Weyerhaeuser
Paper Company

1801 Hibbard Street
P.O Drawer X
Alameda, California 94501
Tel (510) 523 6121

Weyerhaeuser

November 12, 1993

Ms. Juliet Shin
Alameda County-Health Care Services Agency
UST Local Oversight Program
80 Swan Way, Rm. 200
Oakland, CA 94612

RE: SUBMITTAL OF SITE INVESTIGATION WORK PLAN,
WEYERHAEUSER ALAMEDA FACILITY, 1801 HIBBARD STREET, STID 1202

Dear Ms. Shin:

Weyerhaeuser respectfully submits the enclosed work plan to conduct additional soil and ground water site investigation in the vicinity of two former underground tank installations here at our Alameda facility. The enclosed work plan was prepared by West and Associates Environmental Engineers, Inc., under contract to our corporate Office of the Environment in Tacoma, Washington.

We believe you will find the enclosed work plan meets all State and Tri-Regional guidelines for technical content. It is our hope that this effort will conclude site investigation at our facility and permit us to move ahead with environmental remediation.

If your review of our proposed work plan raises any technical questions, please contact our consultant, Mr. Brian W. West, PE (707) 451-1360. For any administrative questions, please contact Mr. Steven Mindt at (510) 814-1131.

We look forward to your approval of our proposal and stand by to conduct the site investigation immediately upon your authorization.

Sincerely,

WEYERHAEUSER PAPER COMPANY

Floyd R. Smith
General Manager

FRS:jnq

PROPOSED SITE ASSESSMENT WORKPLAN

WEYERHAEUSER PAPER COMPANY
ALAMEDA CORRUGATED BOX FACILITY
1801 Hibbard Street
Alameda, California
STID 1202

Submitted to:

ALAMEDA COUNTY
HEALTH CARE SERVICES AGENCY
DEPARTMENT OF ENVIRONMENTAL HEALTH
Oakland

Prepared for:

THE WEYERHAEUSER CORPORATION
OFFICE OF THE ENVIRONMENT
TOXIC/SOLID WASTE TEAM
Tacoma, Washington

Prepared by:

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.
Vacaville

November, 1993

ACKNOWLEDGEMENTS

This workplan was prepared under authorization of the Weyerhaeuser Corporation, Office of the Environment, Toxic/Solid Waste Team, Tacoma, Washington. The Weyerhaeuser project officer is Ms. Jennifer Strachan, mail stop CH1 K29, Tacoma, WA 98477; (206) 924-6511.

At the Alameda Corrugated Box plant, both Mr. Floyd Smith, General Manager and Mr. Steve Mindt, Production Manager, have environmental compliance responsibilities related to this project. The Alameda plant address is 1801 Hibbard Street, PO Drawer X, Alameda, CA 95601; (510) 814-1104.

The lead regulatory agency for the Weyerhaeuser Alameda plant is the Alameda County Health Care Agency, Department of Environmental Health. Ms. Juliet Shin, Hazardous Materials Specialist, is the staff person assigned. The Department of Environmental Health is located at 80 Swan Way, Room 200, Oakland, CA 94621; (510) 271-4320.

In the preparation of this workplan reliance was made on past site work performed by Soil Tech Engineering, Inc. Mr. Frank Hamedi was the Soil Tech Engineering employee most closely associated with the Weyerhaeuser Alameda site. The address for Soil Tech Engineering is 298 Brokaw Road, Santa Clara, CA 95050; (408) 496-0265.

Soil Tech Engineers has prepared three reports describing conditions at the Weyerhaeuser site:

- PRELIMINARY SUBSURFACE INVESTIGATION AT FORMER UNDERGROUND GASOLINE TANK AREA - January 20, 1992
- ADDITIONAL SUBSURFACE INVESTIGATION AT FORMER UNDERGROUND GASOLINE TANK AREA - May 18, 1992
- ADDITIONAL INVESTIGATION FOR WEYERHAEUSER PAPER COMPANY PROPERTY - January 28, 1993

Material in this workplan taken directly from a Soil Tech report is enclosed in quotation marks.

This workplan was prepared by West & Associates Environmental Engineers, Inc. West & Associates is located at 112 Pepperell Court, Vacaville, CA 95688; mailing address, PO Box 5891, Vacaville 95696; (707) 451-1360. Principal author is Mr. Brian W. West PE. (Registered California Civil Engineer No. 32319 - expires 12/31/96).

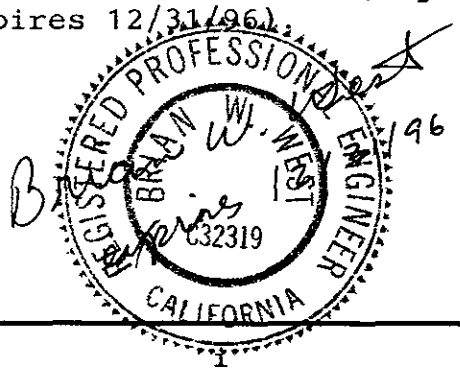


TABLE OF CONTENTS

APPENDICES

1.0 INTRODUCTION

This workplan describes proposed site investigation activities to be performed at the Weyerhaeuser Corporation Alameda Corrugated Box Facility. Site investigation is proposed at two, separate, former underground tank locations. In this Section, the project scope and objectives are described along with a summarized presentation of selected background material.

1.1 Scope

The scope of this workplan includes presentation of proposed work, methods, equipment and materials for performance of sub-surface investigations at two study areas at the Weyerhaeuser Box facility, 1801 Hibbard Street in Alameda. The two study areas are:

1. Former underground gasoline tank cluster (three, 1,000 gallon tanks)
2. Former underground diesel tank installation (one, 10,000 gallon tank)

Specific scope items proposed in this workplan include:

- Completion of soils borings and associated soil sampling
- Construction of groundwater monitoring wells
- Monitoring of new and existing groundwater wells
  - Depth to groundwater measurements
  - Groundwater sample collection
- Laboratory analysis of soil and groundwater samples
- Hydrologic analysis
- Preparation of a written report of findings

The scope of this workplan also includes a description of proposed measures to remediate both soil and groundwater contamination known to exist at both former underground tank locations.

1.2 Objectives

It is the objective of the Weyerhaeuser Corporation to comply with all local, Regional, State and Federal regulations pertaining to environmental protection and remediation. The overall objective of investigative work at the two former underground tank installations is to develop sufficient technical data to design an effective and efficient remediation program.

The specific objectives of site investigation proposed in this workplan include:

- Fully define the extent of soil contamination near the former gasoline tank cluster

- Develop a specific plan to remediate soil contamination by excavation
- Fully define the extent of groundwater contamination near the former underground gasoline tank cluster
- Acquire hydrologic data allowing the selection of an appropriate groundwater remediation approach
- Assess the magnitude of groundwater contamination near the former diesel tank installation

Proposed site investigation activity to accomplish these objectives is described in Section 3.0.

1.3 Summarized Background

The Weyerhaeuser Alameda Corrugated Box facility was formerly equipped with five underground fuel storage tanks. The five tanks were distributed in three separate installations located along the northwestern side of the facility.

In early 1991 Weyerhaeuser removed a cluster of three, 1,000 gallon gasoline tanks and one, 10,000 gallon diesel tank. A 20,000 gallon diesel tank remains in service on-site to this day. Upon removal, the 10,000 gallon diesel tank installation was found to be virtually uncontaminated, however, significant soil and groundwater contamination was encountered at the gasoline tank cluster location.

The tank removal contractor performed overexcavation at the gasoline tank cluster location in an attempt to remediate soil contamination. Between February and April 1991 the tank excavation was enlarged from 460 ft^2 to 640 ft^2 and then to 930 ft^2.

Four soil samples were collected from the gasoline tank cluster pit sidewalls at the conclusion of overexcavation. Only one endpoint sidewall soil sample (Sample No. 11) was non-detectable for all tested chemical constituents. One of the sidewall soil samples (Sample No. 9) was found to contain only trace levels of toluene. The other two endpoint soil samples (Sample No.'s 8 & 10), were found to contain low levels of TPH and BTXE compounds.

During the time the gasoline tank cluster excavation was open, the standing groundwater level in the pit was observed to rise from greater than 8 feet to less than 4 feet below ground surface. As the pit water level rose, presumably overexcavation became more difficult. The file record indicates endpoint soil samples were collected from higher on the pit sidewalls as the water level rose.

Both the gasoline tank cluster and diesel tank excavations were backfilled with clean soil. Contaminated soil was transported to off-site disposal.

In December 1991 and again in April 1992, Soil Tech Engineering performed soils and groundwater investigations near the former gasoline tank cluster. A total of six groundwater monitoring wells were installed. Soil samples for laboratory analysis were collected during monitoring well installation. Between December 1991 and July 1993 Soil Tech performed groundwater monitoring on six occasions.

In December 1992, Soil Tech constructed one monitoring well adjacent to the former underground diesel tank, increasing the total number of site wells to seven. That well (MW-7) has been monitored a total of 3 times.

Soil Tech's investigations have revealed significant remaining soil contamination as well as widespread groundwater contamination in the vicinity of the former gasoline tank cluster. The six soil borings and monitoring wells completed to date do not fully define the total extent of either soil or groundwater contamination around the former gasoline tank cluster.

2.0 SITE CHARACTERISTICS

In this Section, physical site characteristics pertinent to the proposed site investigation are presented.

2.1 Topography and Surface Runoff

The Weyerhaeuser Paper Company, Alameda Corrugated Box facility location is indicated on Figure 1. The site is within the city limits of Alameda which is an island in San Francisco Bay. Ground surface at the project site is only about 15 feet above mean sea level.

