August 2, 2001

Chuck Findley
Regional Administrator
United States Environmental Protection Agency
1200 Sixth Avenue
Seattle, Washington 98101

Gail Colburn
Washington State Department of Ecology
Northwest Regional Office
3190 160th Avenue SE
Bellevue, Washington 98008

Re: Interim Cleanup Action Plan
PCB and Trichlorobenzene Occurrences
Jacobson Terminals Property
4063-12

Dear Gail:

This letter summarizes proposed actions to cleanup PCB and trichlorobenzene occurrences detected on the Jacobson Terminals (Terminals) property in Seattle, Washington. This letter provides notification of the intended cleanup action in accordance with 40 CFR 761.61. Certification that all sampling and analysis plans and procedures are available for EPA inspection is provided in Attachment A. Below we summarize the results of site investigations, evaluate remedial alternatives, and describe the proposed cleanup action. The proposed cleanup action is presented as an interim action that is the first step toward complete remediation. Included in this interim cleanup action is a plan for selecting potential future remedial actions and monitoring.

SITE DESCRIPTION

The Jacobson Terminals property is located at 5355 28th Avenue NW in the Ballard District of Seattle as shown on Figure 1. The site is bounded to the south and east by the Lake Washington Ship Canal and to the west by the Hiram Chittenden Locks, operated by the U.S. Army Corps of Engineers. The property is bordered on the north by the former

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Burlington Northern Railroad right of way now owned by the City of Seattle. The former Fentron property, containing a warehouse complex used for office space, storage, light manufacturing, and indoor rock climbing, is located to the north of the right of way. The site and surrounding properties are shown on Figure 2.

The Terminals property is located on a former estuarine tideflat. In the 1920s, the area was filled with sand dredged from the Lake Washington Ship Canal, wood waste, and construction debris. The property was the site of a lumber mill from 1890 to the 1930s. Starting around 1940, the property was used for loading and unloading boats and for storage. The property has been used as a marine support facility since 1975. Various tenants with offices and an operation yard for marine business currently occupy the site.

Several environmental investigations and remedial actions have been conducted on the Terminals property. Data collected in 2001 during a remedial action conducted to address dichlorobenzene suggested the potential occurrence of polychlorinated biphenyls (PCBs) in site soils. The history of environmental and remedial actions conducted on the site and the discovery of PCB occurrences are summarized in a Hart Crowser memo 'Occurrence of Chlorinated Benzenes and PCBs, Jacobson Terminals Property' dated May 7, 2001. This memo is included as Attachment B. Former investigations and remedial actions consist of the following:

- **Market Street Property Chlorinated Solvent Plume Delineation**, involving groundwater sampling to identify and monitor a plume of chlorinated ethenes in groundwater originating from the former Fentron site to the north;

- **Corps Property TPH-Impacted Soil Removal,** involving excavation of PCB- and TPH-impacted soil and confirmational groundwater monitoring from an area along the Corps – Jacobson property line (PCB concentrations were below TSCA levels);

- ***p*-Dichlorobenzene Investigation and Remediation,** including Oxygen-Release Compound (ORC) injection to enhance biodegradation of *p*-dichlorobenzene, a subsurface investigation to identify the *p*-dichlorobenzene source area, and remediation of the source area using *in situ* oxidation; and

- **Initial PCB and Trichlorobenzene Assessment,** which evaluated the potential for PCB and trichlorobenzene occurrences based on data collected during monitoring the *p*-dichlorobenzene remedial action.

The initial PCB and trichlorobenzene assessment included analysis of drill cuttings produced when installing *in situ* oxidation injection points IP-1, IP-2, and IP-3 and sampling nearby monitoring wells. PCBs (Aroclor 1260) were detected in drill cuttings but were not detected in groundwater at downgradient monitoring wells. Trichlorobenzene was detected in drill cuttings and in groundwater close to the source area but was not detected at downgradient monitoring wells.

A subsurface investigation was performed in May and June 2001 to define the limits of PCB and trichlorobenzene contamination, and the results reported in a Hart Crowser memo 'PCB and Trichlorobenzene Assessment Results' dated June 20, 2001, which is provided in Attachment C. This assessment indicated an area of PCB- and trichlorobenzene-impacted soil on the north side of the property, which appears to be a separate occurrence (based on both location and chemical composition) from the area subject to the remedial action described under 'Corps Property TPH-Impacted Soil Removal.' The Site Conceptual Model described in the initial assessment memo dated May 7, 2001, has been updated based on the results of the latest investigation and is described below.

SITE CONDITIONS

A site map showing boring and monitoring well locations is provided on Figure 3. Below we describe hydrogeologic conditions and chemical occurrences in soil and groundwater at the site. The site is mostly flat and almost entirely covered by either pavement or buildings. The north end of the site slopes steeply upward approximately 6 feet in elevation to a parking area and railroad grade.

Hydrogeology

Generalized geologic cross sections depicting subsurface stratigraphy are presented on Figures 4 and 5. Cross section locations are shown on Figure 3. The upper 10 feet of soil is fairly heterogeneous, consisting primarily of silty sand fill material, with occasional debris and discontinuous layers of silt. Up to 8 feet of wood debris and sawdust are located within this fill layer in several areas. A layer of native sand lies beneath the fill material to a depth of 15 to 18 feet. Underlying the sand layer is a clay layer typically 2 to 4 feet thick. Beneath the clay are layers of fine sands and silts of increasing density. Glacial till comprised of very dense, gravelly, sandy silt has been identified at the north end of the site at depths below 20 to 25 feet.

Groundwater gradients on the property are typically very flat, and groundwater elevations fluctuate seasonally in response to the changing water elevation of the Ship Canal. Except on the high north end of the site the depth to groundwater is typically 4 to 7 feet. Most groundwater flow likely occurs in the native sand layer located approximately 10 to 18 feet below ground surface. The groundwater flow rate has been estimated to be around 0.1 feet per day toward the Ship Canal.

Chemical Occurrences

Chlorinated ethene degradation products (cis-dichloroethene and vinyl chloride) have been detected in site groundwater, but have declined as a result of implementing the remedial action on the former Fentron property. These occurrences are currently being monitored and remediated under a separate cleanup action performed under the Washington State Department of Ecology Voluntary Cleanup Program.

Site investigations have identified three potential chemicals of concern on the Jacobson Terminals property:

- **PCBs (Aroclor 1260).** This chemical has been detected in soil at concentrations up to 820 mg/kg, but has not been detected in groundwater. The estimated areal extent of PCB occurrences in soil is shown on Figure 6.

- ***p*-Dichlorobenzene.** This chemical has been detected in soil at concentrations up to 1.4 mg/kg, and in groundwater at concentrations up to 1,300 ug/L.

- **1,2,4-Trichlorobenzene.** This chemical has been detected in soil at concentrations up to 560 mg/kg and in groundwater up to 4,000 ug/L in the source area. The estimated areal extent of 1,2,4-trichlorobenzene concentrations in soil is shown on Figure 7.

Chlorobenzene, *m*-dichlorobenzene, *o*-dichlorobenzene, and 1,2,3-trichlorobenzene have also been detected in soil and groundwater but at concentrations below screening levels. Tables 1 and 2 summarize occurrences of PCBs and chlorinated benzenes in soil and groundwater.

Mixtures of trichlorobenzene and Aroclor 1260 have historically been used for transformer oil, and occurrences of these chemicals are generally collocated. This suggests a release of transformer oil before the site was paved in 1976. However, relative concentrations of the two chemicals are not always consistent, and while this may be the result of differences in

transport properties (PCBs are more hydrophobic than trichlorobenzene and thus less mobile in the subsurface), there is a potential for separate releases of these chemicals having occurred in the same general area.

Chloro- and dichlorobenzenes have been detected at much lower concentrations in soil than trichlorobenzene and may be either an impurity in the trichlorobenzene or a byproduct of trichlorobenzene biodegradation. In particular, 1,2,4-trichlorobenzene is known to degrade to *p*-dichlorobenzene under anaerobic conditions (which are present at the site). This fact, coupled with the higher mobility of dichlorobenzene in groundwater, may explain why source area soil contains much higher concentrations of trichlorobenzene than dichlorobenzene, yet in groundwater downgradient of the source area the opposite is true.

The areal extent of PCB and trichlorobenzene occurrences appears to partly follow a sanitary sewer line installed in 1974. If the release occurred before the line was installed, earthmoving activities could have spread contamination from the original source area to the east and west along the line, accounting for the elliptical shape of the affected area.

The vertical extent of PCB and trichlorobenzene occurrences is portrayed on the geologic cross sections on Figures 8 and 9. The depth of contamination appears limited to above the clay layer approximately 16 to 17 feet deep. The highest concentrations have been detected in the 8- to 16-foot-depth interval, with typically lower concentrations detected in the 0- to 8-foot interval. Since the water table is normally between 4 and 7 feet deep, this implies either transport via downward product migration (trichlorobenzene and PCBs are more dense than water) or mixing from utility earthwork. The fill layer of wood debris could have limited downward product migration, and it is in the area of the thickest of these layers (near SP-19 and SP-4) in which the highest chemical concentrations were detected in the 8- to 12-foot-depth interval. In the area with no identified wood debris fill (near SP-6), the highest concentrations were detected in the 12- to 16-foot-depth interval.

REMEDIAL ACTION OBJECTIVES

The two primary objectives regarding environmental conditions at the Terminals property are as follows:

- **Protection from Direct Contact.** Soil screening criteria are based on relevant and applicable state and federal standards for direct contact under industrial land use

assumptions. The point of compliance is from ground surface to a depth of 15 feet below ground surface.

- **Groundwater Migration Control.** A primary goal of the remedial action is to prevent the discharge of contaminants in groundwater above cleanup levels to sensitive surface water receptors. Groundwater screening criteria include consideration of relevant and applicable standards under state and federal laws. The point of compliance for groundwater will be groundwater quality at the Terminals property boundary directly upgradient of the Ship Canal. The cleanup action will also reduce soil concentrations to sufficiently protect groundwater or will contain and treat groundwater impacted via the soil-to-groundwater pathway.

Screening criteria for groundwater and soil are presented in Table 3. Although PCBs have not been detected in groundwater, detection limits (0.4 ppb) are significantly higher than the screening level. Although it is technically infeasible to detect the screening level of 0.1 ppt, future analyses should be performed using EPA Method 8082 Low Level, with a detection limit of 0.020 ppb, to better evaluate if this remedial action objective has been met.

Based on the existing environmental data, achieving the Remedial Action Objectives would require:

- Reducing PCB concentrations in site soil to below 10 mg/kg. If achieving the cleanup level is not practicable, remediation levels of between 25 and 100 mg/kg (in accordance with 40 CFR 761.61) may be used in conjunction with institutional controls; and

- Preventing groundwater containing *p*-dichlorobenzene concentrations above surface water cleanup levels from entering the Ship Canal. This could be done either by addressing *p*-dichlorobenzene occurrences in groundwater or by reducing *p*-dichlorobenzene and 1,2,4-trichlorobenzene concentrations in soil. Determining soil-to-groundwater cleanup levels for 1,2,4-trichlorobenzene, given its potential biotransformation into *p*-dichlorobenzene, could require natural attenuation monitoring and modeling.

REMEDIATION TECHNOLOGY EVALUATION

We considered the following remediation technologies:

- **Groundwater Pump and Treat.** This technology would seek to prevent discharge of contaminants to surface water by capturing, treating, and discharging groundwater to the sewer. This technology was applied on the upgradient property for several years with very little success due to incomplete plume capture and high maintenance costs because of the water quality (e.g., iron bacteria). Therefore, this technology was rejected.

- **ORC Injection.** Injecting ORC would enhance aerobic biodegradation of *p*-dichlorobenzene to meet surface water standards at the point of compliance. However, ORC injection performed as part of the Market Street property remedial action did not adequately reduce the *p*-dichlorobenzene concentration. In addition, ORC does not remove PCBs. Therefore, this technology was rejected.

- ***In Situ* Oxidation.** Injecting hydrogen peroxide in the source area would both destroy PCBs and chlorinated benzenes *in situ* as well as provide oxygen to enhance aerobic biodegradation of *p*-dichlorobenzene. Limitations include difficulty in dispersing hydrogen peroxide in heterogeneous soils and fully remediating fine-grained fill materials. This technology has already been used with moderate success; after two injections as part of *p*-dichlorobenzene remediation, the groundwater concentration of *p*-dichlorobenzene at injection point IP-1 dropped from 1,300 to 140 ug/L. Soil samples collected from boring SP-6 (located between injection points IP-1 and IP-2) after the injections contained PCB and trichlorobenzene concentrations one-tenth of those detected in the drill cuttings produced while installing the injection points, although this could also be due to soil heterogeneities and differences in sampling. *In situ* oxidation is also currently in practice at the site to remove vinyl chloride from the upgradient property groundwater plume. This technology was retained because of its implementability and the potential success in significantly reducing contaminant concentrations.

- **Excavation and Off-Site Disposal.** This technology provides the best potential mass removal but would be very expensive. Excavation would require rerouting a sanitary sewer line and water line, installing shoring with dewatering and water treatment, and disposing of material containing more than 50 mg/kg PCBs at a TSCA landfill. In addition, because of the site's close proximity to the Ship Canal a shoreline permit would likely be required. This technology is retained as a worst-case alternative if other alternatives are technically infeasible to attain Remedial Action Objectives.

PROPOSED CLEANUP ACTION

To cost-effectively achieve Remedial Action Objectives, we propose the following cleanup action:

- **Interim Cleanup Action—*In Situ* Oxidation.** Install eight new injection points (IP-4 through IP-11) and inject hydrogen peroxide into the subsurface at these and the existing three injection points. Proposed injection point locations are shown on Figure 10. Each injection round will consist of injecting 55 gallons of 35 percent hydrogen peroxide into each point, followed by sampling groundwater from injection points IP-1 and IP-2 and monitoring wells JT-3 and JT-8 and analyzing for di- and trichlorobenzenes by EPA Method 8260. Continue injection rounds until groundwater quality in the injection area does not significantly improve. We expect approximately three injection rounds will be performed.

- **Interim Monitoring.** After the injection rounds are completed, one round of soil sampling and two rounds of groundwater monitoring will be performed to evaluate performance of the remedial action. One soil boring will be advanced 5 to 10 feet away from each injection point in areas previously identified as contaminated. Soil will be continuously sampled to a depth of 20 feet, and one sample will be selected from each boring on the basis of field observations and analyzed for PCBs by EPA Method 8082 and chlorinated benzenes by EPA Method 8260. Groundwater monitoring will be conducted at wells JT-3 and JT-6 for chlorinated benzenes by EPA Method 8260 and PCBs by EPA Method 8082 Low Level. Samples will also be collected at injection points IP-1 and IP-2 and analyzed for chlorinated benzenes to monitor for rebound in source area concentrations. Groundwater sampling will be conducted with peristaltic pumps using low-flow sampling techniques.

- **Remediation Evaluation.** After completing the interim monitoring, a report will be prepared discussing the effectiveness of the action at achieving Remedial Action Objectives. It is possible given the limitations of *in situ* methods and the currently incomplete PCB monitoring data that the objectives might not be met in one or more of the following ways:

  - PCBs are detected in groundwater using the lower detection limit method at JT-6 (the likely point of compliance upgradient of the Ship Canal);

  - p-Dichlorobenzene is detected above screening levels at JT-6; or

- PCBs are detected in soil samples above 100 mg/kg (if detected below 100 mg/kg but above 25 mg/kg, additional actions would be required such as marking the site fence line or maintaining the asphalt cap in accordance with 40 CFR 761.61).

- **Contingency Cleanup Actions.** If not all Remedial Action Objectives are met, contingency cleanup actions will need to be considered. This could include preparing a supplementary cleanup action plan that contains evaluation of possible alternatives, such as installing a sorptive wall (a permeable wall installed in groundwater that uses zeolite, activated carbon, or a similar material to remove dissolved contaminants) if groundwater treatment is needed, or excavating contaminated soil remaining in place.

We believe that this approach is protective of human health and the environment while offering the greatest potential cost savings. The estimated cost of the interim remedial action is $51,000. If the source area is excavated after the interim action, the estimated savings in off-site disposal fees is $120,000, based on an estimated 1,100 tons of soil containing more than 50 mg/kg PCBs, if the interim action reduces PCB concentrations below 50 mg/kg.

This cleanup would be performed under the guidelines of the Washington State Department of Ecology Voluntary Cleanup Program, in accordance with Chapter 173-340 WAC.

SCHEDULE

The schedule for this cleanup action is as follows:

Install Injection Points	August 2001
Perform First Injection Round and Monitoring	September 2001
Perform Second Injection Round and Monitoring	October 2001
Perform Third Injection Round and Monitoring	November 2001
Confirmation Soil Sampling and Analysis	December 2001
First Interim Groundwater Monitoring Round	January 2002
Second Interim Groundwater Monitoring Round	April 2002
Remediation Evaluation Report	June 2002

A schedule for contingency actions and future monitoring will be included in the Remediation Evaluation Report.

LIMITATIONS

Work for this project was performed, and this letter report prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of A&B Jacobson, LLC for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Any questions regarding our work and this letter report, the presentation of the information, and the interpretation of the data are welcome and should be referred to the undersigned.

We trust that this report meets your needs.

Sincerely,

HART CROWSER, INC.

for **JEREMY PORTER**
Senior Staff Engineer

DOUG HILLMAN
Principal Hydrogeologist

Attachments:
Table 1 -Summary of Chlorinated Benzenes and Aroclor 1260 Concentrations in Soil
Table 2 - Summary of Chlorinated Benzenes and Aroclor 1260 Concentrations in Groundwater
Table 3 - Screening Levels for Contaminants of Concern
Figure 1 - Vicinity Map
Figure 2 - Property Ownership Plan
Figure 3 - Exploration Location Plan
Figure 4 - Generalized Geologic Cross Section A-A'
Figure 5 - Generalized Geologic Cross Section B-B'
Figure 6 - Areal Extent of PCB Occurrences
Figure 7 - Areal Extent of Trichlorobenzene Occurrences
Figure 8 - Vertical Extent of PCB Occurrences - Generalized Geologic Cross Section A-A'
Figure 9 - Vertical Extent of PCB Occurrences - Generalized Geologic Cross Section B-B'
Figure 10 - Proposed Injection Point Location Plan
Attachment A - Certification of Sampling and Analysis Plans
Attachment B - Hart Crowser Memo 'Occurrence of Chlorinated Benzenes and PCBs, Jacobson Terminals Property'
Attachment C - Hart Crowser Memo 'PCB and Trichlorobenzene Assessment Results, Jacobson Terminals Property'

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Table 1 - Summary of Chlorinated Benzene and Aroclor 1260 Concentrations in Soil

Sample Location	Sample Depth in Feet	Sampling Date	Concentration in mg/kg						
			EPA Method 8260 (Volatile Organic Compounds)						EPA Method 8082 (PCBs)
			CB	m-DCB	p-DCB	o-DCB	1,2,4-TCB	1,2,3-TCB	Aroclor 1260
		Reporting Limits:	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.20*
p-Dichlorobenzene Assessment									
HC-31 S-2	11 to 14	10/25/2000	0.58	0.21	0.38	4.0			
HC-31 S-3	14 to 17	10/25/2000	0.25 U	0.23	0.32	0.43			
In Situ Oxidation Wells									
IP-1	Drill Cuttings	2/20/2001	0.5 U	0.66	2.7	3.2	230 TIC	17 TIC	360 TIC
IP-2	Drill Cuttings	4/11/2001	0.26	0.92	2.9	4.7	560	13	110
IP-3	Drill Cuttings	4/11/2001	0.12	0.17	0.33	nd	2.8	0.45	0.2 U
JT-8	Drill Cuttings	2/20/2001	0.25 U	nd	0.37	nd			
JT-8	Drill Cuttings	4/11/2001							2.5
PCB and Trichlorobenzene Assessment									
SP1-S4	12 to 16	5/23/2001	nd	nd	nd	nd	nd	nd	2.7
SP2-S4	12 to 16	5/22/2001	nd	0.84	0.62	nd	11	0.79	550
SP2-S5	16 to 20	5/22/2001	nd	nd	nd	nd	0.52	nd	0.31
SP3-S4	12 to 16	5/22/2001	nd	nd	nd	nd	5.8	0.45	14
SP4-S3	8 to 12	5/23/2001	0.79	0.25	0.55	nd	28	2.0	530
SP4-S4	12 to 16	5/23/2001	nd	nd	nd	nd	0.84	0.21	3.4
SP5-S1	0 to 4	5/22/2001	0.57	nd	nd	nd	nd	nd	18
SP5-S2	4 to 8	5/22/2001	5.80	nd	0.21	nd	nd	nd	3.6
SP5-S5	16 to 20	5/22/2001	nd	nd	nd	nd	0.90	nd	0.43
SP6-S1	0 to 4	5/23/2001	nd	nd	nd	nd	nd	nd	0.35
SP6-S3	8 to 12	5/23/2001	0.17	nd	0.15	nd	nd	nd	nd
SP6-S4	12 to 16	5/23/2001	nd	0.93	0.86	0.18	45	2.5	25
SP6-S5	16 to 20	5/23/2001	nd	0.68	0.56	nd	2.7	nd	1.2
SP7-S4	12 to 16	5/22/2001	nd	0.41	nd	nd	1.6	nd	nd
SP8-S2	4 to 8	5/22/2001	0.31	nd	nd	nd	nd	nd	nd
SP8-S4	12 to 16	5/22/2001	nd	nd	nd	nd	nd	nd	nd
SP9-S4	12 to 16	5/22/2001	0.14	0.45	0.15	nd	nd	nd	nd
SP10-S5	16 to 20	5/22/2001	nd	nd	nd	nd	nd	nd	nd
SP11-S4	12 to 16	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP12-S2	4 to 8	5/22/2001	nd	nd	nd	nd	nd	nd	nd
SP12-S5	16 to 20	5/22/2001	0.24	nd	0.18	nd	nd	nd	nd
SP13-S4	12 to 16	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP14-S2	4 to 8	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP14-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP15-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP15-S7	24 to 28	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP16-S1	0 to 4	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP16-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP17-S1	0 to 4	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP17-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP17-S6	20 to 24	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP18-S1	0 to 4	5/21/2001	nd	nd	nd	nd	nd	0.26	0.22
SP18-S2	4 to 8	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP18-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP19-S3	8 to 12	5/23/2001	15	0.32	1.4	nd	0.90	nd	820
SP19-S4	16 to 20	5/23/2001	0.71	nd	nd	nd	0.19	nd	0.5
SP20-S4	16 to 20	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP20-S6	20 to 24	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP21-S3	8 to 12	6/6/2001	nd	nd	nd	nd	nd	nd	0.12 J
SP21-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	0.16 J
SP22-S3	8 to 12	6/6/2001	nd	nd	nd	nd	nd	nd	0.16 J
SP22-S5	16 to 20	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP23-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP24-S2	4 to 8	6/6/2001	0.28	nd	0.17	nd	nd	nd	17
SP24-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP25-S1	0 to 4	6/6/2001	nd	nd	nd	nd	nd	nd	9.5
SP25-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP26-S2	4 to 8	6/6/2001	4.40	nd	0.28	nd	nd	nd	nd
SP26-S4	12 to 16	6/6/2001	0.34	0.62	0.53	nd	26.00	1.80	nd
SP27-S4	12 to 16	6/6/2001	nd	0.38	0.28	nd	3.20	0.28	nd
SP28-S4	12 to 16	6/6/2001	nd	nd	nd	nd	0.16	nd	nd
SP29-S1	0 to 4	6/6/2001	nd	nd	0.21	nd	nd	nd	0.6
SP29-S4	12 to 16	6/6/2001	nd	0.49	0.25	nd	nd	nd	nd

Notes:

nd not detected at detection limit listed at top of column
U not detected at indicated detection limit
J Estimated value
TIC Estimated value based on estimated concentrations of Tentatively Identified Compounds via USEPA Method 8270C
CB chlorobenzene
DCB dichlorobenzene
TCB trichlorobenzene

Table 2 - Summary of Chlorinated Benzene and Aroclor 1260 Concentrations in Groundwater

Location	Depth in Feet	Date	Concentration in ug/L						
			Chlorobenzene	m-Dichlorobenzene	p-Dichlorobenzene	o-Dichlorobenzene	1,2,4-Trichlorobenzene	1,2,3-Trichlorobenzene	Aroclor 1260 [a]
Surface Water Cleanup Level			*5,030*	*na*	*4.86*	*4,200*	*227*	*na*	*0.00017*
GP-5	11.5 to 15.5	6/15/1996	0.5 U	0.5 U	0.5 U	0.5 U	2	2 U	
GP-6	4 to 8	6/15/1996	0.5 U	0.5 U	0.5 U	0.5 U	2	2 U	
	14.5 to 18.5	6/15/1996	47	700	730	14	11	2 U	
SP-15S	14 to 17	5/22/2001	1 U	5	7.1	1 U	1 U	1 U	
SP-15D	21 to 24	5/22/2001	1 U	1 U	1 U	1 U	1 U	1 U	
SP-17	14 to 17	5/21/2001	1 U	1 U	1 U	1 U	1 U	1 U	
HC-MW-1	4 to 14	9/26/1996							4 U
	4 to 14	12/11/1997	0.5 U	0.5 U	0.5 U	0.5 U	2.0	2 U	0.0052 U
HC-MW-2	4 to 13	9/26/1996							4 U
	4 to 13	12/11/1997	100	4.7	6.0	1.3			0.0052 U
HC-MW-3	6 to 11	9/26/1996							4 U
	6 to 11	12/11/1997	0.5 U	0.5 U	0.5 U	0.5 U	2.0	2 U	0.0052 U
	6 to 11	1/20/2000	5 U	1 U	1 U	1 U			
	6 to 11	4/7/2000	5 U	1 U	1 U	1 U			
	6 to 11	7/7/2000	5 U	1 U	1 U	1 U			
	6 to 11	10/11/2000	5 U	1 U	1 U	1 U			
	6 to 11	1/16/2001	5 U	1 U	1 U	1 U			
IP-1	14 to 17	2/20/2001	5 U	140	1300	670			
	14 to 17	4/10/2001	55	100	140	59	850	110	
IP-2	14 to 17	2/20/2001	120	140	200	54			
	14 to 17	4/10/2001	5	14	110	210	4000	590	
IP-3	14 to 17	2/20/2001	88	19	30	1 U			
	14 to 17	4/10/2001	47	7.7	9.4	1.4	19	3.1	
JT-3	11.5 to 16.5	3/15/1996	4 U	5 U	5 U	5 U	5 U		
	11.5 to 16.5	3/22/1999	140	77	44	10			
	11.5 to 16.5	7/30/1999	74	25	19	3.2			
	11.5 to 16.5	10/15/1999		15	8.7	1.4			
	11.5 to 16.5	1/20/2000	130	34	25	2.8			
	11.5 to 16.5	4/7/2000	100	25	16	2.8			
	11.5 to 16.5	7/7/2000	56	12	10	2			
	11.5 to 16.5	10/11/2000	45	1 U	1 U	1 U			
	11.5 to 16.5	1/16/2001	84	24	19	3.1			
	11.5 to 16.5	4/10/2001	50	6.9	5.6	1 U	1 U	1 U	0.4 U

Table 2 - Summary of Chlorinated Benzene and Aroclor 1260 Concentrations in Groundwater

Location	Depth in Feet	Date	Concentration in ug/L						
			Chlorobenzene	m-Dichlorobenzene	p-Dichlorobenzene	o-Dichlorobenzene	1,2,4-Trichlorobenzene	1,2,3-Trichlorobenzene	Aroclor 1260 [a]
Surface Water Cleanup Level			*5,030*	*na*	*4.86*	*4,200*	*227*	*na*	*0.00017*
JT-5 [3]	26 to 29	3/22/1999	5 U	1 U	1 U	1 U			
	26 to 29	7/30/1999	5 U	1 U	1 U	1 U			
	26 to 29	4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	0.4 U
JT-6	14 to 19	3/22/1999	300	570	360	47			
	14 to 19	6/17/1999	5 U	580	300	31			
	14 to 19	7/30/1999	410	400	270	24			
	14 to 19	10/15/1999		240	120	19			
	14 to 19	10/18/1999		250	130	9.2			
	14 to 19	1/21/2000	840	260	180	13			
	14 to 19	4/7/2000	610	270	170	17			
	14 to 19	7/7/2000	300	220	190	18			
	14 to 19	10/11/2000	550	330	250	1 U			
	14 to 19	1/16/2001	1100	230	190	18			
	14 to 19	4/10/2001	660	260	170	16	1 U	1 U	0.4 U
JT-7	14 to 19	3/22/1999	160	190	180	16			
	14 to 19	7/30/1999	240	140	140	16			
	14 to 19	10/15/1999		110	93	6.8			
	14 to 19	10/18/1999		97	88	3.3			
	14 to 19	1/21/2000	140	150	150	9.1			
	14 to 19	4/7/2000	140	120	110	6.7			
	14 to 19	7/7/2000	200	140	200	10			
	14 to 19	10/11/2000	190	90	110	5.3			
	14 to 19	1/16/2001	26	20	22	1 U			
	14 to 19	4/10/2001	180	77	82	4.1	1 U	1 U	0.4 U
JT-8	14 to 17	1/11/2001	630	260	160	21			
	14 to 17	2/20/2001	530	210	200	1 U			
	14 to 17	4/10/2001	150	660	670	18	250	26	

Notes:

Blank indicates sample not analyzed for specific analyte.

