REMEDIAL INVESTIGATION REPORT

FORMER UNDERGROUND FUEL STORAGE TANK AND ABOVE-GROUND ROAD OIL STORAGE TANK AREAS

WEYERHAEUSER SNOQUALMIE MILL

SNOQUALMIE, WASHINGTON

Prepared for

Weyerhaeuser Company

March 24, 1998

Prepared by

EMCON
18912 North Creek Parkway, Suite 200
Bothell, Washington 98011-8016

Project 40141-083.002

CONTENTS

CONTENTS (Continued)

TABLES AND FIGURES

Following Text

Tables

Figures

1 INTRODUCTION

On September 12, 1997, remedial investigation activities were conducted at the former underground fuel storage tank (UST) area and the former above-ground road oil storage tank area of the Weyerhaeuser Snoqualmie Mill in Snoqualmie, Washington (Figure 1). Previous investigations revealed that petroleum hydrocarbon-impacted soil and groundwater were present beneath both areas. The purposes of the current investigation were to evaluate the lateral and vertical extents of hydrocarbon-impacted soil beneath both areas, characterize the current petroleum hydrocarbon concentrations at both areas consistent with the Washington Department of Ecology (Ecology) MTCA Interim Policy Statement for TPH (Interim Policy),[1] and to evaluate the risks associated with the remaining TPH in soil. The tasks completed under the scope of work included the following:

- Drilled and sampled six soil borings (GP-1 through GP-6) at the former UST area.
- Drilled and sampled five soil borings (GP-7 through GP-11) at the former road oil storage tank area.
- Submitted selected soil samples from each boring, except GP-1, for quantitative chemical analysis.
- Evaluated the direct contact and protection of groundwater risks associated with the residual soil contamination at both areas.
- Interpreted the compiled data.
- Prepared this report.

---

1 Washington State Department of Ecology. 1997. *Interim Interpretive and Policy Statement — Cleanup of Petroleum Hydrocarbons (TPH).* Publication No. ECY97-600. January.

2 BACKGROUND

2.1 General Site Information

The Weyerhaeuser Snoqualmie Mill occupies approximately 300 acres near the Snoqualmie River in Snoqualmie, Washington (Figure 1). The former UST area and the former above-ground road oil storage tank area are located in the southern part of the site. The former UST area consisted of 10 gasoline, diesel, and lubricating oil tanks and associated fuel dispensing equipment that were installed in approximately 1960. The tanks and dispensing equipment were removed in January 1989. During the tank removal, petroleum hydrocarbon-saturated soils were observed in the excavation. Approximately 300 cubic yards of impacted soil were excavated and treated on site by bioremediation (landfarming) methods. The area near the former tank basin is currently inactive.

The former above-ground road oil storage tank area consisted of an 8,000-gallon tank and a 4,000-gallon tank that were installed in approximately 1960. The tanks were removed in November 1988. A steam cleaning rack and a machine shop were located to the northwest and west, respectively, of the former road oil tank area (Figure 2). The steam cleaning rack and machine shop have been decommissioned and removed. An above-ground lube oil storage facility and a concrete loading dock currently exist to the south and north of the former road oil tank area.

2.2 Previous Investigation and Remedial Activities - Former UST Area

On August 16, 1989, Weyerhaeuser personnel excavated 11 test pits (W1 through W11) in the former UST area to characterize and determine the extent of soil contamination. The test pit locations are shown on Figure 3. A total of 15 soil samples were collected from the test pits at depths ranging from 4 to 8 feet below ground surface (bgs). The samples from test pits W1, W2, W3, W4, W6, W7, W9, and W12 contained total petroleum hydrocarbon (TPH-IR by EPA Method 418.1) concentrations that exceeded 200 milligrams per kilogram (mg/kg). Benzene, toluene, ethylbenzene, and/or total xylenes (BTEX) concentrations exceeded Ecology cleanup levels in samples from test pits (W1, W2, and W7) located in the southern and southwest portions of the former UST area, in the vicinity of the former gasoline tanks and dispensing equipment. Based on the

soil sample analytical results, Weyerhaeuser notified Ecology of the release on September 6, 1989. The August 1989 investigation activities were summarized in the HDR Engineering, Inc. (HDR), report, *Technical Memorandum 01, Former UST and Road Oil Storage Tank Facilities*, dated February 19, 1990.

To further evaluate the extent of hydrocarbon-impacted soil at the former UST area, HDR and Olympus Environmental, Inc. (Olympus), conducted an investigation in November 1989 that consisted of excavating and sampling 12 test pits (TP-1 through TP-12). The locations of the test pits are shown on Figure 3. Groundwater was encountered in the test pits at a depth of approximately 5 feet bgs. Soil Sample analytical results showed that the samples from TP-2, TP-4, and TP-12 contained total petroleum hydrocarbon (TPH-TLC by thin layer chromatography methods) concentrations greater than 200 mg/kg. Groundwater samples collected from TP-2, TP-3, TP-4, TP-5, TP-7, and TP-12 contained TPH-IR concentrations greater than 1 milligram per liter (mg/L). Groundwater samples were not collected from TP-6, TP-8, and TP-9. It appeared that the silty soils beneath the area limited lateral and vertical contaminant migration. By a depth of approximately 9 feet bgs, TPH-TLC concentrations in soil were below 200 mg/kg. The results of the investigation activities were detailed in HDR's report, *Technical Memorandum 01, Former UST and Road Oil Storage Tank Facilities*, dated February 19, 1990.

Based on the results of the investigation activities, Olympus excavated approximately 700 cubic yards of impacted soil from areas to the west and south of the former UST basin in November 1989. The location of the excavation is shown on Figure 3. The depth of the excavation extended to approximately 10 feet bgs. Fourteen confirmation soil samples (TA-1 through TA-14) were collected from the sidewalls and floor of the excavation (Figure 3). The soil sample analytical results showed that the excavation effectively removed the impacted soil, except to the southeast of the former tank basin. Confirmation samples TA-11 and TA-13 contained TPH-IR concentrations greater than 200 mg/kg, and sample TA-12 contained a benzene concentration (4.7 mg/kg) that exceeded the Ecology cleanup level. The excavation was not extended further to the southeast due to a highly traveled road. Additional impacted soil was not excavated from the tank basin because surface water had accumulated in the basin. The excavated soil was treated on site by landfarming methods. The excavation activities were described in HDR's report, *Technical Memorandum 01, Former UST and Road Oil Storage Tank Facilities*, dated February 19, 1990.

In March 1990, HDR conducted an additional investigation at the former UST area to further determine the lateral extent of soil and groundwater impacts. The investigation consisted of drilling and sampling 13 soil borings (BH-001 through BH-010, BH-019, BH-021, and BH-022). Four of the borings (BH-002, BH-008, BH-010, and BH-019) were completed as groundwater monitoring wells A1-1, A1-2, A1-3, and A-4, respectively. The locations of the borings and monitoring wells are shown on Figure 3. The investigation activities showed that the shallow silt unit beneath the area is underlain

by a sand unit. The top of the sand unit occurs at a depth of approximately 10 to 12 feet bgs, and the unit extends to a depth of approximately 30 feet bgs. The four monitoring wells were screened within the top 10 feet of the sand unit. Soil sample analytical results showed that samples from borings BH-001, BH-003, BH-004, BH-007, and BH-008 contained total petroleum hydrocarbons (TPH by EPA Method 8015 modified) as gasoline (TPH-G) and as diesel (TPH-D) concentrations greater than 200 mg/kg. Benzene, ethylbenzene, and total xylenes concentrations in the sample from BH-005 exceeded Ecology cleanup levels. Free product was not detected in any of the wells. The groundwater sample collected from well A1-3 (located south of the former tank basin) contained a benzene concentration that exceeded Ecology cleanup level. The groundwater sample analytical results are presented in Table 1. The reported groundwater flow direction beneath the area was to the southeast. The results of the investigation were described in HDR's report, *Technical Memorandum 02, Former UST and Road Oil Storage Tank Facilities*, dated March 27, 1990.

In September 1990, Shannon & Wilson, Inc. (Shannon & Wilson) sampled the groundwater in well A1-3 to confirm the benzene results from the March 1990 sampling event. The benzene and total xylenes concentrations (280 and 130 micrograms per liter [µg/L], respectively) exceeded the draft Model Toxics Control Act (MTCA)[2] Method A cleanup levels. The sample results are presented in Table 1.

In November 1990, Shannon & Wilson and Olympus conducted an additional investigation at the former UST area to determine the extent of groundwater contamination to the south of the former tank basin. The work consisted of drilling and sampling three soil borings (BH-060, BH-061, and BH-062) and completing the borings as monitoring wells (A1-5, A1-6, and A1-7, respectively). The locations of the borings/wells are shown on Figure 3. Soil sample analytical results showed that the shallow sample (5 to 6.5 feet bgs) from BH-061 contained TPH as oil (TPH-O) and TPH-G concentrations that exceeded draft MTCA Method A cleanup levels. The concentrations in the boring decreased with depth and the 7.5 to 9 foot sample contained TPH-O and TPH-G concentrations below draft Method A cleanup levels. In December 1990, groundwater samples were collected from the new wells and all of the other wells at the former UST area. The sample from A1-3 contained benzene, toluene, and total xylenes concentrations that exceeded draft Method A cleanup levels. All of the other samples contained BTEX and TPH concentrations below draft Method A cleanup levels. The groundwater sampling results are presented in Table 1. The results of the investigation activities and the September and December 1990 groundwater sampling events were described in Shannon & Wilson's report, *Technical Memorandum 07, Subsurface Groundwater Conditions at Areas No. 1 and No. 2*, dated March 7, 1991.

---

[2] Chapter 173-340 WAC, *The Model Toxics Control Act Cleanup Regulation; Method A Cleanup Levels.*

2.3 Previous Investigation and Remedial Activities - Former Road Oil Storage Tank Area

On November 2, 1989, HDR excavated a test pit (TP-13) beneath the former road oil storage tank area to evaluate potential impacts. The location of the test pit is shown on Figure 4. The soil samples collected from the test pit at depths of 2.5, 3.5, and 6.5 feet bgs contained TPH-TLC concentrations greater than 10,000 mg/kg. In November 1989, Olympus excavated approximately 600 cubic yards of hydrocarbon-impacted soil from the former tank area. All of the impacted soil could not be excavated due to physical constraints (e.g., lumber piles, a highly traveled road near the area, and a fire service main beneath the former tank). The depth of the excavation ranged from approximately 3 to 12 feet bgs. Twenty-three confirmation soil samples (OT-1 through OT-23) were collected from the floor and sidewalls of the excavation. Sample analytical results showed that TPH-TLC concentrations exceeded 200 mg/kg in all of samples except OT-9, OT-10, OT-12, OT-13, OT-14, OT-16, OT-22, and OT-23. The locations of the samples are shown on Figure 4. The excavated soil was treated on site by landfarming methods. The results of the investigation and remediation activities were described in HDR's report, *Technical Memorandum 01, Former UST and Road Oil Storage Tank Facilities,* dated February 19, 1990.

In March 1990, HDR conducted an additional investigation at the former road oil storage tank area to determine the extent of soil impacts and to characterize groundwater conditions. The investigation consisted of drilling and sampling 10 soil borings (BH-004, BH-012 through BH-018, BH-020, and BH-023). Borings BH-018, BH-013, BH-017, and B-023 were completed as groundwater monitoring wells A2-1, A2-2, A2-3, and A2-4, respectively. The locations of the soil borings and monitoring wells are shown on Figure 4. Soil conditions were similar to the former UST area. A shallow silt unit extended to approximately 10 to 12 feet bgs, and an underlying sand unit extended to approximately 30 feet bgs. The wells were screened within the top 10 feet of the sand unit. Soil sample analytical results showed that samples from borings BH-014, BH-015, BH-016, and BH-020 contained TPH-O concentrations greater than 200 mg/kg. In March 1990, groundwater samples from each well contained BTEX concentrations below Ecology cleanup levels. The groundwater sample results are presented in Table 1. The results of the investigation were detailed in HDR's report, *Technical Memorandum 02, Activities Associated with Former UST and Road Oil Storage Tank Facilities,* dated March 27, 1990.

In December 1990, Shannon & Wilson collected groundwater samples from all of the wells at the former road oil storage tank area. The sample analytical results showed that BTEX and TPH concentrations were below draft Method A cleanup levels. The groundwater sample results are presented in Table 1. The results of the sampling event were detailed in Shannon & Wilson's report, *Technical Memorandum 07, Subsurface Groundwater Conditions at Areas No. 1 and No. 2,* dated March 7, 1991.

2.4 1991 through 1993 Groundwater Sampling Results - Former UST Area and Former Road Oil Storage Tank Area

From July 1991 through April 1993, Shannon & Wilson conducted groundwater sampling events at the former UST area and the former road oil storage tank area on a semi-annual basis. During each sampling event, BTEX and TPH concentrations in the samples from well A1-3 exceeded MTCA Method A cleanup levels. The July 1991, September 1992, and April 1993 samples from A1-5 contained benzene and/or TPH concentrations greater than Method A cleanup levels. The September 1992 and April 1993 samples from A1-6 contained TPH concentrations greater than Method A cleanup levels. The samples from all of the other wells in the former UST area did not contain BTEX or TPH concentrations above Method A cleanup levels during any of the sampling events. Wells A1-3, A1-5, and A1-6 are located to the south of the former UST basin.

For the wells located in the road oil storage tank area, the samples from all of the wells, except A2-3, did not contain BTEX or TPH concentrations above Method A cleanup levels during any of the sampling events. The April 1993 sample from A2-3 contained a TPH concentration that exceeded the Method A cleanup level. Well A2-3 is located along the eastern edge of the former tank area. For wells in both areas, total lead concentrations in the samples frequently exceeded the Method A cleanup; however, Shannon & Wilson concluded that the lead concentrations were due to sediment in the samples and did not represent groundwater conditions. The groundwater sampling results for the July 1991 through April 1993 events are shown in Table 1. The results of the July 1991 through April 1993 sampling events were summarized in Shannon & Wilson's report, *Technical Memorandum 14, Groundwater Quality Data - Fourth Biannual Sampling Event,* dated June 2, 1993.

2.5 1997 Groundwater Sampling Results - Former UST Area and Former Road Oil Storage Tank Area

In April and July 1997, EMCON conducted groundwater sampling events at both areas. During both events, well A2-3 could not be located. In April and July 1997, the samples from A1-3 contained BTEX and TPH-G concentrations that exceeded MTCA Method A cleanup levels. The samples from the other wells in the UST area and from all of the wells in the road oil storage tank area contained BTEX and TPH concentrations below Method A cleanup levels. The groundwater sampling results for the April and July 1997 events are shown on Table 1. The results of the April and July 1997 sampling events were presented in EMCON's reports, *April 1997 Groundwater Sampling Results, Former Underground Fuel Storage Tank and Above-Ground Road Oil Storage Areas,* dated August 6, 1997, and *July 1997 Groundwater Sampling Results, Former Underground Fuel Storage Tank and Above-Ground Road Oil Storage Areas,* dated September 12, 1997.

3 FIELD INVESTIGATION

3.1 Soil Borings

Soil conditions were evaluated by drilling six soil borings (GP-1 through GP-6) at the former UST area and five soil borings (GP-7 through GP-11) at the former road oil storage tank area. The boring locations are shown on Figures 5 (UST area) and 6 (road oil storage tank area). All drilling and sampling activities were conducted on September 12, 1997, under the direction of an EMCON geologist. Cascade Drilling, Inc., of Woodinville, Washington, provided the drilling services.

Each boring was advanced to a maximum depth of approximately 12.5 feet bgs by using Geoprobe™ drilling equipment. After completing the drilling, the drilling rods were removed and the 1.5-inch-diameter boreholes collapsed by natural caving of the soil. Hydrated bentonite was used to seal the surface of the borings. Details of the subsurface exploration procedures and the boring logs are presented in Appendix A.

3.2 Soil Sampling

Soil samples were collected during drilling of each boring. The 24-inch-long samples were collected at approximately 0.5- to 3-foot intervals. The samples were collected by using a hydraulically driven, split-spoon sampler. The recovered samples were screened for the potential presence of petroleum hydrocarbons by using physical appearance, odor, and a photoionization detector (PID). Selected samples from the road oil storage tank area were also screened by using a Hanby field test kit. The PID and Hanby kit readings are included on the boring logs at the respective depth intervals. At least one selected soil sample from each boring, except GP-1, were submitted to the certified Weyerhaeuser Analytical and Testing Services Laboratory (Weyerhaeuser Analytical) in Federal Way, Washington, for quantitative chemical analysis. Soil samples from GP-1 were not submitted for analysis because the boring was drilled to determine the western extent of contamination and hydrocarbons were present in the boring. Boring GP-4 was drilled to the west of GP-1 and a sample from GP-4 was submitted for analysis. Soil sampling procedures are described in Appendix A.

All of the submitted samples from the former UST area borings were analyzed for BTEX by EPA Method 8020A, TPH-G by Ecology Method WTPH-G, and TPH-D and TPH-O

by Ecology Method WTPH-D extended. The sample with the highest PID reading from the source area boring (GP-2) was also analyzed for volatile petroleum hydrocarbons (VPH) by Ecology Method WA-VPH, extractable petroleum hydrocarbons (EPH) by Ecology Method EPH, total lead by EPA Method 6010, and polynuclear aromatic hydrocarbons (PAHs) by GC/MS SIM Methods. All of the samples from the former road oil storage tank area borings were analyzed for TPH-D and TPH-O. The sample with the highest PID reading from the source area boring (GP-7) was also analyzed for EPH and PAHs.

3.3 Site Geology

The surficial geology beneath both areas consists of approximately 1 to 9.5 feet of sandy gravel to gravelly sand fill. Where less than 7 feet thick, the fill is underlain by a silt unit that contains trace to abundant organics. A thin peaty zone was present within the silt unit at boring GP-6. Where the silt unit has not been excavated, the unit ranges from approximately 5 to 8 feet in thickness. The silt unit, or the fill unit where the silt has been excavated, is underlain by a silty sand to sandy silt unit. The top of the silty sand to sandy silt unit occurs at depths ranging from approximately 7 to 9.5 feet bgs. Based on previous investigation results, the silty sand to sandy silt unit extends to a depth of at least 30 feet bgs.