The Weyerhaeuser Alameda facility site and surrounding terrain are essentially flat. The site and surrounding property are completely developed. The area contains a mix of industrial, commercial and residential land use.

Drainage in and around the project site has been modified to promote runoff to storm drains emptying directly into the Oakland Inner Harbor. Adjacent to the former gasoline tank cluster is a steam cleaning pad equipped with a catch basin. According to facility personnel, the catch basin empties to the sanitary system.

2.2 Soils

Site soil characteristics down to 20 feet below ground surface are well known due to the seven soils borings completed by Soil Tech Engineering. Review of the Soil Tech boring logs indicates soil characteristics are essentially uniform, horizontally, throughout the area investigated.

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.

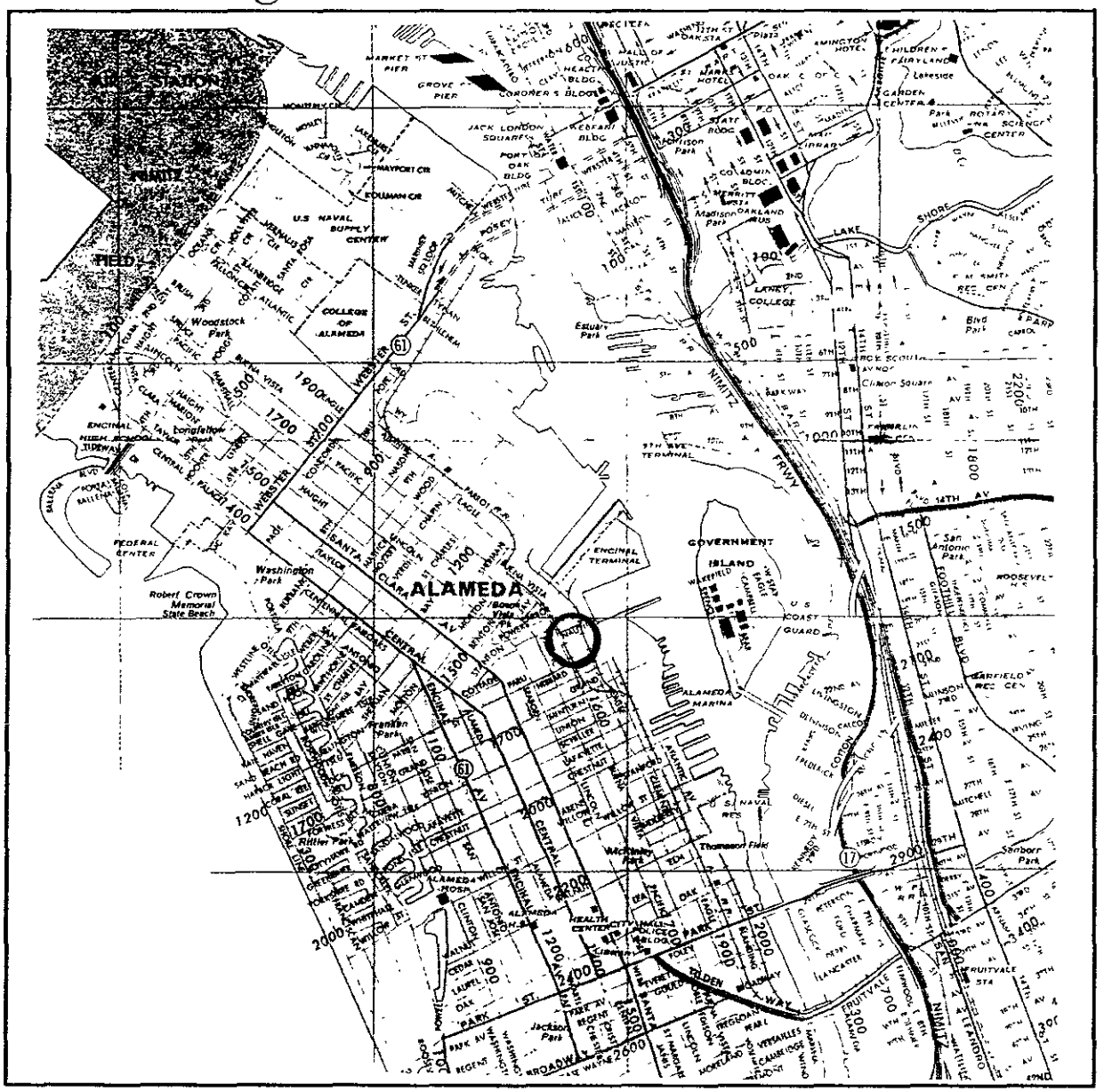
PO BOX 5891, VACAVILLE, CALIFORNIA 95696

Project Name: Weyerhaeuser - Alameda | Nov. 1993

Location: 1801 Hibbard Str., Alameda, California 94501

Map Source: Rand McNally

Figure 1 Site Location



○ Site Location

Scale: 1" = 0.6 miles

Vertically, Soil Tech reports there are three distinct soil stratas: "man-placed fill; alluvial floodplain deposits of clay and silt; and generally cohesive clayey sand, sandy clay alluvial deposits". Soil Tech classified site soils as inorganic clays of low to medium plasticity, sandy clays, silty clays or lean clays (CL in the USCS).

2.3 Hydrology

Groundwater is shallow under the Weyerhaeuser Alameda site. Depth to groundwater has measured as shallow as 2.12 feet (well MW-7, January 8, 1993) below ground surface (BGS) and as deep as 8.14 feet BGS (well MW-6, July 31, 1992. Deeper groundwater is consistently found at the southern end of the site. In general, groundwater levels under the site exhibit the expected seasonal variation of rising during the winter and spring, then falling during the summer and fall.

Soil Tech Engineering has computed a groundwater gradient direction on six occasions; once using three wells (MW-1,2 & 3); twice using six wells (MW-1 - MW-6); and three times using data from all seven wells. The calculated gradient direction has varied as much as 55° if the first measurement (three wells in December 1991) is included or as much as 30° if the first measurement is neglected.

The groundwater gradient direction under the Weyerhaeuser Alameda site is generally to the west. The calculated gradient direction has ranged from a compass heading of 235° to 290°. Monitoring well MW-3 should be in the upgradient direction, with respect to the former gasoline tank cluster, based on these gradient direction calculations.

Observed differences in groundwater elevation between adjacent monitoring wells is surprisingly great considering the topography, homogeneous soil strata, low elevation above mean sea level and proximity to the bay (1,300 feet) at the Weyerhaeuser site. For instance, there is a consistent differential of one foot in groundwater elevation between monitoring wells MW-5 and MW-6, despite the fact they are only 35 feet apart. None of the Soil Tech reports offers a possible explanation for this observed phenomenon.

3.0 CONTAMINANT PROFILE

A considerable amount of data describing the contamination profile of both soil and groundwater has been acquired from past sampling efforts at the Weyerhaeuser Alameda site. In this Section, a description of the soil and groundwater contamination profiles for both the gasoline tank cluster area and 10,000 gallon diesel tank area is presented.

3.1 Former Gasoline Tank Cluster

Both soil and groundwater contamination have been confirmed in the vicinity of the former gasoline tank cluster. Each is discussed separately in the following sub-sections.

3.1.1 Soil

Apparently, one or more of the three tanks formerly in the gasoline tank cluster was once used to store waste oil. Soil sampling performed during the overexcavation identified detectable levels of the expected gasoline compounds as well as total petroleum hydrocarbons (TPH) as diesel; kerosene; oil & grease; some semi-volatile chlorinated organics; and heavy metals. Analysis for volatile chlorinated organics was also performed however none were detected.

Significant soil contamination was encountered in the former gasoline tank cluster backfill. Some soil samples collected from the excavation tested as high as 3,000 PPM TPH gas and 21 PPM benzene. Apparently, highly contaminated soil was effectively removed during the overexcavation. Soil contaminant levels remaining at the site are an order of magnitude less than those measured in the material removed.

As described in Section 1.3, only one pit sidewall soil sample collected at the conclusion of overexcavation was found to be non-detectable for all tested constituents. Soil samples from two of the six borings completed by Soil Tech Engineers contained detectable levels of contamination. Table 1 summarizes the available analytical data describing the existing soil contaminant profile near the gasoline tank cluster. Figure 2 illustrates the soil sample locations.

Although soil removed during the overexcavation was found to contain semi-volatile chlorinated organics and heavy metals, these compounds were not analyzed in any of the samples presented in Table 1.

