SITE HAZARD ASSESSMENT

SUMMARY REPORT

FOR

MALARKEY ASPHALT COMPANY

SEATTLE, WASHINGTON

JULY, 1991

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1.0 INTRODUCTION

This report summarizes the results of a Site Hazard Assessment performed at the Malarkey Asphalt facility located in Seattle, Washington at 8700 Dallas South (Figure 1). The work was conducted by the SAIC/Parametrix team on behalf of the Washington State Department of Ecology (Ecology). The objectives of this project were to gather sufficient environmental data through field screening and sampling of soil and groundwater in an effort to assess the site using the Washington Ranking Method (WARM) guidelines. A Site Hazard Assessment (SHA), as defined by WAC 173-340-320, has been generated based on information gathered from this project.

Included in this report are descriptions of the site background (Section 2.0), objectives (Section 3.0), field procedures (Section 4.0), hydrogeologic conditions (Section 5.0), results (Section 6.0) and summary (Section 7.0). The attached appendices at the end of this report include the Site Hazard Assessment Data Summary Sheets (Appendix A), Exploratory Boring Logs and Well Details (Appendix B), and Certified Analytical Reports and Chain-of-Custody Documentation (Appendix C).

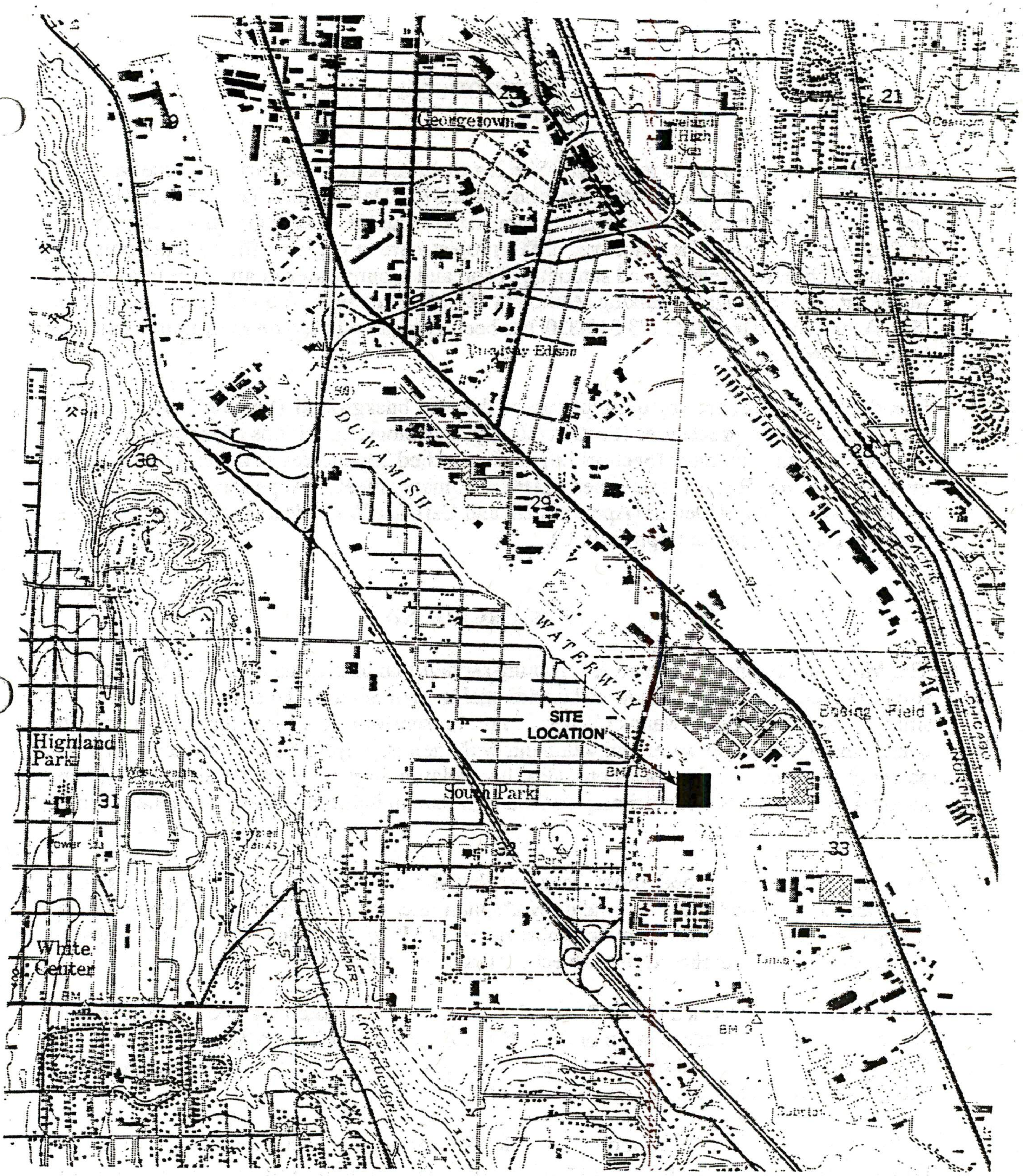
2.0 BACKGROUND

The Malarkey Asphalt Company is a roofing asphalt manufacturing facility in Seattle. The site is located in a mixed commercial/residential area of Seattle. To the north and east, the site is bounded by the Duwamish River. There presently are concerns that the site may be contaminating the river water and sediments with metals, polychlorinated biphenyls (PCBs), polynuclear aromatic hydrocarbons (PAHs), volatile organic compounds (VOCs), and dioxin/dibenzofurans. The primary pathways of contaminant migration are believed to be soil and groundwater.

Asphalt manufacturing operations began at this site around 1937. Companies that have operated at the site prior to Malarkey Asphalt include the Duwamish Manufacturing Company and an unknown company abbreviated as MCW in Ecology's file. The Malarkey Asphalt Company purchased the subject property in 1978.

Prior to 1971, while owned by the Duwamish Manufacturing Company, the facility accepted approximately 1,000 gallons per month of PCB contaminated oil from Seattle City Light for fuel. This oil was burned on site, however, it is not known what type of burner was used. MCW also conducted asphalt operations at the site.

In 1984, Municipality of Metropolitan Seattle (Metro) personnel conducted sampling in the Duwamish River up stream and down stream of the site. Samples were also collected from an unlined holding pond on the east half of the site, from the out-fall from the holding pond to the river, and from an apparent groundwater seep from the facility to the river. Elevated



SCALE IN FEET
0 1,000 2,000

N

Figure 1.
Site Location Map
Malarkey Asphalt Co.
Seattle, Washington

concentrations of PCBs, PAHs, and metals were detected in one or more of the water and sediment samples. These contaminants were detected at substantially higher concentrations in the Duwamish River sediments down stream of the site than upstream of the site.

Wastewater in an unlined holding pond was generally limited to non-contact cooling water from the facility's stills. Metro began negotiations with Malarkey Asphalt to arrange for the disposal of this wastewater to the sanitary sewer system. However, Malarkey Asphalt chose to recycle the cooling water instead. The holding pond was subsequently filled. The sludge in the bottom of the pond was not removed prior to filling.

Facility records indicate the still bottoms from the site were sent to Cedar Hills landfill in 1984 for disposal. The still bottoms contained 3,200 parts per million (ppm) PAHs (primarily 4-, 5-, and 6-ring compounds).

In 1985 and 1986, Ecology conducted inspections of the site. These inspections identified a number of buried and partially-buried underground storage tanks (USTs), above-ground storage tanks (ASTs), and piping. In addition, on-site soils were noted to be stained.

In 1986, sediment samples collected by Ecology from an on-site drainage ditch were found to contain elevated total metals concentrations. Detected metals include lead (1,666 ppm), arsenic (1,944 ppm), and zinc (5,416 ppm).

An enforcement action was pursued by Ecology that mandated an investigation to determine the extent of contamination and other activities on the site by Malarkey Asphalt. However, the company appealed the sampling requirement through claims of economic hardship.

In 1989 the U. S. Environmental Protection Agency (EPA) conducted a Toxic Substances Control Act (TSCA) inspection at the site. During the inspection, samples were collected from a partially buried waste oil tank and from a tank of usable light oil on the site. Total halogenated hydrocarbons were detected at concentrations up to 1,160 ppm. No PCBs were detected.

In 1990 the EPA conducted a Preliminary Assessment (PA) of the site. The PA found that three USTs at the site were leased to Evergreen West Wholesale Lumber Company; one 10,000 gallon waste oil AST was leased to Vintage Oil Company; and a portion of the site was leased to Frontwater Incorporated, a waste oil recycler. In addition, two partially buried tanks and a buried railroad car were identified. These three tanks all contained waste oil.

3.0 OBJECTIVES

Parametrix developed a work plan for investigating the Malarkey facility after reviewing Ecology's proposed scope of work and files. In addition, a site visit to assess general conditions was conducted as part of the work plan preparation. The objectives of that work plan are summarized below.