[a] Aroclor 1016, 1221, 1232, 1242, 1248, and 1254 were analyzed for and not detected.

na not available

U not detected at detection limit indicated.

Table 3 - Screening Levels for Contaminants of Concern

Chemical	Cleanup Level			
	Soil in mg/kg	Basis	Groundwater in ug/L	Basis
p-dichlorobenzene	5,470	(a)	4.15	(c)
1,2,4-trichlorobenzene	35,000	(a)	227	(c)
Aroclor 1260	10	(b)	0.00017	(d)

Note: soil cleanup levels are for direct contact and are not necessarily protective of groundwater.

(a) Based on MTCA Method C direct contact cleanup levels for industrial sites.

(b) Based on MTCA Method A cleanup levels for industrial soils. Remediation levels of 25 to 100 mg/kg may be used with additional controls based on 40 CFR 761.61 for low-occupancy sites.

(c) Based on MTCA Method B surface water cleanup levels.

(d) Based on MTCA Method B surface water cleanup level using 40 CFR Part 131 as an ARAR.

Vicinity Map

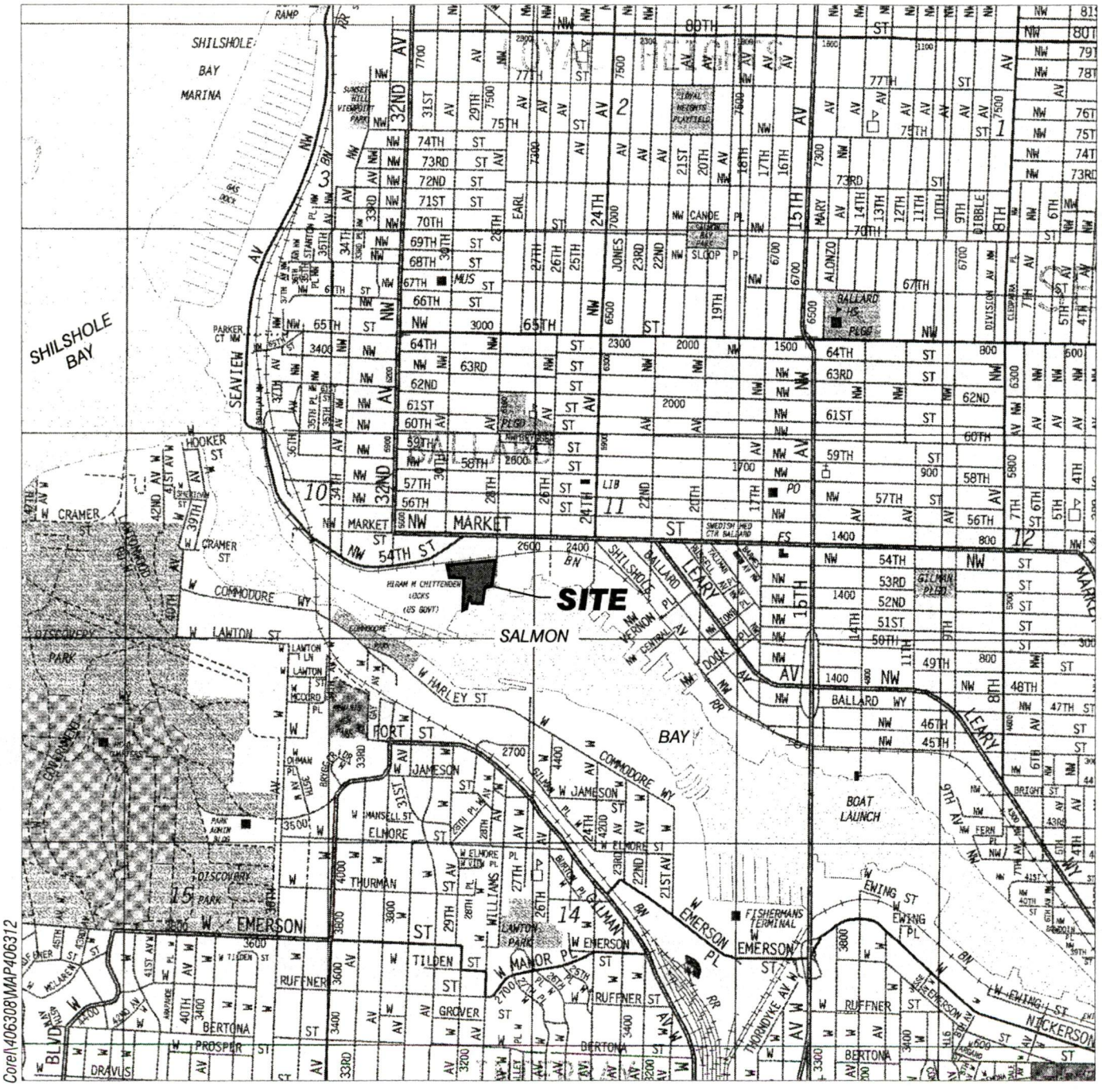

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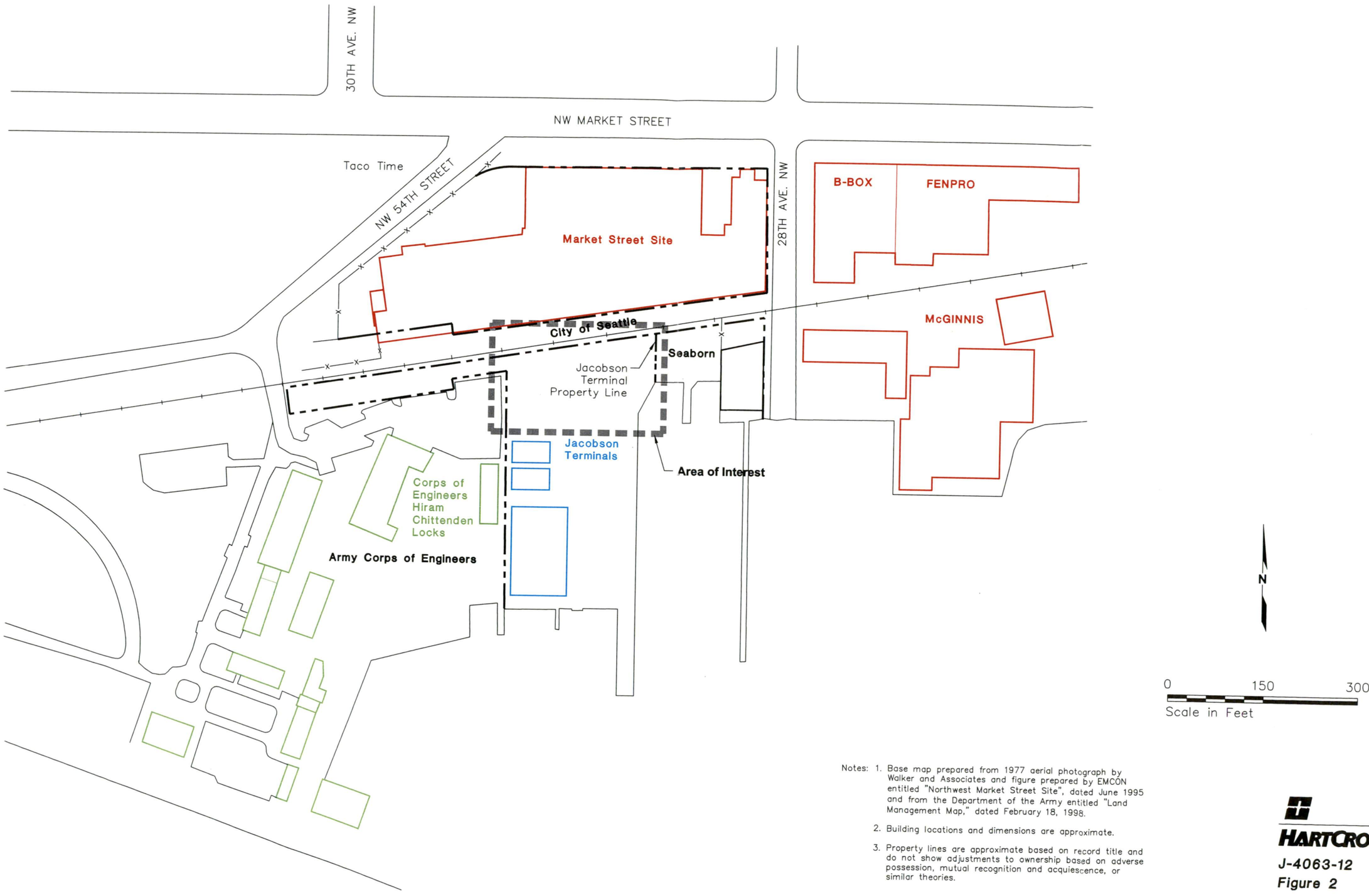
Figure 1

Property Ownership Plan



Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON entitled "Northwest Market Street Site", dated June 1995 and from the Department of the Army entitled "Land Management Map," dated February 18, 1998.
2. Building locations and dimensions are approximate.
3. Property lines are approximate based on record title and do not show adjustments to ownership based on adverse possession, mutual recognition and acquiescence, or similar theories.

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Figure 2

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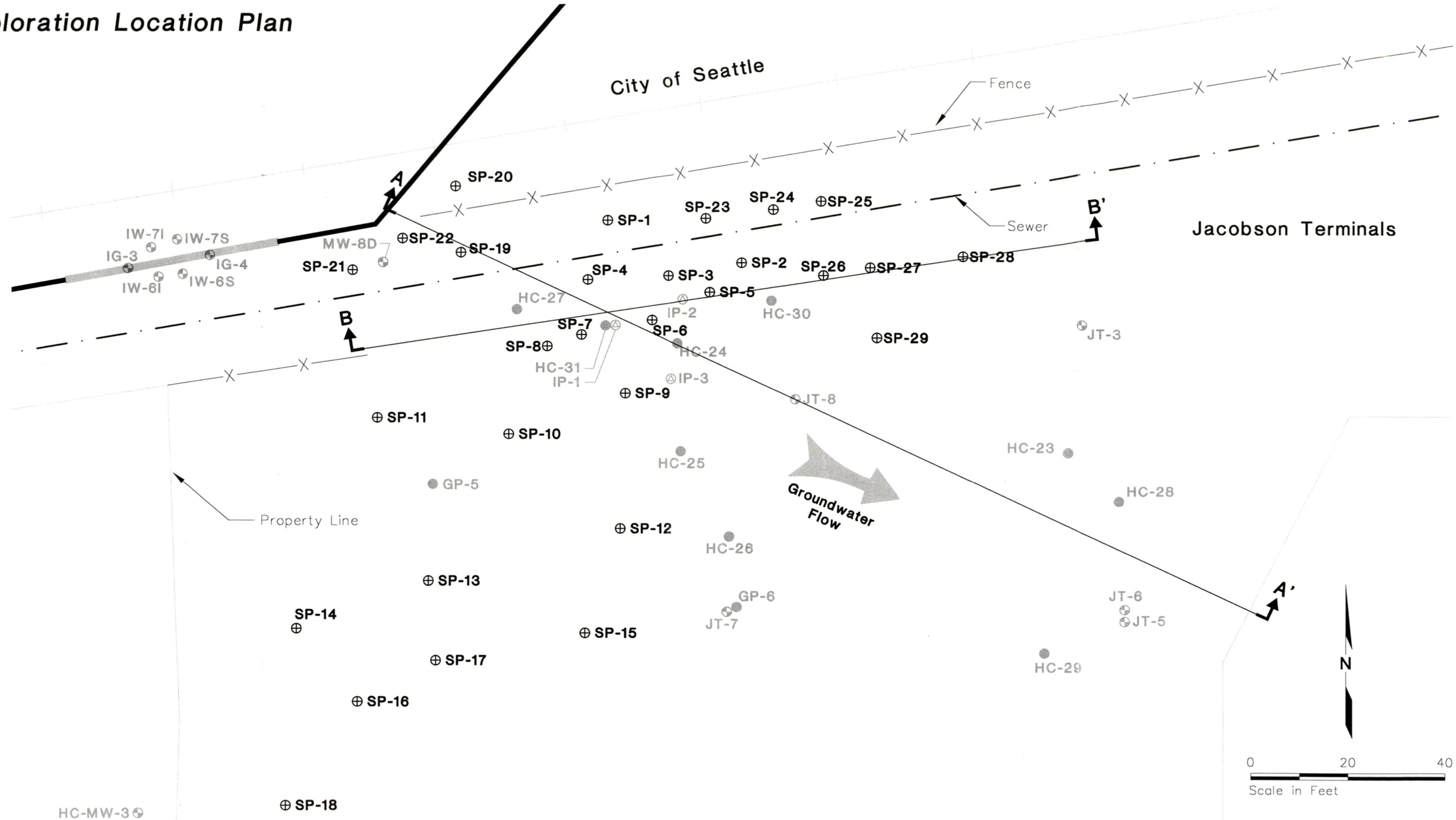
Exploration Location Plan



HC-MW-3

Previous Exploration Location and Number

JT-7 Existing Monitoring Well

HC-24 Strataprobe Boring

IP-1 Injection Point

SP-1 Strataprobe Boring Location for PCB/Trichlorobenzene Assessment

Cement–Bentonite Funnel Wall

Reactive Iron Filings Gate

A A' Cross Section Location and Designation

Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON titled "Northwest Market Street Site," dated June 1995, and from the Department of the Army titled "Land Management Map," dated February 18, 1998.
2. Utility locations are approximate.
3. Samples collected on May 21, 22, 23 and June 6, 2001.

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Figure 3

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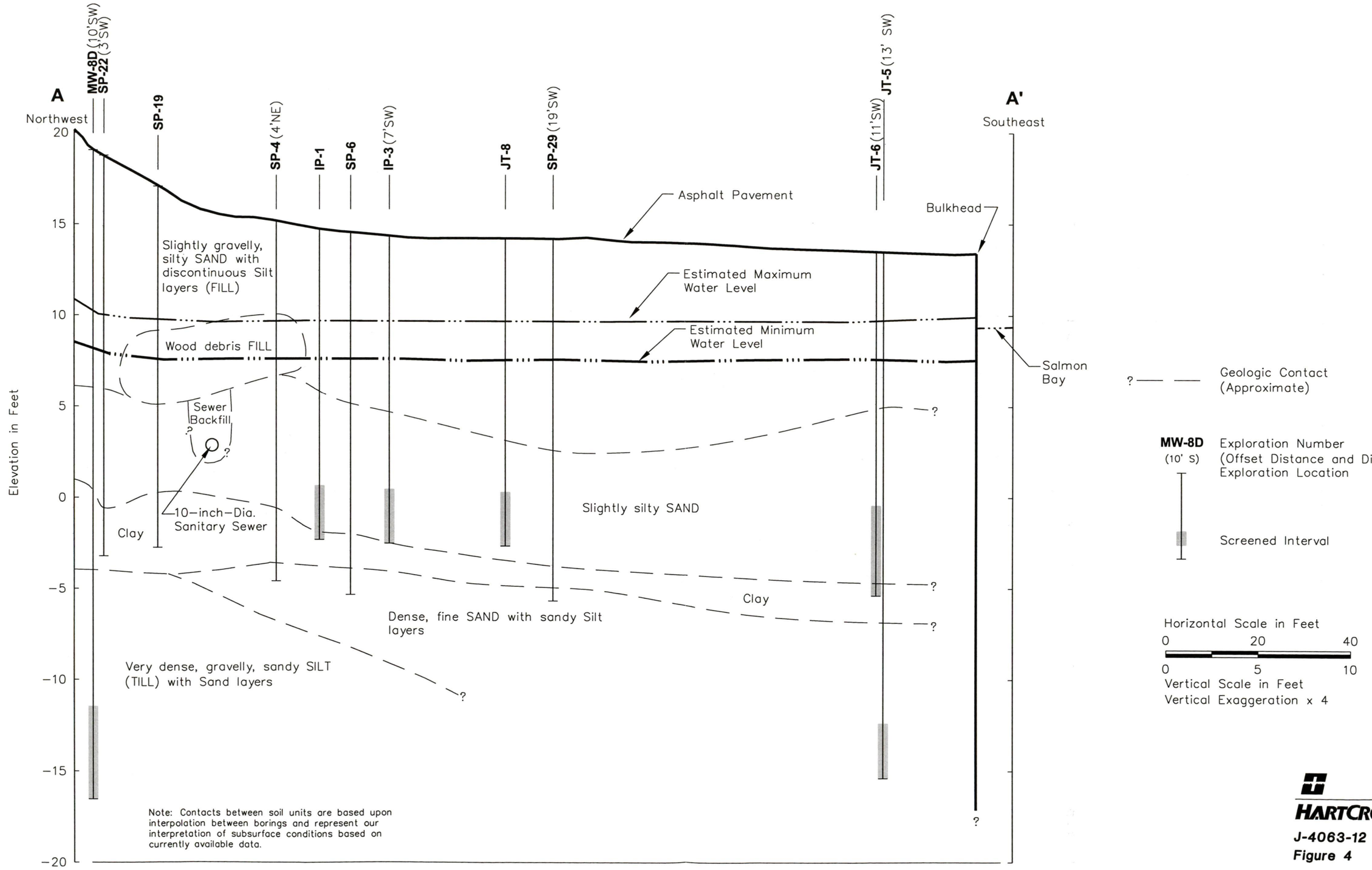
Generalized Geologic Cross Section A-A'



Note: Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.

? —— —— Geologic Contact (Approximate)

MW-8D Exploration Number
(10' S) (Offset Distance and Direction)
Exploration Location

Screened Interval

Horizontal Scale in Feet
0 20 40
0 5 10
Vertical Scale in Feet
Vertical Exaggeration x 4

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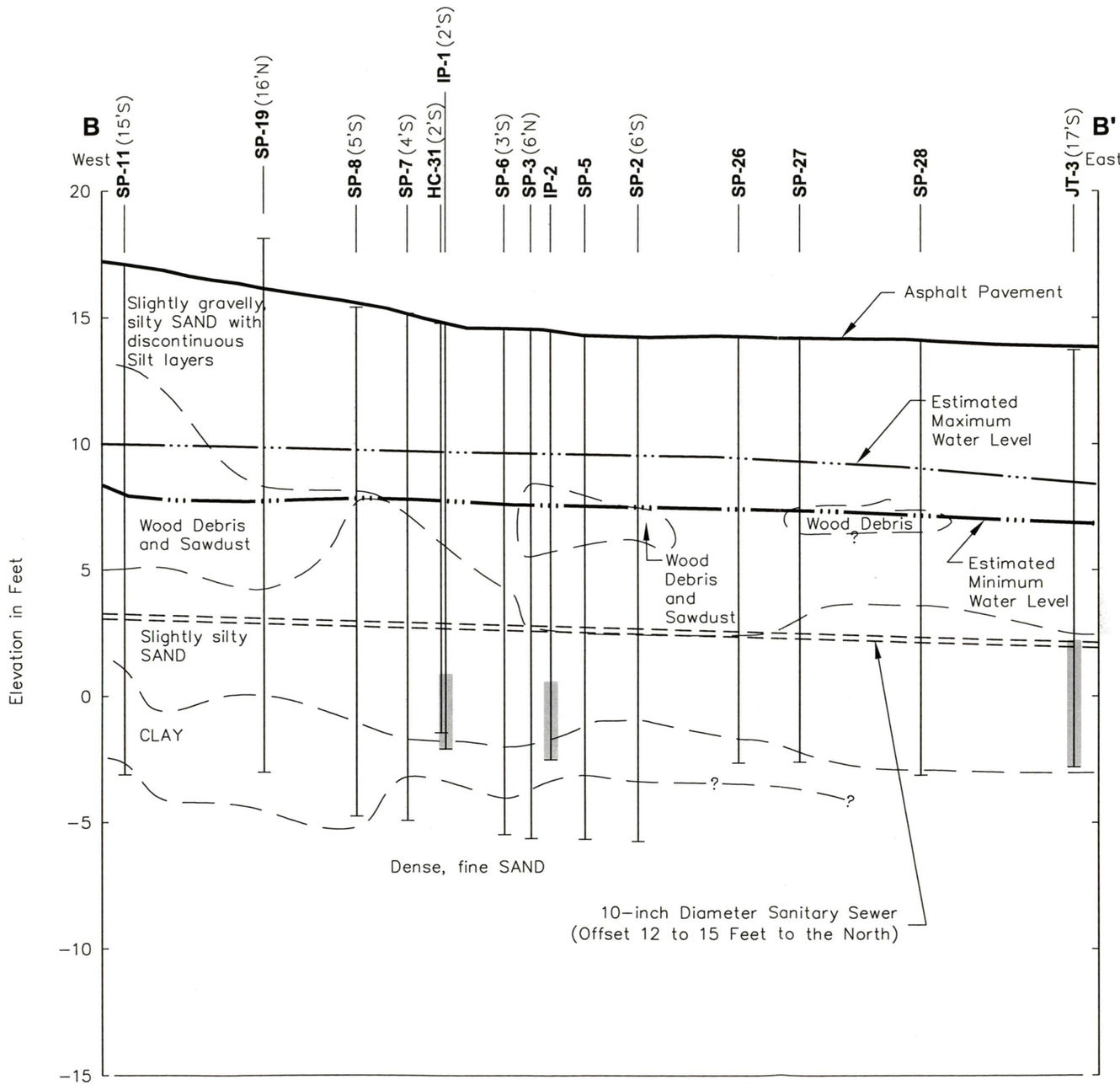
Figure 4

Generalized Geologic Cross Section B-B'



Note: Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.

? — — Geologic Contact (Approximate)

MW-8D Exploration Number
(10' S) (Offset Distance and Direction)
Exploration Location

Screened Interval

Horizontal Scale in Feet
0 20 40
0 5 10
Vertical Scale in Feet
Vertical Exaggeration x 4

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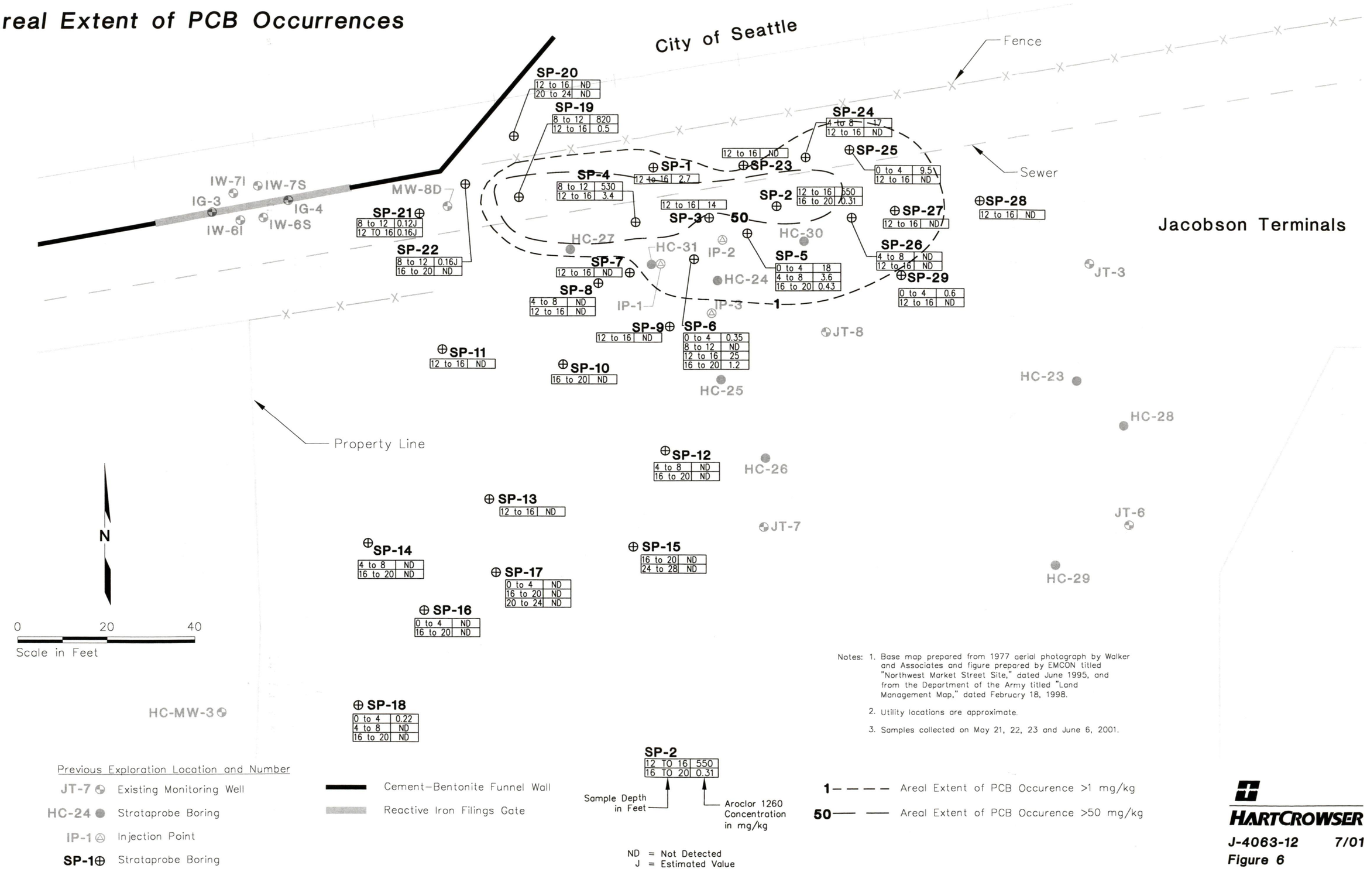
Figure 5

Areal Extent of PCB Occurrences



Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON titled "Northwest Market Street Site," dated June 1995, and from the Department of the Army titled "Land Management Map," dated Februcry 18, 1998.
2. Utility locations are approximate.
3. Samples collected on May 21, 22, 23 and June 6, 2001.