Groundwater is present in the fill unit (where it extends below 5 feet bgs), the silt unit, and the silty sand to sandy silt unit. At the time of drilling, groundwater was initially detected in each boring at a depth of approximately 5 to 6 feet bgs.

4 NATURE AND EXTENT OF CONTAMINATION

4.1 Soil Sample Analytical Results - Former UST Area

The soil sample analytical results showed that the BTEX concentrations in all of the samples from the borings in the former UST area were below MTCA Method B cleanup levels. TPH-G and TPH-D concentrations ranged from less than 5.1 to 1,000 mg/kg and from less than 6.5 to 520 mg/kg, respectively. TPH-O was not detected in any of the samples above the method reporting limits (MRLs). The total lead, total carcinogenic PAH (CPAH), and the non-carcinogenic PAH concentrations in the 5-foot-deep sample from GP-2 were below the MRL, Method A residential and industrial cleanup levels, and Method B cleanup levels, respectively. The soil sample analytical results for BTEX, TPH-G, TPH-D, TPH-O, and total CPAHs are presented in Table 2. Copies of the laboratory report and the chain-of-custody form are presented in Appendix B.

Based on field screening and sample analytical results, petroleum hydrocarbons, where present, were typically detected at a depth of approximately 4.5 feet bgs (just above the groundwater table) and the concentrations significantly decreased with depth. By 7 feet bgs (below groundwater), TPH-G and TPH-D concentrations were reduced to below 125 mg/kg. At the source area boring (GP-2), hydrocarbons were initially detected at a depth of approximately 3 feet bgs. The field screening and sample analytical results showed that hydrocarbon-impacted soils extend from the south end of the former UST basin and the 1989 soil excavation to the south beyond boring GP-5 (Figure 5). Hydrocarbons were detected in source area boring GP-2, and then to the south of GP-2 in borings GP-1 and GP-5. Petroleum hydrocarbons were not detected to the east, west, or southeast of GP-2 in borings GP-3, GP-4, or GP-6, respectively.

4.2 Soil Sample Analytical Results - Former Road Oil Storage Tank Area

The soil sample analytical results showed that the TPH-D and TPH-O concentrations ranged from less than 7.4 to 6,300 mg/kg and from less than 19 to 15,000 mg/kg, respectively. The total CPAH concentration (3.12 mg/kg) in the 6.5-foot-deep sample from GP-7 exceeded the MTCA Method A residential cleanup level (1 mg/kg) but was below the Method A industrial cleanup level (20 mg/kg). Non-carcinogenic PAH

125 mg/kg at a depth of 7 feet bgs. Except for boring GP-10, the TPH-D and TPH-O concentrations at the former road oil storage area were below the MRLs at 8.5 feet bgs. At boring GP-10, the deepest soil sample (7 to 8.5 feet bgs) contained TPH-D and TPH-O concentrations of 1,100 and 2,800 mg/kg, respectively.//It appears that the silt unit has effectively limited the vertical migration of petroleum hydrocarbons.

Based on the 1997 groundwater sampling results, the petroleum hydrocarbons in the soil beneath both areas has not impacted the groundwater in the silty sand to sandy silt unit. The only impacted well in 1997 (A1-3) is also the only well that is screened across the groundwater table within the upper silt unit. All of the other monitoring wells at both areas are screened within the silty sand to sandy silt unit and below the top of the water table in the overlying silt unit.

The field screening and soil sample analytical results showed that hydrocarbon-impacted soil extends laterally from the south end of the former UST basin and the 1989 soil excavation to the south beyond GP-5 (more than 60 feet). At the former road oil storage area, the hydrocarbon-impacted soil occurs beneath the former tank area and extends to the west and south of the area (beyond borings GP-9 and GP-10). At both areas, the soil contamination appears to be associated with the top of the groundwater table.

Based on the analyzed hydrocarbon fraction concentrations, the remaining TPH concentrations at both areas were evaluated for direct contact and protection of groundwater risks in accordance with the Interim Policy. /The direct contact was conservatively evaluated using MTCA Method B residential exposure scenarios. The maximum combined TPH concentrations detected during this investigation (1,000 mg/kg TPH-G + 300 mg/kg TPH-D) at the former UST area are protective of human health risk in a direct contact exposure scenario and are protective of groundwater// The combined TPH concentrations detected at borings GP-9 and GP-10 in the former road oil storage tank area exceeded Method B risk levels for the direct contact exposure scenario. The maximum TPH concentrations in the area are protective of groundwater.

LIMITATIONS

The services described in this report were performed consistent with generally accepted professional consulting principles and practices. No other warranty, express or implied, is made. These services were performed consistent with our agreement with our client. This report is solely for the use and information of our client unless otherwise noted. Any reliance on this report by a third party is at such party's sole risk.

Opinions and recommendations contained in this report apply to conditions existing when services were performed and are intended only for the client, purposes, locations, time frames, and project parameters indicated. We are not responsible for the impacts of any changes in environmental standards, practices, or regulations subsequent to performance of services. We do not warrant the accuracy of information supplied by others, nor the use of segregated portions of this report.

TABLES

Table 1
Groundwater Sample Analytical Results
Former UST and Road Oil Storage Tank Areas
Weyerhaeuser Snoqualmie Mill

Well Number	Date Sampled	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	TPH[b] (µg/L)	TPH as Gasoline[c] (µg/L)	TPH as Diesel[d] (µg/L)	TPH as Oil[e] (µg/L)	Total Lead[f] (µg/L)	Dissolved Lead[f] (µg/L)	Total Suspended Solids[g] (µg/L)
MTCA Method A Cleanup Levels[h]		5	40	30	20	1,000	1,000	1,000	1,000	5	NL	NL
A1-1	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 1.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	120	NA	NA	NA	24	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	260	NA	NA	NA	6.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	190	NA	NA	NA	25	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	600	NA	NA	NA	33	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	100	< 210	5.0	< 3.0	60,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 250	130	< 260	NA	NA	NA
A1-2	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 1.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	490	NA	NA	NA	21	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	610	NA	NA	NA	< 2.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	490	NA	NA	NA	12	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	1,000	NA	NA	NA	4.0	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	120	< 210	< 3.0	< 3.0	180,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	150	< 260	NA	NA	NA
A1-3	3/90	1,300	1,800	50	2,000	NA	NA	NA	NA	NA	NA	NA
	9/90	280	28	2	130	NA	NA	NA	NA	NA	NA	NA
	12/90	420	100	< 5.0	260	NA	NA	NA	NA	NA	NA	NA
	7/91	640	200	1,700	1,060	1,500	NA	NA	NA	58	NA	NA
	3/92	1,200	1,400	370	1,560	4,600	NA	NA	NA	6.0	NA	NA
	9/92	1,200	1,100	360	1,340	2,800	NA	NA	NA	36	NA	NA
	4/93	160	62	110	413	2,000	NA	NA	NA	21	NA	NA
	4/97	1,000	78	480	1,200	NA	11,000	1,600	590	32	< 3.0	1,000,000
	7/97	940	200	370	920	NA	6,200	1,100	610	NA	NA	NA

Table 1
Groundwater Sample Analytical Results
Former UST and Road Oil Storage Tank Areas
Weyerhaeuser Snoqualmie Mill

Well Number	Date Sampled	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	TPH[b] (µg/L)	TPH as Gasoline[c] (µg/L)	TPH as Diesel[d] (µg/L)	TPH as Oil[e] (µg/L)	Total Lead[f] (µg/L)	Dissolved Lead[f] (µg/L)	Total Suspended Solids[g] (µg/L)
MTCA Method A Cleanup Levels[h]		5	40	30	20	1,000	1,000	1,000	1,000	5	NL	NL
A1-4	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 1.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	590	NA	NA	NA	11	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	690	NA	NA	NA	18	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	610	NA	NA	NA	50	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	970	NA	NA	NA	6.0	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	510	340	5.0	< 3.0	380,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 250	330	< 260	NA	NA	NA
A1-5	12/90	< 1.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	14	< 1.0	< 1.0	< 1.0	1,100	NA	NA	NA	18	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	980	NA	NA	NA	7.0	NA	NA
	9/92	14	21	1.1	9.3	1,200	NA	NA	NA	22	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	1,500	NA	NA	NA	7.0	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	590	300	< 3.0	< 3.0	120,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	870	< 260	NA	NA	NA
A1-6	12/90	< 1.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	750	NA	NA	NA	< 5.0	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	670	NA	NA	NA	6.0	NA	NA
	9/92	2.1	2.5	< 1.0	< 1.0	1,200	NA	NA	NA	34	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	1,400	NA	NA	NA	13	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	180	< 200	< 3.0	< 3.0	80,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	210	< 260	NA	NA	NA
A1-7	12/90	< 1.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	180	NA	NA	NA	3.0	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	< 250	NA	NA	NA	< 2.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	190	NA	NA	NA	16	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	670	NA	NA	NA	33	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	180	< 210	3.0	< 3.0	50,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	200	< 260	NA	NA	NA

Table 1
Groundwater Sample Analytical Results
Former UST and Road Oil Storage Tank Areas
Weyerhaeuser Snoqualmie Mill

Well Number	Date Sampled	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	TPH[b] (µg/L)	TPH as Gasoline[c] (µg/L)	TPH as Diesel[d] (µg/L)	TPH as Oil[e] (µg/L)	Total Lead[f] (µg/L)	Dissolved Lead[f] (µg/L)	Total Suspended Solids[g] (µg/L)
MTCA Method A Cleanup Levels[h]		5	40	30	20	1,000	1,000	1,000	1,000	5	NL	NL
A2-1	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	180	NA	NA	NA	22	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	470	NA	NA	NA	< 2.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	260	NA	NA	NA	7.0	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	590	NA	NA	NA	13	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	92	< 200	< 3.0	< 3.0	20,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	190	320	NA	NA	NA
A2-2	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	80	NA	NA	NA	< 5.0	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	< 250	NA	NA	NA	3.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	150	NA	NA	NA	7.0	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	570	NA	NA	NA	8.0	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	< 80	< 200	< 3.0	< 3.0	40,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	< 100	< 260	NA	NA	NA
A2-3	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	420	NA	NA	NA	53	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	780	NA	NA	NA	6.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	570	NA	NA	NA	160	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	1,100	NA	NA	NA	62	NA	NA
	4/97	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS
	7/97	NS	NS	NS	NS	NA	NS	NS	NS	NS	NS	NS

Table 1
Groundwater Sample Analytical Results
Former UST and Road Oil Storage Tank Areas
Weyerhaeuser Snoqualmie Mill

Well Number	Date Sampled	Benzene[a] (µg/L)	Toluene[a] (µg/L)	Ethylbenzene[a] (µg/L)	Total Xylenes[a] (µg/L)	TPH[b] (µg/L)	TPH as Gasoline[c] (µg/L)	TPH as Diesel[d] (µg/L)	TPH as Oil[e] (µg/L)	Total Lead[f] (µg/L)	Dissolved Lead[f] (µg/L)	Total Suspended Solids[g] (µg/L)
MTCA Method A Cleanup Levels[h]		5	40	30	20	1,000	1,000	1,000	1,000	5	NL	NL
A2-4	3/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	12/90	< 5.0	< 5.0	< 5.0	< 5.0	NA	NA	NA	NA	NA	NA	NA
	7/91	< 1.0	< 1.0	< 1.0	< 1.0	270	NA	NA	NA	7.0	NA	NA
	3/92	< 1.0	< 1.0	< 1.0	< 1.0	420	NA	NA	NA	< 2.0	NA	NA
	9/92	< 1.0	< 1.0	< 1.0	< 1.0	410	NA	NA	NA	47	NA	NA
	4/93	< 1.0	< 1.0	< 1.0	< 1.0	660	NA	NA	NA	35	NA	NA
	4/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	290	490	< 3.0	< 3.0	40,000
	7/97	< 1.0	< 1.0	< 1.0	< 1.0	NA	< 50	220	310	NA	NA	NA

NOTE:
NA = Not analyzed.
NS = Not sampled.
NL = There is no MTCA Method A cleanup level for this analyte.
µg/L = micrograms per liter (ppb).
Shaded values exceeded MTCA Method A cleanup levels.
[a] Benzene, toluene, ethylbenzene, and total xylenes by EPA Method 8240.
[b] TPH by EPA Method 8015 Modified.
[c] TPH as gasoline by Ecology Method WTPH-G.
[d] TPH as diesel by Ecology Method WTPH-D.
[e] TPH as oil by Ecology Method WTPH-D extended.
[f] Total and dissolved lead by EPA Method 7421.
[g] Total suspended solids by EPA Method 160.2.
[h] Chapter 173-340 WAC, *The Model Toxics Control Act Cleanup Regulations, Method A Cleanup Levels*. Amended January 1996. Cleanup levels based on protection of drinking water.

Table 2
1997 Soil Sample Analytical Results
Former UST Area
Weyerhaeuser Snoqualmie Mill

Soil Boring	Sample Name	Sample Depth (feet)	Date	Benzene[a] (mg/kg)	Toluene[a] (mg/kg)	Ethylbenzene[a] (mg/kg)	Total Xylenes[a] (mg/kg)	TPH as Gasoline[b] (mg/kg)	TPH as Diesel[c] (mg/kg)	TPH as Oil[c] (mg/kg)	Total CPAHs[d] (mg/kg)
MTCA Method B Cleanup Levels[e]				34.5	16,000	8,000	160,000		3,635[f]		20[g]/1[h]
GP-2	GP-2-5	5 - 7	9/12/97	< 0.007	0.023	0.44	1.25	890	520	< 140	0.005
GP-2	GP-2-7	7 - 9	9/12/97	< 0.003	< 0.003	< 0.003	< 0.006	24	28	< 19	NA
GP-3	GP-3-5	5 - 7	9/12/97	< 0.003	< 0.003	< 0.003	< 0.006	< 6.9	< 8.9	< 22	NA
GP-4	GP-4-9	9 - 10.3	9/12/97	< 0.003	< 0.003	< 0.003	< 0.006	< 6.7	< 8.5	< 21	NA
GP-5	GP-5-5	5 - 6.5	9/12/97	1.40	1.70	12.0	63.0	1,000	300	< 95	NA
GP-5	GP-5-7	7 - 8.5	9/12/97	0.019	0.005	0.043	0.081	110	120	< 100	NA
GP-6	GP-6-5	5 - 7	9/12/97	< 0.003	0.002	< 0.003	< 0.006	< 5.1	< 6.5	< 16	NA

NOTES:

NA = Not analyzed.

[a] Benzene, toluene, ethylbenzene, and total xylenes by EPA Method 8020A.

[b] Total petroleum hydrocarbons as gasoline by Ecology Method WTPH-G.

[c] Total petroleum hydrocarbons as diesel and as oil by Ecology Method WTPH-D extended.

[d] Total carcinogenic polynuclear aromatic hydrocarbons by GC/MS SIM Methods.

[e] Chapter 173-340 WAC, *The Model Toxics Control Act Cleanup Regulation, Method B Cleanup Levels*. Amended January 1996.

[f] Combined TPH-G, TPH-D, and TPH-O cleanup level is based on an evaluation of direct contact and protection of groundwater risk at the site. Risk evaluation was conducted consistent with Ecology's MTCA Interim TPH Policy Statement for TPH, dated January 1997.

[g] Method A industrial cleanup level.

[h] Method A residential cleanup level.

Table 3
1997 Soil Sample Analytical Results
Former Road Oil Storage Tank Area
Weyerhaeuser Snoqualmie Mill

Soil Boring	Sample Name	Sample Depth (feet)	Date	TPH as Diesel[a] (mg/kg)	TPH as Oil[a] (mg/kg)	Total CPAHs[b] (mg/kg)
MTCA Method B Cleanup Levels[c]				3,291[d]		20*/1[f]
GP-7	GP-7-6.5	6.5 - 8	9/12/97	740	950	3.12
GP-7	GP-7-8.5	8.5 - 10	9/12/97	< 7.4	< 19	NA
GP-8	GP-8-5	5 - 6.5	9/12/97	< 10	< 24	NA
GP-9	GP-9-5	5 - 6.5	9/12/97	3,600	8,300	NA
GP-10	GP-10-5	5 - 6.5	9/12/97	6,300	15,000	NA
GP-10	GP-10-7	7 - 8.5	9/12/97	1,100	2,800	NA
GP-11	GP-11-7	35620	9/12/97	< 8.2	< 20	NA

NOTES:

NA = Not analyzed.

Shaded values equal or exceed MTCA Method B Cleanup Levels.

[a] Total petroleum hydrocarbons as diesel and as oil by Ecology Method WTPH-D extended.

[b] Total carcinogenic polynuclear aromatic hydrocarbons (CPAHs) by GC/MS SIM Methods.

[c] Chapter 173-340 WAC, *The Model Toxics Control Act Cleanup Regulations, Method B Cleanup Levels.* Amended January 1996.

[d] Combined TPH-D and TPH-O cleanup level is based on an evaluation of direct contact and protection of groundwater risk at the site. Risk evaluation was conducted consistent with Ecology's MTCA Interim Policy Statement for TPH, dated January 1997.

[e] Method A industrial cleanup level.

[f] Method A residential cleanup level.

Table 4
1997 Soil Sample Laboratory Results
VPH and EPH Analyses
Former UST and Road Oil Storage Tank Areas
Weyerhaeuser Snoqualmie Mill

	Soil Concentration Sample GP-2-5			Soil Concentration Sample GP-7-6.5
HC Fraction	VPH (mg/kg)	EPH (mg/kg)	E-TPH (mg/kg)	EPH (mg/kg)
Aliphatics EC5-EC6	ND	—	ND	—
Aliphatics >EC6-EC8	114	—	114	—
Aliphatics >EC8-EC10	74	16	74	ND
Aliphatics >EC10-EC12	87.9	47.3	87.9	7
Aliphatics >EC12-EC16	—	229	229	38
Aliphatics >EC16	—	219	219	613
Aromatics EC5-EC7	ND[a]	—	ND	—
Aromatics >EC7-EC8	0.023[b]	—	0.023	—
Aromatics >EC8-EC10	56	—	56	—
Aromatics >EC10-EC12	126	16.9	126	ND
Aromatics >EC12-EC16	79.6	65.4	79.6	28.4
Aromatics >EC16-EC21	—	126	126	161
Aromatics >EC21-EC35	—	13.5	13.5	350

NOTES:

— = Not analyzed by this method.

