PROPOSED REMEDIAL WORKPLAN

SOIL EXCAVATION
and
SPARGING SYSTEM CONSTRUCTION

WEYERHAEUSER PAPER COMPANY
1801 HIBBARD STREET
ALAMEDA, CALIFORNIA

Submitted to:

ALAMEDA COUNTY HEALTH CARE AGENCY
DIVISION OF HAZARDOUS MATERIALS
Alameda

Prepared for:

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

Prepared by:

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.
Vacaville, California

September 1995

ACKNOWLEDGEMENTS

This report was prepared under authorization of the Weyerhaeuser Corporation, Office of the Environment, Toxic/Solid Waste Team, Tacoma, Washington. The Weyerhaeuser project officer is Mr. Ed Granados, mail stop CH 1K29, Tacoma, WA 98477; (206) 924-3934.

At the Alameda Corrugated Box plant, both Mr. John Hipner, Plant Engineer and Mr. Tom Muncell, Maintenance Manager, have environmental compliance responsibilities related to this project. The Alameda plant address is 1801 Hibbard Street, PO Drawer X, Alameda, CA 95601; (510) 814-1167.

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 1131 Harbor Bay Parkway, Suite 250, Alameda, CA 94502-6577; (510) 567-6700.

In the preparation of this workplan reliance was made on past site work performed by Soil Tech Engineering, Inc. Material in this workplan taken directly from a Soil Tech report is so noted. 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.

This workplan was prepared by West & Associates Environmental Engineers, Inc. West & Associates is located at 490 Merchant Street, Suite 104, 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).

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1.0 INTRODUCTION

This workplan describes proposed methods for remediation of soil contamination in the vicinity of a former underground fuel storage tank cluster at the Weyerhaeuser Paper Company (WPC) property in Alameda. Remediation of soil contamination at the WPC site is necessary in order to attain groundwater quality standards.

1.1 Objectives

The objective of this proposed project is excavation of the maximum practical amount of petroleum and solvent contamination from the vicinity of the former underground gasoline storage tank cluster. Pit de-watering to permit excavation below the capillary fringe will be attempted. Specific project objectives include:

- Excavate all contamination in the vadose zone outside the footprint of the main plant building
- Excavate contamination within the saturated zone as practical
- Aerate excavated soil to less than 1 PPM TPH on-site
- Construct an air sparging grid in the bottom of the excavation
- Replace aerated soil in the excavation and restore the site to its original configuration

Proper management of pit water is also an objective of this project.

1.2 Scope

The scope of this workplan includes remediation of soil contamination in the vicinity of the former underground gasoline tank cluster at 1801 Hibbard Street in Alameda. Remediation of groundwater contamination is not a part of this proposal. It is proposed to operate a groundwater sparging system after remediation of soil contamination in order to remediate groundwater contamination.

Specifically, the scope of this workplan includes presentation of methods and techniques for:

- Identification of underground utilities and pavement removal
- Excavation of contaminated soil
- Air monitoring
- On-site aeration of contaminated soil in conformance with prevailing environmental regulations
- Soil sampling
- Design and installation of an air sparging grid
- Pit de-watering and proper management of contaminated groundwater
- Site restoration
- Project health & safety

Preparation of a written report of findings including proposals for future remedial activity is also a part of this workplan.

1.3 Summarized Background

The Weyerhaeuser Paper Company (WPC) Alameda facility at 1801 Hibbard Str. manufacturers corrugated cardboard boxes. The facility was originally constructed in 1946. Underground fuel tanks had been historically installed at the facility for vehicle, generator and boiler fuel storage. Both gasoline and diesel fuels were formerly stored underground. All underground fuel storage capacity has now been removed, the last remaining underground tank having been taken out in January 1994.

The WPC facility is located on Alameda island in San Francisco Bay. The site is less than 0.25 miles west of the Oakland Inner Harbor. Site soils are predominantly sand with minor clay stringers. Groundwater is 3-6 feet below ground surface and tidally influenced.

Two former underground tank installations currently have open case files: the 1991 diesel tank and the 1991 gasoline tank cluster. The 1991 designation refers to the year of removal. This workplan addresses soil remediation in the vicinity of the 1991 gasoline tank cluster.

The 1991 gasoline tank cluster consisted of three 1,000 gallon gasoline tanks. Apparently, one of the tanks was also used for waste oil storage. Leakage from the 1991 gasoline tank cluster is the predominant environmental problem on-site. Both soil and groundwater contamination exists as a result of 1991 gasoline tank cluster leakage.

There was an attempt at soil remediation made during the 1991 gasoline tank cluster removal. A series of three overexcavations were completed before site constraints rendered further excavation impractical. The final excavation dimensions were approximately 30'x 30'. It has been determined that soil contamination extends considerably further than the final overexcavation dimensions in the west, north and south directions.

Soil Tech Engineering, Inc. (STE) performed a series of site investigations at the WPC facility beginning in 1991. STE eventually installed seven groundwater monitoring wells and performed periodic groundwater monitoring.

Throughout 1994, West & Associates Environmental Engineers, Inc. conducted further site investigations at the 1991 gasoline tank cluster study area and performed quarterly groundwater monitoring.

A total of four groundwater wells were installed including one (MW-12) through the floor of the main plant building, 20 feet inside the building footprint. The presence of contamination under the main plant building was confirmed by an angle boring (SB-2) completed in October.

Soil and groundwater contamination at the WPC site in the vicinity of the 1991 gasoline tank cluster is in excess of usually accepted limits. Remedial measures are needed to reduce contaminant levels to closure standards. Although soil excavation was not the first choice remedial approach at the WPC site, it has now been selected as the most appropriate technique.

2.0 SITE CHARACTERISTICS

In this Section, physical characteristics pertinent to the proposed remedial project are presented.