1. Drill three exploratory borings in the vicinity of the project site and convert to groundwater monitoring wells. From each boring select three soil samples and analyze for VOCs (EPA Method 8240), semi-volatile organic compounds (semi-VOCs/EPA Method 8270), PCBs (EPA Method 8080), and total metals (As, Ba, Cd, Cr, Cu, Ni, Pb, Zn, 7000 series method). In addition, the one soil sample from all of the borings that exhibits the highest degree of staining will be submitted with the above-mentioned samples and analyzed for Toxic Characteristics Leaching Procedure (TCLP extraction for metals) (in order to characterize whether it is a dangerous waste) and dioxin/dibenzofuran compounds (EPA Method 8280).

2. Collect one groundwater sample from each well and analyze for VOCs, semi-VOCs, PCBs, and total metals.

3. Collect two product samples from locations to be determined in field by Ecology and analyze for VOCs, semi-VOCs, PCBs, and TCLP metals.

4. Collect one asbestos sample from an above-ground storage tank and analyze for percent friable asbestos content (EPA Method 600/M4-82-020).

These objectives were met except for the following.

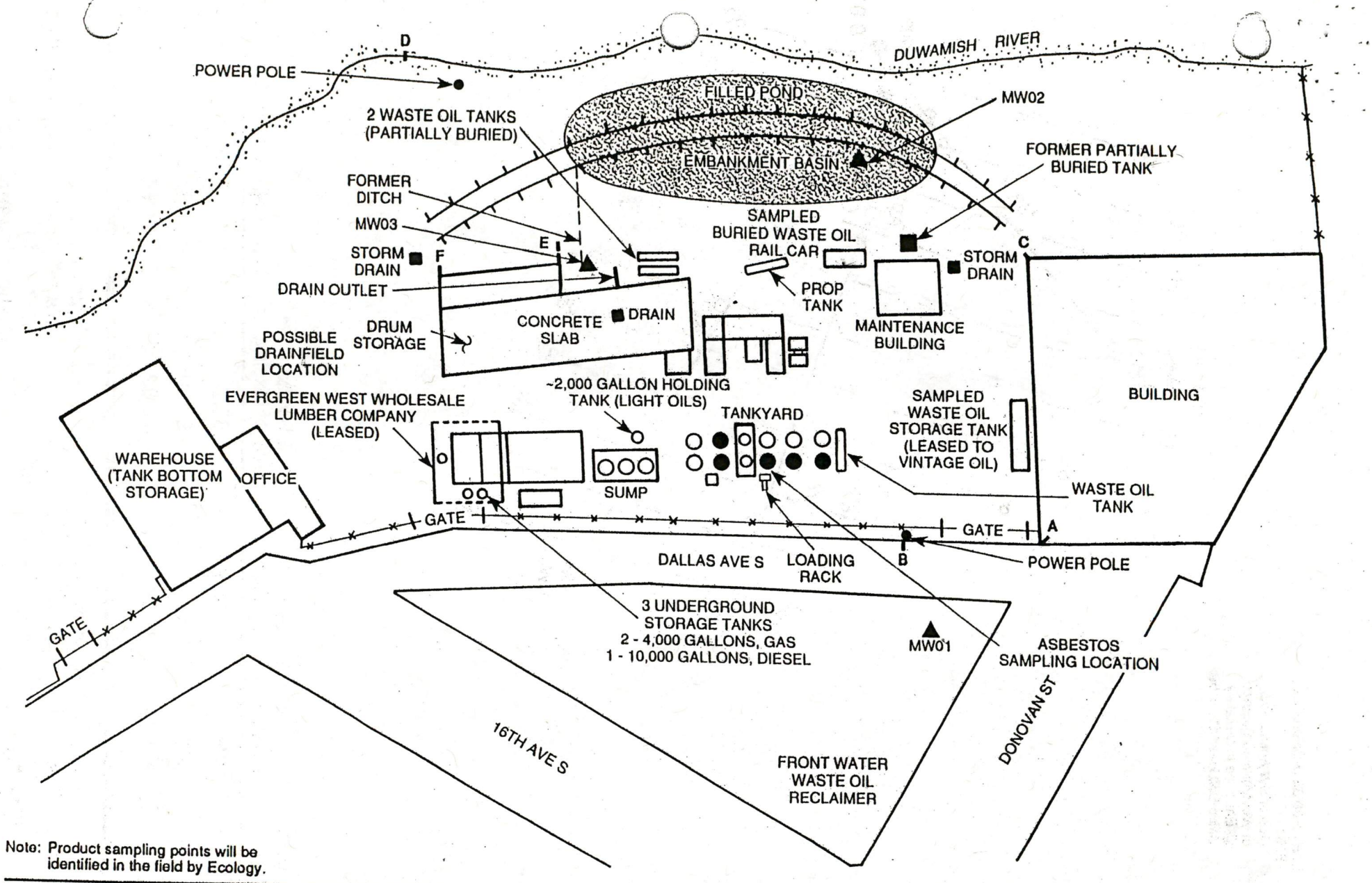
- The dioxin/dibenzofuran analysis was run on a composite sample and the TCLP extraction on a discrete sample.

- The EPA method for dioxin/dibenzofuran was changed from EPA 8280 to 8290 as requested by Ms. Elaine Atkinson (Ecology).

4.0 FIELD PROCEDURES

The field investigation was conducted on April 30 through May 3, and on May 15, 1991. Three exploratory borings were drilled (MW-01, MW-02, MW-03) to a maximum depth of 15.5 feet in positions assumed to be up- and down-gradient of Malarkey Asphalt operations (Figure 2). The exploratory borings were drilled by John Mathes & Associates using continuous-flight, hollow-stem auger drilling equipment. Soil samples were collected continuously above first encountered groundwater and at 3- to 5-foot intervals below the saturated zone. Upon completion, the borings were converted to groundwater monitoring wells by installing 2-inch-diameter schedule 40 PVC casing. The location of each well and top-of-casing elevation were surveyed to an assumed on-site elevation by a licensed surveyor. Survey data was used to construct groundwater contour maps (Figures 3 and 4). Soil samples collected during drilling were field screened for VOCs using a photoionization detector (PID). Logs of exploratory borings and well details are included in Appendix B.

A split-spoon sampler was used to collect the soil samples. The sampler was advanced into the undisturbed soil beyond the tip of the auger. Soil samples selected for laboratory



Note: Product sampling points will be identified in the field by Ecology.