ND = Not detected above method reporting limit.

VPH = Volatile Petroleum Hydrocarbons.

EPH = Extractable (Semi-Volatile) Petroleum Hydrocarbons.

E-TPH = Equivalent Total Petroleum Hydrocarbons; combines the maximum hydrocarbon fraction concentrations of the VPH and EPH.

[a] Included in BTEX results as benzene, see Table 2.

[b] Included in BTEX results, as toluene, see Table 2.

Table 5
Protection of Direct Contact for Method B Residential Scenario
Former UST Area
Weyerhaeuser Snoqualmie Mill

Compound Group Source	Soil Concentration [a] SC (mg/kg) Site-specific	Reference Dose ORfD (mg/kg/day) Interim Policy	Potency Factor OCPF (mg/kg/day)-1 Interim Policy	Soil Ingestion Factor (1/day) Interim Policy	Multiplier (kg/mg) Equations 1&2	HQ or Risk (unitless) Equations 3&4
Aliphatics EC5-EC6	ND	0.06	NA	1.25E-05	2.08E-04	0.000
Aliphatics >EC6-EC8	114	0.06	NA	1.25E-05	2.08E-04	0.024
Aliphatics >EC8-EC10	74	0.06	NA	1.25E-05	2.08E-04	0.015
Aliphatics >EC10-EC12	88	0.06	NA	1.25E-05	2.08E-04	0.018
Aliphatics >EC12-EC16	229	0.06	NA	1.25E-05	2.08E-04	0.048
Aliphatics >EC16	219	0.06	NA	1.25E-05	2.08E-04	0.046
Aromatics EC5-EC7	ND[b]	0.03	NA	1.25E-05	4.17E-04	0.000
Aromatics >EC7-EC8	0.023[c]	0.03	NA	1.25E-05	4.17E-04	0.000
Aromatics >EC8-EC10	56	0.03	NA	1.25E-05	4.17E-04	0.023
Aromatics >EC10-EC12	126	0.03	NA	1.25E-05	4.17E-04	0.053
Aromatics >EC12-EC16	80	0.03	NA	1.25E-05	4.17E-04	0.033
Aromatics >EC16-EC21	126	0.03	NA	1.25E-05	4.17E-04	0.053
Aromatics >EC21-EC35	14	0.03	NA	1.25E-05	4.17E-04	0.01
E-TPH	**1,124**					0.32
Toluene	0.023	0.2	NA	1.25E-05	6.25E-05	1.44E-06
Ethylbenzene	0.44	0.1	NA	1.25E-05	1.25E-04	5.50E-05
Xylenes	1.25	2	NA	1.25E-05	6.25E-06	7.83E-06
Total Hazard Index						0.32
Maximum Acceptable Concentration[d]	3,538					1.0

NOTE:

ND = Not detected above method reporting limit.

[a] Hydrocarbon fractions based on values reported for sample GP-2-5.

[b] Included in BTEX results as benzene, see Table 2.

[c] Included in BTEX results as toluene, see Table 2.

[d] Based on the hydrocarbon fractions from sample GP-2-5, this concentration would produce a hazard index of 1.0 under a residential exposure scenario.

Equations
1: Noncarcinogens: $Multiplier_n = Factor_n / ORfD$
2: Carcinogens: $Multiplier_c = Factor_c * OCPF$
3: Noncarcinogens: $HQ = SC * Multiplier_n$
4: Carcinogens: $Risk = SC * Multiplier_c$

Abbreviations
EC = Equivalent carbon number
NA = Not applicable
E-TPH = Equivalent total petroleum hydrocarbons; combines the maximum fraction concentrations of the VPH and EPH.

Table 6
Protection of Direct Contact for Method B Residential Scenario
Former Road Oil Storage Tank Area
Weyerhaeuser Snoqualmie Mill

Compound Group Source	Soil Concentration[a] SC (mg/kg) Site-specific	Reference Dose ORfD (mg/kg/day) Interim Policy	Potency Factor OCPF (mg/kg/day)-1 Interim Policy	Soil Ingestion Factor (1/day) Interim Policy	Multiplier (kg/mg) Equations 1&2	HQ or Risk (unitless) Equations 3&4
Aliphatics EC5-EC6	—	0.06	NA	1.25E-05	2.08E-04	0.000
Aliphatics >EC6-EC8	—	0.06	NA	1.25E-05	2.08E-04	0.000
Aliphatics >EC8-EC10	ND	0.06	NA	1.25E-05	2.08E-04	0.000
Aliphatics >EC10-EC12	7	0.06	NA	1.25E-05	2.08E-04	0.001
Aliphatics >EC12-EC16	38	0.06	NA	1.25E-05	2.08E-04	0.008
Aliphatics >EC16	613	0.06	NA	1.25E-05	2.08E-04	0.128
Aromatics EC5-EC7	—	0.03	NA	1.25E-05	4.17E-04	0.000
Aromatics >EC7-EC8	—	0.03	NA	1.25E-05	4.17E-04	0.000
Aromatics >EC8-EC10	—	0.03	NA	1.25E-05	4.17E-04	0.000
Aromatics >EC10-EC12	ND	0.03	NA	1.25E-05	4.17E-04	0.000
Aromatics >EC12-EC16	28	0.03	NA	1.25E-05	4.17E-04	0.012
Aromatics >EC16-EC21	161	0.03	NA	1.25E-05	4.17E-04	0.067
Aromatics >EC21-EC35	350	0.03	NA	1.25E-05	4.17E-04	0.15
EPH	**1,198**					0.36
Toluene	1.7	0.2	NA	1.25E-05	6.25E-05	1.06E-04
Ethylbenzene	12	0.1	NA	1.25E-05	1.25E-04	1.50E-03
Xylenes	63	2	NA	1.25E-05	6.25E-06	3.94E-04
Total Hazard Index						0.36
Maximum Acceptable Concentration[b]	3,291					1.0

NOTE:

— = Not analyzed by this method.

ND = Not detected above method reporting limit.

[a] Hydrocarbon fractions based on values reported for sample GP-7-6.5.

[b] Based on the hydrocarbon fractions from sample GP-7-6.5, this concentration would produce a hazard index of 1.0 under a residential exposure scenario.

Equations
1: Noncarcinogens: $Multiplier_n = Factor_n / ORfD$
2: Carcinogens: $Multiplier_c = Factor_c * OCPF$
3: Noncarcinogens: $HQ = SC * Multiplier_n$
4: Carcinogens: $Risk = SC * Multiplier_c$

Abbreviations
EC = Equivalent carbon number
NA = Not applicable
EPH = Extractable petroleum hydrocarbons

Table 7
Protection of Groundwater
Former UST Area
Weyerhaeuser Snoqualmie Mill

Compound Group Source	Soil Concentration[a] SC (mg/kg) Site-specific	Molecular Weight MW (g/mole) Interim Policy	Moles M (unitless) SC/MW	Mole Fraction X (percent) M/sum(M)	Solubility S (mg/L) Interim Policy	Effective Solubility ES (mg/L) X*S	Dilution Factor DF (unitless) Interim Policy	Groundwater Concentration GC (mg/L) ES/DF
Aliphatics EC5-EC6	ND	81	0.00	0.00	28	0.0000	20	0.00
Aliphatics >EC6-EC8	114	100	1.14	0.17	4.2	0.6946	20	0.03
Aliphatics >EC8-EC10	74	130	0.57	0.08	0.33	0.0271	20	0.00
Aliphatics >EC10-EC12	88	160	0.55	0.08	0.03	0.0021	20	0.00
Aliphatics >EC12-EC16	229	200	1.15	0.17	0.0006	0.0001	20	0.00
Aliphatics >EC16	219	270	0.81	0.12	1.00E-06	0.0000	20	0.00
Aromatics EC5-EC7	ND[b]	78	0.00	0.00	1800	0.0000	20	0.00
Aromatics >EC7-EC8	0.023[c]	92	0.00	0.00	520	0.0000	20	0.00
Aromatics >EC8-EC10	56	120	0.46	0.07	65	4.3614	20	0.22
Aromatics >EC10-EC12	126	130	0.97	0.14	25	3.5153	20	0.18
Aromatics >EC12-EC16	80	150	0.53	0.08	5.80	0.4465	20	0.02
Aromatics >EC16-EC21	126	190	0.66	0.10	0.51	0.0491	20	0.00
Aromatics >EC21-EC35	14	240	0.06	0.01	0.01	0.0001	20	0.00
E-TPH	**1,124**		**6.89**	**1.00**				**0.45**

NOTE:

ND = Not detected above method reporting limit.

[a] Hydrocarbon fractions based on values reported for sample GP-2-5.

[b] Included in BTEX results as benzene, see Table 2.

[c] Included in BTEX results as toluene, see Table 2.

Abbreviations

EC = Equivalent carbon number

NA = Not applicable

E-TPH = Equivalent total petroleum hydrocarbons; combines the maximum fraction concentrations of the VPH and EPH.

Table 8
Protection of Groundwater
Former Road Oil Storage Tank Area
Weyerhaeuser Snoqualmie Mill

Compound Group Source	Soil Concentration[a] SC (mg/kg) Site-specific	Molecular Weight MW (g/mole) Interim Policy	Moles M (unitless) SC/MW	Mole Fraction X (percent) M/sum(M)	Solubility S (mg/L) Interim Policy	Effective Solubility ES (mg/L) X*S	Dilution Factor DF (unitless) Interim Policy	Groundwater Concentration GC (mg/L) ES/DF
Aliphatics EC5-EC6	—	81	0.00	0.00	28	0.00	20	0.000
Aliphatics >EC6-EC8	—	100	0.00	0.00	4.2	0.00	20	0.000
Aliphatics >EC8-EC10	ND	130	0.00	0.00	0.33	0.00	20	0.000
Aliphatics >EC10-EC12	7	160	0.04	0.01	0.03	0.00	20	0.000
Aliphatics >EC12-EC16	38	200	0.19	0.04	0.0006	0.00	20	0.000
Aliphatics >EC16	613	270	2.27	0.45	1.00E-06	0.00	20	0.000
Benzene	—	78	0.00	0.00	1800	0.00	20	0.000
Toluene	—	92	0.00	0.00	520	0.00	20	0.000
Aromatics >EC8-EC10	—	120	0.00	0.00	65	0.00	20	0.000
Aromatics >EC10-EC12	ND	130	0.00	0.00	25	0.00	20	0.000
Aromatics >EC12-EC16	28	150	0.19	0.04	5.8	0.22	20	0.011
Aromatics >EC16-EC21	161	190	0.85	0.17	0.51	0.09	20	0.004
Aromatics >EC21-EC35	350	240	1.46	0.29	0.01	0.00	20	0.000
EPH	**1,198**		**5.00**	**1.00**				**0.015**

NOTE:

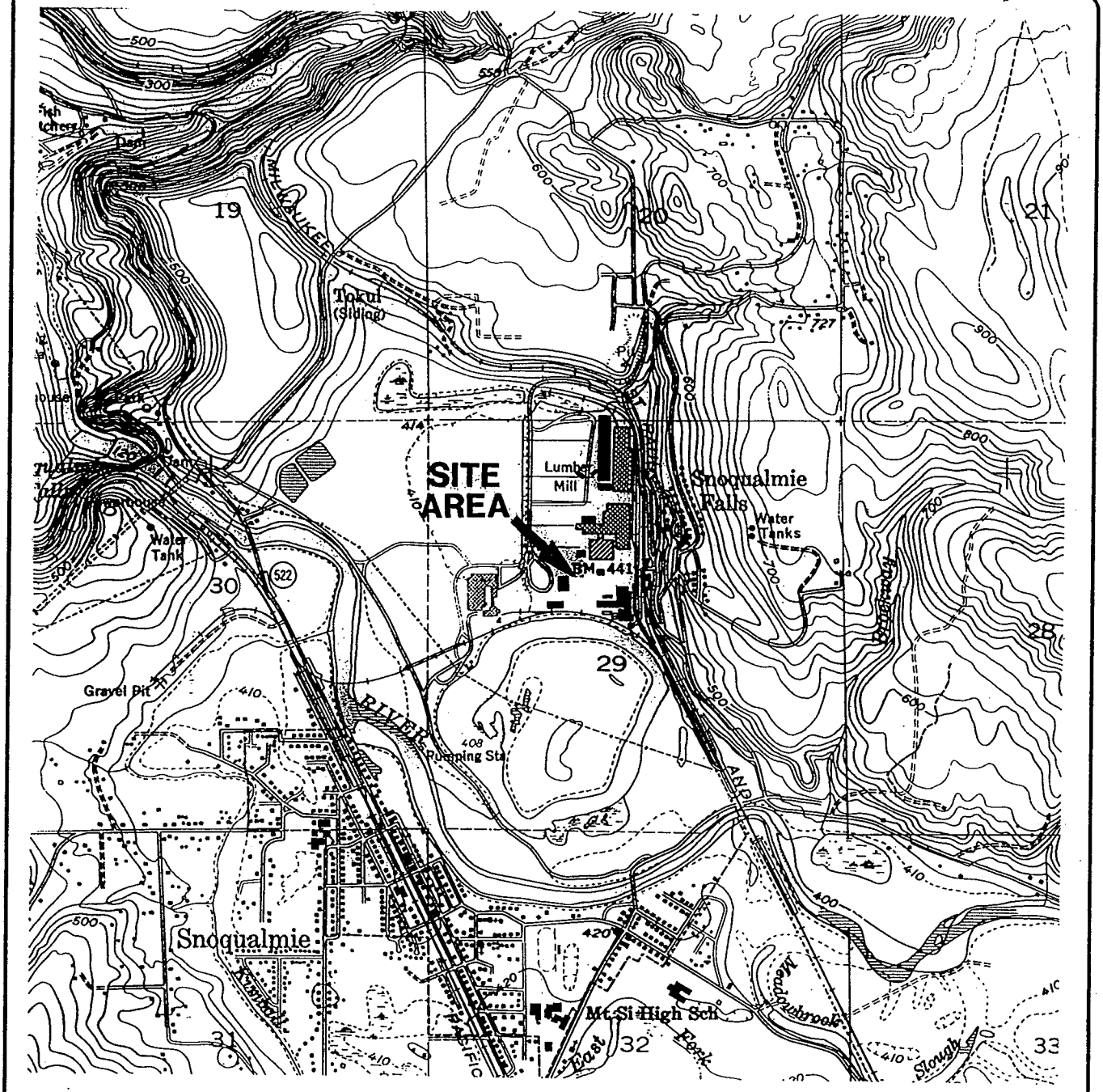
— = Not analyzed by this method.

ND = Not detected above method reporting limit.

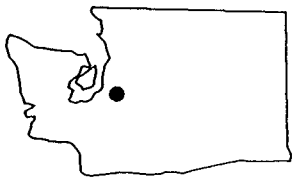
[a] Hydrocarbon fractions based on values reported for sample GP-7-6.5.

Abbreviations
EC = Equivalent carbon number
EPH = Extractable petroleum hydrocarbons

FIGURES



SOURCE: USGS 7.5 X 15 MINUTE SERIES, SNOQUALMIE, WASHINGTON 1973.