2.1 Site Location

The Weyerhaeuser Paper Company, Alameda Corrugated Box facility address is 1801 Hibbard Street. The property is on the northeast corner of Hibbard and Buena Vista Streets. The site is in the city of Alameda and within the County of Alameda. Alameda is in the San Francisco Bay Water Quality Control Region. The WPC site appears on the Oakland West 7.5' USGS topographic map quadrangle.

Figure 1 illustrates the WPC regional setting. The immediate site vicinity is presented in Figure 2. Figure 3 illustrates the 1991 gasoline tank cluster area.

2.2 Topography and Surface Runoff

The WPC site is on 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. There is a slight slope from west to east, ie towards the Oakland Inner Harbor. 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. The harbor shoreline is less than 0.25 miles east of the WPC property.

2.3 Soils

Shallow soil characteristics at the WPC site are well known due to the many borings completed during site investigation. Horizontally, soil conditions throughout the 1991 gasoline tank cluster study area are fairly uniform. Site soils are predominantly fine grained silty sands with minor clay stringers. WPC soil falls into the CL classification based on the USCS system. The prevalence of clay increases slightly from north to south.

Vertically, soil conditions under the WPC site are also fairly uniform, although it is only possible to retrieve representative soil samples down to about 12 feet BGS due to groundwater conditions. Vertical pit sidewalls were observed to be quite stable during the 1994 diesel tank removal and it has been noted that borings remain open after auger removal, at least in the vadose zone.

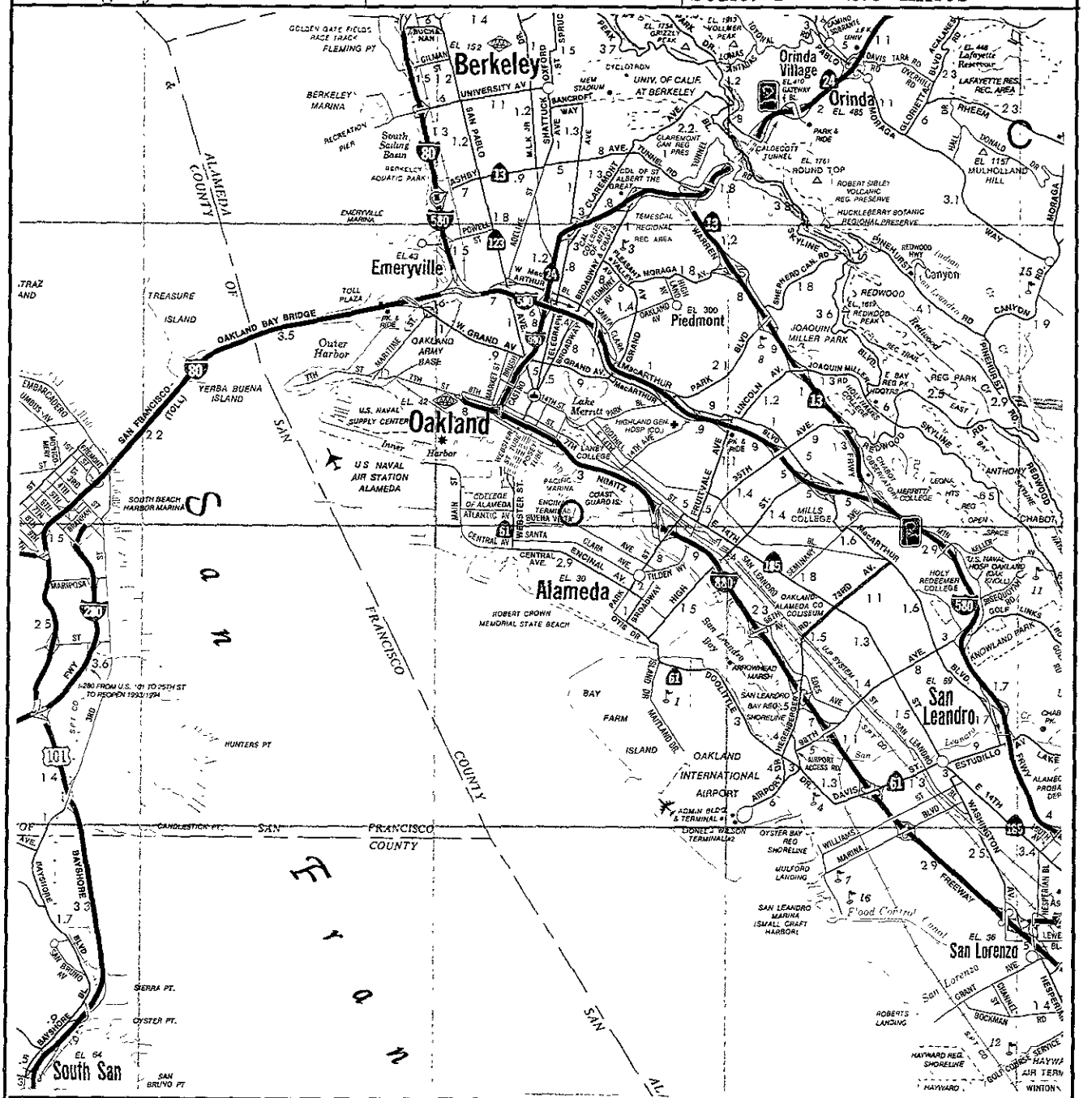
WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.