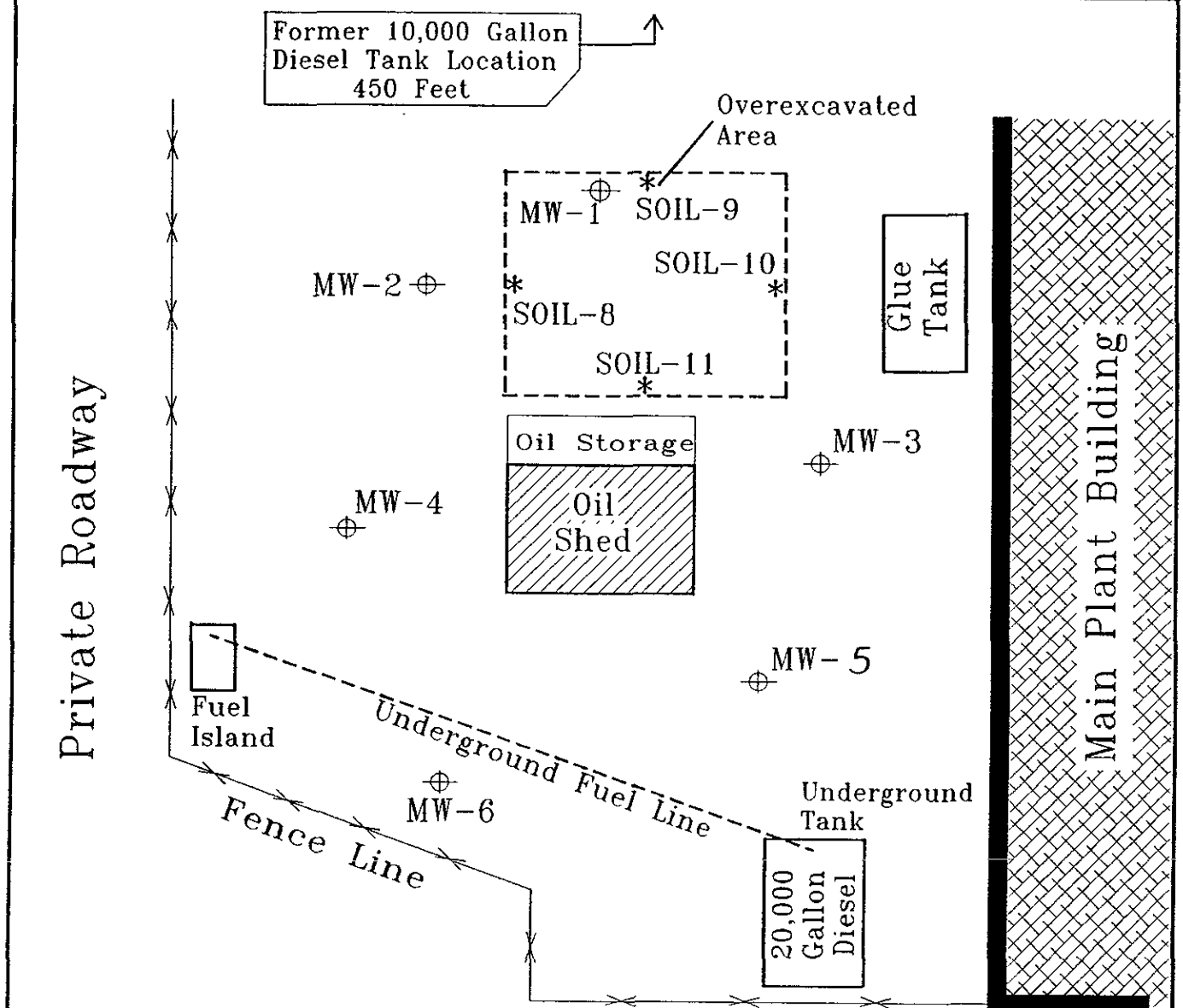
Referring to Figure 2, two anomalies are readily apparent. Sidewall sample SOIL-8, was found to contain only 1,100 ug/kg TPH compared to 370,000 ug/kg TPH for sample MW-2 (7'), although the SOIL-8 sample location is closer to the former tank cluster. Apparently, the difference in sample depths, 3' BGS vs. 7' BGS results in the discrepancy.

Both samples MW-3 (3' & 7') and MW-2 (7') contained much more contamination than sample SOIL-11, although the location of sample SOIL-11 is in between MW-2 and MW-3 and is closer to the former tank cluster. This anomaly cannot be explained by differential sampling depths and may be a result of preferential contaminant migration in the southerly direction.

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.

PO Box 5891, Vacaville, California 95696

Project Name: Weyerhaeuser - Alameda		70288.01
Location: 1801 Hibbard Str., Alameda, CA 94501		
Drawing By: BWW	Date: Nov., 1993	Scale: 1" = 20'



LEGEND

⊕ Existing Groundwater Monitoring Well

* Sidewall Soil Sampling Location

Figure 2

TABLE 1
SOIL CONTAMINANT CONCENTRATIONS
GASOLINE TANK CLUSTER AREA
WEYERHAEUSER PAPER COMPANY ALAMEDA FACILITY
All values in ug/kg

SAMPLE ID	TPH GAS	BENZENE	TOLUENE	XYLENES	ETHYL BENZENE
SOIL - 8	1,100	38	16	5.0	ND
SOIL - 9	ND	ND	21	ND	ND
SOIL - 10	1,200	100	19	26	21
SOIL - 11	ND	ND	ND	ND	ND
MW-2 (3')	ND	ND	ND	ND	ND
MW-2 (7')	370,000	560	1,000	6,700	1,500
MW-3 (3')	74,000	160	6	790	240
MW-3 (7')	550,000	440	1,000	8,500	1,300

NOTES

1. Sidewall soil samples SOIL-8 thru SOIL-11 collected at 4.5' BGS
2. Sample MW-3 (3') contained 1,000 ug/kg total oil & grease
3. ND: Non-detectable

It is evident from the data in Table 1 that soil contamination is still present both east and west of the former gasoline tank cluster. The absence of contamination in sidewall soil samples SOIL-9 and SOIL-11 would indicate that soil contamination is not present north and south of the overexcavated area, however, these endpoint sidewall samples may not be a reliable indicator of actual site conditions.

The presence of non-gasoline compounds in the gasoline tank cluster soils may be the result of waste oil leakage or surface spillage. Table 2 lists the non-gasoline compounds and concentrations encountered. The soil from which samples in Table 2 were collected has been removed from the site. The only non-gasoline compound verified to still exist in the former gasoline tank cluster area soils is oil & grease (see footnote to Table 1).

Detectable concentrations of Cadmium, Chromium, Lead, Nickel and Zinc were found in samples SOIL #1 - SOIL #7, however the measured levels were orders of magnitude less than established State Total Threshold Limit Concentration (TTLC) limits. Soluble Threshold Limit Concentration (STLC) analyses were not performed.

TABLE 2
NON-GASOLINE SOIL CONTAMINANTS
FORMER GASOLINE TANK CLUSTER
WEYERHAEUSER PAPER COMPANY ALAMEDA FACILITY
All values in mg/kg

SAMPLE ID	DIESEL	OIL & GREASE	KEROSENE	NAPHTHA-LENE	METHYL NAPTHA-LENE	BENZOIC ACID
GAS-S	22	NA	NA	NA	NA	NA
SOIL #1	ND	29	ND	2.2	2.2	ND
SOIL #2	ND	13	ND	0.7	0.8	ND
SOIL #3	ND	55	ND	2.4	1.9	ND
SOIL #4	ND	57	57	35	20	3.1
SOIL #5	ND	ND	ND	7.6	6.5	ND
SOIL #6	ND	73	17	30	27	2.8
SOIL #7	ND	ND	ND	2.0	1.5	ND

NOTES
NA: Not Analyzed
ND: Not Detected

In summary, highly contaminated soil was apparently removed during the overexcavation. Residual contamination definitely exists east and west of the former gasoline tank cluster. Endpoint sidewall soil samples are not sufficiently reliable to conclude that no residual soil contamination is present north or south of the former tank cluster. Non-gasoline contaminants were detected in soils removed during the overexcavation. Due to lack of testing, it is not known if non-gasoline compounds are present in contaminated soil remaining on-site.

3.1.2 Groundwater

There was, apparently, two samples of pit water collected during the overexcavation project; Water-1 and Water-2. The file record does not indicate the method by which either sample was collected or whether the pit was purged and allowed to recharge prior to sampling.

Pit water sample Water-1 was collected on February 28, 1991. Water-1 was analyzed for TPH in the gas/kerosene/diesel range; oil & grease; BTXE, heavy metals; semi-volatile chlorinated organics and volatile chlorinated organics. Analytical results are presented below.

PIT WATER SAMPLE: WATER-1
FORMER GASOLINE TANK CLUSTER
WEYERHAEUSER PAPER COMPANY ALAMEDA FACILITY
February 28, 1991

TPH - gas:	22,000 ug/l
TPH - kerosene:	ND
TPH - diesel:	190 ug/l
Oil & Grease:	5,100 ug/l
Benzene:	1,000 ug/l
Toluene:	570 ug/l
Xylenes:	410 ug/l
Ethyl Benzene	130 ug/l
Cadmium:	ND
Chromium:	160 ug/l
Lead:	130 ug/l
Nickel:	200 ug/l
Zinc:	240 ug/l
Naphthalene:	430 ug/l
Methylnaphthalene	160 ug/l

Gasoline tank cluster pit water sample Water-2 was collected on April 3, 1991. Sample Water-2 was only analyzed for TPH-gas and BTXE. The results of that analysis are presented below.

PIT WATER SAMPLE: WATER-2
FORMER GASOLINE TANK CLUSTER
WEYERHAEUSER PAPER COMPANY ALAMEDA FACILITY
April 3, 1991

TPH - gas:	13,000 ug/l
Benzene:	580 ug/l
Toluene:	130 ug/l
Xylenes:	400 ug/l
Ethyl Benzene	29 ug/l

Apparently, water was pumped from the gasoline tank cluster pit just prior to placing backfill.

As discussed in Section 1.3, Soil Tech Engineering constructed a total of six groundwater monitoring wells around the former gasoline tank cluster and has performed periodic groundwater monitoring. Table 3, taken directly from Soil Tech's most recent groundwater monitoring report (July 19, 1993), presents a summary of all groundwater analytical results.

