Weyerhaeuser

Corporate Headquarters
Tacoma, Washington 98477
Tel (206) 924 2345

February 22, 1990

Mr. Joseph Hickey
Contaminated Site Inspector
Washington State Dept. of Ecology
Northwest Regional Office
4350 150th Avenue N.E.
Redmond, WA 98052

Re: Snoqualmie Petroleum Contamination

Dear Mr. Hickey:

Attached please find a technical memorandum, prepared by HDR Engineering, Inc., that summarizes activities to date regarding petroleum hydrocarbon contamination at the Weyerhaeuser facilities in Snoqualmie, Washington. This memorandum is intended to be a follow-up report to the initial release report sent to you on September 6, 1989.

As indicated in the report, we have Olympus Environmental and HDR Engineering currently under contract to perform all additional site work and remedial activities that may be required. We intend to forward all future reports on this site to you as soon as they become available.

In the meantime, please contact me at 924-2693 if you have any questions about the site or our actions.

Very truly yours,

Rodney G. Proctor

Rodney G. Proctor, Manager
Environmental and Regulatory Affairs

Attachment

cc: Max Healea - Snoqualmie 81 (w/o attachment)
Mick McCourt - WTC 2H4 (w/o attachment)

TECHNICAL MEMORANDUM 01

FORMER UST AND ROAD OIL STORAGE TANK FACILITIES

WEYERHAEUSER'S SNOQUALMIE FALLS SAWMILL

SNOQUALMIE, WASHINGTON

INTRODUCTION

Site Background

Former UST Facility: Area No. 1

The Weyerhaeuser Company issued a Request For Proposal (RFP) on September 21, 1989 for assistance with the closure of a petroleum hydrocarbon Underground Storage Tank (UST) facility at their Snoqualmie sawmill facility located in Snoqualmie, WA. The sawmill facility is illustrated in the attached Site Location Map, Figure 1. At the time the RFP was issued, several USTs which contained motor grade gasoline, diesel fuels and lubricating oils had been removed by the Weyerhaeuser Company. The location of the former UST facility within the sawmill is illustrated in the attached Sawmill Site Plan, Figure 2.

During removal of the USTs from this location during January 1989, approximately 300 Cubic Yards (CY) of petroleum saturated soils determined by visual observation were excavated and removed by the Weyerhaeuser Company to a secure area within Weyerhaeuser's property. Confirmation soil samples were not obtained by the field crew during these activities. Upon completion of activities in January 1989, the resulting excavation was backfilled to grade with a clean, porous, sandy material.

Confirmation Sampling

In response to the visual observations noted by Weyerhaeuser's field personnel in January 1989, a subsurface soil investigation was completed by Weyerhaeuser environmental personnel on August 16, 1989. Eleven test pits were excavated within the confines of Area #1 as illustrated in the attached Former UST Cluster Area Site Plan, Figure 3.

Fifteen soil samples were obtained by Weyerhaeuser personnel from depths ranging from four to eight feet below grade for subsequent laboratory analysis by Weyerhaeuser's laboratory. Analysis of soil and groundwater for determination of petroleum hydrocarbons was accomplished utilizing Environmental Protection Agency's (EPA) Method 418.1. Results of the investigation determined that seven locations within Area No. 1 contained petroleum hydrocarbons in excess of the current 200 part per million (ppm) Washington State Department of Ecology (WDOE) Soil Cleanup Levels (SCLs) as discussed in the WDOE Policies and Procedures for (Petroleum) Underground Storage Tank Removal, Draft statement, dated August 1, 1988 and also as presented in the

WDOE Method B Compliance Cleanup Levels, Table A-4, Soil, January 17, 1990 Work Group Review Draft of the Cleanup Standards Regulation - Appendix A, Tables.

During the investigation of August 16, 1989, two groundwater samples were also obtained by Weyerhaeuser environmental personnel and found to contain petroleum hydrocarbons below the 15 ppm WDOE Water Cleanup Levels (WCLs) as discussed in the previously cited WDOE document.

Concentrations of benzene, toluene, ethylbenzene and xylene (BTE&X) were also determined in soil from samples obtained on August 16, 1989 by EPA Method 8240. The results suggested that soil in the southwest and southern portion of Area No. 1 are above the WDOE Soil Cleanup Goals (SCGs) for these compounds. Soils which contained high levels of BTE&X are situated in an area which had previously hosted motor grade gasoline USTs and dispensing equipment.

Analytical results of Weyerhaeuser's August 16, 1989 soil and groundwater investigation in Area No. 1 are presented in Appendix A, attached.

