwater samples collected from the areas where the boilers and former AST were located. The maximum concentrations of TPPH and TEPH detected in soil samples were 280 and 160 milligrams per kilogram (mg/Kg), respectively. The aromatic hydrocarbons ethylbenzene, toluene and total xylenes were detected at 1.6 mg/Kg, 0.52 mg/Kg and 1.2 mg/Kg, respectively.

TPPH, TEPH and BTEX were detected in the one groundwater sample collected at concentrations of 3100, 160000, 7.3, 19, 11 and 22 micrograms per liter (µg/L), respectively. Benzene was present above the State's maximum contaminant level (MCL) of 1.0 µg/L.

No volatile organic compounds were detected in the composited surface soil sample analyzed for this suite of chemicals. The composite sample did contain total lead at a concentration of 73 mg/Kg, but did not contain extractable lead.

3.3 PHASE II SOIL AND GROUNDWATER INVESTIGATION

A total of six groundwater monitoring wells were installed in September 1997. The wells were constructed of 4-inch diameter schedule 40 PVC with 15 feet of well screen located from 9 to 24 feet bgs. The wells were developed and initially sampled on September 8, 1997 (Kleinfelder, 1997).

In October 1997, Kleinfelder prepared a Remedial Investigations, RBCA Tier 2 Evaluation and Remedial Action Plan for the site. The conclusion of the RBCA study indicated that the benzene concentrations noted in well KMW-6 exceeded the State's MCL and could pose a adverse human health effect if onsite, impacted groundwater were used for drinking water purposes. Additionally, three remedial alternatives were evaluated and included a) air sparging the entire plume; b) bioremediation of the entire plume and c) air sparging the higher plume concentrations combined with passive bioremediation of the outer plume

(lower concentrations). Kleinfelder recommended air sparging with passive bioremediation. However, this option was not implemented. Instead, an ORC Slurry Injection Program to address groundwater petroleum concentrations is being proposed.

Groundwater monitoring and sampling activities have taken place intermittently between September 1997 and October 2002. Results of the recent sampling event are consistent with historical results. A complete known history of groundwater monitoring and sampling results are documented in the Quarterly Monitoring Report, Fourth Quarter 2002, dated December 3, 2002.

4. PROPOSED WORK

4.1 INTRODUCTION

The proposed work to be performed at the Site consists of the following tasks:

- Implement ORC Slurry Injection Program
- Destroy four groundwater monitoring wells: KMW-2, KMW-3, KMW-4 and KMW-5.
- Continue quarterly groundwater monitoring and sampling activities.
- Document the ORC Slurry Injection and Well Destruction activities in reports according to the schedules provided in this Workplan.

The project activities will be conducted under the supervision of a California Registered Geologist (RG) or a Professional Engineer (PE).

4.2 GROUNDWATER REMEDIATION /OXYGEN ENHANCEMENT

4.2.1 Field Preparation Activities

Prior to the performance of any intrusive field procedures, the following tasks will be performed:

- Clearance of the proposed borehole area by a private underground utility locating service, and
- Procurement of all applicable permits will be obtained by ATC before the beginning of the ORC Slurry Injection program and well destruction activities.

4.2.2 Oxygen Release Compound®

ORC® is a patented formulation of magnesium peroxide that slowly releases oxygen when moist; the hydrated product is magnesium hydroxide. When exposed to groundwater the ORC® will release oxygen as needed to indigenous microbes to degrade the petroleum hydrocarbons in the groundwater.

4.2.3 ORC Slurry Injection Program

Groundwater data obtained by ATC on October 16, 2002 show the Site to be depleted in oxygen. The impacted groundwater at the Site is generally within the area identified in Figure 1, and located near wells KMW-6 and KMW-7. The area of impacted groundwater does not extend beyond the locations currently shown as wells KMW-5 and KMW-8.

Figure 1 offers the location of targeted ORC Injection points in the area of observed, highest dissolved hydrocarbon concentrations in groundwater. ATC proposes to inject ORC slurry into the area of impacted groundwater to facilitate an increase in oxygen in the subsurface. The increased oxygen is expected to enhance the anaerobic breakdown of petroleum hydrocarbons in the subsurface and thereby reduce the residual hydrocarbon concentrations.