PO Box 5891, Vacaville, California 95696

Project Name: Weyerhaeuser Paper Company - Alameda | Date: Jan. 1995

Location: 1801 Hibbard Str., Alameda, California 94501

Drawing By: BWW | Scale: 1" = 2.5 miles



LEGEND

○ SITE LOCATION

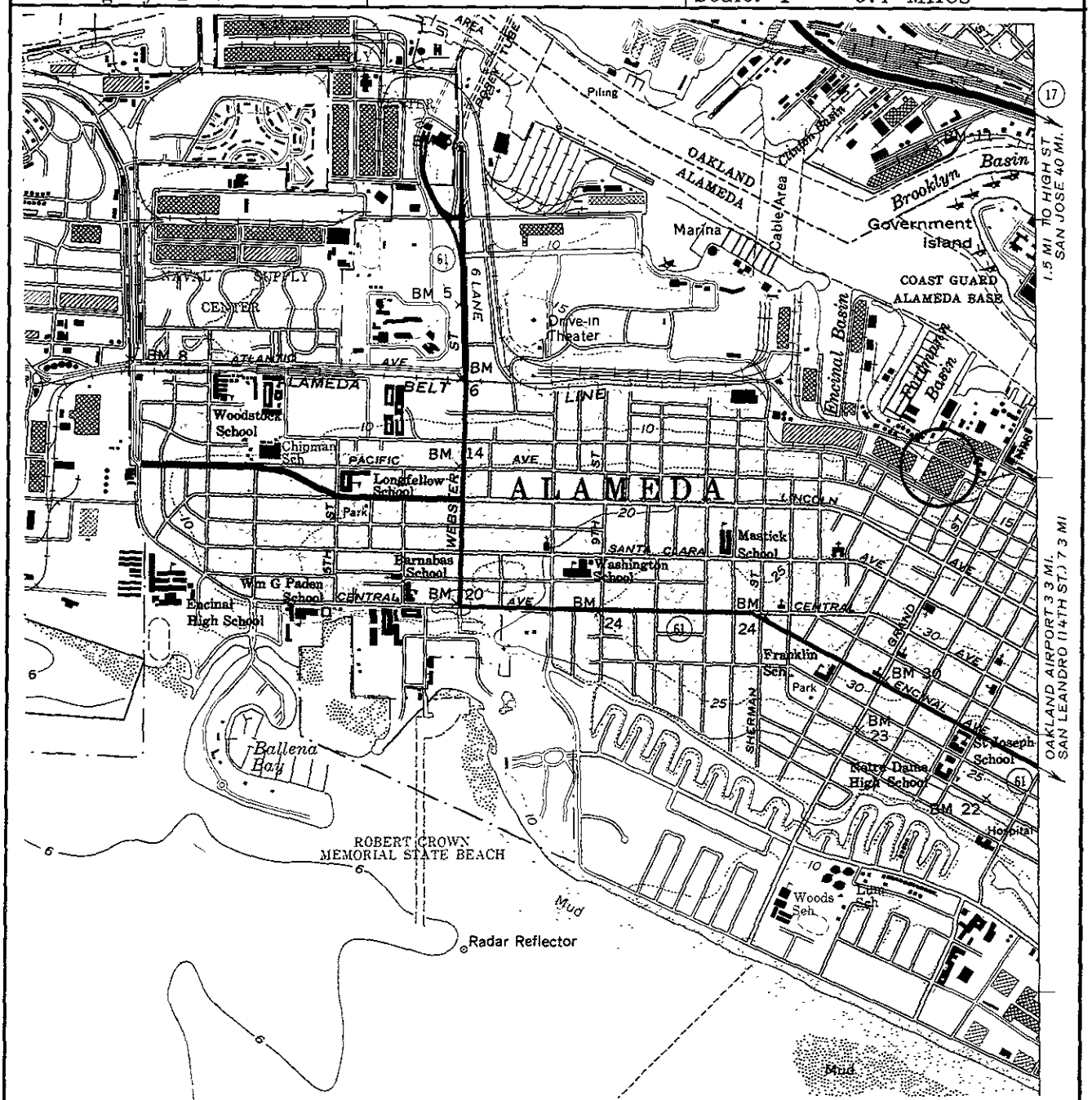
Figure 1

WPC ALAMEDA FACILITY - REGIONAL SETTING

WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.

PO Box 5891, Vacaville, California 95696

Project Name: Weyerhaeuser Paper Company - Alameda	Date: Jan. 1995
Location: 1801 Hibbard Str., Alameda, California 94501	
Drawing By: BWW	Scale: 1" = 0.4 Miles