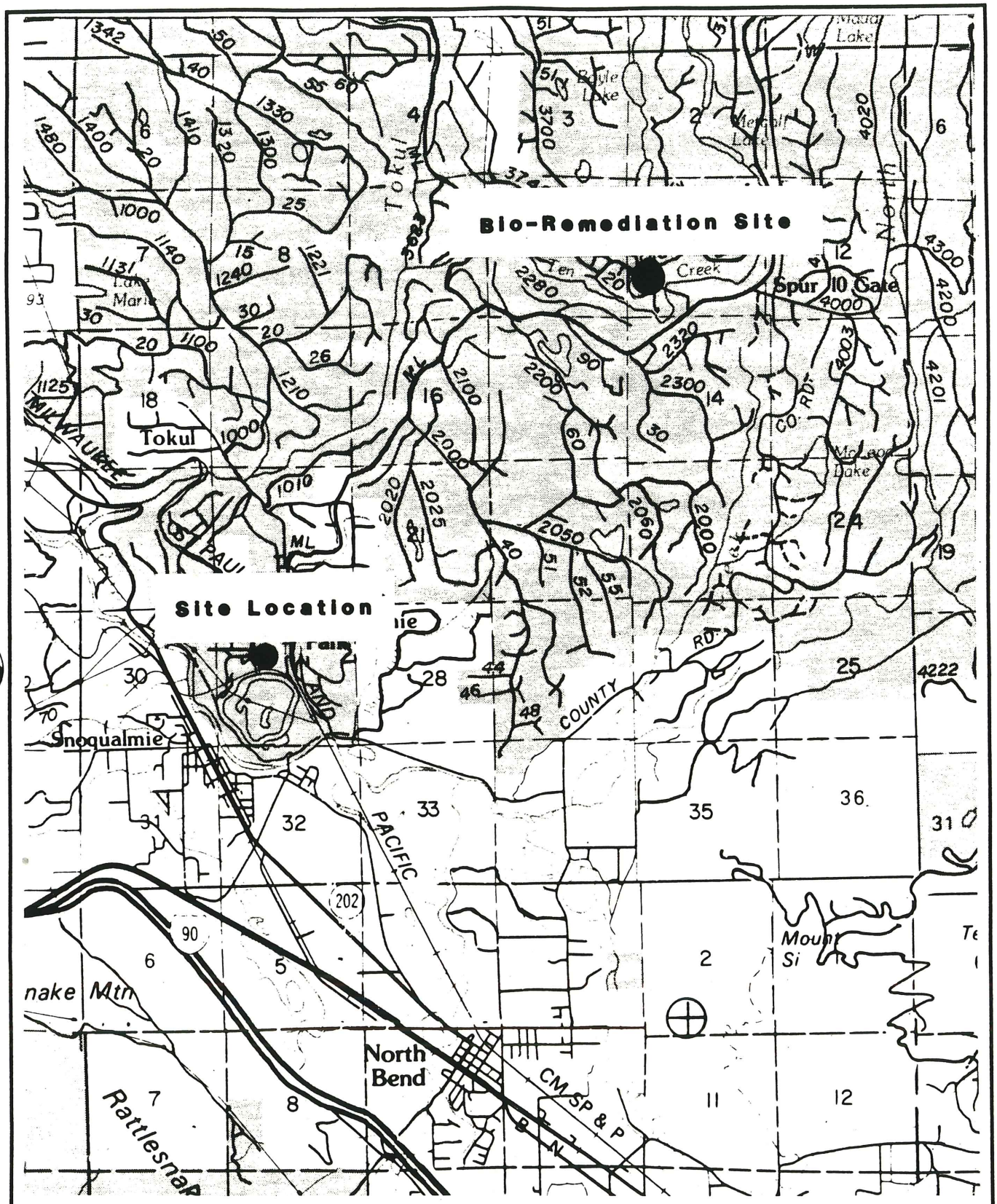
Site Activities and Results

Area No. 1: Test Pit Investigation and Field Sampling Activities

To address the possibility of Petroleum Contaminated Soils (PCSs) outside of Area No. 1, OEI and HDR provided the Weyerhaeuser Company with further field investigative services and remedial action alternatives at Area No. 1. HDRs scope-of-services requested by OEI for this portion of the project was submitted to OEI on November 8, 1989.

At the request of the Weyerhaeuser Company, the prime contractor OEI, together with HDR to complete a soils study in the vicinity of Area No. 1. This study was intended to define the vertical and lateral extent of petroleum hydrocarbon migration within native soil and to guide excavation of PCSs during limited remediation efforts.

HDR's soil investigation and test pit study was completed on November 2, 1989. Information was documented within 12 individual test pits on soil type and extent (within the limitations imposed by test pit study techniques), concentrations of petroleum hydrocarbons in site soils as determined by Thin Layer Chromatography (TLC) field screening techniques, concentrations of petroleum hydrocarbons in groundwater as determined by EPA Method 418.1, and observations of the local groundwater regime.