As indicated by the data in Table 3, groundwater samples collected from monitoring well MW-3 consistently contain the highest levels of contamination. Contaminant levels in MW-3 groundwater samples have increased each of the past 3 monitoring cycles. As discussed in Section 2.3, based on the calculated groundwater gradient direction, monitoring

TABLE 3
GROUNDWATER ANALYTICAL RESULTS
IN
MILLIGRAMS PER LITER (mg/l)

Date	Well #	TPHd	TPHg	B	T	E	X	TOG
12/23/91	STMW-1	ND	ND	ND	ND	ND	ND	NA
	STMW-2	0.08	2.3	0.72	0.066	0.0015	0.24	NA
	STMW-3	1.7	14	3.0	0.54	0.37	1.2	NA
4/27/92	STMW-1	ND	0.15	0.0015	0.0012	0.0018	0.002	ND
	STMW-2	ND	1.1	0.0094	0.0053	0.002	0.024	ND
	STMW-3	2.0	9.4	0.057	0.05	0.0046	0.22	ND
	STMW-4	ND	0.79	0.0077	0.0026	0.002	0.011	ND
	STMW-5	ND	ND	ND	ND	ND	ND	ND
	STMW-6	ND	ND	ND	ND	ND	ND	ND
7/31/92	STMW-1	ND	0.31	0.002	0.0018	0.0012	0.0045	0.6
	STMW-2	ND	1.5	0.0033	0.0053	0.01	0.026	4.4
	STMW-3	ND	1.4	0.0019	0.0051	0.0083	0.023	0.6
	STMW-4	ND	1.3	0.0061	0.0043	0.0073	0.021	ND
	STMW-5	ND	ND	ND	ND	ND	ND	0.7
	STMW-6	ND	ND	ND	ND	ND	ND	ND

TABLE 3 CONT'D
GROUNDWATER ANALYTICAL RESULTS
IN
MILLIGRAMS PER LITER (mg/l)

Date	Well #	TPHd	TPHg	B	T	E	X	TOG
1/08/93	STMW-1	ND	0.14	0.006	0.0012	0.0006	0.0022	0.8
	STMW-2	ND	0.07	ND	ND	0.0005	0.0014	0.9
	STMW-3	ND	15	0.038	0.04	0.064	0.14	19
	STMW-4	ND	0.86	0.0015	0.0045	0.0096	0.017	1.4
	STMW-5	ND	ND	ND	ND	ND	ND	ND
	STMW-6	ND	ND	ND	ND	ND	ND	ND
	STMW-7	ND	NA	ND	ND	ND	ND	NA
4/06/93	STMW-1	1.3	ND	ND	ND	ND	ND	1.6
	STMW-2	0.21	ND	ND	ND	ND	ND	0.6
	STMW-3	0.33	21	0.062	0.076	0.084	0.2	0.7
	STMW-4	ND	2.5	0.0052	0.0063	0.011	0.017	ND
	STMW-5	ND	ND	ND	ND	ND	ND	ND
	STMW-6	ND	ND	ND	ND	ND	ND	ND
	STMW-7	0.19	NA	ND	ND	ND	ND	NA

TABLE 3 CONT'D
GROUNDWATER ANALYTICAL RESULTS
IN
MILLIGRAMS PER LITER (mg/l)

Date	Well #	TPHd	TPHg	B	T	E	X	TOG
7/12/93	STMW-1	0.14	ND	ND	ND	ND	ND	0.7
	STMW-2	ND	1.6	0.0014	0.0023	0.0025	0.0082	12
	STMW-3	1.6	22	0.022	0.041	0.042	0.12	ND
	STMW-4	ND	2.0	0.0018	0.0038	0.0039	0.011	ND
	STMW-5	ND	0.27	ND	ND	0.0006	0.0014	ND
	STMW-6	NA	NA	NA	NA	NA	NA	NA
	STMW-7	0.08	NA	ND	ND	ND	ND	NA
	SDWS	NL	NL	0.001	0.100*	0.68	1.75	NL

TPHd - Total Petroleum Hydrocarbons as diesel
TPHg - Total Petroleum Hydrocarbons as gasoline
BTEX - Benzene, Toluene, Ethylbenzene, Total Xylenes
TOG - Total Oil and Grease
ND - Not Detected (Below Laboratory Detection Limit)
NA - Not Analyzed
NL - No MCL Levels
* - Action Level not Enforceable-Health Based Advisory Levels

well MW-3 should be upgradient from the former gasoline tank cluster. The Soil Tech Engineering reports present no discussion or explanation for this apparent anomaly.

Every gasoline tank cluster monitoring well, with the exception of MW-6, has produced groundwater samples containing detectable gasoline contamination. Groundwater samples from monitoring wells MW-1, 2, 3 & 4 have all been found to contain benzene in excess of the State Maximum Concentration Limit (MCL). During the most recent sampling cycle, only groundwater samples from monitoring wells MW-1, 2 & 3 were in excess of the benzene MCL.

No groundwater samples from any of the monitoring wells have been analyzed for heavy metals or semi-volatile chlorinated organics. As indicated in Table 3, every monitoring well, with the exception of MW-6, has intermittently been found to contain TPH-diesel and oil & grease.

As is apparent from Figure 2, the existing set of six monitoring wells do not completely define the full extent of groundwater contamination. In particular, it is not known how far the contaminant plume extends south and east of well MW-3 or west and north of well MW-2. Monitoring well MW-6 defines the plume boundary southeast of the former gasoline tank cluster and, presumably, there is no groundwater contamination east (upgradient) of the tank cluster.

In summary, groundwater contamination in excess of State standards is known to exist in the vicinity of the former gasoline tank cluster. The full extent of groundwater contamination is not known. Heavy metal and semi-volatile chlorinated organic contamination was detected in open pit water but has not been analyzed for during later site investigation activities.

3.2 Former Diesel Tank

Only groundwater contamination has been confirmed in the vicinity of the former 10,000 gallon diesel tank. A summary of past sampling results for both soil and groundwater is presented in the following sub-sections.

3.2.1 Soil

The file record indicates that the 10,000 gallon diesel tank was removed in good condition with no indications of leakage (Alameda County Health Department, Hazardous Materials Division Inspection Form, Inspector William Faulhalser). There was no observable contamination in the tank backfill or pit sidewalls based on odor or staining. Soil excavated to remove the tank was apparently used to backfill the hole.

Four soil samples were taken from the 10,000 gallon diesel tank pit sidewalls, two from the west sidewall (labeled Diesel-NW & Diesel-SW)

and two from the east sidewall (labeled Diesel-NE and Diesel-SE). The samples were collected from 6.5 feet below ground surface on February 7, 1991. Each sample was analyzed for TPH-diesel, TPH-gas and BTXE. All four samples were found to be non-detectable for all tested parameters.

In December 1992, Soil Tech Engineering collected two soil samples at depths of three and five feet BGS immediately west of the former 10,000 gallon tank pit. Both samples were analyzed for TPH-diesel and BTXE. Both samples were found to be non-detectable for all tested parameters.

3.2.2 Groundwater

According to the Alameda County Health Department, Hazardous Materials Division Inspection Form completed for this tank removal, there was "oil on water in hole where 10,000 tank pulled". Although the 10,000 gallon tank was removed on February 7, 1991 and there was evidently water in the hole on that date, a pit water sample was not collected until February 25, 1991.

The file record does not contain any information on how the diesel tank pit water sample was collected and apparently the pit was not purged and allowed to recharge prior to sampling. The pit water sample, labeled Diesel Tank Pit, was analyzed for TPH-diesel and BTXE. The pit water sample was found to contain 3,600 ug/l TPH-diesel but was non-detectable for BTXE.

The file record indicates approximately 1,500 gallons of water was pumped from the 10,000 gallon diesel pit on February 25, 1991 just prior to backfilling.

On December 22, 1992, Soil Tech Engineering constructed a groundwater monitoring well (MW-7) immediately downgradient from the former 10,000 gallon tank pit. No contamination was observed in either soil or groundwater during well construction.

Groundwater well MW-7 was initially sampled January 8, 1993. The groundwater sample was analyzed for TPH-diesel and BTXE. No detectable contamination was found.

Groundwater well MW-7 was subsequently monitored on April 6, 1993. On that occasion, the groundwater sample was found to contain 190 ug/l TPH-diesel but no detectable BTXE. Similarly, on July 12, 1993 groundwater sample MW-7 contained 80 ug/l TPH-diesel and no BTXE. All three sample analyses results for monitoring well MW-7 are presented in Table 3.

4.0 PROPOSED SITE INVESTIGATION

In this Section, proposed action to further investigate known contamination at both the former gasoline tank cluster and former 10,000 gallon diesel tank site is presented.

4.1 Former Gasoline Tank Cluster

Additional site investigation is required to fully define both soil and groundwater contamination in the vicinity of the former gasoline tank cluster. Proposed actions are described in the following sub-sections.

4.1.1 Soil

Residual soil contamination is present on at least two sides of the former gasoline tank cluster. Further site investigation is proposed to fully define the extent and magnitude of contamination.

Objectives

- Define the lateral and vertical extent of soil contamination
- Identify potential non-gasoline contaminants
- Acquire data to design an effective and efficient remediation by excavation project

Scope

- Complete soils borings and associated soil sampling
- Analyze soil samples in a DHS certified testing laboratory
- Abandon borings not intended as monitoring wells

Approach

It is intended to complete at least seven new soils borings around the former gasoline tank cluster as indicated on Figure 3. Two borings have been sited north and south of existing well MW-2 in order to define the extent of soil contamination west of the former gasoline tank cluster. One boring is sited north of pit sidewall sample location SOIL-9 to investigate possible contamination in that direction. Similarly, a boring is sited south of pit sidewall sample location SOIL-11.