APPROXIMATE SCALE IN FEET

0 100 200

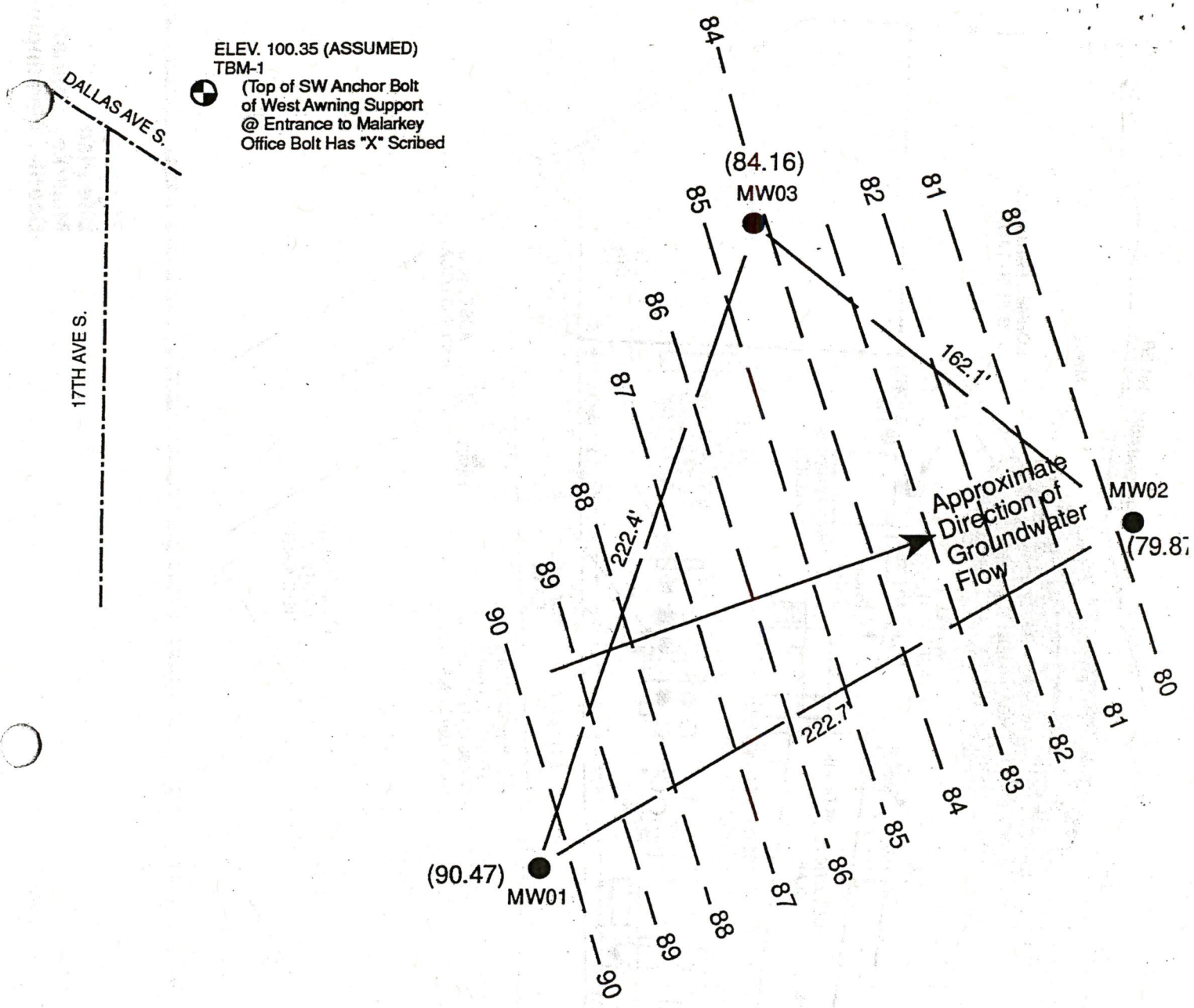
N

Fenceline

Heated Tanks

Proposed Monitoring Well

Figure 2.
Site Plan
Malarkey Asphalt Co.
Seattle, Washington



Monitor Well Number	Coordinates North	East	Elevation Top of Casing	Top of Notched PVC
01	743.3	5156.5	98.76	98.55
02	852.2	5350.8	92.20	92.02
03	954.8	5225.4	93.02	92.80

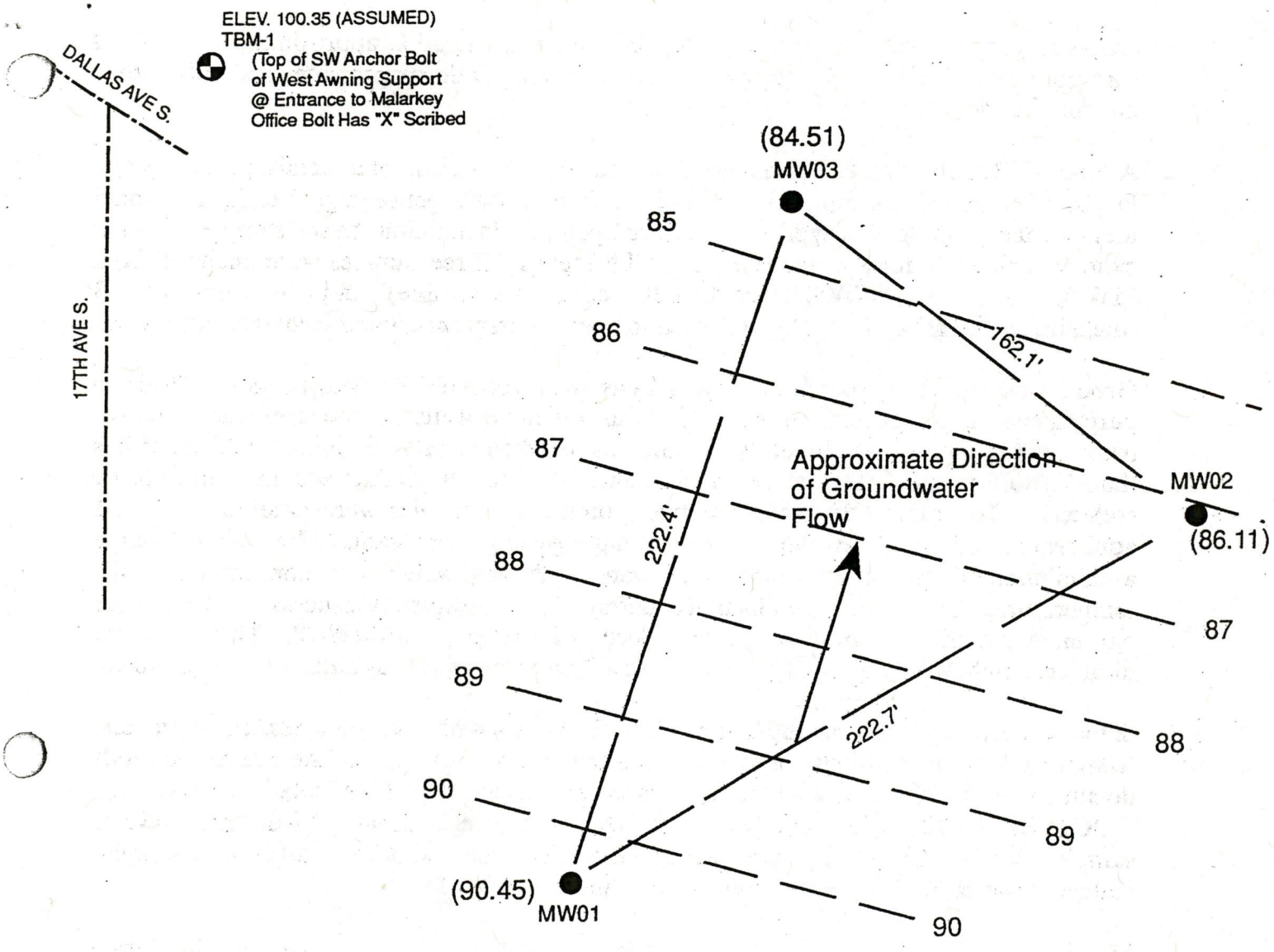
SCALE IN FEET
0 25 50

N

(90.47) Groundwater Elevation
Measered May 15, 1991
@ Low Tide (Elevations are in feet
reletive to an assumed elevation)

90 — — — 90 Groundwater Elevation Contour
(Feet)

Figure 3.
Groundwater Countour Map
(Low Tide)
Malarkey Asphalt Co.
Seattle, Washington



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(90.47) Groundwater Elevation
Measered May 15, 1991
@ High Tide (Elevations are in feet
reletive to an assumed elevation)

90 — — — 90 Groundwater Elevation Contour
(Feet)

Figure 4.
Groundwater Countour Map
(High Tide)
Malarkey Asphalt Co.
Seattle, Washington

analysis were placed into laboratory supplied glass jars, stored at approximately 4° C, and transported to an Ecology-approved laboratory along with appropriate chain-of-custody documentation.

A total of 12 soil samples were analyzed for semi-VOCs, VOCs, total metals, pesticides and PCBs. A composite sample (3 to 1) collected from MW-02 between ground surface and 5 feet was analyzed for dioxin/dibenzofuran compounds. In addition the soil sample collected from MW-02 at 3 feet was analyzed for TCLP metals. Three samples were analyzed from MW-01, four from MW-02 (including the composite sample), and five from MW-03 (including the duplicate sample collected for quality assurance/quality control purposes).

Groundwater samples for laboratory analysis were collected on May 3, 1991. Prior to purging and sampling, depth to water was measured in the wells and the presence of floating product was checked for. Floating product was detected in MW-03 with a thickness of less than 1/8 of an inch. Due to the small amount detected, a product sample could not be collected. To ensure that representative groundwater samples were obtained from the aquifer, the wells were developed prior to sampling using a disposable teflon bailer to purge a minimum of five casing volumes of water. Purged water was monitored for pH, temperature, and specific conductance during the development process. These three parameters stabilized prior to sample collection in MW-01 and MW-02. They were not monitored in MW-03 due to the possibility that floating product may damage the equipment.

Samples were placed in the appropriate U.S. EPA-approved containers, placed on ice, and transported to the Ecology approved laboratory, along with appropriate chain-of-custody documentation. The groundwater samples were analyzed for metals (total and dissolved), VOCs, semi-VOCs, PCBs and pesticides. Due to the high turbidity of the groundwater samples, it was decided that both total and dissolved metals should be analyzed. Samples collected for dissolved metals analysis were filtered by the lab.

Ms. Atkinson instructed Parametrix to collect product samples from the partially buried railroad car and the above-ground tank leased by Vintage Oil. The product samples were collected on May 3, 1991 with disposable teflon bailers. The samples were transported along with the groundwater samples to the laboratory and were analyzed for semi-VOCs, VOCs, PCBs, pesticides and TCLP metals.