LEGEND

O SITE LOCATION

Figure 2

WPC ALAMEDA FACILITY - SITE LOCATION

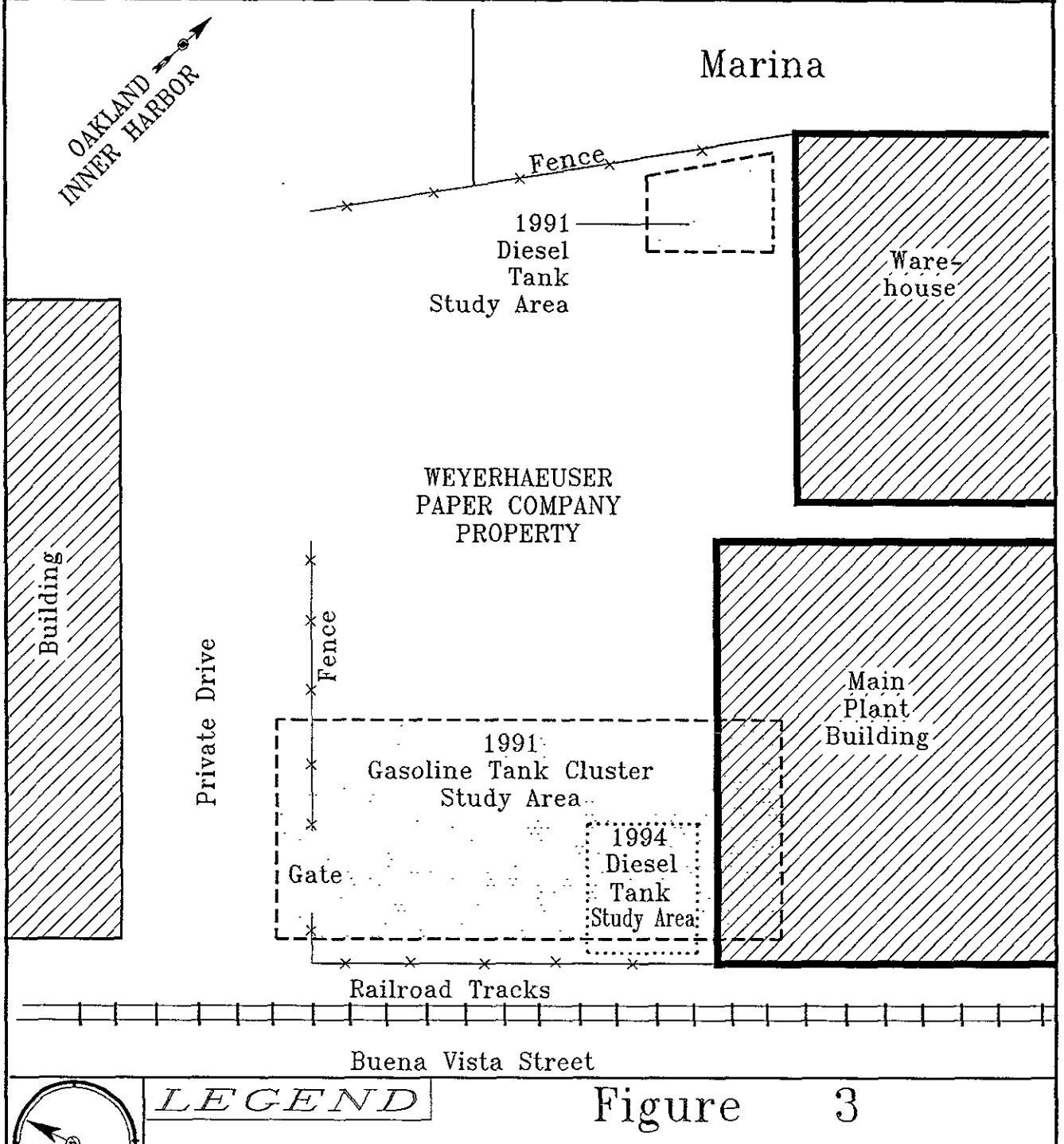
WEST & ASSOCIATES ENVIRONMENTAL ENGINEERS, INC.

PO Box 5891, Vacaville, California 95696

Project Name: WPC ALAMEDA FACILITY | Date: Jan. 1995

Location: 1801 Hibbard Str., Alameda, California 94501

Drawing By: BWW | Scale: 1" = 100'



LEGEND

Figure 3

SITE INVESTIGATION STUDY AREAS

2.4 Hydrology

Groundwater is shallow under the Weyerhaeuser Alameda site. Depth to groundwater has been measured as shallow as 2.12 feet (well MW-7, January 8, 1993) BGS and as deep as 8.14 feet BGS (well MW-6, July 31, 1992). Groundwater becomes shallower as one approaches the Oakland Inner Harbor (east of the facility). 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 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 close proximity of the Weyerhaeuser site to San Francisco Bay. 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.

3.0 CONTAMINANT PROFILE

Apparently, one of the three tanks formerly in the 1991 gasoline tank cluster was once used to store waste oil. Soil sampling performed during the overexcavation identified not only detectable levels of the expected gasoline compounds but also total petroleum hydrocarbons (TPH) as diesel; kerosene; oil & grease; some semi-volatile chlorinated organics; and heavy metals. Soils analysis for volatile chlorinated organics was also performed however none were detected.

High contaminant concentrations were 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. Based on soil sample results obtained by STE it appeared that the most highly contaminated soil had been removed during the overexcavation. Their soil sample analytical results were orders of magnitude less than those obtained from the tank bedding. However, it was observed during the most recent site investigation that standard laboratory analytical techniques resulted in soil contaminant concentrations significantly less than that measured in the field with a PID. When soil samples were re-analyzed in the laboratory utilizing a headspace "fuel fingerprint in air" method, significantly greater contaminant levels were measured. Apparently, STE's soil analytical results understate actual contaminant levels.

Table 1 presents soil analytical results from the tank excavation sidewalls and from borings completed by STE during their investigations of 1992-1993. Figure 4 illustrates the soil sample locations.

With reference to Figure 4, two soil sample 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.

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. Apparently, the observed difficulty in accurately testing volatile compounds from sandy site soils is the cause of these discrepancies.

Although soil removed during the overexcavation was found to contain semi-volatile chlorinated organics and heavy metals, STE did not test any soil samples for these compounds in any of their site investigations.

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 detected. 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, naphthalene and methylnapthalene. (see footnote to Table 1).

LEDGEND

- ▲ Soil Boring
- ⊕ Monitoring Well
- ○ Pit Sidewall or Bottom

MW-12

MAIN PLANT BUILDING

BOILER ROOM

MACHINE SHOP

REST ROOM

OFFICES

SB-1

SB-2

B-4

B-MW 8

MW-9

MW-3

B-1

HOT WAX TANK

MANHOLE

SOIL 10

4" SS

PIPE TRENCH

B-5

MW-5

FIRST OVEREXCAVATION

2nd OVEREXCAVATION

3rd OVEREXCAVATION

SOIL 9

GAS TANK

GAS TANK

GAS TANK

SOIL 11

MW-1

CANOPY

OIL STORAGE BUILDING

PIT WALL

1994 DIESEL TANK EXCAVATION

PIT MIDDLE

NORTH TANK PIT

SOUTH TANK PIT

PROPANE ENCLOSURE

B-2

PLATE

MW-6

SOIL 8

MW-2

B-3

MW-11

MW-4

PIPING TRENCH

8" SEWER

BUENA VISTA ST. →

B-MW 10

A.G. TANK

SAND CRIB

MANHOLE

WASTE OIL TANK

FORMER DISPENSER

GATE

MW-10

PRIVATE DRIVE

N

WEYERHAEUSER - ALAMEDA

SCALE: 1" = 10'	APPROVED BY:	DRAWN BY BWW
DATE: FEB. 94		REVISED

ALL SOIL SAMPLE LOCATIONS: 1991-1994

1801 HIBBARD ST.

DRAWING NUMBER FIG. 4

11 X 17 PRINTED ON NO. 1000H CLEARPRINT ●

TABLE 1
SOIL CONTAMINANT CONCENTRATIONS
TANK REMOVAL & STE SOIL SAMPLES
1991 GASOLINE TANK CLUSTER AREA
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

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. Soil metals concentrations encountered during the West & Associates site investigation were similarly low.

