aqua resources inc. a wholly owned subsidiary of The Earth Technology Corporation

2030 Addison Street, Suite 500 • Berkeley, California 94704 • 415 540-6954

92 MAR -9 AM 6:26

March 9, 1992

Mr. Barney Chan
Alameda County Health Care Services
80 Swan Way, Room 200
Oakland, CA 94621

690262.4

Reference: Remediation in Former Gas Holder Tank Area
4930 Coliseum Way, Oakland, CA 94612

Dear Mr. Chan:

Following your letter of February 5, 1992, Aqua Resources Inc., prepared a Preliminary Site Assessment and Workplan for Additional Investigation for the above site contaminated with lead.

Please review the site assessment, and if you have any questions or comments, do not hesitate to call me.

Very truly yours,
AQUA RESOURCES INC.
a wholly owned subsidiary of The Earth Technology Corporation

Wojciech Bajsarowicz

Voytek Bajsarowicz, R.E.A.
Project Engineer

VB:blw

cc: Wally Pearce

90262.4\chan.ltr

Preliminary Site Assessment and Workplan for Additional Investigation

for

PG&E
ENCON-GAS Transmission and Distribution Construction Yard
Former Gas Holder Tank Area
4930 Coliseum Way
Oakland, California

Submitted to:

Alameda County Health Care Services Agency
Department of Environmental Health
Division of Hazardous Materials

Prepared by:

Aqua Resources Inc.
a wholly owned subsidiary of The Earth Technology Corporation
2030 Addison Street, Suite 500
Berkeley, CA 94704

March 6, 1992

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1.0 INTRODUCTION

1.1 STATEMENT OF PURPOSE

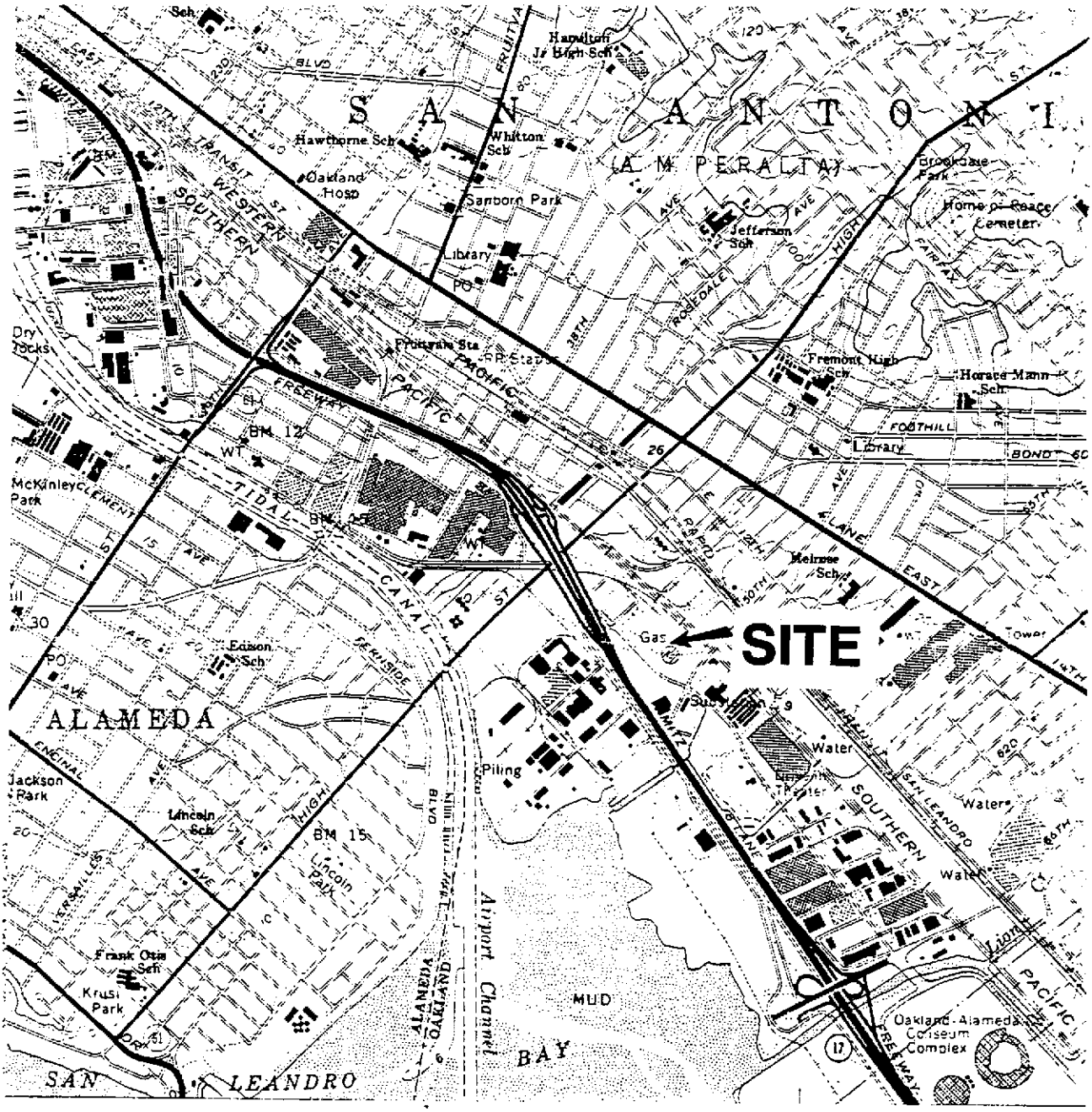
This report presents the Preliminary Site Assessment and Workplan for Additional Investigation of a lead contaminated area near a former Gas Holder Tank located at the Pacific Gas and Electric Company Encon-Gas Transmission and Distribution Construction Yard at 4930 Coliseum Way, Oakland, California. This report is being prepared for the submittal to the Alameda County Health Care Services Agency and evaluates three options for remediation.

1.2 REPORT ORGANIZATION

The Preliminary Site Assessment and Workplan for Additional Investigation consists of the following elements:

- Site background
- Results of previous investigations
- Preliminary action levels for soil
- Preliminary estimate of volume of soil to be remediated
- Proposed remedial actions to be performed at the present time
- Preliminary description of proposed remediation alternatives
- Guidelines for Health Risk Assessment
- Schedule of proposed activities

The Site Sampling Plan, and the Health and Safety Plan are included as appendices to this report.



Scale

0 1/2 1

MILE

N

Source: United States Geological Survey, 1959, photorevised 1980, Oakland East 7.5 minute topographic quadrangle.

AQUA RESOURCES, INC. BERKELEY, CALIFORNIA	
PG & E ENCON-Gas T & D Construction Yard	
Site Location Map	
JOB NO. **90262**	**Figure 1.1**
	DATE: July 23, 1991

2.0 SITE BACKGROUND

2.1 SITE DESCRIPTION

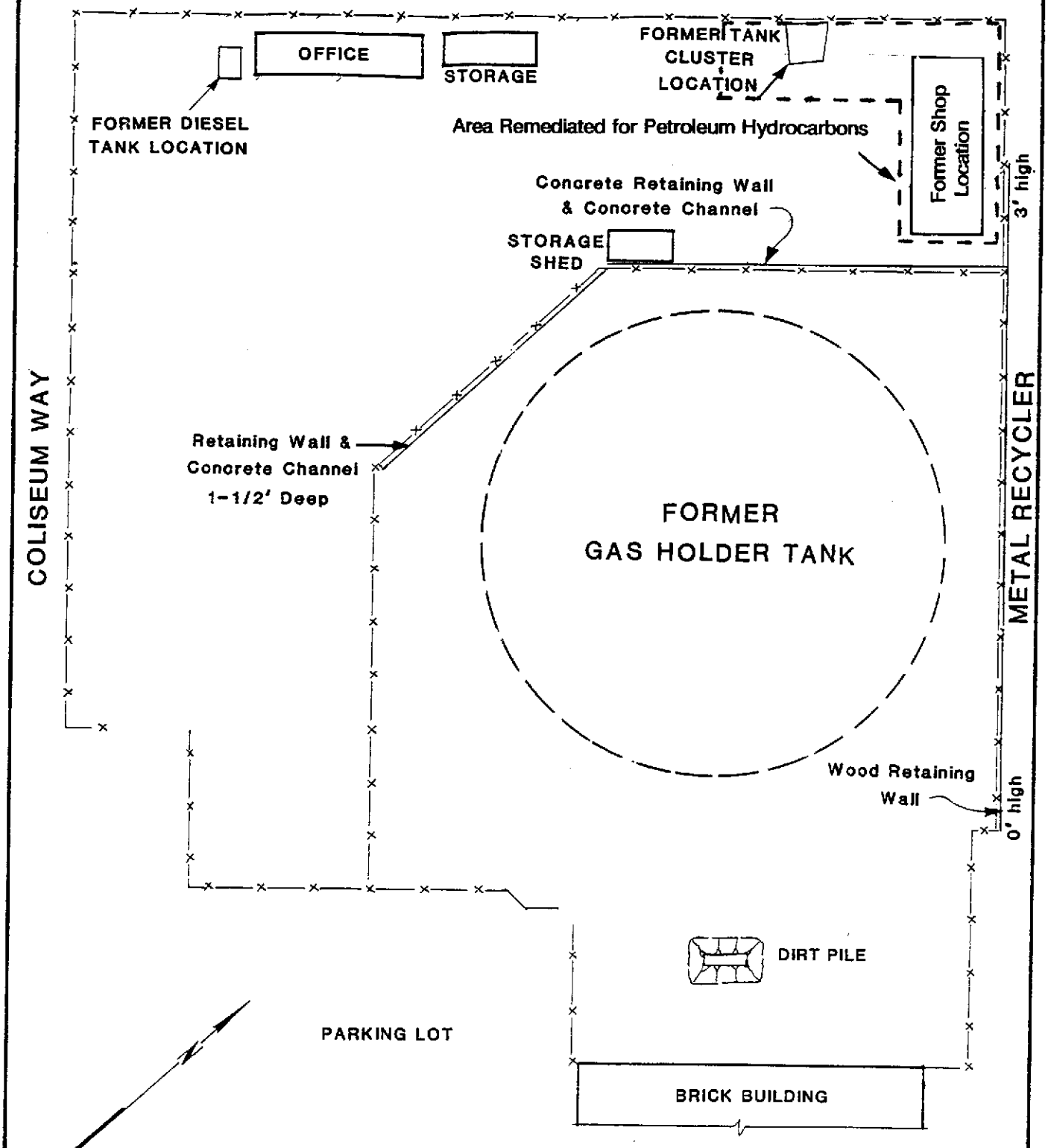
The T&D Construction Gas Yard is wholly owned by PG&E and is used as a vehicle, materials, and equipment storage and distribution facility. Historically, the site was also used as a vehicle service center and aboveground natural gas storage facility.

The site is surrounded by industrial properties. Immediately to the northeast of the site is a junkyard and metal recycling operation; to the northwest is a plaster casting company, a pattern company and a metal foundry; to the west and southwest (across Coliseum Way) are two motels and a recreational vehicle sales facility; to the southeast (across 50th Street) is a trucking facility.

Figure 2.1 shows the site layout including the former location of the GHT. An office building, material storage warehouse, and a petroleum oil and lubricant storage shed are located on-site. The figure also indicates an area recently remediated due to the presence of petroleum hydrocarbons thought to have originated from a former underground tank cluster and a former vehicle maintenance garage. This area lies at an elevation of about 3 to 4 feet above that of the former GHT area and is separated from it by a concrete retaining wall. Except for an asphalt parking lot and asphalt paved area extending from the previous remediation area southwest to the storage shed, the site is graveled.

2.2 SITE HISTORY

The earliest aerial photographs made available to ARI at the California Division of Mines and Geology (DMG) photo library that cover the site area were taken in August of 1939. These photos showed that the area was already heavily developed. Very large commercial/ industrial buildings existed along both sides of San Leandro Street between High Street and 50th Avenue. A large round tank, the former GHT, was in place on the PG&E site; however, the shadow of the tank prevented our determining if any structures existed on the site of the present-day scrap metal business. There were large buildings east of the railroad track and west of San Leandro Street. There were no large buildings at 4700-4800 Coliseum Way.



AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA

PG & E ENCON-Gas T & D Construction Yard

Site Plan

JOB NO. 90262

Figure 2.1

DATE: **Feb.6 1992**

Some small buildings were in place around Coliseum Way and 46th Avenue. The East Creek Slough drainage penetrated farther inland to the south and east of the site than it does at present. The only other aerial photograph available for this area was taken in March of 1984. It showed the site in approximately the same condition as it is at present.

Historical topographic maps for the Oakland East Quadrangle were also reviewed at the DMG. These maps were dated 1949, 1959, and 1968 (photo revision of 1959 map). Each of these maps used a pink coloration to designate a developed area, rather than showing individual buildings. The only structure at the site shown on these maps was the GHT.

The above ground low-pressure GHT stood for over 50 years before it was dismantled in May of 1990. Presently, only the circular concrete foundation, 24 tank tie-down boxes, and a number of oil soaked, circular concrete cylinders remain from the GHT. The entire tank was originally painted with a red lead or lead-based primer. Reportedly, before each of the regular tank painting episodes, the old paint was removed by sand blasting. Inspection of paint chips from the former GHT show at least two layers of red paint separated by a layer of green paint. It is believed that the sandblasting and final dismantling of the GHT generated paint chips which are the source of elevated lead levels in the surrounding soil.

2.3 REGIONAL AND SITE GEOLOGY AND HYDROGEOLOGY

2.3.1 Regional Geology

Geologic maps of the region prepared by the DMG (1961) and by Goldman (1969) show the site is underlain by Quaternary marine and marsh deposits. These sediments consist predominantly of highly plastic, blue-grey Bay Mud interbedded with grey, organic-rich silty sands and clayey marsh deposits.

2.3.2 Site Geology

The area near the removed GHT has a gravel surface. It is lower in elevation and separated from the storage shed area by a concrete retaining wall. Seven borings and one monitoring well were located in this lower area. The boring logs are included in Appendix D. The subsurface materials observed typically consisted of 2-1/2 to 3-1/2 feet of silty clay with a

small percentage of sand and gravel. Underlying this unit was 2 to 3 feet of gravelly sandy clay. The unit at the bottom of the borings was sand or an approximately 50/50 mixture of clay/sand and gravel.

SB-20 differed from the above borings, in that angular rocks up to 3-inch in diameter were found to a depth of 1 foot below the surface, overlying the gravelly sandy clay.

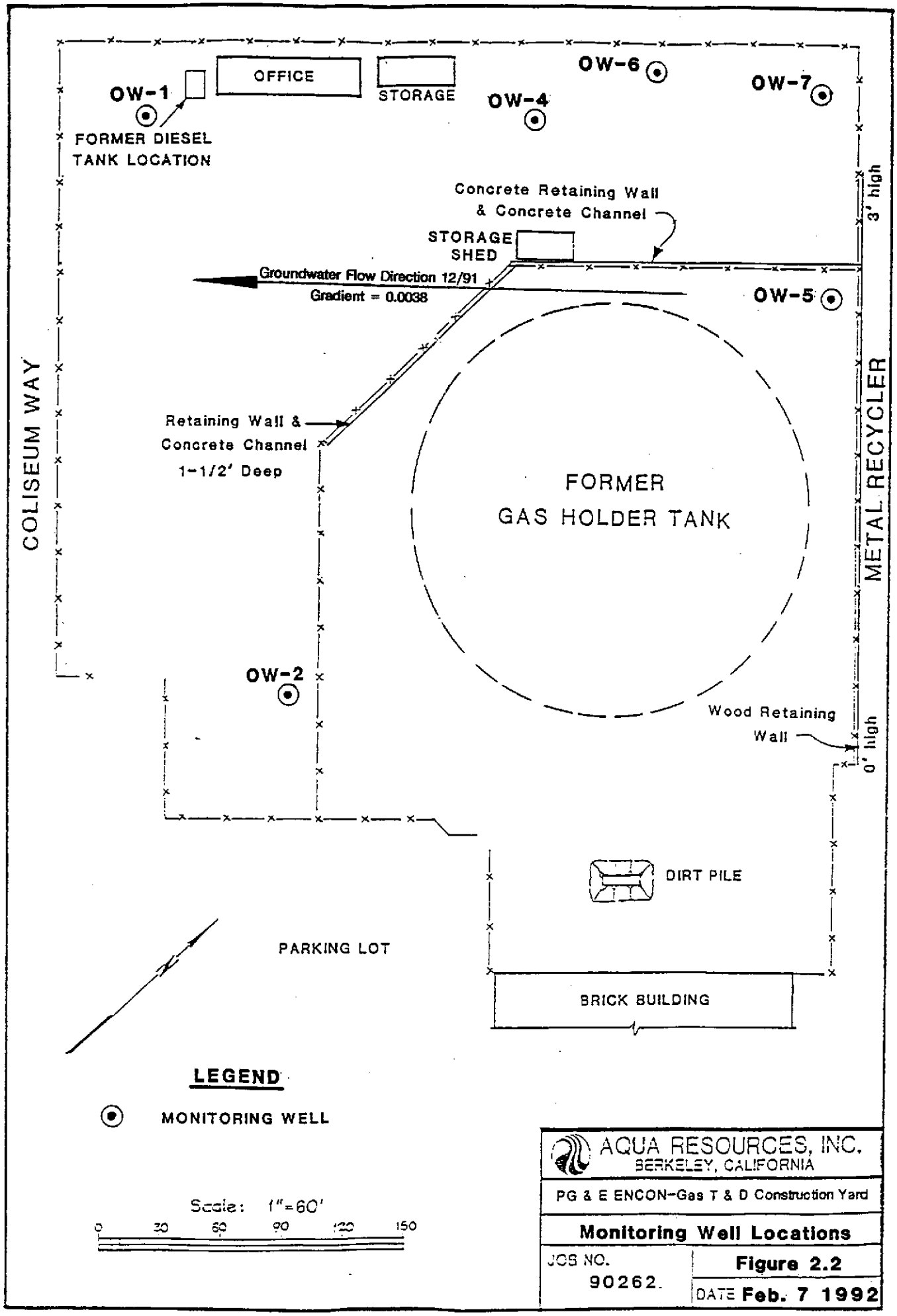
The monitoring well (OW-5) was completed to a depth of 17 feet. The upper soils were similar to the borings, and overlay more units of interbedded silty clay and sandy clay.

2.3.3 Site Hydrogeology

The topography of the area in the vicinity of the site is relatively flat. Regional surface water flow is to the southwest (toward San Leandro Bay). Surface water bodies nearest the site include San Leandro Bay (located approximately one third of a mile south of the site) and a canal that extends north from San Leandro Bay (located about one half of a mile west of the site). The potentiometric surface of the uppermost water bearing zone beneath the site was found in December, 1991 to be 4-1/4 feet below the ground surface in monitoring well OW-5.

In borings SB-1 to SB-10 saturated soil was encountered at 8 to 10 feet below ground surface. Comparing the stabilized groundwater level and the depth of first encounter indicates some degree of confinement. In soil borings near the northeastern property line, saturated soil was encountered at 5 to 7 feet below ground surface, which is located about 3 feet below the area of the welding shop.

Six groundwater monitoring wells are currently in place on the site, completed to an approximate depth of 20 feet below ground surface. Their locations are shown in Figure 2.2. Groundwater surface elevations measured in December 1991 in OW-1, OW-2, and OW-5 confirm the general regional groundwater flow direction to the southwest across the site at a gradient of 0.0038 ft/ft. However, groundwater elevations in OW-3, later replaced by OW-6, and OW-4 are anomalously high and may indicate the presence of an artificial water source, such as a leaking pipe, in this area. Water samples collected from four wells constructed on-site showed typical conductivity levels of 1,000 to 1,500 microsiemen per centimeter. There is a relation between conductivity and total dissolved solids (½ conductivity ≈ total dissolved


OW-1
OFFICE
STORAGE
OW-6
OW-7
OW-4
FORMER DIESEL
TANK LOCATION
Concrete Retaining Wall
& Concrete Channel
3' high
STORAGE
SHED
Groundwater Flow Direction 12/91
Gradient = 0.0038
OW-5
COLISEUM WAY
METAL RECYCLER
Retaining Wall &
Concrete Channel
1-1/2' Deep
FORMER
GAS HOLDER TANK
OW-2
Wood Retaining
Wall
0' high
DIRT PILE
PARKING LOT
BRICK BUILDING
LEGEND
MONITORING WELL
Scale: 1"=60'
0 30 60 90 120 150
AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA
PG & E ENCON-Gas T & D Construction Yard
Monitoring Well Locations
JOS NO. 90262.
Figure 2.2
DATE Feb. 7 1992

3.0 RESULTS OF PREVIOUS INVESTIGATIONS

Remedial investigation (RI) of the former tank cluster area was performed by ARI in July 1991. Remediation was performed in November and December 1991 and was followed by the closure report. For the results of remediation, please refer to this report.

Investigations of the former GHT area have been conducted both by PG&E and ARI. The results of these investigations are discussed in the sections which follow.

3.1 PG&E INVESTIGATIONS RELATED TO THE FORMER GAS HOLDER TANK AREA

The above ground low-pressure gas holder tank was part of an investigation by PG&E's Department of Engineering Research in March 1988. The entire gas holder was originally painted with red lead or a lead based primer. In one paint sample a lead concentration of 100,000 — 150,000 ppm (10%-15%) was detected. Before each of the regular painting episodes, the old paint was removed by sand blasting. The dismantling of the gas holder in May 1990 also generated construction residues that included lead paint chips. Additional residues may have been generated by at least one sandblasting and painting operation conducted years earlier.

Soil samples collected by PG&E in June 1990 were analyzed for lead by Precision Analytical Laboratory, Inc. The results are listed in Table 3.1. Sample #1 "Sand & Oil" is reported by PG&E to be from the covered sand pile in the gas holder yard.

Table 3.1
Lead Concentrations in Soil and Paint Samples

Sample	Pb (mg/kg)
#1 Sand & Oil	3,100
#1 Main Yard Soil/Paint	61,225
#2 Stockpile North Yard	3,620
Cold tar	15,100
#7 Paint	100,000 — 150,000

3.2 AQUA RESOURCES' INVESTIGATIONS RELATED TO THE FORMER GAS HOLDER TANK AREA

In November and December 1990, and later in April and May of 1991, Aqua Resources Inc. (ARI) investigated the following potential sources of soil and/or groundwater contamination at the site around former GHT:

- lead paint chips in the area of the former gas holder;
- small quantities of petroleum products residing in the 24 gas holder tie-down boxes;
- oil-soaked concrete rings stored near the former gas holder.

The objective, scope, and results of each investigation are described below.

3.2.1 Native Soils Potentially Impacted by Lead Paint Chips

As discussed in Section 3.1, soil samples taken from the immediate vicinity of the former GHT were found to contain elevated levels of lead during a June, 1990 investigation conducted by PG&E. Soils in this and other areas of the yard were sampled by ARI in an attempt to determine the vertical and lateral extent of lead contaminated soils in the gas yard.

3.2.1.1 Sample Methods and Locations — In late 1990, samples for lead analysis were taken at a total of 37 locations, including 16 in the immediate vicinity of the former GHT (within 15 feet of the outer edge of the concrete pad) and 24 locations in the parking lot and other areas of the gas yard. These samples were given identifiers starting with the letter "T" for samples nearest the former tank and the letter "A" for samples away from the former tank. In all, 45 samples were taken at depths ranging from surface to 3 feet. The results of this investigation were presented to PG&E in a Draft Site Remediation Plan (ARI, 1990) and are repeated here.

Borings were drilled with a two-man power auger and soils samples were collected with a drive sampler. Several samples were composited and all samples were pulverized in the lab in order to obtain a more even distribution of paint chips and to minimize spikes possibly caused by analyzing larger paint chips.

In April and May of 1991, 41 additional samples were collected and analyzed for lead content at 8 separate locations. These samples were collected in brass tubes using a rotary drill rig equipped with a split barrel sampler and ranged in depth from 1/2 to 16 feet, with the majority of samples collected in the upper 7 feet. Samples from 7 of the locations were given sample identifiers starting with "SB" for soil boring. Samples from the final location were collected during the installation of observation well OW-5. The identifiers for these samples begin with the well name.

On January 3, 1991, two additional samples, T-3-A2 and -B2, were collected from the same locations as samples T-3-A and -B and were analyzed for lead by TCLP. The locations of all the soil samples obtained in characterizing the former GHT area are shown in Figure 3.1.

3.1.1.2 **Results of Soil Sample Analysis** - All samples were analyzed at a certified laboratory for total lead. 16 of the samples were additionally extracted by California WET and analyzed for soluble lead, and one sample was analyzed for lead in TCLP leachate solution. The results are shown in Table 3.2. Copies of the original laboratory results and chain of custody documentation can be found in Appendix C. Most samples taken in the immediate vicinity of the former gas holder, series "T" samples generally taken within 15 feet of the GHT pad, were found to contain lead above the California Code of Regulations (CCR) Title 26 Total Threshold Limit Concentration (TTLC) of 1,000 mg/kg for lead. The highest detected total lead concentration among these samples was 31,000 mg/kg, found in a composite of samples T-7-A and T-7-B collected from near the ground surface. Where WET soluble lead concentrations were measured in these same samples, the CCR Title 26 Soluble Threshold Limit Concentration (STLC) for lead of 5.0 mg/L was exceeded in every case. The highest soluble lead concentration observed in these samples was 1400 mg/l, found in a surface sample T-3-A and B.

The one sample which was analyzed for TCLP leachate concentration, a composite of T-3-A2 and T-3-B2, exhibited a concentration of 32 mg/L which exceeds the Federal regulatory level of 5 mg/L.

The balance of samples collected from the distance of about 15 to 150 feet from the GHT showed wide variations in total and soluble lead concentrations. The maximum total lead seen in these samples was 10,000 mg/kg in surface sample A-12, and a maximum of 27.5

mg/l soluble lead was observed at a depth of 2 feet in sample SB-19-1. Five of the 11 samples collected in areas outside of the fence were found to exceed CCR Title 26 limits. These elevated levels indicate that some movement of lead from the immediate vicinity of the gas holder, by wind or vehicular traffic, may have occurred. All of the samples collected beyond about 120 feet from the GHT pad, however, were below the state regulatory hazardous lead concentrations.

The data indicates that the vertical extent of hazardous lead levels is confined to the upper 4 feet of soil. Figures 3.2 and 3.3 show plots of all concentration data for total lead and soluble lead, respectively compared to depth. It is clear from these plots that the lead concentration decreases with depth, with the highest levels being confined to the near surface. For both total and soluble lead no samples collected below 4 feet in depth exceeded the regulatory hazardous lead concentrations.

Sample location T-8-A is believed to lie on the backfill of an excavation made during removal of the GHT. Some of the backfill for that excavation may have been taken from the ground surface near the gas holder, and may have contained elevated levels of lead. Samples taken at this location support this hypothesis, since they show lead levels of 4,600 ppm at a depth of 2.5 feet, the highest concentration observed below 1 foot in depth. The total depth of the former excavation is believed to be approximately 6 to 8 feet. A second excavation, located near T-3-A and similar to the first, was reported by PG&E and is shown on Figure 3.1.

3.2.2 Covered Soil Stockpile

On January 27, 1991 a composite sample, SP-1, collected from four locations in the covered sand pile in the former GHT area was collected and analyzed for total lead (EPA 7420), soluble lead (WET), and total petroleum hydrocarbons (EPA 418.1). Total lead was found at a concentration of 2,870 mg/kg which exceeds the TTLC of 1,000 mg/kg. Soluble lead was found at 210 mg/L which also exceeds the STLC of 5 mg/L. Total petroleum hydrocarbons were found at a concentration of 8,600 mg/kg. The location of the soil stockpile is shown as "dirt pile" in Figure 3.1.