A total of 30 injection points will be advanced on 20-foot centers. Each injection point will be advanced to a total depth of 25 feet below ground surface (bgs). A slurry consisting of ORC and water will be

pressure injected at each point. During the process, the injection probe will be raised from 25 to 10 feet bgs (in the borehole) to ensure that the ORC slurry is injected into the total thickness of the saturated column of the surrounding aquifer matrix.

Prior to advancement of any soil borings, ATC will procure permits from the Alameda County Flood Control and Water Conservation District, Zone 7. ATC will contact Underground Service Alert (USA) to notify relevant utility companies of the work that is being proposed to be performed at the Site. In addition, prior to the advancement of any borings, ATC will contract with an underground utility location company to geophysically check the locations of potential hazards that could be posed by underground impediments.

4.2.4 Well Destruction

ATC recommends the destruction of groundwater monitoring wells KMW-2, KMW-3, KMW-4 and KMW-5. Data from these wells were historically non-detect, and the wells do not provide meaningful data. The locations of the wells are presented on Figure 1.

Total depths of the wells are as follows: KMW-2 is 23.57 feet bgs. The depth of well KMW-3 is 23.46 feet bgs, KMW-4 is 23.69 feet bgs, and KMW-5 is 23.58 feet bgs. The construction details for the wells are shown in Table 1. Prior to conducting the fieldwork proposed at the site, ATC will submit well destruction applications to Alameda County Department of Environmental Health. The Alameda County, Zone 7 will permit the destruction of the monitoring wells. The abandonment will be performed by a California-certified drilling subcontractor, under the supervision of a California-registered geologist.

During well destruction, the well lids will be removed. The four wells will be pressure grouted to approximately two inches below the surface using cement grout. The grouted well borings will then be patched with asphalt patch or concrete to compliment the surrounding ground surface.

Soil cuttings generated during the well destruction (if any) will be stored in Department of Transport (DOT) approved drums and disposed by a licensed hazardous waste hauler.

4.2.5 Investigation Derived Waste Management

Investigation Derived Waste (IDW) (soils) are anticipated to be generated during the ORC Slurry Injection program. The soils will be placed on a minimum of 10-mil plastic sheeting and covered with weighted 10-mil plastic sheeting and secured in place until laboratory results indicate the appropriate classification for disposal. Following results of lab analyses, the soils will be transported under waste manifest, and disposed of at a licensed disposal facility in accordance with California law. ATC can identify disposal options for the Client; however, the Client is ultimately responsible for disposal for any IDW produced during the implementation of these investigation activities.

5. FIELD QUALITY ASSURANCE/QUALITY CONTROL

Field quality assurance/quality control (QA/QC) will be documented by two indirect means: field documentation and QA/QC sample collection and analysis.

5.1 FIELD DOCUMENTATION

Four formats will be used to document the implementation of field activities:

- Field data sheets;
- Photodocumentation Record;
- Sample Labels;
- Chain-of-custody record.

5.1.1 Field Data Sheets

Field data sheets will be completed in the field to document field activities. The data sheets will include all sample-collection information including sample date and time, location and client, analytical methods, samplers' initials, and the name and address of the laboratory and information collected in the field, including Dissolved Oxygen (DO), Oxygen Reduction Potential (ORP), temperature, pH, conductivity, etc.

5.1.2 Photodocumentation Record

Photographs will be used to document relevant phases of the field activities. These photographs will be logged and placed into the Report, as appropriate.

5.1.3 Sample Labels

Samples labels will be completed in waterproof ink at the time of sample collection and before the sample is placed in the cooler. The following information will be included on the sample label: sample number, date and time, sample location and client, analysis and laboratory, preservative, samplers' initials, and project number.

5.1.4 Chain-of-Custody Records

A chain-of-custody record will be completed as soil and/or groundwater samples are collected, so that samples do not have to be removed from the cooler. The record will be checked for completeness at the end of each day samples are collected and signed. The chain-of-custody will then be hand-delivered with the samples to the laboratory, or placed in a sealable plastic freezer bag and taped to the inside lid of a cooler for shipment. Information on the chain-of-custody record will include: sample date and time, sample ID and location, matrix, number of containers, required analyses, preservative, instructions for composite samples, turnaround time, project manager's name, project number, project name and location, client and laboratory names, and sampler signatures.