WASHINGTON

N

0 2000 4000

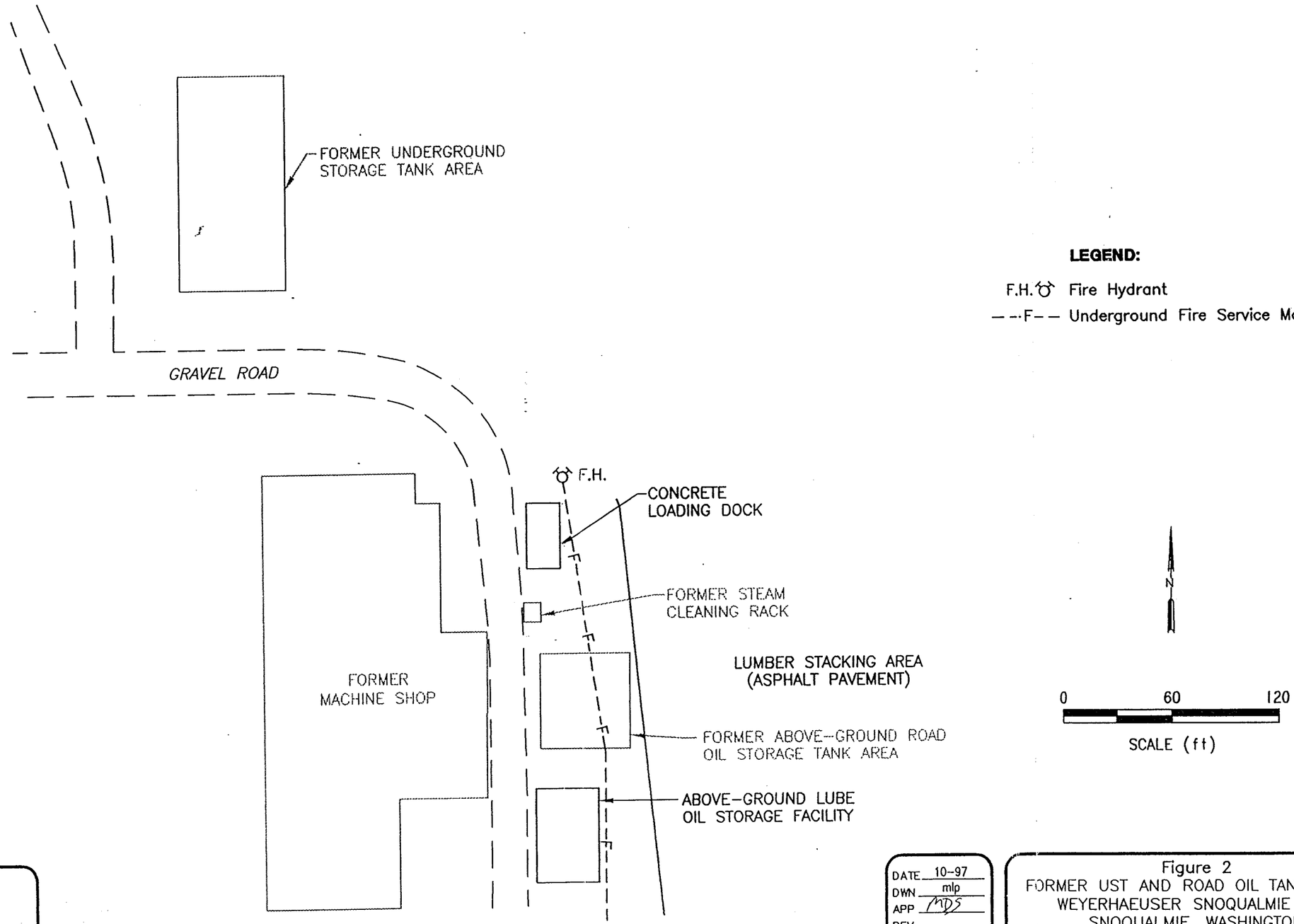
SCALE (ft)

EMCON

DATE 5-97
DWN. MLP
REV.
APPR. MDE
PROJECT NO.
40141-083.001

Figure 1
FORMER UST AND ROAD OIL TANK AREAS
WEYERHAEUSER SNOQUALMIE MILL
SNOQUALMIE, WASHINGTON

SITE VICINITY MAP



LEGEND:

F.H. Fire Hydrant

---F-- Underground Fire Service Main

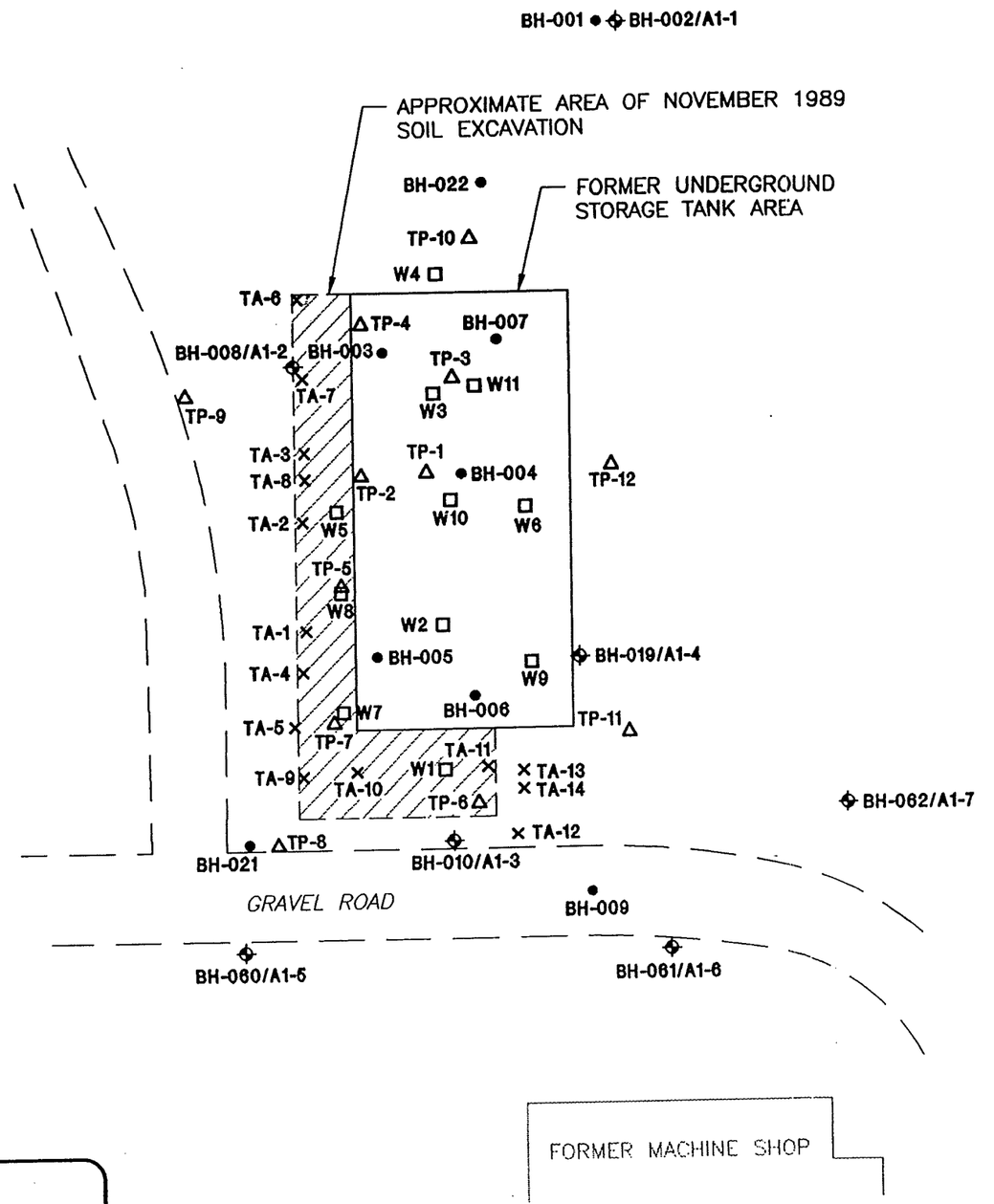
EMCON

DATE	10-97
DWN	mlp
APP	MDS
REV	
PROJECT NO.	40141-083.002

Figure 2
FORMER UST AND ROAD OIL TANK AREAS
WEYERHAEUSER SNOQUALMIE MILL
SNOQUALMIE, WASHINGTON

SITE MAP

ENW-BOTHELL2/DATA: G:\DWG\40141083\B0002R03.dwg Xrefs: <NONE>
Scale: 1 = 60.00 DimScale: 1 = 60.00 Date: 10/24/97 Time: 9:30 AM Operator: MLP



LEGEND:

- W2 □ August 1989 Test Pit Location
- TP-2 △ November 1989 Test Pit Location
- TA-6 × 1989 Soil Excavation Confirmation Soil Sample Location
- BH-004 ● March 1990 Soil Boring Location
- A1-1 ⊕ Groundwater Monitoring Well Location
- ▨ Area of Soil Excavation

N

0 40 80

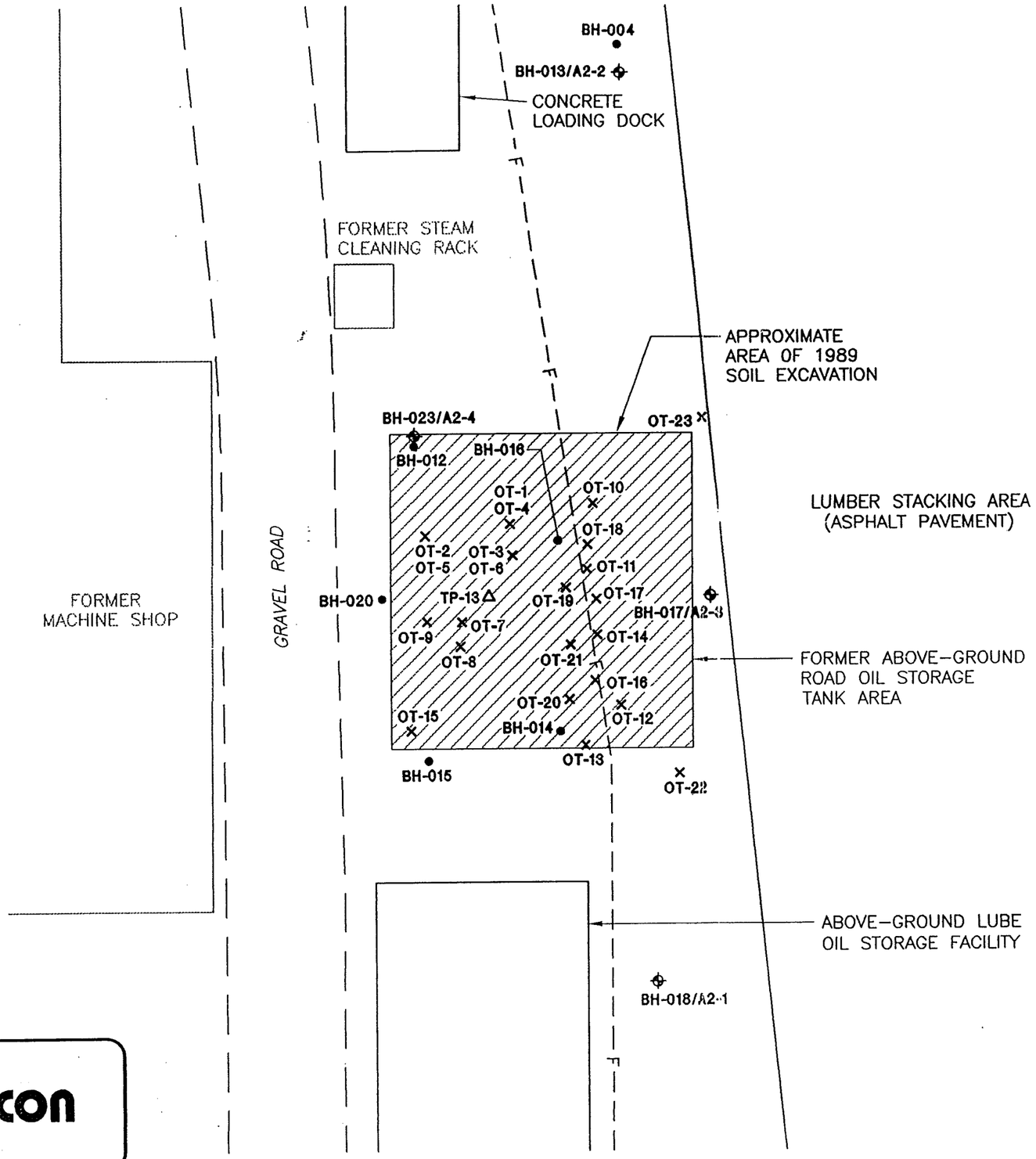
SCALE (ft)

EMCON

DATE	10-97
DWN	mlp
APP	MDS
REV	
PROJECT NO.	40141-083.002

Figure 3
FORMER UNDERGROUND STORAGE TANK AREA
WEYERHAEUSER SNOQUALMIE MILL
SNOQUALMIE, WASHINGTON
1989 AND 1990 TEST PIT AND SOIL BORING LOCATIONS

ENW-BOTHELL2/DATA: G:\DWG\40141083\B0002R01.dwg Xrefs: <NONE>
Scale: 1 = 40.00 DimScale: 1 = 40.00 Date: 10/29/97 Time: 8:59 AM Operator: MLP



LEGEND:

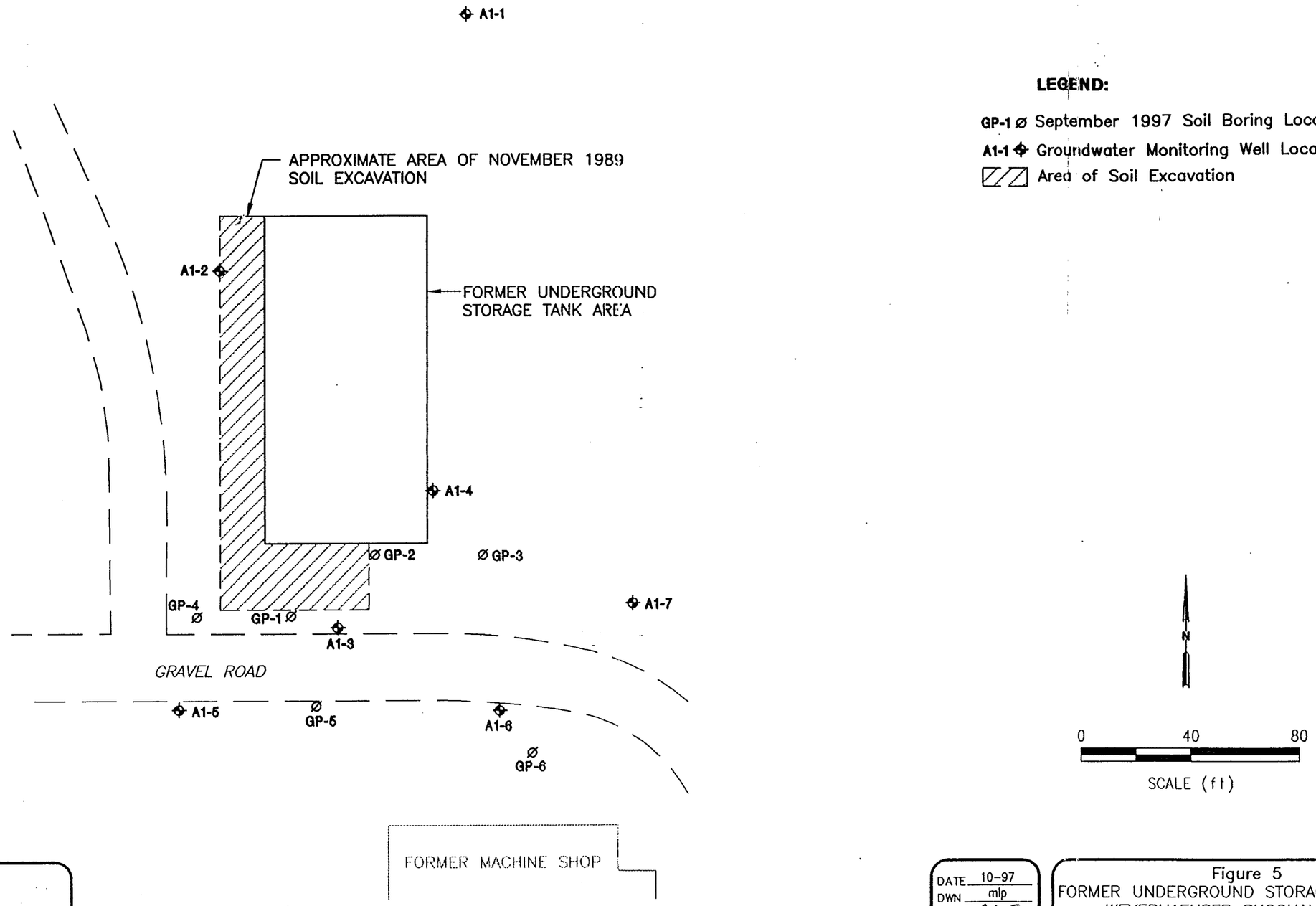
- TP-13 Δ November 1989 Test Pit Location
- OT-2 × 1989 Soil Excavation Confirmation Soil Sample Location
- BH-016 • March 1990 Soil Boring Location
- A2-2 ⊕ Groundwater Monitoring Well Location
- Area of Soil Excavation
- — — F — — Underground Fire Service Main

EMCON

DATE	10-97
DWN	mlp
APP	MDS
REV	
PROJECT NO.	40141-083.002

Figure 4
FORMER ROAD OIL STORAGE TANK AREA
WEYERHAEUSER SNOQUALMIE MILL
SNOQUALMIE, WASHINGTON
1989 AND 1990 TEST PIT AND SOIL BORING LOCATIONS

ENV-BOTHELL2/DATA: G:\DWG\40141083\B0002R04.dwg Xrefs: <NONE>
Scale: 1 = 20.00 DimScale: 1 = 20.00 Date: 10/29/97 Time: 8:52 AM Operator: MLP



LEGEND:

GP-1 ⌀ September 1997 Soil Boring Location

A1-1 ⌖ Groundwater Monitoring Well Location

Area of Soil Excavation

N

0 40 80

SCALE (ft)

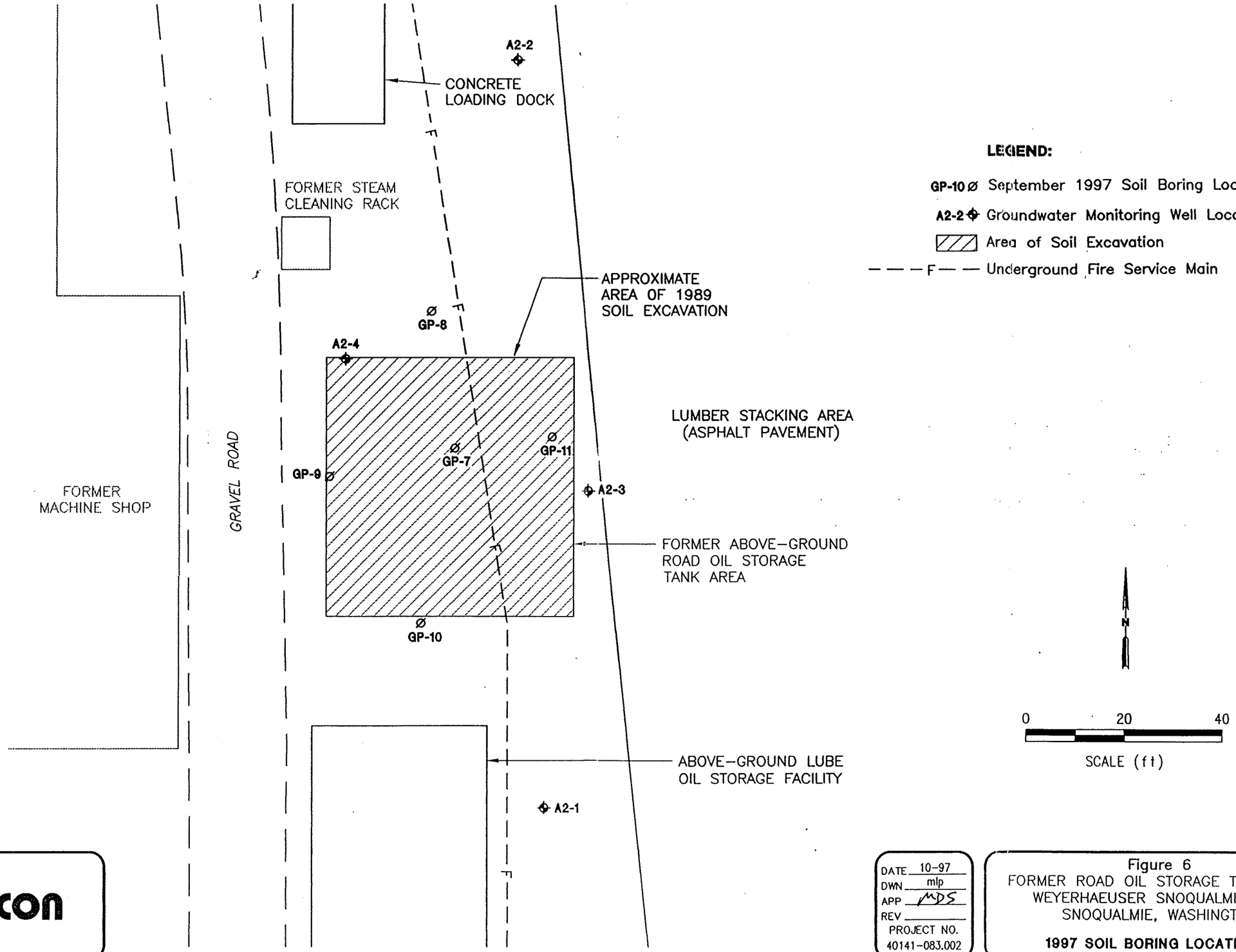
EMCON

DATE 10-97
DWN mlp
APP MDS
REV
PROJECT NO.
40141-083.002

Figure 5
FORMER UNDERGROUND STORAGE TANK AREA
WEYERHAEUSER SNOQUALMIE MILL
SNOQUALMIE, WASHINGTON

1997 SOIL BORING LOCATIONS

ENW-BOTHELL2/DATA: G:\DWG\40141083\B0002R05.dwg Xrefs: <NONE>
Scale: 1 = 40.00 DimScale: 1 = 40.00 Date: 10/29/97 Time: 9:01 AM Operator: MLP