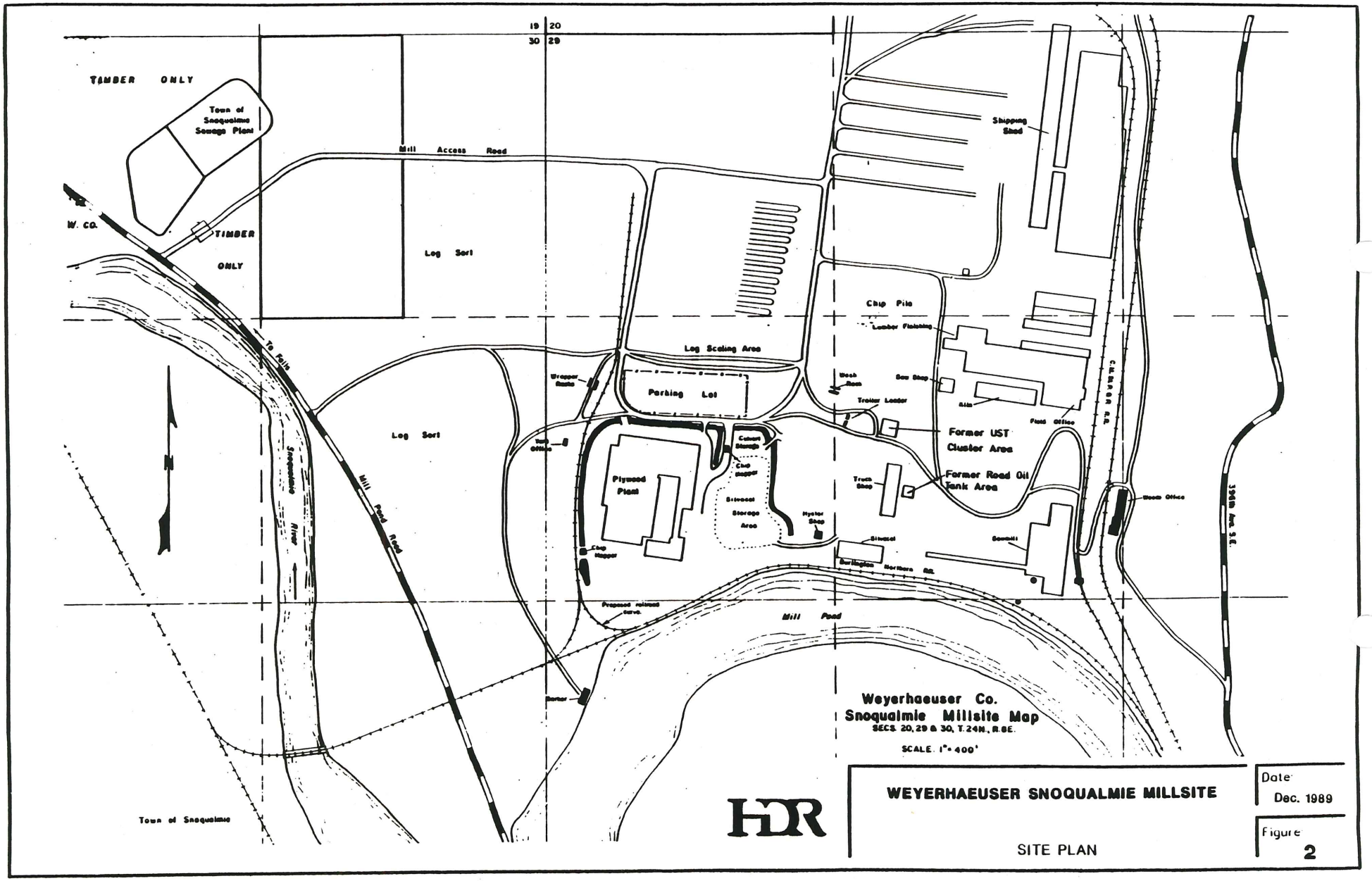


HDR

Site Location Map

Date

Figure 1



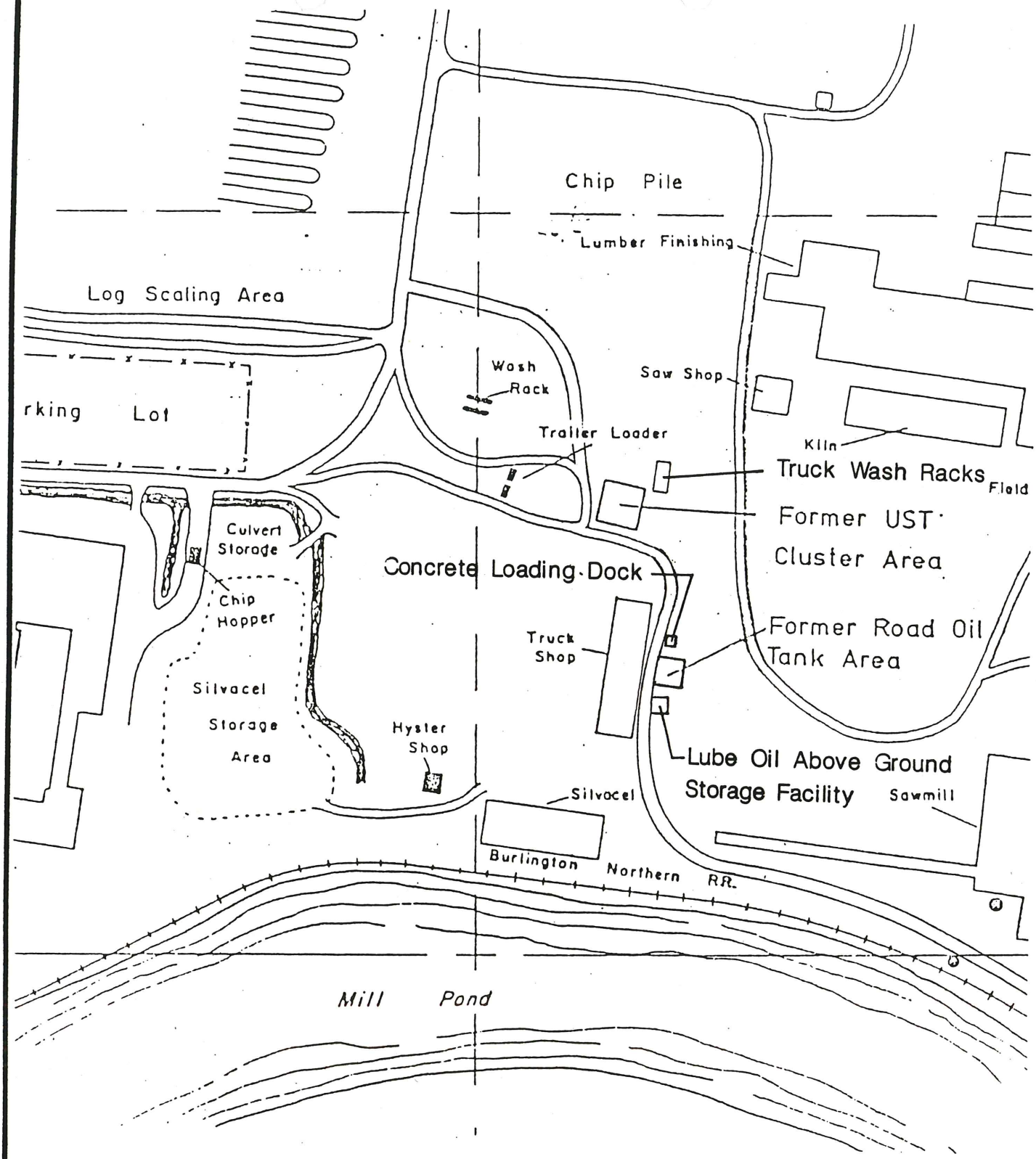
HDR

WEYERHAEUSER SNOQUALMIE MILLSITE

SITE PLAN

Date: Dec. 1989

Figure: 2



WEYERHAEUSER SNOQUALMIE MILLSITE

FORMER UST AND ROAD OIL STORAGE TANK AREAS

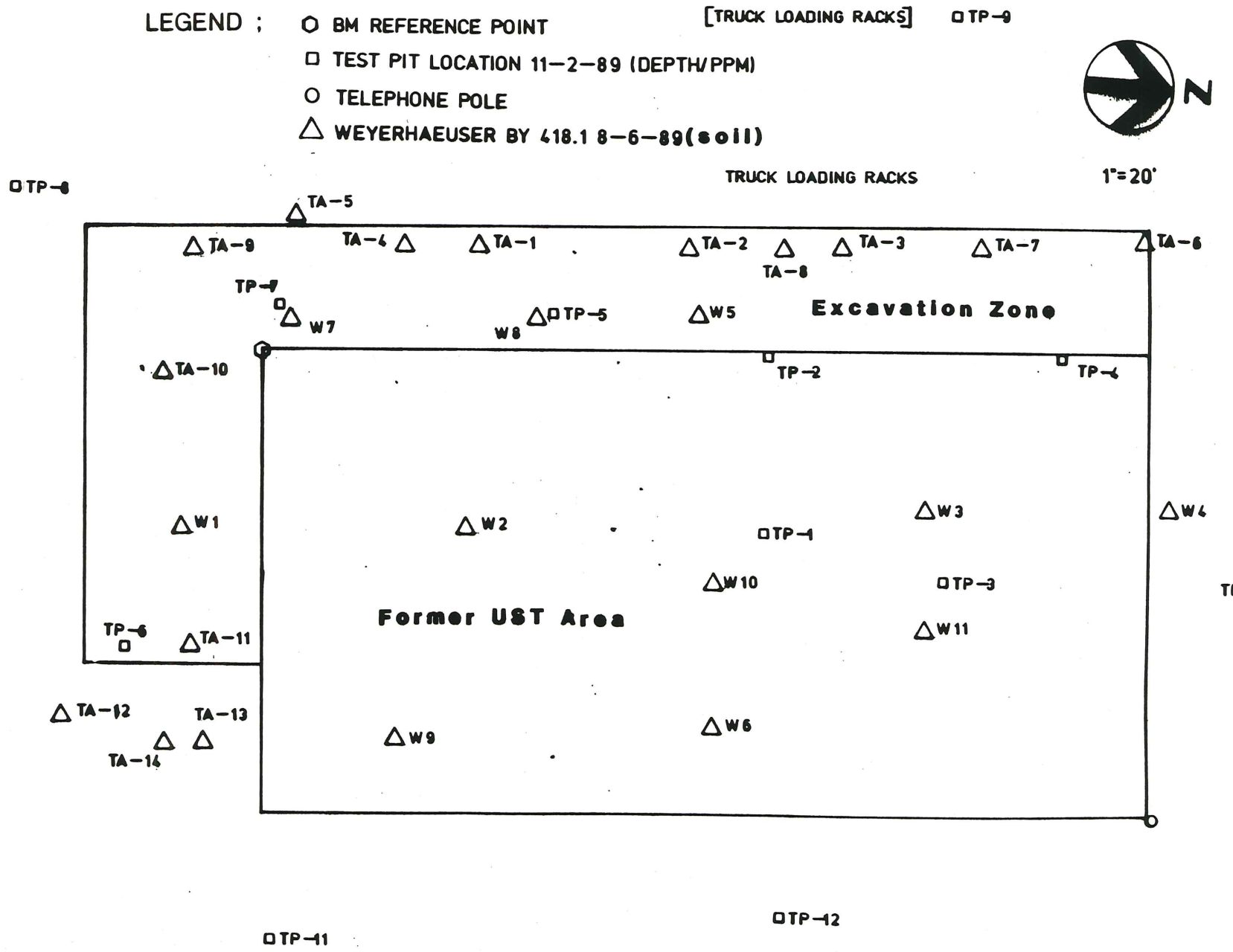
Date: Feb.1990

Figure: 2A

HDR

LEGEND ;

