

March 23, 1999

Alameda County Health Care Services Agency Department of Environmental Health 1131 Harbor Bay Parkway, Suite 250 Alameda, CA 94502-6577

Attn: Mr. Larry Seto

Hazardous Materials Specialist

SUBJECT: GROUNDWATER SPARGING/VAPOR EXTRACTION SYSTEM PERFORMANCE

REPORT, WEYERHAEUSER PAPER COMPANY, ALAMEDA CORRUGATED BOX

FACILITY, 1801 HIBBARD STR., STID 1202

Dear Mr. Seto,

Per the recent request by your agency, West & Associates Environmental Engineers, Inc. respectfully submits this letter report summarizing the remedial effectiveness of the groundwater sparging/vapor extraction (GWS/VE) system operated at the Weyerhaeuser facility referenced above.

Full scale operation of the sparging system began at the end of March 1996. The system was shut down in late February 1998.

#### REMEDIAL EFFECTIVENESS

The remedial effectiveness of the GWS/VE system has been evaluated based on the reduction of contamination concentrations in groundwater.

The sparge system was designed to reduce groundwater contaminant concentrations by 1) directly stripping volatiles from the groundwater and by 2) oxygenating the groundwater to enhance natural biological degradation of hydrocarbon contamination.

#### Groundwater Contaminant Concentrations

A continued decreasing trend in TPH-g and BTXE concentrations in MW-3B was observed since air sparging activities began. Table 1 presents the percent reduction in TPH-gas and benzene concentrations in well MW-3B measured between February 1996 and August 1998. MW-3B has historically been the most contaminated well at the site.

PHONE: (707) 451-1360 • P.O. BOX 5891, VACAVILLE, CALIFORNIA 95696



GROUNDWATER SPARGING/VAPOR EXTRACTION, WEYERHAEUSER PAPER COMPANY, 2/4

TABLE 1
GROUNDWATER CONTAMINANT COMPARISON: WELL MW-3B
FIRST QUARTER 1996 THRU THIRD QUARTER 1998
All Values in ug/1

Date	TPH (gas)	BENZENE	PERCENT REDUCTION TPH-gas (since 2/96)	PERCENT REDUCTION BENZENE (since 2/96)
2/96	19,000	2,100	NA	NA
6/96	11,000	1,300	42%	38%
9/96	6,000	840	68%	60%
11/96	5,500	440	71%	79%
2/97	12,000	1,000	37%	52%
6/97	2,030	293	89%	86%
9/97	2,140	33.7	88%	98%
12/97	1,200	95.0	94%	95%
2/98	2,370	176	88%	92%
5/98	3,160	170	83%	92%
8/98	1,700	99.3	91%	95%

#### **ABBREVIATIONS**

ug/l: Micrograms per liter

TPH: Total Petroleum Hydrocarbons

A decrease in soil vapor volatile concentrations and groundwater contaminant concentrations was observed since start up of the sparging system. In August 1998 TPH-gas and benzene concentrations in MW-3B were approximately 91% and 95% lower, respectively, than prior to the start up of groundwater sparging.

#### Contaminant Mass Removal

This section presents the estimated total of contaminant mass removed as a result of direct stripping of volatiles by the GWS/VE system.

Laboratory chemical analysis results for vapor samples collected during pilot test activities are presented in Table 2.



## GROUNDWATER SPARGING/VAPOR EXTRACTION, WEYERHAEUSER PAPER COMPANY, 3/4

# TABLE 2 LABORATORY ANALYTICAL RESULTS FOR VAPOR SAMPLES all values in $mg/M^3$

SAMPLE ID	DESCRIPTION	TPH-G	BENZENE	TOLUENE	ETHYL- BENZENE	TOTAL XYLENES
VAPOR-1	All zones operating; pre- treatment of vapors	14	ND	ŊD	ND	ND
VAPOR-2	Zone II operating only; pre-treatment of vapors	5,200	ND	ND	36	56

NOTES

ND: Not Detected

The data presented above was used to make a correlation between field PID readings and laboratory chemical analysis results.

Based on PID readings recorded at the time vapor samples "VAPOR-1" and "VAPOR-2" were collected a conversion factor of 8.2 has been derived for converting measurement units of ppmv (PID) to  $mg/M^3$ . For example a PID reading of 10 ppmv would be equivalent to 82  $mg/M^3$ .

The following factors were use to conservatively estimate the mass of contamination stripped from groundwater below the site.

- Average vapor concentration: 1.15 ppmv (PID) or 9.43 mg/M<sup>3</sup>
- Average SVE blower flow rate: 35 cfm
- 14,016 hours of operation

Based on the information presented above it is conservatively estimated that 18 lbs (~2.5 gallons) of TPH as gasoline was sparged from groundwater below the site.

#### Biological Degradation

Biological degradation is believed to have played a significant role in reducing contaminant concentrations below the site. Biological degradation is believed to have been significantly enhanced by the oxygenation of groundwater as a result of the air sparging activities.