EMCON

DATE 10-97
DWN mlp
APP MDS
REV
PROJECT NO.
40141-083.002

Figure 6
FORMER ROAD OIL STORAGE TANK AREA
WEYERHAEUSER SNOQUALMIE MILL
SNOQUALMIE, WASHINGTON

1997 SOIL BORING LOCATIONS

ENW-BOTHELL2/DATA: G:\DWG\40141083\BO002R06.dwg Xrefs: <NONE>
Scale: 1 = 20.00 DimScale: 1 = 20.00 Date: 10/29/97 Time: 8:56 AM Operator: MLP

APPENDIX A

SUBSURFACE EXPLORATION PROCEDURES

SUBSURFACE EXPLORATION PROCEDURES

This appendix documents the procedures EMCON used to perform the 1997 field investigation activities described in this report. The discussion includes information on the following subjects:

- Drilling and sampling
- Soil sampling
- Soil screening

Soil Borings

The subsurface exploration program conducted for this investigation consisted of advancing and sampling 11 soil borings by using a Geoprobe™ rig. The borings penetrated to a maximum depth of 12.5 feet below ground surface (bgs). Boring logs, which include soil descriptions, are contained in this appendix. The soil boring locations are shown on Figures 5 and 6 of this report. The boring locations were horizontally surveyed by EMCON personnel.

The soil borings were drilled on September 12, 1997, by Cascade Drilling, Inc., of Woodinville, Washington. The borings were completed by using a Geoprobe drill rig which advanced a 1.5-inch outside-diameter split-spoon samplers.

The 24-inch-long soil samples were collected at approximately 0.5- to 3-foot intervals. Each soil sample was described generally consistent with the Unified Soil Classification System (Figure A-1). The drilling and sampling tools were steam cleaned or washed in distilled water before each use. The drilling activities were directed and logged by an EMCON geologist.

Once completed, all borings collapsed following final extraction of the sampler and drill rods. Hydrated bentonite was used to seal the surface of the borings.

Soil Sampling

Soil samples recovered from the soil borings were split into at least two approximately equal portions. Using stainless steel spoons, the first portion was transferred to

laboratory-prepared glass jars with Teflon™-lined lids and placed in a chilled cooler for transport to the testing laboratory. Chain-of-custody procedures were used to document the sample handling. The second portion was placed in a clean sealable plastic bag for field screening. Field screening methods are discussed below.

Soil Screening

Soil samples were screened for volatile organic compounds by using a photoionization detector (PID) at the time of the collection. Selected samples were also screened by using a Hanby field test kit. The PID is a subjective analysis affected by, among other influences, climate (e.g., temperature and humidity), soil type and conditions, instrument calibration, and operation. A Thermo Environmental Instruments OVM/Datalogger Model 580B PID, was calibrated to 100 parts per million isobutylene. The Hanby kit is a liquid extraction and a colorometric analysis that is compared to standard colors of extractions from known petroleum hydrocarbon concentrations. The intent of these analyses were to qualitatively compare samples and to assist in sample selection for chemical analysis.

The samples were placed in clean, sealable plastic bags. Each sealed plastic bag was then allowed to stand in the back of a field vehicle for approximately 15 minutes. The plastic bag was then punctured with the PID probe, and the maximum reading in the headspace above the soil was recorded. For the Hanby kit analysis, a known volume of soil was placed in a vial and a liquid reagent was added to the sample. The sample was vigorously shaken and allowed to sit for at least 20 minutes. The color of the liquid was compared to standard color charts to determine the TPH concentration. The PID and Hanby measurements are listed on the boring logs presented within this appendix. They are recorded at their respective depth intervals.

Sample Descriptions

Classification of soils in this report is based on visual field observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field or laboratory testing unless stated. Visual-manual classification methods of ASTM D 2488 were used as an identification guide. Soil density/consistency in borings is related primarily to the Standard Penetration Resistance. Soil density/consistency in test pits is estimated based on visual observation and is presented parenthetically on the test pit logs.

SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	GROUP NAME
COARSE GRAINED SOILS More than 50% retained on No. 200 Sieve.	GRAVEL More than 50% of coarse fraction retained on No. 4 sieve.	CLEAN GRAVEL	GW	Well-graded gravel, fine to coarse gravel
			GP	Poorly-graded gravel
		GRAVEL WITH FINES	GM	Silty gravel
			GC	Clayey gravel
	SAND More than 50% of coarse fraction passes No. 4 sieve.	CLEAN SAND	SW	Well-graded sand, fine to coarse sand
			SP	Poorly-graded sand
		SAND WITH FINES	SM	Silty sand
			SC	Clayey sand
FINE GRAINED SOILS More than 50% passes No. 200 sieve.	SILT AND CLAY Liquid limit less than 50.	INORGANIC	ML	Silt
			CL	Clay
		ORGANIC	OL	Organic silt, organic clay
	SILT AND CLAY Liquid limit 50 or more.	INORGANIC	MH	Silt of high plasticity, elastic silt
			CH	Clay of high plasticity, fat clay
		ORGANIC	OH	Organic clay, organic silt
HIGHLY ORGANIC SOILS			PT	Peat

DENSITY/CONSISTENCY

SAND or GRAVEL		SILT or CLAY	
Density	Standard Penetration Resistance in Blows/Foot	Consistency	Standard Penetration Resistance in Blows/Foot
Very loose	0 - 4	Very soft	0 - 2
Loose	4 - 10	Soft	2 - 4
Medium dense	10 - 30	Medium stiff	4 - 8
Dense	30 - 50	Stiff	8 - 15
Very dense	>50	Very stiff	15 - 30
		Hard	>30

MOISTURE

Modifier	Description
Dry	Little perceptible moisture
Damp	Some perceptible moisture, probably below optimum
Moist	Probably near optimum moisture content
Wet	Much perceptible moisture, probably above optimum

MINOR CONSTITUENTS

Modifier	Estimated Percentage
Trace	< 5
Few	5 - 10
Little	10 - 25
Some	25 - 45

emcon Northwest, Inc.

DATE 3-91
DWN. TB
APPR.
REVIS.
PROJECT NO. 1.00

Figure A-1

SOIL CLASSIFICATION SYSTEM

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP- 1
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	8.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
SS-1	0					0 to 0.3 inch: CRUSHED ROCK 0.3 to 6.0 feet: GRAVEL (GW), brown, fine to medium, trace fines, trace fine sand, damp, no hydrocarbon-like odor. (FILL)
		ATD	5			@ 5.0 feet: wet. Hydrocarbon-like odor.
SS-2	100					6.0 to 8.0 feet: SANDY GRAVEL (GW), brown, fine to medium, few fine sand, trace to few fines, wet, hydrocarbon-like odor. (FILL)
SS-3	0					Boring terminated at 8.0 feet below ground surface.
			10			
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP- 2
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	9.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
						0.3 to 1.0 foot: SANDY SILTY GRAVEL (GW), brown, fine to medium. (FILL)
SS-1	0					1.0 to 9.0 feet: SILT (ML), brown, low plasticity, damp, organics present, hydrocarbon-like odor. (MARSH DEPOSIT)
SS-2	119					
SS-3*	162	▽ ATD	5			@ 5.0 feet: wet.
SS-4*	11					
			10			Boring terminated at 9.0 feet below ground surface.
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photolonization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Weyerhaeuser Snoqualmie Mill**	BORING NO.	**GP- 3**
LOCATION	**Snoqualmie, Washington**	PAGE	**1 OF 1**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND ELEV.	
DRILL METHOD	**Geoprobe**	TOTAL DEPTH	**11.50'**
LOGGED BY	**Russell Thompson**	DATE COMPLETED	**09/12/97**

SAMPLE METHOD AND NUMBER	PID (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	0					**0.3 to 3.5 feet: GRAVELLY SAND (SW)**, brown, fine to coarse, little fine gravel, trace to few fines, damp, no hydrocarbon-like odor. (FILL)
						3.5 to 8.5 feet: SILT (ML), brown to tan, low plasticity, trace fine sand, damp, no hydrocarbon-like odor. (MARSH DEPOSIT)
SS-2*	0	▽ ATD	5			@ 5.5 feet: wet.
SS-3	0		10			**8.5 to 11.5 feet: SILTY SAND (SM)**, tan, fine, little fines, wet, no hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
						Boring terminated at 11.5 feet below ground surface.
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP- 4
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	11.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	0					0.3 to 1.0 foot: SANDY SILTY GRAVEL (GW), brown, fine to medium, few to little fines, few fine sand, moist, no hydrocarbon-like odor. (FILL)
						1.0 to 4.0 feet: GRAVELLY SAND (SW), tan to brown, fine to coarse, few fine gravel, trace to few fines, damp, no hydrocarbon-like odor. (FILL)
						4.0 to 9.5 feet: SANDY GRAVEL (GW), brown, fine to medium, few fine sand, trace fines, damp, no hydrocarbon-like odor. (FILL)
SS-2	0	▽ ATD	5			@ 5.0 feet: wet.
SS-3	0					
SS-4*	0		10			9.5 to 11.0 feet: SANDY SILT (ML), brown, low plasticity, little to some fine sand, wet, no hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
						Boring terminated at 11.5 feet below ground surface.
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photolonization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP- 5
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	9.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	8					**0.3 to 3.5 feet: SANDY SILTY GRAVEL (GW),** brown, fine to medium, few fines, few fine sand, damp, hydrocarbon-like odor. (FILL)
						3.5 to 9.0 feet: SILT (ML), gray, low plasticity, moist, hydrocarbon-like odor, sheen present locally. (MARSH DEPOSIT)
SS-2*	273	▽ ATD	5			@ 5.5 feet: wet.
SS-3*	77					
						Boring terminated at 9.0 feet below ground surface.
			10			
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP- 6
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	9.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	18					0.3 to 1.0 foot: SANDY SILTY GRAVEL (GM), brown, fine to medium, few fine sand, few fines, damp, no hydrocarbon-like odor. (FILL)
						1.0 to 7.5 feet: SILT (ML), brown, low to medium plasticity, damp, no hydrocarbon-like odor. (MARSH DEPOSIT)
						@ 1.7 to 2.0 feet: black horizon composed of silty sand and organics.
SS-2*	0	▽ ATD	5			@ 5.0 feet: wet.
SS-3	0					7.5 to 9.0 feet: SILTY SAND (SM), tan, fine, some fines, wet, no hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
						Boring terminated at 9.0 feet below ground surface.
			10			
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.

EMCON

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP- 7
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	12.50'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID/Hanby (in ppm)	LITHOLOGIC DESCRIPTION
		0 to 0.3 inch: CRUSHED ROCK
SS-1	0	0.3 to 2.5 feet: SANDY SILTY GRAVEL (GW), brown, fine to medium, little fine sand, few to little fines, damp, no hydrocarbon-like odor. (FILL)
SS-2	0	2.5 to 8.0 feet: SILT (ML), brown, medium plasticity, damp to very moist, hydrocarbon-like odor, organics present. (MARSH DEPOSIT)
SS-3	11	@ 4.5 to 8.5 feet: product staining.
		▽ ATD
SS-4*	18/ 1000+	@ 6.0 feet: wet. Product droplets on water.
		8.0 to 8.5 feet: SANDY SILT (ML), tan brown, low plasticity, some fine sand, wet, hydrocarbon-like odor.
SS-5*	0	8.5 to 12.5 feet: SILTY SAND (SM), gray brown, fine, some fines, moist to wet, no hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
SS-6	0	
		Boring terminated at 12.5 feet below ground surface.

GROUND WATER LEVELS | DEPTH IN FEET | SAMPLES | LITHOLOGIC COLUMN

5 10 15 20

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.
(5) Hanby = Hanby field test readings in ppm.

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP-8
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	9.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID/Hanby (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	0					0.3 to 1.0 foot: SANDY SILTY GRAVEL (GW), brown, fine to medium, few fines, few fine sand, damp, no hydrocarbon-like odor. (FILL)
						1.0 to 3.5 feet: SANDY SILT (ML), dark brown, low plasticity, little to some fine sand, trace to few fine gravel, damp, no hydrocarbon-like odor, black organic streaks. (MARSH DEPOSIT)
						3.5 to 7.5 feet: SILT (ML), brown, low plasticity, trace to few fine to medium sand, moist, no hydrocarbon-like odor, organics present.
SS-2*	0/50	▽ ATD	5			@ 5.0 feet: wet.
SS-3	0					
						7.5 to 9.0 feet: SILTY SAND (SM), brown, fine, little fines, wet, no hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
			10			Boring terminated at 9.0 feet below ground surface.
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.
(5) Hanby = Hanby field test readings in ppm.

LOG OF EXPLORATORY BORING

PROJECT NAME	**Weyerhaeuser Snoqualmie Mill**	BORING NO.	**GP- 9**
LOCATION	**Snoqualmie, Washington**	PAGE	**1 OF 1**
DRILLED BY	**Cascade Drilling, Inc.**	GROUND ELEV.	
DRILL METHOD	**Geoprobe**	TOTAL DEPTH	**9.00'**
LOGGED BY	**Russell Thompson**	DATE COMPLETED	**09/12/97**

SAMPLE METHOD AND NUMBER	PID/Hanby (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	0					**0.3 to 2.5 feet: SANDY SILTY GRAVEL (GM)**, tan, fine to medium, few to little fines, few fine sand, no hydrocarbon-like odor, damp. (FILL)
						2.5 to 3.0 feet: WOOD DEBRIS, black, no hydrocarbon-like odor. (FILL)
						3.0 to 9.0 feet: SILT (ML), tan to brown, low plasticity, trace fine sand, moist, no hydrocarbon-like odor. (MARSH DEPOSIT)
SS-2*	44/500+	▽ ATD	5			@ 5.0 feet: wet.
SS-3	4					
						Boring terminated at 9.0 feet below ground surface.
			10			
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.
(5) Hanby = Hanby field test readings in ppm.

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP-10
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	9.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID/Hanby (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	0					**0.3 to 2.0 feet: SANDY SILTY GRAVEL (GM)**, brown, fine to medium, some fines, few fine sand, damp, no noticeable odor. (FILL)
						2.0 to 8.0 feet: SILT (ML), dark brown, low plasticity, trace to few fine sand, moist. (MARSH DEPOSIT)
SS-2*	24/500	▽ ATD	5			@ 5.0 feet: hydrocarbon-like odor, organics present, wet.
SS-3*	15					**8.0 to 9.0 feet: SANDY SILT (ML)**, brown to tan, low plasticity, some fine sand, wet, slight hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
			10			Boring terminated at 9.0 feet below ground surface.
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.
(5) Hanby = Hanby field test readings in ppm.

LOG OF EXPLORATORY BORING

PROJECT NAME	Weyerhaeuser Snoqualmie Mill	BORING NO.	GP-11
LOCATION	Snoqualmie, Washington	PAGE	1 OF 1
DRILLED BY	Cascade Drilling, Inc.	GROUND ELEV.	
DRILL METHOD	Geoprobe	TOTAL DEPTH	9.00'
LOGGED BY	Russell Thompson	DATE COMPLETED	09/12/97

SAMPLE METHOD AND NUMBER	PID/Hanby (in ppm)	GROUND WATER LEVELS	DEPTH IN FEET	SAMPLES	LITHOLOGIC COLUMN	LITHOLOGIC DESCRIPTION
						0 to 0.3 inch: CRUSHED ROCK
SS-1	0					0.3 to 5.0 feet: SANDY GRAVEL (GW), brown, fine to medium, some fine to coarse sand, few fines, damp, no hydrocarbon-like odor. (FILL)
SS-2	0/10-50	▽ ATD	5			5.0 to 7.0 feet: SILTY GRAVEL (GM), brown, fine to medium, some fines, few fine sand, wet, sheen, no hydrocarbon-like odor. (FILL)
SS-3*	0					7.0 to 9.0 feet: SILTY SAND (SM), gray, fine, some fines, wet, no hydrocarbon-like odor. (ALLUVIAL DEPOSIT)
			10			Boring terminated at 9.0 feet below ground surface.
			15			
			20			

REMARKS

(1) SS = 1.5-inch-O.D. split-spoon sampler. (2) PID = Photoionization detector readings in parts per million (ppm).
(3) * = Sample submitted for laboratory analysis. (4) ATD = Approximate depth to groundwater at time of drilling.
(5) Hanby = Hanby field test readings in ppm.