5.0 HYDROGEOLOGIC CONDITIONS

The soil types encountered during the drilling of MW-01, -02, and -03 were interbedded silts, sands, and gravels. Soil which appeared to be fill was encountered in each boring from ground surface to approximately one to three feet below grade. A geologic cross-section depicting the subsurface soil conditions is shown in Figure 5. Static groundwater levels were measured on May 15, 1991 during high and low tides (Table 1). These measurements

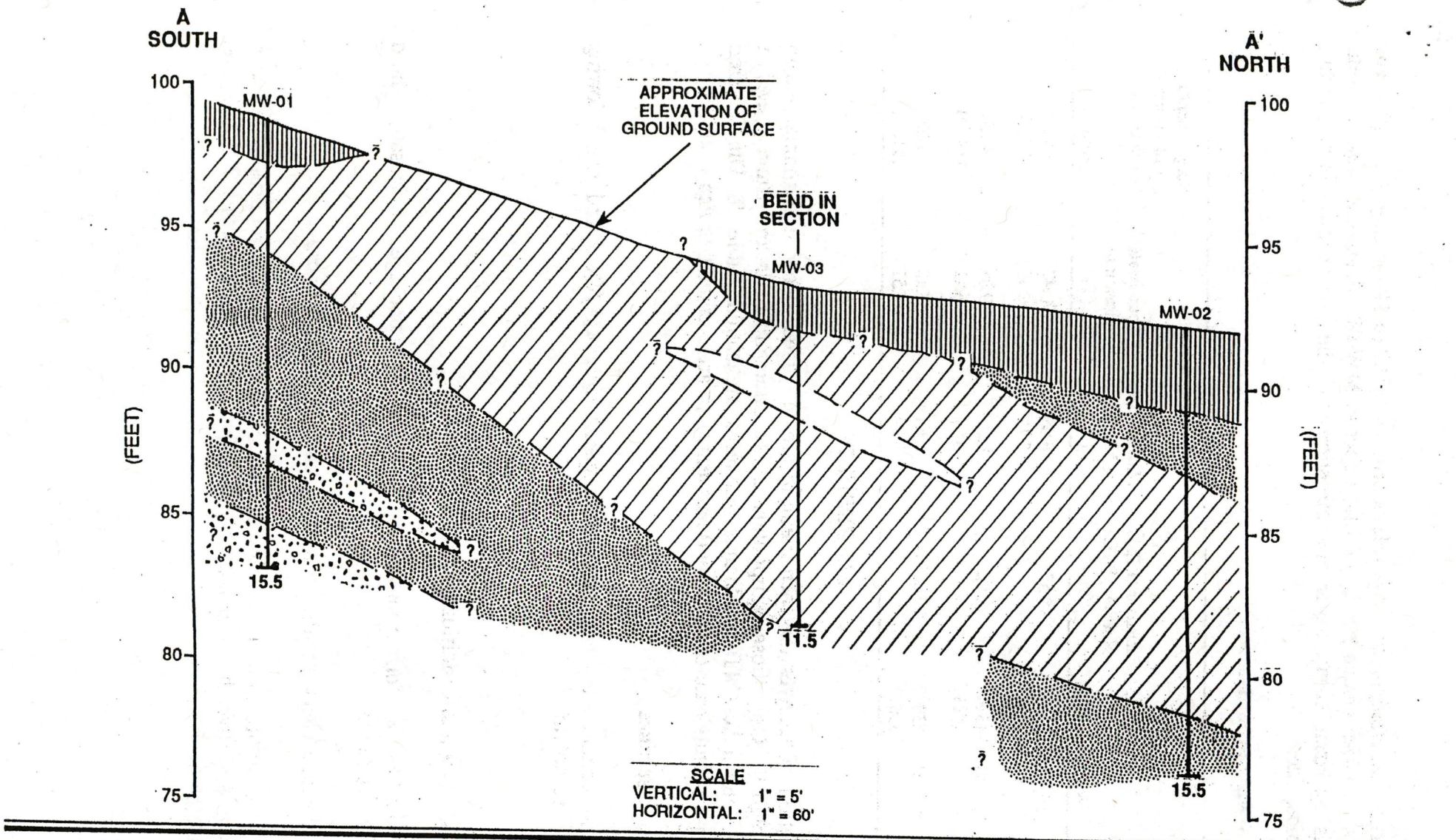


Figure 5.
Cross-Section A-A'

indicated a large tidal effect on the water elevation in MW-02 (6.24-ft change), a slight tidal effect in MW-03 (0.35-ft change), and no tidal effect in MW-01. Based on these two sets of water levels, apparent groundwater flow direction is to the east at low tide and to the northeast at high tide.

Table 1. Water Level Measurements

Monitoring Well	Date	Time	Elevation Top of Notched PVC (ft)	Depth to Water Below Notch (ft)	Groundwater Elevation (ft)	Screen depth below ground surface (ft) Top (Bottom)
MW-01	5/3/91	1236	98.55	8.08	90.47	5.0
		1859		8.10	90.45	(15.0)
MW-02	5/3/91	1310	92.02	12.15	79.87	4.25
		1915		5.91	86.11	(14.25)
MW-03	5/3/91	1300	93.80	8.64	85.16	1.50
		1907		8.29	85.51	(11.50)

6.0 RESULTS

Positive detection of analytes for each medium are discussed below and summarized in Tables 2 through 9. Only those compounds above detection limits are listed. Level A Model Toxics Control Act (MTCA) cleanup standards are listed in Table 10. The Certified Analytical Report and Chain of Custody documentation are included as Appendix C.

6.1 Quality Assurance

A QA/QC was conducted on the analytical results were QA/QCd and the following observations were noted:

Metals

1. Holding times and conditions were all acceptable.

2. No method blank information was included in the data package. No rinsate or field blanks were taken.

3. No calibration check standards were included in the data package.

4. Analytical replicates were all acceptable, except the TCLP replicates for lead, cadmium and silver had relatively high relative percent differences (22.1, 22.2, and 32.6, respectively).

Table 2. Analytical results for TCLP metals in soil and product samples (mg/L). Malarkey Asphalt, Seattle, Washington.

	Sample Number			
	MWO2-3.0	Buried Tank Car	Vintage Oil Tank	Dangerous Waste Level[1]
Ag	0.01	0.02	0.03	5.0
As	<0.1	<0.1	<0.1	5.0
Ba	<0.5	<0.5	<0.5	100.0
Cd	0.02	0.02	0.05	1.0
Cr	<0.01	<0.01	0.02	5.0
Hg	<0.001	<0.001	<0.001	0.2
Pb	0.13	0.25	0.29	5.0
Se	<0.2	<0.2	<0.2	1.0

1-Source: Department of Ecology Dangerous Waste Regulations (173-303-090 WAC)

Table 3. Analytical results for total metals in soil samples (mg/Kg).

Analytes	Sample Number										
	MW01-1.5	MW01-3.0	MW01-7.5	MW02-1.5	MW02-3.0	MW02-4.5	MW03-1.5	MW03-3.0	MW03-4.0	MW03-4.5	MW03-6.0
Al	17,500	20,000	11,000	11,900	14,300	11,300	18,200	12,500	15,700	14,600	13,700
Ba	326	114	34	74	77	32	111	68	75	61	55
Cd	<1	<1	<1	<1	<1	<1	2	<1	<1	<1	<1
Cr	1,860	26	10	20	23	12	121	11	17	14	14
Cu	433	36	13	50	31	54	91	24	30	23	21
Ni	218	20	3	28	29	17	80	13	16	12	10
Pb	83	61	<5	144	63	18	188	190	51	7	<5
Zn	296	110	17	180	84	41	381	85	100	32	29

Table 4. Analytical results for total and dissolved metals in groundwater samples (in ug/L).

	Sample Number				
	MW01-A	MW01-B (duplicate)	MW02	MW03-A	MW03-B (duplicate)
Al	210,000 (<200)	251,000 (<200)	479,000 (<200)	1,520,000 (261)	4,020,000 (219)
Ba	705 (<100)	886 (<100)	2,380 (<100)	6,730 (<100)	15,800 (<100)
Cd	<10 (<10)	<10 (<10)	<10 (<10)	41 (<10)	104 (<10)
Cr	253 (<10)	302 (<10)	796 (<10)	1,350 (<10)	3,870 (<10)
Cu	373 (<20)	467 (<20)	1,060 (<20)	2,630 (<20)	6,960 (<20)
Ni	270 (<30)	320 (<30)	487 (<30)	1,190 (<30)	2,720 (<30)
Pb	156 (<50)	212 (<50)	337 (<50)	2,960 (<50)	8,550 (<50)
Zn	534 (25)	644 (<20)	1,390 (<20)	5,480 (<20)	15,200 (<20)

Value in ( ) is dissolved metal concentration

Table 5. Analytical results[1] for pesticide and polychlorinated biphenyl compounds in soil, groundwater and product samples (ppb).