Previous Exploration Location and Number

- JT-7 — Existing Monitoring Well
- HC-24 — Strataprobe Boring
- IP-1 — Injection Point
- SP-1 — Strataprobe Boring

- Cement–Bentonite Funnel Wall
- Reactive Iron Filings Gate

SP-2 (12 TO 16 | 550; 16 TO 20 | 0.31)
Sample Depth in Feet
Aroclor 1260 Concentration in mg/kg

ND = Not Detected
J = Estimated Value

1 — — — Areal Extent of PCB Occurence >1 mg/kg

50 —— —— Areal Extent of PCB Occurence >50 mg/kg

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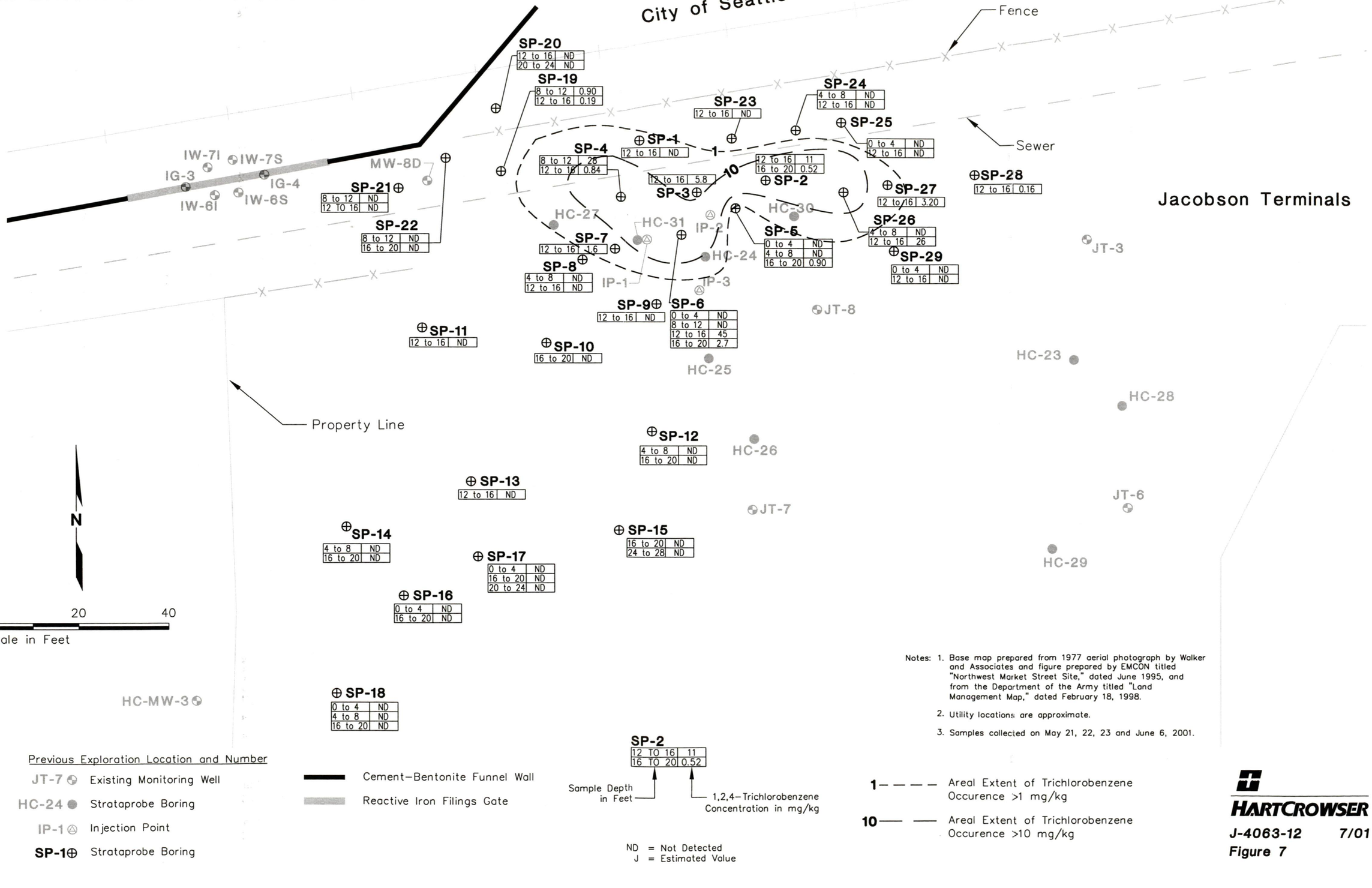
Figure 6

Areal Extent of Trichlorobenzene Occurrences



Previous Exploration Location and Number

- JT-7 — Existing Monitoring Well
- HC-24 — Strataprobe Boring
- IP-1 — Injection Point
- SP-1 — Strataprobe Boring

Cement–Bentonite Funnel Wall

Reactive Iron Filings Gate

SP-2
12 TO 16 | 11
16 TO 20 | 0.52

Sample Depth in Feet

1,2,4–Trichlorobenzene Concentration in mg/kg

ND = Not Detected
J = Estimated Value

Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON titled "Northwest Market Street Site," dated June 1995, and from the Department of the Army titled "Land Management Map," dated February 18, 1998.
2. Utility locations are approximate.
3. Samples collected on May 21, 22, 23 and June 6, 2001.

1 — — — Areal Extent of Trichlorobenzene Occurence >1 mg/kg

10 —— —— Areal Extent of Trichlorobenzene Occurence >10 mg/kg

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Figure 7

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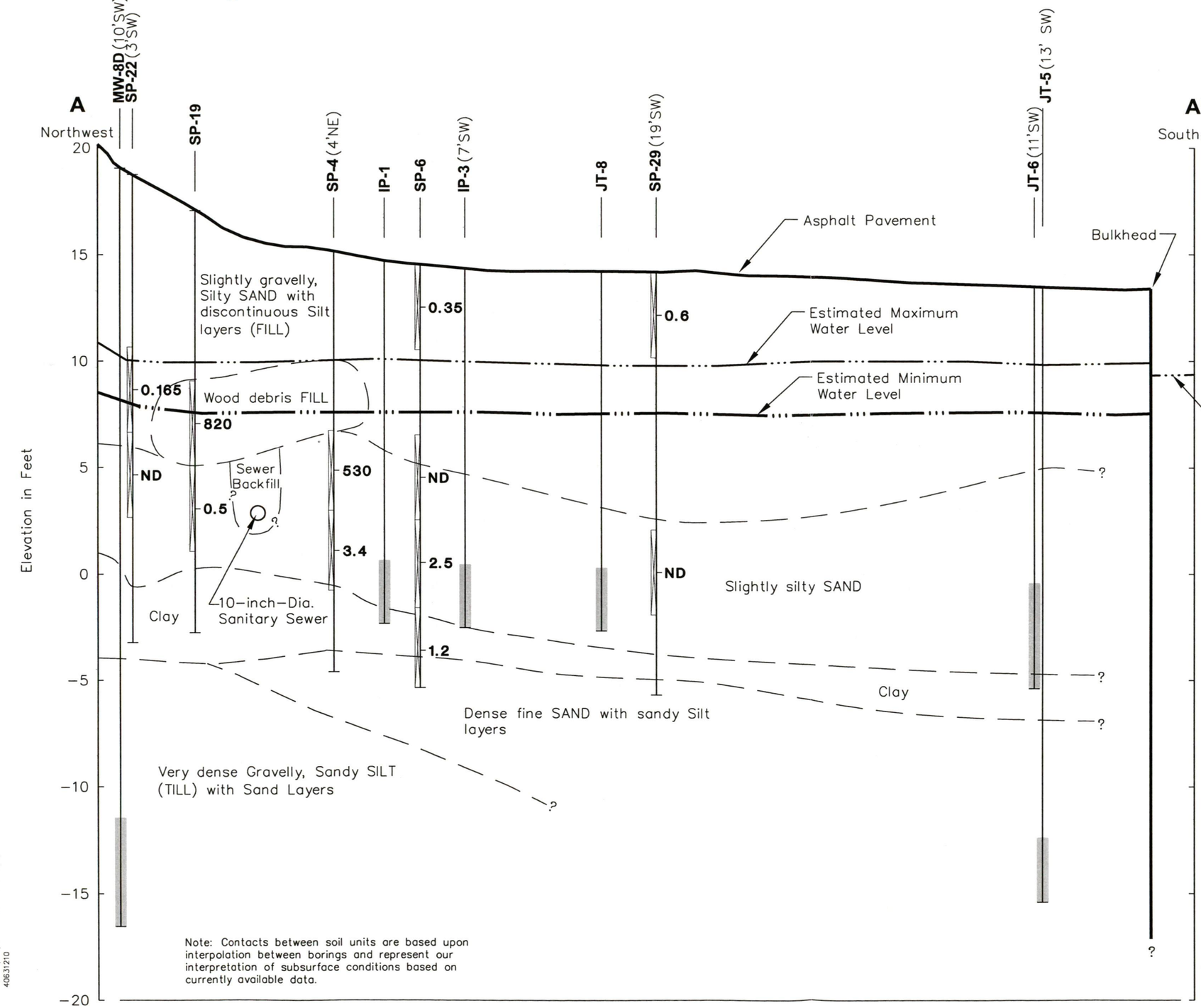
Vertical Extent of PCB Occurrences

Generalized Geologic Cross Section A-A'



Note: Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.

? —— —— Geologic Contact (Approximate)

MW-8D Exploration Number
(10' S) (Offset Distance and Direction) Exploration Location

820 Sample Interval and PCB Concentration in mg/kg (ND=Not Detected)

Screened Interval

Horizontal Scale in Feet
0 20 40
0 5 10
Vertical Scale in Feet
Vertical Exaggeration x 4

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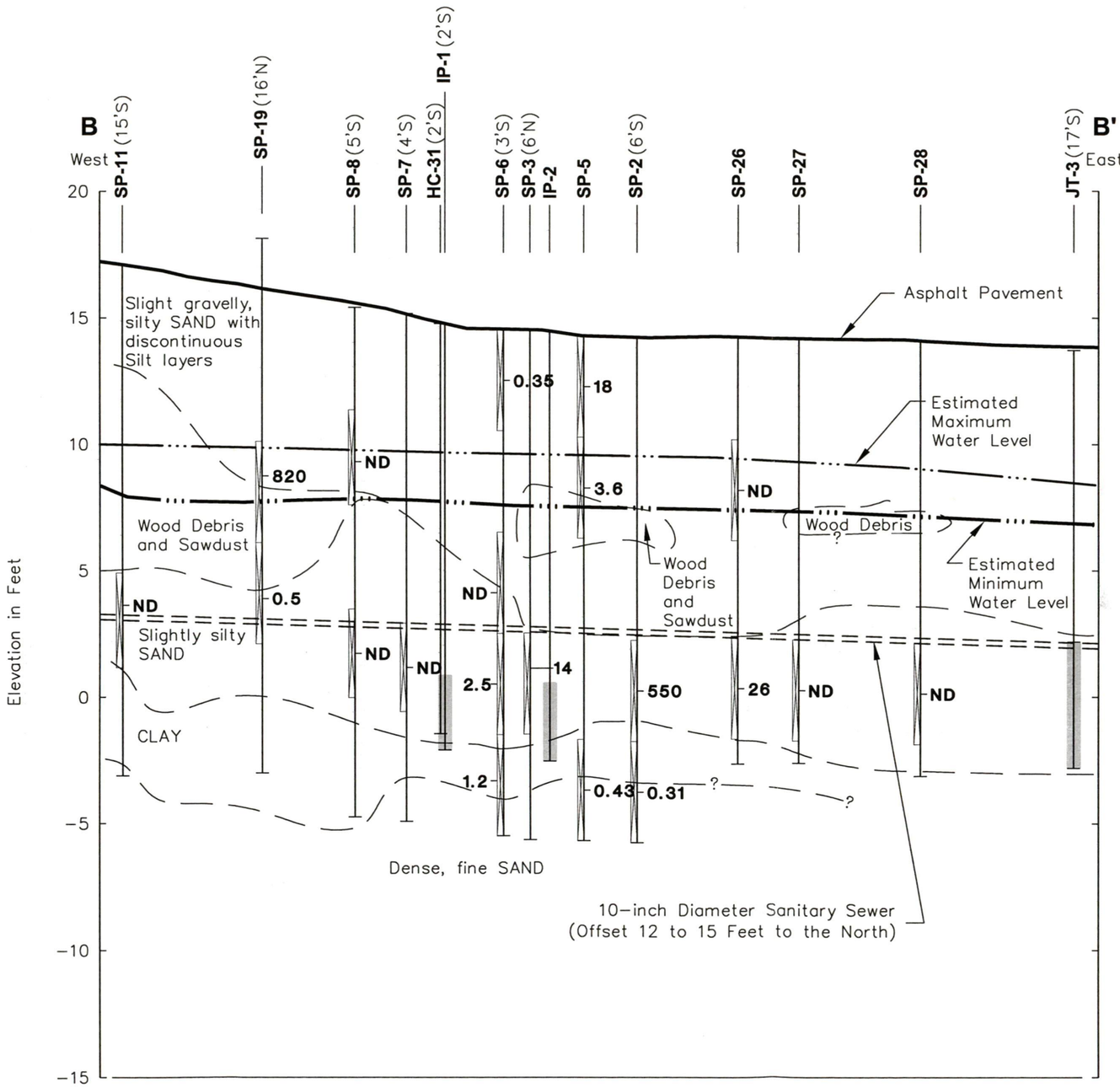
Figure 8

Vertical Extent of PCB Occurrences

Generalized Geologic Cross Section B-B'



Note: Contacts between soil units are based upon interpolation between borings and represent our interpretation of subsurface conditions based on currently available data.

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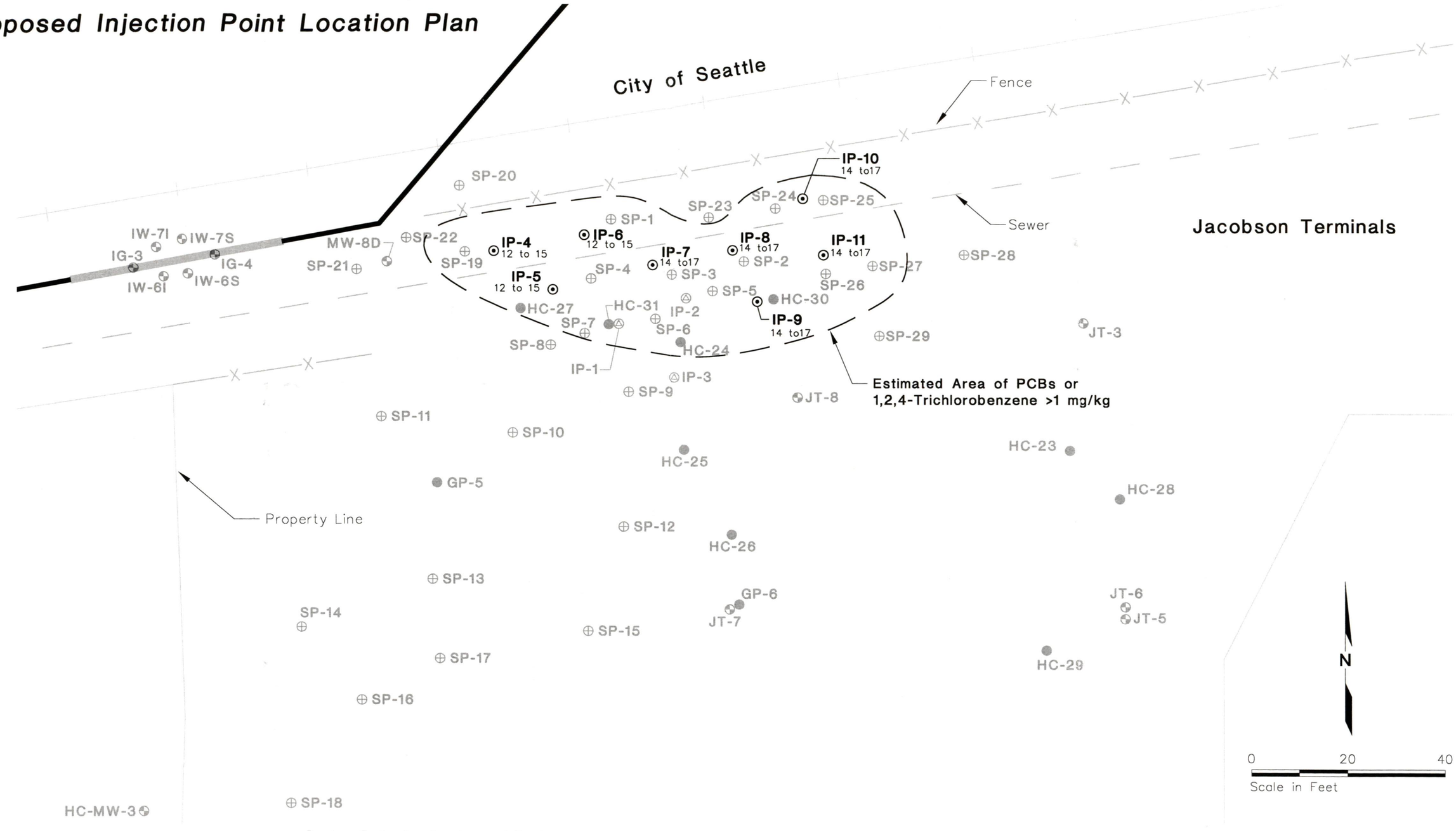
Figure 9

Proposed Injection Point Location Plan



Previous Exploration Location and Number

- JT-7 — Existing Monitoring Well
- HC-24 — Strataprobe Boring
- IP-1 — Injection Point
- SP-1 — Strataprobe Boring Location for PCB/Trichlorobenzene Assessment

- IP-4 / 12 to 15 — Proposed Injection Point / Proposed Depth of Screened Interval in Feet
- Cement–Bentonite Funnel Wall
- Reactive Iron Filings Gate

Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON titled "Northwest Market Street Site," dated June 1995, and from the Department of the Army titled "Land Management Map," dated February 18, 1998.
2. Utility locations are approximate.
3. Samples collected on May 21, 22, 23 and June 6, 2001.

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Figure 10

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ATTACHMENT A
CERTIFICATION OF SAMPLING AND ANALYSIS PLANS

This certifies in accordance with 40 CFR 761.61 that all sampling plans, sample collection procedures, sample preparation procedures, extraction procedures, and instrumental/chemical analysis procedures used to assess or characterize PCB contamination at the cleanup site are on file at the Hart Crowser office located at 1910 Fairview Avenue East, Seattle, Washington, 98102, and are available for EPA inspection.

PROPERTY OWNER:

Alan Jacobson
A&B Jacobson, LLC

PARTY CONDUCTING THE CLEANUP:

Doug Hillman, Principal Hydrogeologist
Hart Crowser, Inc.

ATTACHMENT B
HART CROWSER MEMO 'OCCURRENCE OF CHLORINATED BENZENES AND PCBS, JACOBSON TERMINALS PROPERTY'

MEMORANDUM

DATE: May 7, 2001

TO: Al Jacobson, A&B Jacobson, LLC

FROM: Jeremy Porter and Doug Hillman, Hart Crowser

RE: **Occurrence of Chlorinated Benzenes and PCBs**
Jacobson Terminals Property
4063-12

This memorandum summarizes the data collected to date regarding the occurrence of chlorinated benzenes and polychlorinated biphenyls (PCBs) on the Jacobson Terminals property in the Ballard district of Seattle, Washington. The following are summarized below:

- A history of investigative and remedial actions relevant to chlorinated benzene and PCB occurrences;
- A site conceptual model; and
- Recommendations for future work.

SUMMARY OF INVESTIGATIVE AND REMEDIAL ACTIONS

Chlorinated benzenes were detected on the Jacobson Terminals property during several investigations and remedial actions performed for other contaminant occurrences. The only chlorinated benzene detected above groundwater screening levels was p-dichlorobenzene. This chemical was not known to have ever been used or stored at the site. Relevant data from the investigations are summarized below. Groundwater and soil chemical data are summarized in Tables 1 and 2, respectively.

Market Street Property Chlorinated Solvent Plume Delineation

Between 1996 and 1999, several investigations were conducted on the Jacobson Terminals property to monitor a chlorinated solvent plume originating from the upgradient Market Street property. Exploration locations are shown on Figure 1. These included the following:

1910 Fairview Avenue East
Seattle, Washington 98102-3699
Fax 206.328.5581
Tel 206.324.9530

- Wells JT-1, JT-2, JT-3, and JT-4 installed by Hart Crowser in February 1996 (Hart Crowser 1998a). Wells JT-1 and JT-2 were abandoned in October 1999;

- Geoprobe borings GP-1 through GP-6 advanced by EMCON in June 1996 (EMCON 1996); and

- Wells JT-5, JT-6, and JT-7 installed by Hart Crowser in March 1999 (Hart Crowser 1999).

In borings GP-6 and wells JT-6 and JT-7, p-dichlorobenzene was detected in groundwater at concentrations exceeding surface water cleanup standards (EMCON 1996; Hart Crowser 1999). A summary of chlorinated benzene concentrations in Jacobson Terminals property wells is provided in Table 1.

Corps Property TPH-Impacted Soil Removal

In August 1994, investigations by Hart Crowser and Woodward-Clyde (Hart Crowser 1996) indicated localized PCB contamination near a transformer and along the Corps-Jacobson Terminals property boundary. Hart Crowser borings HC-2, HC-3, and HC-4 indicated trace or non-detect concentrations of PCBs to the east and north of the transformer, effectively bounding the localized impacts. In August 1996, TPH-contaminated soil was removed from the transformer boundary shown on Figure 1 (Hart Crowser 1997). PCBs were not detected in side wall and bottom verification samples collected after the excavation. Three wells (HC-MW-1, HC-MW-2, and HC-MW-3) were installed in September 1996 around the excavated area on the Corps and Jacobson Terminals properties. In HC-MW-2, p-dichlorobenzene was detected at a concentration of 6 ug/L, slightly exceeding the MTCA surface water cleanup level (Hart Crowser 1998b). Chlorinated benzenes were not detected in wells HC-MW-1 and HC-MW-3.

p-Dichlorobenzene Remediation Phase I—ORC Injection

The limited area in which p-dichlorobenzene was detected appeared indicative of a low-level residual occurrence. Since p-dichlorobenzene is aerobically biodegraded, the regular ORC injections planned for removal of other chlorinated constituents (cis-DCE and vinyl chloride) under the Market Street Property Cleanup Action Plan (Hart Crowser 1999) were designed to also remediate p-dichlorobenzene. Time-series results of groundwater monitoring for p-dichlorobenzene concentrations at wells JT-6 and JT-7 following ORC injection events is presented on Figure 2.

Dichlorobenzene Assessment

Although p-dichlorobenzene concentrations declined slightly following ORC injections, concentrations still exceeded surface water cleanup levels and did not decline as noticeably as concentrations of other targeted chlorinated constituents. This pattern indicated the potential for a source of p-dichlorobenzene upgradient of the ORC treatment area, thus limiting effectiveness of the injection events.

In October 2000, a Strataprobe investigation was conducted to further delineate the p-dichlorobenzene plume and identify a possible source of the groundwater contamination (Hart Crowser 2000). Boring locations are presented on Figure 1, and analytical results and sample depths are presented in Tables 1 and 2. Small DNAPL droplets were observed in a groundwater sample collected from boring HC-24, located approximately 100 feet upgradient of JT-6. Chemical testing indicated the presence of chlorobenzene and m-, o-, and p-dichlorobenzene in this sample. Borings located 20 feet away in cross- and downgradient directions of HC-24 indicated high dissolved concentrations of p-dichlorobenzene but no evidence of free product. The p-dichlorobenzene concentrations in groundwater declined rapidly in all directions from this source area.

The injection program was approved in a January 4, 2001, letter from the Washington State Department of Ecology referencing the site as UIC Site 12133.

p-Dichlorobenzene Remediation Phase 2—In Situ Oxidation

Since ORC had not been successful in remediating the dissolved p-dichlorobenzene plume, a more aggressive source area treatment was initiated in which concentrated hydrogen peroxide was injected into the observed source area around HC-24 to destroy p-dichlorobenzene *in situ*. The injection point and monitoring well locations are shown on Figure 1. The injection program consisted of the following activities:

- Installing three 2-inch-diameter steel injection points (IP-1, IP-2, and IP-3) in the most contaminated soil zone (15 to 18 feet deep);

- Installing monitoring well JT-8 approximately 30 feet downgradient of the source area, to monitor injection performance;

- Injecting 35 percent hydrogen peroxide into the injection points. Injection consisted of a staged process in which peroxide is pumped into the injection point under pressure

until no more volume can be injected. The process is repeated after allowing the subsurface pressure to release; and

- Monitoring source area and downgradient wells after the peroxide has dissipated, typically one to two weeks after an injection round.

Two injection rounds were performed in January and March 2001. Chemical results before and after the injections at wells IP-1, IP-2, IP-3, and JT-8 are summarized in Table 1. Concentrations of p-dichlorobenzene declined in injection point wells but increased in the downgradient well JT-8. This may be the result of the mixing action of injecting peroxide increasing the contact between DNAPL and groundwater, as well as groundwater mounding from the injections pushing the dissolved contaminant plume from the source area.

Drill cuttings from wells IP-1, IP-2, IP-3, and JT-8 were collected and characterized for disposal. During characterization, higher molecular weight chlorinated benzenes (primarily 1,2,4-trichlorobenzene) and PCBs were detected in soil. The highest concentrations were detected in cuttings from IP-1, with total PCB concentrations estimated to be approximately 360 mg/kg and the 1,2,4-trichlorobenzene concentration estimated to be 230 mg/kg. The PCB mixture was identified as Aroclor 1260. Groundwater from well IP-1 exhibited a strong mothball-like odor, which is characteristic of chlorobenzenes. Analytical results from drum samples are summarized in Table 2.

PCB and Trichlorobenzene Initial Assessment

Based on the drum sample analytical results, groundwater at monitoring wells JT-3, JT-5, JT-6, and JT-7 was collected and analyzed for PCBs by EPA Method 8081 and trichlorobenzenes by EPA Method 8260 in April 2001. Neither PCBs nor trichlorobenzenes were detected in these wells; however, the surface water cleanup level is less than the method detection limit for PCBs. Samples from injection point wells IP-1, IP-2, and IP-3 and monitoring well JT-8 were analyzed for trichlorobenzenes by EPA Method 8260. 1,2,4-trichlorobenzene was detected at concentrations between 19 and 4,000 ug/L in source area wells and at 250 ug/L at JT-8.

SITE CONCEPTUAL MODEL

Potential Sources

The source of p-dichlorobenzene in groundwater in wells JT-6 and JT-7 appears to be the source area identified around boring HC-24 during the October 2000 Strataprobe investigation. This source area apparently contains soil impacted with trichlorobenzene and PCBs, and field observations indicate that some DNAPL may be present in the area immediately around HC-24. The DNAPL was observed at an approximate depth of 17 feet. This area is in the middle of the yard. Two transformers were reportedly stored near this area for a short time in the middle 1970s, when the area was not paved. The approximate area in which transformers were stored is shown on Figure 3. Mixtures of PCBs and trichlorobenzenes were often used together in transformer oil before PCBs were banned in the late 1970s. It is possible the contamination detected in this area came from an unreported release of transformer oil from this general time period.