APPENDIX B

LABORATORY REPORTS

Weyerhaeuser

32901 Weyerhaeuser Way South
Federal Way WA 98003
Tel (253) 924-6872
Fax (253) 924-6654

October 2, 1997

Mr. Mike Staton
EMCON NW
18912 North Creek Parkway, Suite 100
Bothell, WA 98011

RE: Service Request 04844 - Snoqualmie/EMCON Soil Samples

Dear Mike:

Attached is a copy of our final report for the samples you requested we analyze.

The results from North Creek Analytical for VPH and EPH should be sent to us on Monday. I will fax them to you when I get them.

Invoicing for this work will be directly to Weyerhaeuser. If you have any questions concerning this report, please feel free to contact me at (253) 924-6521.

Thank you for the opportunity to be of service. I look forward to working with you on future projects.

Sincerely,

Rick Bogar

Richard Bogar, Chromatography Team Leader
Weyerhaeuser Analytical and Testing Services

Weyerhaeuser

32901 Weyerhaeuser Way South
Federal Way WA 98003
Tel (253) 924-6872
Fax (253) 924-6654

SDG NARRATIVE

Organic Analysis

WEYERHAEUSER (WEYER)
ANALYTICAL AND TESTING SERVICES

Case Number 4844
SDG Number 87428

PROJECT: SNOQUALMIE/EMCON SOIL SAMPLES EMCON PROJ# 40141-083.001

The samples from this SDG were received on 9/16/97. The SDG was composed of soil samples for the analysis of WTPH-G, WTPH-D, PAH by 8270Mod., Pb, and BTEX by EPA8240. The requested analyses were as follows:

SAMPLE ID	LAB ID	MATRIX	ANALYSIS
GP-2-5	87428	SOIL	WTPH-D;WTPH-G;Pb;BTEX;PAH
GP-2-5DUP	87428DUP	SOIL	WTPH-G
GP-2-7	87429	SOIL	WTPH-D;WTPH-G; BTEX
GP-2-7DUP	87429DUP	SOIL	WTPH-D
GP-3-5	87430	SOIL	WTPH-D;WTPH-G; BTEX
GP-3-5DUP	87430DUP	SOIL	WTPH-D
GP-3-5MS	87430MS	SOIL	BTEX
GP-3-5MSD	87430MSD	SOIL	BTEX
GP-4-9	87431	SOIL	WTPH-D;WTPH-G; BTEX
GP-5-5	87432	SOIL	WTPH-D;WTPH-G; BTEX
GP-5-5DL	87432DL	SOIL	BTEX
GP-5-5DLDUP	87432DLDUP	SOIL	BTEX
GP-5-7	87433	SOIL	WTPH-D;WTPH-G; BTEX
GP-6-5	87434	SOIL	WTPH-D;WTPH-G; BTEX
GP-7-6.5	87435	SOIL	WTPH-D;PAH

SAMPLE ID	LAB ID	MATRIX	ANALYSIS
GP-7-6.5MS	87435MS	SOIL	PAH
GP-7-8.5	87436	SOIL	WTPH-D
GP-8-5	87437	SOIL	WTPH-D
GP-9-5	87438	SOIL	WTPH-D
GP-10-5	87439	SOIL	WTPH-D
GP-10-7	87440	SOIL	WTPH-D
GP-11-7	87441	SOIL	WTPH-D
LCS 09/26/97	LCS 09/26/97	Fortified Blank	WTPH-G
SLC4T1_091997	SLC4T1_091997	Fortified Blank	PAH

Laboratory comments for this sample delivery group are listed below. The comments are broken up into categories for ease of explanation.

1. BTEX (EPA 8240)

   a) All samples and blanks contain a response near scan #100 due to carbon dioxide which is not reported as a TIC.

   b) Sample GP-5-5 required a medium level extraction due to the concentrations found in the 1 gram analysis. The diluted values qualified with a "D" are the best concentrations for this sample. A duplicate was also prepared and there is good agreement between them.

2. WTPH-G

   a) The duplicate for sample GP-2-5 contained a lower concentration of gasoline range organics and did not agree well with original analysis. The difference appears to be related to sample non-homogeneity.

   b) The surrogate could not be reported for sample GP-2-5 due to matrix interference. The surrogate was reported for the duplicate of the sample due to the lower levels of gasoline range organics as noted in a).

3. WTPH-D

   a) Surrogates could not be reported for samples GP-8-5 and GP-10-5 due to large sample dilution and interference from the sample matrix.

4. PAH

   a) Sample extract dilution and re-analysis was required for both samples because compound concentrations exceeded the calibration range. Rather than report the results for each dilution, a summary report has been prepared for each sample with results that fall with the calibration range reported.

   b) All surrogates except pyrene-d10 were diluted out and could not be reported for sample GP-2-5.

   c) The matrix spike recoveries were not meaningful for many of the target compounds because the concentration of compounds native in the sample was much higher than the concentration spiked.

5. METALS (LEAD)

Weyerhaeuser

Sample Analysis Request Chain of Custody Form

Date 9-15-97

Facility Snoqualmie mill

Sampler's Project No. 40141-083,001

Weyerhaeuser Account No.

Sampled by: ☐ Facility ☐ E&AS/WTC ☐ E&AS/NB

Consultant: Emcon

Address: 18912 North Creek Parkway Suite 100

Phone No.: (425) 485-5000 FAX: (425) 486-9766

Project Manager (print): Mike Staton

Sampler Name (print): Russell Thompson

Recorded By (signed):

Sample Description (ID, Date, Time are Required)

Method	Field Sample ID (15 characters max.)	Date (m/d/y)	Time (hh:mm)	Depth (ft / m)	Matrix: Water	Soil/Sed	Oil	Preservative: HCl	H_2SO_4	HNO_3	$Na_2S_2O_3$	Filtered	Number of Containers
	GP-2-1	9-12-97	0850	1		X							2
	GP-2-3		0900	3		X							2
	GP-2-5		0905	5		X							2
	GP-2-7		0910	7		X							2
	GP-3-1		0930	1		X							2
	GP-3-5		0935	5		X							2
	GP-3-9.5		0950	9.5		X							2
	GP-4-1		1015	1		X							2
	GP-4-9		1040	9		X							2
	GP-5-1		1105	1		X							2
	GP-5-5		1115	5		X							2

Method: G, grab; D, depth composite; T, time composite. Depth required for soil or sediment samples.

Analyses Requested (circle or write in parameters)

Field Sample ID	pH Cond TDS TSS Color Tannins	Volatile Organics (BTEX) Method 8020	Semi-volatile Organics	TPH: 418.1 (TPH-G) (TPH-D extended)	Ca Mg Na K Fe Mn	Metals (list below) Total Pb Method 6010	NH_3 HCO_3 CO_3 Cl F NO_3 SO_4	AOX	TCLP: Metals VOA SVOA Pest Herb PCBs	Dioxin: Total / 2,3,7,8-TCDD / 2,3,7,8-TCDF	CN	BOD P-ortho	TKN P-total TOC COD	VPH by Ecology method WA-VPH	EPH-by Ecology method WA-EPH	CPAHs by GC/MS sim methods	Notes
GP-2-1																	
GP-2-3																	
GP-2-5		X		X		X*								X*	X*	X*	*
GP-2-7		X		X													
GP-3-1																	
GP-3-5		X		X													
GP-3-9.5																	
GP-4-1																	
GP-4-9		X		X													
GP-5-1																	
GP-5-5		X		X													

Remarks/Detection Limit Requirements

* Hold All VPH/EPH/CPAHs/and total Pb analysis till notified to Run.

Sulfuric acid/Silica gel cleanup on all TPH-D ext analysis

☐ Samples on Ice or Blue Ice

Lab Turn-Around Time

☐ 24 Hr ☐ 48 Hr ☐ 7 Day

☐ 2-3 wk Date Due:

Reporting and QA/QC Requirements

RESULTS TO: Mike Staton

CC:

☐ CLP Package ☐ NPDES Permit ☐ Other: ☐ Electronic Report

Laboratory

☐ WATS/WTC ☐ WATS/NB ☐ Other:

Lab SR#:

Case ID:

SDG ID:

Sample Chain of Custody and Shipping Method Record

	Date	Time		
Relinquished By Sampler (signature):	9-15-97	1330	Received By (signature):	Shipping Method
Relinquished By (signature):	9-5-97	1:30	Received By (signature):	Airbill No.
Relinquished By (signature):	Date	Time	Received For Laboratory By (signature): B Chappel 9.15.97 1400	
			Samples Received Intact: yes	Cooler Temp: 4 °C

S00000

WATS/WTC: 32901 Weyerhaeuser Way South, Federal Way, WA 98003 (206-924-6293)

WATS/NB: New Bern R&D Field Station, Highway 43 North, New Bern, NC 28563 (919-633-7238)

Weyerhaeuser

Analytical & ing Services

Sample Analysis Request/Chain of Custody Form

Date 9-15-97

Facility Snoqualmie Mill

Sampler's Project No. 40141-083.001

Weyerhaeuser Account No.

Sampled by: ☐ Facility ☐ E&AS/WTC ☐ E&AS/NB

Consultant: Emcon

Address: 18912 N creek Parkway Suite 100

Phone No.: (425) 485-5000 FAX: (425) 486-9766

Project Manager (print): Mike Slater

Sampler Name (print): Russell Thompson

Recorded By (signed)

Sample Description (ID, Date, Time are Required)

Method	Field Sample ID (15 characters max.)	Date (m/d/y)	Time (hh:mm)	Depth (ft / m)	Matrix: Water	Soil/Sed	Oil	Preservative: HCl	H_2SO_4	HNO_3	$Na_2S_2O_3$		Filtered	Number of Containers
	GP-5-7	9-12-97	1120	7		X								
	GP-6-1		1145	1		X								
	GP-6-5		1150	5		X								
	GP-6-7		1205	7		X								
	GP-7-.5		1240	.5		X								
	GP-7-2.5		1245	2.5		X								
	GP-7-4.5		1250	4.5		X								
	GP-7-6.5		1300	6.5		X								
	GP-7-8.5		1310	8.9		X								
	GP-7-10.5		1320	10.5		X								
	GP-8-1	↓	1345	1		X								

Method: G, grab; D, depth composite; T, time composite. Depth required for soil or sediment samples.

Analyses Requested (circle or write in parameters)

Notes	pH	Cond	TDS	TSS	Color	Tannins	Volatile Organics (BTEX) method 8020	Semi-volatile Organics	TPH: 418.1	TPH-G	TPH-D	Ca	Mg	Na	K	Fe	Mn	Metals (list below)	NH_3	HCO_3	CO_3	Cl	F	NO_3	SO_4	AOX	TCLP: Metals VOA SVOA Pest Herb PCBs*	Dioxin: Total / 2,3,7,8-TCDD /2,3,7,8-TCDF	CN	BOD	P-ortho	TKN	P-total	TOC	COD	EPH by Ecology method WA-EPH	CPAHs by GC/MS SIM method	TPH-Dext by Ecology method NWTPH-Dx
							X		X																												X	X
							X		X																													
																																					X	X
																																					X	X

Remarks/Detection Limit Requirements

* Hold All EPH and CPAHs analysis till notified to Run.

Sulfuric acid/Silica gel cleanup on all TPH-Dext analysis

☐ Samples on Ice or Blue Ice

Lab Turn-Around Time

☐ 24 Hr ☐ 48 Hr ☐ 7 Day

☐ 2-3 wk Date Due:

Reporting and QA/QC Requirements

RESULTS TO: Mike Slater

CC:

☐ CLP Package

☐ NPDES Permit

☐ Other:

☐ Electronic Report

Laboratory

☐ WATS/WTC ☐ WATS/NB

☐ Other:

Lab SR#:

Case ID:

SDG ID:

Sample Chain of Custody and Shipping Method Record

Relinquished By Sampler (signature):	Date	Time	Received By (signature):	Shipping Method
	9-15-97	1330		
Relinquished By (signature):	Date	Time	Received By (signature):	Airbill No.
	9-15-97	1:28		
Relinquished By (signature):	Date	Time	Received For Laboratory By (signature):	
			B Chappel	9.15.97 1400
			Samples Received Intact: yes	Cooler Temp: 4 °C

WATS/WTC: 32901 Weyerhaeuser Way South, Federal Way, WA 98003 (206-924-6293)

WATS/NB: New Bern R&D Field Station, Highway 43 North, New Bern, NC 28563 (919-633-7238)

Form 16307 Printing Services TP-1 Tacoma

Weyerhaeuser Company
Analytical Laboratories
Tacoma, Washington

Service Request 04844

Report

Snoqualmie/EMCON Soil Samples

Sample Designation			Analytical Lab Code	Total Lead
				mg/kg, as-received basis
GP-2-5	09/12/97	0905	87428	< 10
			Quantitation Limit:	10
			Method Number:	AM1-3050/6010

Approved: Mary Beth Lanza

Report Date 9/29/97 04844M.XLS

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-2-5

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87428

Sample wt/vol: 1.0 (g/mL) G Lab File ID: A6443

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 28 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	7	U
108-88-3	Toluene	23	
100-41-4	Ethylbenzene	440	
106-42-3	mp-Xylene	1200	
95-47-6	o-Xylene	52	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-2-7

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87429

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6439

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 23 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	3	U
108-88-3	Toluene	3	U
100-41-4	Ethylbenzene	3	U
106-42-3	mp-Xylene	3	U
95-47-6	o-Xylene	3	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-3-5

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87430

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6437

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 28 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	3	U
108-88-3	Toluene	3	U
100-41-4	Ethylbenzene	3	U
106-42-3	mp-Xylene	3	U
95-47-6	o-Xylene	3	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-4-9

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87431

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6438

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 28 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	3	U
108-88-3	Toluene	3	U
100-41-4	Ethylbenzene	3	U
106-42-3	mp-Xylene	3	U
95-47-6	o-Xylene	3	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-5-5

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87432

Sample wt/vol: 1.0 (g/mL) G Lab File ID: A6441

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 29 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	650	
108-88-3	Toluene	520	
100-41-4	Ethylbenzene	3200	E
106-42-3	mp-Xylene	5900	E
95-47-6	o-Xylene	3200	E

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-5-5DL

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87432DL

Sample wt/vol: 4.0 (g/mL) G Lab File ID: B3560

Level: (low/med) MED Date Received: 09/16/97

% Moisture: not dec. 29 Date Analyzed: 09/24/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	1400	D
108-88-3	Toluene	1700	D
100-41-4	Ethylbenzene	12000	D
106-42-3	mp-Xylene	52000	D
95-47-6	o-Xylene	11000	D

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-5-5DLDUP

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87432DLDUP

Sample wt/vol: 4.0 (g/mL) G Lab File ID: B3561

Level: (low/med) MED Date Received: 09/16/97

% Moisture: not dec. 29 Date Analyzed: 09/24/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	1300	D
108-88-3	Toluene	1600	D
100-41-4	Ethylbenzene	11000	D
106-42-3	mp-Xylene	50000	D
95-47-6	o-Xylene	11000	D

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-5-7

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87433

Sample wt/vol: 1.0 (g/mL) G Lab File ID: A6442

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 21 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	19	
108-88-3	Toluene	5	J
100-41-4	Ethylbenzene	43	
106-42-3	mp-Xylene	64	
95-47-6	o-Xylene	17	

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-6-5

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87434

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6440

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 25 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	3	U
108-88-3	Toluene	2	J
100-41-4	Ethylbenzene	3	U
106-42-3	mp-Xylene	3	U
95-47-6	o-Xylene	3	U

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Level: (low/med) LOW

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	GP-2-5	124	108	91	0	0
02	GP-2-7	100	104	96	0	0
03	GP-3-5	101	102	95	0	0
04	GP-4-9	102	100	96	0	0
05	GP-5-5	114	110	99	0	0
06	GP-5-7	99	105	93	0	0
07	GP-6-5	96	102	95	0	0
08	GP-3-5MS	102	99	87	0	0
09	GP-3-5MSD	103	100	89	0	0
10	VBLKS1	99	102	96	0	0

		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(84-138)
SMC2 (BFB)	= Bromofluorobenzene	(59-113)
SMC3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

2B

SOIL VOLATILE SYSTEM MONITORING COMPOUND RECOVERY

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Level: (low/med) MED

	EPA SAMPLE NO.	SMC1 (TOL) #	SMC2 (BFB) #	SMC3 (DCE) #	OTHER	TOT OUT
01	GP-5-5DL	125	98	88	0	0
02	GP-5-5DLDUP	123	94	83	0	0
03	VBLKM1	118	103	90	0	0

		QC LIMITS
SMC1 (TOL)	= Toluene-d8	(84-138)
SMC2 (BFB)	= Bromofluorobenzene	(59-113)
SMC3 (DCE)	= 1,2-Dichloroethane-d4	(70-121)

Column to be used to flag recovery values

* Values outside of contract required QC limits

D System Monitoring Compound diluted out

3B

SOIL VOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix Spike - EPA Sample No.: GP-3-5 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC LIMITS REC.
1,1-Dichloroethene	139.0	0	130.6	94	59-172
Trichloroethene	139.0	0	123.9	89	62-137
Benzene	139.0	0	131.1	94	66-142
Toluene	139.0	0	135.6	98	59-139
Chlorobenzene	139.0	0	129.4	93	60-133

COMPOUND	SPIKE ADDED (ug/Kg)	MSD CONCENTRATION (ug/Kg)	MSD % REC #	% RPD #	QC LIMITS RPD	QC LIMITS REC.
1,1-Dichloroethene	139.0	124.2	89	5	22	59-172
Trichloroethene	139.0	120.3	87	2	24	62-137
Benzene	139.0	126.4	91	3	21	66-142
Toluene	139.0	136.7	98	0	21	59-139
Chlorobenzene	139.0	130.8	94	1	21	60-133

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 5 outside limits
Spike Recovery: 0 out of 10 outside limits

COMMENTS:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-3-5MS

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87430MS

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6445

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 28 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	130	
108-88-3	Toluene	140	
100-41-4	Ethylbenzene	3	U
106-42-3	mp-Xylene	3	U
95-47-6	o-Xylene	3	U

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

GP-3-5MSD

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: 87430MSD

Sample wt/vol: 2.5 (g/mL) G Lab File ID: A6446

Level: (low/med) LOW Date Received: 09/16/97

% Moisture: not dec. 28 Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	130	
108-88-3	Toluene	140	
100-41-4	Ethylbenzene	3	U
106-42-3	mp-Xylene	3	U
95-47-6	o-Xylene	3	U

4A

VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKS1

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Lab File ID: A6436 Lab Sample ID: VBLKS1

Date Analyzed: 09/23/97 Time Analyzed: 1144

GC Column: CAP ID: 0.530(mm) Heated Purge: (Y/N) N

Instrument ID: VOA1

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	GP-2-5	87428	A6443	1849
02	GP-2-7	87429	A6439	1415
03	GP-3-5	87430	A6437	1235
04	GP-4-9	87431	A6438	1325
05	GP-5-5	87432	A6441	1708
06	GP-5-7	87433	A6442	1759
07	GP-6-5	87434	A6440	1618
08	GP-3-5MS	87430MS	A6445	2028
09	GP-3-5MSD	87430MSD	A6446	2118

COMMENTS:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKS1

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: VBLKS1

Sample wt/vol: 5.0 (g/mL) G Lab File ID: A6436

Level: (low/med) LOW Date Received:

% Moisture: not dec. Date Analyzed: 09/23/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: (uL) Soil Aliquot Volume: (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	1	U
108-88-3	Toluene	1	U
100-41-4	Ethylbenzene	1	U
106-42-3	mp-Xylene	1	U
95-47-6	o-Xylene	1	U

4A
VOLATILE METHOD BLANK SUMMARY

EPA SAMPLE NO.