Soil

Analytes	Sample Number								
	MW01-1.5	MW01-3.0	MW02-1.5	MW02-3.0	MW02-4.5	MW03-1.5	MW03-3.0	MW03-4.0	MW03-4.5
Aroclor 1248	1,500	ND	ND	ND	ND	ND	ND	ND	ND
Aroclor 1260	1,200	24,000	370,000	600,000	2,700	170,000	50,000	6,200	1,800
4-4'DDT	63	1,700	14,000	23,000	280	6,400	1,800	240J	99
4,4'-DDD	7.3J	140	ND	ND	14J	ND	ND	ND	11J
Gamma Chlordane	22J	21J	ND	ND	4.8J	ND	ND	ND	ND
4,4'-DDE	20J	ND	ND	ND	ND	ND	ND	ND	ND

Groundwater/Product

Analytes	Sample Number						
	MW01-A	MW01-B	MW02	MW03-A	MW03-B	Buried Tank Car	Vintage Oil Tank
Aroclor 1260	1.8	1.7	11	77	38	ND	48,000J
4,4' DDT	0.089J	0.085J	0.61	3.2	1.6	ND	1,800J
4,4' DDD	ND	ND	0.056J	ND	ND	ND	ND
Heptachlor-epoxide	ND	ND	ND	ND	ND	4,800	2,300J

J-Concentration estimated due to detection limit that is higher than measured concentration
ND-Not detected
1-Only compounds found above detection limits listed

Table 6. Analytical results[1] for volatile organic compounds in soil, groundwater and product samples (ppb).

Soil

Analytes	MW01-1.5	MWO2-4.5	MW03-4.5	MW03-6-0
Acetone	31	16	ND	46
Methylene chloride	ND	ND	13	12

Groundwater and Product

Analytes	MWO3A	Buried Tank Car	Vintage Oil Tank
1,1,1 Trichloroethane	ND	60,000	170,000
Benzene	ND	33,000	130,000
Tetrachloroethane	ND	18,000	80,000
Toluene	ND	200,000	810,000
Ethylbenzene	ND	160,000	250,000
Xylene-total	4J	1,200,000	1,600,000

ND-Not Detected
J-Concentration estimated due to detection limit that is higher than measured concentration
1-Only those compounds found above detection limits are listed

Table 7. Analytical results[1] for Dioxin/Dibenzofuran compounds in soil samples (ppt).

Analytes	MWO2-0-5.0
HpCDD	480
1,2,3,4,6,7,8-HpCDD	320
OCDD	1,800
HxCDF	170
1,2,3,4,7,8-HxCDF	31
HpCDF	280
1,2,3,4,6,7,8-HpCDF	130
OCDF	780

Table 8. Analytical results[1] for semi-volatile organic compounds in soil samples (ppb).

Analytes	MWO1-1.5	MW01-3.0	MW01-7.5	MW02-1.5	MW02-4.5	MW03-1.5	MW03-4.5
4-Methylphenol	190J	ND	ND	ND	ND	ND	ND
Pyrene	84J	110J	95J	ND	170J	ND	ND
Fluoranthene	ND	98J	ND	ND	150J	ND	ND
bis(2-Ethylhexyl)phthalate	ND	150BJ	82BJ	ND	ND	37,000	ND
2,4-Dimethylphenol	ND	ND	ND	5200J	ND	ND	ND
Napthalene	ND	ND	ND	3300J	ND	ND	250J
2-Methylnapthalene	ND	ND	ND	130,000B	ND	ND	240J
Phenanthrene	ND	ND	ND	4700J	110J	ND	160J
Chrysene	ND	ND	ND	4300J	100J	ND	ND
Benzo(a)anthracene	ND	ND	ND	ND	110J	ND	ND
2-Chlorophenol	ND	ND	150J	ND	ND	ND	ND

ND-Compound not found above detection limits
1-Only those compounds found above detection limits are listed
B-Compound found in method blank
J-Concentration estimated due to detection limit that is higher than measured concentration

Table 9. Analytical results* for semi-volatile organic compounds in product and groundwater samples (ppb).

Product

Analytes	Buried Tank Car	Vintage Oil Tank
Napthalene	730,000J	380,000
Acenapthene	210,000J	ND
Dibenzofuran	220,000J	ND
Fluorene	240,000J	ND
Phenanthrene	160,000J	100,000J
bis(2-Ethylhexyl)phthalate	1,100,000J	ND
2-Methylnapthalene	ND	590,000B
N-Nitrosodiphenylamine(1)	ND	73,000J

Groundwater

Analytes	MWO1A	MW01B	MW02	MW03A	MW03B
bis(2-Ethylhexyl)phthalate	11	11	12	42	ND
Napthalene	ND	ND	ND	110	60J
2-Methylnapthalene	ND	ND	ND	30J	ND

ND-Not detected
J-Concentration estimated due to detection limit that is higher than measured concentration
*-Only those compounds found above detection limits are listed
B-Compound found in method blank

Table 10. Level A MTCA Standards

Compound	Groundwater (ug/L)	Soil (mg/kg)
Arsenic	5.0	20
Benzene	5.0	0.5
Cadmium	5.0	2.0
Chromium (total)	50.0	100.0
DDT	0.1	1.0
Ethylbenzene	30.0	20.0
Lead	5.0	250.0
Methylene Chloride	5.0	0.5
Mercury	2.0	1
PCB Mixtures	0.1	1.0
Tetrachloroethylene	5.0	0.5
Toluene	40.0	40.0
TPH	1000.0	100.0 (gas) 200.0 (oil) 200.0 (diesel)
1,1,1 Trichloroethane	200.0	20.0
Trichloroethylene	5.0	0.5
Xylenes	20.0	20.0

5. Matrix spikes were all acceptable. However, the percent recoveries of silver and barium were low for the TCLP method (Ag 30.8% and 66.6%; Ba 73.5%). It is unclear whether these spikes were added before or after extraction and, therefore, it is not possible to completely evaluate the silver and barium matrix spike data.

Organics

1. Holding times were unacceptable for most media. The samples for volatile analyses were held for 19 (water) to 48 (soil) days, exceeding the recommended holding time of 14 days. Holding times for the water samples to be analyzed for pesticides/PCBs and semi-volatiles were acceptable. The holding times, prior to extraction, for the soil and sludge samples to be analyzed for semi-volatiles and pesticides/PCBs ranged from 22 to 27 days, exceeding the maximum recommended holding time of 14 days to extraction.

2. Method blanks for VOCs, dioxins, and pesticides/PCBs showed no contamination. Method blanks for semi-volatiles had level of chrysene (99J) and 2-Methylnaphthalene (6300J).

3. No surrogate recovery data was present for VOCs, semivolatiles, or dioxins. Pesticide/PCB analyses of the following samples had surrogate recoveries of zero: MW-01-1.5, MW-01-3.0, MW-01-7.5, MW-02-4.5, MW-03-4.5, MW-03-6.0, MW-01A, MW-01B, MW-02, MW-03A, MW-03B.

4. Matrix spike/matrix spike duplicate data were acceptable for pesticide/PCB and VOC analyses. MS/MSD recoveries for semivolatiles were zero. No MS/MSD data were given for dioxin analyses.

In general the metals data seem to be of acceptable quality for a preliminary site investigation. However, because the holding times were exceeded and the surrogate recovery was low (or surrogate recovery data was nonexistent), it is recommended that all of the organic data that are quantified as below detection limits be rejected, except the dioxin analysis. All organic analyses above detection limits should be considered estimates.

6.2 SUBSURFACE SOIL SAMPLES

Subsurface soil samples were collected on May 1 and 2, 1991. Approximate sampling locations are shown on Figure 2. Compounds found above detection limits in the subsurface are summarized in Tables 3, 5, 6, 7, and 8.

Results of the TCLP test (MW02-3.0) are presented in Table 2. Metals above detection limits include silver, cadmium and lead. All results were below dangerous waste criteria (173-303-090 WAC)

Heavy metals found at concentrations above detection limits are presented in Table 3. Heavy metals were detected in all eleven soil samples submitted for analyses. In each

sample, the highest metals concentration detected was aluminum with concentrations ranging from 11,000 mg/kg (MW01-7.5) to 20,000 mg/kg (MW01-3.0).

Pesticides and PCBs found at concentrations above detection limits are presented in Table 5. Pesticides and PCBs were detected in nine of the 11 subsurface soil samples submitted for analysis. Pesticide concentrations ranged as high as 23,000 ug/kg (4,4'-DDT, MW02-3) and PCB concentrations ranged as high as 600,000 ug/kg (Aroclor 1260, MW02-3).

VOCs found at concentrations above detection limits are listed in Table 6. Acetone was detected in three of the samples (MW01-1.5, MW02-4.5, MW03-6.0) in concentrations ranging from 16 to 46 ug/kg. Methylene chloride was detected in two of the samples (MW03-4.5, MW03-6.0) ranging in concentration from 12 to 13 ug/kg.

Dioxins found at concentrations above detection limits are listed in Table 7. Dioxins were detected at concentrations as high as 1,800 ppt (MW02-0-5.0).

Semi-VOCs found at concentrations above detection concentrations are summarized in Table 8. Semi-VOCs were detected in seven of the 11 samples submitted for analysis at concentrations as high as 130,000 ug/kg (2-Methynapthalene, MW02-1.5).

6.3 GROUNDWATER SAMPLES

Groundwater samples were collected on May 3, 1991. Approximate locations of the wells are shown on Figure 2. Compounds found above detection limits are summarized in Tables 4, 5, 6, and 10.