During 1994, West & Associates completed a total of twelve soil borings in and around the 1991 gasoline tank cluster area. Ten of the borings were completed in January 1994 (B-1, B-2, B-3, B-4, B-5, B-MW8, B-MW10, MW-9, MW-10 & MW-11), one of the borings (SB-2) was completed in September 1994 and one boring (MW-12) was completed in December 1994. All borings with the exception of SB-2 were completed utilizing a powered continuous flight auger. Boring SB-2 was a hand augered boring angled under the building foundation. Figure 4 depicts the West & Associates soil sampling locations.

A total of eighteen soil samples collected from the West & Associates borings were submitted for laboratory analysis. Additionally, one soil sample was collected from the pit sidewall of the 1994 diesel tank excavation west of the oil storage building.

TABLE 2
TANK REMOVAL & STE SOIL SAMPLES
NON-GASOLINE SOIL CONTAMINANTS
1991 GASOLINE TANK CLUSTER
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

Soil samples were submitted to Coast to Coast Analytical Laboratories (later Pace Analytical) for total petroleum hydrocarbon and benzene, toluene, xylene & ethyl benzene analysis. Soil samples were also tested for metals, volatile organics and semi-volatile organics.

Seven of the eighteen soil samples submitted for analysis had registered significant total volatile contamination based on field testing with a photoionization detector. However, no significant gasoline contamination was reported by Coast to Coast Analytical in any of the eighteen soil samples submitted.

Eventually it was determined that in-lab handling of the sandy site soils resulted in the loss of volatiles observed in the analytical results. Consequently, the seven suspect soil samples were re-analyzed utilizing a head space "fuel fingerprint in air" technique which minimized sample handling and resultant volatile loss. Significant gasoline contamination was detected in six of the suspect soil samples utilizing the head space technique.

Soil samples from borings B-MW10, B-4 and from monitoring well MW-9 were found to contain elevated levels of gasoline contamination. Soil samples from borings B-5 and B-MW8 were found to be moderately contaminated. Soil samples from borings B-1, B-2, B-3 and monitoring wells MW-10 and MW-11 were uncontaminated. Table 3 presents the

TABLE 3
PETROLEUM CONTAMINATION ANALYSES - SOIL
All Values in mg/Kg

SAMPLE ID	OIL & GREASE	TPH (diesel)	TPH (gas)	BENZENE	TOLUENE	XYLENES	ETHYL BENZENE
B-1, 5'	ND	ND	ND	ND	0.011	ND	ND
B-1, 10'	ND	ND	ND	ND	ND	ND	ND
B-2, 5'	ND	ND	ND	ND	ND	ND	ND
B-2, 10'	ND	ND	ND	ND	0.09	ND	ND
B-3, 5'	ND	ND	ND	ND	ND	ND	ND
B-3, 11.5'	ND	ND	ND	ND	ND	ND	ND
B-4, 5.5'	ND	ND[1]	ND	ND	ND	1.2	ND
MW-8, 7'	ND	ND	ND	ND	ND	ND	ND
MW-9, 5'	ND	ND	ND	ND	ND	ND	ND
MW-9, 9'	ND	ND	ND	0.017	ND	ND	0.099
MW-10, 5'	ND	ND	ND	ND	ND	ND	ND
MW-10, 9'	ND	ND	ND	ND	ND	ND	ND
MW-10b,7.5'	ND	ND	ND	ND	ND	ND	ND
MW-10b,11.5'	ND	ND	ND	ND	ND	ND	ND
MW-11, 6'	50	ND	ND	ND	ND	ND	ND
MW-11, 11'	ND	ND	ND	ND	ND	ND	ND
MW-12, 8'	NA	NA	ND	ND	ND	ND	ND
MW-12, 12'	NA	NA	ND	ND	ND	ND	ND
NORTH END WALL	50	ND	ND	ND	ND	ND	ND

ND: Not Detected, Minimum detection limits for each compound listed on original laboratory report forms

[1] Heavier molecular weight hydrocarbon compounds were detected

original soils analysis including those from samples collected in boring MW-12 (December 1994), Table 4 presents the results of the "fuel fingerprint in air" tests. Figure 5 illustrates the estimated limits of soil contamination.

In addition to testing for petroleum compounds, selected soil samples were analyzed for volatile organics, semi-volatile organics and metals. No significant concentrations of these compounds were detected. Table 5 presents soil semi-volatile analysis results and Table 6 presents results of soil metals analysis.

TABLE 4
SOIL SAMPLE ANALYTICAL RESULTS
"FUEL FINGERPRINT IN AIR"
January 1994
all values in PPB by volume

SAMPLE ID	TPH	BENZENE	TOLUENE	XYLENES	ETHYL BENZENE
B-4, 5.5'	9,700	ND	12	440	160
B-MW8, 7'	ND	ND	ND	ND	ND
B-MW10, 5'	34,000	970	130	620	150
B-MW10, 9'	5,700	ND	1.2	100	35
MW-9, 5'	17,000	ND	70	370	60
MW-9, 9'	6,000	180	50	300	280
NORTH END WALL	ND	ND	ND	250	40

NOTES
ND: Not Detected (Minimum detection limit specified on original laboratory report forms appearing in Appendix)
PPB: Parts Per Billion
Analysis by EPA test method TO-14

TABLE 5
SEMI-VOLATILE ORGANIC ANALYSIS - SOIL

SAMPLE ID	COMPOUND	CONCENTRATION ug/l
B-4, 5.5'	NAPHTHALENE	35
	METHYLNAPTHALENE	10

Copies of chain of custody forms and original laboratory reports are contained in the Appendix.