VBLKM1

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Lab File ID: B3559 Lab Sample ID: VBLKM1

Date Analyzed: 09/24/97 Time Analyzed: 1631

GC Column: CAP ID: 0.530(mm) Heated Purge: (Y/N) N

Instrument ID: VOA2

THIS METHOD BLANK APPLIES TO THE FOLLOWING SAMPLES, MS AND MSD:

	EPA SAMPLE NO.	LAB SAMPLE ID	LAB FILE ID	TIME ANALYZED
01	GP-5-5DL	87432DL	B3560	1720
02	GP-5-5DLDUP	87432DLDUP	B3561	1810

COMMENTS:

1A

VOLATILE ORGANICS ANALYSIS DATA SHEET

EPA SAMPLE NO.

VBLKM1

Lab Name: WEYERHAEUSER Contract: 046-5601

Lab Code: WEYER Case No.: 04844 SAS No.: SDG No.: GP-2-5

Matrix: (soil/water) SOIL Lab Sample ID: VBLKM1

Sample wt/vol: 4.0 (g/mL) G Lab File ID: B3559

Level: (low/med) MED Date Received:

% Moisture: not dec. Date Analyzed: 09/24/97

GC Column: CAP ID: 0.530 (mm) Dilution Factor: 1.0

Soil Extract Volume: 10000 (uL) Soil Aliquot Volume: 100 (uL)

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	120	U
108-88-3	Toluene	120	U
100-41-4	Ethylbenzene	120	U
106-42-3	mp-Xylene	120	U
95-47-6	o-Xylene	120	U

Flag Qualifiers For Organic Analysis Reports

U Indicates that the compound was analyzed for but not detected above the reporting limit. The sample reporting limit corrected for dilution and percent moisture is reported.

J Indicates an estimated value. This flag is used either when estimating a concentration for tentatively identified compounds or when the data indicates the presence of a compound but the result is less than the sample quantitation limit but greater than zero.

N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds, where the identification is based on a mass spectral library search.

P This flag is used for a pesticide/Aroclor target analyte when there is greater than 25% difference for the detected concentrations between the two GC columns. The lower of the two results is reported.

C This flag is used for pesticide results that have been confirmed by GC/MS

B This flag is used when the analyte is detected in the associated blank as well as the sample.

E This flag is used for compounds whose concentrations exceed the calibration range of the instrument.

D This flag identifies all compounds identified in an analysis at a secondary dilution. This flag alerts the data user that any discrepancies between the concentrations reported in the two runs may be due to dilution errors.

A This flag is used for tentatively identified compounds that suspected to be aldol-condensation products.

X This flag is assigned by the computer when the program has been manually adjusted by the operator. It has no significance to the number itself.

WTPH-G

Service Request: 04844
Analyst: C. Thomson

Sample ID Client ID	Blank 09/26/97	LCS 09/26/97	87428 GP-2-5	87429 GP-2-7	87430 GP-3-5
Analyte	mg/Kg	% Rec.	mg/Kg	mg/Kg	mg/Kg
Gasoline Range Organics	U	122%	890	24	U
Surrogate % Recovery					
Bromofluorobenzene (BFB)	102%	88%	0 D	92%	72%

0 D - Indicates surrogate recovery is not available due to matrix interference.

Date Sampled			09/12/97	09/12/97	09/12/97
Date Extracted	09/26/97	09/26/97	09/26/97	09/26/97	09/26/97
Date Analyzed	09/30/97	09/30/97	09/30/97	09/30/97	09/30/97
Holding Time Days			14	14	14
Reporting Limit					
Gasoline Range Organics	5.0		35	6.2	6.9

Approved by _____ Date 10/1/97

WTPH-G

Service Request: 04844
Analyst: C. Thomson

Sample ID Client ID	87431 GP-4-9	87432 GP-5-5	87433 GP-5-7	87434 GP-6-5	87428DUP GP-2-5DUP
Analyte	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Gasoline Range Organics	U	1000	110	U	310
Surrogate % Recovery Bromofluorobenzene (BFB)	78%	0 D	118%	71%	74%
Date Sampled	09/12/97	09/12/97	09/12/97	09/12/97	09/12/97
Date Extracted	09/26/97	09/26/97	09/26/97	09/26/97	09/26/97
Date Analyzed	09/30/97	09/30/97	09/30/97	09/30/97	09/30/97
Holding Time Days	14	14	14	14	14
Reporting Limit Gasoline Range Organics	6.7	35	31	5.1	34

WTPH-D Extended

Service Request: 04844
Analyst: C. Thomson

Sample ID	Blank	LCS	87428	87429	87430
Client ID	09/24/97	09/24/97	GP-2-5	GP-2-7	GP-3-5
Analytes	mg/Kg	% Rec.	mg/Kg	mg/Kg	mg/Kg
Diesel Fuel Range	U	120%	520	28	U
Motor Oil Range	U		U	U	U
Surrogate Recovery	97%	103%	110%	99%	100%

0 D - Indicates surrogate recovery unavailable due to matrix interference.

Date Sampled			09/12/97	09/12/97	09/12/97
Date Extracted	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97
Date Analyzed	09/29/97	09/29/97	09/29/97	09/29/97	09/29/97
Holding Time Days			12	12	12
Reporting Limit					
Diesel Range	6.8		55	7.4	8.9
Motor Oil Range	17		140	19	22

Approved by _____ Date 10/1/97

WTPH-D Extended

Service Request:
Analyst:

Sample ID Client ID	87431 GP-4-9	87432 GP-5-5	87433 GP-5-7	87434 GP-6-5	87435 GP-7-6.5
Analytes	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Diesel Fuel Range	U	300	120	U	740
Motor Oil Range	U	U	U	U	950
Surrogate Recovery	100%	111%	109%	98%	106%
Date Sampled	09/12/97	09/12/97	09/12/97	09/12/97	09/12/97
Date Extracted	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97
Date Analyzed	09/29/97	09/29/97	09/29/97	09/29/97	09/29/97
Holding Time Days	12	12	12	12	12
Reporting Limit					
Diesel Range	8.5	38	40	6.5	43
Motor Oil Range	21	95	100	16	110

WTPH-D Extended

Service Request:
Analyst:

Sample ID Client ID	87436 GP-7-8.5	87437 GP-8-5	87438 GP-9-5	87439 GP-10-5	87440 GP-10-7
Analytes	mg/Kg	mg/Kg	mg/Kg	mg/Kg	mg/Kg
Diesel Fuel Range	U	U	3600	6300	1100
Motor Oil Range	U	U	8300	15000	2800
Surrogate Recovery	100%	116%	0 D	0 D	132%
Date Sampled	09/12/97	09/12/97	09/12/97	09/12/97	09/12/97
Date Extracted	09/24/97	09/24/97	09/24/97	09/24/97	09/24/97
Date Analyzed	09/29/97	09/30/97	09/30/97	09/30/97	09/29/97
Holding Time Days	12	12	12	12	12
Reporting Limit					
Diesel Range	7.4	10	330	360	74
Motor Oil Range	19	24	820	910	190

WTPH-D Extended

Service Request:
Analyst:

Sample ID Client ID	87441 GP-11-7	87429DUP GP-2-7DUP	87430DUP GP-3-5DUP
Analytes	mg/Kg	mg/Kg	mg/Kg
Diesel Fuel Range	U	18	U
Motor Oil Range	U	U	U
Surrogate Recovery	99%	107%	99%
Date Sampled	09/12/97	09/12/97	09/12/97
Date Extracted	09/24/97	09/24/97	09/24/97
Date Analyzed	09/29/97	09/29/97	09/29/97
Holding Time Days	12	12	12
Reporting Limit			
Diesel Range	8.2	7.3	8.9
Motor Oil Range	20	18	22

Summary Report - PAH

Weyerhaeuser Analytical

SR #04844 - Snoqualmie/EMCON soil Samples EMCON proj# 40141-083.001

Method: PAHSIM

Units: ug/Kg(PPB)

Client ID		**GP-2-5**	**GP-7-6.5**	**SOIL BLANK**
Sample Date and Time		9/12/97 0905	9/12/97 1300	
Lab ID		87428	87435	SBL4T1_091997
Naphthalene	91-20-3	750	430	2 U
2-Methylnaphthalene	91-57-6	5600	14000	2 U
Acenaphthylene	208-96-8	120	280	2 U
Acenaphthene	83-32-9	240	1600	2 U
Dibenzofuran	132-64-9	110	520	2 U
Fluorene	86-73-7	470	2700	2 U
Phenanthrene	85-01-8	930	11000	2 U
Anthracene	120-12-7	3 U	1200	2 U
Fluoranthene	206-44-0	15	380	2 U
Pyrene	129-00-0	75	3900	2 U
Benzo(a)Anthracene	56-55-3	3 U	280	2 U
Chrysene	218-01-9	5	1600	2 U
Benzo(b)fluoranthene	205-99-2	3 U	140	2 U
Benzo(k)fluoranthene	207-08-9	3 U	120	2 U
Benzo(a)pyrene	50-32-8	3 U	860	2 U
Indeno(1,2,3-cd)pyrene	193-39-5	3 U	62	2 U
Dibenzo(a,h)anthracene	53-70-3	3 U	54	2 U
Benzo(g,h,i)perylene	191-24-2	3 U	160	2 U
1-Methylnaphthalene-d1	(20-120)	62%	0% D	84%
o-Terphenyl	(20-120)	91%	0% D	87%
Pyrene-d10	(20-120)	104%	134% D	85%
Benzo(g,h,i)perylene-d12	(20-120)	77%	0% D	78%
Date Extracted		9/19/97	9/19/97	9/19/97
Date Analyzed		9/30/97	9/30/97	9/30/97

D= Sample diluted.

2D

SOIL SEMIVOLATILE SURROGATE RECOVERY

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 4844 Method: 8270SIM SDG No.: 87428

Level: (low/med) LOW

	EPA SAMPLE NO.	S1 #	S2 #	S3 #	S4 #	S5 #	S6 #	S7 #	S8 #	TOT OUT
01	SLC4T1_091997	82	80	88	78					0
02	SBL4T1_091997	84	87	85	78					0
03	GP-2-5	62	91	104	77					0
04	GP-7-6.5	0D	0D	134D	0D					0
05	GP-7-6.5DL	0D	0D	0D	0D					0
06	GP-7-6.5DL2	0D	0D	0D	0D					0
07	GP-2-5DL3	0D	0D	0D	0D					0
08	GP-2-5DL2	0D	0D	0D	0D					0
09	GP-2-5DL	0D	100	104	71					0
10	GP-7-6.5MS	117D	140D	201D	0D					0
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										
21										
22										
23										
24										
25										
26										
27										
28										
29										
30										

		QC LIMITS
S1	= 1-Methylnaphthalene-d1	(20-120)
S2	= o-Terphenyl	(20-120)
S3	= Pyrene-d10	(20-120)
S4	= Benzo(g,h,i)perylene-d	(20-120)

Column to be used to flag recovery values
* Values outside of contract required QC limits
D Surrogate diluted out

3ALT

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 4844 Method: PAHSIM SDG No.: 87428

Matrix Spike - EPA Sample No.: SBL4T1_09199 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
Naphthalene	20	0.00	16	80	20-160
2-Methylnaphthalene	20	0.00	22	110	20-160
Acenaphthylene	20	0.00	15	75	20-160
Acenaphthene	20	0.00	15	75	20-160
Dibenzofuran	20	0.00	14	70	20-160
Fluorene	20	0.00	15	75	20-160
Phenanthrene	20	0.00	17	85	20-160
Anthracene	20	0.00	16	80	20-160
Fluoranthene	20	0.00	15	75	20-160
Pyrene	20	0.00	17	85	20-160
Benzo(a)Anthracene	20	0.00	11	55	20-160
Chrysene	20	0.00	11	55	20-160
Benzo(b)fluoranthene	20	0.00	19	95	20-160
Benzo(k)fluoranthene	20	0.00	18	90	20-160
Benzo(a)pyrene	20	0.00	15	75	20-160
Indeno(1,2,3-cd)pyrene	20	0.00	17	85	20-160
Dibenzo(a,h)anthracene	20	0.00	16	80	20-160
Benzo(g,h,i)perylene	20	0.00	16	80	20-160

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 4 out of 22 outside limits

COMMENTS: _____

3ALT

SOIL SEMIVOLATILE MATRIX SPIKE/MATRIX SPIKE DUPLICATE RECOVERY

Lab Name: WEYERHAEUSER Contract:

Lab Code: WEYER Case No.: 4844 Method: PAHSIM SDG No.: 87428

Matrix Spike - EPA Sample No.: GP-7-6.5 Level: (low/med) LOW

COMPOUND	SPIKE ADDED (ug/Kg)	SAMPLE CONCENTRATION (ug/Kg)	MS CONCENTRATION (ug/Kg)	MS % REC #	QC. LIMITS REC.
Naphthalene	27	430	550	444*	20-160
2-Methylnaphthalene	27	12000	21000	33333*	20-160
Acenaphthylene	27	280	420	518*	20-160
Acenaphthene	27	1400	1800	1481*	20-160
Dibenzofuran	27	520	1000	1778*	20-160
Fluorene	27	3000	4900	7037*	20-160
Phenanthrene	27	7300	11000	13704*	20-160
Anthracene	27	990	1200	778*	20-160
Fluoranthene	27	380	610	852*	20-160
Pyrene	27	2000	2400	1481*	20-160
Benzo(a)Anthracene	27	280	580	1111*	20-160
Chrysene	27	1600	1600	0*	20-160
Benzo(b)fluoranthene	27	140	170	111	20-160
Benzo(k)fluoranthene	27	120	190	259*	20-160
Benzo(a)pyrene	27	820	860	148	20-160
Indeno(1,2,3-cd)pyrene	27	62	100	141	20-160
Dibenzo(a,h)anthracene	27	54	94	148	20-160
Benzo(g,h,i)perylene	27	160	220	222*	20-160
Benzo(g,h,i)perylene-d1	27	0.00	0.00	0*	20-160
1-Methylnaphthalene-d10	27	0.00	32	118	20-160
o-Terphenyl	27	0.00	39	144	20-160
Pyrene-d10	27	37	55	67	20-160

Column to be used to flag recovery and RPD values with an asterisk

* Values outside of QC limits

RPD: 0 out of 0 outside limits
Spike Recovery: 15 out of 22 outside limits

COMMENTS: _____

Weyerhaeuser

32901 Weyerhaeuser Way South
Federal Way WA 98003
Tel (253) 924-6872
Fax (253) 924-6654

October 8, 1997

OCT 10

Mr. Mike Staton
EMCON NW
18912 North Creek Parkway, Suite 100
Bothell, WA 98011

RE: Service Request 04844 - Snoqualmie/EMCON Soil Samples

Dear Mike:

Attached is a copy of the final report from North Creek Analytical for VPH and EPH on the samples listed on the above referenced service request.

Thank you for the opportunity to be of service. I look forward to working with you on future projects.