Table 3.2: Soil Sample Data Related to the Former Gas Holder Tank Area

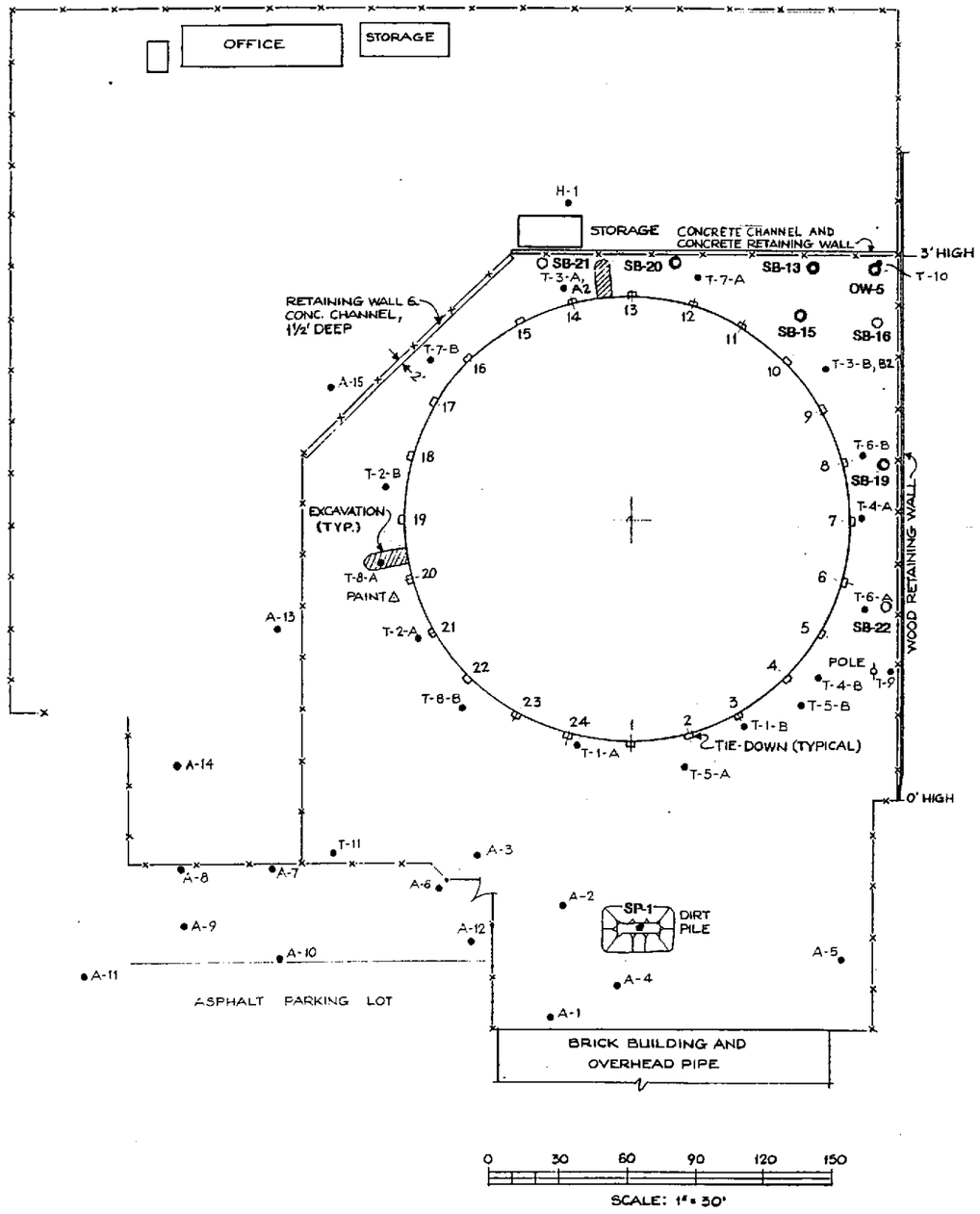
Sample ID	Sample Depth (ft)	Total Lead (mg/kg)	Soluble Lead by WET (mg/L)	Lead in TCLP Extract (mg/L)
A-1	0.00	2300		
A-1	1.50	1400		
A-2	0.00	160		
A-2	1.50	930		
A-3	0.00	34		
A-3	1.50	330		
A-4	0.00	89		
A-4	1.00	240		
A-5	0.00	57		
A-5	1.00	380		
A-6	0.00	1800		
A-7	0.00	2200		
A-8	0.00	580		
A-9	0.00	7.9		
A-10	0.00	13		
A-11	0.00	53		
A-12	0.00	10000		
A-13	0.00	8300		
A-14	0.00	150		
A-15	0.00	1200		
H-1	0.00	29		
OW-5-1	0.50	310	7.9	
OW-5-2	1.00	33	0.6	
OW-5-3	1.50	6.2		
OW-5-4	2.00	9.9		
OW-5-5	2.50	9.1		
OW-5-6	3.00	9.5		
OW-5-7	3.50	7.4		
OW-5-8	4.00	8.4		
OW-5-9	4.50	8.6		
OW-5-10	5.00	8.5		
OW-5-11	5.50	10		
OW-5-12	6.00	9.2		
OW-5-13	6.50	9.3		
OW-5-14	7.00	8.6		
OW-5-15	7.50	5.9		
OW-5-16	8.00	6.1		
OW-5-17	8.50	6.4		
OW-5-18	9.00	6.1		
OW-5-20	13.00	8		
OW-5-23	16.00	6.3		

NOTES: Comma in ID denotes composite sample. Blank cell denotes Not Analyzed.

Table 3.2: Soil Sample Data Related to the Former Gas Holder Tank Area (Cont.)

Sample ID	Sample Depth (ft)	Total Lead (mg/kg)	Soluble Lead by WET (mg/L)	Lead in TCLP Extract (mg/L)
SB-13-1	2.00	6.9		
SB-13-2	5.00	12.2		
SB-13-3	7.00	18.8		
SB-15-1	2.00	3241		
SB-15-2	4.00	15.6		
SB-15-3	7.00	13.2		
SB-16-1	2.00	2.8		
SB-16-2	4.00	5.4		
SB-16-3	7.00	5.4		
SB-19-1	2.00	608	27.5	
SB-19-2	5.00	8.5		
SB-19-3	7.00	5.5		
SB-20-1	2.50	123	27.4	
SB-20-2	4.00	932	32	
SB-20-3	7.00	143	3.05	
SB-21-1	2.00	3		
SB-21-2	5.00	7.3		
SB-21-3	7.00	7.7		
SB-22-1	3.75	199	3.18	
SB-22-2	5.00	7		
SB-22-3	7.00	7.8		
T-1,2-A,B	1.00	4100		
T-1-A,B	0.00	11000	550	
T-1-A,B	2.00	1100		
T-2,3-A,B	2.00	3100		
T-2-A,B	0.00	8600	400	
T-3,4-A,B	0.50	9600	690	
T-3-A2,B2	0.00	4900	410	32
T-3-A,B	0.00	19000	1400	
T-4-A	0.25	16000		
T-4-A,B	0.00	19000		
T-5-A	3.00	<2.5		
T-5-A,B	0.00	11000		
T-5-B	2.00	3100		
T-6-A	2.00	4		
T-6-A,B	0.00	5900		
T-6-B	2.50	80		
T-7-A	2.00	<2.5		
T-7-A,B	0.00	31000	1100	
T-7-B	3.00	500	17	
T-8-A	2.50	4600	180	
T-8-A,B	0.00	11000		
T-8-B	3.00	770	89	
T-9	0.00	6100		
T-10	0.00	410		
T-11	0.00	94		

NOTES: Comma in ID denotes composite sample. Blank cell denotes Not Analyzed.



LEGEND

- ●T-1-A Soil Sample Locations
- —x— FENCE
- SB-21 Soil Boring Locations

FIGURE 3.1: Soil Sample Location Plan
by Aqua Resources, a wholly owned subsidiary of The Earth Technology Corporation
February 7, 1992

Figure 3.2: Total Lead Conc. in Soil
Related to Sample Depth

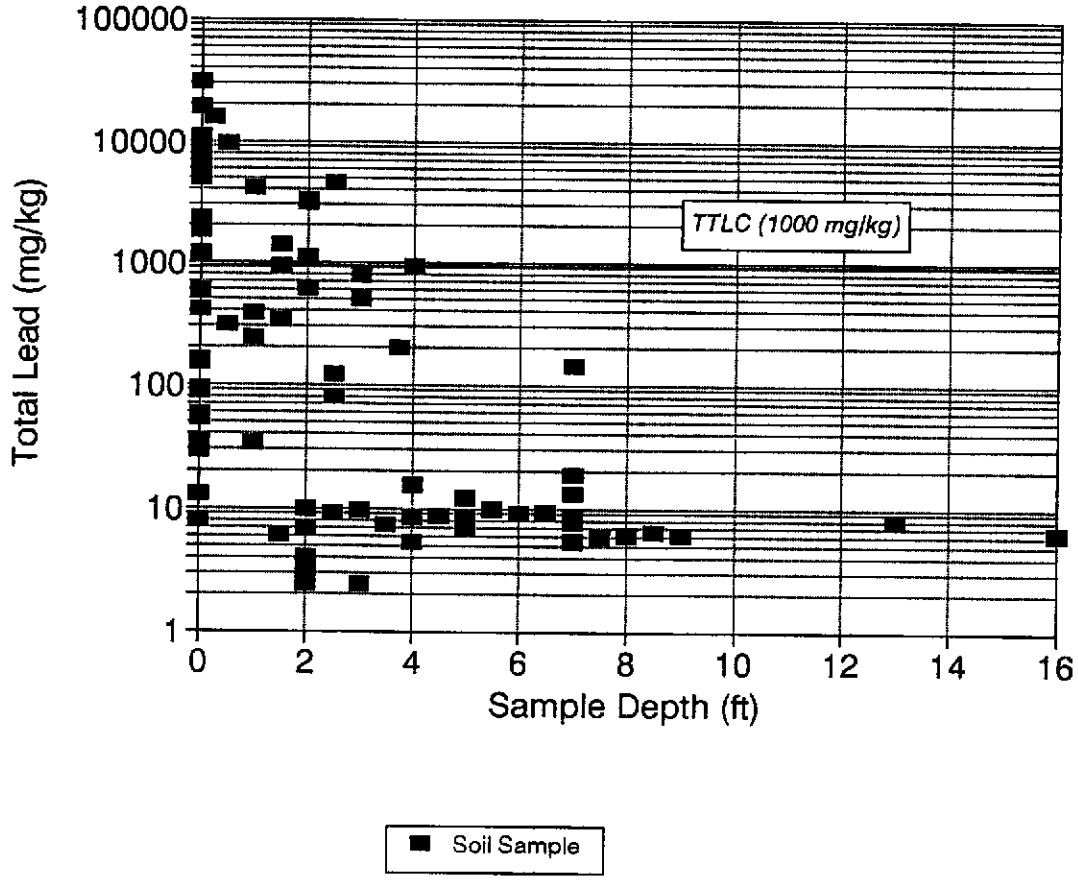
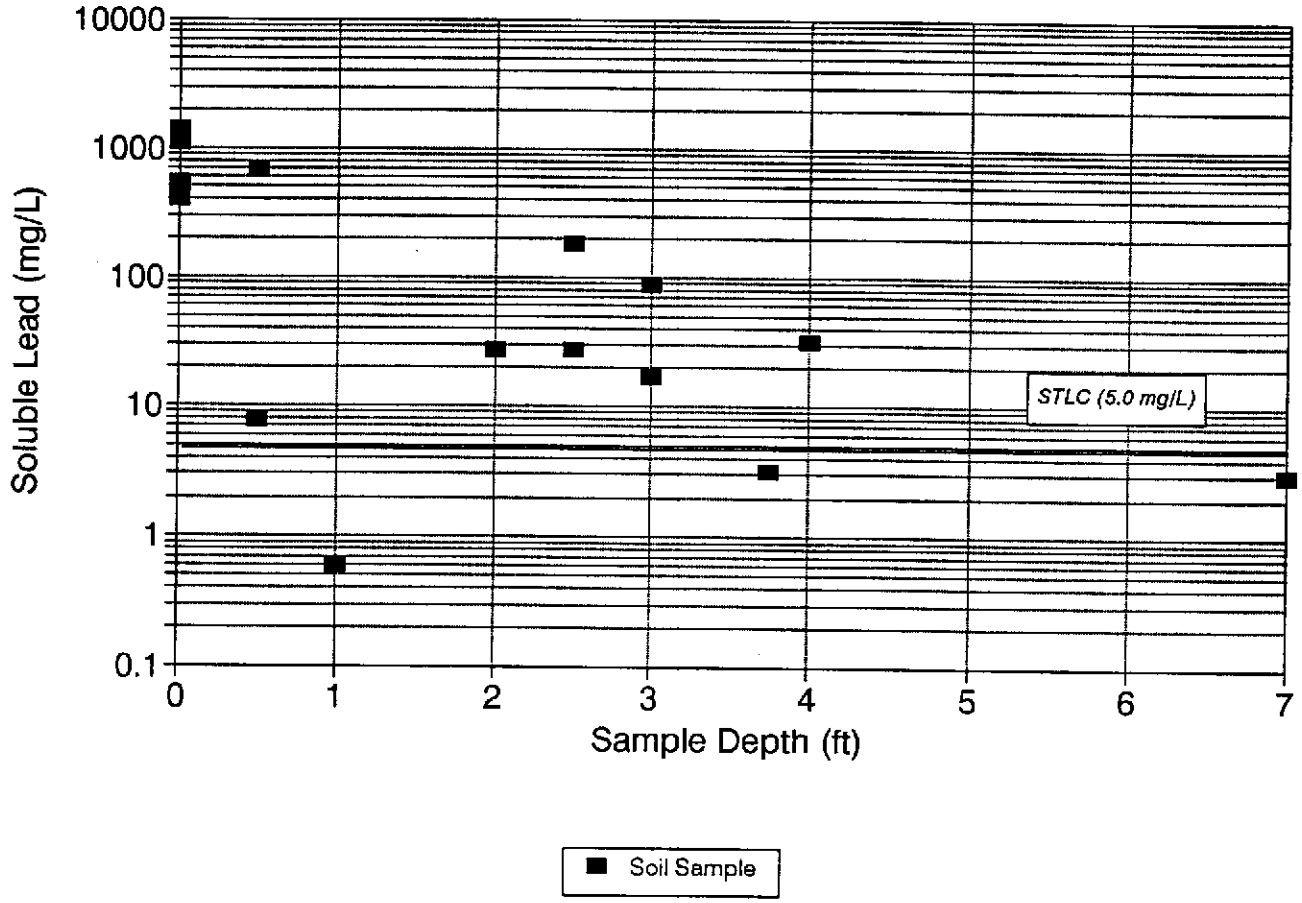


Figure 3.3: Soluble WET Lead Conc.
in Soil Related to Sample Depth



3.2.3 Soils Potentially Impacted by Hydrocarbons in Gas Holder Tie-Down Boxes

Twenty-four tie-down boxes remained at the perimeter of the gas holder after its demolition. The dimensions of these boxes are approximately 24 inches wide by 40 inches long by 18 inches deep and are finished approximately at grade. Each box contains two small compartments that could hold a total of about 10 gallons of fluid. Inspection by ARI in November, 1990 revealed a small amount of petroleum hydrocarbons in several boxes. PG&E personnel reported that these fluids were most likely the lubricating oil used to prevent corrosion at the base of the gas holder. This oil was reportedly added to the gas holder as new (not previously used for other purposes) oil.

Inspection of the soil surrounding each of the tie-down boxes revealed very limited amounts of visible staining and no observable free product.

3.2.3.1 Sample Methods and Locations — Soil samples were taken from directly outside of two of the boxes where visible staining was observed, using the procedures outlined in the Site Sample Plan (Appendix A). Sample locations (T-1-A and T-1-B) are shown in Figure 3.1.

3.2.3.2 Results of Sample Analysis — Samples were analyzed for oil and for grease and for total petroleum hydrocarbons as diesel and kerosene. Analytical results are shown in Table 4.2. Results indicate that soils at depths of 0 and 1 feet may exceed the proposed cleanup level of 100 ppm total petroleum hydrocarbons as diesel, discussed in Section 4.2, while soils at a depth of 3 feet are below the proposed cleanup level.

3.2.4 Oil Soaked Concrete Rings

A total of 23 concrete rings, approximately 3 feet in diameter and 1.2 feet thick are currently stored inside the fenced area surrounding the former gas holder. These rings are visibly oil-stained on the surface and were reported by PG&E personnel to be stained throughout their thickness. PG&E personnel report that this oil is of the same origin as that found in the tie-downs. There is no visible free product or staining on the soil surrounding the rings.

3.2.4.1 Sample Methods and Locations — Samples were obtained from a concrete slab by chipping concrete and sand from the deteriorated surface of one slab. Sample handling

procedures outlined in the Site Sampling Plan were followed. The laboratory was instructed to pulverize the sample prior to analysis.

3.2.4.2 **Results of Concrete Sample Analysis** — Samples were analyzed for oil and grease, TPH (as diesel and kerosene) and BTEX. Analytical results are shown in Table 3.3. These results indicate high surface contamination from petroleum hydrocarbons. A sample from the concrete ring was additionally analyzed for total lead, which was found at a concentration of 230 mg/kg, which is below the TTLC of 1000 mg/kg.

3.2.5 Results of Previous Groundwater Investigations

3.2.5.1 **Investigation of Lead Content** - Groundwater samples were obtained from monitoring wells OW-1, OW-2, OW-3, OW-4 and OW-5 on April 17, 1991 as part of the quarterly groundwater monitoring program at the site. Although lead concentrations are not monitored quarterly, 10 water samples, two from each well, were collected on this date and analyzed for lead concentration. The results, shown in Table 3.4, indicate that lead levels do not exceed the Maximum Contamination Levels (MCLs) for lead in drinking water listed in CCR Title 22, Section 64435. In each case the lead concentration was below the detection limit of 50 ug/L.

Table 3.4 Lead Concentrations in Groundwater

Sample ID	Lead Concentration (ug/L)
OW-1-1	< 50
OW-1-2	< 50
OW-2-1	< 50
OW-2-2	< 50
OW-3-1	< 50
OW-3-2	< 50
OW-4-1	< 50
OW-4-2	< 50
OW-5-1	< 50
OW-5-2	< 50

Table 3.3: TPH, Oil and Grease, and VOCs in Soil

Sample ID	Depth (ft)	Oil and Grease (mg/kg)	TPH Diesel (mg/kg)	TPH Kerosene (mg/kg)	Purgeable VOCs (ug/kg)				
					Total	Aromatics			
					Halocarbons	B	T	E	X
Concrete Rings	-	61,000	37,000	ND		30	120	29	200
T-9	0		440	ND	ND	ND	31	ND	ND
T-1-A,B	0	2,400	ND						
T-1-A,B	2-2.5	220	74	ND					
T-1,2-A,B	1	960	200	ND					
T-8-A	2.5		420	ND					
A-2	0		210	ND					
H-1	0.5				ND	ND	30	ND	ND
SB-13-1	2	78							
SB-13-2	5	20							
SB-13-3	7	18							
SB-15-1	2	2,300							
SB-15-2	4	30							
SB-15-3	7	18							
SB-16-1	2	ND							
SB-16-2	4	8							
SB-16-3	7	110	510	ND	ND	110	79	ND	140
SB-19-1	2	66							
SB-19-2	5	6							
SB-19-3	7	22							
SB-20-1	2.5	82							
SB-20-2	4	120	66	ND	ND	ND	ND	ND	ND
SB-20-3	7	34							
SB-21-1	2	24							
SB-21-2	5	ND	ND	ND	ND	ND	ND	ND	ND
SB-21-3	7	ND	ND	ND					
SB-22-1	3.75	28							
SB-22-2	5	ND	ND	ND					
SB-22-3	7	ND	ND	ND	ND	ND	ND	ND	ND

Notes:
ND = Not Detected
Blank cell indicates Not Analyzed
Commas in ID denote Composite Samples

3.2.5.2 **Investigation of Organic Hydrocarbon Content** - Quarterly monitoring of the water levels in the various monitoring wells on site indicates that groundwater flow in the uppermost water bearing zone beneath the site is in a southwest to south southwesterly direction. Of the six present monitoring wells, wells OW-2 and OW-5 lie nearest the former GHT area. The well locations can be found in Figure 2.2. Monitoring well OW-2 lies hydraulically downgradient from the former GHT and well OW-5, situated about 10 feet from the northeastern property line, lies hydraulically upgradient from the former GHT. Petroleum hydrocarbon results of the three quarters of sampling from these wells are shown in Table 3.5 below. Well OW-5 was constructed in April of 1990, so this data represents all of the samples collected from this well to date.

The monitoring well results indicate the presence of hydrocarbon fuel contamination in the shallow groundwater upgradient from the former GHT location. Hydrocarbons in the diesel fuel range and trace amounts of BTEX compounds have been present in all of the quarterly samples taken from well OW-5 to date. Concentrations of the volatile halocarbon solvents methylene chloride, 1,1 dichloroethane, 1,1,1 trichloroethane, trichloroethylene (TCE) and tetrachloroethylene (PCE) have been detected in this well at concentrations above their detection limits. The potential source of these solvents is unknown. The volatile organic compounds benzene, toluene, ethylbenzene and xylenes have also been observed in this well.

Downgradient (well OW-2) from the former GHT location trace organic concentrations of: diesel fuel, methylene chloride and PCE have each been detected during the past three quarters at concentrations above their detection limits once.

The MCLs for the detected compounds were only exceeded for benzene in well OW-5 over the span of this data. The MCL for benzene is 1 ug/L, while the average concentration for samples for this well is 18 ug/L.

The data indicate the possible existence of an off-site source of fuel contamination upgradient from well OW-5, near the northeast property boundary of the site. This conclusion was reached because a comparison of groundwater samples from OW-5 with OW-2 demonstrates that the concentrations of every tested compound are lower in well OW-2, which lies almost directly downgradient from well OW-5 and the former GHT location.

Table 3.5 Summary of Recent Quarterly Sample Analytical Results for Detected Organic Compounds in Groundwater, in ug/L unless otherwise indicated

Compound	Well Number / Month Sampled						
	OW-2			OW-5			
	4/91	7/91	12/91	4/91	7/91	7/91+	12/91
Oil & Grease (mg/L)		< 5	< 5		< 5	< 5	< 5
TPH	< 500			< 500			
TEH-Diesel	< 200	< 50	650	600*	1500	1200	1200
Methylene-chloride	2.0	< 2.0	< 2.0	2.4	< 2.0	< 2.0	< 2.0
1,1-DCA	< 0.2	< 1.0	< 1.0	1.8	7.2	8.6	< 1.0
1,1,1-TCA	< 0.2	< 1.0	< 1.0	6.0	26	30	18
TCE	< 0.5	< 1.0	< 1.0	0.75	< 1.0	< 1.0	< 1.0
PCE	0.53	< 1.0	< 1.0	0.7	< 1.0	< 1.0	< 1.0
Benzene	< 0.5	< 1.0	< 1.0	14	20	26	11
Toluene	< 0.5	< 1.0	< 1.0	0.57	< 1.0	< 1.0	< 1.0
Ethylbenzene	< 0.5	< 1.0	< 1.0	0.58	< 1.0	< 1.0	< 1.0
Xylenes	< 1.0	< 1.0	< 1.0	5.6	4.0	5.0	6.9

NOTES:
< Indicates Not Detected at or above the listed detection limit.
+ Duplicate Sample
* Detected compound does not match the diesel standard.
Blank cell denotes Not Analyzed
Underlined numbers indicate concentration above the method detection limit.

METHODS:
TPH (Total Petroleum Hydrocarbons) by EPA 418.1
TEH (Total Extractable Hydrocarbons) by Cal. DHS Method
Oil & Grease by SMWW 17:5520BF
BTEX by EPA 8020
Others by EPA 8010

4.0 PRELIMINARY ACTION LEVELS FOR SOIL

4.1 PRELIMINARY ACTION LEVELS FOR SOIL CONTAMINATED WITH LEAD

The primary goals of remediating a contaminated site are to protect humans from incidental health risk due to exposure to the contaminants present, and to prevent future spreading of the contamination. Remediation of groundwater where it may be used as a drinking water source protects humans from possible ingestion route of exposure. Remediation of soil protects humans from contact, inhalation and other routes of exposure and should also protect potential drinking water sources from future contamination. When soil action levels for the former GHT area were discussed with the Alameda County Health Agency in January 1991, the County indicated that the preliminary action levels should be consistent with the CCR Title 26, which specifies concentrations or organic and inorganic compounds which are toxic or hazardous. The preliminary action levels for lead-impacted soils are the CCR title 26 limits for lead:

Total Threshold Limit Concentration (TTLC) - 1,000 mg/kg
Soluble Threshold Limit Concentration (STLC) - 5 mg/L

These concentrations were used in the following sections to provide estimates of the areal and volume extent of impacted soil, as well as to calculate statistically the number of samples which may be required for further characterization of the site. Health Risk Assessment Report, requested by the County, may change the proposed action levels.

4.2 CLEANUP LEVELS FOR PETROLEUM HYDROCARBONS IN SOIL AROUND TANK TIE DOWN BOXES

For soils in the vicinity of the oil bearing tank tie down boxes, the following cleanup levels for petroleum hydrocarbons were established:

- TPH as Gasoline: 10 mg/kg
- TPH as Diesel: 100 mg/kg
- TPH as Kerosene: 100 mg/kg
- Oil and Grease: 1000 mg/kg
- BTEX : 5 ug/kg for each compound

These criteria were used during the remedial action taken at the PG&E site in the vicinity of the former tank cluster. They were derived using the procedures described in the Leaking Underground Fuel Tank Manual (State of California LUFT Task Force, 1989) and the Tri-Regional Board Staff Recommendations for Preliminary Evaluation and Investigation of Underground Tank Sites, using the climatological and hydrogeologic parameters of the PG&E site.

5.0 PRELIMINARY ESTIMATE OF VOLUME OF SOIL TO BE REMEDIATED

Based upon the nature of the former GHT and the known history of use of the GHT area the principal contaminant is understood to be lead from paint, while elevated concentrations of petroleum hydrocarbons are believed to be confined to the near surface in and around the GHT tie down boxes, and the oil soaked concrete cylinders. The volumes of soil estimated to exceed the proposed cleanup levels for lead are discussed below.