6. LABORATORY QUALITY ASSURANCE/QUALITY CONTROL

A Cal/EPA Environmental Laboratory Accreditation Program (ELAP) -accredited hazardous-waste fixed-base laboratory will perform all analytical testing. The laboratories will be responsible for maintaining custody of the samples, and for maintaining all associated records documenting that custody. Upon receipt of the samples, the laboratories will check the original chain-of-custody documents and compare them with the labeled contents of each sample container for accuracy and traceability. The laboratories will check all sample containers for integrity, and will record any observations on the original chain-of-custody record; the chain-of-custody form will be signed and dated by representative(s) of the laboratories.

Each sample will be logged into the laboratory by assigning it a unique sample number. All samples received as part of the same shipment will receive the same work order. Appending sequential letters to the end of the sample number identifies each container of the sample. The laboratory number and the sample ID number will be recorded on the laboratory report.

7. PROPOSED SCHEDULE

Field work for the ORC Slurry Injection program is estimated to take approximately one week to complete. Implementation of the work will be contingent on the availability of subcontractors, procurement of required materials and timely issuance of agency authorizations and required permits. It is assumed client and agency approval to proceed with the proposed investigation will be provided by December 20, 2002 and that agency permits, if any are required, can be obtained by December 31, 2002. In that event, it is anticipated fieldwork for the ORC Injection program can commence in early January 2003, prior to the mid-January 2003 quarterly groundwater monitoring and sampling activities. A report documenting the ORC Injection program can then be provided by February 1, 2003.

Approximately one field day will be required to destroy the four monitoring wells. ACHCSA approval of the Workplan is required and well destruction permits will need to be obtained from Zone 7 prior to field work. It is anticipated well destruction activities will commence following the mid-January 2003 quarterly monitoring and sampling activities. A Well Destruction Report will be submitted three to four weeks following well destruction activities.

Proposed/tentative completion dates for the above activities is included below:

TASK	SCHEDULED COMPLETION DATE
Agency Work Plan Approval	January 15, 2003
Issuance of Zone 7 Permits for ORC	January 15, 2003
Issuance of Zone 7 Permits for Well Destruction	January 15, 2003
Quarterly Monitoring/Sampling Event	January 15, 2003
ORC Injection Program – Fieldwork	January 24, 2003
Well Destruction – Fieldwork	January 24, 2003
ORC Injection and Well Destruction Report	February 15, 2003

8. SITE SPECIFIC HEALTH AND SAFETY PLAN

The Federal OSHA and California Department of Safety and Health (DOSH) require that a site-specific Health and Safety Plan (HASP) be prepared prior to field activities (29 CFR Part 1910.120[j]; Title 8, CCR). In addition, ATC safety policy dictates that a HASP be generated for use by the ATC field team because the potential for exposure to hazardous materials exists. All ATC field personnel and subcontractors working directly in the field will be required to adhere to the HASP developed for the Site.

The site-specific HASP provides general guidelines for decision points in site safety planning, and will establish personnel protection standards and mandatory safety practices and procedures. In general, the HASP covers the following subjects:

- Emergency contracts to be used in the event of an accident or exposure;
- Description of site hazards, both physical and chemical;
- On-site monitoring (as needed) and personnel protection;
- Project team organization and responsibilities;
- Site control measures;
- Decontamination procedures; and
- Training requirements for personnel.
- Emergency procedures including information on the location to the nearest hospital providing emergency care services.

The provisions of the HASP will be mandatory for all on-site personnel; all ATC subcontractors shall, at a minimum, conform to this plan. The site plan will be updated, discussed and signed by appropriate field personnel, prior to each field event.