Dichlorobenzenes and chlorobenzene have been detected in soil in the source area but at lower concentrations than trichlorobenzene and PCBs. Chloro- and dichlorobenzenes may be an impurity in the trichlorobenzene/PCB oil or be a byproduct of trichlorobenzene biodegradation. Under anaerobic conditions some bacteria have been found to reductively dechlorinate trichlorobenzene to produce dichlorobenzene. Groundwater conditions at the site are generally anaerobic.

Depth of Contamination

The upper 17 to 18 feet of soil on Jacobson Terminals is generally fill material consisting of sand to silty sand. Below 17 feet is a silt layer typically 3 to 4 feet thick. The absence of chlorinated benzenes in the shallow sample from boring GP-6 (4- to 8-foot depth, near the top of the water table) and in well JT-5 (26- to 29-foot depth, below the silt layer) indicates that contamination is confined to soil and groundwater just above the silt layer. Some residual soil contamination may be present in shallower soils if a past surface release occurred; however, it appears the bulk of contamination has accumulated at the top of the confining silt layer.

Contaminant Migration

PCBs are very hydrophobic and thus are not easily transported by groundwater. PCBs do not appear to migrate far from the source area as they were not detected in wells JT-6, JT-7, or JT-3. Chlorinated benzenes with more chlorine atoms are generally more hydrophobic;

therefore, trichlorobenzene is more hydrophobic than dichlorobenzene. This explains why higher concentrations of trichlorobenzene than dichlorobenzene have been detected in soil, yet dichlorobenzene has been detected at higher concentrations in downgradient monitoring wells. In addition, trichlorobenzene may be degraded to dichlorobenzene, thereby increasing dichlorobenzene concentrations downgradient of the source area. Of the PCBs and chlorinated benzenes detected in soil, only p-dichlorobenzene has been detected in monitoring wells JT-3, JT-6, or JT-7 at concentrations above MTCA surface water cleanup levels.

RECOMMENDATIONS

PCBs and trichlorobenzene were not analyzed for in the site assessment that identified the p-dichlorobenzene source area. Although the evidence suggests that these chemicals may be collocated, additional characterization is needed to define the extent of PCB and trichlorobenzene contamination. Additional remediation actions will have to take into account the presence of these other constituents. Although hydrogen peroxide is also effective for these chemicals, the potential presence of PCBs and trichlorobenzene as DNAPL calls for a re-evaluation of remedial options. An additional site investigation should delineate PCB and trichlorobenzene occurrences as well as provide sufficient information to further plan a remedial strategy.

We recommend the following approach.

- **Conduct a Field Investigation Using a Direct-Push Drill Rig.** Advance borings at locations shown on Figure 3. Collect continuous soil samples to identify soil contacts and potential contaminant migration routes or confining layers; screen for the presence of DNAPL and odor; and analyze selected samples for PCBs by EPA Method 8081 and for chlorinated benzenes by EPA Method 8260. Borings would be advanced to the confining silt layer and in selected cases beneath this layer to characterize deeper soils and test for migration of contaminants beneath the silt layer. This investigation would delineate both the vertical and horizontal extent of DNAPL and residual soil contamination.

- **Prepare a Cleanup Action Plan.** This would include a focused feasibility study that evaluates remedial options for the site and proposes a cleanup action to obtain a No Further Action letter from the Washington State Department of Ecology.

Attachments:
References
Table 1 – Summary of Chlorinated Benzene and PCB Concentrations in Groundwater
Table 2 – Summary of Chlorinated Benzene and PCB Concentrations in Soil
Figure 1 – Exploration and Excavation Location Map
Figure 2 – Effect of ORC Injection on p-Dichlorobenzene Concentrations
Figure 3 – Proposed PCB and Trichlorobenzene Assessment Map

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REFERENCES

EMCON, 1996. Interim Report on Independent Cleanup, 2801 Northwest Market Street. Prepared for Fentron Building Products, December 1996.

Hart Crowser, 1996. Independent Cleanup Action Work Plan, Jacobson Terminals, Chittenden Locks. Prepared for Jacobson Terminals. June 10, 1996.

Hart Crowser, 1997. Petroleum Contaminated Soil Removal, Lake Washington Ship Canal. Prepared for Seattle District U.S. Army Corps of Engineers and Jacobson Terminals. March 1997.

Hart Crowser, 1998a. Summary of Groundwater Assessment Results and Request for Ecology Assistance. September 16, 1998.

Hart Crowser, 1998b. Results of December 1997 Groundwater Sampling and Analysis, Lake Washington Ship Canal, January 29, 1998.

Hart Crowser, 1999. Cleanup Action Plan Vol. I, Market Street Property. Prepared for A&B Jacobson, LLC. June 22, 1999.

Hart Crowser, 2000. Occurrence and Proposed Remediation of p-Dichlorobenzene, Jacobson Terminals Property. December 14, 2000.

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Table 1 - Summary of Chlorinated Benzene and Aroclor 1260 Concentrations in Groundwater

Location	Depth in Feet	Date	Concentration in ug/L						
			Chlorobenzene	m-Dichlorobenzene	p-Dichlorobenzene	o-Dichlorobenzene	1,2,4-Trichlorobenzene	1,2,3-Trichlorobenzene	Aroclor 1260 [a]
Surface Water Cleanup Level			*5,030*	*na*	*4.86*	*4,200*	*227*	*na*	*0.000027*
GP-5	11.5 to 15.5	6/15/1996	0.5 U	0.5 U	0.5 U	0.5 U	2	2 U	
GP-6	4 to 8	6/15/1996	0.5 U	0.5 U	0.5 U	0.5 U	2	2 U	
	14.5 to 18.5	6/15/1996	47	700	730	14	11	2 U	
HC-MW-1	4 to 14	9/26/1996							4 U
	4 to 14	12/11/1997	0.5 U	0.5 U	0.5 U	0.5 U	2.0	2 U	0.0052 U
HC-MW-2	4 to 13	9/26/1996							4 U
	4 to 13	12/11/1997	100	4.7	6.0	1.3			0.0052 U
HC-MW-3	6 to 11	9/26/1996							4 U
	6 to 11	12/11/1997	0.5 U	0.5 U	0.5 U	0.5 U	2.0	2 U	0.0052 U
	6 to 11	1/20/2000	5 U	1 U	1 U	1 U			
	6 to 11	4/7/2000	5 U	1 U	1 U	1 U			
	6 to 11	7/7/2000	5 U	1 U	1 U	1 U			
	6 to 11	10/11/2000	5 U	1 U	1 U	1 U			
	6 to 11	1/16/2001	5 U	1 U	1 U	1 U			
IP-1	14 to 17	2/20/2001	5 U	140	1300	670			
	14 to 17	4/10/2001	55	100	140	59	850	110	
IP-2	14 to 17	2/20/2001	120	140	200	54			
	14 to 17	4/10/2001	5	14	110	210	4000	590	
IP-3	14 to 17	2/20/2001	88	19	30	1 U			
	14 to 17	4/10/2001	47	7.7	9.4	1.4	19	3.1	
JT-3	11.5 to 16.5	3/15/1996	4 U	5 U	5 U	5 U	5 U		
	11.5 to 16.5	3/22/1999	140	77	44	10			
	11.5 to 16.5	7/30/1999	74	25	19	3.2			
	11.5 to 16.5	10/15/1999		15	8.7	1.4			
	11.5 to 16.5	1/20/2000	130	34	25	2.8			
	11.5 to 16.5	4/7/2000	100	25	16	2.8			
	11.5 to 16.5	7/7/2000	56	12	10	2			
	11.5 to 16.5	10/11/2000	45	1 U	1 U	1 U			
	11.5 to 16.5	1/16/2001	84	24	19	3.1			
	11.5 to 16.5	4/10/2001	50	6.9	5.6	1 U	1 U	1 U	0.4 U

Location	Depth in Feet	Date	Concentration in ug/L						
			Chlorobenzene	m-Dichlorobenzene	p-Dichlorobenzene	o-Dichlorobenzene	1,2,4-Trichlorobenzene	1,2,3-Trichlorobenzene	Aroclor 1260 [a]
Surface Water Cleanup Level			*5,030*	*na*	*4.86*	*4,200*	*227*	*na*	*0.000027*
JT-5 [3]	26 to 29	3/22/1999	5 U	1 U	1 U	1 U			
	26 to 29	7/30/1999	5 U	1 U	1 U	1 U			
	26 to 29	4/10/2001	1 U	1 U	1 U	1 U	1 U	1 U	0.4 U
JT-6	14 to 19	3/22/1999	300	570	360	47			
	14 to 19	6/17/1999	5 U	580	300	31			
	14 to 19	7/30/1999	410	400	270	24			
	14 to 19	10/15/1999		240	120	19			
	14 to 19	10/18/1999		250	130	9.2			
	14 to 19	1/21/2000	840	260	180	13			
	14 to 19	4/7/2000	610	270	170	17			
	14 to 19	7/7/2000	300	220	190	18			
	14 to 19	10/11/2000	550	330	250	1 U			
	14 to 19	1/16/2001	1100	230	190	18			
	14 to 19	4/10/2001	660	260	170	16	1 U	1 U	0.4 U
JT-7	14 to 19	3/22/1999	160	190	180	16			
	14 to 19	7/30/1999	240	140	140	16			
	14 to 19	10/15/1999		110	93	6.8			
	14 to 19	10/18/1999		97	88	3.3			
	14 to 19	1/21/2000	140	150	150	9.1			
	14 to 19	4/7/2000	140	120	110	6.7			
	14 to 19	7/7/2000	200	140	200	10			
	14 to 19	10/11/2000	190	90	110	5.3			
	14 to 19	1/16/2001	26	20	22	1 U			
	14 to 19	4/10/2001	180	77	82	4.1	1 U	1 U	0.4 U
JT-8	14 to 17	1/11/2001	630	260	160	21			
	14 to 17	2/20/2001	530	210	200	1 U			
	14 to 17	4/10/2001	150	660	670	18	250	26	

Notes:

Blank indicates sample not analyzed for specific analyte.

[a] Aroclor 1016, 1221, 1232, 1242, 1248, and 1254 were analyzed for and not detected.

na not available

U not detected at detection limit indicated.

Table 2 - Summary of Chlorinated Benzene and Aroclor 1260 Concentrations in Soil

Location	Depth in Feet	Date	Concentration in mg/kg							
			Chlorobenzene	m-Dichlorobenzene	p-Dichlorobenzene	o-Dichlorobenzene	1,2,4-Trichlorobenzene	1,2,3-Trichlorobenzene	1,2,3,4-Tetrachlorobenzene	Aroclor 1260 [a]
Method B Direct Contact Cleanup Level			*1,600*	*7,200*	*41.7*	*na*	*800*	*na*	*na*	*0.13*
Corps Area PCB Investigation										
HC-1 S-3	4 to 4.5	4/4/1994								30
HC-3 S-1	2 to 3.5	4/4/1994								0.16 J
Corps Area Excavation Verification Samples										
HC-EX-IL (Bottom)		8/21/1996								0.2 U
HC-EX-2L (Bottom)		8/21/1996								0.2 U
HC-EX-3L (Bottom)		8/21/1996								0.2 U
HC-EX-4L (North Wall)		8/21/1996								0.2 U
HC-EX-5L (East Wall)		8/21/1996								0.2 U
HC-EX-6L (South Wall)		8/21/1996								0.2 U
HC-EX-7L (West Wall)		8/21/1996								0.2 U
p-Dichlorobenzene Assessment										
HC-31 S-2	11 to 14	10/25/2000	0.58	0.21	0.38	4.0				
HC-31 S-3	14 to 17	10/25/2000	0.25 U	0.23	0.32	0.43				
In Situ Oxidation Wells										
IP-1	Drill Cuttings	2/20/2001	0.50 U	0.66	2.7	3.2	230 TIC	17 TIC	3.1 TIC	360 TIC
IP-2	Drill Cuttings	4/11/2001	0.26	0.92	2.9	4.7	560	13		110
IP-3	Drill Cuttings	4/11/2001	0.12	0.17	0.33	0.05 U	2.8	0.45		0.2 U
JT-8	Drill Cuttings	2/20/2001	0.25 U	0.05 U	0.37	0.05 U				
JT-8	Drill Cuttings	4/11/2001								2.5

Notes:

Blank indicates sample not analyzed for specific analyte.

[a] Aroclor 1016, 1221, 1232, 1242, 1248, and 1254 were analyzed for and not detected.

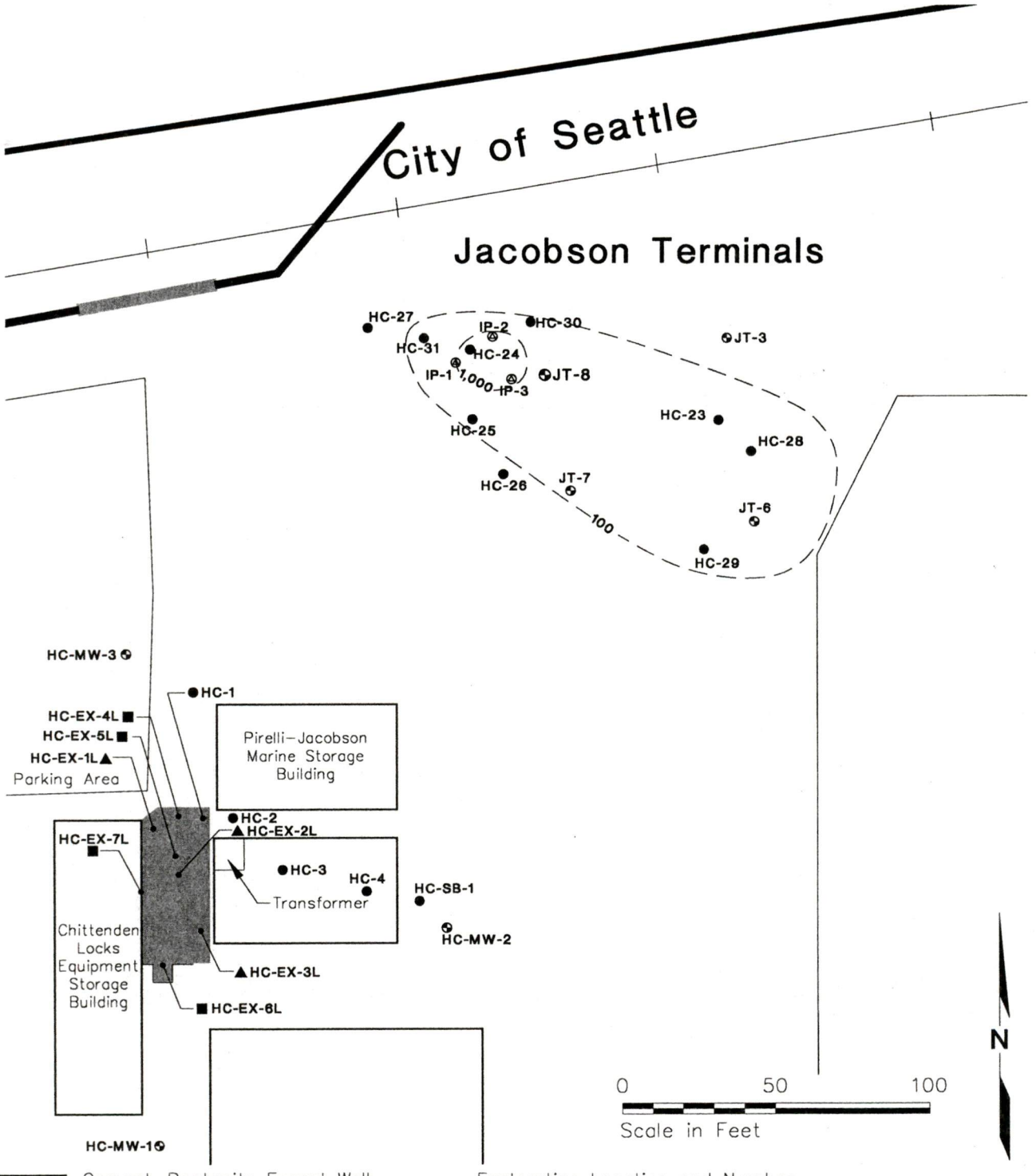
TIC Estimated value based on estimated concentrations of Tentatively Identified Compounds via USEPA Method 8270C

U Not detected at indicated detection limit

J Estimated value

na not available

Exploration and Excavation Location Map



Cement-Bentonite Funnel Wall

Reactive Iron Filings Gate

—100— p-Dichlorobenzene Concentration Contour in µg/L (in October 2000 before peroxide injection)

Excavation Area

Exploration Location and Number

● HC-SB-1	Soil Boring
⊗ HC-MW-1	Groundwater Monitoring Well
▲ HC-EX-1L	Verification Bottom Sample
■ HC-EX-4L	Verification Side Wall Sample
● HC-24	Strataprobe Boring
⊗ IP-1	Injection Point

Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON entitled "Northwest Market Street Site," dated June 1995, and from the Department of the Army entitled "Land Management Map," dated February 18, 1998.
2. Building locations and dimensions are approximate.

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Figure 1

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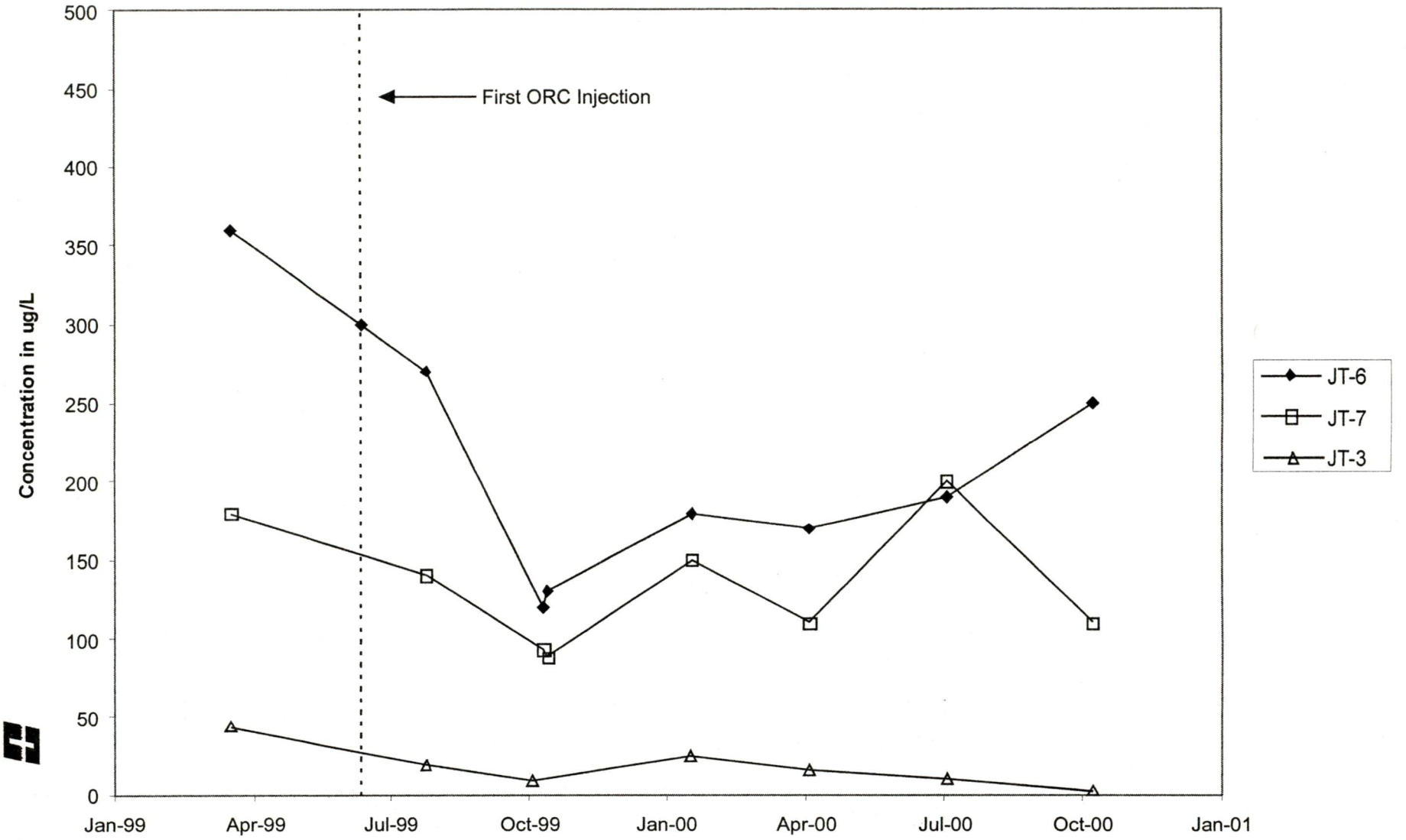
Effect of ORC Injection on p-Dichlorobenzene Concentrations



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J-4063-12 5/01

Figure 2

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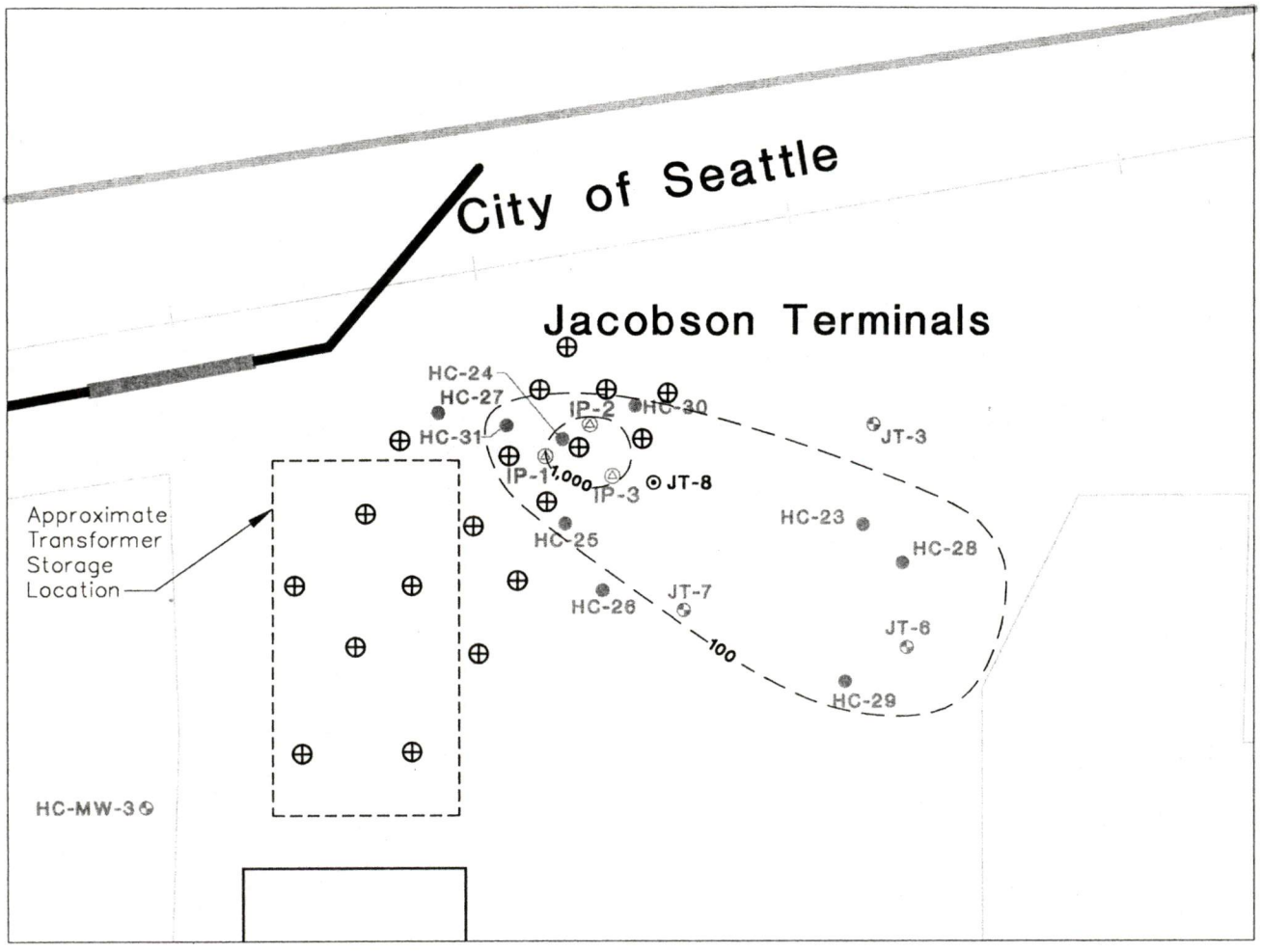
Proposed PCB and Trichlorobenzene Assessment



0 50 100

Scale in Feet

N

Cement–Bentonite Funnel Wall

Reactive Iron Filings Gate

— —100— — p–Dichlorobenzene Concentration Contour in µg/L (in October 2000 before peroxide injection)

Exploration Location and Number

JT-7 Existing Monitoring Well

HC-24 Strataprobe Boring

IP-1 Injection Point

⊕ Proposed Strataprobe Boring Location

Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON entitled "Northwest Market Street Site," dated June 1995, and from the Department of the Army entitled "Land Management Map," dated February 18, 1998.
2. Building locations and dimensions are approximate.
3. Measurements made and samples collected on October 11, 12, and 24, 2000.

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J-4063-12 5/01

Figure 3

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40631204

ATTACHMENT C
HART CROWSER MEMO 'PCB AND TRICHLOROBENZENE ASSESSMENT RESULTS, JACOBSON TERMINALS PROPERTY'

MEMORANDUM

DATE: June 20, 2001

TO: Al Jacobson, A&B Jacobson, LLC

FROM: Jeremy Porter and Doug Hillman, Hart Crowser

RE: **PCB and Trichlorobenzene Assessment Results**
4063-12

This memo summarizes the results of the PCB and Trichlorobezene Assessment for the Jacobson Terminals property located 5355 28th Avenue NW in the Ballard district of Seattle. Groundwater monitoring at the site indicated concentrations of *m-*, *o-*, and *p*-dichlorobenzene in groundwater, with *p*-dichlorobenzene concentrations exceeding Model Toxics Control Act Method B cleanup levels. Hart Crowser performed a subsurface investigation in October 2000 to identify the dichlorobenzene source, and a hot-spot area was identified on the north end of the property. Three injection points – IP-1, IP-2, and IP-3 – were installed in this area in January 2001 to be used for injecting hydrogen peroxide to destroy the dichlorobenzenes *in situ*. Monitoring well JT-8 was installed downgradient of the area to monitor remediation effectiveness.

PCBs and trichlorobenzene were detected in drill cuttings from wells IP-1 and IP-2. In response to these detections, Hart Crowser conducted a subsurface investigation on May 21, May 22, and May 23, 2001, to define the vertical and horizontal extent of PCB and trichlorobenzene contamination. After receiving the results of the initial investigation, Hart Crowser conducted a follow-up investigation on June 6, 2001, to finish delineating the extent of contamination. The field methods and results of the PCB and trichlorobenzene assessment are summarized below.

FIELD METHODS

Boring locations are shown on Figure 1. Borings were drilled using a direct-push drill rig, and continuous 4-foot-long soil samples were collected, logged, and inspected for evidence of contamination. Boring logs are provided in Appendix A. Three groundwater samples were collected with a peristaltic pump and analyzed for volatile organic compounds by EPA Method 8260. Fifty-three soil samples were submitted for analysis for PCBs by EPA Method

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8082 and for volatile organic compounds by EPA Method 8260. A diesel odor was detected in sample SP-18 S-1, and this sample was submitted for analysis for diesel-range petroleum by NWTPH-Dx.