Three borings have been sited along the west side of the main plant building. These borings are intended to define the easterly extent of soil contamination and to determine if contamination has migrated under any building structures. If necessary, angle boring will be performed to collect soil samples under structural barriers.

During the boring process, both soil cuttings and core samples will be field screened for the presence of obvious contamination. In the event

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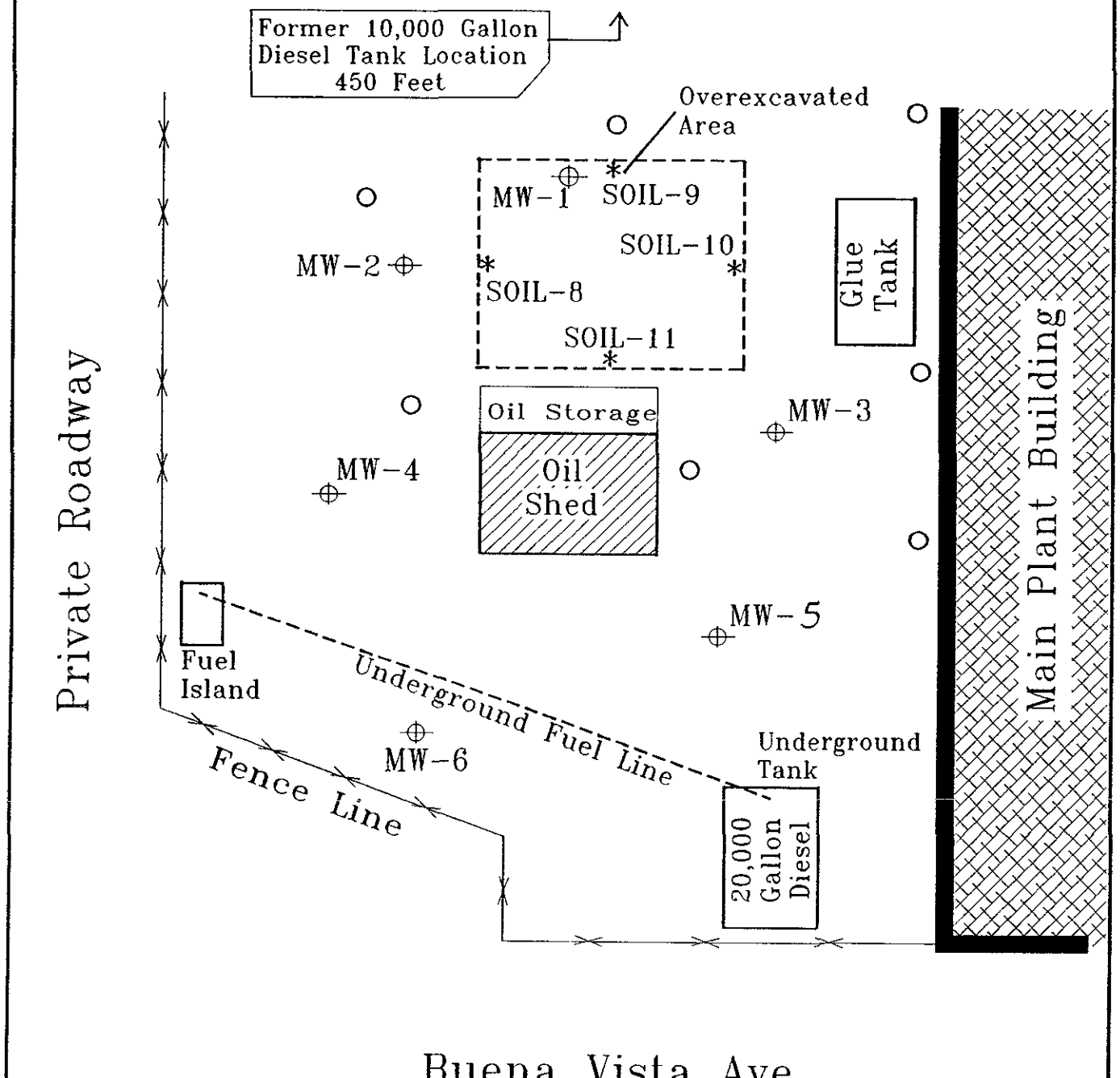
Project Name: Weyerhaeuser - Alameda | 70288.01

Location: 1801 Hibbard Str., Alameda, CA 94501

Drawing By: BWW | Date: Nov., 1993 | Scale: 1" = 20'



LEGEND

⊕ Existing Well

* Sidewall Soil Sample Location

O Proposed Soil Boring Location

Figure 3

significant contamination is encountered at any of the locations indicated on Figure 3, a decision will be made in the field to perform additional borings. It is the intent of this investigation to complete sufficient borings and soil sampling to completely define the extent of soil contamination.

It is intended to complete all borings utilizing a powered, continuous flight, hollow stem auger drill rig. Undisturbed soil samples will be collected using a split spoon sampler fitted with new brass inserts. Drilling and soil sampling specifications will comply with State Water Board and Tri-Regional Board Staff Recommendations For Preliminary Evaluation and Investigation of Underground Tank Sites. Drilling and sampling specifications are presented in the appendix section: SOIL BORINGS AND SAMPLING.

Nominally, soil samples will be collected at 3 feet and 7 feet BGS to be consistent with the protocol established by Soil Tech Engineers. If groundwater is encountered shallower than 7 feet, a soil sample will be collected at the capillary fringe. If groundwater is deeper than 7 feet BGS, the boring will be advanced to the saturated zone and a third sample collected at the capillary fringe.

If obvious soil contamination is identified in the field, the supervising engineer may elect to collect soil samples at depths other than 3 and 7 feet BGS. At a minimum, two soil samples will be collected from each boring.

All soil samples will be sealed, labeled, chilled and entered on a chain of custody form as specified in the appendix section: SOIL BORINGS AND SAMPLING. Soil samples will be hand carried to a DHS certified laboratory for analytical testing. Each sample will be discreetly analyzed for TPH in the gas/kerosene/diesel and BTXE by EPA method 8260, GC/MS and total oil & grease by EPA method 5520. Soil samples observed in the field to be contaminated, or those found to be contaminated by analyses listed above, will be further tested for semi-volatile chlorinated organics by EPA method 8270 and heavy metals (Cr, Cd, Pb, Zn & Ni). Minimum detection limits will comply with specifications as listed in the Tri-Regional Guidelines.

All borings will be permitted in accordance with prevailing Alameda County and/or Alameda County Flood Control District regulations. Soil cuttings will be containerized, labeled and stored on-site pending receipt of laboratory analysis and arrangements for proper disposal. Each boring will be abandoned at the conclusion of soil sampling by filling with hydrated bentonite hole plug.

Summary

A minimum of seven soil borings are proposed. At least two soil samples will be collected from each boring. Each soil sample will be analyzed for petroleum contamination and possibly semi-volatile chlorinateds or heavy metals. The data acquired from the boring program will allow the full extent of soil contamination to be defined.

4.1.2 Groundwater

Since monitoring began in 1991, detectable groundwater contamination has consistently been found in five of six former gasoline cluster monitoring wells. The existing configuration of six monitoring wells does not fully define the contaminant plume. Construction of additional monitoring wells is proposed to determine the plume geometry.

Objectives

- Define the extent of contaminated groundwater
- Identify any non-gasoline groundwater contaminants
- Acquire hydrologic data sufficient to select an appropriate remedial approach

Scope

- Convert two soil borings into groundwater monitoring wells
- Construct at least two additional monitoring wells for a total of four new wells
- Develop, measure depth to groundwater, collect groundwater samples and survey well tops of all new monitoring wells
- Analyze groundwater samples for contaminants of interest

Approach

It is intended to convert two of the soil borings described in Section 4.1.1 into groundwater monitoring wells. The proposed locations are illustrated on Figure 4. Both locations are east of existing monitoring well MW-3, next to the plant building wall. The southerly monitoring well, tentatively labeled MW-8, is intended to define the contaminant plume boundary south of the former gasoline tank cluster. Proposed new monitoring well MW-9 is intended to define the extent of groundwater contamination east of the former gasoline tank cluster. Groundwater data from both MW-8 and MW-9 will indicate whether contamination has migrated under the plant building.

Soil remediation will likely result in the removal of existing monitoring wells MW-2 and MW-3. New well locations have been sited to compensate for the loss of those sampling points.

It is proposed to site two new groundwater monitoring wells west of the former gasoline tank cluster, outside the area of soil investigation. Labeled MW-10 and MW-11 on Figure 4, these two wells are intended to define the contaminant plume boundary east and north of existing well MW-2.