LEDGEND

▲ SOIL BORING LOCATION

⊕ MONITORING WELL

MW-12

MAIN PLANT BUILDING

BOILER ROOM

MACHINE SHOP

REST ROOM

OFFICES

SB-2

B-4

B-MW 8

HOT WAX TANK

B-1

MW-9

MANHOLE

VENT LINES

4" SS

MW-3

B-5

PIPE TRENCH

MW-5

1994 DIESEL TANK EXCAVATION

PROPANE ENCLOSURE

MW-1

FORMER GASOLINE TANK CLUSTER EXCAVATION

CANOPY

OIL STORAGE BUILDING

B-2

Estimated Extent of Detectable Soil Contamination

PLATE

MW-6

MW-2

MW-11

B-3

MW-4

8" SEWER

PIPING TRENCH

BUENA VISTA ST.

B-10

A.G. TANK

SAND CRIB

MANHOLE

WASTE OIL TANK

FORMER DISPENSER

GATE

MW-10

PRIVATE DRIVE

N

WEYERHAEUSER - ALAMEDA

SCALE: 1"= 10'	APPROVED BY:	DRAWN BY BWW
DATE: FEB. 94		REVISED

ESTIMATED EXTENT OF SOIL CONTAMINATION

1801 HIBBARD ST.	DRAWING NUMBER FIG. 5

11 X 17 PRINTED ON NO. 1000H CLEARPRINT ●

TABLE 6
METALS ANALYSIS - SOIL
JANUARY 1994
all values in mg/KG

METAL	B-4, 5.5'	MW-8, 7'	MW-9, 5'	MW-9, 9'	MW-10, 5'	MW-10, 9'	NORTH END WALL
CADMIUM	ND	ND	ND	ND	ND	ND	ND
CHROMIUM	23	21	24	24	19	26	21
LEAD	8	6	4	6	8	6	6
NICKEL	28	27	16	24	10	28	22
ZINC	17	60	25	21	21	30	16

NOTES:

ND: Not Detected, minimum detection limits for each metal listed on original laboratory report forms

In summary, gasoline contamination in soil extends under the main plant building south of the 1991 gasoline tank cluster and almost to the property line north of the former tank cluster location. Traces of soil contamination from the 1991 gasoline tank cluster were detected on the east pit sidewall of the 1994 diesel tank excavation west of the former gasoline tank cluster. Soil contamination appears to have been largely removed east of the 1991 gasoline tank cluster.

4.0 REMEDIAL WORKPLAN

It is proposed to excavate contaminated soil to the maximum practical depth, aerate soil on-site to below 1.0 PPM total petroleum hydrocarbons and then replace the soil in the excavation. Only incidental amounts of soil, if any, will be off-hauled.

It is also proposed to construct a groundwater sparging grid in the saturated zone within the excavated area. A corresponding vapor extraction grid would be constructed immediately above the saturated zone to collect sparged volatiles.

4.1 Air Quality Compliance

The Bay Area Air Quality Management District (BAAQMD) regulates air pollutant emissions from the WPC Alameda location. The BAAQMD allows aeration of gasoline contaminated soils based on the TPH-gas concentration and quantity processed per day.

BAAQMD Rule 8, Regulation 40, Section 301 allows soil aeration in conformance with the following schedule:

ORGANIC CONTENT (ppm)	YD^3/DAY
2000-2999	15
1000-1999	30
500-999	60
100-499	120

No soil samples from within the area to be excavated were found to be greater than 500 PPM total volatiles, either by conventional laboratory analysis or by fuel fingerprint in air analysis. Similarly, no soil samples field screened with a PID registered greater than 500 PPM total volatiles. Therefore, it is proposed to aerate 120 yd^3 of soil per day. Soil not undergoing active aeration will be covered with plastic sheeting.

Due to the space restrictions at the WPC Alameda plant, 120 yd^3 is also approximately the maximum amount of soil that could be aerated at any one time. Soil will be screened with a calibrated photoionization detector (PID) as it is excavated. If any soil registers higher than 499 PPM it will be assumed to be in the BAAQMD 500-999 PPM category and will be aerated accordingly.

Prior to initiating aeration operations the BAAQMD will be notified as required by Rule 40. A completed BAAQMD "Notification Form" will be telefaxed to the Enforcement Division at (415) 928-0338 at least three working days prior to beginning the project.

4.2 Soil Excavation

Prior to conducting any sub-surface work the area will be surveyed by Underground Service Alert to identify any non-Weyerhaeuser underground utilities. Additionally, the Weyerhaeuser facility building plans will be reviewed to identify company owned underground utilities.

It is proposed to excavate all soil within the area designated on Figure 6, with the exception of those areas previously overexcavated. The excavation area depicted on Figure 6 is based on a 1 PPM TPH-gas threshold. It is presumed that the soil within the previous overexcavation is clean. Sidewall soil sampling (described in Section 4.6) will be conducted to verify that assumption. The total amount of soil to be excavated at the WPC site is estimated to be 850 yd^3

Overlying pavement will be removed in a sequenced pattern. Pavement will only be removed as necessary in order to provide the maximum paved operating area for machinery.

Soil will be excavated in batches of approximately 120 yd^3 each. Soil will be excavated using a case 680E backhoe with a 18 inch bucket. As contaminated soil is excavated it will be placed in stockpiles as indicated on Figure 6. The stockpile area is paved. Soil stockpiles will be placed on plastic sheeting and covered at all times unless soil is actively being added or removed.

Sidewall samples will be screened with a PID to determine when complete removal of all contaminated soil has occurred. It is the intent of this project to excavate, to the maximum practical extent, soil contaminated greater than 1 PPM total volatiles.