5.1 VOLUME OF NATIVE SOIL ESTIMATED TO EXCEED THE PROPOSED CLEANUP LEVELS FOR LEAD

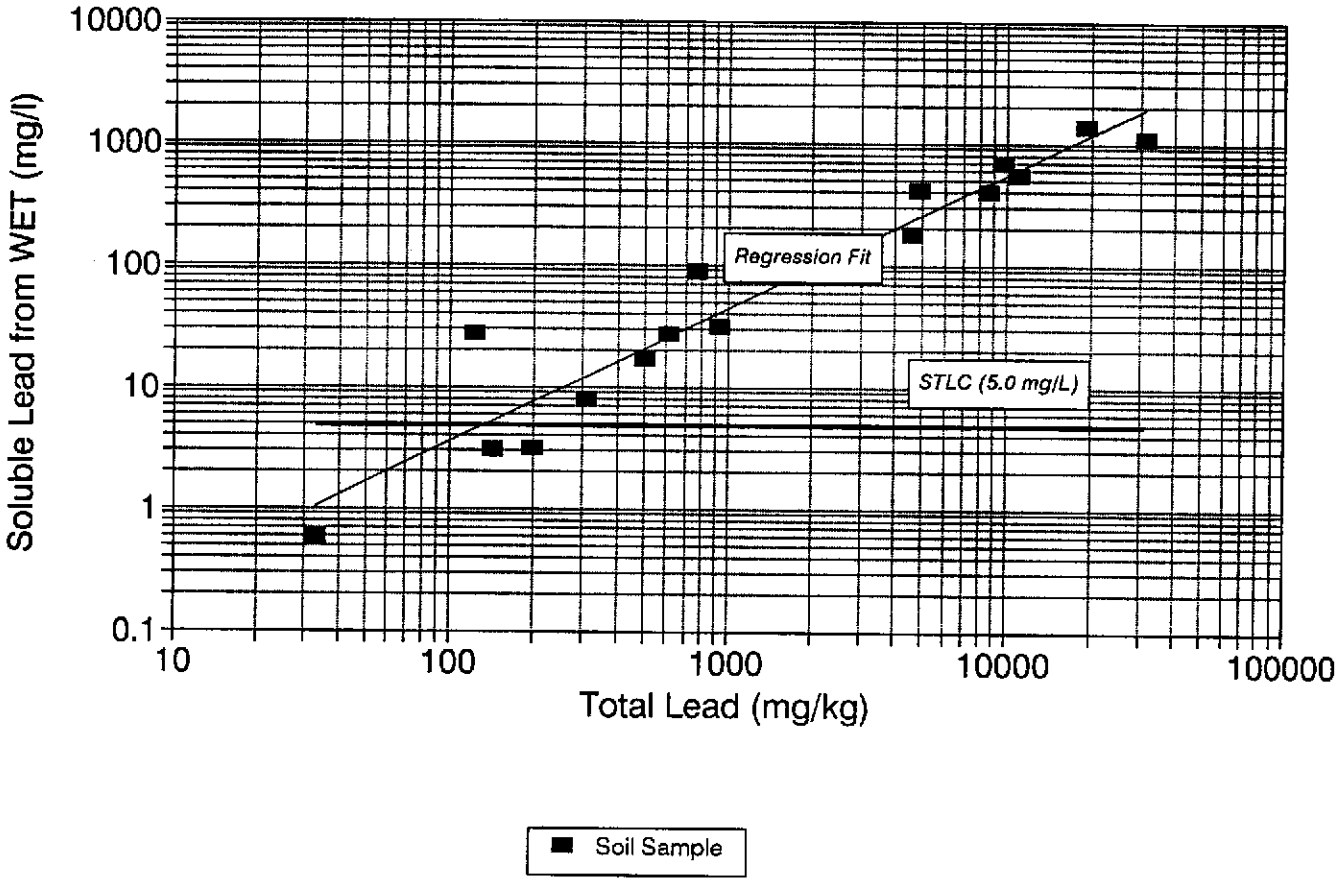
In estimating the volume of lead-contaminated soil to be remediated, samples were assumed to exceed the proposed cleanup standard if:

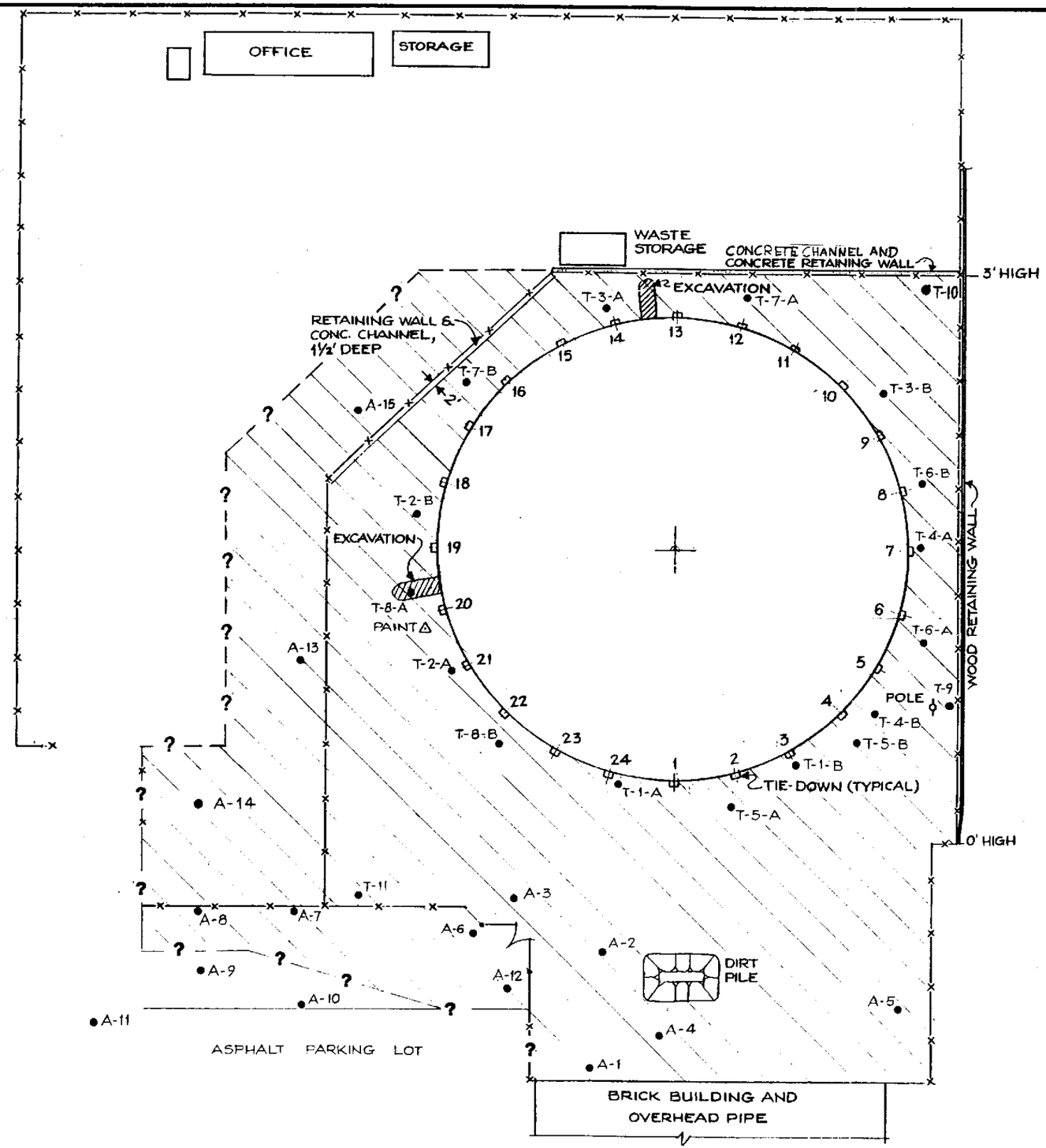
1) the measured total lead concentration exceed the TTLC value; or
2) the measured or assumed soluble lead concentration exceeded the STLC value.

For samples where soluble lead concentration was not measured, it was estimated as 5 percent of the total concentration for the purpose of determining the approximate quantity of soil requiring remediation at the site. This 5 percent approximation is believed to be a conservative estimate. A plot of total lead concentration versus soluble lead concentration from samples in which both were measured is shown in Figure 5.1 along with a log-log straight line regression fit to the data. As the Figure indicates, the log-log linear model relating total concentration to soluble concentration appears to fit the data quite well. This log-log linear relationship, known in chemical equilibrium literature as the Freundlich isotherm, is frequently observed in studies of constituent equilibrium concentrations in a solid phase in soil and in an aqueous phase in pore water. The intersection of the STLC for soluble lead, 5 mg/L, and the fit line for the date appears at approximately 150 mg/kg on the total lead axis, indicating that soluble lead concentration is actually closer to 3.3 percent of the total lead concentration at low concentrations.

The total area of soil estimated to exceed the proposed cleanup level is shown in Figure 5.2. Most of the area inside the gas holder fence, excluding the concrete foundation, is believed

Figure 5.1: Comparison of Total Lead
to Soluble Lead in Soil Samples





LEGEND

AREA WHERE LEAD CONCENTRATIONS EXCEED THE TTLC OR STLC

---?--- ASSUMED BOUNDARY OF CONTAMINATION

AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA

PG & E Gas Construction Yard

Approximate Area of Lead Contaminated Soil

JOB NO. **90262**

Figure 5.2

DATE: **Feb., 1992**

to require remediation. Some soils immediately outside the fence and toward Coliseum Way also exceeded the proposed action levels, although additional sampling is necessary to fully define that area.

The total depth of soils to be remediated is approximately 4 feet as was discussed in Section 3.1.1.2. A statistical analysis of all 23 samples collected below 4 feet in depth indicated that for a confidence interval of 80 percent, the total lead concentration below this depth lies in the range of 6.7 to 21.9 mg/kg. A statistically representative number of soluble lead samples have not been collected at this depth, however, using the 5 percent estimation would give a maximum expected soluble concentration of 1.1 mg/L, well below the 5.0 mg/L STLC. It was assumed then that soils to a depth of four feet would require remediation over the entire area shown in Figure 5.2

Based on the above, the total quantity of lead contaminated soil to be remediated, is estimated to be approximately 10,000 cubic yards.

6.0 PROPOSED REMEDIAL ACTIONS TO BE PERFORMED AT THE PRESENT TIME

6.1 EVALUATION OF TIE-DOWN BOXES NEAR THE FORMER GAS HOLDER TANK

Small quantities of oil that tie boxes contain will be removed by pumping. Boxes will be steam-cleaned and the generated rinsates will be collected. Boxes will be observed for any structural damage. If a box is found to be in sound structural condition with no cracks, it will be left in place. Boxes with cracks will be removed, and soil below it will be sampled and analyzed by TPH 418.1 and total lead. Additional laboratory analyses might be required depending on the results of this sampling.

Soil found to be contaminated by petroleum hydrocarbons above the cleanup levels presented in this document will be removed and disposed of properly. If the excavated soil is found to be hazardous by CCR Title 26, it will be disposed of at the Class I disposal facilities.

6.2 DISPOSAL OF THE OIL-SOAKED CONCRETE CYLINDERS

There are 23 concrete cylinders at the site. Each ring is approximately 3 feet in diameter and 14 inches thick. These cylinders will be steam cleaned and the resulting rinsate and sediment collected. Representative samples of the cleaned cylinders, rinsate and sediment will be collected and analyzed for lead and TPH. A method of disposal will be determined for the appropriate level of contamination. If sampling confirms that cleaned cylinders are not hazardous by CCR Title 26, they will be disposed of at the Class III landfill or at recycling facilities like Gibson Oil or P&G Environmental Services.

6.3 DISPOSAL OF SOIL STOCKPILE PREVIOUSLY REMOVED FROM THE GAS HOLDER

The approximate quantity of soil already removed and stockpiled onsite from the gas holder area is approximately 72 cubic yards. Location of the stockpile is shown in Figure 3.1 where it is labeled as "dirt pile". This soil is known to be contaminated with lead and oil based upon the results from a sample collected by PG&E, reportedly from this stockpile, and a sample by ARI collected in January 1992. This soil will be offhauled for treatment and disposal at Chemical Waste Management's Class I facility in Kettleman Hills, California.

6.4 COLLECTION OF ADDITIONAL DATA TO DETERMINE EXTENT OF ELEVATED LEAD LEVELS

Some additional data is required both to establish the horizontal extent of lead concentration in soil at the PG&E site. It will also assist in establishing the relationship between total and soluble lead for the local soils. It is expected that vertical contamination is more shallow outside the immediate tank parameter.

6.4.1 No Additional Data Required for Depth Extent

The depth of lead-impacted soils with concentrations exceeding the regulatory levels, however, has been estimated to be from the ground surface to an approximate depth of 4 feet in the former GHT area. No samples collected below 4 feet have been found to exceed either the TTLC of 1,000 mg/kg or the STLC of 5 mg/L. A statistical characterization of the 23 samples collected at the depth below 4 feet indicates that the total lead below 4 feet is between 6.7 mg/l and 21.9 mg/l - an 80% level of confidence. EPA guidance document SW-846 suggests that no further samples are warranted to establish that the regulatory threshold for total lead is exceeded in soils below 4 feet. While a statistically representative number of soluble lead samples has not been collected below this depth, it is believed that once a correlation between total and soluble lead has been established (see Section 6.4.2), a similar conclusion can be reached without the need for further samples below 4 feet.

6.4.2 Obtain Additional Total and Soluble Lead Data to Establish Their Correlation

Actions levels for total and soluble lead concentration have been proposed. To date, ARI has obtained results on 87 analyses for total lead in native soil samples from the former GHT area, while a total of 16 analyses for soluble lead have been conducted on the same sample population. In order to minimize the analytical cost of the lead extent investigation while maximizing the amount of analytical data, ARI proposes to establish a relationship between total lead and WET soluble lead for the local soils at the PG&E site. As discussed in Section 5.1 and illustrated in Figure 5.1, a log-log linear relationship between total and soluble lead, or Freundlich isotherm, appears to fit well the data gathered thus far. It is proposed that between 5 and 10 additional native soil samples, collected and analyzed for

both total and soluble lead concentration, will be sufficient to supplement the existing data. These samples would be selected from the additional samples collected for the purposes of determining the horizontal extent of lead contamination discussed below.

6.4.3 Obtain Additional Samples for Determining Horizontal Extent of Elevated Lead Levels

A preliminary estimate of the horizontal extent of elevated lead concentrations was shown in Figure 5.2. With this estimate of extent, however, only four of the 46 sample locations lie outside of the estimated boundary. Therefore, it is proposed that additional locations be sampled near this estimated boundary. For guidance on the number of additional samples required, Equation 8 from Section 9 of SW-846 (EPA, 1986) was applied to the total lead data using all 11 samples collected from outside of the fenced area immediately surrounding the former GHT location in order to estimate the mean and variance. This equation suggests that 14 samples are appropriate. If an additional two samples are added as a precaution, 16 total lead samples should be collected. ARI proposes to collect these 16 samples from randomly determined locations within forty feet of the assumed boundary shown in Figure 5.2. The locations will be determined by the method of random sampling described in SW-846. An imaginary grid will be constructed over area to be sampled assigning consecutive numbers to each grid block, and then 16 random locations will be selected using a random number generator. The depth of these samples will be between the ground surface and one foot, the interval where lead concentration has been observed to be the highest. Each of the samples will be analyzed for total lead concentration, and half of the samples will additionally be analyzed for WET soluble lead concentration to aid in establishing the total to soluble lead relationship.

6.5 QUARTERLY GROUNDWATER MONITORING PROGRAM FOR WELLS OW-5 AND OW-2 FOR LEAD

As was noted in Section 3.2.3.1, lead concentrations were found to be below 50 ug/L in each of the five monitoring wells sampled on April 17, 1991. In a meeting with the Alameda County Health Agency in January of 1992, the County suggested that groundwater monitoring would be required if soluble lead were observed in soil at levels above the STLC. It is recommended that quarterly monitoring for lead be conducted on the upgradient well OW-5 and the downgradient well OW-2 for a period extending to one year beyond the

completion of remedial actions. This quarterly sampling program would be integrated with the present quarterly sampling program for hydrocarbons. The next quarterly samples will be collected in March of 1992.

7.0 PRELIMINARY DESCRIPTION OF PROPOSED REMEDIATION ALTERNATIVES

Four alternatives are being considered for the final remedial action in the former GHT location at the PG&E Site:

1. No action

This option is the most economic option since it would involve no further costs. Hazardous waste levels of total and soluble lead at the site make this option infeasible.

2. Remove and dispose of soil with elevated lead concentration to a Class I landfill, and backfill with clean imported material.

This option is potentially the most expensive given the high cost of disposal to a Class I facility which currently would be over $300 per cubic yard. It is also undesirable from the point of view that it simply relocates the contaminated soil to a different site and creates additional potential health and safety hazards during excavation and hauling.

3. Place an impermeable asphaltic concrete cap over the site.

This option involves capping the surface area containing elevated concentrations of lead to prevent the migration of soluble lead to the groundwater and reduce the movement of air-borne dust. Recent sampling confirms that lead has not migrated to groundwater. Preliminary cost estimates show it to be an order of magnitude less expensive than excavation and offhaul. A comparison of the costs for both options is presented in Table 7.1, Parts 1 and 2.

4. Excavate and treat the soil on-site using soil washing or magnetic extraction technologies.

The cost of this option lies between offhauling at the expensive end, and capping at the least end. The viability of this option would be dependant upon the results of a bench scale feasibility study. Since the lead concentration in soil at the site has been found to exceed Federal hazardous limits, a permit to treat hazardous waste would be required. This option would require special provisions during construction activities.

Table 7.1 Part 1: Order of Magnitude Cost Estimate for the Removal and Disposal of Lead Contaminated Soil at a Class I Landfill

Task	Quantity	Unit Price ($)	Total ($)
1) Excavation of contaminated soil	7,610 cy	14	106,000
2) Transportation to landfill	7,689* cy	52	400,000
3) Disposal cost	7,689 cy	318	2,445,000
4) Removal of fence	781 lf	1.7	1,000
5) Removal of tie-downs	24 ea	500	12,000
6) Backfill	6,370 cy	21.50	137,000
7) Gravel (6")	7,610 sy	4.7	36,000
8) New fence	781 lf	11.2	9,000
Subtotal			3,146,000
Engineering 10%			315,000
Contract Management 5%			157,000
Subtotal			3,618,000
Contingencies 10%			362,000
TOTAL			3,980,000

* Includes stockpiled soil and concrete rings.

Table 7.1 Part 2: Order of Magnitude Cost Estimate
for Placing of Asphaltic Concrete Cap Over Entire Site

Task	Quantity	Unit Price ($)	Total
1) Removal of tie downs	24 ea	500	12,000
2) Disposal of stockpiled soil and concrete rings: • transportation • disposal cost	 79 cy 79 cy	 52 318	 4,000 25,000
3) Removal of fence	813 lf	1.7	1,000
4) Regrading of the site	2,530 cy	19.4	49,000
5) Aggregate base	3,080 cy	29	89,000
6) AC pavement	18,480 sy	6.2	115,000
7) New fence	813 lf	11.2	9,000
8) Drainage design and construction	LS	LS	50,000
9) Health risk assessment including additional sampling	LS	LS	35,000
10) Drilling of monitoring wells and sampling	3 ea	2,000	6,000
	Subtotal		395,000
	Engineering 10%		39,000
	Contract Management 5%		20,000
	Subtotal		454,000
	Contingencies 10%		45,000
	TOTAL		499,000

8.0 GUIDELINES FOR HEALTH RISK ASSESSMENT

A health risk assessment (HRA) will be conducted to predict possible migration routes and to identify areas where the contamination source may impact health or the environment. All available information will be integrated to forecast the contaminant movement in all phases toward pathway outlets. The HRA will be used to establish the need for the remedial system and to determine final cleanup requirements.

The HRA should address the following issues:

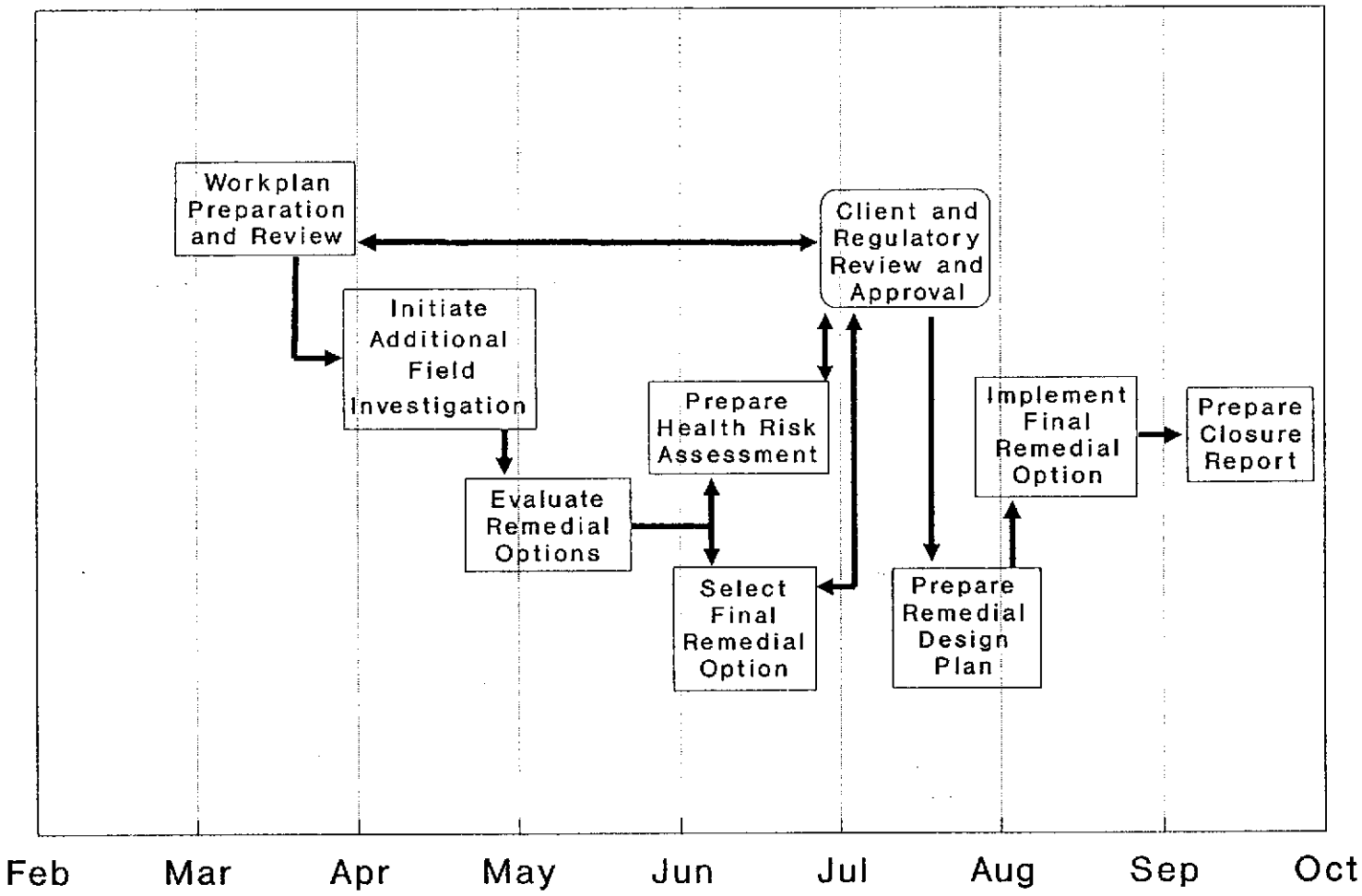
- The potential target receptors
- The potential exposure pathways
- Typical dose of exposure through the various pathways
- Typical exposure durations
- Associated health risk from exposure

These issues will be addressed both for the baseline exposure, i.e. the current exposure before remedial action, and the post remediation exposure. The conclusions of the HRA will establish a remediation target concentration which would not increase the health risk to humans.

9.0 SCHEDULE OF PROPOSED ACTIVITIES

The approximate schedule of activities related to the design and implementation of a final remedial option for the former GHT area at the PG&E site is summarized in Figure 9.1.

Figure 9.1 Schedule of Activities for 1992



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Aerial photos: BUT-289-49 & 50, taken 8/2/39, black and white, 1:20,000; WAC-84C 2-27, taken 3/18/84, black and white, 1:24,000

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Water Work, Feasibility Study and Corrective Action Plan, PG&E Yard, 4930 Coliseum Way, Oakland, California, October 18, 1989.

LIST OF ACRONYMS AND ABBREVIATIONS

ARI	Aqua Resources Incorporated, a wholly owned subsidiary of The Earth Technology Corporation
BTEX	Benzene, Toluene, Ethylbenzene, and Xylenes
CCR	California Code of Regulations
DMG	California Division of Mines and Geology
EPA	Environmental Protection Agency
GHT	Gas Holder Tank
HRA	Health Risk Assessment
LUFT	Leaking Underground Fuel Tank
MCL	Maximum Contaminant Level
PG&E	Pacific Gas and Electric Company
RI	Remedial Investigation
RWQCB	Regional Water Quality Control Board
STLC	Soluble Threshold Limit Concentration (CCR Title 26)
TCLP	Toxicity Characteristic Leaching Procedure
TDS	Total Dissolved Solids
TEH/TPH	Total Extractable Petroleum Hydrocarbons
TETC	The Earth Technology Corporation
TPH	Total Petroleum Hydrocarbons
TTLC	Total Threshold Limit Concentration (CCR Title 26)
TVH	Total Volatile Hydrocarbons
VOC	Volatile Organic Compounds
WET	Waste Extraction Test

APPENDIX A

Site Sampling and Analysis Plan and QA/QC Plan

Site Sampling and Analysis Plan
and
Quality Assurance and Quality Control Plan
for Additional Investigation

Prepared for:

PG&E
ENCON-GAS Transmission and Distribution Construction Yard
Former Gas Holder Tank Area
4930 Coliseum Way
Oakland, California

Prepared by:

Aqua Resources Inc.
a wholly owned subsidiary of The Earth Technology Corporation
2030 Addison Street, Suite 500
Berkeley, California 94704

Aqua Resources Inc.

March 6, 1992

SAMPLING AND QA/QC PLAN

1.0 SITE LOCATION

The site is the PG&E General Construction ENCON Gas Yard located at 4930 Coliseum Way in Oakland, California.

2.0 OBJECTIVE

The purposes of the field sampling effort are to:

- Obtain additional information on the horizontal extent of soil contamination from releases of lead
- Obtain additional information on the site specific relationship between total and soluble lead
- Perform confirmatory sampling of soils underlying those former tank tie down boxes which require removal to ensure the removal of the surrounding petroleum hydrocarbon impacted soils
- Perform sampling of any generated soil stockpiles for characterization of lead and petroleum hydrocarbon content
- Obtain quarterly groundwater samples to assess groundwater contamination

3.0 SAMPLING PROCEDURES AND LOCATIONS

3.1 General

Soil samples will be collected using a sample slide hammer whose barrel accepts a 2" OD by 6" long brass sample tube. Once collected, the brass tube sample will be quickly removed. The features of the soil observed at the ends of the tube, e.g. soil type and appearance of

contaminants, will be quickly noted. The ends of the sample tube will then be sealed with aluminum foil and new snug fitting plastic end caps. For those samples which will be analyzed for volatile organic hydrocarbons, any organic vapor meter (OVM) readings from the soil will be noted and care will be taken to obtain a full sample with minimal air headspace.

Brass tubes will be purchased as precleaned. Sampling equipment which comes in contact with the sample, whether for soil or water samples, will be disassembled and washed and rinsed prior to obtaining a sample from each new location. The wash will consist of a solution of TSP in water. The rinse will consist of a triple water rinse with the final rinse being distilled water. Generated decontamination fluids will be disposed into DOT approved drums. Used drums will be left on site pending determination of appropriate disposal.

The samples which will be collected in the current additional investigation are described for each activity below and summarized under the subject heading "ANALYSIS PLAN." All samples will be labelled with the sample number and date of sample. Those collected for hydrocarbon analysis will then be immediately placed in a chilled (approximately 4°C) ice chest for storage. Standard chain of custody forms (Figure 1) and procedures will be used to deliver the samples to the analytical laboratory in a timely manner. The chain of custody procedure is described in detail under the subject heading "CHAIN OF CUSTODY."

3.2 Samples for Determining Lead Extent

The horizontal extent of soil contamination will be explored through soil samples collected from the depths between 0 and 1 foot below ground surface (bgs). A hand auger or trowel will be used to expose bgs sample locations. These samples will be analyzed for total lead by EPA method 7420.