Sincerely,

Rick Bogar

Richard Bogar, Chromatography Team Leader
Weyerhaeuser Analytical and Testing Services

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project: Weyerhaeuser Soil Samples	Sampled: 9/12/97
W C 2F25	Project Number: RD0082260	Received: 9/17/97
T oma, WA 98477-0001	Project Manager: Rick Bogar	Reported: 10/6/97 13:23

ANALYTICAL REPORT FOR SAMPLES:

Sample Description	Laboratory Sample Number	Sample Matrix	Date Sampled
C -2-5	B709353-01	Soil	9/12/97
C -7-6.5	B709353-02	Soil	9/12/97

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
TTC 2F25	Project Number:	RD0082260	Received: 9/17/97
acoma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Volatile Petroleum Hydrocarbons by WDOE Interim TPH Policy Method
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
			B709353-01				Soil	
GP-2-5					20.0	ND	mg/kg dry	
C5-C6 Aliphatics	0970667	9/25/97	9/27/97		20.0	114	"	
C6-C8 Aliphatics	"	"	"		20.0	73.5	"	
C8-C10 Aliphatics	"	"	"		20.0	87.9	"	1
C10-C12 Aliphatics	"	"	"		20.0	55.5	"	
C8-C10 Aromatics	"	"	"		20.0	126	"	
C10-C12 Aromatics	"	"	"		20.0	79.6	"	
C12-C13 Aromatics	"	"	"			NR	%	2
Surrogate: 4-BFB (FID)	"	"	"	*60.0-140*		*146*	"	2
Surrogate: 4-BFB (PID)	"	"	"	*60.0-140*				

**Refer to end of report for text of notes and definitions.*

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
WTC 2F25	Project Number:	RD0082260	Received: 9/17/97
Tacoma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Extractable Petroleum Hydrocarbons by WDOE Interim TPH Policy Method
North Creek Analytical - Bothell

Analyte	Batch Number	Date Prepared	Date Analyzed	Surrogate Limits	Reporting Limit	Result	Units	Notes*
GP-2-5			**B709353-01**				Soil	
C8-C10 Aliphatics	0970641	9/25/97	9/28/97		5.00	16.1	mg/kg dry	
C10-C12 Aliphatics	"	"	"		5.00	47.3	"	
C12-C16 Aliphatics	"	"	"		5.00	229	"	
C16-C21 Aliphatics	"	"	"		5.00	178	"	
C21-C34 Aliphatics	"	"	"		5.00	40.6	"	
C10-C12 Aromatics	"	"	9/29/97		5.00	16.9	"	
C12-C16 Aromatics	"	"	"		5.00	65.4	"	
C16-C21 Aromatics	"	"	"		5.00	126	"	
C21-C34 Aromatics	"	"	"		5.00	13.5	"	
Surrogate: Octacosane	"	"	*9/28/97*	*50.0-150*		*79.5*	%	
Surrogate: 2-FBP	"	"	*9/29/97*	*50.0-150*		*63.4*	"	
GP-7-6.5			**B709353-02**				Soil	
C8-C10 Aliphatics	0970641	9/25/97	9/29/97		5.00	ND	mg/kg dry	
C10-C12 Aliphatics	"	"	"		5.00	7.01	"	
C12-C16 Aliphatics	"	"	"		5.00	38.2	"	
C16-C21 Aliphatics	"	"	"		5.00	107	"	
C21-C34 Aliphatics	"	"	"		5.00	506	"	
C10-C12 Aromatics	"	"	"		5.00	ND	"	
C12-C16 Aromatics	"	"	"		5.00	28.4	"	
C16-C21 Aromatics	"	"	"		5.00	161	"	
C21-C34 Aromatics	"	"	"		5.00	350	"	
Surrogate: Octacosane	"	"	"	*50.0-150*		*82.5*	%	
Surrogate: 2-FBP	"	"	"	*50.0-150*		*73.2*	"	

Refer to end of report for text of notes and definitions.

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
TC 2F25	Project Number:	RD0082260	Received: 9/17/97
coma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Dry Weight Determination
North Creek Analytical - Bothell

mple Name	Lab ID	Matrix	Result	Units
GP-2-5	B709353-01	Soil	71.2	%
P-7-6.5	B709353-02	Soil	76.6	%

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project: Weyerhaeuser Soil Samples	Sampled: 9/12/97
TC 2F25	Project Number: RD0082260	Received: 9/17/97
coma, WA 98477-0001	Project Manager: Rick Bogar	Reported: 10/6/97 13:23

Volatile Petroleum Hydrocarbons by WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0970667	**Date Prepared: 9/25/97**					**Extraction Method: EPA 5030 (MeOH)**				
Blank	**0970667-BLK1**									
5-C6 Aliphatics	9/26/97			ND	mg/kg dry	5.00				
C6-C8 Aliphatics	"			ND	"	5.00				
C8-C10 Aliphatics	"			ND	"	5.00				
10-C12 Aliphatics	"			ND	"	5.00				
8-C10 Aromatics	"			ND	"	5.00				
C10-C12 Aromatics	"			ND	"	5.00				
12-C13 Aromatics	"			ND	"	5.00				
urrogate: 4-BFB (FID)	"	*4.00*		*4.07*	"	*60.0-140*	*102*			
Surrogate: 4-BFB (PID)	"	*4.00*		*4.60*	"	*60.0-140*	*115*			
LCS	**0970667-BS1**									
5-C6 Aliphatics	9/26/97	2.00		2.21	mg/kg dry	70.0-130	111			
C6-C8 Aliphatics	"	1.00		1.08	"	70.0-130	108			
8-C10 Aliphatics	"	1.00		1.70	"	70.0-130	170			3
10-C12 Aliphatics	"	1.00		1.11	"	70.0-130	111			
C8-C10 Aromatics	"	4.00		3.35	"	70.0-130	83.7			
C10-C12 Aromatics	"	1.00		0.937	"	70.0-130	93.7			
12-C13 Aromatics	"	1.00		0.817	"	70.0-130	81.7			
Surrogate: 4-BFB (FID)	"	*4.00*		*4.02*	"	*60.0-140*	*100*			
Surrogate: 4-BFB (PID)	"	*4.00*		*4.74*	"	*60.0-140*	*118*			
Duplicate	**0970667-DUP1**	**B709294-08**								
C5-C6 Aliphatics	9/26/97		ND	ND	mg/kg dry			25.0		
C6-C8 Aliphatics	"		ND	ND	"			25.0		
C8-C10 Aliphatics	"		ND	ND	"			25.0		
C10-C12 Aliphatics	"		ND	ND	"			25.0		
C8-C10 Aromatics	"		ND	ND	"			25.0		
C10-C12 Aromatics	"		ND	ND	"			25.0		
C12-C13 Aromatics	"		ND	ND	"			25.0		
Surrogate: 4-BFB (FID)	"	*4.97*		*4.55*	"	*60.0-140*	*91.5*			
Surrogate: 4-BFB (PID)	"	*4.97*		*5.08*	"	*60.0-140*	*102*			
Duplicate	**0970667-DUP2**	**B709294-10**								
C5-C6 Aliphatics	9/27/97		ND	ND	mg/kg dry			25.0		
C6-C8 Aliphatics	"		ND	ND	"			25.0		
C8-C10 Aliphatics	"		ND	ND	"			25.0		
C10-C12 Aliphatics	"		ND	ND	"			25.0		

**Refer to end of report for text of notes and definitions.*

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
WTC 2F25	Project Number:	RD0082260	Received: 9/17/97
Tacoma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Volatile Petroleum Hydrocarbons by WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Duplicate (continued)	0970667-DUP2		B709294-10							
C8-C10 Aromatics	9/27/97		ND	ND	mg/kg dry			25.0		
C10-C12 Aromatics	"		ND	ND	"			25.0		
C12-C13 Aromatics	"		ND	ND	"			25.0		
Surrogate: 4-BFB (FID)	"	*5.10*		*4.41*	"	*60.0-140*	*86.5*			
Surrogate: 4-BFB (PID)	"	*5.10*		*5.05*	"	*60.0-140*	*99.0*			

Refer to end of report for text of notes and definitions.

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
WTC 2F25	Project Number:	RD0082260	Received: 9/17/97
acoma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Extractable Petroleum Hydrocarbons by WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0970641	**Date Prepared: 9/25/97**					**Extraction Method: EPA 3550**				
LCS	**0970641-BS1**									
8-C10 Aliphatics	9/28/97	1.67		0.578	mg/kg dry	60.0-140	34.6			
10-C12 Aliphatics	"	1.67		0.643	"	60.0-140	38.5			
C12-C16 Aliphatics	"	1.67		1.02	"	60.0-140	61.1			
16-C21 Aliphatics	"	1.67		1.13	"	60.0-140	67.7			
21-C34 Aliphatics	"	1.67		1.07	"	60.0-140	64.1			
C10-C12 Aromatics	"	1.67		1.11	"	60.0-140	66.5			
C12-C16 Aromatics	"	5.00		3.55	"	60.0-140	71.0			
16-C21 Aromatics	"	8.33		7.40	"	60.0-140	88.8			
21-C34 Aromatics	"	13.3		12.2	"	60.0-140	91.7			
Surrogate: Octacosane	"	*11.8*		*3.42*	"	*50.0-150*	*29.0*			
urrogate: 2-FBP	"	*11.7*		*7.70*	"	*50.0-150*	*65.8*			
LCS Dup	**0970641-BSD1**									
8-C10 Aliphatics	9/28/97	1.67		0.929	mg/kg dry	60.0-140	55.6	40.0	46.6	
10-C12 Aliphatics	"	1.67		1.04	"	60.0-140	62.3	40.0	47.2	
12-C16 Aliphatics	"	1.67		1.36	"	60.0-140	81.4	40.0	28.5	
C16-C21 Aliphatics	"	1.67		1.39	"	60.0-140	83.2	40.0	20.5	
21-C34 Aliphatics	"	1.67		1.28	"	60.0-140	76.6	40.0	17.8	
10-C12 Aromatics	"	1.67		0.929	"	60.0-140	55.6	40.0	17.9	
C12-C16 Aromatics	"	5.00		3.54	"	60.0-140	70.8	40.0	0.282	
16-C21 Aromatics	"	8.33		6.60	"	60.0-140	79.2	40.0	11.4	
21-C34 Aromatics	"	13.3		11.7	"	60.0-140	88.0	40.0	4.12	
Surrogate: Octacosane	"	*11.8*		*3.71*	"	*50.0-150*	*31.4*			
Surrogate: 2-FBP	"	*11.7*		*7.70*	"	*50.0-150*	*65.8*			
Matrix Spike	**0970641-MS1**		**B709294-18**							
C8-C10 Aliphatics	9/28/97	2.31	ND	1.92	mg/kg dry	60.0-140	83.1			
10-C12 Aliphatics	"	2.31	ND	2.71	"	60.0-140	117			
12-C16 Aliphatics	"	2.31	10.1	10.1	"	60.0-140	NR			
C16-C21 Aliphatics	"	2.31	10.1	10.4	"	60.0-140	13.0			
C21-C34 Aliphatics	"	2.31	30.0	15.9	"	60.0-140	NR			
10-C12 Aromatics	"	2.31	ND	1.59	"	60.0-140	68.8			
12-C16 Aromatics	"	6.94	ND	5.55	"	60.0-140	80.0			
C16-C21 Aromatics	"	11.6	ND	11.8	"	60.0-140	102			
21-C34 Aromatics	"	18.5	15.6	21.4	"	60.0-140	31.4			
urrogate: Octacosane	"	*16.4*		*12.9*	"	*50.0-150*	*78.7*			
Surrogate: 2-FBP	"	*16.2*		*10.7*	"	*50.0-150*	*66.0*			

North Creek Analytical, Inc.

**Refer to end of report for text of notes and definitions.*

Matthew Essig, Project Manager

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
WTC 2F25	Project Number:	RD0082260	Received: 9/17/97
acoma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Extractable Petroleum Hydrocarbons by WDOE Interim TPH Policy Method/Quality Control
North Creek Analytical - Bothell

Analyte	Date Analyzed	Spike Level	Sample Result	QC Result	Units	Reporting Limit / Recov. Limits	Recov. %	RPD Limit	RPD %	Notes*
Batch: 0970778	**Date Prepared: 9/30/97**				**Extraction Method: EPA 3550**					
Blank	**0970778-BLK1**									
C8-C10 Aliphatics	10/3/97			ND	mg/kg dry	5.00				
C10-C12 Aliphatics	"			ND	"	5.00				
C12-C16 Aliphatics	"			ND	"	5.00				
C16-C21 Aliphatics	"			ND	"	5.00				
C21-C34 Aliphatics	"			ND	"	5.00				
C10-C12 Aromatics	"			ND	"	5.00				
C12-C16 Aromatics	"			ND	"	5.00				
C16-C21 Aromatics	"			ND	"	5.00				
C21-C34 Aromatics	"			ND	"	5.00				
Surrogate: Octacosane	"	*11.8*		*ND*	"	*50.0-150*	*NR*			
Surrogate: 2-FBP	"	*11.7*		*ND*	"	*50.0-150*	*NR*			
LCS	**0970778-BS1**									
C8-C10 Aliphatics	10/3/97	1.67		ND	mg/kg dry	60.0-140	NR			
C10-C12 Aliphatics	"	1.67		ND	"	60.0-140	NR			
C12-C16 Aliphatics	"	1.67		ND	"	60.0-140	NR			
C16-C21 Aliphatics	"	1.67		ND	"	60.0-140	NR			
C21-C34 Aliphatics	"	1.67		ND	"	60.0-140	NR			
C10-C12 Aromatics	"	0.0833		ND	"	60.0-140	NR			
C12-C16 Aromatics	"	0.250		ND	"	60.0-140	NR			
C16-C21 Aromatics	"	0.417		ND	"	60.0-140	NR			
C21-C34 Aromatics	"	0.667		ND	"	60.0-140	NR			
Surrogate: Octacosane	"	*11.8*		*ND*	"	*50.0-150*	*NR*			
Surrogate: 2-FBP	"	*11.7*		*ND*	"	*50.0-150*	*NR*			
LCS Dup	**0970778-BSD1**									
C8-C10 Aliphatics	10/3/97	1.67		ND	mg/kg dry	60.0-140	NR	40.0		
C10-C12 Aliphatics	"	1.67		ND	"	60.0-140	NR	40.0		
C12-C16 Aliphatics	"	1.67		ND	"	60.0-140	NR	40.0		
C16-C21 Aliphatics	"	1.67		ND	"	60.0-140	NR	40.0		
C21-C34 Aliphatics	"	1.67		ND	"	60.0-140	NR	40.0		
C10-C12 Aromatics	"	0.0833		ND	"	60.0-140	NR	40.0		
C12-C16 Aromatics	"	0.250		ND	"	60.0-140	NR	40.0		
C16-C21 Aromatics	"	0.417		ND	"	60.0-140	NR	40.0		
C21-C34 Aromatics	"	0.667		ND	"	60.0-140	NR	40.0		
Surrogate: Octacosane	"	*11.8*		*ND*	"	*50.0-150*	*NR*			
Surrogate: 2-FBP	"	*11.7*		*ND*	"	*50.0-150*	*NR*			

North Creek Analytical, Inc.

**Refer to end of report for text of notes and definitions.*

Matthew Essig, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132

NORTH CREEK ANALYTICAL
Environmental Laboratory Services

BOTHELL ▪ (425) 481-9200 ▪ FAX 485-2992
SPOKANE ▪ (509) 924-9200 ▪ FAX 924-9290
PORTLAND ▪ (503) 643-9200 ▪ FAX 644-2202

WEYERHAEUSER Technology Center-Tacoma	Project:	Weyerhaeuser Soil Samples	Sampled: 9/12/97
WTC 2F25	Project Number:	RD0082260	Received: 9/17/97
Tacoma, WA 98477-0001	Project Manager:	Rick Bogar	Reported: 10/6/97 13:23

Notes and Definitions

#	Note
	This sample appears to contain extractable diesel range organics.
2	The surrogate recovery for this sample cannot be accurately quantified due to interference from coeluting organic compounds present in the sample.
3	The spike recovery for this QC sample is outside of established control limits. Review of associated batch QC indicates the recovery for this analyte does not represent an out-of-control condition for the batch.
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
Recov.	Recovery
RPD	Relative Percent Difference

North Creek Analytical, Inc.

Matthew Essig, Project Manager

18939 120th Avenue N.E., Suite 101, Bothell, WA 98011-9508
East 11115 Montgomery, Suite B, Spokane, WA 99206-4776
9405 S.W. Nimbus Avenue, Beaverton, OR 97008-7132

Sample Analysis Request/Chain of Custody Form B70935-3

Facility: Weyerhaeuser Dioxin proj. SR 4844 | Date: 9.19.97 | Page 1 of 1

Sampler's Project No.

Weyerhaeuser Account No. PO # RD008226(0)

Sampled by: ☐ Facility ☐ E&AS/WTC ☐ E&AS/NB | Consultant | Address | Phone No | FAX

Project Manager (print)

Sampler Name (print)

Recorded By (signed)

Sample Description (ID, Date, Time are Required)

Method	Field Sample ID (15 characters max.)	Date (m/d/y)	Time (hh:mm)	Depth (ft / m)	Matrix: Water	Matrix: Soil/Sed	Matrix: Oil	Preservative: HCl	Preservative: H_2SO_4	Preservative: HNO_3	Preservative: $Na_2S_2O_3$	Preservative: Filtered	Number of Containers	Analyses Requested (circle or write in parameters)
	GP-2-5	9.12.97	0905			✓								✓ VPH - Ecology method WA - VPH; ✓ EPH - Ecology method
	GP-7-6.5	9.12.97	1300			✓								✓

B70935 -01, -02

Dioxin only

EPH

Analyses Requested (circle or write in parameters): pH Cond TDS TSS Color Tannins; Volatile Organics / BTEX; Semi-volatile Organics; TPH: 418.1 TPH-G TPH-D; Ca Mg Na K Fe Mn; Metals (list below); NH_3 HCO_3 CO_3 Cl F NO_3 SO_4; AOX; TCLP: Metals VOA SVOA Pest Herb PCBs; Dioxin: Total / 2,3,7,8-TCDD / 2,3,7,8-TCDF; CN; BOD P-ortho; TKN P-total TOC COD

Method: G, grab; D, depth composite; T, time composite. Depth required for soil or sediment samples.

☐ Samples on Ice or Blue Ice

Lab Turn-Around Time

☐ 24 Hr ☐ 48 Hr ☐ 7 Day ☒ (2) 3 wk Date Due:

Reporting and QA/QC Requirements

RESULTS TO:

CC:

☐ CLP Package ☐ NPDES Permit ☐ Other: ☐ Electronic Report

Remarks/Detection Limit Requirements

Analysis per discussion w/ Dennis Catalano or Rick Bogar

Laboratory

☐ WATS/WTC ☐ WATS/NB ☐ Other:

Lab SR#:

Case ID:

SDG ID:

Sample Chain of Custody and Shipping Method Record

	Date	Time		
Relinquished By Sampler (signature): D Chappel	9.18.97	1000	Received By (signature):	Shipping Method
Relinquished By (signature):	Date	Time	Received By (signature):	Airbill No.
Relinquished By (signature):	Date	Time	Received For Laboratory By (signature):	

Samples Received Intact: Cooler Temp: °C

WATS/WTC: 32901 Weyerhaeuser Way South, Federal Way, WA 98003 (206-924-6293)

WATS/NB: New Bern R&D Field Station, Highway 43 North, New Bern, NC 28563 (919-633-7238

Form 16307 (2/96) Printing Services TP-1 Tacoma