CHEMICAL RESULTS

Chlorinated benzene and PCB concentrations detected in soil samples are summarized in Table 1. Chlorinated benzene concentrations detected in groundwater samples are summarized in Table 2. Chemical results for trichlorobenzene and Aroclor 1260 are displayed with their boring locations on Figure 2. Laboratory certificates of analysis are included in Appendix B.

The primary constituents detected in soil were 1,2,4-trichlorobenzene at concentrations up to 45 mg/kg and PCBs (Aroclor 1260) at concentrations up to 820 mg/kg. No other Aroclor mixtures were detected. Lower concentrations of chlorobenzene (up to 15 mg/kg), 1,2,3-trichlorobenzene (up to 2 mg/kg), and dichlorobenzene isomers (less than 1 mg/kg) were also detected in soil. The highest concentrations were detected at depths between 8 and 16 feet; concentrations decreased significantly below 16 feet. A 2- to 3-foot-thick clay layer at this depth was observed across the impacted area, and likely prevents deeper migration of the contaminants.

LIMITATIONS

Work for this project was performed, and this Memorandum prepared, in accordance with generally accepted professional practices for the nature and conditions of the work completed in the same or similar localities, at the time the work was performed. It is intended for the exclusive use of A&B Jacobson, LLC for specific application to the referenced property. This report is not meant to represent a legal opinion. No other warranty, express or implied, is made.

Attachments:
Table 1 - Summary of Chlorinated Benzenes and Aroclor 1260 Concentrations in Soil
Table 2 – Summary of Chlorinated Benzene Concentrations in Groundwater
Figure 1 – Exploration Location Plan
Figure 2 – PCB and Trichlorobenzene Assessment Results
Appendix A – Boring Logs
Appendix B – Laboratory Certificates of Analysis
Environmental Services Network Northwest

Table 1 - Summary of Chlorinated Benzene and Aroclor 1260 Concentrations in Soil

Sample Location	Sample Depth in Feet	Sampling Date	Concentration in mg/kg						
			EPA Method 8260 (Volatile Organic Compounds)						EPA Method 8082 (PCBs)
			CB	m-DCB	p-DCB	o-DCB	1,2,4-TCB	1,2,3-TCB	Aroclor 1260
		Reporting Limits:	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.05*	*0.20*
SP1-S4	12 to 16	5/23/2001	nd	nd	nd	nd	nd	nd	2.7
SP2-S4	12 to 16	5/22/2001	nd	0.84	0.62	nd	11	0.79	550
SP2-S5	16 to 20	5/22/2001	nd	nd	nd	nd	0.52	nd	0.31
SP3-S4	12 to 16	5/22/2001	nd	nd	nd	nd	5.8	0.45	14
SP4-S3	8 to 12	5/23/2001	0.79	0.25	0.55	nd	28	2.0	530
SP4-S4	12 to 16	5/23/2001	nd	nd	nd	nd	0.84	0.21	3.4
SP5-S1	0 to 4	5/22/2001	0.57	nd	nd	nd	nd	nd	18
SP5-S2	4 to 8	5/22/2001	5.80	nd	0.21	nd	nd	nd	3.6
SP5-S5	16 to 20	5/22/2001	nd	nd	nd	nd	0.90	nd	0.43
SP6-S1	0 to 4	5/23/2001	nd	nd	nd	nd	nd	nd	0.35
SP6-S3	8 to 12	5/23/2001	0.17	nd	0.15	nd	nd	nd	nd
SP6-S4	12 to 16	5/23/2001	nd	0.93	0.86	0.18	45	2.5	25
SP6-S5	16 to 20	5/23/2001	nd	0.68	0.56	nd	2.7	nd	1.2
SP7-S4	12 to 16	5/22/2001	nd	0.41	nd	nd	1.6	nd	nd
SP8-S2	4 to 8	5/22/2001	0.31	nd	nd	nd	nd	nd	nd
SP8-S4	12 to 16	5/22/2001	nd	nd	nd	nd	nd	nd	nd
SP9-S4	12 to 16	5/22/2001	0.14	0.45	0.15	nd	nd	nd	nd
SP10-S5	16 to 20	5/22/2001	nd	nd	nd	nd	nd	nd	nd
SP11-S4	12 to 16	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP12-S2	4 to 8	5/22/2001	nd	nd	nd	nd	nd	nd	nd
SP12-S5	16 to 20	5/22/2001	0.24	nd	0.18	nd	nd	nd	nd
SP13-S4	12 to 16	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP14-S2	4 to 8	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP14-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP15-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP15-S7	24 to 28	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP16-S1	0 to 4	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP16-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP17-S1	0 to 4	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP17-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP17-S6	20 to 24	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP18-S1	0 to 4	5/21/2001	nd	nd	nd	nd	nd	0.26	0.22
SP18-S2	4 to 8	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP18-S5	16 to 20	5/21/2001	nd	nd	nd	nd	nd	nd	nd
SP19-S3	8 to 12	5/23/2001	15	0.32	1.4	nd	0.90	nd	820
SP19-S4	16 to 20	5/23/2001	0.71	nd	nd	nd	0.19	nd	0.5
SP20-S4	16 to 20	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP20-S6	20 to 24	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP21-S3	8 to 12	6/6/2001	nd	nd	nd	nd	nd	nd	0.12 J
SP21-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	0.16 J
SP22-S3	8 to 12	6/6/2001	nd	nd	nd	nd	nd	nd	0.16 J
SP22-S5	16 to 20	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP23-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP24-S2	4 to 8	6/6/2001	0.28	nd	0.17	nd	nd	nd	17
SP24-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP25-S1	0 to 4	6/6/2001	nd	nd	nd	nd	nd	nd	9.5
SP25-S4	12 to 16	6/6/2001	nd	nd	nd	nd	nd	nd	nd
SP26-S2	4 to 8	6/6/2001	4.40	nd	0.28	nd	nd	nd	nd
SP26-S4	12 to 16	6/6/2001	0.34	0.62	0.53	nd	26.00	1.80	nd
SP27-S4	12 to 16	6/6/2001	nd	0.38	0.28	nd	3.20	0.28	nd
SP28-S4	12 to 16	6/6/2001	nd	nd	nd	nd	0.16	nd	nd
SP29-S1	0 to 4	6/6/2001	nd	nd	0.21	nd	nd	nd	0.6
SP29-S4	12 to 16	6/6/2001	nd	0.49	0.25	nd	nd	nd	nd

Notes:

nd not detected
J Estimated value
CB chlorobenzene
DCB dichlorobenzene
TCB trichlorobenzene

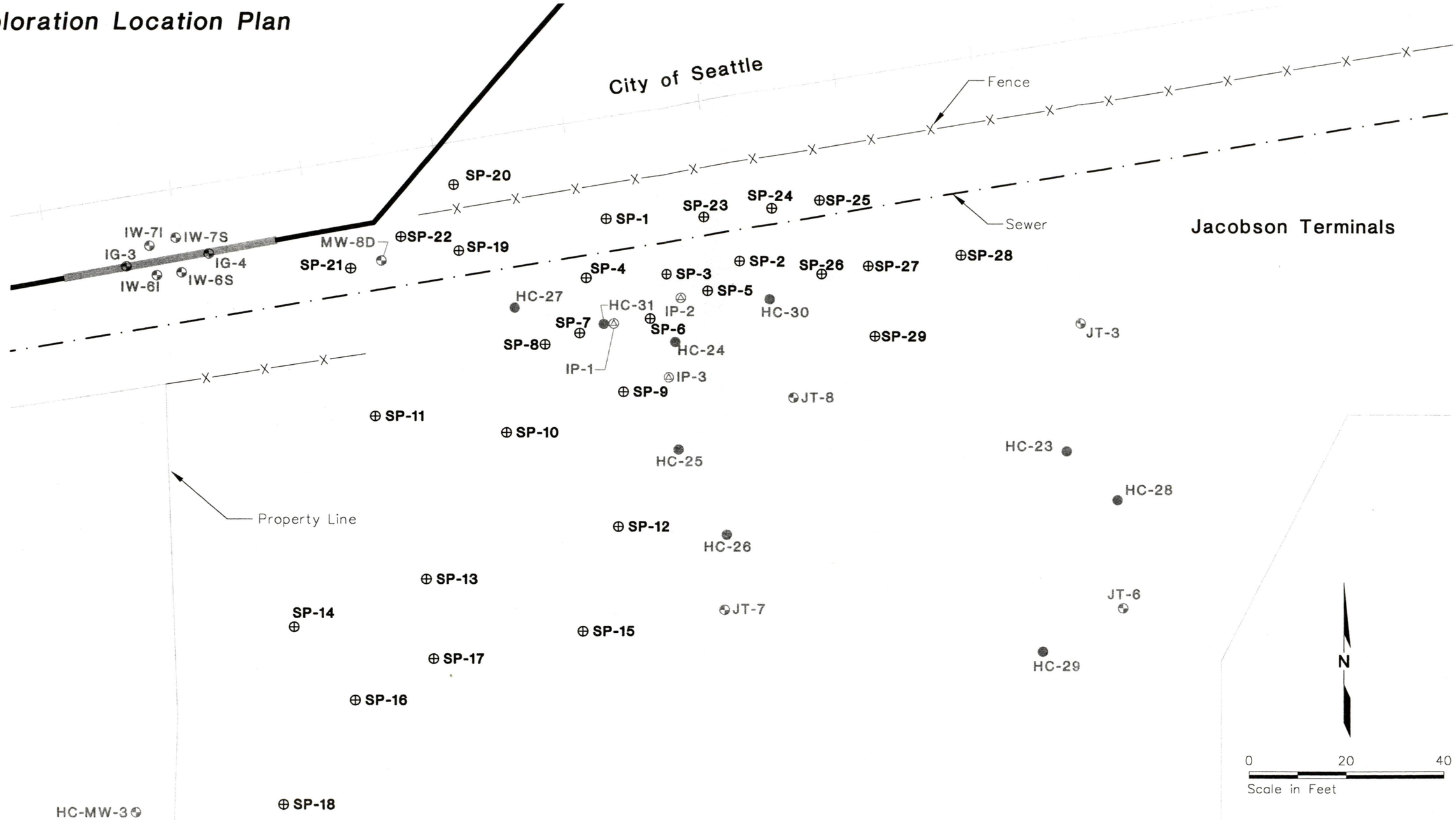
Table 2 - Summary of Chlorinated Benzene Concentrations in Groundwater

Location	Depth in Feet	Date	Concentration in µg/L EPA Method 8260 (Volatile Organic Compounds)					
			CB	m-DCB	p-DCB	o-DCB	1,2,4-TCB	1,2,3-TCB
		Reporting Limits:	*1.0*	*1.0*	*1.0*	*1.0*	*1.0*	*1.0*
SP-15S	14 to 17	5/22/2001	nd	5.0	7.1	nd	nd	nd
SP-15D	21 to 24	5/22/2001	nd	nd	nd	nd	nd	nd
SP-17S	14 to 17	5/21/2001	nd	nd	nd	nd	nd	nd

Notes:

nd not detected
CB chlorobenzene
DCB dichlorobenzene
TCP trichlorobenzene

Exploration Location Plan



Previous Exploration Location and Number

- JT-7 — Existing Monitoring Well
- HC-24 — Strataprobe Boring
- IP-1 — Injection Point
- SP-1 — Strataprobe Boring Location for this Study

- Cement–Bentonite Funnel Wall
- Reactive Iron Filings Gate

Notes:
1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON titled "Northwest Market Street Site," dated June 1995, and from the Department of the Army titled "Land Management Map," dated February 18, 1998.
2. Utility locations are approximate.
3. Samples collected on May 21, 22, 23 and June 6, 2001.

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Figure 1

PCB and Trichlorobenzene Assessment Results

City of Seattle

Fence

Sewer

Jacobson Terminals

Property Line

SP-20		
12 to 16	ND	ND
20 to 24	ND	ND

SP-19		
8 to 12	0.90	820
12 to 16	0.19	0.5

SP-24		
4 to 8	ND	17
12 to 16	ND	ND

SP-3		
12 to 16	5.8	14

SP-23		
12 to 16	ND	ND

SP-1		
12 to 16	ND	2.7

SP-4		
8 to 12	28	530
12 to 16	0.84	3.4

SP-2		
12 to 16	11	550
16 to 20	0.52	0.31

SP-25		
0 to 4	ND	9.5
12 to 16	ND	ND

SP-21		
8 to 12	ND	0.12J
12 TO 16	ND	0.16J

SP-22		
8 to 12	ND	0.16J
16 to 20	ND	ND

SP-28		
12 to 16	0.16	ND

SP-27		
12 to 16	3.20	ND

SP-26		
4 to 8	ND	ND
12 to 16	26	ND

SP-5		
0 to 4	ND	18
4 to 8	ND	3.6
16 to 20	0.90	0.43

SP-29		
0 to 4	ND	0.6
12 to 16	ND	ND

SP-7		
12 to 16	1.6	ND

SP-8		
4 to 8	ND	ND
12 to 16	ND	ND

SP-9		
12 to 16	ND	ND

SP-6		
0 to 4	ND	0.35
8 to 12	ND	ND
12 to 16	45	25
16 to 20	2.7	1.2

SP-11		
12 to 16	ND	ND

SP-10		
16 to 20	ND	ND

SP-12		
4 to 8	ND	ND
16 to 20	ND	ND

SP-13		
12 to 16	ND	ND

SP-14		
4 to 8	ND	ND
16 to 20	ND	ND

SP-15		
16 to 20	ND	ND
24 to 28	ND	ND

SP-17		
0 to 4	ND	ND
16 to 20	ND	ND
20 to 24	ND	ND

SP-16		
0 to 4	ND	ND
16 to 20	ND	ND

SP-18		
0 to 4	ND	0.22
4 to 8	ND	ND
16 to 20	ND	ND

IW-7I IW-7S IG-3 IG-4 IW-6I IW-6S MW-8D

HC-27 HC-31 IP-2 HC-30 HC-24 IP-1 IP-3 JT-3 JT-8 HC-25 HC-23 HC-28 HC-26 JT-6 JT-7 HC-29 HC-MW-3

N

0 20 40

Scale in Feet

Previous Exploration Location and Number

JT-7 Existing Monitoring Well

HC-24 Strataprobe Boring

IP-1 Injection Point

SP-1 Strataprobe Boring Location for this Study

Cement–Bentonite Funnel Wall

Reactive Iron Filings Gate

SP-2

12 TO 16	11	550
16 TO 20	0.52	0.31

Sample Depth in Feet

1,2,4–Trichlorobenzene Concentration in mg/kg

Aroclor 1260 Concentration in mg/kg

ND = Not Detected

J = Estimated Value

Notes:

1. Base map prepared from 1977 aerial photograph by Walker and Associates and figure prepared by EMCON titled "Northwest Market Street Site," dated June 1995, and from the Department of the Army titled "Land Management Map," dated February 18, 1998.
2. Utility locations are approximate.
3. Samples collected on May 21, 22, 23 and June 6, 2001.

DTN 6/20/01 1=1 charlie.pc2
40631206

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Figure 2

APPENDIX A
BORING LOGS

Key to Exploration Logs

Sample Description

Classification of soils in this report is based on visual field and laboratory observations which include density/consistency, moisture condition, grain size, and plasticity estimates and should not be construed to imply field nor laboratory testing unless presented herein. Visual–manual classification methods of ASTM D 2488 were used as an identification guide.

Soil descriptions consist of the following:
Density/consistency, moisture, color, minor constituents, MAJOR CONSTITUENT, additional remarks.

Density/Consistency

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.

SAND or GRAVEL Density	Standard Penetration Resistance (N) in Blows/Foot	SILT or CLAY Consistency	Standard Penetration Resistance (N) in Blows/Foot	Approximate Shear Strength in TSF
Very loose	0 – 4	Very soft	0 – 2	<0.125
Loose	4 – 10	Soft	2 – 4	0.125 – 0.25
Medium dense	10 – 30	Medium stiff	4 – 8	0.25 – 0.5
Dense	30 – 50	Stiff	8 – 15	0.5 – 1.0
Very dense	>50	Very stiff	15 – 30	1.0 – 2.0
		Hard	>30	>2.0

Moisture

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

	Estimated Percentage
Not identified in description	0 – 5
Slightly (clayey, silty, etc.)	5 – 12
Clayey, silty, sandy, gravelly	12 – 30
Very (clayey, silty, etc.)	30 – 50

Legends

Sampling Test Symbols

BORING SAMPLES

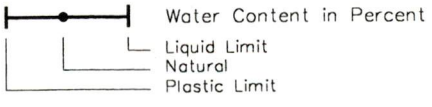
- Split Spoon
- Shelby Tube
- Cuttings
- Core Run
- * No Sample Recovery
- P Tube Pushed, Not Driven

TEST PIT SAMPLES

- Grab (Jar)
- Bag
- Shelby Tube

Test Symbols

GS	Grain Size Classification
CN	Consolidation
UU	Unconsolidated Undrained Triaxial
CU	Consolidated Undrained Triaxial
CD	Consolidated Drained Triaxial
QU	Unconfined Compression
DS	Direct Shear
K	Permeability
PP	Pocket Penetrometer Approximate Compressive Strength in TSF
TV	Torvane Approximate Shear Strength in TSF
CBR	California Bearing Ratio
MD	Moisture Density Relationship
AL	Atterberg Limits



PID	Photoionization Detector Reading
CA	Chemical Analysis
DT	*In Situ* Density Test

Groundwater Observations

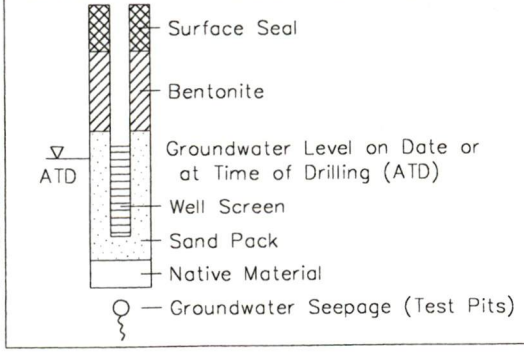


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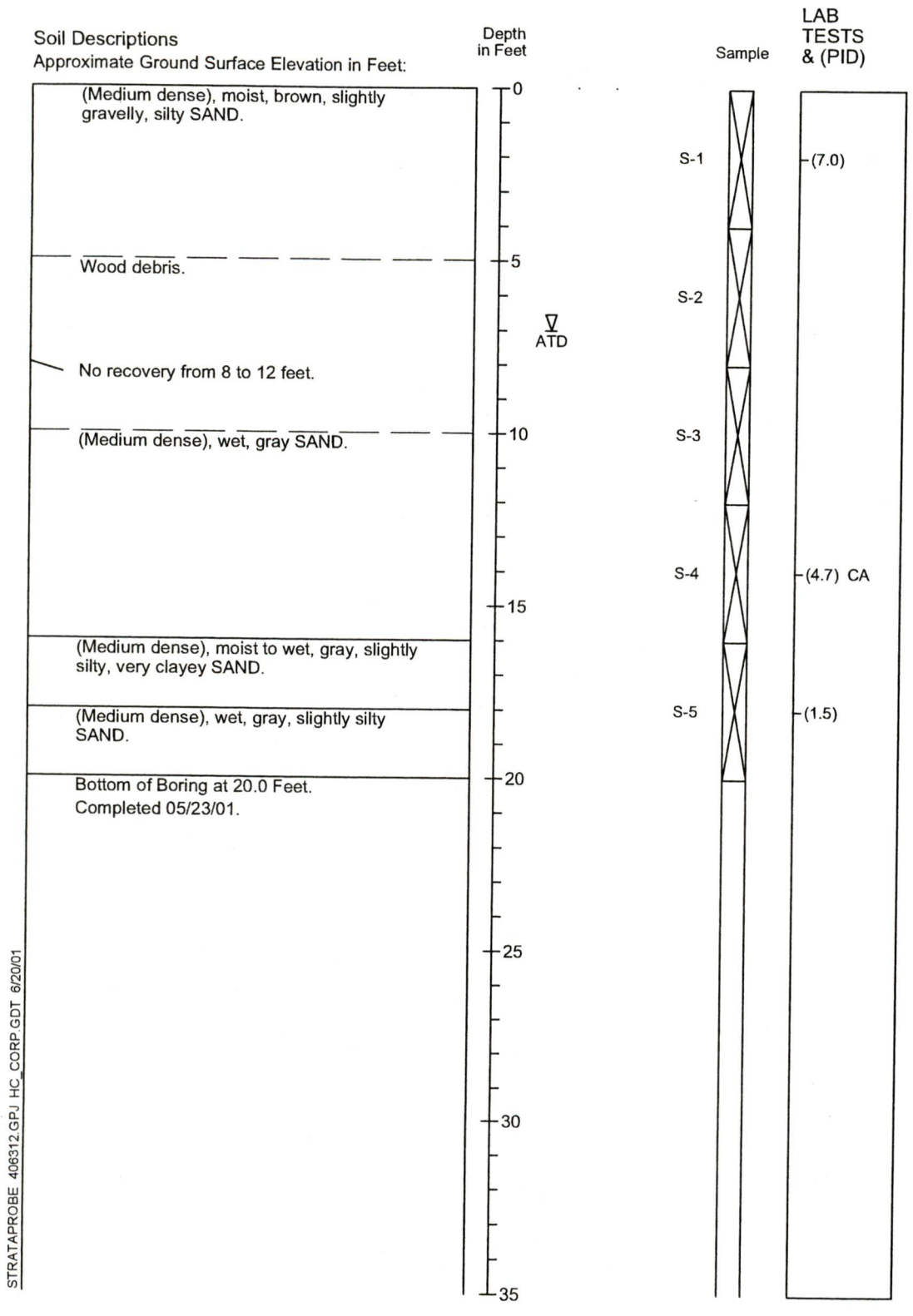
Figure A-1

Strataprobe Boring Log SP-1



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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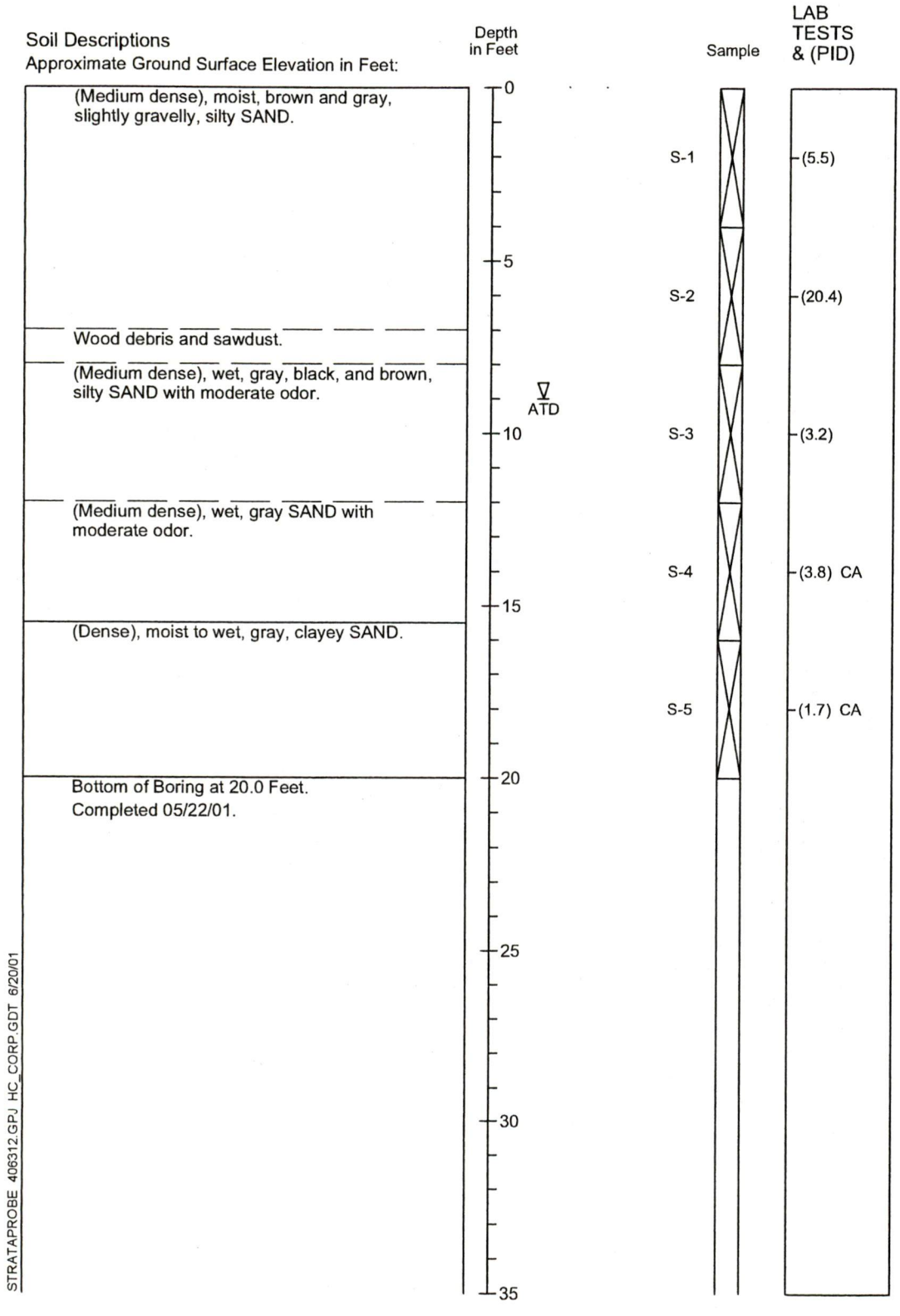
Figure A-2