A total of 16 locations will be sampled. Their locations and depth interval (0-6 inches, 6-12 inches) will be selected in random fashion, per EPA document SW-846, from all accessible locations which lie within 40 feet of the estimated lead extent shown in Figure 2. This extent was estimated based upon previous sample results.

3.3 Samples for Establishing Total and Soluble Lead Relationship

Figure 1: Chain of Custody Documentation

AQUA RESOURCES, INC.

SHIPMENT NO.:_____

CHAIN OF CUSTODY RECORD

PAGE_____OF_____

DATE_____

PROJECT NAME:_____

PROJECT NO.:_____

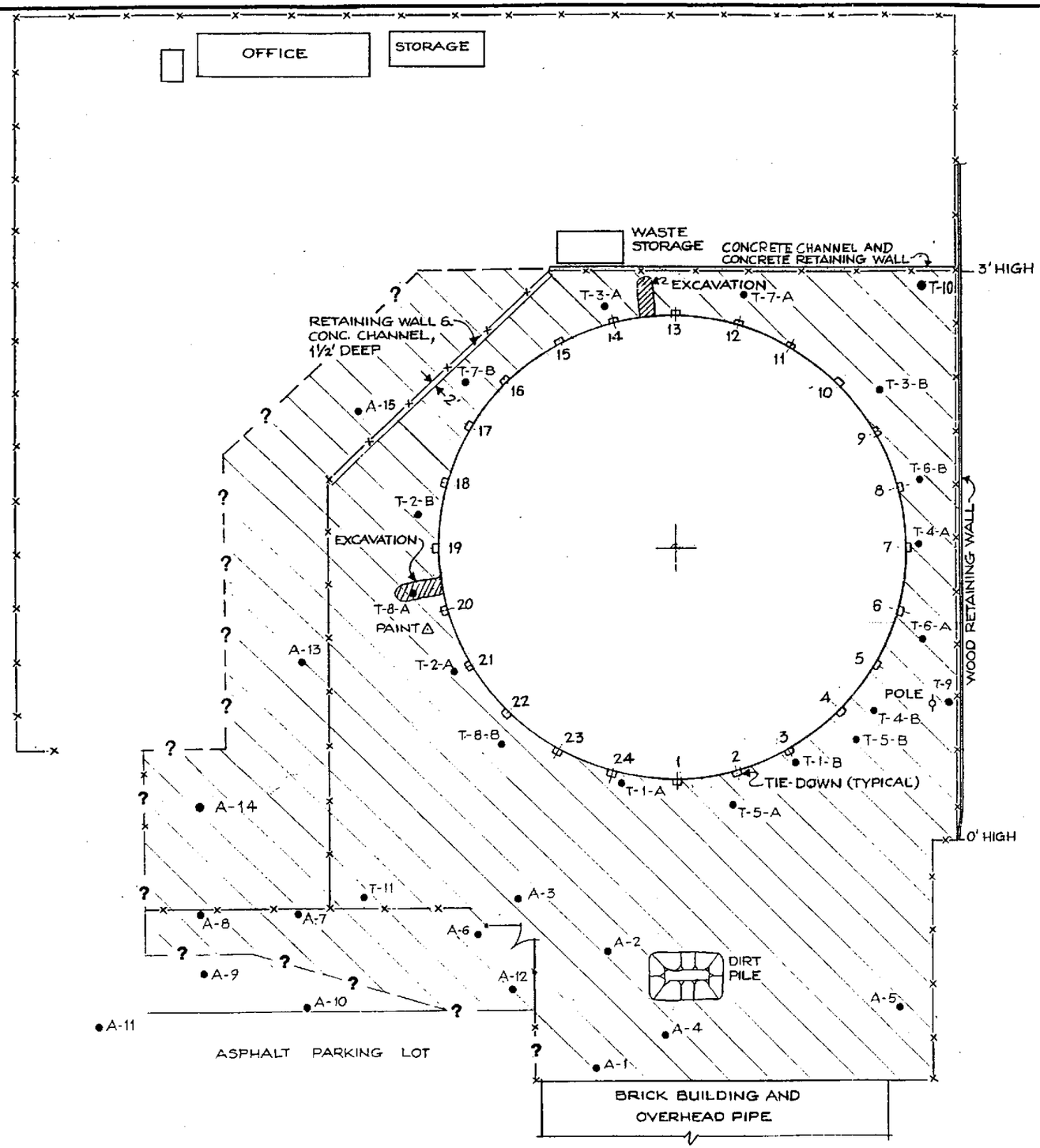
Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	

Total Number of Samples Shipped: | Sampler's Signature:

Relinquished By:	Received By:	Date / /
Signature_____	Signature_____	
Printed Name_____	Printed Name_____	Time
Company_____	Company_____	
Reason_____		
Relinquished By:	**Received By:**	Date / /
Signature_____	Signature_____	
Printed Name_____	Printed Name_____	Time
Company_____	Company_____	
Reason_____		

REMARKS:

Special Shipment / Handling / Storage Requirements:



Scale: 1" = 50'

0 30 60 90 120 150

LEGEND

AREA WHERE LEAD CONCENTRATIONS EXCEED THE TTLC OR STLC

——?—— ASSUMED BOUNDARY OF CONTAMINATION

AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA

PG & E Gas Construction Yard

Approximate Area of Lead Contaminated Soil

JOB NO. **90262**

Figure 2

DATE: **Feb., 1992**

No additional sampling will be required for these samples. These samples will be selected from among the samples collected for total lead based upon the concentration of total lead present. Between 5 and 10 soluble lead analyses will be performed in order to provide a full range of total and soluble concentrations. The soluble lead concentration will be determined by performing a WET extraction and analyzing the extract by EPA method 7420.

3.4 Tie Down Box Cleaning and Inspection for Possible Removal & Confirmatory Sampling

The 24 gas holder tank tie down boxes, shown in Figure 2, will be pumped dry of any free hydrocarbon product and steam cleaned in-situ. Water generated from cleaning will then, in turn, be pumped from each box. All pumped fluids will be collected in DOT approved drums which will be left on site pending determination of appropriate disposal. The cleaned boxes will then be inspected to evaluate their integrity. Those boxes which appear to have pathways for leakage to the surrounding soil; whether from defect, mishandling or corrosion, will be removed along with any surrounding soil which appears to be impacted by petroleum hydrocarbons. Visual inspection for soil staining and OVM screening will be used to determine the extent of impacted soil around the removed box. The outside portion any removed boxes will then be steam cleaned as before, with any generated fluids collected and drummed. The cleaned box will then be disposed to a Class III landfill. Any soil removed will be stockpiled with a layer of 6 mil visqueen over- and underlying the pile. A confirmatory soil sample will be collected at the base of each of box removal excavation, expected to be at a depth of about 2 and 1/2 feet. The confirmatory samples will be screened for TPH by EPA method 418.1. Those locations which indicate remaining elevated hydrocarbon concentrations will either be further excavated, or an additional sample for analysis of TPH as diesel fuel (EPA 8015), TVG as gasoline (8015) and BTEX compounds (EPA 8020) will be collected at the discretion of the field engineer. Further excavation will be performed at locations which fail the action levels for these constituents.

3.5 Soil Stockpile Characterization Samples

Generated waste soil stockpiles will be sampled at an approximate frequency of one sample per every 20 cubic yards. Locations will be selected randomly per EPA document SW-846. The analyses performed will depend upon the requirements of the disposal facility, however, at a minimum, the lead concentration in the soil will be analyzed.

3.6 Quarterly Groundwater Monitoring

Two monitoring wells, OW-2 and OW-5 will be sampled quarterly and analyzed for lead content. This will be performed along with normal quarterly sampling of these and other wells which currently is being performed for other constituents.

Groundwater sampling methods will follow guidelines presented in EPA-600/4-84-076, Method III-9, "Sampling Monitoring Wells with a Bucket Type Bailer." After first opening the well the initial depth to water will be measured and recorded using an electric tape depth to water meter. Then the well will be purged of the appropriate volume of water by using either a downhole pump or through bailing. A precleaned teflon, stainless steel or disposable PVC bailer will be used to collect the samples. A new length of nylon rope will be used at each well for raising and lowering the bailer. Clean sample containers will be provided by the laboratory and will contain any required preservatives as specified by the requested EPA analytical method. The analysis method for lead in water will be that specified in CCR Title 26.

4.0 CHAIN OF CUSTODY

Official custody of samples will be maintained and documented from the time of sample collection through the completion of laboratory analyses. The following custody documentation procedure was developed by the National Enforcement Investigations Center of the EPA, and is used on this project.

A sample is considered to be in an individual's custody if the following criteria are met: it is in his/her possession or it is in his view after being in his/her possession; it was in his/her possession and then locked up or transferred to a designated secure area. Under this definition, the team members actually performing the sampling are personally responsible for the care and custody of the samples collected until they were transferred or dispatched properly. The QA

Officer will review all field activities to confirm that proper custody procedures are followed during the field work.

The Chain of Custody Record/Sampling Log is employed as physical evidence of sample custody. The individual performing the sampling will complete a Chain of Custody Record to accompany each sample shipment from the field to the laboratory. Basic information was recorded on the Chain of Custody Record, including the project number and name and samplers' signatures. For each sample number, the sampler will indicate the sample number, depth, date, whether the sample was a composite or grab, and number of containers. When relinquishing the samples, the sampler will sign in the space indicated at the bottom of the form. The recipient will sign in the "Received by" section of the form, entering the date and time the samples were received.

The custody record will be completed using waterproof ink. Any corrections shall be made by drawing a line through and initialing the error, then entering the correct information.

The original signature copy of the Chain of Custody Record will be secured to the samples it covered. A copy of the custody record will be retained for the sampler's files. The laboratory representative accepting the incoming sample shipment shall sign and date the Chain of Custody Record to acknowledge receipt of the samples, completing the sample transfer process. It shall be the laboratory's responsibility to maintain internal log books and records that provide a custody record throughout sample preparation and analysis.

5.0 ANALYSES PLAN

Soil and groundwater samples selected for chemical analysis will be submitted to a State certified laboratory utilizing chain of custody protocols. Chemical analyses to be performed are summarized in the following table.

Sample I.D. (Purpose)	Number of Samples	Sample Type	Depth	Proposed Analyses
A-16 through A-31 (horiz. Pb extent)	16	Soil	Between 0 and 1 feet	Total Lead
(5 to 10 of) A-16 to A-31 (soluble Pb to total Pb relationship)	5 to 10	Soil	Between 0 and 1 feet	Soluble Lead
TD-1 to TD- ?? (confirmatory samples below removed tie down boxes)	Max. of 24	Soil	Base of Excavation	TPH with possible later analysis for TEH-Diesel TVH-Gasoline BTEX
SP-2 to SP-? (stockpile characterization)	Approx. 1 per 20 yd^3	Soil	Distributed throughout stockpile	Total Lead at a Minimum
OW-2 and OW-5 (Quarterly water monitoring)	2 per Quarter	Water	-	Total Lead in Water

Final determination of the type of chemical analyses performed on individual samples will be based on actual field observation.

Health and Safety Plan
for Additional Investigation

Prepared for:

PG&E
ENCON-GAS Transmission and Distribution Construction Yard
Former Gas Holder Tank Area
4930 Coliseum Way
Oakland, California

Prepared by:

Aqua Resources Inc.
a wholly owned subsidiary of The Earth Technology Corporation
2030 Addison Street, Suite 500
Berkeley, California 94704

Aqua Resources Inc.

March 6, 1992

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HEALTH & SAFETY PLAN

1.0 INTRODUCTION

This Health and Safety Plan (HSP) is prepared for the investigation and evaluation of petroleum hydrocarbon contamination (diesel and waste oil), lead paint chips and volatile organic compounds (VOCs) at the PG&E General Construction Gas Yard in Oakland, California. The HSP addresses potential health and safety hazards that may be encountered during the project and includes health and safety guidance for the field crew, on-site supervisors and project management personnel to conduct their job responsibilities on the site. The HSP is prepared based on accepted industrial hygiene practice for the hazardous waste industry.

2.0 PROJECT OBJECTIVES

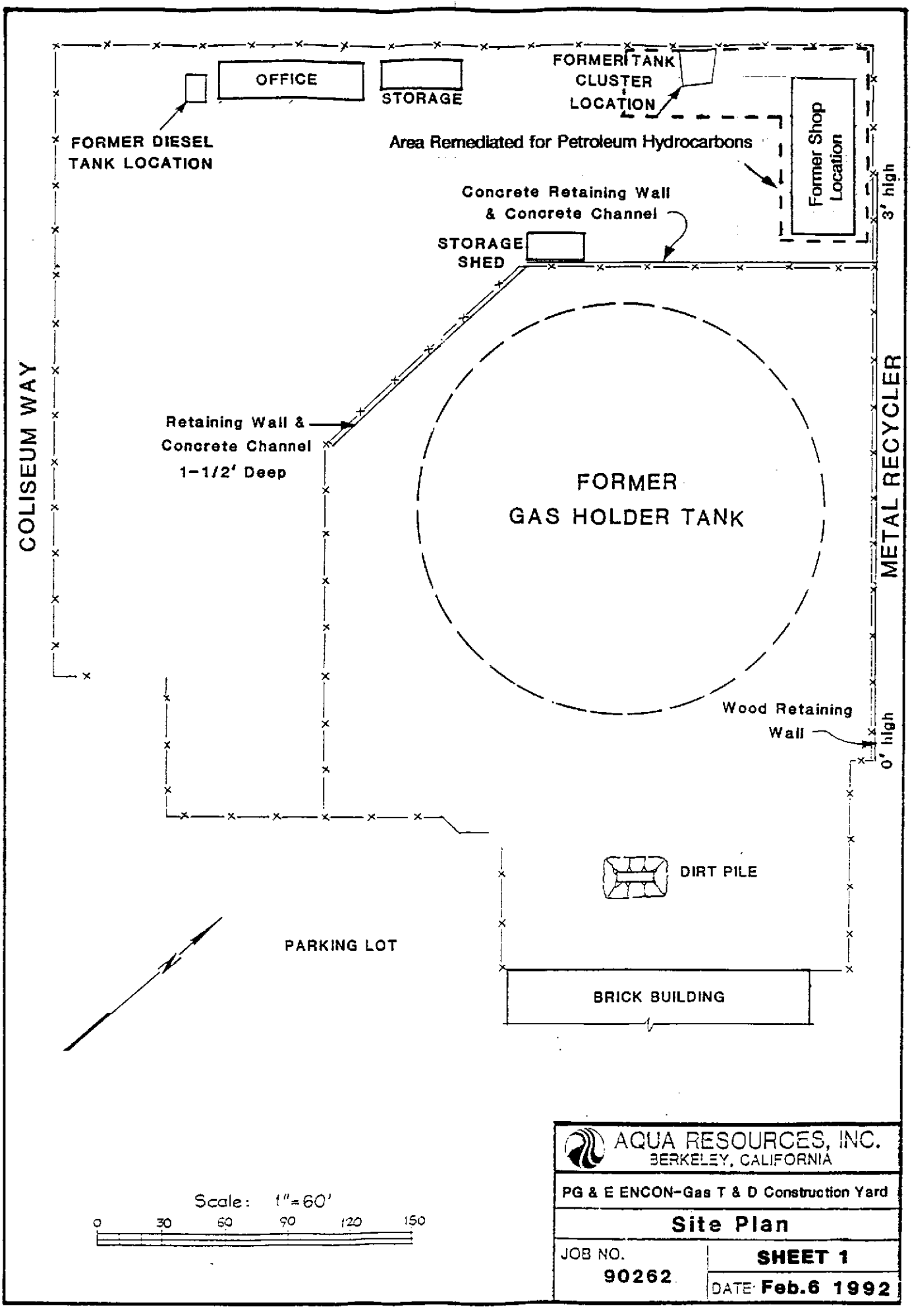
The objectives of the proposed work at the site are to evaluate the extent of possible soil and groundwater contamination from releases of petroleum hydrocarbons, VOCs, and lead paint chips. These data will be utilized in preparing a detailed corrective action plan for the site.

Possible field activities at the Site include:

- Use of a hand or power augur and drive sampler to obtain soil samples
- Drilling of soil boring(s)
- Soil sampling during drilling
- Installation and development of monitoring well(s)
- Collection of groundwater samples
- Steam cleaning of equipment.

3.0 SITE DESCRIPTION

The site is located at 4930 Coliseum Way in Oakland, California. The site is shown on the Vicinity Map, Sheet 1. The site is used by PG&E as a vehicle, materials and equipment storage and distribution facility. Historically, the site was also used as a vehicle service


OFFICE
STORAGE
FORMER TANK CLUSTER LOCATION
FORMER DIESEL TANK LOCATION
Area Remediated for Petroleum Hydrocarbons
Former Shop Location
3' high
Concrete Retaining Wall & Concrete Channel
STORAGE SHED
COLISEUM WAY
METAL RECYCLER
Retaining Wall & Concrete Channel 1-1/2' Deep
FORMER GAS HOLDER TANK
Wood Retaining Wall
0' high
DIRT PILE
PARKING LOT
BRICK BUILDING
Scale: 1"=60'
0 30 60 90 120 150
AQUA RESOURCES, INC.
BERKELEY, CALIFORNIA
PG & E ENCON-Gas T & D Construction Yard
Site Plan
JOB NO. 90262
SHEET 1
DATE Feb.6 1992

center and above ground natural gas storage facility. Some surfaces are paved with concrete or asphalt, and a large portion of the site is unpaved or surfaced with gravel only. Other site improvements include several buildings and storage sheds.

4.0 JOB HAZARD EVALUATION

4.1 Chemical Hazards

Petroleum hydrocarbons, lead compounds and VOCs are expected to be encountered in this project. Hazardous Substance Information Forms contained in Appendix I contain general physical, chemical, and toxicological data on these compounds. Toxicological data are summarized below:

Substance	Exposure Route	Exposure Symptoms
Petroleum Hydrocarbons	Inhalation* Ingestion Skin Absorption*	Dizziness, drowsiness, headache, nausea, eye irritation
Lead Oxide, Monoxide	Inhalation* Ingestion	Constipation, insomnia, gastrointestinal disorders, anemia, weakness, joint pain
1,2-DCE	Inhalation* Ingestion	Irritates eyes, respiratory system, central nervous system, depression
Xylene	Inhalation* Ingestion Skin Absorption Skin and/or Eye Contact	Dizziness, excitement, drowsiness, incoordination, staggering gait, irritates eyes, nose, throat, corneal vascularization, anorexia, nausea, vomiting, abdominal pain, dermatitis
Ethylbenzene	Inhalation* Ingestion Skin and/or Eye Contact	Irritates eyes, mucous membranes, headaches, dermatitis, narcosis, coma

* Primary exposure route(s)

Petroleum hydrocarbons used at the site are known to contain benzene which has been identified as a potential carcinogen for man by the International Agency for Research on Cancer (IARC) (IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man, Volume 7, 1974, and Volume 18, 1978).

The current OSHA permissible exposure limit (PEL) for petroleum hydrocarbons is 2000 mg/m^3 over an eight hour day. NIOSH recommends that the permissible exposure limit for petroleum hydrocarbons be 350 mg/m^3 averaged over a work shift of up to 10 hours per day, 40 hours per week.

NIOSH 10 hour time weighted average (TWA) for lead is 0.1 mg/m^3 (12 ppb); for xylene 435 mg/m^3 (100 ppm); for DCE exposure limits are 790 mg/m^3 (200 ppm), for ethylbenzene 435 mg/m^3 (100 ppm); and for PCBs 1.0 ug/m^3 (0.075 ppb).

4.2 Heat Stress

Heat stress may occur due to prolonged working under hot weather conditions, poor ventilation, and extensive work hours without adequate resting periods and replacement of water and salt. Kinds or levels of heat stress are listed below:

Heat Rash: Hot humid conditions; red dermatitis

Heat Cramps: Painful spasms in skeletal muscles and pain in extremities and abdomen caused by profuse sweating and water replacement without adequate salt or electrolyte replacement. Larger muscle groups that are fatigued from use are usually most susceptible.

Heat Exhaustion: Characterized by extreme weakness or fatigue, dizziness, nausea, and headache. The skin is clammy and moist, complexion pale or flushed, and body temperature normal or slightly higher than normal. In serious cases, a person may vomit or lose consciousness. Treatment is rest in a cool place (do not chill) and replacement of body water lost by perspiration. Severe cases may require care for several days. There are no permanent effects.

Heat Stroke: Most severe form of heat stress; mortality rate is 50%. Very serious condition caused by a breakdown of the body's heat regulation mechanism. Signs and symptoms include red, hot dry skin, and body temperature 105 °F or higher. No perspiration, but nausea, dizziness, confusion, or convulsions may occur. Quick treatment is necessary. Body heat should be reduced artificially, but not too rapidly, by soaking the person's clothes with water and fanning them. Alternatively, remove as much clothing as possible; wrap injured in a sheet soaked in water and fan vigorously; treat for shock.

Steps to minimize or monitor heat stress are given in Section 10, Monitoring Procedures and Criteria.

4.3 Other Hazards

Other hazards may include excessive noise and dust exposure during the drilling, and operation of other construction equipment. There are also physical hazards associated with working around drilling equipment and other construction equipment and hazards from various activities such as handling heavy augers during drilling and rotating or moving equipment. Physical hazards include:

- Falling resulting from tripping on objects lying on the ground, stepping into open excavations or boreholes or from uneven terrain;

- Injury from moving equipment such as when heavy equipment is in motion or being operated.

The Contractor shall follow appropriate safety regulations to protect the safety of people working around the drilling equipment. Equipment and machinery to be used on site shall be in good condition and shall be operated by qualified employees according to the manufacturer's instructions.

5.0 SITE CONTROL

The onsite Command Post and staging areas have been established at the parking area located inside the main gate at the northwest end of the site.

Control boundaries have been established, and the Exclusion Zone (the contaminated area), Contamination Reduction Zone, and Support Zone (clean area) have been identified and designated as follows:

Exclusion Zone:	Fenced area around the former gas storage tank.
Contamination Reduction Zone:	Area immediately outside and adjacent to the fenced area.
Support Zone:	Parking area outside the main gate.

A site map showing the general location of the site is attached to this Health & Safety Plan (Plate 1). Site perimeter of the property is secured by existing fences and gates. NO UNAUTHORIZED PERSON SHALL BE PRESENT WITHIN THE FENCED YARD AT ANY TIME DURING PERFORMANCE OF ACTIVITIES DESCRIBED IN SECTION 2. The Site Safety Officer or his designated Team Leader is responsible for maintaining site security.

6.0 ONSITE ORGANIZATION AND COORDINATION

Project organization is as follows:

Engineer:	Aqua Resources Inc. (ARI)
Client:	PG&E

Personnel and duties at the site are as follows:

Site Safety Officer:	Mr. Voytek Bajsarowicz, ARI
Field Team Leader:	Mr. Aaron Stessman, ARI
Field Geologist:	Mr. Mark Peterson, ARI

Aqua Resources Inc. (ARI) personnel will log the borings, test pits, handle the soil and groundwater samples after collection, provide the necessary coordination and supervision to carry out the proposed works, and will be present at the site to ensure the execution of this Health and Safety Plan.

The Site Safety Officer (SSO) will be responsible for the continuous monitoring of the site environment and observation of safety procedures on site. The SSO has the authority to make, if required by a specific site condition, any changes to this Health and Safety Plan such as level of protection, and boundaries of different zoning. All personnel arriving or departing the site should check in and out with the Site Safety Officer. All activities on site must be cleared through the Site Safety Officer.

When the designated SSO is away from the site, Mr. Aaron Stessman shall be the Alternate Site Safety Officer (ASSO). The ASSO shall have the same authority and shall perform the same tasks as the SSO.

The Contractor will perform drilling/backhoe operations, collect soil samples (driller only), decontaminate drilling equipment, and contain drilling wastes in drums. Soils excavated by backhoe shall be placed on top of existing stockpiles or adjacent to the excavation at a location designated by the Field Team Leader.

7.0 COMMUNICATION

Site activities in the Contamination Reduction Zone and Support Zones allow for direct voice contact at all times. Voice communication at Exclusion Zone may not be possible due to restriction of the half mask respirator. Where direct voice contact is not possible, personnel shall be briefed on duties to be performed before entering those areas. Hand sign signals shall be used for communication within such areas. Personnel shall leave the Exclusion Zone as soon as the desired duties are accomplished.

Personnel at the site will remain in constant voice communication or within sight of the Field Team Leader or his designated line-of-sight support person.

A Buddy System shall be established for all personnel working within the Exclusion Zone. Each worker shall have a designated co-worker or "buddy". Each of them shall be able to:

1) Provide their partner with assistance whenever needed.
2) Observe their partner for signs of chemical or heat exposure.
3) Periodically check the integrity of their partner's protective clothing.
4) Notify the SSO or others if emergency help is needed.

The following standard hand signals will be used in case voice communication is impossible.

Both arms waving	Someone is injured
Hand gripping throat	Out of air, cannot breathe
Hands on top of head	Need assistance
Thumbs up	OK, I am all right, I understand
Thumbs down	No, negative

8.0 STANDARD OPERATING PROCEDURES

1) All personnel arriving or departing the site shall log in/out with the SSO.

2) All equipment shall be checked for proper functioning and calibration at the start of each work day.

3) All activities on site must be cleared through the SSO.

4) All personnel leaving the Exclusion Zone must decontaminate at the Contamination Reduction Zone.

5) No one shall stay in the Exclusion Zone alone.

6) There shall be no smoking or eating in the Contamination Reduction Zone or in the Exclusion Zone.

9.0 PERSONNEL PROTECTIVE EQUIPMENT

Based on an evaluation of the potential hazards, the following levels of personnel protection have been designated for the applicable work locations and tasks:

Location	Job Function	Level of Protection
Exclusion Zone	All	C
All other areas	All	D

Specific protective equipment shall be as follows:

Level C Protection

- Full face, air-purifying respirator with pesticide cartridge(s) and particulate prefilter(s); or half mask, air-purifying respirator with same cartridges;
- TYVEK chemical-resistant one-piece suit;
- Inner and outer gloves made of chemical-resistant materials such as viton, nitrile, or neoprene;
- Chemical-resistant safety boots/shoes;
- Hard hat;
- Eye Protection (safety glasses or goggles);

The OSHA Personal Equipment Standard (29 CFR Part 1910.134) shall be followed when using respirators. A Respiration Protection Program regarding the proper use of air-purifying respirator is presented in Appendix II.

Level D Protection

- Safety boots/shoes;

- Outer gloves made of chemical-resistant materials such as viton, nitrile, or neoprene;
- Hard hat, if appropriate;
- Eye Protection (safety glasses or goggles);
- Gloves, cloth or leather for general use;

Personnel shall also be provided with adequate hearing protection such as ear plugs or ear muffs when performing activities that produce high noise level.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER.

10.0 MONITORING PROCEDURES AND CRITERIA

Personal monitoring shall be in effect to prevent injury to workers due to excessive exposure to hazardous chemicals, heat stress and noise. The following program of monitoring will be in effect for all personnel engaged in conduct of the work.

- Body temperature monitoring: The expected air temperature range will be 60-70°F. Metabolic heat load due to work activities is not expected to exceed 300 kcal-hour. Personnel shall decrease work if oral temperature is greater than 99.6 °F; do not wear (semi-) impermeable clothing if oral temperature is greater than 100.6 °F. Body temperature shall be taken at the request of the Site Safety Officer or the worker himself.

- Heart rate: Decrease work if heartbeat is greater than 110 beats per minute at the beginning of a rest period.