- BM REFERENCE POINT
- TEST PIT LOCATION 11-2-89 (DEPTH/PPM)
- TELEPHONE POLE
- WEYERHAEUSER BY 418.1 8-6-89(soil)



WEYERHAEUSER SNOQUALMIE MILLSITE

FORMER UST CLUSTER: AREA #1

Date JAN 90

Figure 3

Analytical Methodologies

EPA Method 418.1

Laboratory hydrocarbon analysis consisted of infrared spectrophotometry (IR) with supplemental silica gel separation for petroleum hydrocarbons ranging from C-4 to C-22. In an effort to obtain improved resolution keyed to detection of petroleum hydrocarbons, a two-phased laboratory analytical process was employed. First, IR was used to evaluate total hydrocarbon in the sample. Following this, silica gel was used to remove all polar compounds including fatty acids from the sample, leaving only the non-polar compounds consisting primarily of petroleum hydrocarbons for repeat analysis by IR. In simple terms, this method enables some differentiation between decaying vegetable and animal matter from petroleum hydrocarbons. Current system detection limits are on the order of 5 parts per million (ppm) for hydrocarbons in soil and 1 ppm for water.

Thin Layer Chromatography

Thin layer chromatography (TLC) is a rapid field screening method for assessing concentrations of petroleum hydrocarbons in soil and water. With this method, petroleum hydrocarbon contaminants are extracted from the sample using hexane. Silica gel coated plates are spotted with the extracts along with solutions of petroleum hydrocarbons of known concentrations and composition. Following elution of the plate in hexane, the plates are dried, stained with iodine, and visualized in ultraviolet light with a wavelength of 254 nanometers. Detection limits are on the order of 50 ppm for soils and 5 ppm for water.

Results

The results of HDR's November 2, 1989 field efforts suggest that the native clay soils which surround Area No. 1 effectively limit the vertical and lateral migration of petroleum hydrocarbons outside the boundaries of the former UST Facility. Subsurface conditions within the immediate area suggest that the facility is underlain at shallow depths by a dark gray clay.

This clay horizon ranges in depth from three feet to ten feet below the existing grade at the site. Below this horizon of clay, the soil profile gradually grades into a light brownish yellow silty clay which extends to the terminus of the excavation at approximately 12 feet below grade. HDR suspects that this silty clay grades into a more porous, and hydraulically conductive material with depth.

Locations of HDRs test pits are shown in Figure 3. Analytical data from HDR's TLC field screening and laboratory confirmation sampling by EPA Method 418.1 efforts are presented in Table 1.

Initial Corrective Actions

At the request of the Weyerhaeuser Company, OEI commenced excavation of PCSs from the west and south perimeter of Area No. 1 on November 16, 1989. Results of HDRs test pit study completed on November 2, 1989 were used to guide the excavation of those areas which were documented to contained PCSs in excess of the WDOE SCLs.

Prior to excavation of PCSs at Area No.1, the upper three to five feet of soil above the excavation zone was stripped back and stockpiled at the former UST facility and utilized for road repair fill at the sawmill site by The Weyerhaeuser Company. The upper soil profile at this location contained dust retardant road oil residues. Soil generated from this process was not reused as backfill material in the resulting excavation formed by the removal of PCSs.

Approximately 700 CY of PCSs were removed from an excavation which was situated parallel to the west and south perimeter of Area No. 1. The PCSs excavated from this area were transported by Weyerhaeuser personnel to a secure area within Weyerhaeuser's property and placed in burmed cells which were lined with polyethylene film and latter covered to prevent degradation by natural elements. This material handling is explained in latter portions of this technical memorandum. The excavation zone varied in width from 17 to 24 feet (ft) with a terminal depth of approximately ten ft below the existing grade at the site. The excavation zone is illustrated in Figure 3.

During excavation of PCSs at Area No. 1, 14 soil samples were obtained from the excavation and field screened for determination of petroleum hydrocarbon content with TLC field screening techniques. Fourteen soil samples were verified by EPA Method 418.1 at Weyerhaeuser's laboratory in accordance with the WDOE Policies and Procedures for (Petroleum) Underground Storage Tank Removal, Draft statement, dated August 1, 1988. Four soil samples which contained Volatile Organic Compounds (VOCs) were delivered to Weyerhaeuser's laboratory for analysis of VOCs by EPA Method 8240. Verification sample locations within the excavation zone are illustrated in Figure 3. Results of field screening by TLC techniques and confirmation laboratory analysis are presented in Table 2.

All of the areas sampled at the completion of excavation efforts were found to be below current WDOE SCLs for petroleum hydrocarbons.

A single area in the vicinity of Test Area (TA) TA-12 at five ft below grade contained VOCs in excess of WDOE SCLs for these compounds. Continued soil excavation was not feasible at location TA-12 due to:

- A highly traveled roadway directly adjacent to the area; and,
- Uncertainties surrounding the lateral extent of these PCSs.

PCSs not excavated from within the confines of Area No. 1 were left in place due to the following prevailing restrictions:

- Surface water which had accumulated within the porous sandy backfill could not be handled in a cost effective manner which would allow access to the PCSs;

- The additional extent of PCSs beyond the area of excavation had not been assessed;

- The cost associated with the removal of an uncertain quantity of PCSs could not be justified at the time of the field efforts without further investigative work.

At the completion of excavation efforts at Area No. 1, the resulting excavation zone was backfilled to grade with a clean, porous, sandy material.

PCSs Handling

PCSs from Area No. 1 were transported by Weyerhaeuser's work crews to a secure area within Weyerhaeuser's property during excavation efforts. Under the direction of OEI, Weyerhaeuser personnel constructed eight individual burmed containment cells. Each cell was lined with polyethylene film prior to placement of the excavated PCSs. After filling each of the cells to capacity with PCSs, each cell was then covered (secured) with polyethylene film to prevent infiltration of rainwater and deterioration of PCSs by natural elements. PCSs are now being evaluated for possible bioremediation efforts.