Strataprobe Boring Log SP-2



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1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
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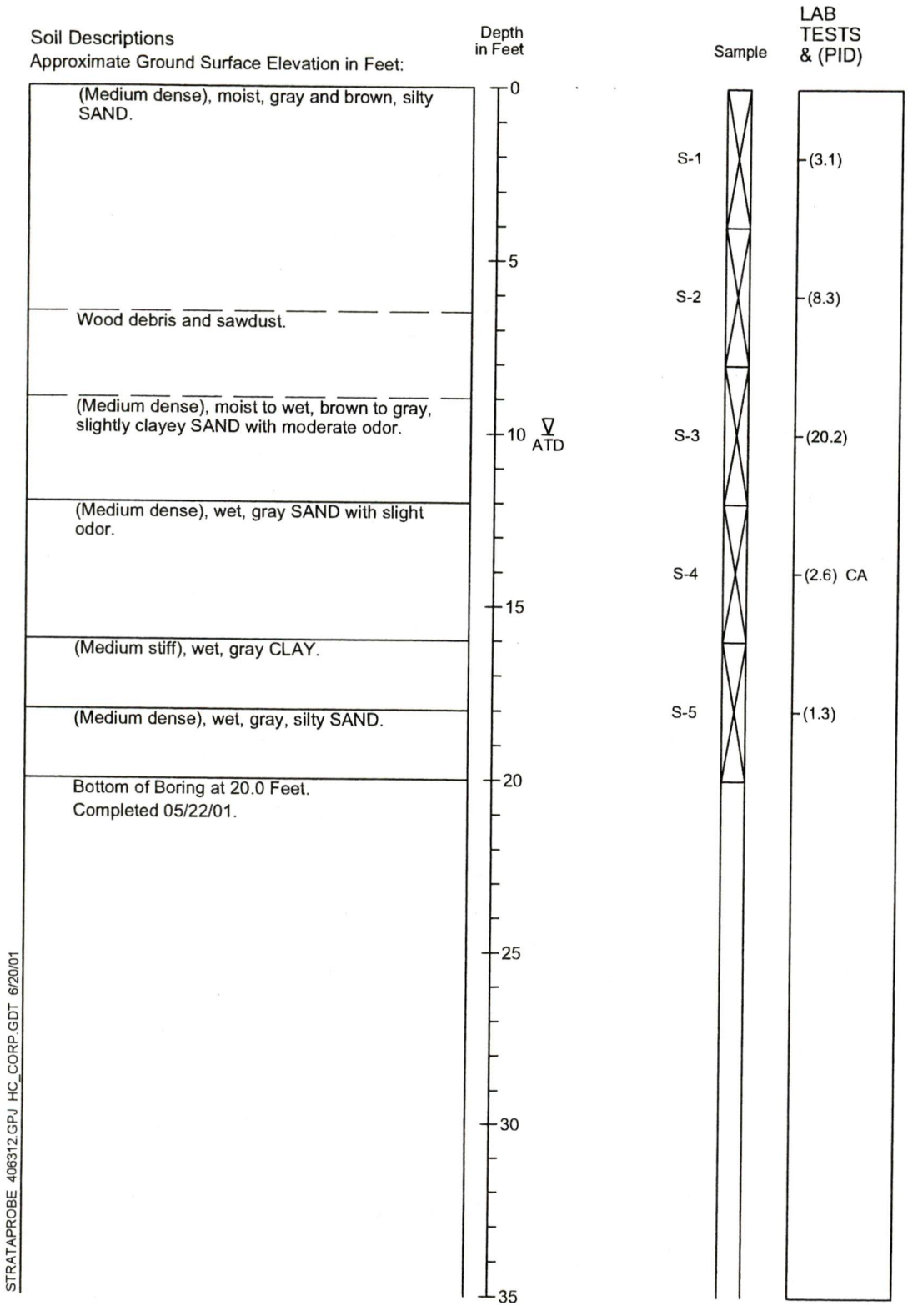
Figure A-3

Strataprobe Boring Log SP-3



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2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
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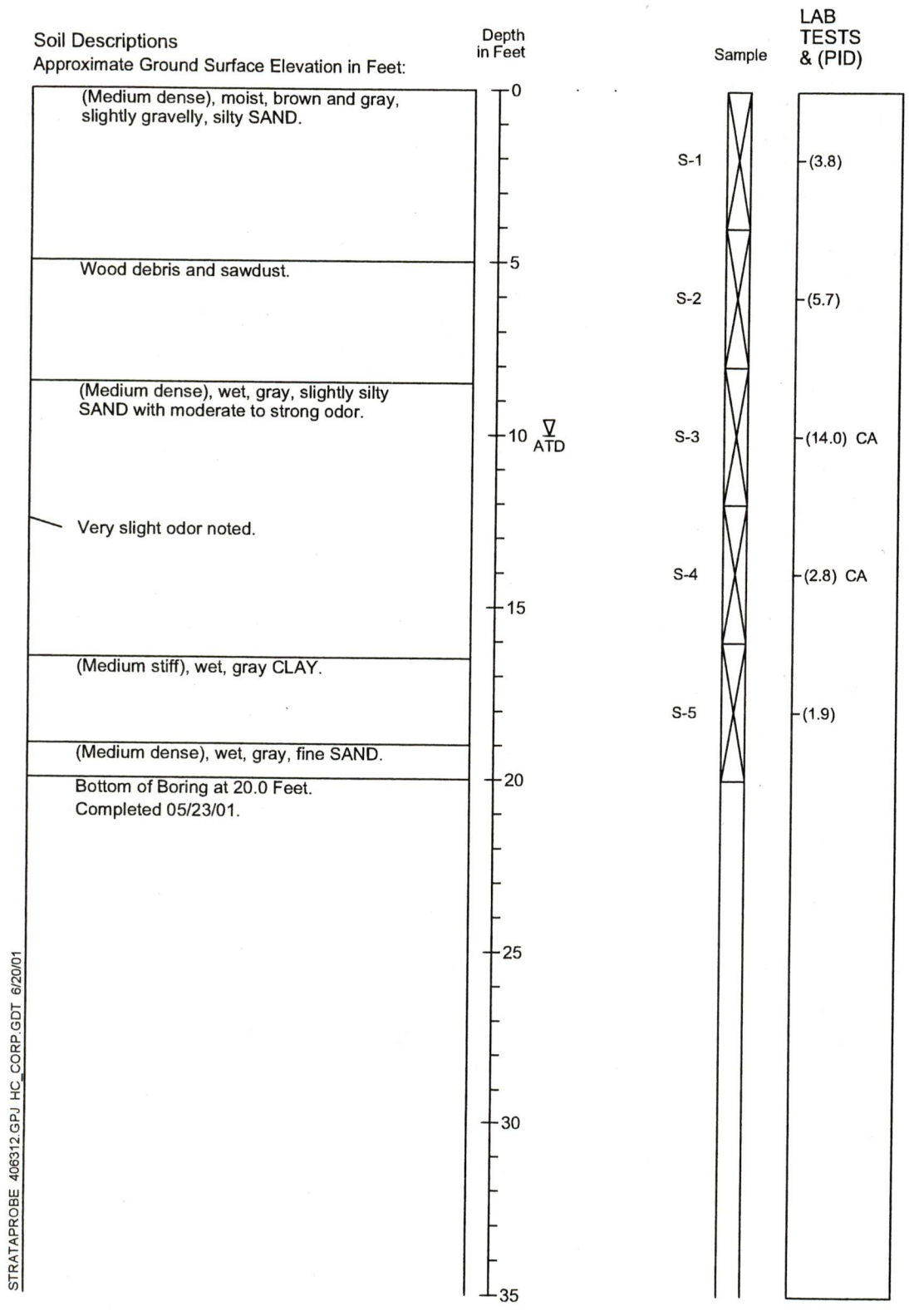
Figure A-4

Strataprobe Boring Log SP-4



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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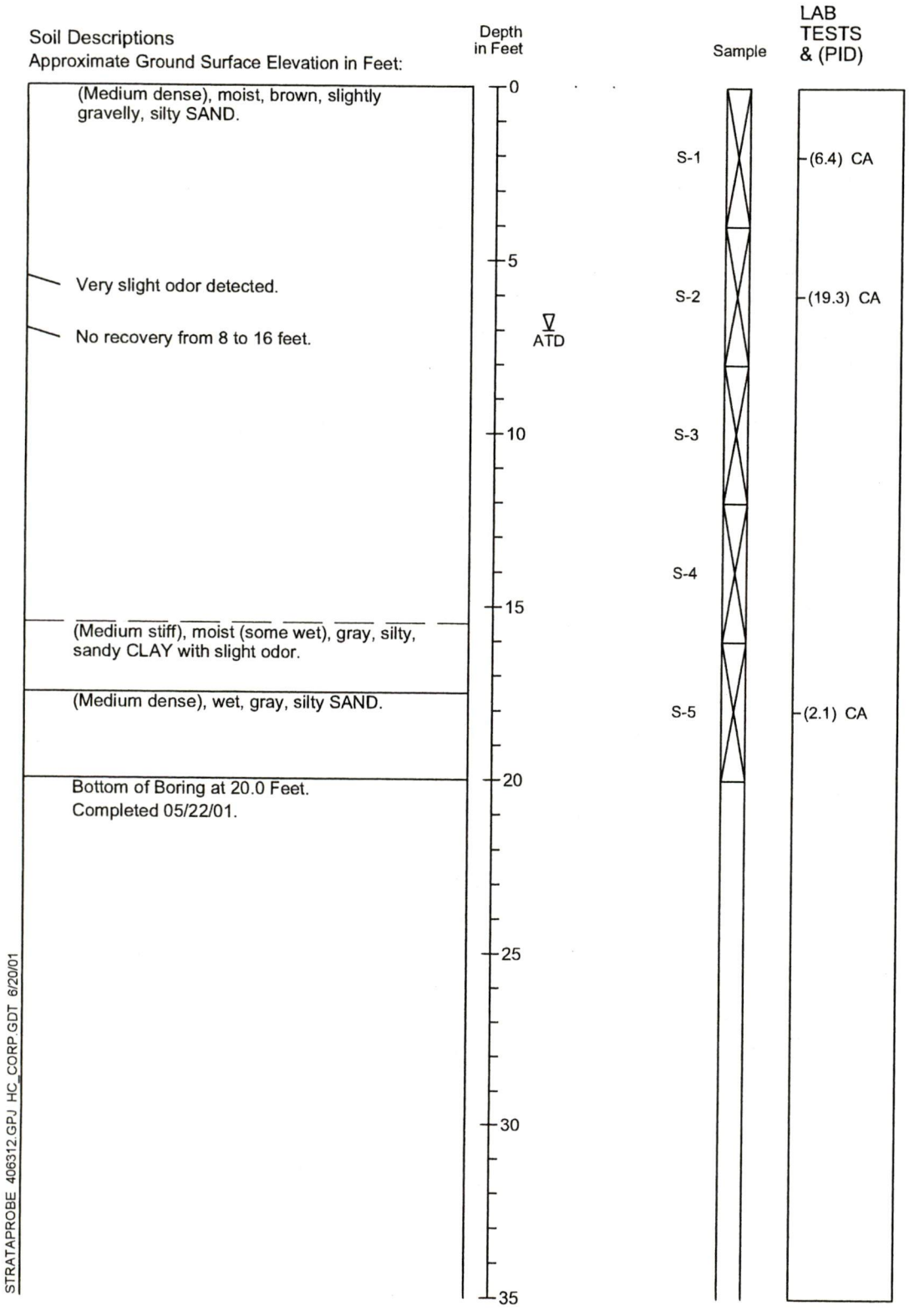
Figure A-5

Strataprobe Boring Log SP-5



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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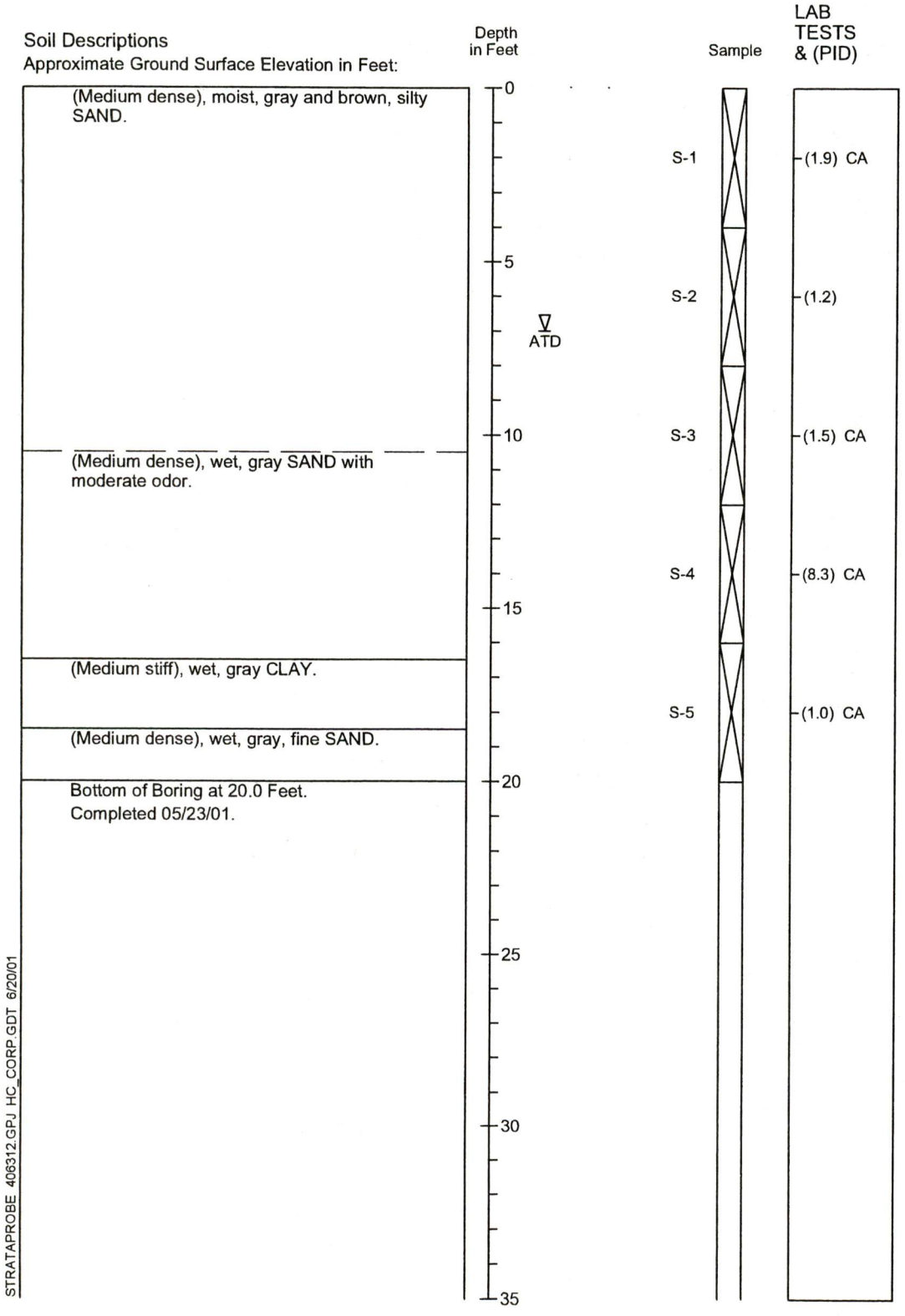
Figure A-6

Strataprobe Boring Log SP-6



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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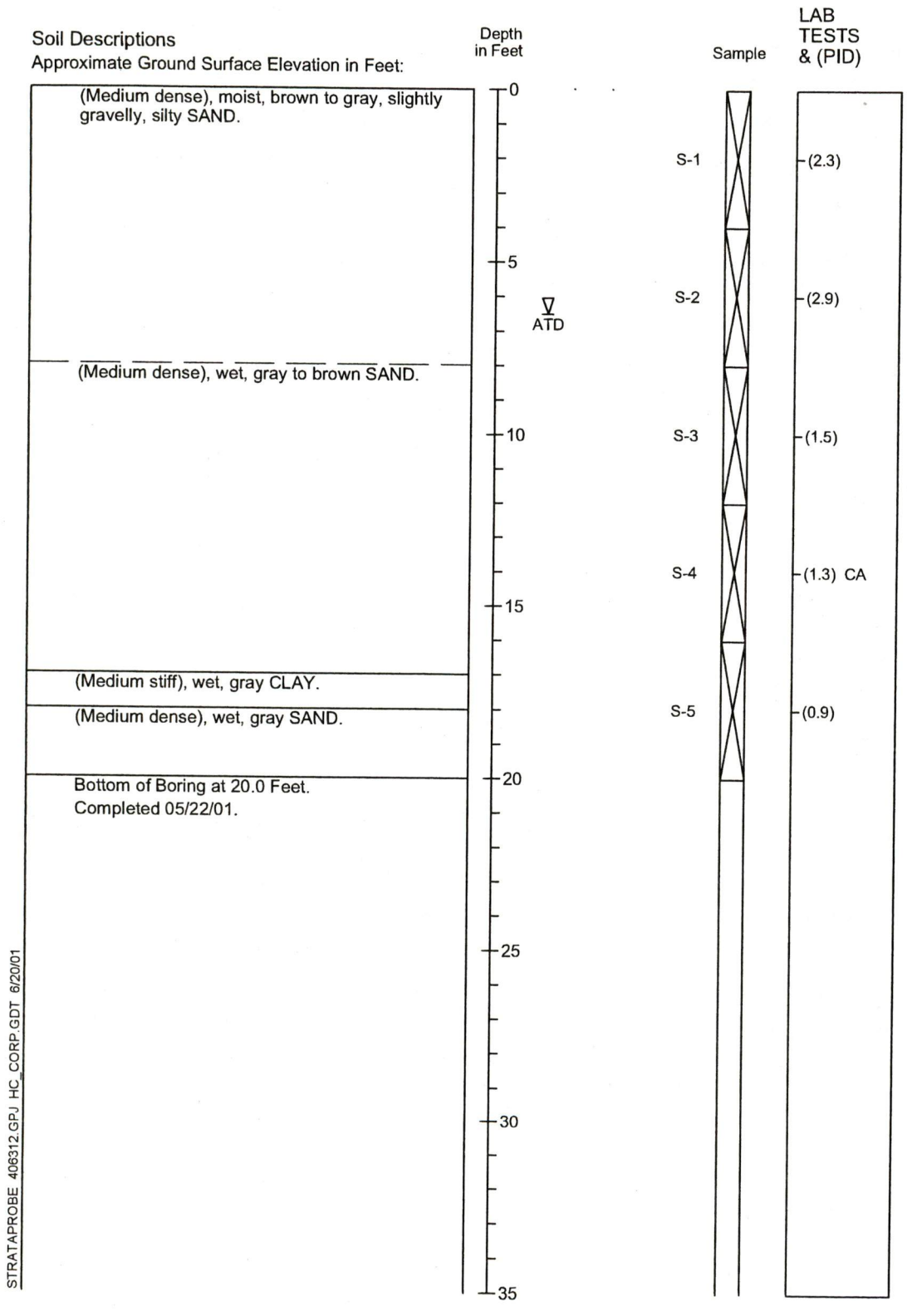
Figure A-7

Strataprobe Boring Log SP-7



1. Refer to Figure A-1 for explanation of descriptions and symbols.
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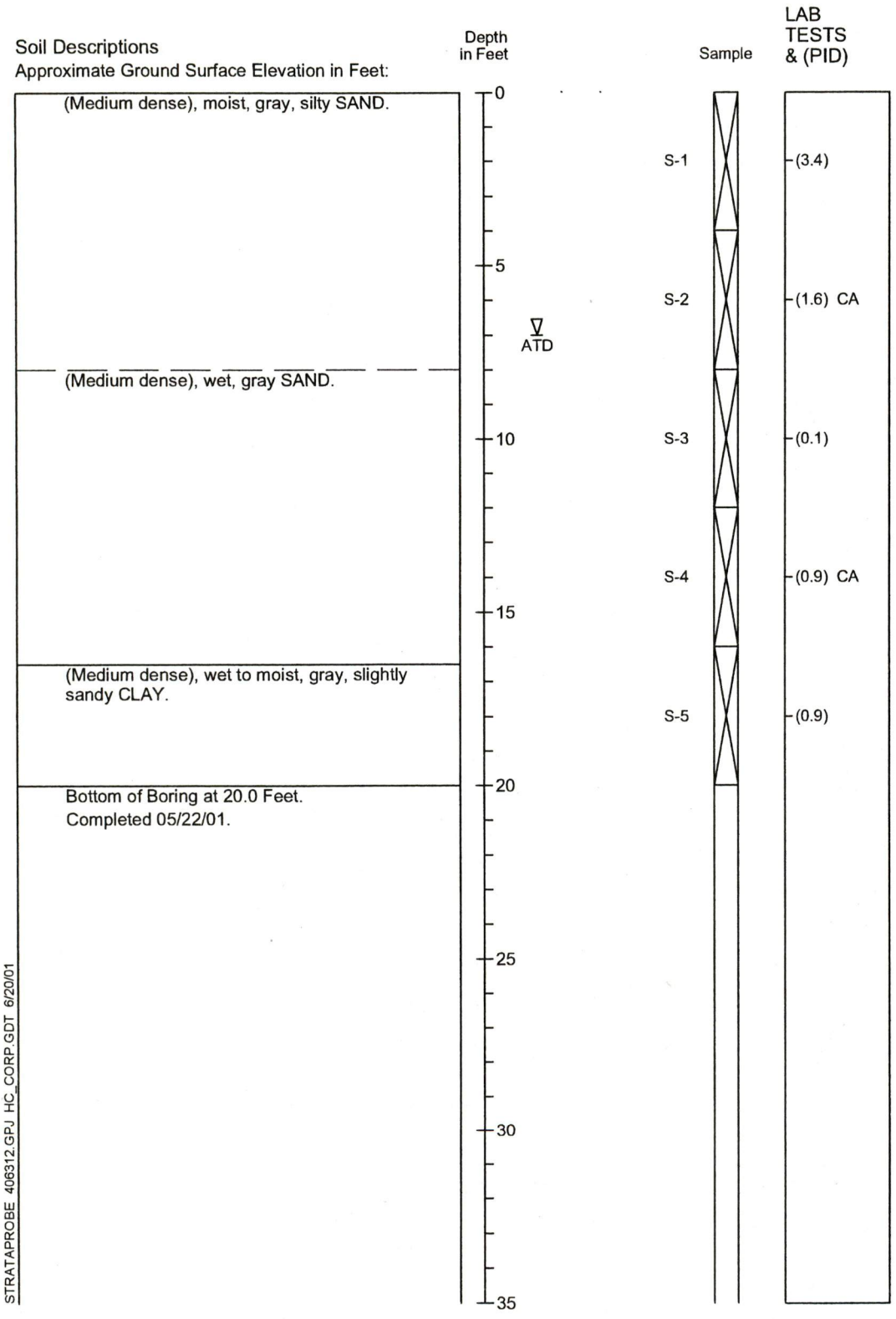
Figure A-8

Strataprobe Boring Log SP-8



1. Refer to Figure A-1 for explanation of descriptions and symbols.
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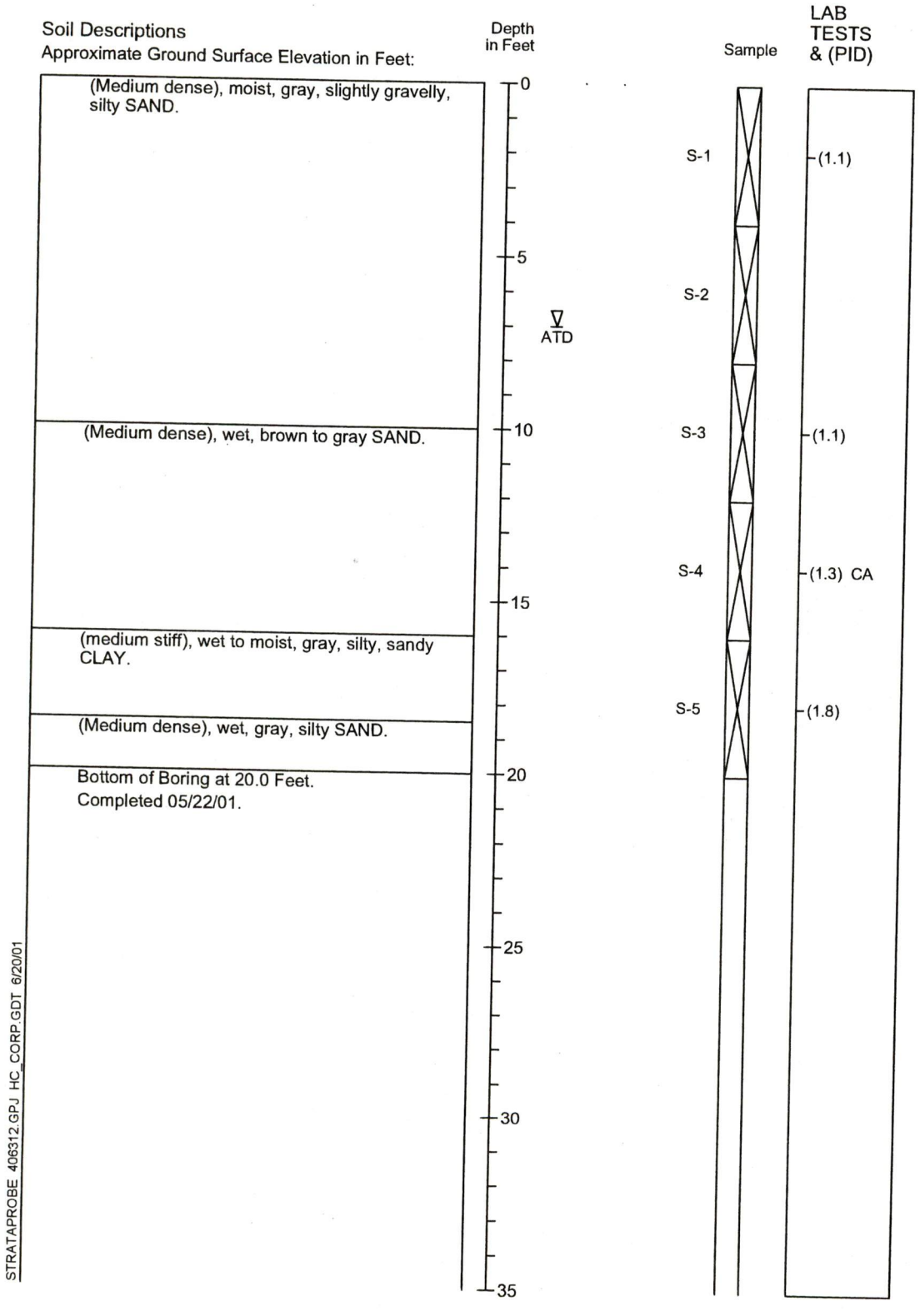
Figure A-9

Strataprobe Boring Log SP-9



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
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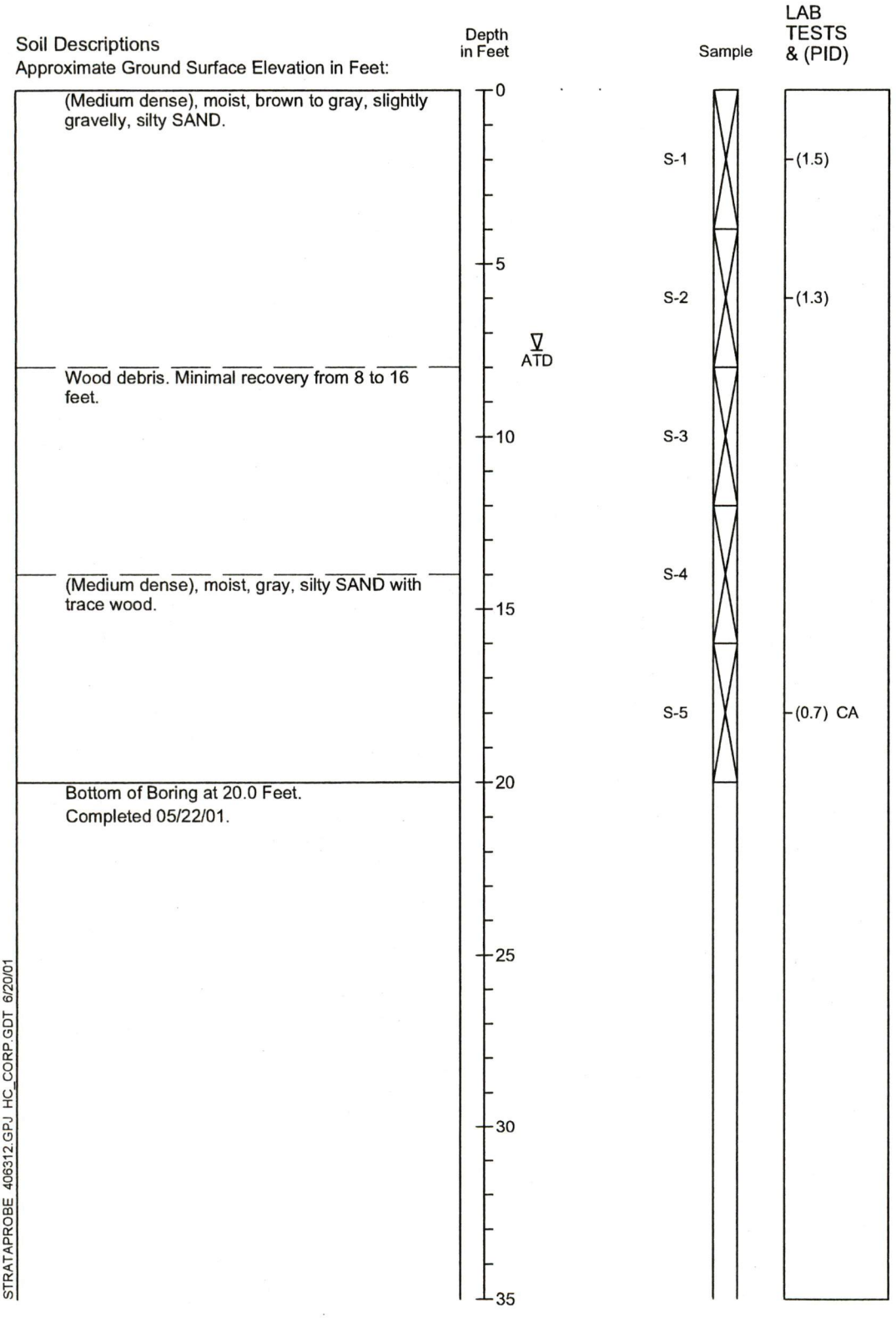
Figure A-10