- Body water loss: Measure weight at beginning and end of each day. Weight loss should not exceed 1.5% of total body weight in a work day.

Personnel will be instructed in self heat stress monitoring (awareness of signs such as shortness of breath, excessive perspiration and general discomfort). If personnel self-monitoring indicates that heat stress monitoring is required, the following procedures shall be followed:

- Physiological monitoring frequency shall be every 180 minutes of work.
- Heart Rate: radial pulse during a 30-second period as early as possible in the rest period.
- Oral temperature: measured with a clinical thermometer (3-minutes under the tongue).

Personnel shall read this Health and Safety Plan and be familiar with the symptoms caused by excessive exposure to the various chemicals that may be encountered during the site activities (Section 4.1 Chemical Hazards) and shall stop their activities and report to the SSO should they suspect the development of such symptoms.

11.0 DECONTAMINATION PROCEDURES

Personnel and equipment leaving the exclusion zone shall be decontaminated. The standard level decontamination protocol shall be used with the following decontamination steps:

(1) Equipment drop
(2) Outer boot wash and rinse
(3) Tape and outer glove removal
(4) Coverall wash/rinse or disposal as required
(5) Remove coverall
(6) Inner glove wash/rinse
(7) Remove respirator
(8) Inner glove removal
(9) Field wash/rinse

The above decontamination steps shall be carried out at the Contamination Reduction Zone. ARI will provide the following decontamination and first aid equipment at the Contamination

Reduction Zone: plastic buckets, brush, plastic bags for disposable surgical (inner) gloves and first aid kit.

Soap and water will be provided and used as the decontamination solution.

Decontamination rinse water shall be stored in appropriate containers that are clearly labeled. The decontamination rinse water may have to be analyzed for levels of petroleum hydrocarbons or lead and, if required, disposed of as hazardous waste in conformance with all Federal, State and local laws by the Client.

12.0 EMERGENCY RESPONSE PROCEDURES

12.1 SITE SAFETY OFFICER

The Site Safety Officer shall record all injuries happened at the site including nature of injuries, response actions to each injury, and cause of injuries, if known. The SSO shall give a precise report to hospital as to extent of decontamination of the injured person and nature of contaminants involved.

12.2 EMERGENCY MEDICAL CARE

For any emergency, call "911" first. Highland Hospital, located at 1411 E. 31st Street in Oakland is approximately 5 minutes from this site. A map showing the location of this facility will be available at the site, and is included in this Health and Safety Plan (Sheet 2).

First-aid equipment will be available on site, consisting of a first-aid kit. Local ambulance service is available by calling 911.

First Aid Instructions

None of the chemicals mentioned is expected to be encountered in concentrated form during drilling. In the unlikely event that concentrated chemicals are found at the site and they come in contact with the eyes, then the affected eye will be immediately washed with large amount

of water, occasionally lifting the lower and upper lids. Immediate medical attention will be sought. To reduce the risk of eye injuries, personnel will not be permitted to wear contact lenses while working.

If concentrated chemicals come into contact with the skin, the affected area will be washed with soap and water.

Both the Engineer and the Contractor shall have personnel(s) familiar with first aid and CPR.

EMERGENCY PHONE NUMBERS: (This list is reprinted in Appendix III).

Emergency: 911
Police Department: 596-3737
Fire Department: 596-3771
Hospital: 534-8055
Public Health Advisor, Hazard Evaluation System and Information Service (HESIS) 540-3014

12.3 EMERGENCY PROCEDURES

The following standard emergency procedures will be used by onsite personnel. The Site Safety Officer shall be notified of any onsite emergencies and be responsible for ensuring that the appropriate procedures are followed.

Personnel Injury in the Exclusion Zone or the Contamination Reduction Zone: Upon notification of an injury in the Exclusion Zone or Contamination Reduction Zone, the designated emergency signal (voice contact) shall be sounded. All site personnel shall assemble at the Contamination Reduction Zone. The Site Safety Officer will evaluate the nature of the injury, and the affected person will be decontaminated to the extent possible prior to movement to the Support Zone. If the SSO judges it to be necessary, an ambulance will be called and the designated medical facility will be contacted to receive the case. No person shall reenter the Exclusion Zone until the cause of the injury or symptoms is determined.

Personnel Injury in the Support Zone: Upon notification of an injury in the Support Zone, the Site Safety Officer will assess the nature of the injury. If the cause of the injury or loss of the injured person does not affect the performance of site personnel, operations may continue, and the affected personnel will be conveyed to the designated medical facility, as deemed necessary by the SSO. If the injury increases the risk to others, the SSO may require all activities on site to stop until the added risk is removed or minimized.

Fire/Explosion: Upon notification of a fire or explosion on site, the SSO will order all site personnel to assemble outside the entrance gate of the site. The fire department shall be alerted and all personnel moved to a safe distance from the involved area.

Equipment Failure: If any equipment on site fails to operate properly, the Site Safety Officer shall be notified and he will then determine the effect of this failure on continuing operations on site. If the failure affects the safety of personnel or prevents continued progress for the work, all personnel within the Exclusion Zone or the Contamination Reduction Zone shall proceed to the Support Zone until the situation has been evaluated by the SSO.

Re-entry of Exclusion Zone: In all situations, when an onsite emergency results in evacuation of the Exclusion Zone, personnel shall not reenter until:

- The conditions resulting in the emergency have been corrected.
- The hazards have been reassessed.
- The Site Safety Plan has been reviewed.
- Site personnel have been briefed on any changes in the Site Safety Plan.

13.0 HEALTH & SAFETY TRAINING AND MEDICAL SURVEILLANCE

All site personnel shall be properly trained for the purpose of this project. The training shall comply with OSHA, 1910.120 (e). This Health and Safety Plan shall be made available to each Field Team Leader, the Site Safety Officer, local hospital, and the Contractor. The Contractor shall be responsible for making his employees familiar with the names and alternates for site safety and health. This includes SSO, ASSO, and Project Team Leader. It

is the Contractor's responsibility to ensure that his employees have adequate training in the following:

- Names of personnel and alternates responsible for site safety and health;
- Safety, health and other hazards present on the site;
- Use of Personal Protection Equipment;
- Work practices by which the employee can minimize risks from hazards;
- Safe use of engineering controls and equipment on the site;
- Medical surveillance requirements including recognition of symptoms and signs which might indicate over exposure to hazards; and
- Sections 5 through 12 of this Health & Safety Plan.

14.0 ACKNOWLEDGEMENT

The undersigned have read the above plan and are familiar with its provisions.

SIGNATURE

Site Safety Officer: _____

Field Team Leader: _____

Other Site Personnel: _____

_____

_____

_____

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_____

_____

_____

APPENDIX I

HAZARDOUS SUBSTANCE INFORMATION FORMS

- Explanation of Codes and Abbreviations
- 1,2-Dichloroethylene (1,2-DCE)
- Xylene (o-, m-, and p-isomers)
- Ethylbenzene
- Petroleum Hydrocarbons
- Lead Monoxide

EXPLANATION OF CODES AND ABBREVIATIONS
HAZARDOUS SUBSTANCES INFORMATION FORMS

CHEMICAL NAME AND FORMULA

The chemical name given is usually that found in 29 CFR 1910, Subpart Z, General Industry Standards for Toxic and Hazardous Substances (OSHA). The chemical formula is also provided.

Below the chemical formula is the Chemical Abstract Service (CAS) registry number. This number, in the format xxx-xx-x, is unique for each chemical and allows more efficient searching on other data bases such as the Chemical Substances Information Network (CSIN).

Also included is the NIOSH Registry of Toxic Effects of Chemical Substances (RTECS) number, in the format ABxxxxxxx. RTECS may be useful in obtaining additional information on a chemical.

Under the RTECS number, the U.S. Department of Transportation (DOT) UN or NA identification number and the corresponding guide number have been placed. Their format is xxxx xx and indicates that the chemical is regulated by DOT. The guide number (xx) refers to actions to be taken to stabilize an emergency situation. This information can be found in the DOT Hazardous Materials Emergency Response Guidebook, DOT P5800.3.

SYNONYMS

Several common synonyms, if any, are listed for each chemical in this column.

EXPOSURE LIMITS

The permissible exposure limit (PEL), as found in 29 CFR 1910, Subpart Z, General Industry Standards for Toxic and Hazardous Substances as of March 11, 1984, is listed first. Unless noted otherwise, exposure limits are 8-hour time-weighted average (TWA) concentrations. OSHA ceiling concentrations shall not be exceeded at any time.

IDLH LEVEL

The Immediately Dangerous to Life or Health (IDLH) level is listed in either ppm or mg/m^3. This level represents a maximum concentration from which one could escape within 30 minutes without any escape-impairing symptoms or any irreversible health effects. Where the notation "Carcinogen" appears, NIOSH has recommended that the substance be treated as a potential human carcinogen.

PHYSICAL DESCRIPTION

A brief description of the appearance and odor of each substance is provided.

CHEMICAL AND PHYSICAL PROPERTIES

A number of important chemical and physical properties are given for each substance:

- MW: Molecular weight
- UEL: Upper explosive limit in air, % by volume
- LEL: Lower explosive limit in air, % by volume
- IP: Ionization Potential, Ev
- MEC: Minimum explosive concentration for a dust in air, g/l

INCOMPATIBILITIES

Potentially hazardous incompatibilities of each substance are listed.

PERSONAL PROTECTION AND SANITATION

A summary of recommended practices specific to each toxic substance is presented. These recommendations supplement general work practices (e.g., no eating where chemicals are used).

ROUTE OF HEALTH HAZARD

The toxicologically important routes of entry for each substance are listed.

SYMPTOMS

Potential symptoms as a result of exposure are listed.

FIRST AID

First aid procedures are listed for response to eye and skin contact, inhalation, and ingestion of the toxic substance.

TARGET ORGANS

The organs which are affected by exposure to each substance are listed.

HAZARDOUS SUBSTANCE INFORMATION FORM

CHEMICAL NAME: Xylene (o-, m-, and p-isomers)

FORMULA: $C_6H_4(CH_3)_2$

CAS: 1330-20-7

RTECS: ZE2100000

DOT UN OR NA: 1307 27

SYNONYMS: p-ortho-Xylene, 1,2-Dimethyl-benzene; meta-Xylene, 1,3-Dimethyl-benzene; para-Xylene, 1,4-Dimethyl-benzene

EXPOSURE LIMITS: 100 ppm, (435 mg/m^3)

IDLH LEVEL: 10,000 ppm

PHYSICAL DESCRIPTION: Colorless liquid with aromatic odor (pure p-xylene is a solid at less than 55°F)

CHEMICAL AND PHYSICAL PROPERTIES:

MW:	106	VP:	7/9/9 Hg
BP:	292/282/281 °F	MP:	-12/54/55 °F
UEL:	6/7/7%	LEL:	1/1.1/1.1%
Sol:	0.00003%	Fl.P:	90/84/81%
IP:	8.56/8.56/8.44 eV		

INCOMPATIBILITIES: Strong oxidizers

PERSONNEL PROTECTION AND SANITATION CLOTHING: Wear appropriate clothing to prevent repeated or prolonged skin contact. Employees should wash promptly upon contamination. Immediately remove any clothing that becomes wet.

HEALTH HAZARDS:

Route: Inhalation; skin absorption, ingestion, eye and/or skin contact

Symptoms: Dizziness; excitement; drowsiness; incoordination; staggering gait; eye, nose and throat irritation; corneal vacuolization; anorexia; nausea; vomit; abdominal pain; dermatitis

FIRST AID: If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

If this chemical comes in contact with the skin, wash the contaminated skin with soap and water. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get immediate medical attention.

TARGET ORGANS: Central nervous system, eyes,gastrointestinal tract, blood, liver, kidneys, skin

HAZARDOUS SUBSTANCE INFORMATION FORM

CHEMICAL NAME: 1,2-Dichloroethylene

FORMULA: ClCHCHCl

CAS: 540-59-0

RTECS: KV9360000

DOT UN OR NA: 1150 29

SYNONYMS: Acetylene dichloride, cis-Acetylene dichloride, Dioform, trans-Acetylene dichloride, sym-Dichloroethylene

EXPOSURE LIMITS: 200 ppm (790 mg/m^3)

IDLH LEVEL: 4,000 ppm

PHYSICAL DESCRIPTION: Colorless liquid with an ether-like, slightly acrid odor, like chloroform

CHEMICAL AND PHYSICAL PROPERTIES:

MW:	97	VP:	180 to 265 mm
BP:	113 to 140 °F	MP:	56 to 115 °F
Sol:	0.35 to 0.63%	UEL:	12.8%
Fl.P:	36 to 39 °F	LEL:	9.7%
IP:	9.65 eV		

INCOMPATIBILITIES: Strong oxidizers

PERSONNEL PROTECTION AND SANITATION CLOTHING: Wear appropriate clothing to prevent repeated or prolonged skin contact. Employees should wash promptly upon contamination. Immediately remove any clothing that becomes wet.

HEALTH HAZARDS:

Route: Inhalation; ingestion; skin and/or eye contact

Symptoms: Eye and respiratory system irritation; central nervous system depression

FIRST AID: If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

If this chemical comes in contact with the skin, wash the contaminated skin with soap and water. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get immediate medical attention.

TARGET ORGANS: Respiratory system, eyes, central nervous system

HAZARDOUS SUBSTANCE INFORMATION FORM

CHEMICAL NAME: Ethylbenzene

FORMULA: $C_2H_5C_6H_5$

CAS: 100-41-4

RTECS: DA0700000

DOT UN OR NA: 1175 26

SYNONYMS: Phenylethane, Ethylbenzol

EXPOSURE LIMITS: 100 ppm (435 mg/m^3)

IDLH LEVEL: 2,000 ppm

PHYSICAL DESCRIPTION: Colorless liquid with an aromatic odor

CHEMICAL AND PHYSICAL PROPERTIES:

MW:	106	VP:	7.1 mm Hg
BP:	211 °F	MP:	-139 °F
Sol:	0.015%	UEL:	6.7%
Fl.P:	59 °F	LEL:	1.0%
IP:	8.76 eV		

INCOMPATIBILITIES: Strong oxidizers

PERSONNEL PROTECTION AND SANITATION CLOTHING: Wear appropriate clothing to prevent repeated or prolonged skin contact. Employees should wash promptly upon contamination. Immediately remove any clothing that becomes wet.

HEALTH HAZARDS:

Route: Inhalation; Ingestion; skin and/or eye contact

Symptoms: Eye and mucous membrane irritation; headache; dermatitis; narcosis; coma

FIRST AID: If this chemical comes in contact with the eyes, immediately wash the eyes with large amounts of water, occasionally lifting the lower and upper lids. Get medical attention immediately. Contact lenses should not be worn when working with this chemical.

If this chemical comes in contact with the skin, promptly wash the contaminated skin with soap and water. If the chemical penetrates the clothing, promptly remove the clothing and wash the skin with water. If irritation persists after washing, get medical attention. If a person breathes in large amounts of this chemical, move the exposed person to fresh air at once. If breathing has stopped, perform artificial respiration. Keep the affected person warm and at rest. Get medical attention as soon as possible. If this chemical has been swallowed, get immediate medical attention.

TARGET ORGANS: Eyes, upper respiratory system, skin, central nervous system

12/30/81

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

Form Approved
OMB No. 44-R1387

MATERIAL SAFETY DATA SHEET

Required under USDL Safety and Health Regulations for Ship Repairing, Shipbuilding, and Shipbreaking (29 CFR 1915, 1916, 1917)

SECTION I

MANUFACTURER'S NAME: ABC Incorporated	EMERGENCY TELEPHONE NO.: (000) 000-0000 (000) 000-0000 (nights)
ADDRESS (Number, Street, City, State, and ZIP Code): 1 Main Street, Anytown, Anystate (00000)	
CHEMICAL NAME AND SYNONYMS: Lead Monoxide, Lead Oxide	TRADE NAME AND SYNONYMS: Litharge "X" Brand
CHEMICAL FAMILY: Metal Oxides	FORMULA: PbO CAS# 1317-36-8

SECTION II - HAZARDOUS INGREDIENTS

PAINTS, PRESERVATIVES, & SOLVENTS	%	TLV (Units)	ALLOYS AND METALLIC COATINGS	%	TLV (Units)
PIGMENTS Not applicable (NA)			BASE METAL NA		
CATALYST "			ALLOYS "		
VEHICLE "			METALLIC COATINGS "		
SOLVENTS "			FILLER METAL PLUS COATING OR CORE FLUX "		
ADDITIVES "			OTHERS "		
OTHERS "					

HAZARDOUS MIXTURES OF OTHER LIQUIDS, SOLIDS, OR GASES	%	TLV (Units)
Lead Monoxide	99.8	0.05 mg
NOTE: Effective July 29, 1979, the OSHA permissible exposure limit (PEL) for inorganic lead was reduced to 0.05 mg/m^3. Consult OSHA regulation 29 CFR 1910.1025 for additional requirements.		

SECTION III - PHYSICAL DATA

BOILING POINT (°F.)	NA	SPECIFIC GRAVITY (H_2O=1)	9.53
VAPOR PRESSURE (mm Hg.)	NA	PERCENT, VOLATILE BY VOLUME (%)	NA
VAPOR DENSITY (AIR=1)	NA	EVAPORATION RATE (_____ =1)	NA
SOLUBILITY IN WATER	Insol.	Melting Point (°F)	1630
APPEARANCE AND ODOR	Odorless, yellow-orange powder		

SECTION IV - FIRE AND EXPLOSION HAZARD DATA

FLASH POINT (Method used): Nonflammable	FLAMMABLE LIMITS: NA	Lel	Uel
EXTINGUISHING MEDIA: NA			
SPECIAL FIRE FIGHTING PROCEDURES: Wear NIOSH/MSHA approved self-contained breathing apparatus and protective clothing.			
UNUSUAL FIRE AND EXPLOSION HAZARDS: NONE			

SECTION V - HEALTH HAZARD DATA

THRESHOLD LIMIT VALUE
(See Section II)

EFFECTS OF OVEREXPOSURE
Early symptoms of lead intoxication include constipation, insomnia, gastrointestinal disorders, anemia, weakness and joint pain.

EMERGENCY AND FIRST AID PROCEDURES
Remove immediately from further exposure and place individual under the care of an occupational physician. If ingested, induce vomiting in a conscious individual and immediately call a physician.

SECTION VI - REACTIVITY DATA

STABILITY	UNSTABLE		CONDITIONS TO AVOID NA
	STABLE	X	

INCOMPATABILITY *(Materials to avoid)*
Strong oxidizers

HAZARDOUS DECOMPOSITION PRODUCTS
At temperatures above the melting point, lead oxide fumes may be evolved.

HAZARDOUS POLYMERIZATION	MAY OCCUR		CONDITIONS TO AVOID NA
	WILL NOT OCCUR	X	

SECTION VII - SPILL OR LEAK PROCEDURES

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED
A clean-up procedure (vacumming, if feasible) which minimizes exposure is required. If the possibility of dust or fume exposure exists, wear approved respiratory protection (see below). Place all material in closed containers.

WASTE DISPOSAL METHOD
Dispose of material in accordance with Federal, State and Local air pollution, water pollution and solid waste regulations. Recommend disposal in an EPA approved hazardous waste landfill.

SECTION VIII - SPECIAL PROTECTION INFORMATION

RESPIRATORY PROTECTION *(Specify type)*
NIOSH/MSHA approved respirator for toxic dust and/or fume (see below).

VENTILATION	LOCAL EXHAUST Required (see below)	SPECIAL
	MECHANICAL *(General)*	OTHER

PROTECTIVE GLOVES (see below)	EYE PROTECTION Recommended

OTHER PROTECTIVE EQUIPMENT Protective clothing is required if lead exposures exceed the OSHA PEL or significant contact occurs. Remove all work clothing before leaving plant premises.

SECTION IX - SPECIAL PRECAUTIONS

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING Local exhaust ventilation and/or respiratory protection is required for melting, grinding, drossing, soldering and other operations where airborne lead exposures in excell of the PEL may occur.

OTHER PRECAUTIONS Avoid ingestion and innalation. Practice good personal hygiene and housekeeping procedures (see OSHA lead standard). Wash thoroughly before smoking, eating or drinking.

Form OSHA-20
Rev. May 72

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

GAT

Common Synonyms	Watery liquid	Colorless to pale brown or pink	Gasoline odor
Motor spirit Petrol	Floats on water. Flammable, irritating vapor is produced.		

Stop discharge if possible. Keep people away.
Shut off ignition sources and call fire department.
Stay upwind and use water spray to "knock down" vapor.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

FLAMMABLE.
Flashback along vapor trail may occur.
Vapor may explode if ignited in an enclosed area.
Extinguish with dry chemical, foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

VAPOR
Irritating to eyes, nose and throat.
If inhaled, will cause dizziness, headache, difficult breathing or loss of consciousness.
Move to fresh air.
If breathing has stopped, give artificial respiration.
If breathing is difficult, give oxygen.

LIQUID
Irritating to skin and eyes.
If swallowed, will cause nausea or vomiting.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

HARMFUL TO AQUATIC LIFE IN VERY LOW CONCENTRATIONS.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)
Issue warning-high flammability
Evacuate area
Disperse and flush

2. LABEL

2.1 Category: Flammable liquid
2.2 Class: 3

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: (Mixture of hydrocarbons)
3.3 IMO/UN Designation: 3.1/1203
3.4 DOT ID No.: 1203
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Colorless to brown
4.3 Odor: Gasoline

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Protective goggles, gloves.
5.2 Symptoms Following Exposure: Irritation of mucous membranes and stimulation followed by depression of central nervous system. Breathing of vapor may also cause dizziness, headache, incoordination or, in more severe cases, anesthesia, coma, and respiratory arrest. If liquid enters lungs, it will cause severe irritation, coughing, gagging, pulmonary edema, and, later, signs of bronchopneumonia and pneumonitis. Swallowing may cause irregular heartbeat.
5.3 Treatment of Exposure: INHALATION: maintain respiration and administer oxygen; enforce bed rest if liquid is in lungs. INGESTION: do NOT induce vomiting; stomach should be lavaged (by doctor) if appreciable quantity is swallowed. EYES: wash with copious quantity of water. SKIN: wipe off and wash with soap and water.
5.4 Threshold Limit Value: 300 ppm
5.5 Short Term Inhalation Limits: 500 ppm for 30 min.
5.6 Toxicity by Ingestion: Grade 2; LD_{50} = 0.5 to 5 g/kg.
5.7 Late Toxicity: None
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: 0.25 ppm
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: −36°F C.C.
6.2 Flammable Limits in Air: 1.4%-7.4%
6.3 Fire Extinguishing Agents: Foam, carbon dioxide, dry chemical
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: None
6.6 Behavior in Fire: Vapor is heavier than air and may travel considerable distance to a source of ignition and flash back.
6.7 Ignition Temperature: 853°F
6.8 Electrical Hazard: Class I, Group D
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: 30 ppm/24 hr/juvenile American shad/TL_m/fresh water
91 mg/l/24 hr/juvenile American shad/TL_m/salt water
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): 3%, 5 days
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Various octane ratings; military specifications
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester) or pressure-vacuum

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)
A-T-U-V-W

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Flammable liquid
11.2 NAS Hazard Rating for Bulk Water Transportation:

Category	Rating
Fire	3
Health	
Vapor Irritant	1
Liquid or Solid Irritant	1
Poisons	2
Water Pollution	
Human Toxicity	1
Aquatic Toxicity	2
Aesthetic Effect	2
Reactivity	
Other Chemicals	0
Water	0
Self Reaction	0

11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	1
Flammability (Red)	3
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 140—390°F
= 60—199°C = 333—472°K
12.4 Freezing Point: Not pertinent
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.7321 at 20°C (liquid)
12.8 Liquid Surface Tension: 19-23 dynes/cm
= 0.019—0.023 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 49-51 dynes/cm
= 0.049—0.051 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: 3.4
12.11 Ratio of Specific Heats of Vapor (Gas): (est.) 1.054
12.12 Latent Heat of Vaporization: 130—150 Btu/lb = 71—81 cal/g
= 3.0 — 3.4 X 10^4 J/kg
12.13 Heat of Combustion: −18,720 Btu/lb
= −10,400 cal/g = 435.1 X 10^4 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: 7.4 psia

NOTES

GAT

GASOLINES: AUTOMOTIVE (<4.23g lead/gal)

12.17 SATURATED LIQUID DENSITY

Temperature (degrees F)	Pounds per cubic foot
45	46.270
50	46.130
55	46.000
60	45.850
65	45.710
70	45.560
75	45.400
80	45.240
85	45.080
90	44.910
95	44.750
100	44.570
105	44.390
110	44.210
115	44.030

12.18 LIQUID HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
10	.459
15	.462
20	.464
25	.467
30	.470
35	.472
40	.475
45	.478
50	.480
55	.483
60	.486
65	.488
70	.491
75	.494
80	.496
85	.499
90	.502
95	.504
100	.507
105	.510

12.19 LIQUID THERMAL CONDUCTIVITY

Temperature (degrees F)	British thermal unit-inch per hour-square foot-F (estimate)
40	.909
50	.900
60	.891
70	.883
80	.874
90	.865
100	.856
110	.847
120	.838
130	.829
140	.821
150	.812
160	.803
170	.794
180	.785
190	.776

12.20 LIQUID VISCOSITY

Temperature (degrees F)	Centipoise
46	.521
48	.514
50	.507
52	.500
54	.494
56	.487
58	.481
60	.475
62	.469
64	.463
66	.457
68	.451
70	.446
72	.440
74	.435
76	.430
78	.424
80	.419
82	.414
84	.410
86	.405
88	.400
90	.396
92	.391
94	.387
96	.382

12.21 SOLUBILITY IN WATER

Temperature (degrees F)	Pounds per 100 pounds of water
	INSOLUBLE

12.22 SATURATED VAPOR PRESSURE

Temperature (degrees F)	Pounds per square inch
	DATA NOT AVAILABLE

12.23 SATURATED VAPOR DENSITY

Temperature (degrees F)	Pounds per cubic foot
	NOT PERTINENT

12.24 IDEAL GAS HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
	DATA NOT AVAILABLE

OILS: DIESEL

ODS

Common Synonyms
Fuel oil 1-D
Fuel oil 2-D

Oily liquid | Yellow-brown | Lube or fuel oil odor

Floats on water.