TABLE 1
UNDERGROUND STORAGE TANK TEST PIT SAMPLE RESULTS
TAKEN ON NOVEMBER 2, 1989

SAMPLE NUMBER	MATRIX	TLC - TPH RESULT (ppm)	TPH RESULT (ppm)	QA/QC RELATIONSHIP
TP-1-3.5	soil	100	NA	field screen
TP-1-GW	water	NA	1 <	Weyerhaeuser
TP-2-2.7	soil	100	NA	field screen
TP-2-5.5	soil	300	NA	field screen
TP-2-6.0	soil	5,000	NA	field screen
TP-2-GW	water	NA	110	Weyerhaeuser
TP-3-GW	water	NA	1 <	Weyerhaeuser
TP-4-4.0	soil	3,000	NA	field screen
TP-4-8.0	soil	300	NA	field screen
TP-4-GW	water	NA	3	Weyerhaeuser
TP-5-5.0	soil	100 <	NA	field screen
TP-5-7.0	soil	100 <	NA	field screen
TP-5-GW	water	NA	2	Weyerhaeuser
TP-6-8.0	soil	100 <	NA	field screen
TP-7-GW	water	NA	1,200	Weyerhaeuser
TP-8-9.0	soil	100 <	NA	field screen
TP-9-5.0	soil	100	NA	field screen
TP-9-8.0	soil	100	NA	field screen
TP-10-8.0	soil	100	NA	field screen
TP-10-GW	water	NA	1	Weyerhaeuser
TP-11-5.5	soil	100	NA	field screen
TP-11-8.5	soil	100	NA	field screen
TP-11-GW	water	NA	1	Weyerhaeuser
TP-12-4.5	soil	750	NA	field screen
TP-12-9.0	soil	100	NA	field screen
TP-12-GW	water	NA	6	Weyerhaeuser

< = Below quantitation limit, quantitation limit reported.
> = Above quantitation limit, quantitation limit reported.
NA = Not Analyzed.

Notes:

1) Original laboratory report, field logbook and correspondence available at the HDR Bellevue Office.
2) TPH is the abbreviation for total petroleum hydrocarbons as determined by EPA Method 418.1.
3) Thin layer chromatography (TLC) was utilized as the field screening technique for total petroleum hydrocarbons.
4) TPH maximum concentration in soil is 200 ppm and in water is 15 ppm; (WDOE, Draft UST Removal Policies, 11-1-89).

TABLE 2
UNDERGROUND STORAGE TANK SOIL SAMPLE RESULTS TAKEN DURING EXCAVATION
NOVEMBER 15–17, 1989

SAMPLE NUMBER	MATRIX	TLC – TPH RESULT (ppm)	TPH RESULT (ppm)	BENZENE RESULT (ppb)	TOLUENE RESULT (ppb)	ETH.BENZ RESULT (ppb)	T.XYLENE RESULT (ppb)	QA/QC RELATIONSHIP
TA–1–6.0	soil	100 <	30	NA	NA	NA	NA	Wey/field split
TA–2–6.0	soil	100 <	27	NA	NA	NA	NA	Wey/field split
TA–3–6.0	soil	100 <	63	NA	NA	NA	NA	Wey/field split
TA–4–10.0	soil	100	27	NA	NA	NA	NA	Wey/field split
TA–5–10.0	soil	100 <	21	NA	NA	NA	NA	Wey/field split
TA–6–10.0	soil	100 <	27	NA	NA	NA	NA	Wey/field split
TA–7–10.0	soil	100 <	26	NA	NA	NA	NA	Wey/field split
Fill	soil	100 <	NA	NA	NA	NA	NA	field screen
TA–8–10.0	soil	100 <	41	NA	NA	NA	NA	Wey/field split
Roadbase	soil	750	NA	NA	NA	NA	NA	field screen
TA–9–10.0	soil	100	28	500	11 J	25 <	10 J	Wey/field split
TA–10–10.0	soil	100	28	7	5 <	5 <	5 <	Wey/field split
TA–11–10.0	soil	NA	670	630 <	630 <	630 <	630 <	Weyerhaeuser
TA–12–5.0	soil	NA	19	4,700	25,000	8,200	49,000	Weyerhaeuser
TA–13–5.0	soil	NA	1,600	630 <	1,000	8,600	49,000	Weyerhaeuser
TA–14–10.0	soil	NA	19	630 <	630 <	630 <	630 <	Weyerhaeuser

< = Below quantitation limit, quantitation limit reported.
> = Above quantitation limit, quantitation limit reported.
J = Estimated quantity less than the quantitation limit.
NA = Not Analyzed.

Notes:
1) Original laboratory report, field logbook and correspondence available at the HDR Bellevue office.
2) Samples analyzed by Weyerhaeuser Laboratory for confirmation of field screening results.
3) TPH is the abbreviation for total petroleum hydrocarbons as determined by EPA Method 418.1.
4) Thin layer chromatography (TLC) was utilized as the field screening technique for total petroleum hydrocarbons.
5) TPH maximum concentration in soil is 200 ppm; (WDOE, Draft UST Removal Policies, 11–1–89).
6) Benzene maximum concentration in soil is 660 ppb; (WDOE, Draft UST Removal Policies, 11–1–89).
7) Toluene maximum concentration in soil is 14,300 ppb; (WDOE, Draft UST Removal Policies, 11–1–89).
8) Ethylbenzene maximum concentration in soil is 1,400 ppb; (WDOE, Draft UST Removal Policies, 11–1–89).
9) Benzene, toluene, ethylbenzene and xylene concentrations determined by EPA Method 8240.

Regulatory Compliance Issues

The Weyerhaeuser Company notified Mr. Joseph Hickey, Contaminated Site Inspector of the Hazardous Waste Investigations and Cleanup Program at the Department of Ecology in Redmond, Wa. on September 6, 1989 (Weyerhaeuser Letter dated September 6, 1989, from O.M. Healea, Jr., Area Engineer). This transmittal by Weyerhaeuser contained an in depth fact sheet which contained all relevant information concerning the facility release reporting activities. The Department of Ecology acknowledged the Weyerhaeuser transmittal by telephone at 1035 hours on September 6, 1989.

The release was also reported to the National Response Center and cataloged as File No.: 15739.

To comply with existing federal regulations and Washington state laws and guidelines which pertain to the release and cleanup of petroleum hydrocarbons, HDR recommends that the Weyerhaeuser Company initiate further investigative work for preliminary compliance of the following applicable regulations:

- Part II EPA 40 CFR Part 280: Underground Storage Tanks; Final Rules, Technical Requirements, September 23, 1989:

  - Subpart E - Release Reporting, Investigation, and Confirmation.

  - Subpart F - Release Response and Corrective Action for UST Systems.

- WDOE Draft Policies and procedures for (Petroleum) UST Removal, including Soil Cleanup Levels (SCLs) and Groundwater Cleanup Levels (WCLs), August 1, 1988.

- WDOE Method B Compliance Cleanup Levels, Table A-4, Soil, January 17, 1990 Work Group Review Draft of the Cleanup Standards Regulation - Appendix A, Tables.

A technical proposal for completion of these activities has been submitted to OEI for approval by the Weyerhaeuser Company. Approval for these activities has been granted.

Former Above Ground Road Oil Storage Tank: Area No. 2

At the request of the Weyerhaeuser Company and under the direction of OEI, HDR assisted with an initial investigation of subsurface soil conditions within Area No. 2. Area No. 2 had previously hosted an above ground road oil storage tank. On November 2, 1989, HDR observed the excavation of two test pits within the central core of Area No. 2.