Strataprobe Boring Log SP-10



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1. Refer to Figure A-1 for explanation of descriptions and symbols.
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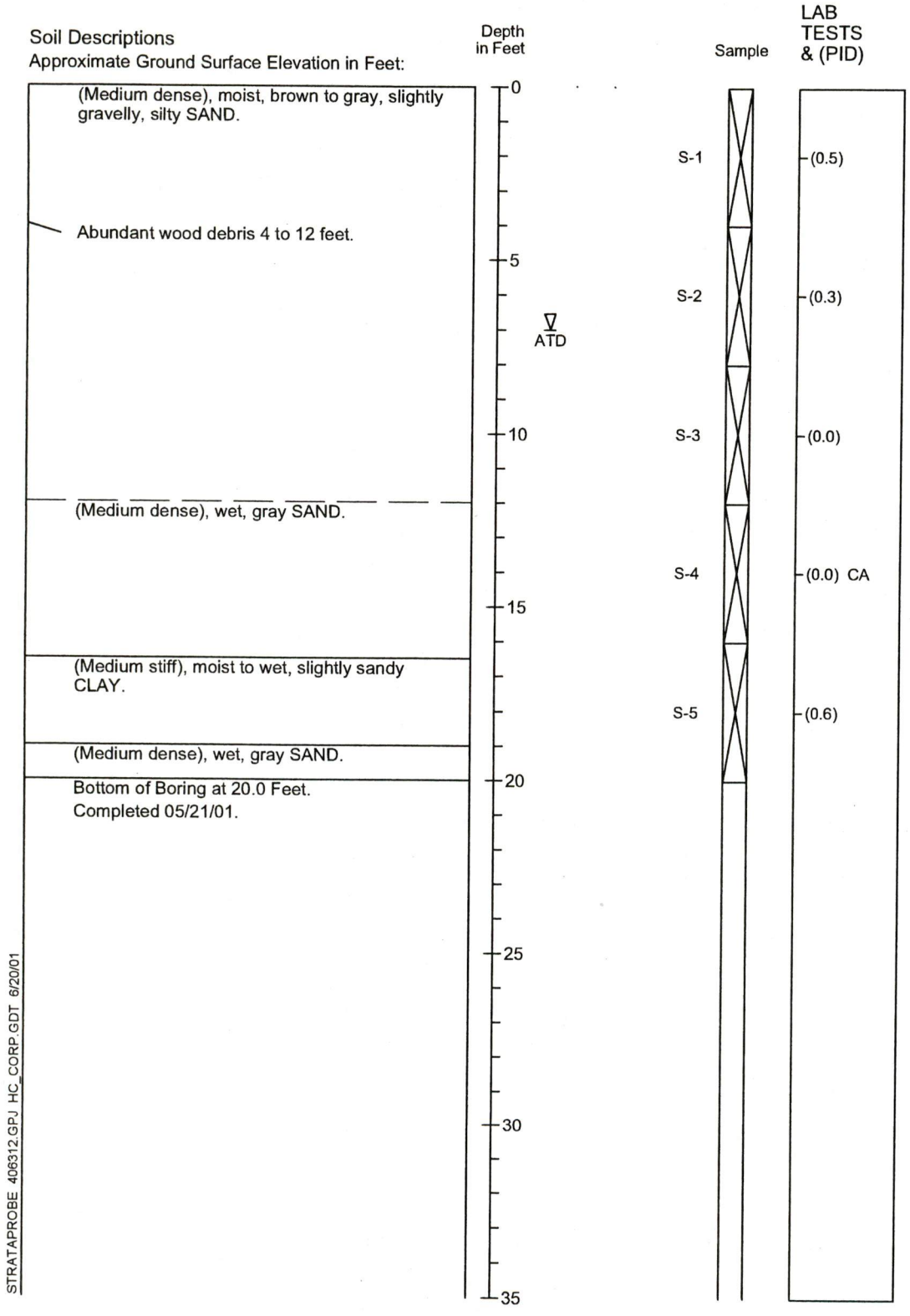
Figure A-11

Strataprobe Boring Log SP-11



1. Refer to Figure A-1 for explanation of descriptions and symbols.
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Figure A-12

Strataprobe Boring Log SP-12

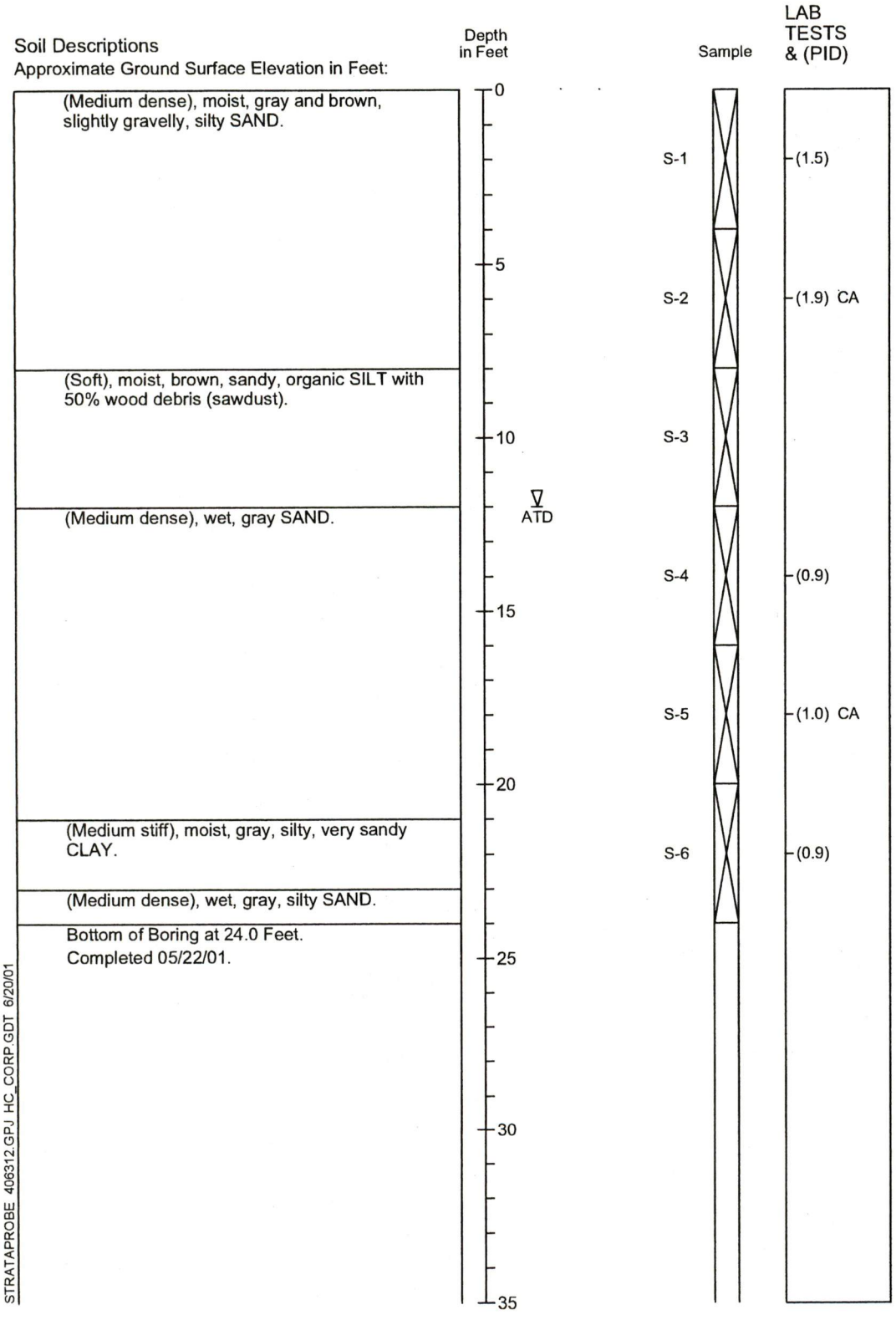

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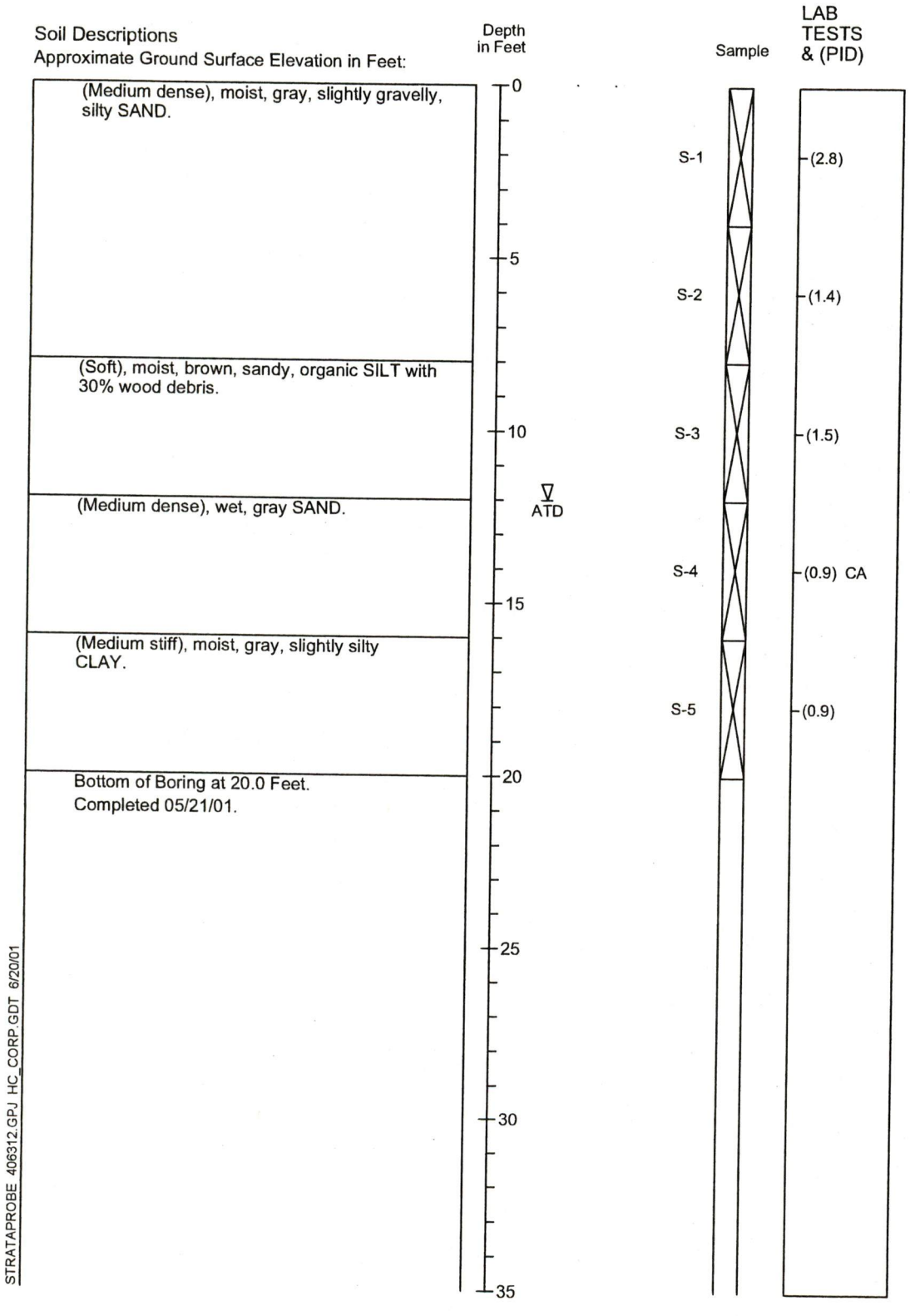
Figure A-13

Strataprobe Boring Log SP-13



1. Refer to Figure A-1 for explanation of descriptions and symbols.
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Figure A-14

Strataprobe Boring Log SP-14

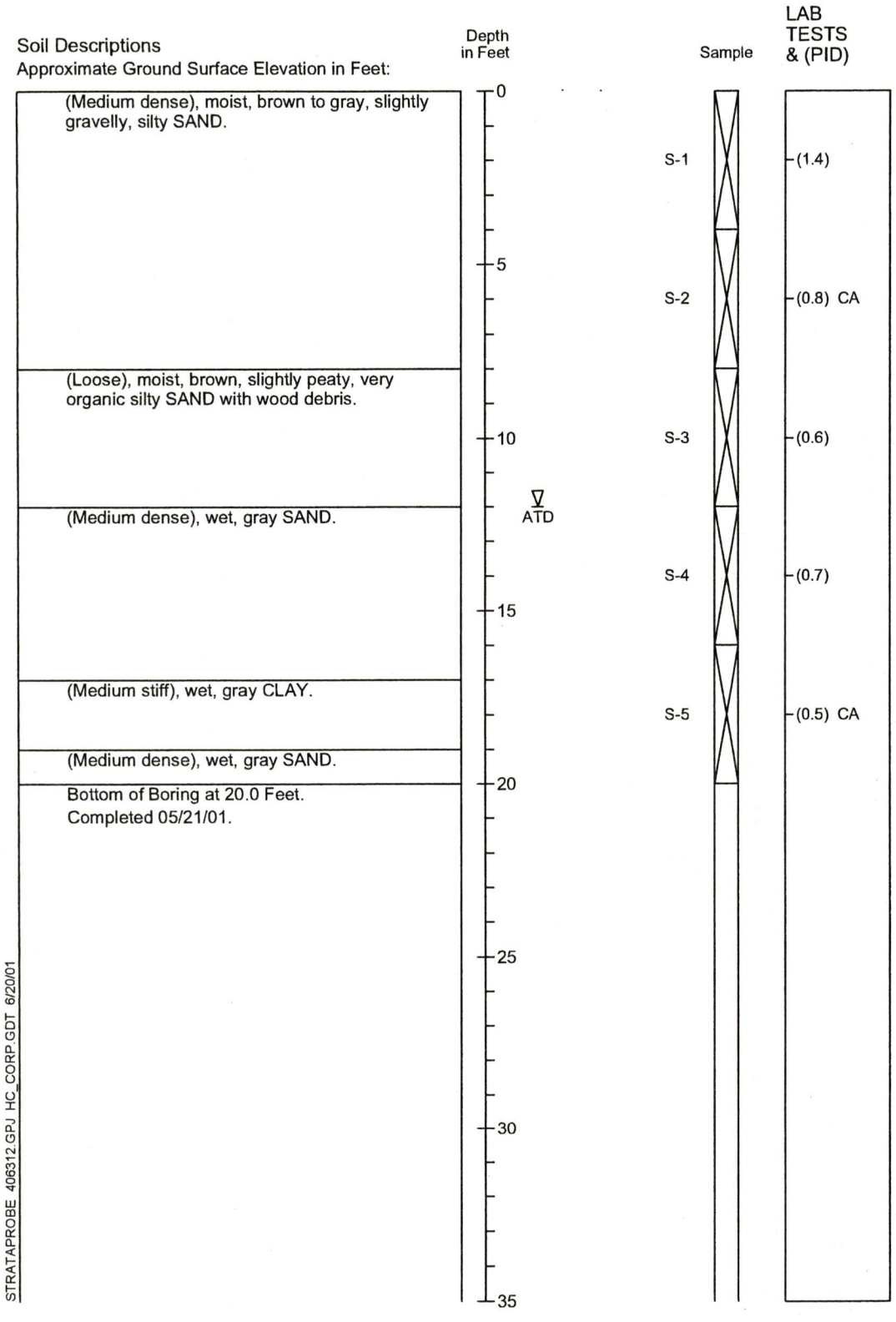

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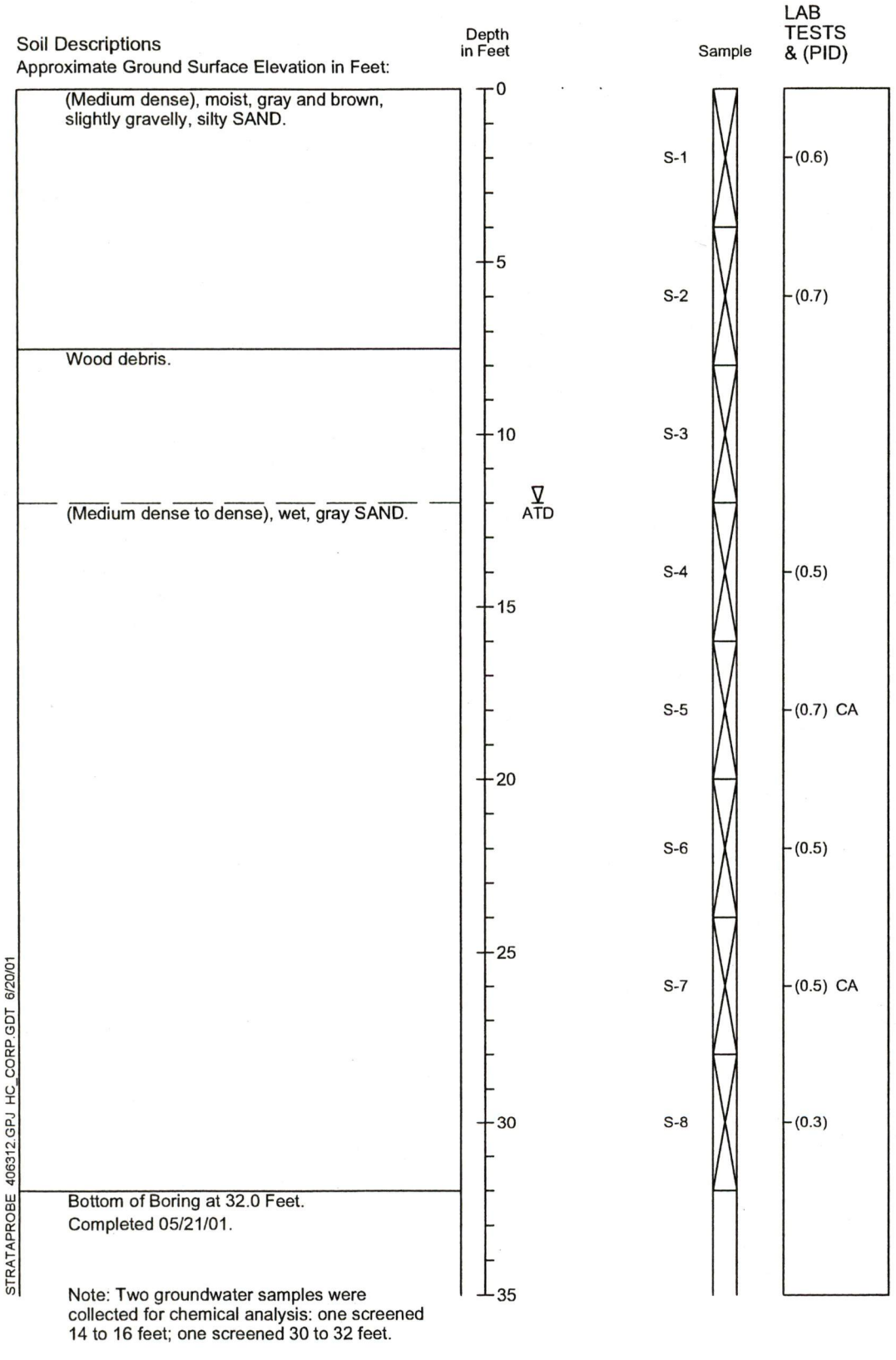
Figure A-15

Strataprobe Boring Log SP-15



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2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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Figure A-16

Strataprobe Boring Log SP-16

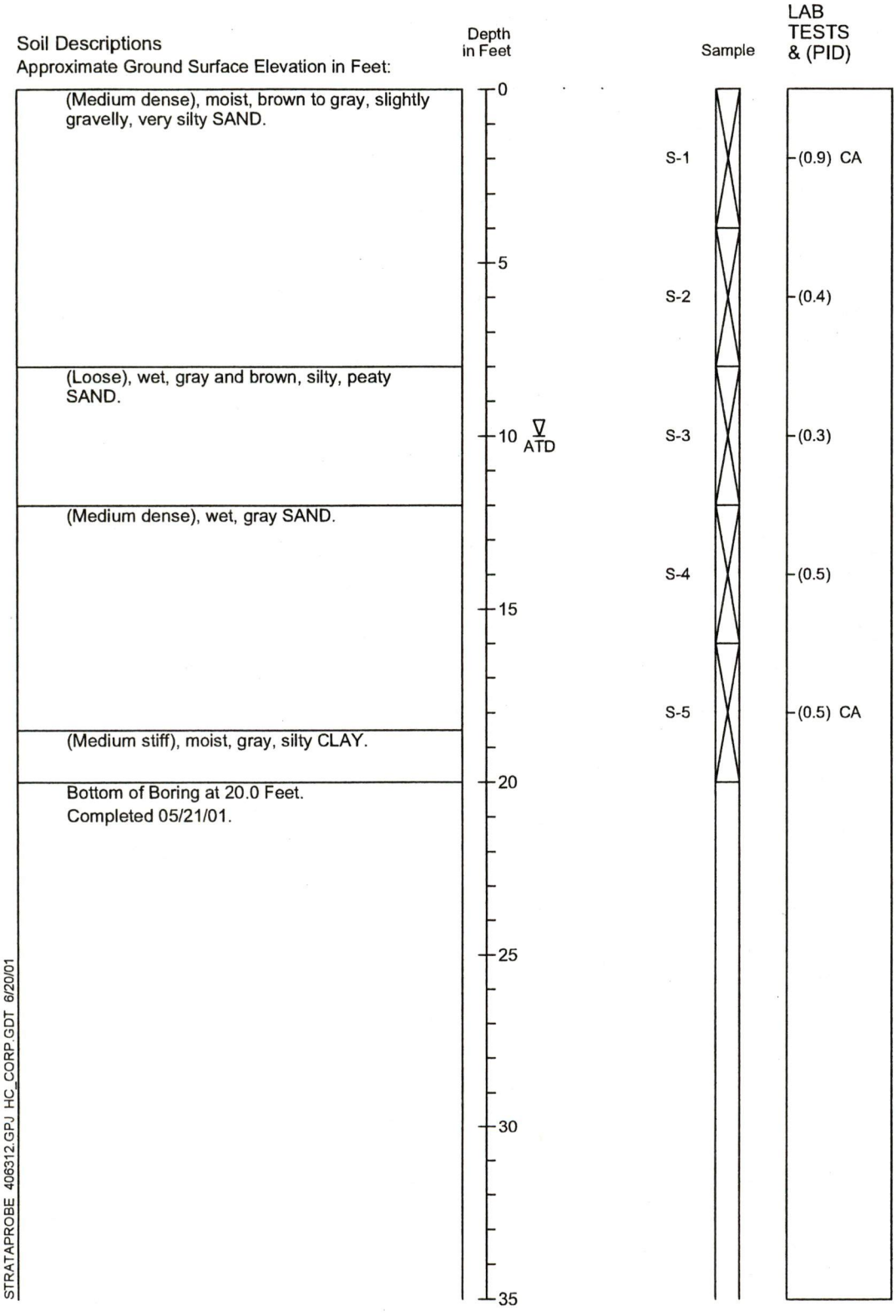

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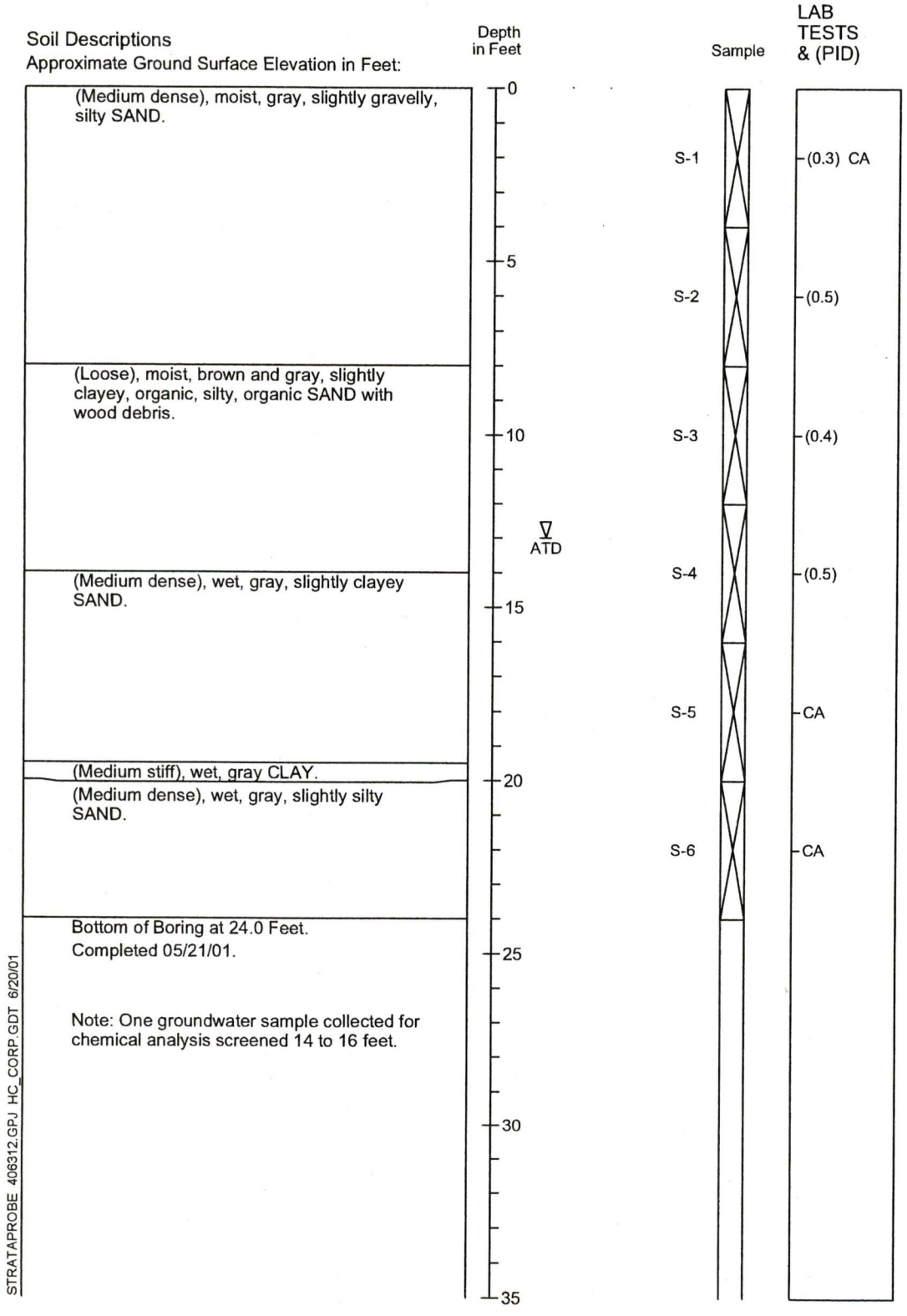
Figure A-17