The results summary for heavy metals is presented in Table 4. Dissolved metal were reported at below detection limits in the groundwater samples for all metals except zinc in MW-01A (25ug/L), aluminum in MW03A (261 ug/L), and MW03B (219 ug/L). Total metals were detected in all groundwater samples with detected concentrations as high as 4,020,000 ug/L (aluminum, MW03-B).

PCBs and pesticides found at concentrations above detection limits are summarized in Table 5. PCBs were detected in all groundwater samples with concentrations ranging from 1.7 ug/L (Aroclor-1260, MW01-B) to 77 ug/L (Aroclor-1260, MW03A). Pesticides, also detected in all submitted samples, were reported at concentrations as high as 3.2 ug/L (4-4' DDT, MW03A).

VOCs found at concentrations above detection limits are presented in Table 6. Of the five groundwater samples submitted for analysis, only MW03A was found to contain VOCs (Xylene-total, 4ug/L).

Semi-VOCs found at concentrations above detection limits are presented in Table 9. Semi-VOCs were detected in all samples analyzed at concentrations as high as 110 ppb (Napthalene, MW03A)

6.4 PRODUCT SAMPLES

The product samples were collected on May 3, 1991. Approximate locations of the sampling points are shown on Figure 2. Compounds found above detection limits are summarized in Tables 5, 6, and 9.

Results of the TCLP analysis are presented in Table 2. TCLP metals were detected in both product samples. The metals above detection limits were silver, cadmium, chromium, and lead. All levels were below dangerous waste levels (173-303-090 WAC)

Pesticides and PCBs were reported as not detected or as values estimated by the lab in the product sample from the Vintage Oil Tank. Estimated concentrations ranged from 1800 ug/L (4,4' DDT) to 48,000 ug/L (Aroclor-1260). PCBs were not detected and pesticides were reported at 4,800 ug/L (Heptachlor epoxide) in the sample from the buried tank car.

VOCs found at concentrations above detection limits may be found in Table 6. VOCs were detected in the buried tank car and the vintage oil tank at concentrations as high as 1,600,000 ug/L (Xylene-total, Vintage Oil Tank).

Semi-VOCs found above detection limits are summarized in Table 9. Semi-VOCs were detected in both product samples at concentrations as high as 1,100,000 kg/L (bis(2-Ethylhexyl)phthalate, Buried Tank Car).

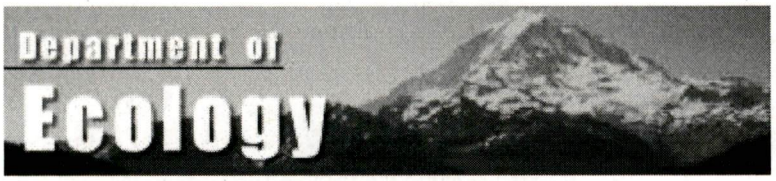
6.5 ASBESTOS SAMPLE

Laboratory analysis revealed the asbestos sample to contain 10% chrysotile and 10% amosite. Other fibrous material was revealed to be cellulose and other non-fibrous material was revealed to be binder.

7.0 SUMMARY

The following observations were noted in reviewing the analytical data:

- It is recommended that all of the organic data that are quantified as below detection limits be rejected, except the dioxin analysis. All organic analyses above detection limits should be considered estimates.
- VOCs, heavy metals, PCBs, pesticides and semi-VOCs were detected in all mediums analyzed (soil, groundwater, product).
- Dioxin was detected in the composite soil sample submitted for analysis.
- The TCLP test revealed that all samples analyzed were below the Dangerous



Ecology Online Conference Scheduling

Browse Reservations My Account Welcome Dale Myers

Reservation Summary

Event: VCP Basin Oil Consultation
Reservation Id: 54977
Event Type: Public Meeting
Meeting Sponsor: Myers, Dale
Has Outlook Appointment: No

1st Contact
1st Contact: Myers, Dale
Phone: (425) 649-4446

Additional Information

Booking Summary Add Booking Cancel All Bookings

Start ▲ End	Event	Building	Room	Status	Actions
Thursday 10/19/2006					
9:30 AM 11:30 AM	VCP Basin Oil Consultation	Northwest Regional Office	SWFAP Conference Room	Web Confirmed	Edit Cancel

Print Email Summary

Powered by ems

Boring #: MW-01
Total Depth: 15.3'
Sheet 1 of 1

Exploratory Boring Log

Location:

Project #: 55-1738-15
Project Name: Malarkey Asphalt
Location: Seattle, WA
PMX Rep: G. Hayman
Sampling Method: 2.5" Split Spoon

Date Started: 5/1/91
Date Completed: 5/1/91
Driller: Mathes
Drilling Method: HSA
Drill Rig: CME 75

Water Level	7.65'	7.57'	7.83'	7.74'		
Time	4:25P	12:10P	9:30A	10:54A		
Date	5/1/91	5/2/91	5/3/91	5/6/91		

Surface Elevation: 98.76'
Datum: Assumed Elevation
Hole Diameter: 8"

Well Installation Data: 0.020" slotted pvc 15' to 5.0', blank pvc 5' to 0', sand 15' to 4', benonite 4' to 2', concrete 2' to 0', flush monument

INSTRUMENT READING (PPM)	BLOWS/FT	SAMPLE TYPE AND NUMBER	% RECOVERY	DEPTH (FT)	SAMPLE INTERVAL	USCS SOIL GROUP	DESCRIPTION	WELL DETAIL
						GP	Gray sandy gravel, crushed rock, fill, dense, damp	
1.6	31	1.5	30			ML	Dark gray sandy silt, soft, damp	
1.6	19	3.0	60					
1.6	17	4.5	70			SM/SP	Dark gray fine sand, some brown mottling, soft, damp	
1.6	17	6.0	50	5				
1.6	16	7.5	60			▽	Some silt layers, wet (first encountered groundwater at time of drilling)	
1.6	9	-	60					
1.6	6	-	50	10				
						GM	Gravel stringer	
						SM	Gray silty sand, wet	
						GM	Sandy to silty gravel, brown, very fine sand, well rounded gravel, up to 2" in diameter	
-	18	-	20	15				LOG

MW-02

EXPLORATORY BORING LOG

PROJECT:	South Park Site	BORING NO:	MLRKY-02
LOCATION:	8700 Dallas Ave S., Seattle, WA	PAGE:	1 of 1
DRILLED BY:	Holt Drilling	GROUND ELEV:	
DRILLING METHOD:	Hollow Stem Auger	TOTAL DEPTH:	16 ft
LOGGED BY:	Warren Hansen	DATE COMPLETED:	12/29/99

SAMPLE DESIG-NATION	PID (ppm)	BLOWS PER 6 INCHES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
								asphalt - top 2 inches over 4 inches concrete
								brown silty sand, trace of silt
	0.0	5/6/5		5				fine sand, wet
	0.1	2/1/1		10				grey sandy silt, moist, plastic
	0.0	2/1/1		15				grey silt, moist, plastic
				20				

NOTES/REMARKS:

Replacement well for abandoned well MW-02. Samples analyzed using PID only. Samples collected using 2.0-inch dia. Stainless steel split-spoon sampler. Reference elevation = ground surface.

Well Depth: Top of PVC to bottom: 16 ft 0.0 in. Ground surface to top of PVC: 4.5 in.

WELL COMPLETION INFORMATION:

2-inch dia. Schedule 40 PVC riser and 0.010-inch screen. Flush monument set in concrete, well plug bentonite chips hydrated with potable water. Well screen filter: 10-20 colorado sand.

ONSITE ENTERPRISES, INC.

EXPLORATORY BORING LOG

PROJECT:	South Park Site	BORING NO:	MLRKY-03
LOCATION:	8700 Dallas Ave S., Seattle, WA	PAGE:	1 of 1
DRILLED BY:	Holt Drilling	GROUND ELEV:	
DRILLING METHOD:	Hollow Stem Auger	TOTAL DEPTH:	14 ft
LOGGED BY:	Warren Hansen	DATE COMPLETED:	12/29/99

SAMPLE DESIG-NATION	PID (ppm)	BLOWS PER 6 INCHES	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	WELL DETAILS	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
								asphalt - top 2 inches over 4 inches concrete
	2.5 (cuttings)	2/1/1	no recovery	5				tan silty sand with rounded pieces of gravel.
	13.7	1/0/1		10				grey sandy silt, moist, plastic. Slight sheen on silt. Slight diesel odor
	0.0	2/1/1		15				grey silt. Moist and plastic. Trace diesel odor
				20				

NOTES/REMARKS:

Replacement well for abandoned well MW-03. Samples analyzed using PID only. Samples collected using 2.0-inch dia. Stainless steel split-spoon sampler. Reference elevation = ground surface.

Well Depth: Top of PVC to bottom: 14 ft 3.5 in. Ground surface to top of PVC: 3.3 in.

WELL COMPLETION INFORMATION:

2-inch dia. Schedule 40 PVC riser and 0.010-inch screen. Flush monument set in concrete, well plug bentonite chips hydrated with potable water. Well screen filter: 10-20 colorado sand.