Three soil samples designated TP-13-2.5, 3.5 & 6.5 in Table 3, obtained from two and one-half, three and one-half and six and one-half feet below the existing grade at this location contained petroleum hydrocarbons in excess of current WDOE SCLs.

In response to the results of the test pits excavated on November 2, 1989, the Weyerhaeuser Company directed OEI to excavate PCSs in Area No. 2. The PCSs excavated from this area were transported by Weyerhaeuser personnel to a secure area of Weyerhaeuser's property and placed in burmed cells which were lined with polyethylene film and latter covered to prevent degradation by natural elements. This material handling is explained in latter portions of this technical memorandum. The former above ground road oil storage tank site is illustrated in Figure 4.

Subsurface conditions within the immediate area suggest that the facility is underlain at shallow depths by a dark gray clay. This clay horizon ranges in depth from three feet to ten feet below the existing grade at the site. Below this horizon of clay, the soil profile gradually grades into a light brownish yellow silty clay which extends to the terminus of the excavation at approximately 10 feet below grade. HDR suspects that this silty clay grades into a more porous material with depth.

During excavation of PCSs in Area No. 2 on November 17, 20 & 21, 1989, approximately 600 CY of PCSs were removed. PCSs were left in place at Area No. 2 due to:

- Limits of the excavation area and depth due to the excavator's boom capabilities (reach);
- The existence of two permanent structures to the north and south of the excavation zone;
- A highly traveled roadway to the west of the excavation zone;
- The lumber stacking operation (concrete pad) at the east side of the excavation;
- The unknown extent of the natural clay layer (barrier);
- The location of an active fire main within the excavation; and,
- The uncertainty associated with the vertical and lateral extent of the PCSs.

Analytical results of field screening by TLC techniques and laboratory analysis of soil by EPA Method 418.1 are listed in Table 3. Additional characterization of PCSs where also assessed on two highly saturated soil samples. VOCs were determined by EPA Method 8240, Polychlorinated Biphenyls; Aroclor 1221, 1016, 1232, 1242, 1248, 1254 and 1260 by EPA Contract Laboratory Program (CLP) medium level soil methods and metals by Extraction Procedure (EP) Toxicity methods. The results as listed in Table 4, suggest that PCSs from Area No. 2 would not be classified as a hazardous material under current Washington State Dangerous Waste Regulations; WAC 173-303.

At the completion of excavation efforts at Area No. 2, the excavation was backfilled to grade with a clean, porous, sandy material.

PCSs Handling

Soils were transported to a secure area of the Weyerhaeuser property. PCSs were transported and deposited into polyethylene lined cells for further evaluation and possible bioremediation efforts.

DISPOSAL OF PCSs

At the present time, the Wyerhaeuser Company has selected on site treatment of stockpiled PCSs by bioremediation methods instituted by landfarming techniques. A complete review of the approach including a treatability study, landfarm design and operation and engineering design has been discussed during a telephone conversation with Ms. Gail Coburn of the Hazardous Waste Cleanup Section of the Northwestern Regional office of the WDOE on January 19, 1990 by HDR. During this telephone conversation, HDR learned that at the present time landfarming of PCSs are not regulated by the WDOE. During our conversation, the WDOE also indicated that there are no formal permit requirements nor notification of construction permits required for this remedial technology. The WDOE did state that a notification of construction/permit would be required by the Puget Sound Air Pollution Control Agency (PSAPCA) concerning air emission monitoring requirements.

The technical proposal for this work is on file at the Weyerhaeuser Snoqualmie Falls facility. The Weyerhaeuser Company has initiated a laboratory treatability study of the PCSs stockpiled at the site for application of landfarming bioremediation degradation.

CONTINUED CORRECTIVE ACTIONS

Based upon decisions made during a meeting held on December 11, 1989 with representatives of the Weyerhaeuser Company, OEI and HDR, additional environmental work has been authorized. Phase II activities as proposed at Areas No. 1 & No. 2 at the Snoqualmie sawmill site will include completion of five individual work elements. Completion of these elements will provide compliance with federal EPA UST regulations and existing and proposed Washington state laws and guidelines which pertain to the release and cleanup of petroleum hydrocarbons.

The following tasks to define the scope of the Phase II assessment effort at Areas No. 1 & No. 2 are:

Task 1	Worker Health and Safety Plan
Task 2	Analysis Plan
Task 3	Phase II Subsurface Soil and Groundwater Investigation Plan
Task 4	Site Hazard Assessment
Task 5	Phase II Investigation Reporting

The Phase II investigation will address the vertical extent of PCSs within the confines of Area No. 1; and the areal and vertical extent of PCSs in the vicinity of Area No. 2. The groundwater investigation portion will address the quality of groundwater in Area No. 1 and No. 2 with the installation and subsequent sampling of four monitoring wells at each area.

HDR has been requested to initiate the above tasks for the Weyerhaeuser Company for further investigative actions at Areas No. 1 & No. 2 in response to the findings of this investigation.

References Cited

1) WDOE Policies and Procedures for (Petroleum) Underground Storage Tank Removal, Draft statement, dated August 1, 1988.

2) WDOE Method B Compliance Cleanup Levels, Table A-4, Soil, January 17, 1990 Work Group Review Draft of the Cleanup Standards Regulation - Appendix A, Tables.

3) Personal communication, telephone conversation with Ms. Gail Coburn of the Hazardous Waste Cleanup Section of the Northwestern Regional office of the WDOE on January 19, 1990 by HDR.

4) Weyerhaeuser Letter dated September 6, 1989, from O.M. Healea, Jr., Area Engineer to The Department of Ecology.

5) Personal communication, telephone conversation with WDOE, Northwest Regional Office, 1035 hours on September 6, 1989, The Weyerhaeuser Company, by O.M. Healea, Jr., Area Engineer.

6) The National Response Center, cataloged as File No.: 15739, September 6, 1989, The Weyerhaeuser Company, by O.M. Healea, Jr., Area Engineer.

7) Part II EPA 40 CFR Part 280: Underground Storage Tanks; Final Rules, Technical Requirements, September 23, 1989:

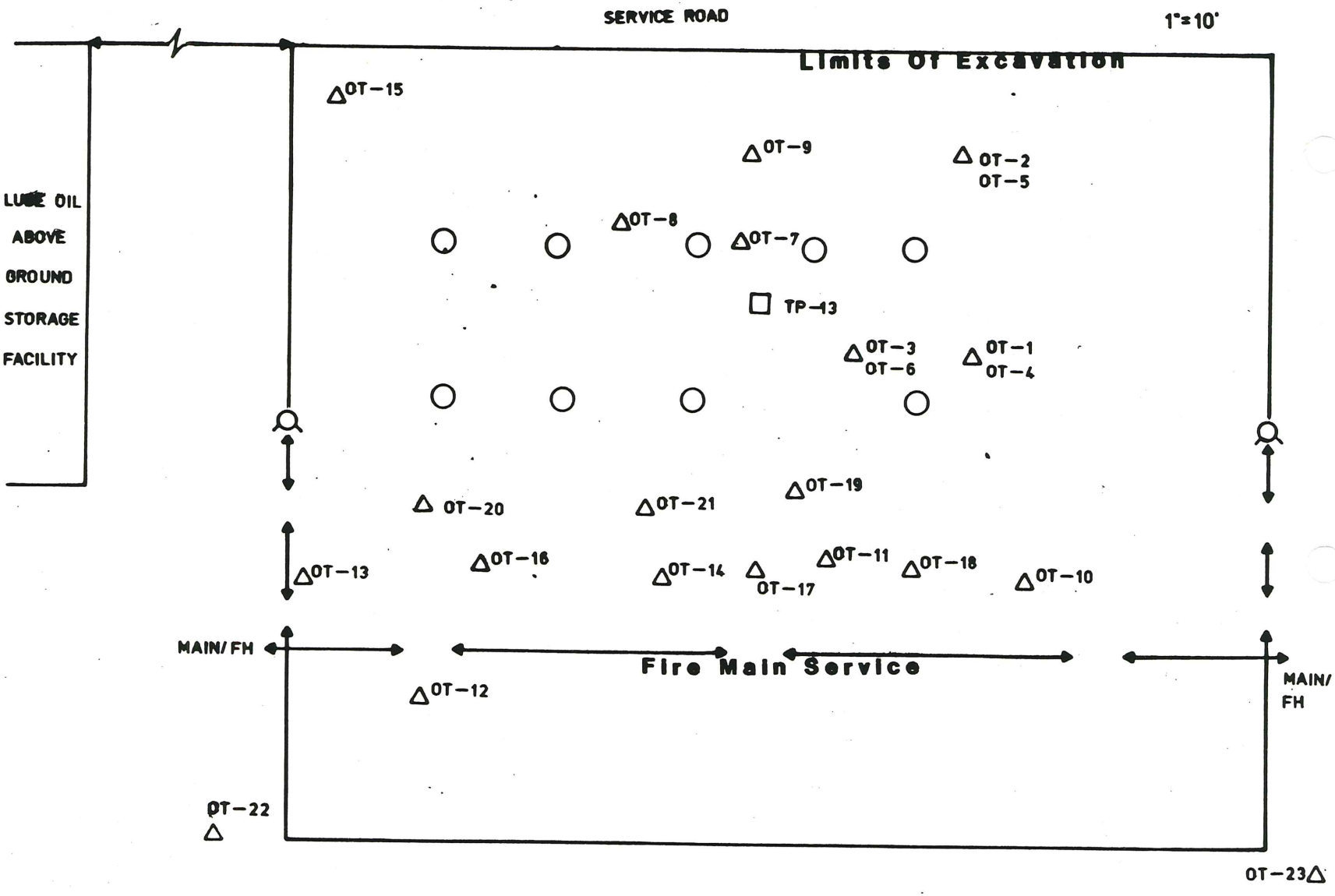
   - Subpart E - Release Reporting, Investigation, and Confirmation.

   - Subpart F - Release Response and Corrective Action for UST Systems.

HDR

LEGEND :

- □ TEST PIT LOCATION 11-2-89 (DEPTH/PPM)
- ⍜ FIRE HYDRANT
- ○ PILINGS
- △ HDR BY TLC 11-17-89 (soil)



WEYERHAEUSER SNOQUALMIE MILLSITE

FORMER ABOVE GROUND ROAD OIL STORAGE TANK: AREA #2

Date JAN 90

Figure 4

TABLE 3
ABOVE GROUND ROAD OIL STORAGE TANK SOIL SAMPLE RESULTS TAKEN DURING EXCAVATION NOVEMBER 17-21, 1989

SAMPLE NUMBER	MATRIX	TLC-TPH RESULT (ppm)	QA/QC RELATIONSHIP
TP-13-2.5	soil	>10,000	field (Note 1)
TP-13-3.5	soil	>10,000	field (Note 1)
TP-13-6.5	soil	>10,000	field (Note 1)
OT-1-6.0	soil	7,500	field screen
OT-2-6.0	soil	7,500	field screen
OT-3-6.0	soil	>10,000	field screen
OT-4-9.0	soil	>10,000	field screen
OT-5-9.0	soil	750	field screen
OT-6-9.0	soil	750	field screen
OT-7-9.0	soil	750	field screen
OT-8-9.0	soil	7,500	field screen
OT-9-12.0	soil	<100	field screen
OT-10-5.0	soil	100	field screen
OT-11-5.0	soil	1,000	field screen
OT-12-3.0	soil	100	field screen
OT-13-3.0	soil	100	field screen
OT-14-5.0	soil	100	field screen
OT-15-8.0	soil	>10,000	field screen
OT-16-8.0	soil	<100	field screen
OT-17-8.0	soil	>10,000	field screen
OT-18-8.0	soil	750	field screen
OT-19-7.0	soil	>10,000	See Note 2
OT-20-7.0	soil	>10,000	See Note 2
OT-21-7.0	soil	5,000	field screen
OT-22-10.0	soil	<100	field screen
OT-23-10.0	soil	<100	field screen

< = Below quantitation limit, quantitation limit reported.
> = Above quantitation limit, quantitation limit reported.

Notes:

1) Samples analyzed in the field on November 2, 1989.
2) Samples analyzed by Weyerhaeuser Laboratory for other parameters. See Table 4.
3) Original field logbook and correspondence available at the HDR Bellevue office.
4) TPH is the abbreviation for total petroleum hydrocarbons.
5) Thin Layer Chromatography (TLC) was utilized as the field screening technique.

TABLE 4
ABOVE GROUND ROAD OIL STORAGE TANK SOIL SAMPLE RESULTS TAKEN DURING EXCAVATION NOVEMBER 17–21

	SAMPLE # MATRIX QA/QC REL	OT-19-7.0 SOIL	OT-20-7.0 SOIL	
Parameter	Units			
Volatile Organics	ug/kg	Analyzed	Analyzed	Max. All. Conc. (1)
acetone	ppb	15	91	NS
benzene	ppb	5 <	5 <	50
bromodichloromethane	ppb	5 <	5 <	1000 (2)
bromoform	ppb	5 <	5 <	1000 (2)
bromomethane	ppb	10 <	10 <	NS
2-butanone	ppb	10 <	26	NS
carbon disulfide	ppb	5 <	5 <	NS
carbon tetrachloride	ppb	5 <	5 <	50
chlorobenzene	ppb	5 <	5 <	NS
chloroethane	ppb	10 <	10 <	NS
2-chloroethyl vinyl ether	ppb	NA	NA	NS
chloroform	ppb	5 <	5 <	1000 (2)
chloromethane	ppb	10 <	10 <	NS
cis-1,3-dichloropropene	ppb	5 <	5 <	NS
dibromochloromethane	ppb	5 <	5 <	NS
1,1-dichloroethane	ppb	5 <	5 <	NS
1,2-dichloroethane	ppb	5 <	5 <	50
1,1-dichloroethene	ppb	5 <	5 <	70
1,2-dichloropropane	ppb	5 <	5 <	50
ethylbenzene	ppb	5 <	5 <	1400 (3)
2-hexanone	ppb	10 <	10 <	NS
methylene chloride	ppb	5 <	5 <	NS
4-methyl-2-pentanone	ppb	10 <	10 <	NS
styrene	ppb	5 <	5 <	50
1,1,2,2-tetrachloroethane	ppb	5 <	5 <	NS
tetrachloroethene	ppb	5 <	5 <	NS
toluene	ppb	5 <	5 <	14300 (3)
1,2-dichloroethene (total)	ppb	5 <	5 <	NS
trans-1,3-dichloropropene	ppb	5 <	5 <	NS
1,1,1-trichloroethane	ppb	5 <	5 <	2000
1,1,2-trichloroethane	ppb	5 <	5 <	NS
trichloroethene	ppb	5 <	5 <	50
vinyl acetate	ppb	10 <	10 <	NS
vinyl chloride	ppb	10 <	10 <	20
total xylenes	ppb	8	11	100000