4.3 On-Site Soil Aeration

Aeration will be promoted by shuttling soil back and forth between the two stockpiles. Specifically, a wheeled loader with a 3 yd^3 bucket will be used to pick up soil from the more contaminated stockpile for transport to the less contaminated stockpile. Aeration will be enhanced by the action of the soil falling 5-6 feet through the air onto the stockpile.

It is anticipated that approximately 2 days will be required to satisfactorily aerate each 120 yd^3 soil batch. Aeration effectiveness will be monitored in the field with a PID.

After field screening indicates the first 120 yd^3 batch has been aerated to less than 1 PPM TPH-gas, two, four sample, soil composite samples will be collected for laboratory analysis. If the two sample analytical results are less than 1 PPM TPH-gas, the soil batch will be replaced in the excavation. If either soil sample is greater than 1 PPM TPH-gas, additional aeration will be performed.

LEDGEND

▲ SOIL BORING LOCATION

⊕ MONITORING WELL

MAIN PLANT BUILDING

BOILER ROOM

MACHINE SHOP

REST ROOM

OFFICES

RISERS

HOT WAX TANK

▲B-1

▲B-4

B-MW 8▲

MW-9

MW-3

MANHOLE

4" SS

STOCKPILE/AERATION AREA

B-5▲

AREA TO BE EXCAVATED

MW-5

LIMITS OF 1991 OVEREXCAVATION

FORMER DIESEL TANK EXCAVATION

PROPANE ENCLOSURE

▲B-2

MW-1

FORMER GAS TANK CLUSTER

PLATE

MW-6

MW-2

▲B-3

MW-11

MW-4

STOCKPILE/AERATION AREA

8" SEWER

BUENA VISTA ST.

▲B-MW 10

A.G. TANK

SAND CRIB

MANHOLE

WASTE OIL TANK

GATE

MW-10

PRIVATE DRIVE

N

WEYERHAEUSER - ALAMEDA

SCALE: 1"= 10'	APPROVED BY:	DRAWN BY BWW
DATE: FEB. 94		REVISED 8-95

SITE LAYOUT

1801 HIBBARD ST.

DRAWING NUMBER FIGURE 6

11 X 17 PRINTED ON NO. 1000H CLEARPRINT ●

Two, four sample composite, verification soil samples will be collected from each 120 yd^3 batch of soil processed. After the first soil batch, at the discretion of the engineer in charge, soil may be replaced in the excavation based on field screening prior to obtaining laboratory results. Re-placement of aerated soil prior to receiving anaytical results will only be practiced if the level of confidence in field screening is high. If any soil is found to be contaminated greater than 1 PPM TPH-gas after replacement, it will be re-excavated for additional aeration treatment.

4.4 Pit Water Management

It has been noted that borings drilled to a depth of 10 feet BGS at the WPC site are dry for an extended period of time, however standing water accumulates immediately in a boring advanced to 12 feet BGS. It has also been noted that after a period of 24 hours, standing groundwater will rise to 5-6 feet BGS in any hole left open.

It is anticipated that soil can be excavated to a depth of about 11 feet BGS without complications due to groundwater. It is expected, however, that groundwater will eventually accumulate in all open excavations. Construction of the sparging grid and replacement of aerated soil will therefore require pit dewatering.

Pit de-watering will be accomplished by placing an electric submersible pump in the excavation. Extracted groundwater will be pumped to a holding tank, filtered and then passed through activated carbon treatment units to remove all gasoline contaminants. Treated water will be routed through a totalizing flowmeter to sanitary sewer discharge.

The Weyerhaeuser Paper Company has an existing permit (No. 188-00911) from the EBMUD to discharge to the industrial sewer system. The EBMUD will be notified that a treated groundwater discharge will take place over a temporary period. The treated groundwater discharge will not exceed existing limitations on quantity or quality as defined by the permit. Third party sampling of treated groundwater effluent will be arranged if necessary.

4.5 Control of Surface Runoff

The project has been timed to minimize the potential for precipitation onto exposed soil. Measures will also be instituted to prevent contaminated runoff from leaving the property should rainfall occur.

In the event of rain, all aeration activities will be terminated and both soil stockpiles covered with plastic sheeting. The soil aeration area will be bermed and configured so that any runoff is directed to the open excavation.

Both soil stockpiles will be continuously covered with plastic sheeting unless soil is being added or removed. The plastic sheeting will not be removed during periods of rainfall.

4.6 Soil Sampling

Soil samples will be collected from the pit side walls to verify the removal of all contamination. Soil samples will be collected from the aerated soil pile to confirm remedial effectiveness.

4.6.1 Sidewall Soil Sampling

It is proposed to collect at least one sidewall soil sample from each excavation zone. At least one soil sample will be collected per each 20 feet of sidewall. It is anticipated that a total of 10 sidewall soil samples will be collected. It is proposed to analyze all sidewall samples discreetly.

Sidewall samples will be collected at a depth of 5 feet BGS. That depth is anticipated to be approximately one foot higher than the current groundwater elevation and is the depth at which the greatest TPH-gas concentrations have historically been detected.

Soil samples will be collected by digging a quantity of soil from the sidewall at the desired depth with the backhoe bucket. Undisturbed soil samples will be collected from the backhoe bucket with a hammer driven core sampler. The core sampler will be fitted with new brass liners. Retrieved samples will be sealed, labeled, chilled and entered on a chain of custody form. The chain of custody form will accompany the sample set until laboratory delivery. All soil sampling procedures will conform with Tri-Regional specifications.

Chemical analysis will be in a DHS certified laboratory using EPA approved test methods. Each soil sample will be analyzed for TPH-gas and BTXE. Every fourth sidewall sample will also be analyzed for napthalene.

4.6.2 Stockpile Soil Sampling

Soil samples will be collected from the aerated soil pile prior to backfill. It is proposed to collect two, four sample composite, soil samples from each 120 yd^3 soil batch. Sample points will be selected at random. Compositing will be performed in the testing laboratory.