Stop discharge if possible.
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with dry chemical, foam, or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Dangerous to aquatic life in high concentrations.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)
Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: Not applicable
3.3 IMO/UN Designation: 3.1/1270
3.4 DOT ID No.: 1270
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Light brown
4.3 Odor: Like fuel oil

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Goggles or face shield.
5.2 Symptoms Following Exposure: If liquid is ingested, an increased frequency of bowel movements will occur.
5.3 Treatment of Exposure: INGESTION: do NOT induce vomiting. SKIN: wipe off, wash with soap and water. EYES: wash with copious amounts of water for at least 15 min.
5.4 Threshold Limit Value: No single TLV applicable.
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: (1-D) 100°F C.C.; (2-D) 125°F C.C.
6.2 Flammable Limits in Air: 1.3-6.0 vol.%
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: (1-D) 350-625°F (2-D) 490-545°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: 204 mg/l/24 hr/juvenile American shad/TL_m/salt water
8.2 Waterfowl Toxicity: > 20 ml/kg /LD_{50}/mallards
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Diesel Fuel 1-D (ASTM); Diesel Fuel 2-D (ASTM)
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)
A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Combustible liquid
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification:

Category	Classification
Health Hazard (Blue)	0
Flammability (Red)	2
Reactivity (Yellow)	0

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: 550—640°F = 288—338°C = 561—612°K
12.4 Freezing Point: 0 to —30°F = —18 to —34°C = 255 to 239°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.841 at 16°C (liquid)
12.8 Liquid Surface Tension: (est.) 25 dynes/cm = 0.025 N/m at 20°C
12.9 Liquid Water Interfacial Tension: (est.) 50 dynes/cm = 0.05 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: —18,400 Btu/lb = —10,200 cal/g = 429 X 10^3 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Varies

NOTES

ODS

OILS: DIESEL

12.17 SATURATED LIQUID DENSITY	
Temperature (degrees F)	Pounds per cubic foot (estimate)
50	52.430
52	52.430
54	52.430
56	52.430
58	52.430
60	52.430
62	52.430
64	52.430
66	52.430
68	52.430
70	52.430
72	52.430
74	52.430
76	52.430
78	52.430
80	52.430
82	52.430
84	52.430

12.18 LIQUID HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
10	.429
15	.431
20	.434
25	.436
30	.439
35	.441
40	.444
45	.446
50	.448
55	.451
60	.453
65	.456
70	.458
75	.461
80	.463
85	.466
90	.468
95	.471
100	.473
105	.475

12.19 LIQUID THERMAL CONDUCTIVITY	
Temperature (degrees F)	British thermal unit-inch per hour-square foot-F
30	.968
35	.966
40	.965
45	.963
50	.962
55	.961
60	.959
65	.958
70	.957
75	.955
80	.954
85	.952
90	.951
95	.950
100	.948
105	.947
110	.946
115	.944
120	.943
125	.941
130	.940

12.20 LIQUID VISCOSITY	
Temperature (degrees F)	Centipoise
100.42	11.950

12.21 SOLUBILITY IN WATER	
Temperature (degrees F)	Pounds per 100 pounds of water
	INSOLUBLE

12.22 SATURATED VAPOR PRESSURE	
Temperature (degrees F)	Pounds per square inch (estimate)
70	.042
75	.049
80	.057
85	.065
90	.076
95	.087
100	.100
105	.114
110	.131
115	.149
120	.170
125	.193
130	.218
135	.247
140	.279
145	.314
150	.352
155	.395
160	.443
165	.495
170	.552
175	.615
180	.683
185	.758
190	.841
195	.930

12.23 SATURATED VAPOR DENSITY	
Temperature (degrees F)	Pounds per cubic foot
	NOT PERTINENT

12.24 IDEAL GAS HEAT CAPACITY	
Temperature (degrees F)	British thermal unit per pound-F
	NOT PERTINENT

OILS, MISCELLANEOUS: MOTOR

OMT

Common Synonyms	Oily liquid	Yellow-brown	Lube oil odor
Crankcase oil Lubricating oil Transmission oil	Floats on water.		

Stop discharge if possible.
Call fire department.
Avoid contact with liquid.
Isolate and remove discharged material.
Notify local health and pollution control agencies.

Fire

Combustible.
Extinguish with dry chemical, foam or carbon dioxide.
Water may be ineffective on fire.
Cool exposed containers with water.

Exposure

CALL FOR MEDICAL AID.

LIQUID
Irritating to skin and eyes.
Harmful if swallowed.
Remove contaminated clothing and shoes.
Flush affected areas with plenty of water.
IF IN EYES, hold eyelids open and flush with plenty of water.
IF SWALLOWED and victim is CONSCIOUS, have victim drink water or milk.
DO NOT INDUCE VOMITING.

Water Pollution

Effect of low concentrations on aquatic life is unknown.
Fouling to shoreline.
May be dangerous if it enters water intakes.

Notify local health and wildlife officials.
Notify operators of nearby water intakes.

1. RESPONSE TO DISCHARGE

(See Response Methods Handbook)

Mechanical containment
Should be removed
Chemical and physical treatment

2. LABEL

2.1 Category: None
2.2 Class: Not pertinent

3. CHEMICAL DESIGNATIONS

3.1 CG Compatibility Class: Miscellaneous Hydrocarbon Mixtures
3.2 Formula: Not applicable
3.3 IMO/UN Designation: 3.3/1270
3.4 DOT ID No.: 1270
3.5 CAS Registry No.: Data not available

4. OBSERVABLE CHARACTERISTICS

4.1 Physical State (as shipped): Liquid
4.2 Color: Yellow fluorescent
4.3 Odor: Characteristic

5. HEALTH HAZARDS

5.1 Personal Protective Equipment: Protective gloves; goggles or face shield.
5.2 Symptoms Following Exposure: INGESTION: minimal gastrointestinal irritation; increased frequency of bowel passage may occur. ASPIRATION: pulmonary irritation is normally minimal but may become more severe several hours after exposure.
5.3 Treatment of Exposure: INGESTION: do NOT lavage or induce vomiting. ASPIRATION: treatment probably not required; delayed development of pulmonary irritation can be detected by serial chest x-rays. EYES: wash with copious amounts of water. SKIN: wipe off oil and wash with soap and water.
5.4 Threshold Limit Value: Data not available
5.5 Short Term Inhalation Limits: Data not available
5.6 Toxicity by Ingestion: Grade 1; LD_{50} = 5 to 15 g/kg
5.7 Late Toxicity: Data not available
5.8 Vapor (Gas) Irritant Characteristics: Vapors cause a slight smarting of the eyes or respiratory system if present in high concentrations. The effect is temporary.
5.9 Liquid or Solid Irritant Characteristics: Minimum hazard. If spilled on clothing and allowed to remain, may cause smarting and reddening of the skin.
5.10 Odor Threshold: Data not available
5.11 IDLH Value: Data not available

6. FIRE HAZARDS

6.1 Flash Point: 275—600°F C.C.
6.2 Flammable Limits in Air: Data not available
6.3 Fire Extinguishing Agents: Dry chemical, foam, or carbon dioxide
6.4 Fire Extinguishing Agents Not to be Used: Water may be ineffective
6.5 Special Hazards of Combustion Products: Not pertinent
6.6 Behavior in Fire: Not pertinent
6.7 Ignition Temperature: 325—625°F
6.8 Electrical Hazard: Not pertinent
6.9 Burning Rate: 4 mm/min.
6.10 Adiabatic Flame Temperature: Data not available
6.11 Stoichiometric Air to Fuel Ratio: Data not available
6.12 Flame Temperature: Data not available

7. CHEMICAL REACTIVITY

7.1 Reactivity With Water: No reaction
7.2 Reactivity with Common Materials: No reaction
7.3 Stability During Transport: Stable
7.4 Neutralizing Agents for Acids and Caustics: Not pertinent
7.5 Polymerization: Not pertinent
7.6 Inhibitor of Polymerization: Not pertinent
7.7 Molar Ratio (Reactant to Product): Data not available
7.8 Reactivity Group: 33

8. WATER POLLUTION

8.1 Aquatic Toxicity: Data not available
8.2 Waterfowl Toxicity: Data not available
8.3 Biological Oxygen Demand (BOD): Data not available
8.4 Food Chain Concentration Potential: None

9. SHIPPING INFORMATION

9.1 Grades of Purity: Various viscosities
9.2 Storage Temperature: Ambient
9.3 Inert Atmosphere: No requirement
9.4 Venting: Open (flame arrester)

10. HAZARD ASSESSMENT CODE

(See Hazard Assessment Handbook)

A-T-U

11. HAZARD CLASSIFICATIONS

11.1 Code of Federal Regulations: Not listed
11.2 NAS Hazard Rating for Bulk Water Transportation: Not listed
11.3 NFPA Hazard Classification: Not listed

12. PHYSICAL AND CHEMICAL PROPERTIES

12.1 Physical State at 15°C and 1 atm: Liquid
12.2 Molecular Weight: Not pertinent
12.3 Boiling Point at 1 atm: Very high
12.4 Freezing Point: —29.9°F = —34.4°C = 238.8°K
12.5 Critical Temperature: Not pertinent
12.6 Critical Pressure: Not pertinent
12.7 Specific Gravity: 0.84—0.96 at 15°C (liquid)
12.8 Liquid Surface Tension: 26-37.5 dynes/cm = 0.026—0.0375 N/m at 20°C
12.9 Liquid Water Interfacial Tension: 33—54 dynes/cm = 0.033—0.054 N/m at 20°C
12.10 Vapor (Gas) Specific Gravity: Not pertinent
12.11 Ratio of Specific Heats of Vapor (Gas): Not pertinent
12.12 Latent Heat of Vaporization: Not pertinent
12.13 Heat of Combustion: —18,466 Btu/lb = —10,270 cal/g = —429.98 X 10^3 J/kg
12.14 Heat of Decomposition: Not pertinent
12.15 Heat of Solution: Not pertinent
12.16 Heat of Polymerization: Not pertinent
12.25 Heat of Fusion: Data not available
12.26 Limiting Value: Data not available
12.27 Reid Vapor Pressure: Data not available

NOTES

OILS, MISCELLANEOUS: MOTOR

12.17 SATURATED LIQUID DENSITY

Temperature (degrees F)	Pounds per cubic foot (estimate)
50	52.430
52	52.430
54	52.430
56	52.430
58	52.430
60	52.430
62	52.430
64	52.430
66	52.430
68	52.430
70	52.430
72	52.430
74	52.430
76	52.430
78	52.430
80	52.430
82	52.430
84	52.430

12.18 LIQUID HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F (estimate)
50	.460
52	.461
54	.462
56	.463
58	.464
60	.465
62	.466
64	.467
66	.468
68	.469
70	.470
72	.471
74	.472
76	.473
78	.474
80	.475
82	.476
84	.477
86	.478
88	.479
90	.480
92	.481
94	.482
96	.483
98	.484
100	.485

12.19 LIQUID THERMAL CONDUCTIVITY

Temperature (degrees F)	British thermal unit-inch per hour-square foot-F (estimate)
35	.920
40	.919
45	.918
50	.917
55	.916
60	.915
65	.914
70	.913
75	.912
80	.911
85	.910
90	.909
95	.908
100	.907
105	.906
110	.905
115	.904
120	.903

12.20 LIQUID VISCOSITY

Temperature (degrees F)	Centipoise
100.42	275.000

12.21 SOLUBILITY IN WATER

Temperature (degrees F)	Pounds per 100 pounds of water
	INSOLUBLE

12.22 SATURATED VAPOR PRESSURE

Temperature (degrees F)	Pounds per square inch (estimate)
70	.042
75	.049
80	.057
85	.065
90	.076
95	.087
100	.100
105	.114
110	.131
115	.149
120	.170
125	.193
130	.218
135	.247
140	.279
145	.314
150	.352
155	.395
160	.443
165	.495
170	.552
175	.615
180	.683
185	.758
190	.841
195	.930

12.23 SATURATED VAPOR DENSITY

Temperature (degrees F)	Pounds per cubic foot
	NOT PERTINENT

12.24 IDEAL GAS HEAT CAPACITY

Temperature (degrees F)	British thermal unit per pound-F
	NOT PERTINENT

APPENDIX II

RESPIRATORY PROTECTION PROGRAM

Because of the anticipated hazards of exposure to lead and petroleum hydrocarbons during the execution of the Site Sample Plan, respirators may be required for personnel working in the Exclusion Zone. The OSHA Personal Equipment Standard (CFR Part 1910.134), attached to the end of this appendix, shall be followed when using a respirator. The respirator and cartridge to be used shall be NIOSH/MSHA certified which are approved for use in atmospheres containing specific chemicals up to designated concentration, AND NOT FOR IDLH ATMOSPHERE. The respirator and cartridge to be used in this Plan shall be pesticide type with particulate prefilter, and can be used only when the ambient atmosphere contains sufficient oxygen (19.5%). The following procedures shall be observed when using respirators:

1) Respirator fit test shall be performed to ensure the "fit" or integrity of the facepiece-to-face seal of a respirator. Appendix D of the OSHA lead standard (29 CFR Part 1910.1025) contains a quality respirator fit testing protocol and is attached to the end of this appendix.

2) A respirator shall not be worn when the following conditions prohibits a tight facepiece-to-face seal: facial hair, scars, hollow temples, very prominent cheekbones, deep skin creases, dentures or missing teeth, and the chewing of gum and tobacco.

3) A cartridge may be used up to its expiration date as long as it was not opened previously. It shall not be opened when they are not for immediate use and shall be discarded after use and should not be used for longer than one shift or when breakthrough occurs, whichever comes first.

4) When warning signals of cartridge breakthrough such as odor or irritation are detected, or when the respirator has an approved end-of-service-life indicator which indicates the sorption capacity of the cartridge has been exhausted, personnel shall leave the Exclusion Zone, decontaminate, and replace the cartridge(s) on the respirator.

5) The Contractor shall provide their employees who are required to enter the Exclusion Zone, including emergency situations, with certified respirators and cartridges and shall supervise and ensure the proper use of these respirators by their employees.

APPENDIX III

EMERGENCY PHONE NUMBERS:

Agency/Facility

Emergency: 911

Police Department: 596-3737

Fire Department: 596-3771

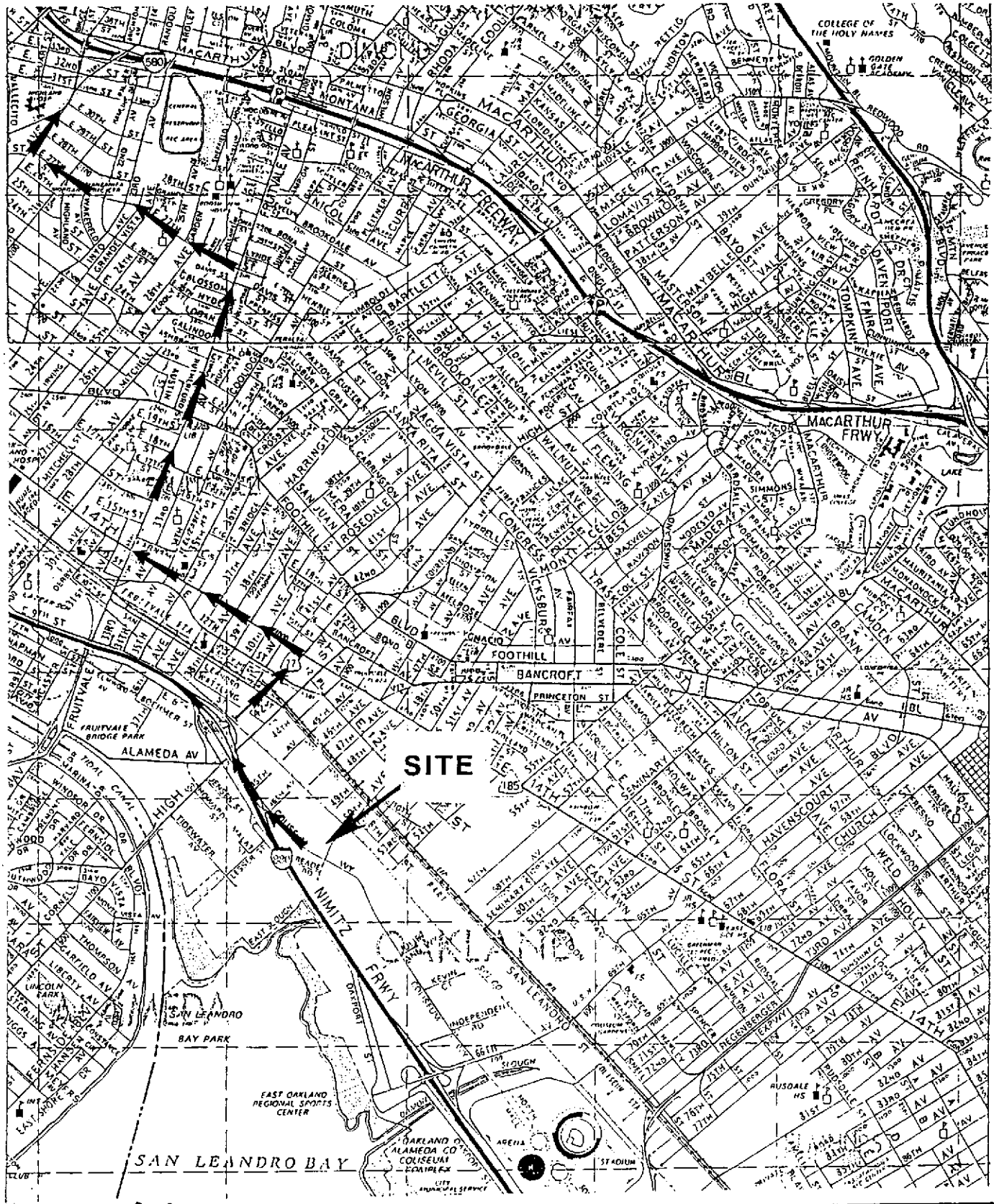
Hospital: 534-8055 — Highland Hospital, 1411 E. 31st Street, Oakland

Public Health Advisor: Hazard Evaluation System and Information Service (HESIS) (510) 540-3014.

Aqua Resources Incorporated: 2030 Addison Street, Suite 500, Berkeley, California (510) 540-6954

Pacific Gas and Electric: (415) 973-5615

Ensco: 41674 Christy Street, Fremont, California (415) 659-0404



N

SCALE

AQUA RESOURCES, INC. BERKELEY, CALIFORNIA	
PG & E Gas Construction Yard	
Route to Hospital	
JOB NO. **90262**	SHEET NO. **2**
	DATE: **Dec. 11 1990**

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 01/03/92
DATE REPORTED: 01/13/92

JOB NO. 90262.2
FILE lab results

LABORATORY NUMBER: 106190

CLIENT: AQUA RESOURCES, INC.

PROJECT ID: 90262.2

LOCATION: PG&E: ENCON

RESULTS: SEE ATTACHED

Reviewed By

Reviewed By

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 106190
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262.2
LOCATION: PG&E: ENCON

DATE RECEIVED: 01/03/92
DATE ANALYZED: 01/08/92
DATE REPORTED: 01/13/92

ANALYSIS: TOTAL LEAD
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
106190-1	T-3-A2 & T-3-B2	4,900	mg/Kg	30

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 106190
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262.2
LOCATION: PG&E: ENCON

DATE RECEIVED: 01/03/92
DATE EXTRACTED: 01/08/92
DATE ANALYZED: 01/09/92
DATE REPORTED: 01/13/92

ANALYSIS: LEAD IN TCLP LEACHATE SOLUTION
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
106190-1	T-3-A2 & T-3-B2	32,000	ug/L	600

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	105

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 106190
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262.2
LOCATION: PG&E: ENCON

DATE RECEIVED: 01/03/92
DATE EXTRACTED: 01/06/92
DATE ANALYZED: 01/08/92
DATE REPORTED: 01/13/92

ANALYSIS: SOLUBLE LEAD
EXTRACTION BY WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
106190-1	T-3-A2 & T-3-B2	410,000	ug/L	3,000

QA/QC SUMMARY

RPD, %	9
RECOVERY, %	98

106190

AQUA RESOURCES, INC.

SHIPMENT NO.: _____

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 1/3/92

PROJECT NAME: PG+E ENCON

PROJECT NO.: 90262.2

Sample Number	Location	Type of Sample		Type of Container	Type of Preservation		Analysis Required
		Material	Method		Temp	Chemical	
T-3-A2	0-4'	Soil	Drive	Brass Tube			3 1
T-3-B2	0-4'	"	"	"			

Total Number of Samples Shipped: 2

Sampler's Signature: [signature]

Relinquished By: Signature [signature] Printed Name Aaron M. Steeman Company Aqua Resources Reason For Analysis	Received By: Signature [signature] Printed Name Nancy J. Wilson Company Curtis & Tompkins	Date 1/3/92 Time 2:55
Relinquished By: Signature _____ Printed Name _____ Company _____ Reason _____	Received By: Signature _____ Printed Name _____ Company _____	Date / / Time: _____

REMARKS:

1 = Homogenize samples and composite - Analyze for Total Lead, WET Soluble lead, TCLP lead

Normal 1 week turnaround

Special Shipment / Handling / Storage Requirements:

THE EARTH TECHNOLOGY CORP.
ANALYTICAL LABORATORIES
5702 BOLSA AVENUE
HUNTINGTON BEACH, CA 92649
Attn: MARLEAH M. MARTIN
Phone: (714) 892-2565

Aqua Resources, Inc.
2030 Addison Street
Berkeley, CA 94704

Attn: Clancy Tenley
Invoice Number: 209

Order #: 91-04-071
Date: 05/22/91 15:46
Work ID: PG&E/690262
Date Received: 04/19/91
Date Completed: 05/03/91

SAMPLE IDENTIFICATION

Sample Number	Sample Description
01	OW-1-1
03	OW-3-1
05	OW-4-1
07	OW-5-1
09	0W-1-1
11	OW-4-1
13	OW-3-1
15	OW-3-2
17	OW-1-1
19	0W-5-1
21	OW-5-1
23	OW-3-1
25	OW-2-1
27	OW-2-1
29	OW-2-2
31	FIELD BLANK
33	TRIP BLANK
35	TRIP BLANK
37	OW-4-1
39	OW-3-1
41	OW-3-2

Sample Number	Sample Description
02	OW-1-2
04	OW-3-2
06	OW-4-2
08	0W-5-2
10	OW-1-1
12	0W-4-1
14	OW-3-1
16	OW-3-2
18	OW-1-1
20	OW-5-1
22	OW-5-1
24	OW-2-1
26	OW-2-1
28	OW-2-1
30	FIELD BLANK
32	FIELD BLANK
34	TRIP BLANK
36	0W-4-1
38	OW-3-1
40	OW-3-2

MULTIPLY THE DETECTION LIMIT BY THE DILUTION FACTOR.
ND = Not detected.
B = Analyte was present in the blank.

Certified By
Marleah M. Martin

ETAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

SAMPLE ID OW-1-1 FRACTION 01A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

KTAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

SAMPLE ID OW-1-2 FRACTION 02A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

Received: 04/19/91

Results by Sample

MPLE ID OW-2-1 FRACTION 28A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

ETAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

SAMPLE ID OW-2-2 FRACTION 29A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

ETAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

MPLE ID OW-3-1 FRACTION 03A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

ETAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

SAMPLE ID OW-3-2 FRACTION 04A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

Received: 04/19/91

Results by Sample

MPLE ID OW-4-1 FRACTION 05A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

ETAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

SAMPLE ID OW-4-2 FRACTION 06A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

ETAL REPORT Work Order # 91-04-071

Received: 04/19/91

Results by Sample

MPLE ID OW-S-1 FRACTION 07A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91

ANALYST WN

FILE ID

UNITS mg/L

BATCH_ID IFW-60

COMMENTS

Received: 04/19/91

Results by Sample

SAMPLE ID OW-5-2 FRACTION 08A TEST CODE WMSC3 NAME MISC test water

Date & Time Collected 04/17/91 Category

ANALYTES	RESULT	LIMIT	D_F	DATE_ANAL
Lead, Pb	ND	0.05	1.0	04/29/91
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		
		0		

Notes and Definitions for this Report:

EXTRACTED 04/29/91
ANALYST WN
FILE ID
UNITS mg/L
BATCH_ID IFW-60
COMMENTS

Chain of Custody Record

The Earth Technology Corporation
Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Lab Job no.: _____
Date _____
Page _____ of _____

Client ARI - Berkeley
Address _____
Project Name / Number PG&E/690262
Contract / Purchase Order / Quote _____

Project Manager Clancy Tenley
Telephone No. 415-540-6954
Fax. No. 415-540-7496
Samplers: (Signature) Beate Neuenhofer

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation: Temp.	Preservation: Chemical	No. of Containers	Analysis Required: Pb *	Luft Diesel & Gasoline Hydrocarbons	601 & 602 Halocarbons & Aromatics	Remarks
	Trip blank		4/17			Plastic bottle	3°C		1	✓			Hexel with Deionized water in lab
	OW-1-1				Water	Plastic bottle 1/2 gl		/	1	✓			
	OW-1-2							/	1	✓			
	OW-3-1							/	1	✓			
	OW-3-2							/	1	✓			
	OW-4-1							/	1	✓			
	OW-4-2							/	1	✓			
	OW-5-1							/	1	✓			
	OW-5-2							/	1	✓			
	OW-1-1					Jar 1/2 gl.		H_2SO_4	1		✓		
	OW-1-1					Jar 1/2 gl.		/	1	✓			
	OW-4-1					VOA vial		/	1			✓	

Relinquished by:	Date	Received by:	Relinquished by:	Date	Received by:
Signature Beate Neuenhofer	04/18	Signature	Signature		Signature
Printed BEATE NEUENHOFER	Time 4pm	Printed	Printed	Time	Printed
Company ARI - Berkeley		Company	Company		Company
Reason lab analysis		Reason	Reason		Reason

Method of Shipment: Fed EX
Shipment No. _____
Special Instructions: _____

Comments: * Pb samples need to be filtered before analysis!

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

The Earth Technology Corporation
Analytical Laboratories
5702 Bolsa Ave.
Huntington Beach, Ca. 92649
(714) 892-2565 FAX (714) 890-4032

Chain of Custody Record

Lab job no.: ______
Date ______
Page ____ of ____

Client: ARI - Berkeley
Address: ______
Project Name / Number: PG&E / 690262
Contract / Purchase Order / Quote: ______

Project Manager: Clancy Tenley
Telephone No.: 415-540-6954
Fax. No.: 415-540-7496
Samplers: (Signature) [signature]

Laboratory Sample Number	Field Sample Number	Location	Date	Time	Sample Type	Type/Size of Container	Preservation Temp.	Preservation Chemical	No. of Containers	601	602	LUFT Diesel	[illegible] Hydrocarbons	Total Dissolved Solids		Remarks
	OW-4-1		04/18		Water	VOA vial	3°C	HCl	1		✓					
	OW-3-1							–	1	✓						
	OW-3-1							HCl	1		✓					
	OW-3-2							–	1	✓						
	OW-3-2							HCl	1		✓					
	OW-1-1							–	1	✓						
	OW-1-1							HCl	1		✓					
	OW-5-1							–	1	✓						
	OW-5-1							HCl	1		✓					
	OW-5-1					Jar / qt.		H_2SO_4	1				✓			
	OW-5-1					Jar / qt.		–	1			✓				
	OW-3-1					Jar / qt.		–	1					✓		

Valid

Relinquished by:
Signature: [signature]
Printed: BEATE NEUENKIRCHER
Company: ARI - Berkeley
Reason: lab analysis
Date: 04/18
Time: 4 pm

Received by:
Signature ______
Printed ______
Company ______
Reason ______

Relinquished by:
Signature ______
Printed ______
Company ______
Reason ______
Date ______
Time ______

Received by:
Signature ______
Printed ______
Company ______
Reason ______

Method of Shipment: Fed Ex
Shipment No. ______
Special Instructions: ______

Comments: ______

After analysis, samples are to be:
- ☐ Disposed of (additional fee)
- ☐ Stored (90 days max)
- ☐ Stored over 90 days (additional fee)
- ☐ Returned to customer

F1000

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DATE RECEIVED: 05/20/91
DATE REQUESTED: 05/29/91
DATE REPORTED: 06/10/91

LAB NUMBER: 103943

CLIENT: AQUA RESOURCES, INC.