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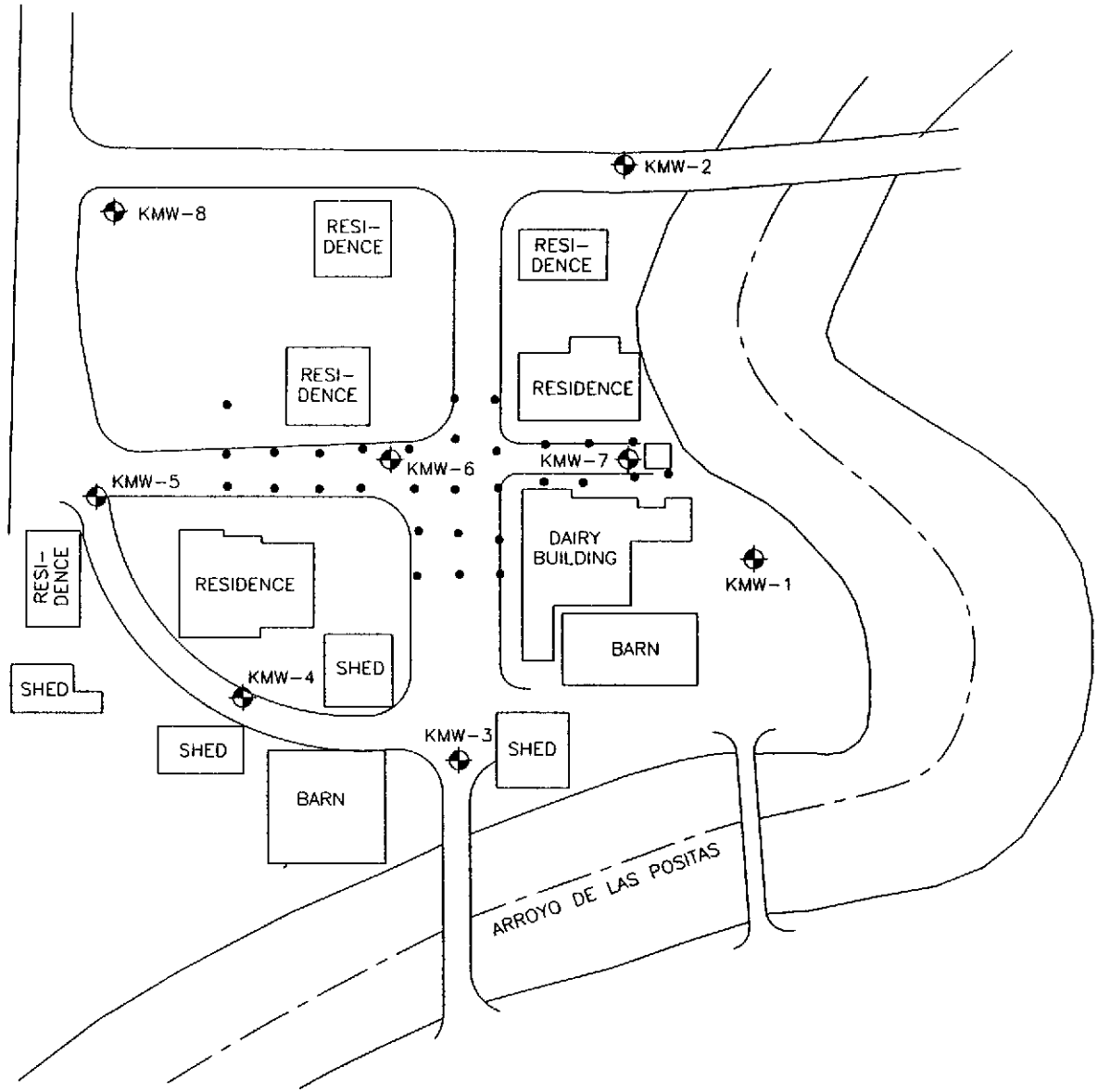

LEGEND

- GROUNDWATER MONITORING WELL
- PROPOSED ORC® INJECTION LOCATION

N

APPROXIMATE SCALE

0 80 160

VATC ASSOCIATES INC.	REVISED EC 11/26/02 8X11 0001-PO	REVIEWED BY REVIEW DATE	PROPOSED ORC® INJECTION LOCATIONS Friesman Ranch Property 1600 Friesman Road Livermore, California
			FIGURE 1 PROJECT 75.23909.0001