Groundwater samples will be bailed from the bottom of each bore hole prior to monitoring well construction. Each groundwater samples will be inspected for the presence of floating product and will be field analyzed utilizing a photoionization detector (PID). Dependent on field

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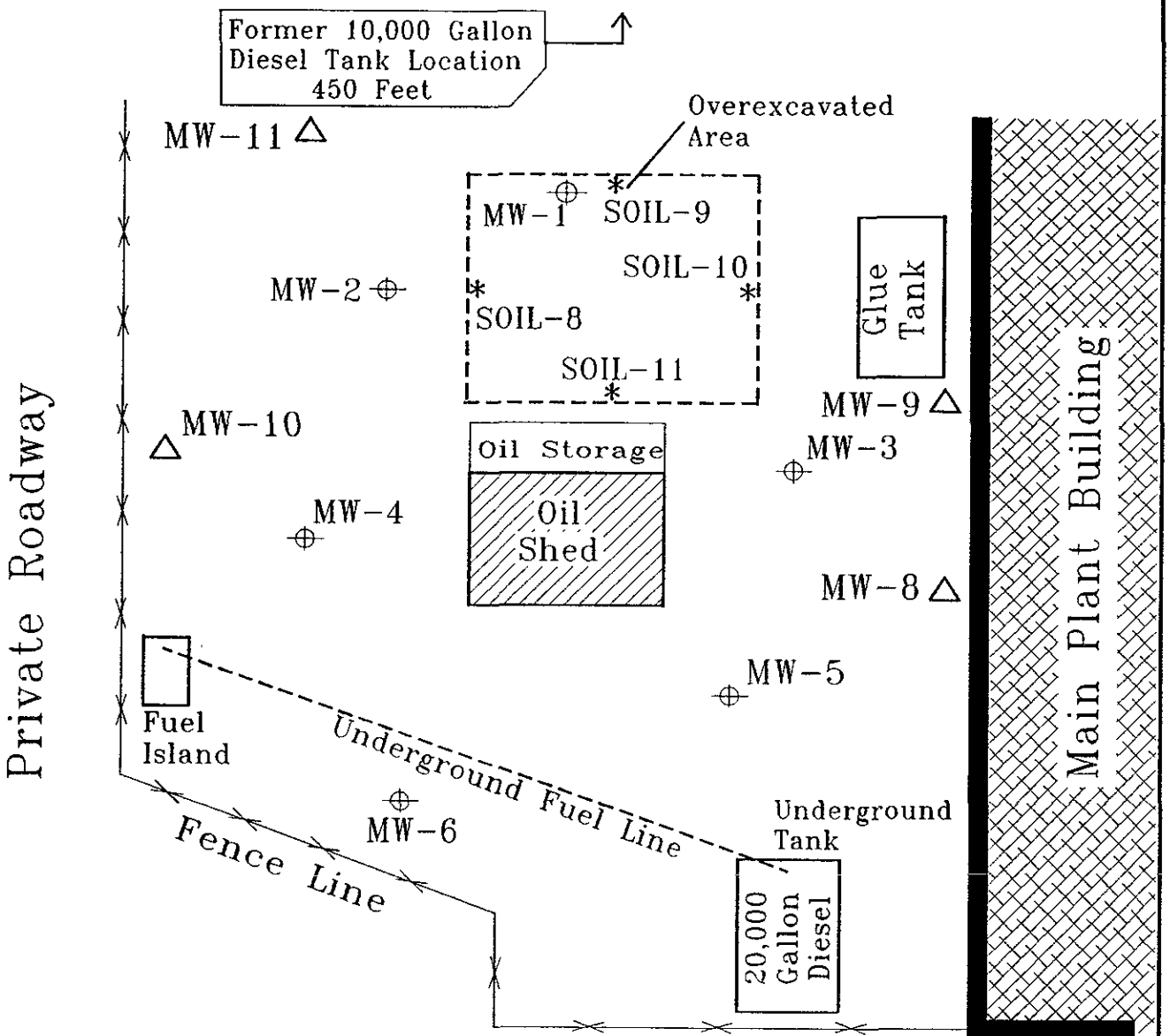
Location: 1801 Hibbard Str., Alameda, CA 94501		
Drawing By: BWW	Date: Nov., 1993	Scale: 1" = 20'



Buena Vista Ave.

LEGEND

⊕ Existing Well △ Proposed Monitoring Well Location

* Sidewall Soil Sample Location

Figure 4

analysis, the supervising engineer may adjust a monitoring well location slightly to better define the contaminant plume boundary. It is not proposed, however, to install additional wells other than the four indicated on Figure 4.

Each groundwater monitoring well will be constructed to State and Tri-Regional guidelines as presented in the appendix section: GROUNDWATER WELLS. Each monitoring well will be constructed of 4" diameter, schedule 40 PVC. Screened sections will penetrate no more than 10' into the saturated zone and be factory cut with 0.020" slots. Each well top will be protected with a water tight, locking cap and traffic rated steel cover.

Completed monitoring wells will be developed by surging and pumping. A surge block will be used to churn the water column. After surging, the well will be de-watered with a high capacity submersible pump. The process will be completed until visible turbidity is absent. Purge water will be containerized on site pending receipt of laboratory analyses and arrangement for proper disposal.

All ten well tops will be surveyed. Both horizontal and vertical coordinates will be established. Well locations will be surveyed horizontally to an accuracy of 0.10 feet. Well tops will be surveyed vertically to an accuracy of 0.01 feet.

Monitoring Schedule

It is proposed to monitor both new and existing site wells. Monitoring at each well will consist of checking for floating product, measuring depth to groundwater and groundwater sample collection.

A period of at least one week will be allowed to elapse between new well development and groundwater sampling to allow for well stabilization. Monitoring well sampling specifications are presented in appendix section: MONITORING WELLS. Important elements of monitoring well sampling include:

- Test for floating product by bailing with a transparent bailer
- Measure depth to groundwater with an electronic sounding probe
- Purge at least 3 well volumes of water prior to sample collection
- Monitor groundwater temperature, ph and conductivity while purging
- Avoid cross-contamination during sample collection

Groundwater samples will be hand carried to a State DHS certified laboratory for chemical analysis. Groundwater samples from each well will be analyzed for:

- TPH - gas/kerosene/diesel
- Oil & Grease
- BTXE
- Volatile chlorinated organics
- Semi-volatile chlorinated organics
- Heavy metals (Cr, Cd, Pb, Ni, Zn)

Minimum detection limits will comply with minimum Tri-Regional specifications.

It is anticipated that the next groundwater monitoring at the Weyerhaeuser Alameda site will occur during the first quarter of 1994. Thereafter, it is proposed to monitor all site groundwater wells quarterly.

4.2 Former Diesel Tank

It is concluded from review of the file record that the 10,000 gallon diesel tank did not leak. If the source groundwater contamination observed in monitoring well MW-7 is the former underground tank it must be a result of overspillage during fill operations. In that case, the quantity of contamination would be small - probably amounting to little more than some contaminated backfill which sloughed into the bottom of the tank pit.

The former 10,000 gallon diesel tank may not be the source of groundwater contamination observed in monitoring well MW-7. Surface spillage or another tank leak are possible alternative sources. The highest contaminant concentration detected in groundwater from MW-7 (190 ug/l) occurred on April 6, 1993 when groundwater was found to be only 2.75 feet BGS.

It is proposed to continue to monitor existing well MW-7, however no new sub-surface investigation in the vicinity of the former 10,000 gallon diesel tank is proposed at this time. During the next sampling cycle, groundwater samples from well MW-7 will be analyzed for:

- TPH - gas/kerosene/diesel
- Oil & Grease
- BTXE
- Volatile chlorinated organics
- semi-volatile chlorinated organics
- Heavy metals (Cr, Cd, Pb, Ni, Zn)

Results of the expanded groundwater analysis will help identify the contaminant source.

Monitoring of new and existing groundwater wells at the former gasoline tank cluster is expected to further define hydrologic conditions at the site, particularly with regard to the groundwater gradient. Based on future hydrologic analysis, the suitability of MW-7 to accurately monitor downgradient groundwater conditions will be reviewed.

5.0 REMEDIAL MEASURES

Specific remedial measures are not proposed at this time. Additional site data is required in order to develop an appropriate remedial program.

Soil

The site investigation proposals described in Section 4 are intended to provide sufficient data to design a detailed soil remediation project. At this time, it is anticipated that soil contamination will be remediated by excavation. All soil contaminated greater than 10 PPM total TPH would be removed. Contaminated soil would be immediately off-hauled to landfill disposal. Pit sidewall samples would be collected every 20 lineal feet to confirm remedial effectiveness.

Two factors could result in re-evaluation of soil excavation as the preferred remedial approach. If testing detects significant non-gasoline contamination, soil disposal could become prohibitively expensive. Alternatively, if soil contamination has migrated under the plant building or other structure, excavation could be impractical.

It is proposed to submit a specific plan for remediation of soil contamination in the site investigation report. The remedial plan will be sufficiently detailed to obtain regulatory agency approval.

Groundwater

The site investigation program described in Section 4 should provide sufficient information to permit selection of a groundwater remediation approach. More groundwater investigation may be required, however, in order to develop a detailed remedial design.

At a minimum, the site investigation report will propose an approach for groundwater remediation. If sufficient information is acquired during this site investigation effort, a more specific proposal will be developed.

No remedial proposal for contaminated groundwater in the vicinity of the 10,000 gallon diesel tank is made at this time. It is proposed to continue groundwater monitoring, as described in Section 4.2.

6.0 REPORT OF FINDINGS

Within 60 days of completing site investigation field work, a written report of findings will be submitted to the Alameda County Health Care Agency and the San Francisco Bay Regional Water Quality Control Board. The report shall include:

- Executive summary
- List of acknowledgements
- Table of contents
- Site status
- Site history
- Location map
- Description of site characteristics
- Boring logs
- Monitoring well diagrams
- Analytical data (including original laboratory report forms)
- Groundwater measurements
- Gradient contours
- Geologic cross sections
- Remedial proposals
- Monitoring well permits
- Purge water data forms
- Recommendations
- Proposed monitoring schedule

7.0 HEALTH & SAFETY PLAN

During the site investigation it is proposed to implement measures to protect workers, the public and the environment from injury or contamination. Health & Safety measures are described in the following Sections.

7.1 Health & Safety Procedures

Objectives

- Protect workers from injury
- Prevent workers, employees or the public from contacting hazardous materials
- Prevent contaminants from entering the environment

Site Safety Officer

A designated site safety officer shall be on-duty during all work activity. The site safety officer shall have completed Hazardous Waste Supervisor, 8 hour training and Hazardous Waste Worker, 40 hour training as defined by OSHA regulation 1910.120.