PROJECT ID: 90262

LOCATION: PG&E

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103943
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG&E

DATE RECEIVED: 05/20/91
DATE REQUESTED: 05/29/91
DATE ANALYZED: 06/03/91
DATE REPORTED: 06/10/91

ANALYSIS: SOLUBLE LEAD
EXTRACTION BY WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
103943-1	SB-19-1	27.5	mg/L	0.3
103943-2	SB-20-1	27.4	mg/L	0.3
103943-3	SB-20-2	32.0	mg/L	0.3
103943-4	SB-20-3	3.05	mg/L	0.06
103943-5	SB-22-1	3.18	mg/L	0.06
103943-6	SB-9-1	2.57	mg/L	0.06
103943-7	SB-10-1	18.2	mg/L	0.06
103943-8	SB-7-1	0.52	mg/L	0.06

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	97

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 05/20/91
DATE REPORTED: 05/31/91

AQUA RESOURCES, INC
RECEIVED
JUN - 6 1991

JOB NO. _____
FILE _____

LAB NUMBER: 103863

CLIENT: AQUA RESOURCES

PROJECT ID: 90262

LOCATION: PG & E

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103863-1
CLIENT: AQUA RESOURCES
PROJECT #: 90262
LOCATION: PG & E
SAMPLE ID: SB-21-2

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/29/91
DATE REPORTED: 05/31/91

EPA 8010
Purgeable Halocarbons in Soil

Compound	Result ug/Kg	REPORTING LIMIT ug/Kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
cis-1,2-dichloroethene	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
freon 113	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
1,1,2-trichloroethane	ND	5.0
trans-1,3-dichloropropene	ND	5.0
dibromochloromethane	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
tetrachloroethene	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
chlorobenzene	ND	5.0
1,3-dichlorobenzene	ND	5.0
1,2-dichlorobenzene	ND	5.0
1,4-dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	9
RECOVERY, %	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103863-1
CLIENT: AQUA RESOURCES
PROJECT #: 90262
LOCATION: PG & E
SAMPLE ID: SB-21-2

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/29/91
DATE REPORTED: 05/31/91

EPA 8020: Volatile Aromatic Hydrocarbons in Soil

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene	ND	5.0
Toluene	ND	5.0
Ethyl Benzene	ND	5.0
Total Xylenes	ND	5.0
Chlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	96

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103863-4
CLIENT: AQUA RESOURCES
PROJECT #: 90262
LOCATION: PG & E
SAMPLE ID: SB-22-3

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/29/91
DATE REPORTED: 05/31/91

EPA 8010
Purgeable Halocarbons in Soil

Compound	Result ug/Kg	REPORTING LIMIT ug/Kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
cis-1,2-dichloroethene	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
freon 113	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
1,1,2-trichloroethane	ND	5.0
trans-1,3-dichloropropene	ND	5.0
dibromochloromethane	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
tetrachloroethene	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
chlorobenzene	ND	5.0
1,3-dichlorobenzene	ND	5.0
1,2-dichlorobenzene	ND	5.0
1,4-dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit..

QA/QC SUMMARY

RPD, %	9
RECOVERY, %	99

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103863-4
CLIENT: AQUA RESOURCES
PROJECT #: 90262
LOCATION: PG & E
SAMPLE ID: SB-22-3

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/29/91
DATE REPORTED: 05/31/91

EPA 8020: Volatile Aromatic Hydrocarbons in Soil

COMPOUND	RESULT ug/Kg	REPORTING LIMIT ug/Kg
Benzene	ND	5.0
Toluene	ND	5.0
Ethyl Benzene	ND	5.0
Total Xylenes	ND	5.0
Chlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	96

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103863
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG & E

DATE RECEIVED: 05/20/91
DATE EXTRACTED: 05/21/91
DATE ANALYZED: 05/21/91
DATE REPORTED: 05/22/91

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
103863-1	SB-21-2	ND	ND	1.0
103863-2	SB-21-3	ND	ND	1.0
103863-3	SB-22-2	ND	ND	1.0
103863-4	SB-22-3	ND	ND	1.0

ND = Not Detected at or above reporting limit.

*Reporting limit applies to all analytes.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	113

Curtis & Tompkins, Ltd.

Client: Aqua Resources

Laboratory Login Number: 103863

Project Name: PG & E
Project Number: 90262

Report Date: 21 May 91

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) METHOD: SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
103863-001	SB-21-2	Soil	20-MAY-91	20-MAY-91	21-MAY-91	ND	mg/Kg	50	TR	1483
103863-002	SB-21-3	Soil	20-MAY-91	20-MAY-91	21-MAY-91	ND	mg/Kg	50	TR	1483
103863-003	SB-22-2	Soil	20-MAY-91	20-MAY-91	21-MAY-91	ND	mg/Kg	50	TR	1483
103863-004	SB-22-3	Soil	20-MAY-91	20-MAY-91	21-MAY-91	ND	mg/Kg	50	TR	1483

ND = Not Detected at or above Reporting Limit (RL).

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DATE RECEIVED: 05/20/91
DATE REPORTED: 06/07/91

LAB NUMBER: 103864

CLIENT: AQUA RESOURCES, INC.

PROJECT ID: 90262

LOCATION: PG&E

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-3
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG&E
SAMPLE ID: SB-16-3

DATE RECEIVED: 05/20/91
DATE ANALYZED: 06/04/91
DATE REPORTED: 06/07/91

EPA 8010: Volatile Halocarbons in Soil & Wastes
Extraction Method: EPA 5030 - Purge & Trap

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
chloromethane	ND	100
bromomethane	ND	100
vinyl chloride	ND	100
chloroethane	ND	100
methylene chloride	ND	50
trichlorofluoromethane	ND	50
1,1-dichloroethene	ND	50
1,1-dichloroethane	ND	50
cis-1,2-dichloroethene	ND	50
trans-1,2-dichloroethene	ND	50
chloroform	ND	50
freon 113	ND	50
1,2-dichloroethane	ND	50
1,1,1-trichloroethane	ND	50
carbon tetrachloride	ND	50
bromodichloromethane	ND	50
1,2-dichloropropane	ND	50
cis-1,3-dichloropropene	ND	50
trichloroethylene	ND	50
1,1,2-trichloroethane	ND	50
trans-1,3-dichloropropene	ND	50
dibromochloromethane	ND	50
2-chloroethylvinyl ether	ND	100
bromoform	ND	50
tetrachloroethylene	ND	50
1,1,2,2-tetrachloroethane	ND	50
chlorobenzene	ND	50
1,3-dichlorobenzene	ND	50
1,2-dichlorobenzene	ND	50
1,4-dichlorobenzene	ND	50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

Duplicate: Relative % Difference	21
Spike: Average % Recovery	91

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-3
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG&E
SAMPLE ID: SB-16-3

DATE RECEIVED: 05/20/91
DATE ANALYZED: 06/04/91
DATE REPORTED: 06/07/91

EPA 8020: Volatile Aromatic Hydrocarbons in Soils & Wastes
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Resul ug/Kg	Reporting Limit ug/Kg
Benzene	110	50
Toluene	79	50
Ethyl Benzene	ND	50
Total Xylenes	140	50
Chlorobenzene	ND	50
1,4-Dichlorobenzene	ND	50
1,3-Dichlorobenzene	ND	50
1,2-Dichlorobenzene	ND	50

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	12
RECOVERY, %	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-11
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG&E
SAMPLE ID: SB-20-2

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/30/91
DATE REPORTED: 06/07/91

EPA 8010: Volatile Halocarbons in Soil & Wastes
Extraction Method: EPA 5030 - Purge & Trap

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
cis-1,2-dichloroethene	ND	5.0
trans-1,2-dichloroethene	ND	5.0
chloroform	ND	5.0
freon 113	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
1,1,2-trichloroethane	ND	5.0
trans-1,3-dichloropropene	ND	5.0
dibromochloromethane	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
tetrachloroethylene	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
chlorobenzene	ND	5.0
1,3-dichlorobenzene	ND	5.0
1,2-dichlorobenzene	ND	5.0
1,4-dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

Duplicate: Relative % Difference	13
Spike: Average % Recovery	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-11
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG&E
SAMPLE ID: SB-20-2

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/30/91
DATE REPORTED: 06/07/91

EPA 8020: Volatile Aromatic Hydrocarbons in Soils & Wastes
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Resul ug/Kg	Reporting Limit ug/Kg
Benzene	ND	5.0
Toluene	ND	5.0
Ethyl Benzene	ND	5.0
Total Xylenes	ND	5.0
Chlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	94

Curtis & Tompkins, Ltd.

Client: Aqua Resources

Laboratory Login Number: 103864

Project Name: PG & E
Project Number: 90262

Report Date: 04 June 91

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) METHOD: SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
103864-001	SB-16-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	ND	mg/Kg	5	TR	1554
103864-002	SB-16-2	Soil	20-MAY-91	20-MAY-91	30-MAY-91	8.0	mg/Kg	5	TR	1554
103864-003	SB-16-3	Soil	20-MAY-91	20-MAY-91	30-MAY-91	110	mg/Kg	5	TR	1554
103864-004	SB-13-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	78.	mg/Kg	5	TR	1554
103864-005	SB-13-2	Soil	20-MAY-91	20-MAY-91	30-MAY-91	20.	mg/Kg	5	TR	1554
103864-006	SB-13-3	Soil	20-MAY-91	20-MAY-91	30-MAY-91	18.	mg/Kg	5	TR	1554
103864-007	SB-19-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	66.	mg/Kg	5	TR	1554
103864-008	SB-19-2	Soil	20-MAY-91	20-MAY-91	30-MAY-91	6.0	mg/Kg	5	TR	1554
103864-009	SB-19-3	Soil	20-MAY-91	20-MAY-91	30-MAY-91	22.	mg/Kg	5	TR	1554
103864-010	SB-20-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	82.	mg/Kg	5	TR	1554
103864-011	SB-20-2	Soil	20-MAY-91	20-MAY-91	30-MAY-91	120	mg/Kg	5	TR	1554
103864-012	SB-20-3	Soil	20-MAY-91	20-MAY-91	30-MAY-91	34.	mg/Kg	5	TR	1554
103864-013	SB-21-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	24.	mg/Kg	5	TR	1554
103864-014	SB-22-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	28.	mg/Kg	5	TR	1554
103864-015	SB-15-1	Soil	20-MAY-91	20-MAY-91	30-MAY-91	2300	mg/Kg	5	TR	1554
103864-016	SB-15-2	Soil	20-MAY-91	20-MAY-91	30-MAY-91	30.	mg/Kg	5	TR	1554

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd.

Client: Aqua Resources

Laboratory Login Number: 103864

Project Name: PG & E
Project Number: 90262

Report Date: 04 June 91

ANALYSIS: Hydrocarbon Oil & Grease (Gravimetric) **METHOD:** SMWW 17:5520EF

Lab ID	Sample ID	Matrix	Sampled	Received	Analyzed	Result	Units	RL	Analyst	QC Batch
103864-017	SB-15-3	Soil	20-MAY-91	20-MAY-91	30-MAY-91	18.	mg/Kg	5	TR	1554

ND = Not Detected at or above Reporting Limit (RL).

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG & E

DATE RECEIVED: 05/20/91
DATE EXTRACTED: 05/24/91
DATE ANALYZED: 05/24/91
DATE REPORTED: 06/04/91

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
103864-3	SB-16-3	ND	510	10
103864-11	SB-20-2	ND	66	10

ND = Not Detected at or above reporting limit.

*Reporting limit applies to all analytes.

QA/QC SUMMARY

RPD, %	13
RECOVERY, %	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-3
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
SAMPLE ID: SB-16-3

DATE RECEIVED: 05/20/91
DATE EXTRACTED: 05/28/91
DATE ANALYZED: 06/03/91
DATE REPORTED: 06/04/91

POLYCHLORINATED BIPHENYLS (PCBs)
ANALYSIS METHOD: EPA 8080
EXTRACTION METHOD: EPA 3550

AROCLOR TYPE	RESULT (ug/Kg)	REPORTING LIMIT (ug/Kg)
AROCLOR 1221	ND	17
AROCLOR 1232	ND	17
AROCLOR 1016	ND	17
AROCLOR 1242	ND	17
AROCLOR 1248	ND	17
AROCLOR 1254	ND	17
AROCLOR 1260	ND	17

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	27
RECOVERY, %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-5
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
SAMPLE ID: SB-13-2

DATE RECEIVED: 05/20/91
DATE EXTRACTED: 05/28/91
DATE ANALYZED: 06/03/91
DATE REPORTED: 06/04/91

POLYCHLORINATED BIPHENYLS (PCBs)
ANALYSIS METHOD: EPA 8080
EXTRACTION METHOD: EPA 3550

AROCLOR TYPE	RESULT (ug/Kg)	REPORTING LIMIT (ug/Kg)
AROCLOR 1221	ND	17
AROCLOR 1232	ND	17
AROCLOR 1016	ND	17
AROCLOR 1242	ND	17
AROCLOR 1248	ND	17
AROCLOR 1254	ND	17
AROCLOR 1260	ND	17

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	27
RECOVERY, %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-9
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
SAMPLE ID: SB-19-3

DATE RECEIVED: 05/20/91
DATE EXTRACTED: 05/28/91
DATE ANALYZED: 06/03/91
DATE REPORTED: 06/04/91

POLYCHLORINATED BIPHENYLS (PCBs)
ANALYSIS METHOD: EPA 8080
EXTRACTION METHOD: EPA 3550

AROCLOR TYPE	RESULT (ug/Kg)	REPORTING LIMIT (ug/Kg)
AROCLOR 1221	ND	17
AROCLOR 1232	ND	17
AROCLOR 1016	ND	17
AROCLOR 1242	ND	17
AROCLOR 1248	ND	17
AROCLOR 1254	ND	17
AROCLOR 1260	ND	17

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	27
RECOVERY, %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-3
CLIENT: AQUA RESOURCES
LOCATION: PG & E
SAMPLE ID: SB-16-3

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/21,28-29/91
DATE REPORTED: 06/05/91

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	REPORTING LIMIT mg/Kg	METHOD
Antimony	ND	3.0	EPA 6010
Arsenic	ND	2.5	EPA 7060
Barium	118	0.25	EPA 6010
Beryllium	0.38	0.10	EPA 6010
Cadmium	1.8	0.25	EPA 6010
Chromium (total)	46.6	0.49	EPA 6010
Cobalt	9.7	0.90	EPA 6010
Copper	21.2	0.49	EPA 6010
Lead	5.4	3.0	EPA 7420
Mercury	ND	0.10	EPA 7471
Molybdenum	ND	0.69	EPA 6010
Nickel	74.5	1.6	EPA 6010
Selenium	ND	2.5	EPA 7740
Silver	ND	0.49	EPA 6010
Thallium	ND	2.5	EPA 7841
Vanadium	29.0	0.49	EPA 6010
Zinc	40.2	0.49	EPA 6010

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	2	102	Mercury	2	97
Arsenic	3	108	Molybdenum	1	88
Barium	3	93	Nickel	1	87
Beryllium	<1	94	Selenium	3	93
Cadmium	3	92	Silver	1	82
Chromium	2	88	Thallium	2	110
Cobalt	2	89	Vanadium	<1	90
Copper	4	91	Zinc	2	90
Lead	6	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-5
CLIENT: AQUA RESOURCES
LOCATION: PG & E
SAMPLE ID: SB-13-2

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/21,28-29/91
DATE REPORTED: 06/05/91

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	REPORTING LIMIT mg/Kg	METHOD
Antimony	ND	2.9	EPA 6010
Arsenic	ND	2.5	EPA 7060
Barium	133	0.24	EPA 6010
Beryllium	0.36	0.10	EPA 6010
Cadmium	1.9	0.24	EPA 6010
Chromium (total)	40.0	0.49	EPA 6010
Cobalt	11.8	0.88	EPA 6010
Copper	29.8	0.49	EPA 6010
Lead	12.2	3.0	EPA 7420
Mercury	0.12	0.10	EPA 7471
Molybdenum	ND	0.68	EPA 6010
Nickel	73.5	1.6	EPA 6010
Selenium	ND	2.5	EPA 7740
Silver	ND	0.49	EPA 6010
Thallium	ND	2.5	EPA 7841
Vanadium	29.5	0.49	EPA 6010
Zinc	43.8	0.49	EPA 6010

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	2	102	Mercury	2	97
Arsenic	3	108	Molybdenum	1	88
Barium	3	93	Nickel	1	87
Beryllium	<1	94	Selenium	3	93
Cadmium	3	92	Silver	1	82
Chromium	2	88	Thallium	2	110
Cobalt	2	89	Vanadium	<1	90
Copper	4	91	Zinc	2	90
Lead	6	90			

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 103864-9
CLIENT: AQUA RESOURCES
LOCATION: PG & E
SAMPLE ID: SB-19-3

DATE RECEIVED: 05/20/91
DATE ANALYZED: 05/21,28-29/91
DATE REPORTED: 06/05/91

Title 26 Metals in Soils & Wastes
Digestion Method: EPA 3050

METAL	RESULT mg/Kg	REPORTING LIMIT mg/Kg	METHOD
Antimony	ND	3.0	EPA 6010
Arsenic	ND	2.5	EPA 7060
Barium	108	0.25	EPA 6010
Beryllium	0.35	0.10	EPA 6010
Cadmium	1.7	0.25	EPA 6010
Chromium (total)	36.2	0.50	EPA 6010
Cobalt	11.4	0.90	EPA 6010
Copper	19.4	0.50	EPA 6010
Lead	5.5	3.0	EPA 7420
Mercury	ND	0.10	EPA 7471
Molybdenum	ND	0.70	EPA 6010
Nickel	70.6	1.6	EPA 6010
Selenium	ND	2.5	EPA 7740
Silver	ND	0.50	EPA 6010
Thallium	ND	2.5	EPA 7841
Vanadium	22.6	0.50	EPA 6010
Zinc	36.6	0.50	EPA 6010

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

	RPD,%	RECOVERY,%		RPD,%	RECOVERY,%
Antimony	2	102	Mercury	2	97
Arsenic	3	108	Molybdenum	1	88
Barium	3	93	Nickel	1	87
Beryllium	<1	94	Selenium	3	93
Cadmium	3	92	Silver	1	82
Chromium	2	88	Thallium	2	110
Cobalt	2	89	Vanadium	<1	90
Copper	4	91	Zinc	2	90
Lead	6	90			

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 05/23/91
DATE REPORTED: 06/07/91

LAB NUMBER: 103913

CLIENT: AQUA RESOURCES

PROJECT ID: 90262.1

LOCATION: PG & E

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102358-2
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
SAMPLE ID: T-9

DATE RECEIVED: 11/21/90
DATE ANALYZED: 11/29/90
DATE REPORTED: 12/03/90

EPA 8010: Volatile Halocarbons in Soil & Wastes
Extraction Method: EPA 5030 - Purge & Trap

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
1,2-dichloroethene (total)	ND	5.0
chloroform	ND	5.0
freon 113	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
1,1,2-trichloroethane	ND	5.0
trans-1,3-dichloropropene	ND	5.0
dibromochloromethane	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
tetrachloroethylene	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
chlorobenzene	ND	5.0
1,3-dichlorobenzene	ND	5.0
1,2-dichlorobenzene	ND	5.0
1,4-dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

Duplicate: Relative % Difference	3
Spike: Average % Recovery	80

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102358-2
CLIENT: AQUA RESOURCES, INC.
PROJECT: 90262
LOCATION: P.G.&E.
SAMPLE ID: T-9

DATE RECEIVED: 11/21/90
DATE ANALYZED: 11/29/90
DATE REPORTED: 12/03/90

EPA 8020: Volatile Aromatic Hydrocarbons in Soils & Wastes
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/Kg	Reporting Limit ug/Kg
Benzene	ND	5.0
Toluene	31	5.0
Ethyl Benzene	ND	5.0
Total Xylenes	ND	5.0
Chlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	91

AQUA RESOURCES, INC.

SHIPMENT NO.: 3

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 11/21/90

PROJECT NAME: PGand E

PROJECT NO.: 90262

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required
Concrete		Soil	drive	2" brass tube	4°c	—	Note 1
T-9	0'	↓	↓	↓	↓	↓	Note 2
T-11	0'						Pb-TTLC
A-7	0'						Pb-TTLC
A-6	0'						Pb-TTLC
T-10	0'						Pb-TTLC

Total Number of Samples Shipped: 6

Sampler's Signature: Clarence K Tenley

Relinquished By:
Signature: Clarence K Tenley
Printed Name: Clarence K Tenley
Company: ARI
Reason: to Lab

Received By:
Signature: Nancy D-W Lam
Printed Name: Nancy J. Wilson
Company: C-T Lab

Date: 11/21/90
Time: 12:55

Relinquished By:
Signature
Printed Name
Company
Reason

Received By:
Signature
Printed Name
Company

Date: / /
Time

REMARKS:

Note 1: Pb-TTLC, 503E, TPH-D/8020

Note 2: Pb-TTLC, 8010/8020, TPH-D

Special Shipment / Handling / Storage Requirements:

pulverize before analysis

102358

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/30/90
DATE REPORTED: 12/03/90

LAB NUMBER: 102413

CLIENT: AQUA RESOURCES, INC.

REPORT ON: 9 SOIL SAMPLES

PROJECT #: 90262
LOCATION: P.G.&E.

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102413
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/30/90
DATE ANALYZED: 12/03/90
DATE REPORTED: 12/03/90

ANALYSIS: LEAD
ANALYSIS METHOD: EPA 7420

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102413-1	A-8	580	mg/Kg	2.5
102413-2	A-9	7.9	mg/Kg	2.5
102413-3	A-10	13	mg/Kg	2.5
102413-4	A-11	53	mg/Kg	2.5
102413-5	A-12	10,000	mg/Kg	25
102413-6	A-13	8,300	mg/Kg	25
102413-7	A-14	150	mg/Kg	2.5
102413-8	A-15	1,200	mg/Kg	25
102413-9	H-1	29	mg/Kg	2.5

QA/QC SUMMARY

RPD, %	1
RECOVERY, %	94

102413

AQUA RESOURCES, INC.

RUSH

SHIPMENT NO.: 4

CHAIN OF CUSTODY RECORD

PAGE 1 OF 1

DATE 4/30/90

PROJECT NAME: PG and E

PROJECT NO.: 90262

	Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required
1	A-8	0'	soil	drive	brass tube	—	—	lead - TTLC
2	A-9	0'	↓	↓	↓	↓	↓	↓
3	A-10	0'						
4	A-11	0'						
5	A-12	0'						
6	A-13	0'						
7	A-14	0'						
8	A-15	0'	↓	↓	↓	↓	↓	↓

Total Number of Samples Shipped: 8

Sampler's Signature: Clarence Tenley

Relinquished By:
Signature: Clarence Tenley
Printed Name: Clarence Tenley
Company: AR I
Reason: to lab

Received By:
Signature:
Printed Name:
Company:
Date: / /
Time:

Relinquished By:
Signature:
Printed Name:
Company:
Reason:

Received By:
Signature: Joanne Duarte
Printed Name: C.T.
Company:
Date: 11/30/90
Time: 3:35

REMARKS: One - day turn around.

-9 Add H-1 102345-11

Special Shipment / Handling / Storage Requirements:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/20/90
DATE REQUESTED: 11/30/90
DATE REPORTED: 12/10/90

AQUA RESOURCES, INC
RECEIVED
DEC 14 1990
JOB NO. _____
FILE _____

LAB NUMBER: 102419

CLIENT: AQUA RESOURCES

PROJECT ID: 90262
LOCATION: PG & E

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102419
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG & E

DATE RECEIVED: 11/20/90
DATE ANALYZED: 12/06/90
DATE REPORTED: 12/10/90

ANALYSIS: SOLUBLE LEAD
EXTRACTION BY WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
102419-1	A-4 0'	0.48	mg/L	0.05
102419-2	T-7-B 3'	17	mg/L	0.05
102419-3	T-8-B 3'	89	mg/L	0.05
102419-4	T-7-A 0'	1,100	mg/L	5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	96

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102358
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/21/90
DATE ANALYZED: 11/26/90
DATE REPORTED: 11/29/90

ANALYSIS: LEAD
ANALYSIS METHOD: 7420
PREPARATION METHOD: EPA 3050

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102358-1	CONCRETE	230	mg/Kg	2.5
102358-2	T-9	6,100	mg/Kg	25
102358-3	T-11	94	mg/Kg	2.5
102358-4	A-7	2,200	mg/Kg	25
102358-5	A-6	1,800	mg/Kg	25
102358-6	T-10	410	mg/Kg	2.5

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	96

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102358
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/21/90
DATE EXTRACTED: 11/27/90
DATE ANALYZED: 11/27/90
DATE REPORTED: 12/03/90

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
102358-1	CONCRETE	ND	37,000	1000
102358-2	T-9	ND	440	100

ND = Not Detected at or above reporting limit.

*Reporting limit applies to all analytes.

QA/QC SUMMARY

RPD, %	11
RECOVERY, %	86

Curtis & Tompkins, Ltd.

LAB NUMBER: 102344
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/19/90
DATE ANALYZED: 11/26/90
DATE REPORTED: 12/04/90

ANALYSIS: HYDROCARBON OIL AND GREASE
METHOD: SMWW 17:5520 E&F

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102344-19	T-1-a 0'-0" T-1-b 0'-0"	2,800	mg/Kg	50
102344-20	T-1-a 2 1/2' T-1-b 2'	220	mg/Kg	50
102344-21	T-1-a 1' T-2-b 1'	960	mg/Kg	50

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	94

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102344
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262

DATE RECEIVED: 11/19/90
DATE ANALYZED: 11/26/90
DATE REPORTED: 12/04/90

ANALYSIS: LEAD
ANALYSIS METHOD: EPA 7420

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102344-4	T-4-a 0'3"	16,000	mg/Kg	250
102344-5	PAINT	100,000		250
102344-19	T-1-a 0'-0", T-1-b 0'-0"	11,000	mg/Kg	250
102344-20	T-1-a 2 1/2', T-1-b 2'	1,100	mg/Kg	25
102344-21	T-1-a 1' T-2-b 1'	4,100	mg/Kg	25
102344-22	T-2-a 0'-0" T-2-b 0'-0"	8,600	mg/Kg	25
102344-23	T-2-a 2' T-3-b 2'	3,100	mg/Kg	25
102344-24	T-3-a 0' T-3-b 0'	19,000	mg/Kg	250
102344-25	T-4-a 0' T-4-b 0'	19,000	mg/Kg	250
102344-26	T-3-a 6" T-4-b 6"	9,600	mg/Kg	250

QA/QC SUMMARY

RPD, %	4
RECOVERY, %	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102344
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/19/90
DATE ANALYZED: 11/28/90
DATE REPORTED: 12/03/90

ANALYSIS: SOLUBLE LEAD
EXTRACTION BY WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
102344-19	T-1-a 0'-0", T-1-b 0'-0"	550	mg/L	5
102344-22	T-2-a 0'-0" T-2-b 0'-0"	400	mg/L	5
102344-24	T-3-a 0' T-3-b 0'	1,400	mg/L	5
102344-26	T-3-a 6" T-4-b 6"	690	mg/L	5

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	100

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102344
CLIENT: AQUA RESOURCES
PROJECT ID: 90262
LOCATION: PG & E

DATE RECEIVED: 11/19/90
DATE EXTRACTED: 11/21/90
DATE ANALYZED: 11/27/90
DATE REPORTED: 12/03/90

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
102344-19	T-1-a 0'0"& T-1-b 0'0"	ND	2,400	100
102344-20	T-1-a 2 1/2'& T-1-b 2'	ND	74	10
102344-21	T-1-a 1'& T-2-b 1'	ND	200	10

ND = Not Detected at or above reporting limit.

*Reporting limit applies to all analytes.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	90

102344

AQUA RESOURCES, INC.