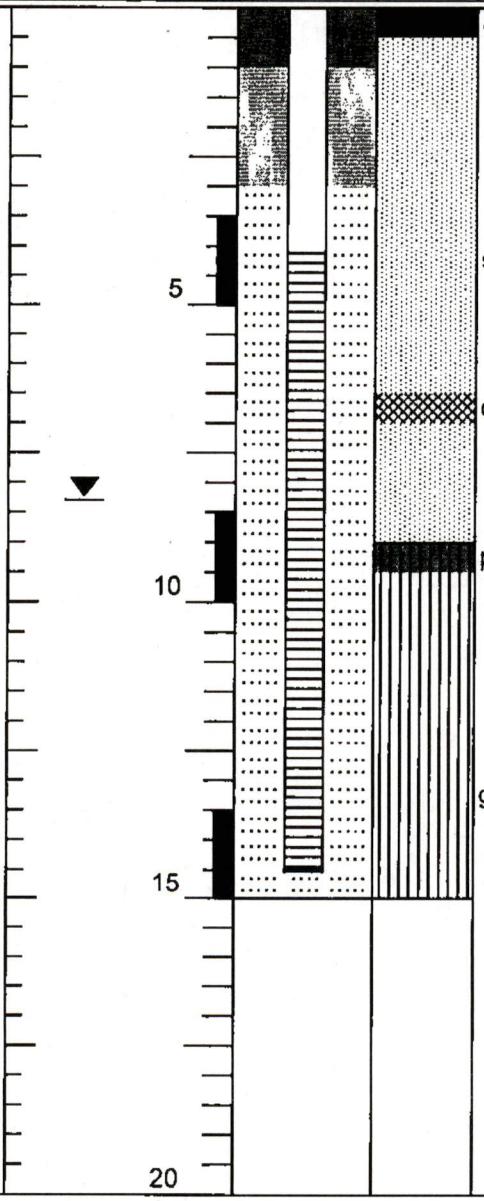
ONSITE ENTERPRISES, INC.

MW-04

EXPLORATORY BORING LOG

PROJECT:	South Park Site	BORING NO:	MLRKY-04
LOCATION:	8700 Dallas Ave S., Seattle, WA	PAGE:	1 of 1
DRILLED BY:	Holt Drilling	GROUND ELEV:	
DRILLING METHOD:	Hollow Stem Auger	TOTAL DEPTH:	15 ft
LOGGED BY:	Warren Hansen	DATE COMPLETED:	12/29/99

SAMPLE DESIG-NATION	PID (ppm)	BLOWS PER 6 INCHES	LITHOLOGIC DESCRIPTION
			asphalt - top 6 inches
	6.7	6/8/16	silty sand, small rounded gravel
			concrete debris encountered at 7.0 ft
	21.7	4/2/2	peat layer. Poor recovery
	20.4	2/1/2	grey silt. Moist and plastic.



NOTES/REMARKS:

Replacement well for abandoned well MW-04. Samples analyzed using PID only. Samples collected using 2.0-inch dia. Stainless steel split-spoon sampler. Reference elevation = ground surface.

Well Depth: Top of PVC to bottom: 14 ft 3.0 in. Ground surface to top of PVC: 3.6 in.

WELL COMPLETION INFORMATION:

2-inch dia. Schedule 40 PVC riser and 0.010-inch screen. Flush monument set in concrete, well plug bentonite chips hydrated with potable water. Well screen filter: 10-20 colorado sand.

ONSITE ENTERPRISES, INC.

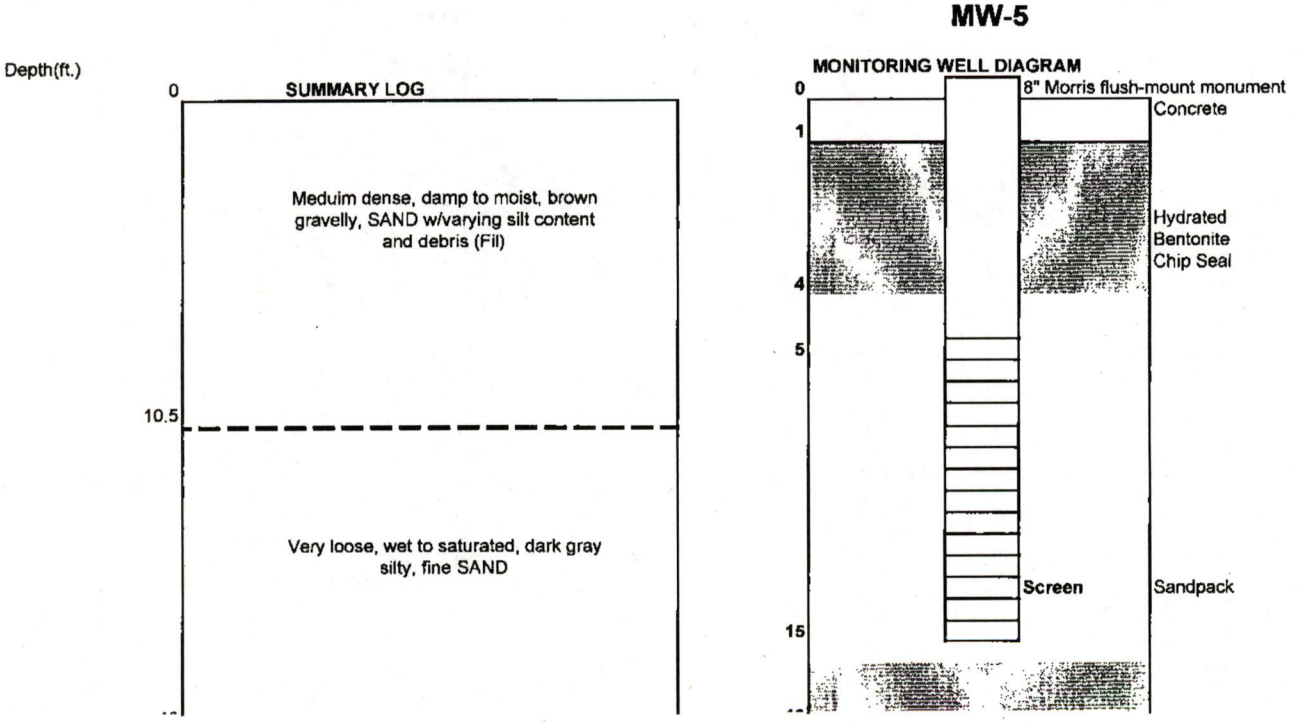
BORING MONITORING WELL DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION Location **T-117-SB3**

Field Rep: DG Cooper
Drilling Co.: Holt
Driller: John
Drill Type: Mobile B-59
Size/Type Casing: 4" HAS

Location: Terminal 117 Port of Seattle
Elevation (Ft.): Top PVC Pipe: Grnd Surface: asphalt pavemt
Date Completed: 12/4/03
Weather: Rain
Hammer Type: 140 # SPT Sampler Type: 18" SPT Split Spoon

Spl.No.	Type sample saved	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length inches	Time	Sample Description
T117-SB3-01	16 oz. jar		0-1.5	14/17/12	18	0935	Damp, browm gravelly, SAND
	zip-loc						w/some silt, brick fragments
T117-SB3-02	16 oz. jar		2.5-4	6/9/10	18	0940	upper 12" as above
	zip-loc	gravelly					lower 6"-dk gray , F-M SAND
T117-SB3-03	16 oz. jar		5-6.5	5/10/7	8	0945	moist, gray, gravelly, SAND
		smoother					w/trace silt, asphalt fragments
T117-SB3-04	16 oz. jar		7.5-9	5/10/8	12	0950	moist, brown, gravelly, silty
	zip-loc	hard gravelly					SAND, w/ crushed rock
T117-SB3-05	16 oz. jar	smooth @ 10.5'	12.5-14	0/1/1	18	1000	wet, dk gray, silty, F SAND
	zip-loc						
T117-SB3-06	16 oz. jar		17.5-19	0-18"	18	1010	sat, dk gray, silty, F SAND
	zip-loc						

LABORATORY SAMPLES:



BORING MONITORING WELL DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION Location **T-117-SB4**

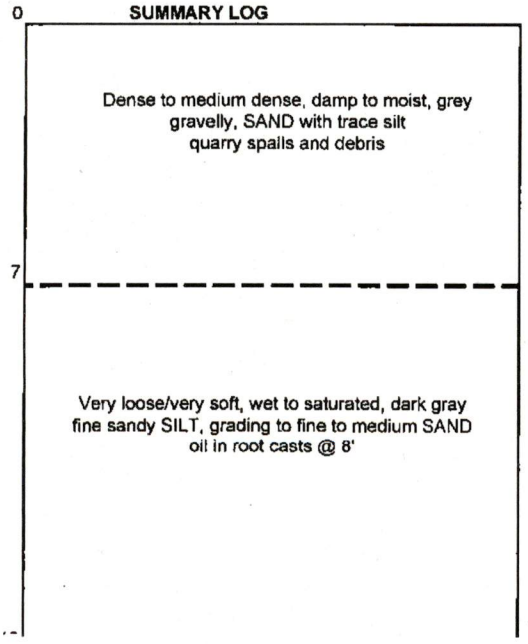
Field Rep: DG Cooper
Drilling Co.: Holt
Driller: John
Drill Type: Mobile B-59
Size/Type Casing: 4" HAS