The site safety officer shall keep a copy of the health & safety plan at the site. The site safety officer shall ensure that all persons at the work site have read and understood the site safety plan. A bound log book available for inspection by regulatory personnel shall be maintained at the site by the safety officer.

The site safety officer shall have a battery powered cellular phone on site at all times. As a backup, the safety officer shall have access to a land line phone in the Weyerhaeuser plant. In the event of emergency, assistance is summoned by dialing 911. The closest responder is:

- City of Alameda Fire Department, Station 3
  1703 Grand Street, Alameda

The nearest location for medical assistance is:

- Alameda Hospital
  2070 Clinton Ave., Alameda
  (510) 522-3700

Hazard Assessment - Physical

The principal hazard associated with the proposed work involves operation of a mobile, hollow stem rotary, drill rig. No excavation or earth moving work is proposed.

Potential hazards include drilling into underground utilities, coming into contact with rotating equipment, falling objects and heavy lifting.

Health & Safety Measures - Physical

The possibility of accidental damage through contact with underground utilities will be minimized by diligently locating all known sub-surface structures before drilling. Since drilling depths are shallow and soil conditions sandy, a low drill torque setting can be used, reducing the threat of utility damage.

The area immediately around the drill rig will be physically cordoned by a combination of barriers and caution tape. The site safety officer shall be responsible for establishing the exclusion zone and for prohibiting entry to unauthorized persons.

All personnel working inside the exclusion zone will be equipped with sturdy, steel toed, footwear; eye protection; protective outer clothing; hearing protection; hard hat; suitable respiratory protection and gloves. Based on the work activity underway, the site safety officer will advise personnel regarding mandatory use of any piece of protective equipment.

The Weyerhaeuser Alameda site is completely fenced. The public does not have access. Weyerhaeuser employees will be briefed concerning safety procedures and can be expected to comply.

Hazard Assessment - Chemical

The following chemical compounds are known to be on site:

- Petroleum Hydrocarbons
- Volatile Aromatics (benzene, toluene, xylene, ethyl benzene)
- Oil & Grease

Personnel may come into contact with these compounds either through inhalation or dermal contact. Ingestion exposure is not possible since eating, drinking and smoking are prohibited in the exclusion area.

Health & Safety Measures - Chemical

All personnel authorized to enter the exclusion zone shall have completed 40 hour health & safety training for hazardous waste workers as defined by OSHA regulation 1910.120. All personnel shall be current with regard to annual 8 hour hazardous waste health & safety training refresher courses.

Air monitoring will be continuously conducted while work activities are underway. A wind speed and direction indicator will be placed in a clearly visible location. Air monitoring will be performed downwind from the boring location using a PhotoVac MP 1500 Photoionization detector (PID). The PID will be calibrated at the start of each work day.

The PID alarm shall be set to 300 PPM total volatiles. If the ambient air concentration exceeds that limit, work will either be stopped until the ambient concentration falls below 300 PPM or respiratory protection will be used.

Each worker within the exclusion zone shall have a properly fitted half face respirator equipped with organic filter cartridges. One spare pack of organic filter cartridges per worker shall be available on site if sub-surface work is underway.

Dermal contact with hazardous chemicals shall be prevented by the use of protective clothing. Workers shall be equipped with tyvex overalls and disposable vinyl gloves. Spare overalls and gloves shall be available on-site while sub-surface work activities are underway.

7.2 Environmental Protection

Contaminated material shall be isolated from the environment. Drill cuttings and purge water shall be immediately placed in DOT approved open top 55 gallon drums. Full drums shall be sealed, labeled (contents, generator name/address and date) and relocated to a secure, temporary on-site storage area.

All decontamination water shall be considered hazardous. Decon water shall be collected in a containment area. Decon water will be periodically transferred to properly labeled 55 gallon drums for temporary on-site storage.

Residue samples will be collected and analyzed in order to arrange for legal disposal. All resides will be transported to proper disposal within 90 days of generation.

Additional specifications describing residue management are presented in the appendix section: EQUIPMENT DECONTAMINATION AND DISPOSAL OF CONTAMINATED MATERIALS.

APPENDICES

SOIL BORINGS AND SAMPLING
MONITORING WELLS
SAMPLE QUALITY ASSURANCE/CONTROL
EQUIPMENT DECONTAMINATION
&
DISPOSAL OF CONTAMINATED MATERIAL

WEST ASSOCIATES

SOILS BORINGS AND SAMPLING

Soil borings shall be completed through the use of a mobil, continuous flight, hollow stem, auger drill rig. The drilling sub-contractor shall have a valid California C-57 license. All borings will be supervised and logged by an engineer or geologist licensed in California.

Materials encountered during the drilling shall be described and classified by the Uniform Soil Classification System (USCS). The supervising professional shall keep a written log of all sub-surface work performed.

Borings will be advanced until reaching the saturated zone or encountering apparently clean soil. Drilling through confining layers or penetrating further than necessary into clean soil will be avoided.

Undisturbed soil samples will be collected with a hammer driven, split spoon, core sampler fitted with new, brass sleeves. The blow count for each 0.5 foot of penetration shall be recorded. Soil samples designated for chemical analysis shall be tightly capped, labeled, sealed in zip lock bags and chilled.

The number and stratigraphic position of soil samples will be selected to adequately define the magnitude and distribution of contamination. Samples will be collected at marked changes in lithography, at the capillary fringe and at the hole bottom.

All borings will be abandoned as soon as possible. Abandonment will be by placement of bentonite hole plug, hydrated with clean water, or pre-mixed bentonite grout. Borings in pavement shall be capped with asphalt or concrete.

All boring locations shall be plotted on a site plan. Horizontal control accuracy shall be at least 0.10 feet.

MONITORING WELLS

Monitoring wells are intended to obtain specific water elevation and quality data. The well is designed to sample a specific aquifer or portion of an aquifer. The design, construction and field oversight of well construction shall be supervised by a civil engineer with current California registration.

Monitoring Well Installation

Monitoring wells will be drilled by a contractor licensed (C-57) in the State of California. Wells will be drilled with a continuous flight hollow stem auger unless site specific conditions preclude its use. An application to install a monitoring well will be filed in all jurisdictions were required.

Specifications for drilling within the vadose zone are described in the Soil Borings Section and will be observed during monitoring well construction. A sample will be taken at the capillary fringe.

The monitoring well boring will extend at least 15 feet into the saturated zone. Drilling through confining layers under contaminated zones will be avoided. If necessary, a large diameter surface casing will be installed through the contaminated zone to prevent the introduction of contaminants into the aquifer.

The monitoring well will be screened at least 15 feet into the aquifer and at least 5 feet above the water table, if possible. A filter pack of chemically inert sand with a grain size and grain size distribution appropriate for the aquifer will be installed from the base of the screened section to 2 feet above the top of the well screen. Well screens and filter backs will not be constructed through impermeable layers.

A three to five foot bentonite annular seal will be placed above the filter pack. The annular space above the seal will be backfilled with grout. A five foot cement surface seal will be placed. A water tight casing top and locking well cover cap will be provided. The well top or cover will be clearly labeled "MONITORING WELL". A traffic rated well cover will be installed if appropriate. Figure 2 presents a typical monitoring well.

Monitoring Well Development

Upon well completion the natural hydraulic conductivity of the formation will be restored and all foreign sediment removed to ensure turbid free, representative, groundwater samples.

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PO BOX 5891, VACAVILLE, CALIFORNIA, 95696