SHIPMENT NO.: 1

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2

DATE 11/12/90

PROJECT NAME: PG and E

PROJECT NO.: 90262

	Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required
1	T-2-a	0'0"						NOTE 3
2	T-2-a	2'						NOTE 4
3	T-3-a	0'6"						NOTE 4
4	T-4-a	0'3"						NOTE 4
5	Paint							NOTE 2
6	T-2-b	1'						NOTE 4
7	T-4-b	6"						NOTE 3
8	T-2-b	0'0"						NOTE 3
9	T-3-b	0'0"						NOTE 1
10	T-1-b	0'0"						NOTE 4
11	T-3-b	2'						NOTE 3
12	T-4-b	0'						NOTE 2
13	T-1-b	2'						NOTE 3
14	T-3-a	0'0"						NOTE 3
15	T-4-a	0'						NOTE 1
16	T-1-a	0'						NOTE 2
17	T-1-a	1'						NOTE 2
18	T-1-a	2½'						

Total Number of Samples Shipped: 18

Sampler's Signature: [signature]

Relinquished By:
Signature [signature]
Printed Name Clarence Yeung
Company ARI
Reason to Lab

Received By:
Signature [signature]
Printed Name JOHN GUERETTE
Company CURTIS & TOMPKINS

Date 11/19/90
Time 16:05

Relinquished By:
Signature
Printed Name
Company
Reason

Received By:
Signature
Printed Name
Company

Date / /
Time

REMARKS: 1 Pb-TTLC, STLC; 503E, TPH-D
2 Pb-TTLC; 503E, TPH-D
3 Pb-TTLC, STLC
4 Pb-TTLC

For compositing, see attached note.

Special Shipment / Handling / Storage Requirements:

Pulverize samples before analysis

Curtis & Tompkins, Ltd., Analytical Laboratories. Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/20/90
DATE REPORTED: 12/03/90

LAB NUMBER: 102345

CLIENT: AQUA RESOURCES, INC.

REPORT ON: 19 SOIL SAMPLES AND 4 SOIL COMPOSITES

PROJECT #: 90262
LOCATION: PG&E

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

LABORATORY NUMBER: 102345
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/20/90
DATE ANALYZED: 11/28/90
DATE REPORTED: 11/29/90

ANALYSIS: LEAD
ANALYSIS METHOD: EPA 7420
PREPARATION METHOD: EPA 3050

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
102345-1	A-1 0'	2,300	mg/Kg	25
102345-2	A-1 1 1/2'	1,400	mg/Kg	25
102345-3	A-2 0'	160	mg/Kg	2.5
102345-4	A-2 1 1/2'	930	mg/Kg	2.5
102345-5	A-3 0'	34	mg/Kg	2.5
102345-6	A-3 1 1/2'	330	mg/Kg	2.5
102345-7	A-4 0'	89	mg/Kg	2.5
102345-8	A-4 1'	240	mg/Kg	2.5
102345-9	A-5 0'	57	mg/Kg	2.5
102345-10	A-5 1'	380	mg/Kg	2.5
102345-14	T-5-B 2'	3,100	mg/Kg	25
102345-15	T-5-A 3'	ND	mg/Kg	2.5
102345-18	T-6-B 2 1/2'	80	mg/Kg	2.5
102345-19	T-6-A 2'	4.0	mg/Kg	2.5
102345-20	T-7-A 2'	ND	mg/Kg	2.5
102345-22	T-7-B 3'	500	mg/Kg	2.5
102345-26	T-8-A 2 1/2'	4,600	mg/Kg	25
102345-27	T-8-B 3'	770	mg/Kg	2.5
102345-28	T-5-A 0', T-5-B 0'	11,000	mg/Kg	25
102345-29	T-6-A 0' T-6-B 0'	5,900	mg/Kg	25
102345-30	T-7-A 0', T-7-B 0'	31,000	mg/Kg	250
102345-31	T-8-A 0', T-8-B 0'	11,000	mg/Kg	250

QA/QC SUMMARY

RPD, %	8
RECOVERY, %	97

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102345
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/20/90
DATE ANALYZED: 11/28/90
DATE REPORTED: 11/29/90

ANALYSIS: SOLUBLE LEAD
EXTRACTION BY WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
102345-26	T-8-A 2 1/2'	180	mg/L	0.5

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	101

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102345
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262
LOCATION: P.G.&E.

DATE RECEIVED: 11/20/90
DATE EXTRACTED: 11/21/90
DATE ANALYZED: 11/27/90
DATE REPORTED: 12/03/90

Extractable Petroleum Hydrocarbons in Soils & Wastes
California DOHS Method
LUFT Manual October 1989

LAB ID	SAMPLE ID	KEROSENE RANGE (mg/Kg)	DIESEL RANGE (mg/Kg)	REPORTING LIMIT* (mg/Kg)
102345-3	A-2	ND	210	10
102345-26	T-8-A	ND	420	10

ND = Not Detected at or above reporting limit.

*Reporting limit applies to all analytes.

QA/QC SUMMARY

RPD, %	2
RECOVERY, %	90

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102345-11
CLIENT: AQUA RESOURCES, INC.
PROJECT ID: 90262 - PG&E
SAMPLE ID: H-1

DATE RECEIVED: 11/20/90
DATE ANALYZED: 11/27/90
DATE REPORTED: 12/03/90

EPA 8010: Volatile Halocarbons in Soil & Wastes
Extraction Method: EPA 5030 - Purge & Trap

Compound	RESULT ug/Kg	REPORTING LIMIT ug/Kg
chloromethane	ND	10
bromomethane	ND	10
vinyl chloride	ND	10
chloroethane	ND	10
methylene chloride	ND	5.0
trichlorofluoromethane	ND	5.0
1,1-dichloroethene	ND	5.0
1,1-dichloroethane	ND	5.0
1,2-dichloroethene (total)	ND	5.0
chloroform	ND	5.0
freon 113	ND	5.0
1,2-dichloroethane	ND	5.0
1,1,1-trichloroethane	ND	5.0
carbon tetrachloride	ND	5.0
bromodichloromethane	ND	5.0
1,2-dichloropropane	ND	5.0
cis-1,3-dichloropropene	ND	5.0
trichloroethylene	ND	5.0
1,1,2-trichloroethane	ND	5.0
trans-1,3-dichloropropene	ND	5.0
dibromochloromethane	ND	5.0
2-chloroethylvinyl ether	ND	10
bromoform	ND	5.0
tetrachloroethylene	ND	5.0
1,1,2,2-tetrachloroethane	ND	5.0
chlorobenzene	ND	5.0
1,3-dichlorobenzene	ND	5.0
1,2-dichlorobenzene	ND	5.0
1,4-dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

Duplicate: Relative % Difference	11
Spike: Average % Recovery	89

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 102345-11
CLIENT: AQUA RESOURCES, INC.
PROJECT: 90262
LOCATION: P.G.&E.
SAMPLE ID: H-1

DATE RECEIVED: 11/20/90
DATE ANALYZED: 11/27/90
DATE REPORTED: 12/03/90

EPA 8020: Volatile Aromatic Hydrocarbons in Soils & Wastes
Extraction Method: EPA 5030 - Purge & Trap

COMPOUND	Result ug/Kg	Reporting Limit ug/Kg
Benzene	ND	5.0
Toluene	30	5.0
Ethyl Benzene	ND	5.0
Total Xylenes	ND	5.0
Chlorobenzene	ND	5.0
1,4-Dichlorobenzene	ND	5.0
1,3-Dichlorobenzene	ND	5.0
1,2-Dichlorobenzene	ND	5.0

ND = Not detected at or above reporting limit.

QA/QC SUMMARY

RPD, %	6
RECOVERY, %	94

102345

AQUA RESOURCES, INC.

SHIPMENT NO.: 2

CHAIN OF CUSTODY RECORD

PAGE 1 OF 2

DATE 11/20/90

PROJECT NAME: PG and E

PROJECT NO.: 90262

	Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required
1	A-1	0'	Soil	drive	2" brass tube	4°C	—	Pb - TTLC
2	A-1	1½'	↓	↓	↓	↓	↓	Pb - TTLC
3	A-2	0'						Pb - TTLC TPH-D
4	A-2	1½'						Pb - TTLC
5	A-3	0'						Pb - TTLC
6	A-3	1½'						Pb - TTLC
7	A-4	0'						Pb - TTLC
8	A-4	1'						Pb - TTLC
9	A-5	0'						~~8010/8020~~ Pb - T
10	A-5	1'	Soil					8010/8020
11	H-1	6"					C	Pb-TTLC
12	T-5-A	0'					C	Pb-TTLC
13	T-5-B	0'						Pb-TTLC
14	T-5-B	2'						Pb-TTLC
15	T-5-A	3'					C	Pb-TTLC
16	T-6-A	0'					C	Pb-TTLC
17	T-6-B	0'						Pb-TTLC
18	T-6-B	2½'						Pb-TTLC
19	T-6-A	2'						Pb-TTLC
20	T-7-A	2'	↓	↓	↓	↓	↓	Pb-TTLC

Total Number of Samples Shipped: 27

Sampler's Signature: [signature]

Relinquished By:
Signature [signature]
Printed Name Christopher Tenley
Company ARI
Reason To Lab

Received By:
Signature [signature]
Printed Name Nanda Wilson
Company C.T. Lab
Date 11/20/90
Time 5:00

Relinquished By:
Signature
Printed Name
Company
Reason

Received By:
Signature
Printed Name
Company
Date / /
Time

REMARKS:

Composite: 12 T-5-A 0' with 13 T-5-B 0' — COMP 1 -28
16 T-6-A 0' with 17 T-6-B 0' — COMP 2 -29
21 T-7-A 0' with 23 T-7-B 0' — COMP 3 -30
24 T-8-A 0' with 25 T-8-B 0' — COMP 4 -31

Special Shipment / Handling / Storage Requirements:

Analyze all others alone.

Pulverize - before analysis

102345

AQUA RESOURCES, INC.

SHIPMENT NO.: _____

CHAIN OF CUSTODY RECORD

PAGE 2 OF 2

DATE 4/20/90

PROJECT NAME: _____

PROJECT NO.: _____

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required
T-7-A	0'	Soil	Drive	2" Brass Tube	4°C	— C	Pb-TTLC
T-7-B	3'						Pb-TTLC
T-7-B	0'					C	Pb-TTLC
T-8-A	0'					C	Pb-TTLC
T-8-B	0'					C	Pb-TTLC
T-8-A	2½'						Pb, TTLC, STLC, TPH
T-8-B	3'						Pb-TTLC

Total Number of Samples Shipped: 27 | Sampler's Signature: Clarence Tenley

Relinquished By:
Signature: Clarence Tenley
Printed Name: Clarence Tenley
Company: AR
Reason: To Lab

Received By:
Signature: Nonan Wilson
Printed Name: Nonan Wilson
Company: L-T

Date: 4/20/90
Time: 2:00

Relinquished By:
Signature: _____
Printed Name: _____
Company: _____
Reason: _____

Received By:
Signature: _____
Printed Name: _____
Company: _____

Date: / /
Time: _____

REMARKS:

Special Shipment / Handling / Storage Requirements:

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710, Phone (415) 486-0900

DATE RECEIVED: 11/21/90.
DATE REPORTED: 12/03/90

LAB NUMBER: 102358

CLIENT: AQUA RESOURCES, INC.

REPORT ON: 6 SOIL SAMPLES

PROJECT #: 90262
LOCATION: P.G.&E.

RESULTS: SEE ATTACHED

QA/QC Approval

Final Approval

Curtis & Tompkins, Ltd., Analytical Laboratories, Since 1878
2323 Fifth Street, Berkeley, CA 94710. Phone (415) 486-0900

DATE RECEIVED: 01/27/92
DATE REPORTED: 01/31/92

LABORATORY NUMBER: 106398

CLIENT: AQUA RESOURCES

PROJECT ID: 690262.4

LOCATION: PG&E: ENCON

RESULTS: SEE ATTACHED

Reviewed By

Reviewed By

Curtis & Tompkins, L

LABORATORY NUMBER: 106398
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.4
LOCATION: PG&E: ENCON

DATE RECEIVED: 01/27/92
DATE EXTRACTED: 01/28/92
DATE ANALYZED: 01/30/92
DATE REPORTED: 01/31/92

ANALYSIS: SOLUBLE LEAD
EXTRACTION BY WASTE EXTRACTION TEST: CCR TITLE 26 SECTION 22-66700
ANALYSIS METHOD: EPA 7420

LAB ID	CLIENT ID	RESULT	UNITS	REPORTING LIMIT
106398-1	SP-1	210,000	ug/L	1,200

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	98

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 106398
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.4
LOCATION: PG&E/ ENCON

DATE RECEIVED: 01/27/92
DATE ANALYZED: 01/30/92
DATE REPORTED: 01/31/92

ANALYSIS: LEAD
ANALYSIS METHOD: EPA 7420

LAB ID	SAMPLE ID	RESULT	UNITS	REPORTING LIMIT
106398-1	SP-1	2,870	mg/kg	15

QA/QC SUMMARY

RPD, %	<1
RECOVERY, %	95

Curtis & Tompkins, Ltd.

LABORATORY NUMBER: 106398
CLIENT: AQUA RESOURCES
PROJECT ID: 690262.4
LOCATION: PG&E: ENCON

DATE RECEIVED: 01/27/92
DATE EXTRACTED: 01/30/92
DATE ANALYZED: 01/30/92
DATE REPORTED: 01/31/92

EPA 418.1: Total Recoverable Petroleum Hydrocarbons by IR
Extraction Method: EPA 3550

LAB ID	CLIENT ID	RESULT (mg/Kg)	REPORTING LIMIT (mg/Kg)
106398-1	SP-1	8,600	10

QA/QC SUMMARY

RPD, %	3
RECOVERY, %	97

AQUA RESOURCES, INC.

CHAIN OF CUSTODY RECORD

SHIPMENT NO.: 1

PROJECT NAME: PG+E : ENCON

PAGE 1 OF 1

PROJECT NO.: 690262.4

DATE 1/27/92

Sample Number	Location	Type of Sample: Material	Type of Sample: Method	Type of Container	Type of Preservation: Temp	Type of Preservation: Chemical	Analysis Required
SP-1	Lead Area Stockpile	Soil	Trowel	Brass Tube	4°C		1, 2, 3

Total Number of Samples Shipped: 1

Relinquished By:
Signature: [signature]
Printed Name: Aaron M. Stegeman
Company: Aqua Resources
Reason: For Analysis

Sampler's Signature: [signature]

Received By:
Signature: [signature]
Printed Name: Matt Massie
Company: C&T

Date: 1/27/92
Time: 1540

Relinquished By:
Signature:
Printed Name:
Company:
Reason:

Received By:
Signature:
Printed Name:
Company:

Date: / /
Time:

REMARKS:

1 = TTLC Lead
2 = STLC Lead (WET)
3 = TPH (EPA 418.1)
1 Week turnaround (no RUSH charges)

Special Shipment / Handling / Storage Requirements:

WARNING: Sample may Contain a High Lead Concentration

AQUA RESOURCES, INC.

OBSERVATION WELL INSTALLATION REPORT

Well # OW-5

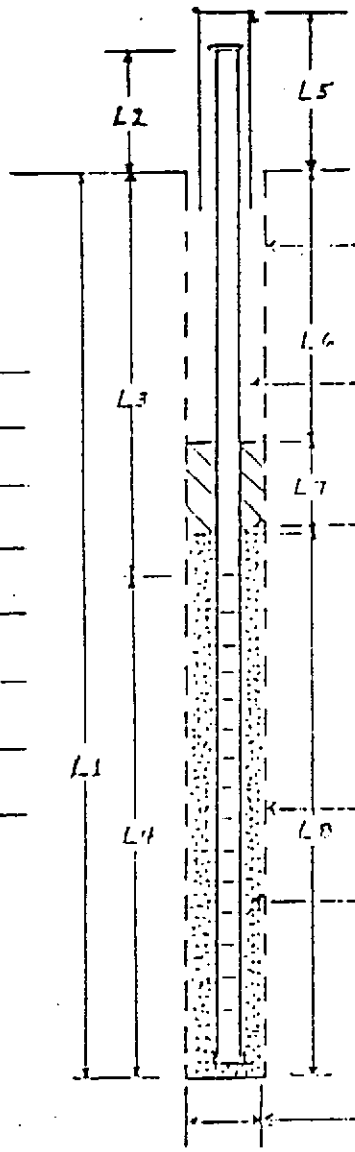
Project PG&E

Location 4930 Coliseum Way, Oakland, CA 94601

Type of Rig CME 55 Installed by HEW Drilling

Date Started 4/16/91 Date Finished 4/16/91

Type of Observation Well water Ground Elev. _____ Casing Top, Elev. _____



L1 16½ feet

L2 ½ foot

L3 6½ feet

L4 10 feet

L5 ½ foot

L6 5 feet

L7 1 foot

L8 10½ feet

Cap locking cap and sealed well cover

Type of Casing 2" pvc

Type of Backfill cement grout

Type of Seal Material bentonite pellets

Size of Openings .020 inch

Type of Filter Material #3 sand

Diameter of Boring 8 inches

Remarks _____

Observed by _____

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION	Oakland	JOB NAME PG&E	JOB NO. 90262.2
DRILLING COMPANY	Exceltech/Resna		BORING NO. OW-6
DRILLER'S NAME	Don Jenkins		SHEET 1 OF 2
DRILL RIG	[ ] Solid Flight Auger [X] 8" Hollow Auger [ ] Rotary Wash		
SAMPLER TYPE:	[X] 2.5" I.D. Split Barrel [ ] 3.0" I.D. Shelby Tube [X] SPT		
DRIVE WEIGHT	140 LB.	FALL 30 IN.	START TIME 8:05 AM PM
WATER LEVEL (Feet)	8'		FINISH TIME 8:54 AM PM
TIME	8:15 am		
DATE	12/19/91		DATE 12/19/91
CASING DEPTH (FEET)	18'		
ELEVATION	3.37' FEET	FIELD ENGINEER Mark Peterson	

DATUM: [ ] Mean Sea Level [X] Other OW-2

SURFACE CONDITIONS
Graded surface of agregate to base rock, nearly level - Since installation of well the surface has been paved with AC.

BLOWS PER HALF FOOT	BLOWS/ft.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION
				0	
				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
16					GC
18				9	
20	38				
				10	SP

Water on top end of sampler with slight sheen
Gravel with interstitial silty clay, olive brown (2.5Y 4/3), saturated. Gravel backfill that penetrated saturated native soil.

Gravelly sand, brown (10YR 4/3), saturated, medium dense, fine to coarse grained sand, poorly sorted, subangular gravel up to 3/4" across.

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION	JOB NAME PG&E	JOB NO 90262.2
DRILLING COMPANY Exceltech/Resna		BORING NO. QW-6
DRILLER'S NAME Don Jenkins		SHEET 2 OF 2
DRILL RIG [ ] Solid Flight Auger [X] Hollow Auger [ ] Rotary Wash		
SAMPLER TYPE: [ ] 2.5" I.D Split Barrel [ ] 2.0" I.D Shelby Tube [ ] SPT		
DRIVE WEIGHT LB.	FALL IN.	START TIME AM PM / FINISH TIME AM PM
WATER LEVEL (Feet)		
TIME		
DATE		DATE 12/19/91
CASING DEPTH (FEET)		
ELEVATION FEET	FIELD ENGINEER Mark Peterson	

DATUM: [ ] Mean Sea Level [ ] Other

SLOWS PER HALF FOOT	BLOWS/ft.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION	SURFACE CONDITIONS
				10		
20						
20				11		
15	35					
				12		
				13		
				14	GM	Increased gravel at 14' to 15'
13						
9				15		
6	15				CL/CH	Silty clay with minor very fine grained sand, light yellowish brown (2.3Y5/3), wet, medium stiff to stiff, rare dark brown staining
				16		
				17		
2						
3				18		
4	SPT 7					Bottom at 18½'
				19		
				20		

AQUA RESOURCES, INC.

OBSERVATION WELL INSTALLATION REPORT

Well # OW-6

Project PG&E

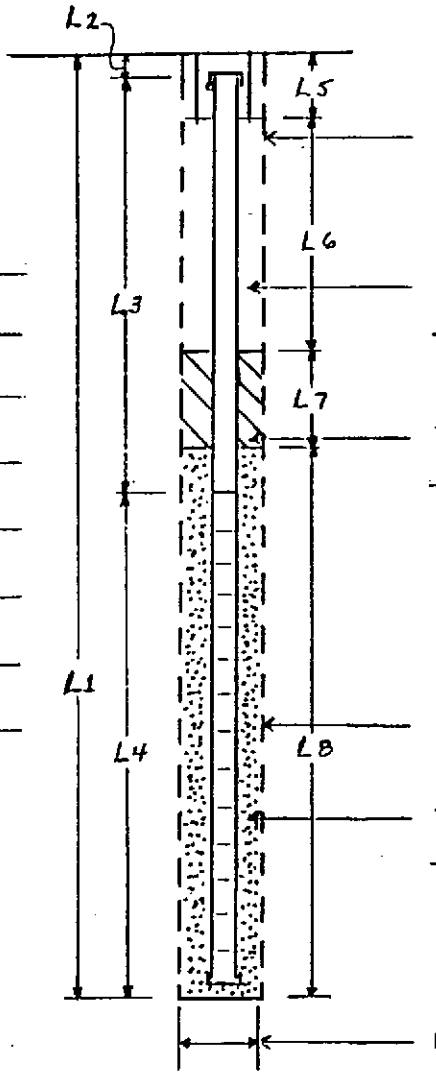
Location 4930 Coliseum Way, Oakland CA 94601

Type of Rig Mobile B61 Installed by RESNA

Date Started 12/19/91 Date Finished 12/19/91

Type of Observation Well Water Ground Elev. _____ Casing Top, Elev. _____

L1 18½ feet
L2 ¼ foot
L3 7½ feet
L4 10 feet
L5 ½ foot
L6 5 feet
L7 1 foot
L8 12½ feet



Cap locking cap and sealed well cover

Type of Casing 2" PVC

Type of Backfill cement grout

Type of Seal Material bentonite pellets

Size of Openings 0.020

Type of Filter Material 2/12 sand

Diameter of Boring 8 inches

Remarks _____

Observed by M. Peterson/A. Stessman

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION: Oakland	JOB NAME: PG&E	JOB NO: 90262.2
DRILLING COMPANY: Exceltech/Resna		BORING NO.: OW-7
DRILLER'S NAME: Don Jenkins		SHEET: 1 OF 2
DRILL RIG: 8" [X] Hollow Auger [ ] Solid Flight Auger [ ] Rotary Wash		
SAMPLER TYPE: [X] 2.5" I.D. Split Barrel [ ] 2.0" I.D. Shelby Tube [ ] SPT		

			START	FINISH
DRIVE WEIGHT: 140 LB.	FALL: 30 IN.		TIME: 9:55 AM PM	TIME: AM PM
WATER LEVEL (Feet): 13½			DATE: 12/19/91	
TIME: 10:00am				
DATE: 12/19/91				
CASING DEPTH (FEET): 17½				
ELEVATION: 4.76 FEET	FIELD ENGINEER: M. Peterson/ A. Stessman			

DATUM: [ ] Mean Sea Level [X] Other OW-2

BLOWS PER HALF FOOT	BLOWS/ft.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION
				0	
				1	
				2	
				3	
				4	
				5	
				6	
				7	
				8	
20					
12				9	
11	23				SP/SC
				10	

SURFACE CONDITIONS:

Graded surface of aggregate to base rock, nearly level - since well installation the surface has been paved with AC.

NOTE: No OVM = OVM reading of 0.o

Gravel backfill material

Gravelly sand with minor silt and clay, greyish green (5G4/2), medium dense, wet, fine to coarse grained sand, poorly sorted, subangular gravel. Note tarry product visible. No OVM, slight hydrocarbon odor.

AQUA RESOURCES, INC.

BORING LOG

LOCATION & NOTES

LOCATION: Oakland	JOB NAME: PG&E	JOB NO: 90262.2	
DRILLING COMPANY		BORING NO.: OW-7	
DRILLER'S NAME		SHEET: 2 OF 2	
DRILL RIG [ ] Solid Flight Auger [ ] Hollow Auger [ ] Rotary Wash			
SAMPLER TYPE: [ ] 2.5" I.D. Split Barrel [ ] 2.0" I.D. Shelby Tube [ ] SPT			
DRIVE WEIGHT LB.	FALL IN.	START TIME AM PM	FINISH TIME AM PM
WATER LEVEL (Feet)		DATE	
TIME			
DATE			
CASING DEPTH (FEET)			
ELEVATION FEET	FIELD ENGINEER		

DATUM: [ ] Mean Sea Level [ ] Other

SURFACE CONDITIONS:

BLOWS PER HALF FOOT	BLOWS/ft.	MOISTURE CONTENT %	DRY UNIT WEIGHT (pcf)	DEPTH IN FEET	USCS CLASSIFICATION	
				10		
				11		
				12		
7						
14					SC	Gravelly sand with increasing clay and silt, yellowish brown (10 YR 516), loose, saturated, fine to coarse grained sand, poorly sorted, subangular gravel. No OVM or odor.
				13		
11	25					
				14		
						Silty clay with minor very fine grained sand, light yellowish-brown (2.5Y 613), wet, stiff, rare dark brown staining. No OVM.
				15		
5					CL/ CH	
8						No recovery/Redrove same interval recovered 100% 2" gravel lense
				16		
10	18					
6						
				17		3" gravelly clay lense
7						
8	15					Silty clay with trace sand and gravel, light yellowish brown (2.5Y 613), wet, stiff, common dark brown-brown staining. No OVM.
				18		
						Bottom at 18'
				19		
				20		

AQUA RESOURCES, INC.

OBSERVATION WELL INSTALLATION REPORT

Well # OW-7

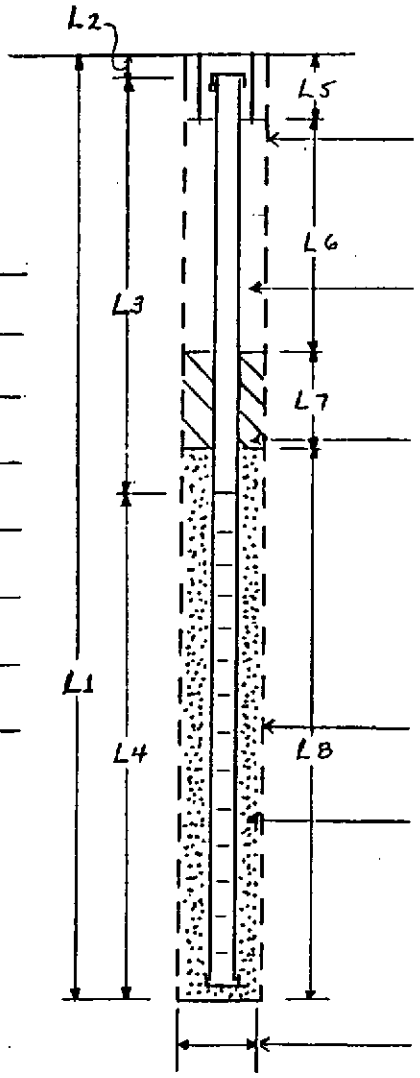
Project PG&E

Location 4930 Coliseum Way, Oakland CA 94601

Type of Rig Mobile B61 Installed by RESNA

Date Started 12/19/91 Date Finished 12/19/91

Type of Observation Well Water Ground Elev. _____ Casing Top, Elev. _____



L1 18 feet

L2 ¼ foot

L3 7½ feet

L4 10 feet

L5 ½ foot

L6 5 feet

L7 1 foot

L8 12 feet

Cap locking cap and sealed well cover

Type of Casing 2" PVC

Type of Backfill cement grout

Type of Seal Material bentonite pellets

Size of Openings 0.020

Type of Filter Material 2/12 sand

Diameter of Boring 8 inches

Remarks _____

Observed by M. Peterson/A. Stessman