Location: Terminal 117 Port of Seattle
Elevation (Ft.): Top PVC Pipe: Grnd Surface: asphalt pavemt
Date Completed: 12/4/03
Weather: Rain
Hammer Type: 140 # SPT Sampler Type: 18" SPT Split Spoon

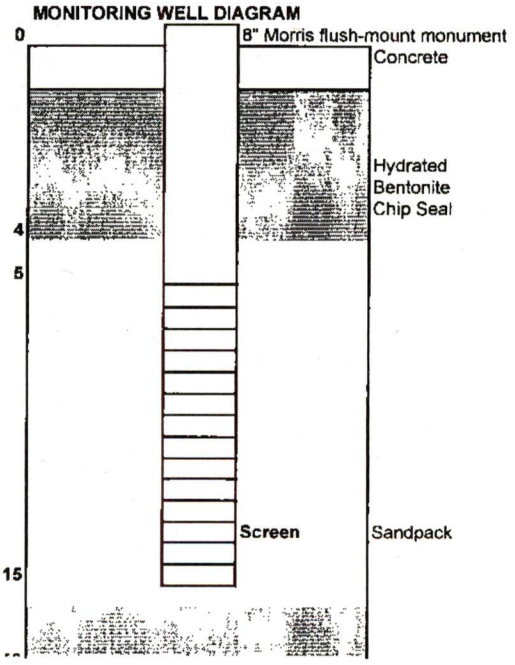
Spl.No.	Type sample saved	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length inches	Time	Sample Description
T117-SB4-01	16 oz jar		0-1.5	20/20/18	12	1140	Damp, gray, gravelly, SAND
	zip-loc	hard/gravelly					w/ trace silt
T117-SB4-02	16 oz jar		2.5-4	10/14/12	6	1155	crushed rock, shattered gravel
T117-SB4-03	16 oz jar	spalls in cuttings	5-6.5	10/7/4	12	1200	moist, mot bwn, silty, SAND
	zip-loc	smooth					w/ peat, roofing felt
T117-SB4-04	16 oz jar		7.5-9	0/1/0	18	1210	wet, dk gry, F sandy, SILT
	zip-loc						w/ oil in root casts
T117-SB4-05	16 oz jar		12.5-14	0/0/1	18	1220	sat, dk gry, F-M SAND
	zip-loc						w/ some silt
T117-SB4-06	16 oz jar		17.5-19	3/4/3	18	1230	sat, dk gry, F-M SAND
	zip-loc						

LABORATORY SAMPLES:

Depth(ft.)



MW-6



BORING & MONITORING WELL - DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION Location **T-117-SB15**

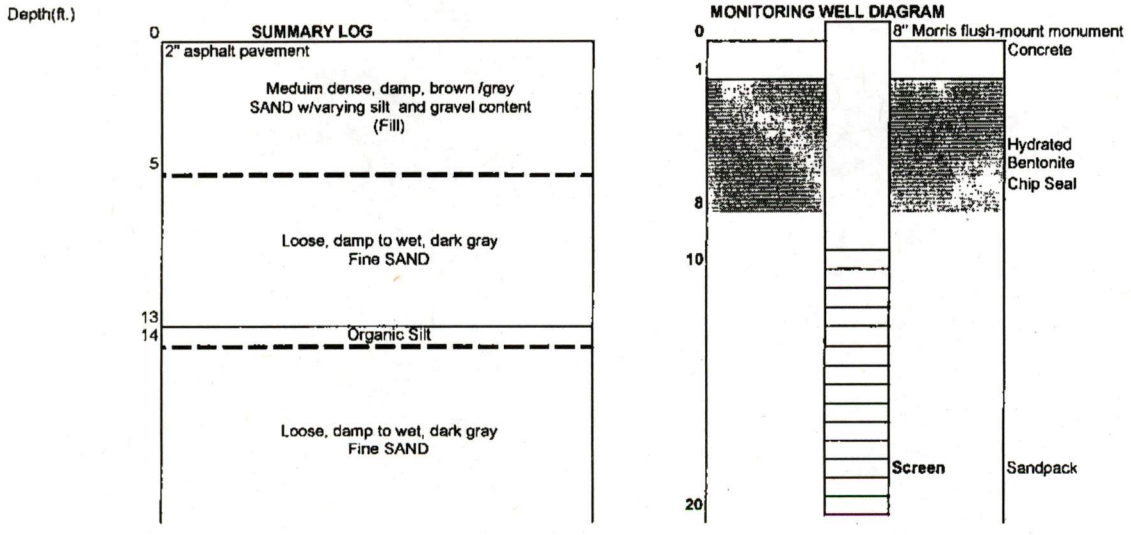
Field Rep: DG Cooper
Drilling Co.: Cascade
Driller: Frank
Drill Type: CME 75
Size/Type Casing: 4" ID Hollow-stem auger

Location: 1' east of PS-1 mark
Elevation (Ft.):Top PVC Pipe: Grnd Surface: asphalt pavemt
Date Completed: 6/6/05
Weather: Sunny 75F
Hammer Type: 140 # SPT Sampler Type: 3" dia. D&M Split Spoon

Spl.No.	Type sample saved	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 Inches	Spl length inches	Time	Sample Description
T117-SB15-01	8/4 oz. jar		0-1.5	6/6/5	18	1420	3" crushed rock atop Medium dense
		gravelly					damp, brown, silty SAND, w/ some gravel
T117-SB15-02	8/4 oz. jar		2.5-4	5/7/6	18	1425	M dense, damp, dark gray, F-M SAND
	zip-loc	smoother					w/ pea gravel
T117-SB15-03	8/4 oz. jar		5-6.5	5/5/4	18	1430	Loose, damp, dark gray, F SAND
	zip-loc						
T117-SB15-04	8/4 oz. jar		7.5-9	2/2/2	18	1435	Loose, moist, dark gray, F SAND
	zip-loc						
T117-SB15-05	8/4 oz. jar		10-11.5	2/2/2	18	1440	Loose, wet, dark gray, F SAND
	zip-loc						
T117-SB15-06	8/4 oz. jar		12.5-14	1/2/4	18	1445	Soft, wet, mottled gray, SILT
	zip-loc						w/peat interbeds, black stained banding
T117-SB15-07	8/4 oz. jar		15-16.5	6/6/8	18	1450	M dense, wet, dark gray, F SAND
	zip-loc						w/ oxidation banding @ 16'
T117-SB15-08	8/4 oz. jar		20-21.5	4/4/5	18	1455	Loose, wet, dark gray, F SAND
	zip-loc						

LABORATORY SAMPLES: PCBs, TOC, Total solids, grain size

MW-7



BORING & MONITORING WELL - DESCRIPTION OF SAMPLES, TESTS, AND INSTALLATION Location **T-117-SB18**

Field Rep: DG Cooper
Drilling Co.: Cascade
Driller: Frank
Drill Type: CME 75
Size/Type Casing: 4" ID Hollow-stem auger

Location: 3' west of staked location
Elevation (Ft.):Top PVC Pipe: Grnd Surface: crushed rock
Date Completed: 6/6/05
Weather: Sunny 75F
Hammer Type: 140 # SPT Sampler Type: 3" dia. D&M Split Spoon

Spl.No.	Type sample saved	Drill Action	Spl Depth (Ft.) From - To	Blows/ 6 inches	Spl length inches	Time	Sample Description
T117-SB18-01	8 oz. jar		0-1.5	6/5/5	18	0930	M dense, damp brown silty, SAND
		gravelly					w/asphalt chunks
T117-SB18-02	8/4 oz. jar		2.5-4	3/3/4	18	0935	Loose, moist, mot brown, silty, SAND
	zip-loc						w/trace gravel
T117-SB18-03	8/4 oz. jar	Hard	5-6.5	6/10/7	18	0940	Loose, moist, mot brown, F-M SAND
	zip-loc	gravelly					w/some silt, coal-like chips
			7.5-9	70-6"	0	0945	no recovery
T117-SB18-04	8 oz. jar		10-11.5	12/13/22	18	0950	M dense, moist, gray, sandy, GRAVEL
							poor recovery
T117-SB18-05	8 oz. jar	very gravelly	12.5-14	55-6"	6	0955	V dense, moist, sandy, GRAVEL
							w/concrete chunks
T117-SB18-06	8/4 oz. jar		15-16.5	50-6"	6	1000	V dense, wet, F-M SAND
							w/concrete chunks
T117-SB18-078	8/4 oz. jar		17.5-19	12/14/24	18	1005	M dense, wet, Dk gray, F-M SAND
	zip-loc						

LABORATORY SAMPLES: PCBs, TOC, Total solids, grain size

MW-8