Polychlorinated biphenyls	mg/kg	Analyzed	Analyzed	Max. All. Conc. (4)
PCB's (Aroclor 1260)	ppm	0.3 <	0.19	1

Table 4 (continued)

	SAMPLE # MATRIX QA/QC REL	OT-19-7.0 SOIL	OT-20-7.0 SOIL	
Parameter	Units			
Metals	mg/L	Analyzed	Analyzed	Max. All. Conc. (5)
barium	ppm	0.5 <	0.5 <	100
cadmium	ppm	0.01 <	0.01 <	1
chromium	ppm	0.01 <	0.01 <	5
lead	ppm	0.05 <	0.05 <	5
mercury	ppm	0.0005 <	0.0005 <	0.2
selenium	ppm	0.1 <	0.1 <	1
silver	ppm	0.01 <	0.01 <	5

< = Below detection limit, detection limit reported.
J = Estimated value less than the quantitation limit.
NA = Laboratory analysis was not performed.
NS = No standard developed.
Max. All. Conc. = Maximum Allowable Concentration

Notes:

1) The maximum allowable concentrations for volatile organics in soil are obtained from the US EPA Drinking Water Regulations.
2) The maximum allowable concentrations for volatile organics in soil are obtained from the National Interim Primary Drinking Water Regulations.
3) The maximum allowable concentrations for volatile organics in soil are obtained from WDOE Draft UST Removal Policies, 11-1-89.
4) The maximum allowable concentrations for PCB's in soil are obtained from WAC 173-303-071 (3)(K).
5) The maximum allowable concentrations for EP Tox Metals in soil are obtained from WAC 173-303-090 (8)(C).
6) Original laboratory report, field logbook and correspondence available at the HDR Bellevue office.
7) Volatile organics as determined by EPA Method 8240.
8) PCBs include: Aroclor 1016, 1221, 1232, 1242, 1248, 1254 and 1260 by EPA CLP Medium level soil methods.

APPENDIX A

WEYERHAEUSER'S AUGUST 16, 1989

ANALYTICAL RESULTS

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-3-5.5

Sample Description: SOIL

Sample wt/vol: 4 G

Level: MED

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33723

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1074

Date Received: 8/16/89

Date Analyzed: 8/29/89

Dilution Factor: .008

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	630	U
108-88-3	Toluene	240.	J
100-41-4	Ethylbenzene	630.	U
133-02-7	Xylene-total	1900.	

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VOLATILE ORG ICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-4-5

Sample Description: SOIL

Sample wt/vol: 5.0 G

Level: LOW

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33724

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1053

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.	U
108-88-3	Toluene	5.	U
100-41-4	Ethylbenzene	5.	U
133-02-7	Xylene-total	5.	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-6-6

Sample Description: SOIL

Sample wt/vol: 5.0 G

Level: LOW

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33725

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1054

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.	U
108-88-3	Toluene	5.	U
100-41-4	Ethylbenzene	5.	U
133-02-7	Xylene-total	5.	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-6-5

Sample Description: SOIL

Sample wt/vol: 5.0 G

Level: LOW

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33726

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1055

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.	U
108-88-3	Toluene	5.	U
100-41-4	Ethylbenzene	5.	U
133-02-7	Xylene-total	5.	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-6-5.5

Sample Description: SOIL

Sample wt/vol: 4 G

Level: MED

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33727

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1067

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: .008

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	630	U
108-88-3	Toluene	630.	U
100-41-4	Ethylbenzene	630.	U
133-02-7	Xylene-total	630.	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-7-5

Sample Description: SOIL

Sample wt/vol: 4 G

Level: MED

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33728

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1068

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: .008

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	6200	
108-88-3	Toluene	15000.	
100-41-4	Ethylbenzene	3800.	
133-02-7	Xylene-total	23000.	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-8-4

Sample Description: SOIL

Sample wt/vol: 5.0 G

Level: LOW

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33729

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1056

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.	U
108-88-3	Toluene	5.	U
100-41-4	Ethylbenzene	5.	U
133-02-7	Xylene-total	5.	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-8-6.5

Sample Description: SOIL

Sample wt/vol: 4 G

Level: MED

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33730

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1075

Date Received: 8/16/89

Date Analyzed: 8/29/89

Dilution Factor: .008

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	630	U
108-88-3	Toluene	630.	U
100-41-4	Ethylbenzene	630.	U
133-02-7	Xylene-total	630.	U

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-8-8

Sample Description: SOIL

Sample wt/vol: 5.0 G

Level: LOW

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33731

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1057

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.	U
108-88-3	Toluene	5.	U
100-41-4	Ethylbenzene	5.	U
133-02-7	Xylene-total	5.	U

VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Lab Sample ID: 33732

Client Sample ID: TP-9-5

Request Number ID: 383

Sample Description: SOIL

Matrix: SOIL

Sample wt/vol: 4 G

Lab File ID: >B1076

Level: MED

Date Received: 8/16/89

% Moisture: not dec. NA

Date Analyzed: 8/29/89

Column: CAP

Dilution Factor: .008

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	630	U
108-88-3	Toluene	630.	U
100-41-4	Ethylbenzene	630.	U
133-02-7	Xylene-total	7500.	

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VOLATILE ORGANICS ANALYSIS DATA SHEET

Lab Name: Weyerhaeuser

Client Sample ID: TP-11-4

Sample Description: SOIL

Sample wt/vol: 5.0 G

Level: LOW

% Moisture: not dec. NA

Column: CAP

Lab Sample ID: 33733

Request Number ID: 383

Matrix: SOIL

Lab File ID: >B1058

Date Received: 8/16/89

Date Analyzed: 8/28/89

Dilution Factor: 1

CAS NO.	COMPOUND	CONCENTRATION UNITS: (ug/L or ug/Kg) UG/KG	Q
71-43-2	Benzene	5.	U
108-88-3	Toluene	5.	U
100-41-4	Ethylbenzene	5.	U
133-02-7	Xylene-total	5.	U