Groundwater Monitoring Well

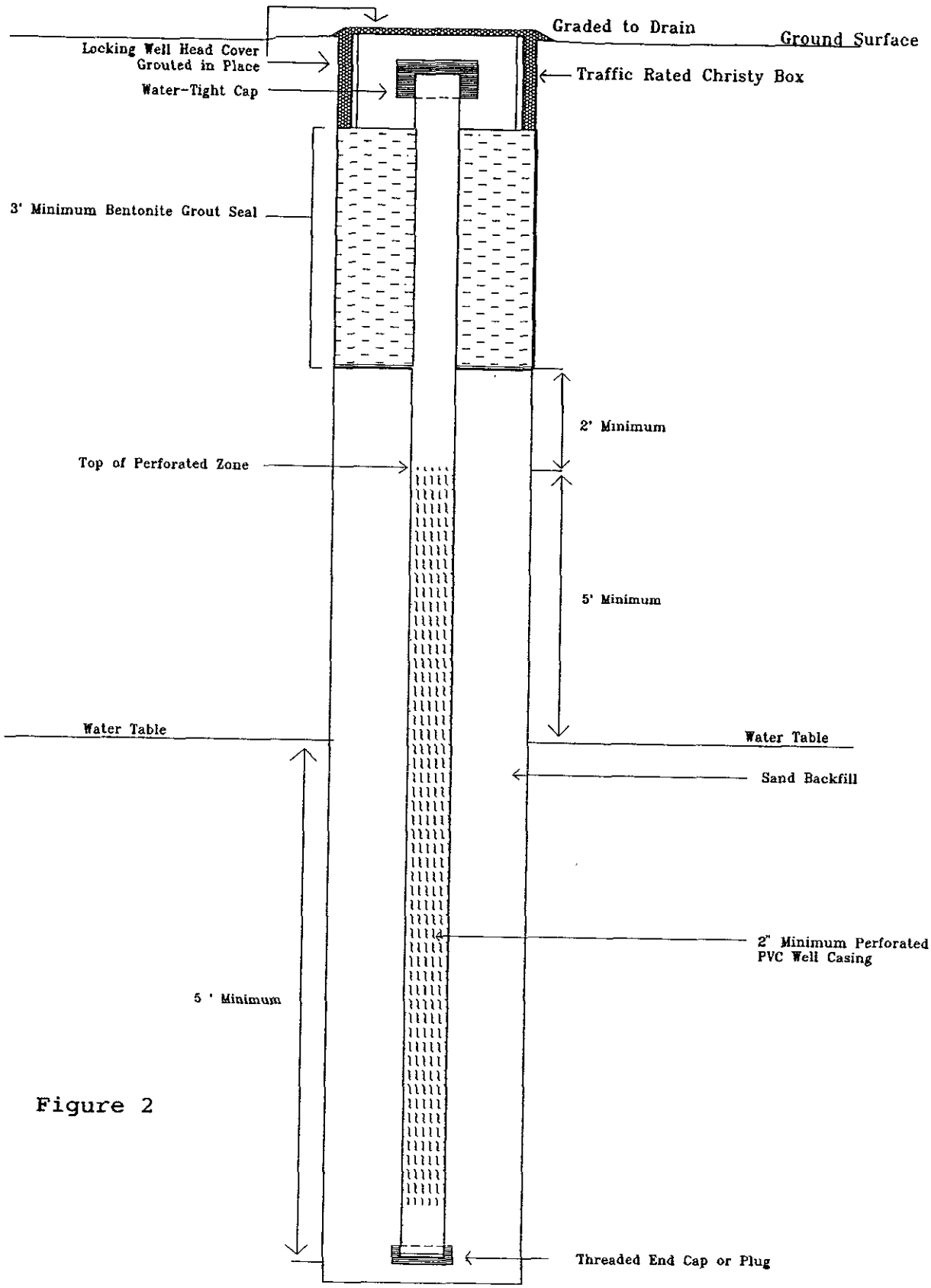

Figure 2

Wells will be developed utilizing surge bailing unless site specific conditions preclude its use. Any outside water introduced for development will be verified uncontaminated and chemically inert. All down hole bailer equipment will be de-contaminated prior to use. The well will be developed until silt free based on Imhoff cone measurement. All extracted fluids will be containerized until sampling for proper disposal.

Groundwater Sampling

Upon completion of development, the well will be allowed to stabilize for a period of time to be determined by the supervising professional. Before collecting a sample for analysis of dissolved constituents, the well shall be purged until temperature, conductivity and ph stabilize.

Alternatively, at least three well volumes shall be pumped or bailed from the well prior to sampling. If this technique is used, the well shall be allowed to recharge to 80% of its original level prior to extracting the sample.

Groundwater samples will be collected using a teflon bailer. Sample containers will be supplied by the analytical laboratory and designed to prevent any loss of volatile constituents. Sample containers will be completely filled so there is no headspace present. Sample containers will be immediately transferred to a chilled storage container and maintained at 4 degrees Centigrade until delivery to the analytical laboratory.

After well purging or bailing at least 24 hours will allowed for stabilization prior to sampling for floating product. A transparent bailer will be used to extract a representative groundwater column from the top of the aquifer. The visible layer of floating product will be measured by gradations on the bailer or some other appropriate method.

Depth to Groundwater Measurement

At least 24 hours shall elapse between well bailing or purging and depth to groundwater measurement. Before commencing depth to groundwater measurement, the well shall be checked for floating product. If significant floating product is present the depth measurement will be corrected by use of an appropriate mathematical calculation.

A datum will be established on or near the top of the well casing utilizing surveying equipment accurate to within 0.01 feet. All well datums will be established from a common point if possible. The depth to groundwater will be measured utilizing an electronic sounding tape utilizing an audible alarm and marked in 0.01 foot increments.

SAMPLE QUALITY ASSURANCE/QUALITY CONTROL

Sample quality will be checked by the use of proper sampling, handling and testing methods. Examples of quality control methods are use of background samples, equipment rinse samples, and trip and field blanks. Chain of custody forms, use of a DHS certified laboratory, acceptable detection limits and proper sample preservation and holding times also provide assurance of accurate analytical data.

Background Samples

Procedures and methods used to obtain, handle, prepare, transport and analyze background samples will be identical to those used for site samples. Background samples will be used to define conditions at the site before the unauthorized release.

An equipment rinse sample will be utilized to detect residual contamination on sampling apparatus. Sampling equipment will be filled with distilled water which will then be transferred to a sample container.

Sample blanks will be used to check for cross-contamination during sample collection, transport and in the laboratory. Two types of sample blanks will be utilized; trip blanks will be used to verify handling, storage and shipment conditions, field blanks will be used to confirm site conditions.

Trip blanks will either be prepared by the analytical laboratory or the responsible professional before traveling to the work site.

One trip blank will be used for each sample set of 20 or less samples. At least 5% trip blanks will be used for sets greater than 20 samples. Trip blanks will remain with the collected samples during transportation and will be analyzed with the field samples to check for any introduced contamination. Trip blanks will not be opened by either the sample collectors or handlers.

Field blank water samples will be opened and exposed at the sampling site to detect contamination from air exposure. The sample will be poured into the sample container to simulate actual sampling conditions.

Chain of Custody Forms

A chain of custody form will be generated for all site samples. The form will accompany the samples from the time of generation to time of analysis. Originals will be retained even if illegibility or inaccuracies require preparation of a replacement. Any corrections will be initialed and dated. Copies will be retained by the supervising professional.

A sample chain of custody form is depicted in the figure on the next page. The site name, collector signature, date and time of collection will always appear. The number and condition of containers, description of samples and sample identification numbers will also be included. The name and signature of all individuals, with inclusive dates of possession, will be recorded.

State Certified Laboratories

All soil and water samples will be analyzed by a commercial laboratory certified by the California Department of Health Services for the intended analysis. Documentation of certification will be presented in all reports containing analytical results.

Detection Limits

Minimum detection limits for analytical procedures are:

COMPOUND	WATER (ppb)	SOIL (ppb)	METHOD*
Benzene	0.3	5.0	EPA 602/8020
Toluene	0.3	5.0	EPA 602/8020
Xylenes (Total)	0.3	5.0	EPA 602/8020
Total Petroleum Hydrocarbons	500.0	1,000.0	DHS mod. 8015 (GC-FID)

* Alternatively, EPA method 8260, Fuel Fingerprint by one-pass mass spectrometry may be substituted.

Sample Preservation and Holding Time

PARAMETER	MATRIX	CONTAINER	HOLDING TIME	PRESERVATION
TPH	Soil	3" stainless or brass cylinder	14 days	Frozen
	Water		40 days	4°C
BTXE	Soil	40ml glass vial teflon faced silicon septum	14 days	4°C
	Water		40 days	4°C
Organic Lead	Soil	3" SS or brass cylinder	14 days	Frozen
	Water	40ml glass vial	4 days	4°C

COAST - TO - COAST ANALYTICAL SERVICES

141 Suburban Road • San Luis Obispo, CA 93401 • (805) 543-2553 FAX (805) 543-2685
751 S. Kellogg, Suite A • Goleta, CA 93117 • (805) 964-7838 FAX (805) 967-4386
6006 Egret Ct. • Benicia, CA 94510 • (707) 747-2757 FAX (707) 747-2765
2400 Cumberland Dr. • Valparaiso, Indiana 46383 • (219) 464-2389 FAX (219) 462-2953

Chain of Custody

Page _____ of _____

• PLEASE PRINT IN PEN

Client: West & Hansen	Contact: Brian W. West	Phone #: (707) 451-1360	FAX #: ( )
Address: 112 Pepperell Court	City: Vacaville	State: CA	Zip: 95688
Project Name/Number		Project MGR: Brian West	
Bill (If different than above)	Address		
Sampler (Print and sign)	Due Date	Circle for RUSH*	Copies To: / Auth. Init.

Sample Description	Date/Time Coll'd	*Matrix	# of Containers	Pres.	Filt. y/n	* Subject to Availability Analysis	Remarks	Lab ID #

Relinquished By	Date/Time	Received By	Relinquished By	Date/Time	Received By

FOR LAB USE ONLY

Shipping Method	Shipping #	Received By	Date/Time	Condition (See Remarks)		
				Cold	Sealed	Intact

REMARKS _____

ORIGINA

*** Matrix:**
DW - Drinking Water
WW - Wastewater
GW - Groundwater
SW - Surface Water
IM - Impinger
FI - Filter
FP - Free Product
A/G - Air/Gas
SL - Sludge/Soil/Solid
OT - Other _____

WEST ASSOCIATES

EQUIPMENT DECONTAMINATION AND DISPOSAL OF CONTAMINATED MATERIAL

Decontamination

All downhole tools and equipment will be decontaminated prior to use at each sample location. Most site equipment will be decontaminated using a portable steam cleaner. Equipment or materials not suitable for high temperature cleaning will be decontaminated utilizing a USEPA Region IX recommended method.

All downhole equipment or other tools, supplies and apparatus coming into contact with potentially contaminated material shall be decontaminated prior to transport off site.

Categorization and Disposal

All excavated soil, drill cuttings, generated fluids, equipment rinsate and contaminated disposable supplies will be containerized onsite until demonstrated to be nonhazardous or designated for proper treatment or disposal. Obviously contaminated material will be segregated from apparently clean material to avoid cross contamination.

Material in each container will be logged as to type and point of origin to facilitate proper categorization. Additional sampling will be performed as necessary to classify each lot.

All regulated material will be manifested and transported to proper disposal as required by law. Material verified non-hazardous will be dispensed with in an appropriate manner.