GROUNDWATER SPARGING/VAPOR EXTRACTION, WEYERHAEUSER PAPER COMPANY, 4/4

#### CONCLUSIONS

Six months after discontinuing active groundwater remediation, gasoline based contaminant concentrations continue to decline. This continued decline in contaminant concentrations is attributed to natural biological degradation.

It has been conservatively estimated that a total of 18 lbs of TPH as gasoline contamination was removed from groundwater by stripping volatiles via air sparging.

In August 1998 TPH-gas and benzene concentrations in MW-3B were approximately 91% and 95% lower, respectively, than prior to the start up of groundwater sparging.

It is concluded that groundwater quality at the WPC Alameda site will continue to improve without the necessity of further active remediation.

Should you require any additional information please contact me at (707) 451-1360.

Sincerely,

Brian W. West PE

wan W. West

President

West & Associates Environmental Engineers, Inc.

BWW/eb

cc: James McCourt, Weyerhaeuser Office of the Environment, Tacoma



1995 pie water

# 4.5 Pit Water Management

Pit dewatering was generally not necessary at the site. Groundwater did not rapidly seep into the open excavation during digging activities. Excavation activities were coordinated so that backfilling was conducted immediately upon reaching the total depth of each zone of the excavation. Each excavation zone was backfilled to at least 5 feet BGS the same day total depth in that zone was reached. By coordinating most of the excavation and backfill activities this way, groundwater generally did not accumulate in the open excavations.

However, during excavation and backfilling activities in Zone I, the excavation was left open for more than 24 hours prior to backfilling and water did accumulate in the pit. In that circumstance pit de-watering was accomplished by placing an electric submersible pump in the excavation. Extracted groundwater was pumped to a holding tank, filtered and then passed through activated carbon treatment units to remove all gasoline contaminants. Treated water was sampled to verify decontamination effectiveness and then used to adjust backfill soil moisture content for proper compaction. Due to soil drying during aeration, considerable water had to be added during the backfill process in order to permit proper compaction. Treated groundwater accounted for less than 10% of the water added for compaction purposes.

Neither TPH as gas nor BTEX were detected above laboratory detection limits in the treated water sample, identified as WPC DISCHARGE. Laboratory analysis results of the treated groundwater are presented on the laboratory report forms in the appendix.

# 4.6 Control of Surface Runoff

During periods of rain, all aeration activities were terminated and all soil stockpiles were covered with plastic sheeting. Therefore, no contaminated surface water was generated at the site. Little or no precipitation fell during the project duration. Control of surface runoff was not a major project activity.

# 4.7 Contaminated Soil Off-Haul

A total of approximately 420  $yd^3$  of contaminated soil was transported to the Vasco Road Landfill in Livermore, California for disposal. Approximately 170  $yd^3$  consisted of gasoline contaminated soil and approximately 250  $yd^3$  consisted of waste oil contaminated soil. The non-hazardous waste manifests are presented in the appendix.



Larry-

Most recent oil & grease data

Where is MW3 B? Not install outil 1298 TABLE 4-8
PETROLEUM CONTAMINATION ANALYSES - GROUNDWATER
FEBRUARY 1994
All Values in ug/1

WELL ID	OIL & GREASE	(	TPH diesel)	TPH (gas)	BENZENE	TOLUENE	XYLENES	ETHYL BENZENE	
MW-1	ND	\$ \$ \$	ND	ND	1.5	ND	ND	ND	
MW-2	ND	)	ND	200	390	25	50	7.1	
MW-3	ND		ND	5400	3900	680	840	390	
MW-4	ND		ND	1000	54	2.7	4.7	1.4	
MW-5	ND		ND	ND	1.8	ND .	ND	ND	
MW-6	ND		ND	ND	2.6	ND	ND	ND	
MW-7	ND		ND '	ND	ND	ND	ND	ND	
MW-9	ND		ΟИ	1,900	63	4.3	1 = 0 <b>14</b> <sup>2 − 200</sup>	22	
MW-10	ND ND		ND	ND	ND	ND	ND	ND	
MW-11	ND		ND	ND	ND	ND	ND	ND	
QC	ND		ND	ND	ND	ND	ND	ND	

## NOTES

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

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\*PONSE CENTER 1-800-424-8802; WITHIN CALIFORNIA CALL 1-800-852-7550

OR SPILL, CALL THE NATIONAL

CASE OF AN EMERGENCY

#### See instructions on Back of Page 6 and Front of Page 7

Department of Health Services
Toxic Substances Control Division
Secremento, California

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H & H Ship Service Company					علملما	17 7	<u> </u>
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11. US DOT Description (Including Proper Shipping Name, Hazard Class, and iD Num	1041)	No.	Туре			W1/Vol	<u> </u>
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-OIL AND WATER			1				EPA/Other
NON RCRA HAZARDOUS WASTE LIQUID	la la	l ol r	1 7 12	·03	15/0/6	<u></u> [	
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EPA 8700—22 (Rev. 6-89) Previous editions are obsolete.

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