Each soil sample will be collected with a hammer driven core sampler. The core sampler will be fitted with new brass liners. Retrieved samples will be sealed, labeled, chilled and entered on a chain of custody form. All soil sampling procedures will conform with Tri-regional specifications.

Chemical analysis will be in a DHS certified laboratory using EPA approved test methods. Each soil sample will be analyzed for TPH-gas and BTXE. One soil sample from each stockpile will also be analyzed for napthalene.

4.7 Air Sparging System

It is proposed to construct an air sparging system in the open excavation. The air sparging system would consist of one inch diameter, schedule 40 PVC pipe perforated with 1/8 inch diameter holes. The sparging lines will be assembled in 2 foot squares. Each square will be manifolded to the air supply such that pressures and air flow rates can be regulated and separate sparging zones established, if desired.

The sparging lines will be bedded in 3/8 inch pea gravel. The objective will be to place a continuous pea gravel layer between 12 and 13 feet BGS.

A soil vapor extraction grid will be placed at 4 feet BGS to complement the air sparging system. The vapor extraction grid will consist of perforated 2 inch diameter PVC piping on three foot centers. It is proposed to bed the soil vapor extraction lines in 3/8 inch pea gravel also.

Pilot tests will be run on the air sparging/vapor extraction system to determine remedial effectiveness and effect (if any) on hydrologic site conditions. After successful construction of the system, a written description of the proposed pilot test program will be submitted to the alameda County Health Agency.

4.8 Site Restoration

After receipt of all soil analytical results confirming remedial effectiveness, the site will be restored to its original configuration. Any utilities disrupted during excavation will be repaired. The compacted backfill will be graded, covered with a 12 inch thick layer of basecourse and a three inch thick layer of asphalt.

5.0 REPORT OF FINDINGS

Within 60 days of completing soil remediation activities, a written report of findings will be submitted to the Alameda County Health 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
- Dimensions of final tank over-excavation
- As-built specifications of the air sparging/vapor extraction system
- Soil sample locations
- Analytical data (including original laboratory report forms)
- Treated water discharge quantities
- Recommendations for future action
- Proposed groundwater monitoring schedule

A schedule for future remedial activity will also be proposed in the soil remediation report.

6.0 HEALTH & SAFETY PLAN

During the soil remediation project 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.

SITE:	Weyerhaeuser Paper Company 1801 Hibbard Street Alameda, CA 95601
SITE CONTACT:	Mr. John Hipner Plant Engineer (510) 814-1167
CONSULTANT:	West & Associates Environmental Engineers 490 Merchant Street, Suite 140 Vacaville, CA 95688
CONSULTANT CONTACT:	Mr. Brian W. West PE Project Manager (707) 451-1360 - Office (707) 322-1646 - Mobile
SITE SAFETY OFFICER: BACKUP SSO:	Brian W. West PE Brennan Mahoney
CONTRACTOR:	All Chemical Disposal, Inc. 941 Berryessa Road, Suite D San Jose, CA 95133
CONTRACTOR CONTACT:	Mr. Dave Escover (408) 453-1660

6.1 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 nearest responder to the WPC Alameda site 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 physical hazard associated with the proposed work involves operation of heavy earth moving equipment. Contact with broken underground utilities, cave in of excavation walls and falling into the excavation are also potential physical hazards. Confined space entry is not a hazard since personnel will not be required and are not permitted into the excavation. The overall physical safety hazard for this project is rated as moderate.

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 digging. Underground Service Alert will be contacted to mark all member utility lines in the work area.

An exclusion zone shall be established around the work area. The site safety officer shall be responsible for establishing the exclusion zone and for prohibiting entry to unauthorized persons. The exclusion zone is indicated on Figure 7. The north and west sides of the exclusion zone consist of chain link fence. The south side coincides with the plant building wall. A line of traffic barriers and caution tape will be established to form the eastern boundary of the exclusion zone.

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.

LEDGEND

MONITORING WELL

MW-12

MAIN PLANT BUILDING

BOILER ROOM

MACHINE SHOP

REST ROOM

OFFICES

HOT WAX TANK

MW-9

MANHOLE

MW-3

4" SS

MW-5

EXCLUSION AREA

PROPANE ENCLOSURE

MW-1

FORMER GASOLINE TANK CLUSTER EXCAVATION

PLATE

MW-6

MW-2

MW-11

MW-4

8" SEWER

BUENA VISTA ST. →

A.G. TANK

SAND CRIB

MANHOLE

FORMER DISPENSER

GATE

MW-10

PRIVATE DRIVE

N

WEYERHAEUSER - ALAMEDA

SCALE: 1"= 10'	APPROVED BY:	DRAWN BY BWW
DATE: FEB. 94		REVISED
1801 HIBBARD ST.		DRAWING NUMBER FIGURE 7

11 X 17 PRINTED ON NO. 1000H CLEARPRINT ●

Hazard Assessment - Chemical

The following chemical compounds are known to be on site:

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

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. Because of the relatively low levels of gasoline contamination present at this site the chemical hazard rating for this project is rated as low.

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 excavation 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.

A break area will be established within the exclusion zone. The break area will be adjacent to the personal decontamination zone so that employees can eat, drink or smoke without leaving the exclusion zone.

6.2 Environmental Protection

Contaminated material shall be isolated from the environment. All contaminated soil will be placed on plastic sheeting and rapidly covered unless undergoing aeration. Contaminated groundwater removed from the excavation will be securely stored in a temporary holding tank until treated for sanitary sewer discharge.

No personnel, equipment or tools will be allowed to leave the work area unless decontaminated. Equipment and tool decontamination will consist of a water spray to remove all loose dirt and a combination of wire brushing and water to remove other dirt. Personal decontamination will consist of an area to remove disposable overalls and gloves, a footwear cleaning station and respirator rinse station.

Decontamination residues will be contained in a leak proof basin. Decontamination water will be transferred to the holding tank for treatment and discharge. Solid decontamination residues will be aerated and backfilled in the excavation.

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. All decontamination procedures will conform with State and federal specifications.