Strataprobe Boring Log SP-17



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2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
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Figure A-18

Strataprobe Boring Log SP-18

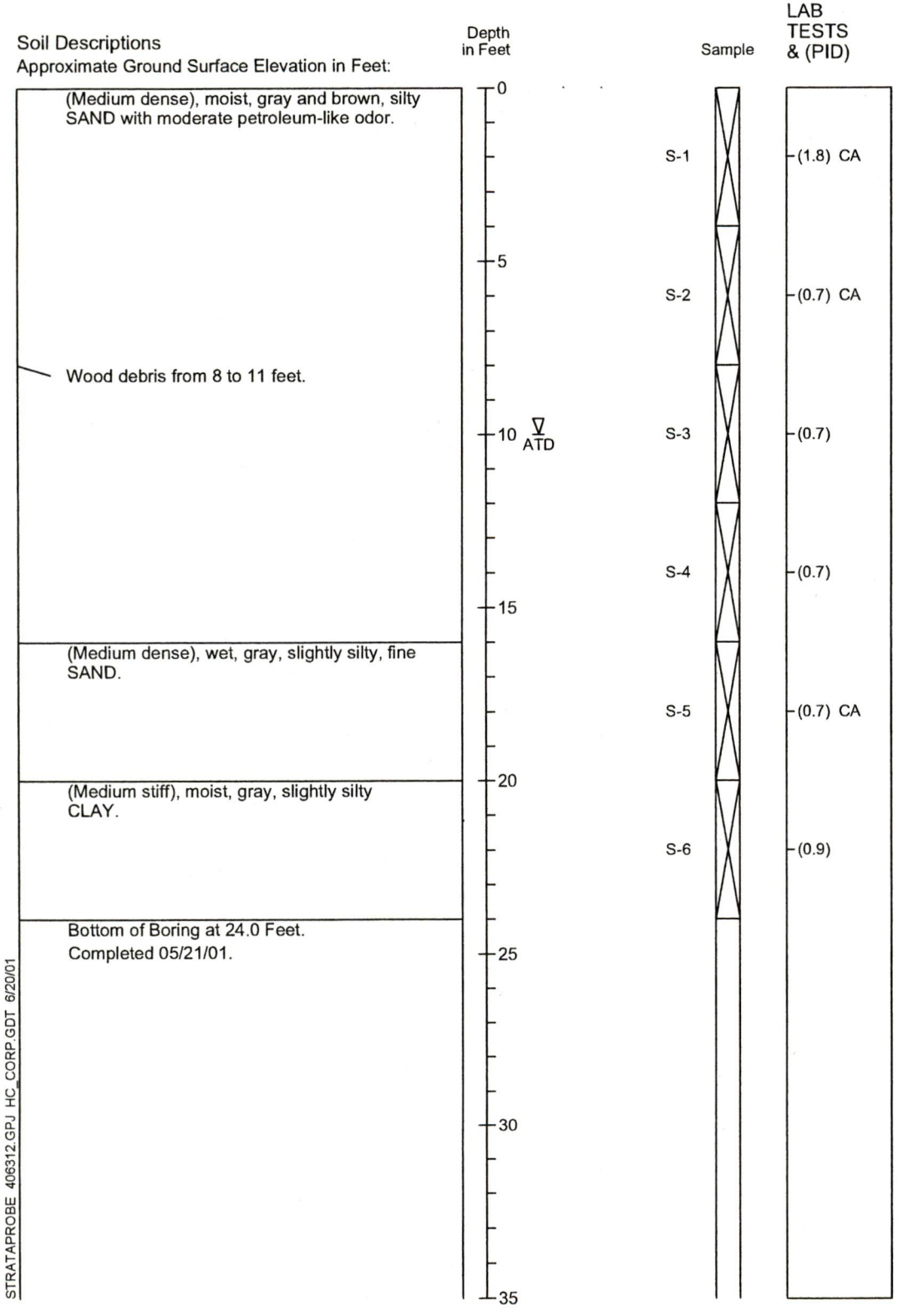

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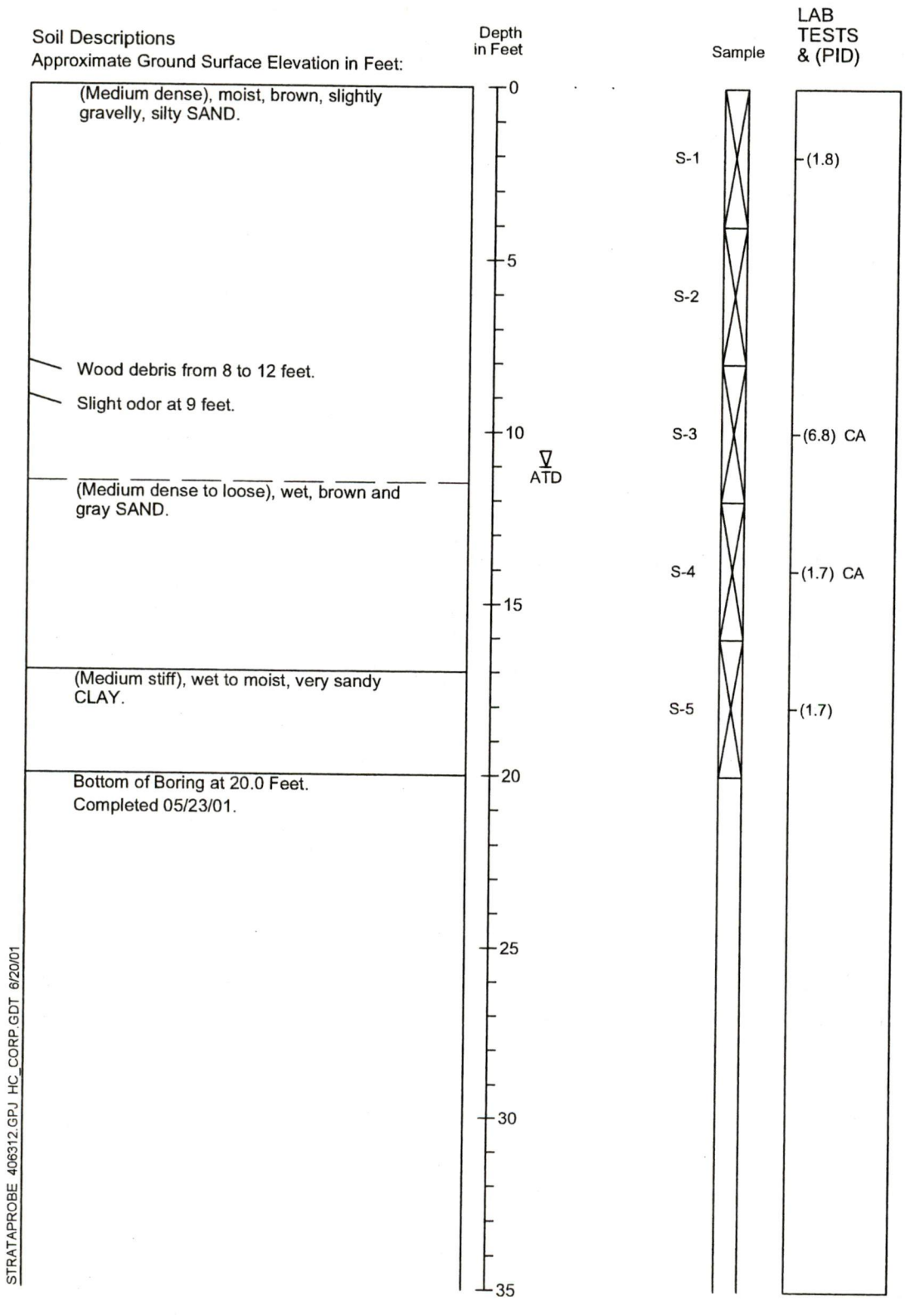
Figure A-19

Strataprobe Boring Log SP-19



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2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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Figure A-20

Strataprobe Boring Log SP-20

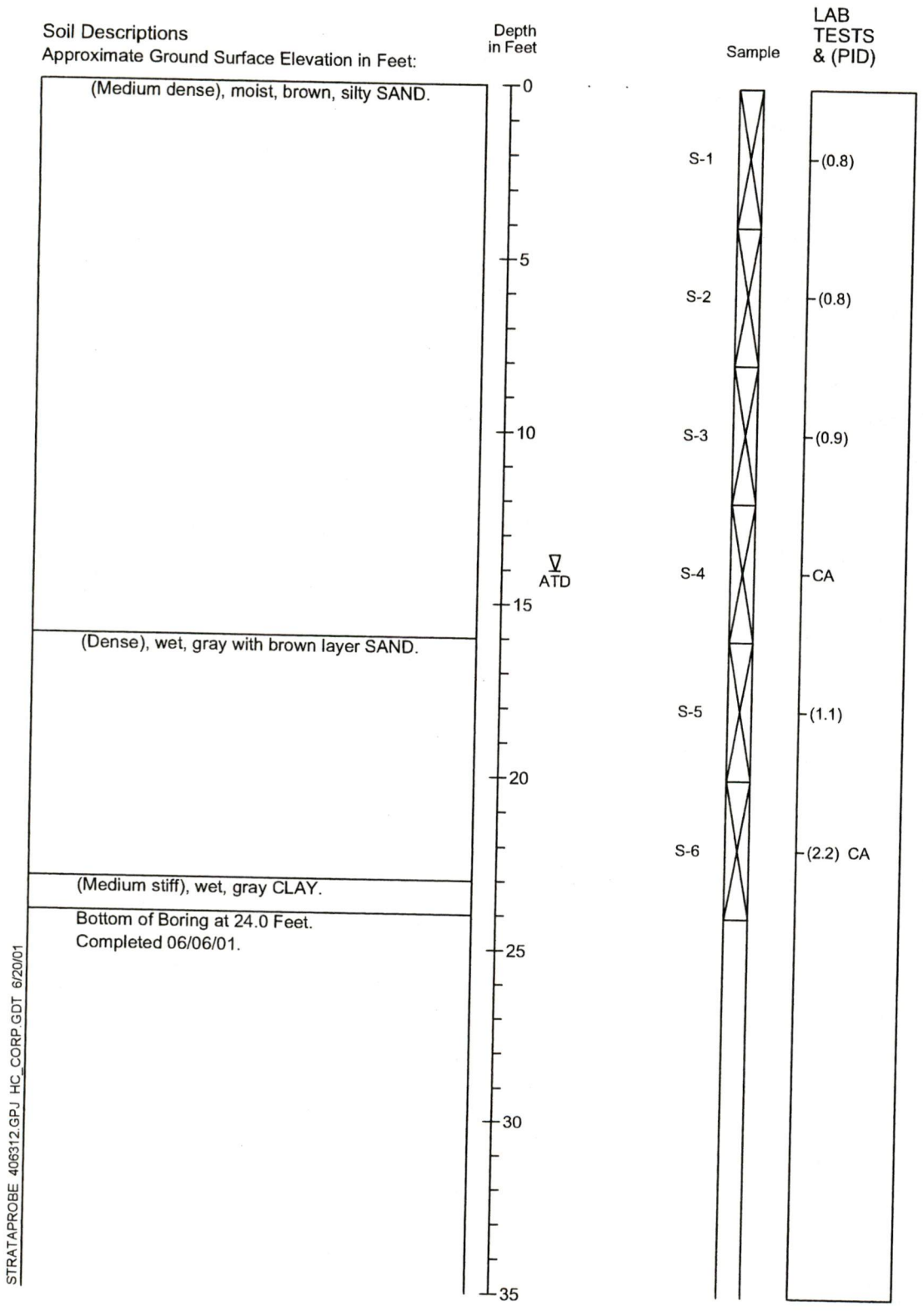

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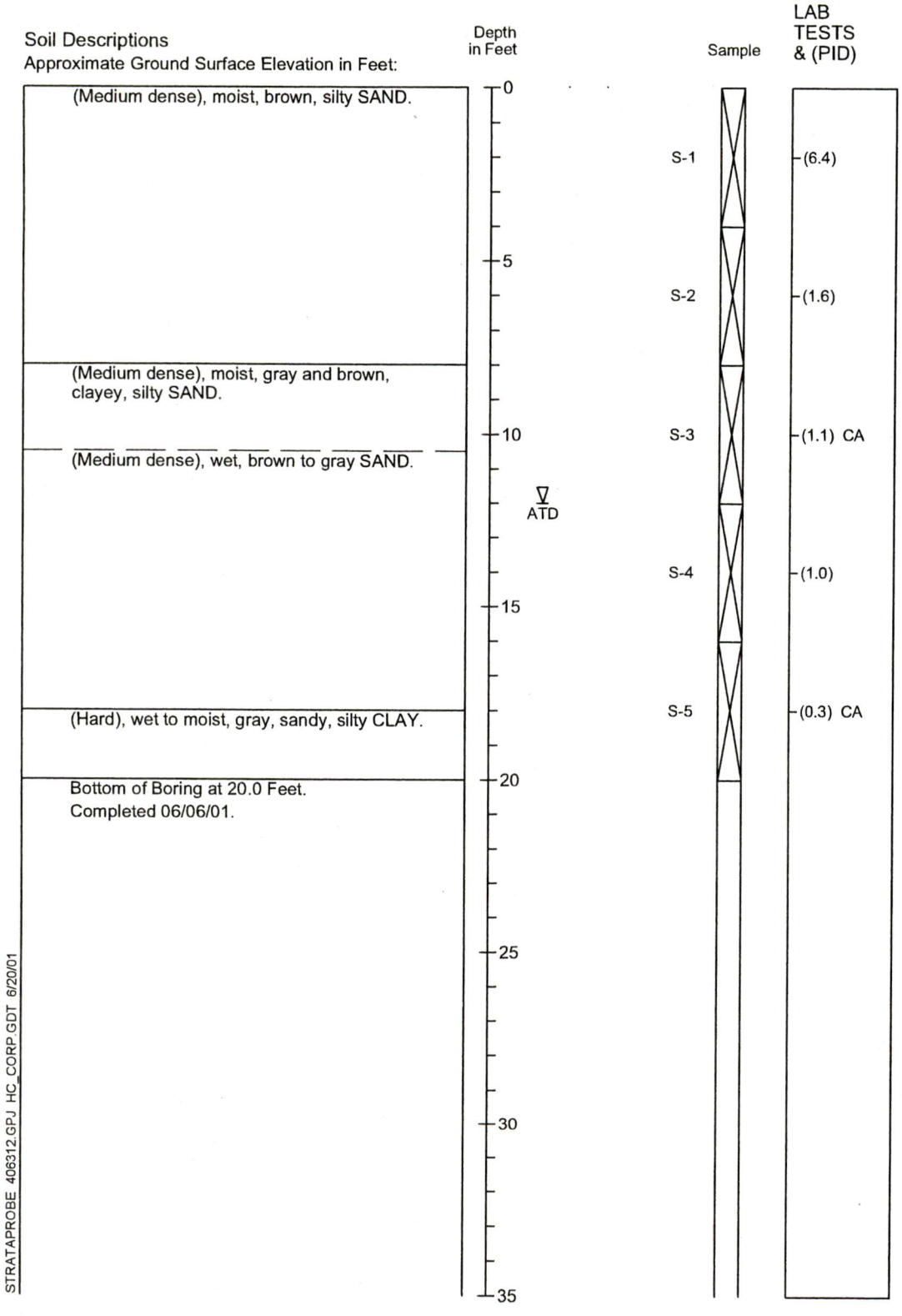
Figure A-21

Strataprobe Boring Log SP-21



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2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
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Figure A-22

Strataprobe Boring Log SP-22

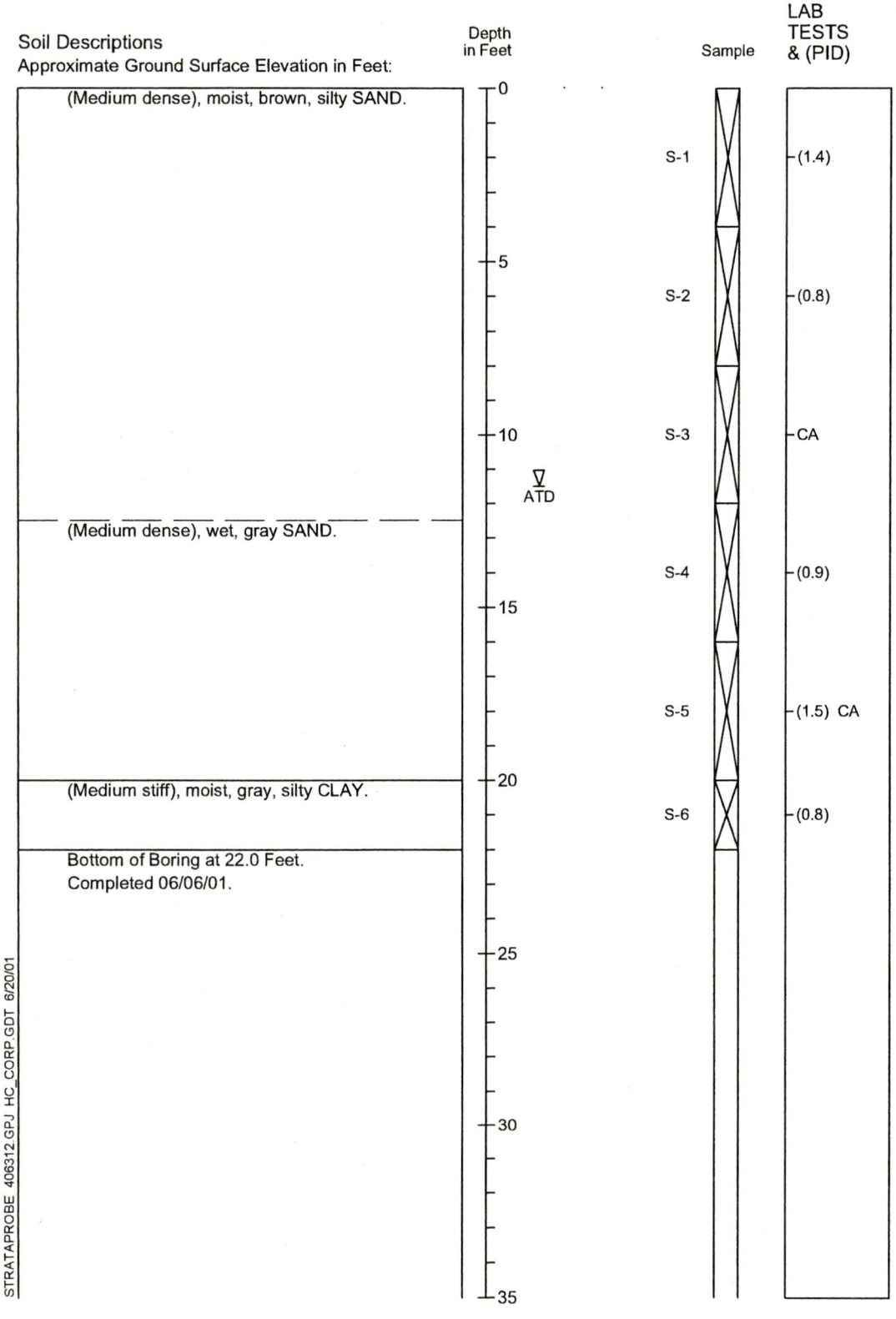

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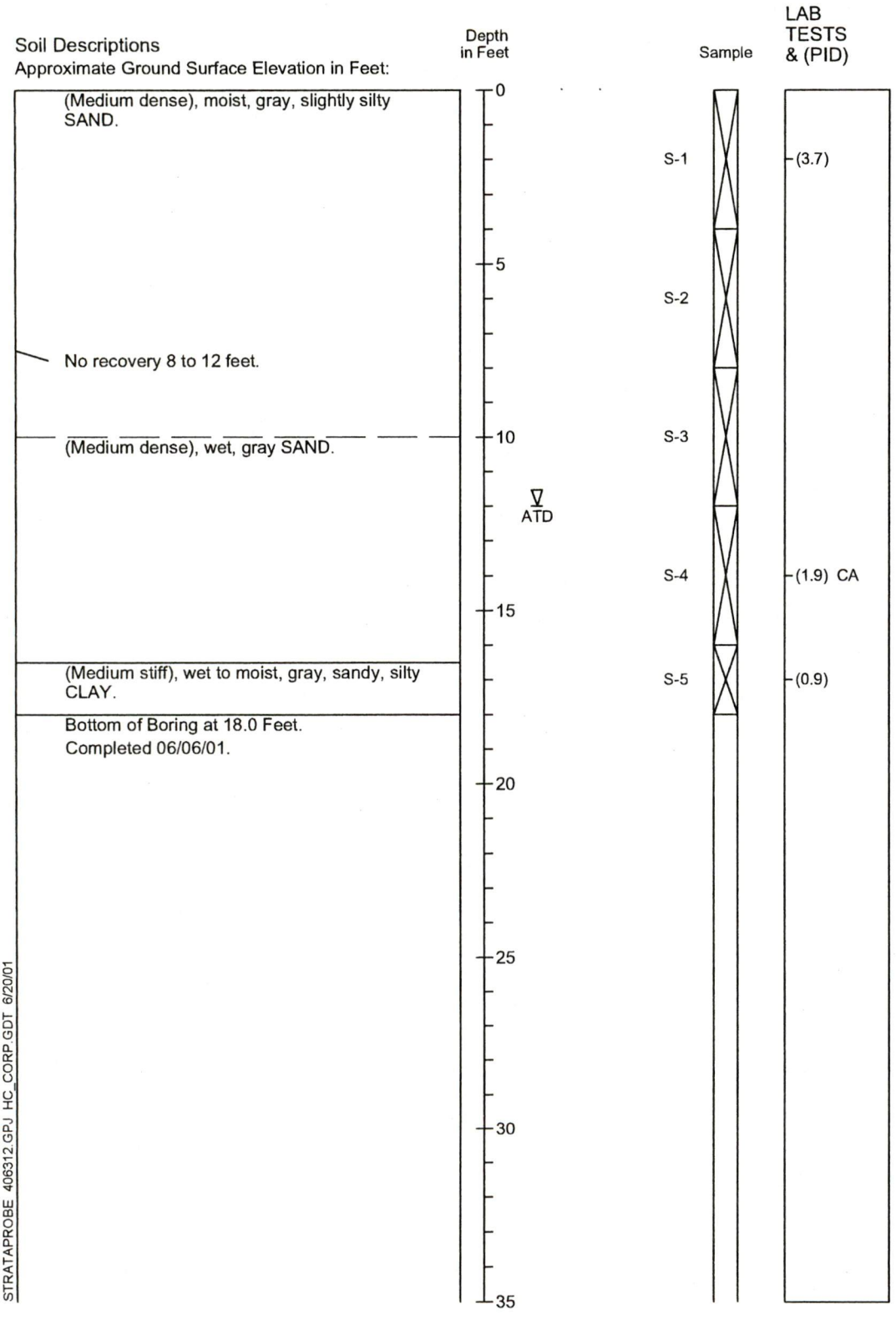
Figure A-23

Strataprobe Boring Log SP-23



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
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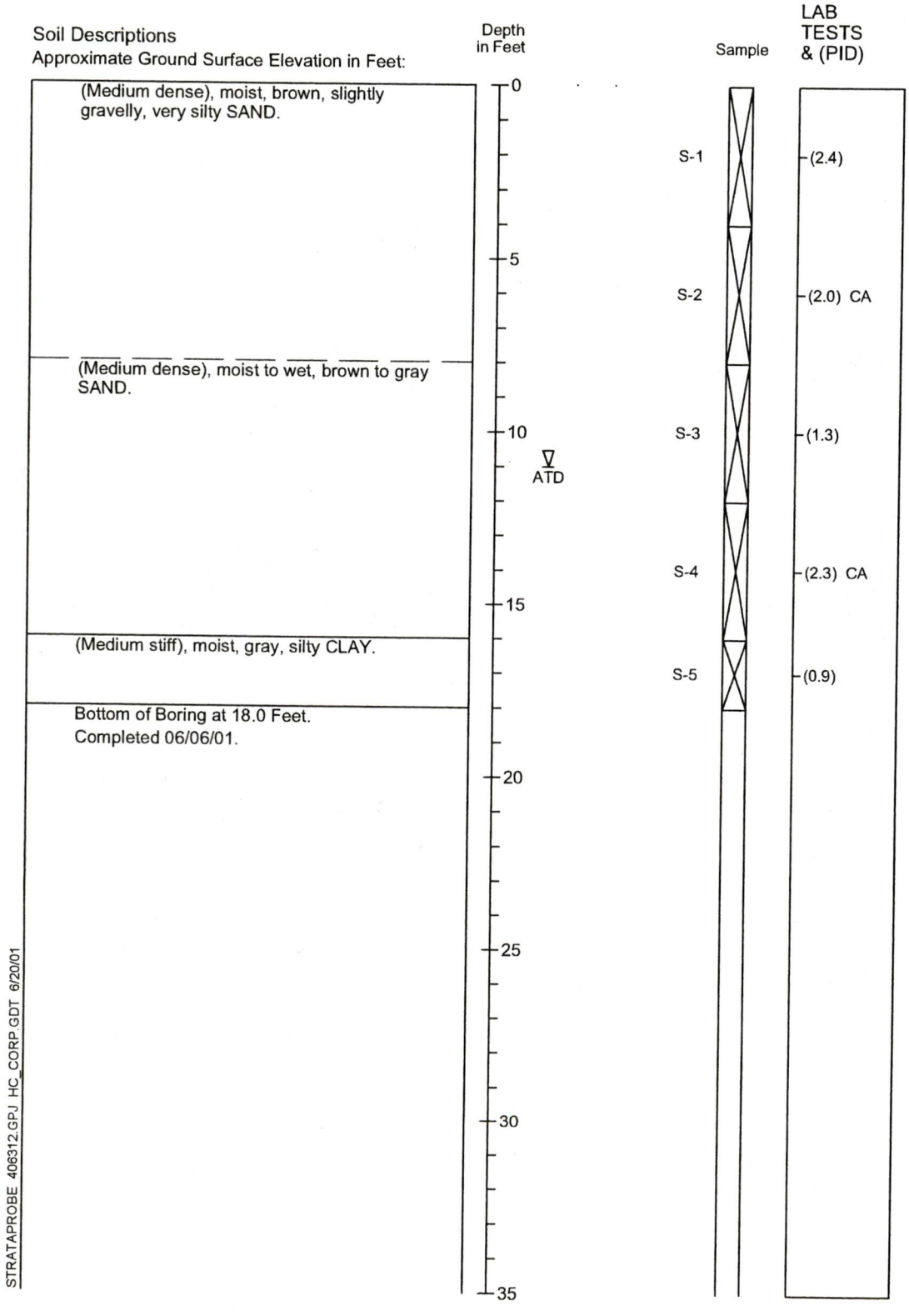
Figure A-24

Strataprobe Boring Log SP-24



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2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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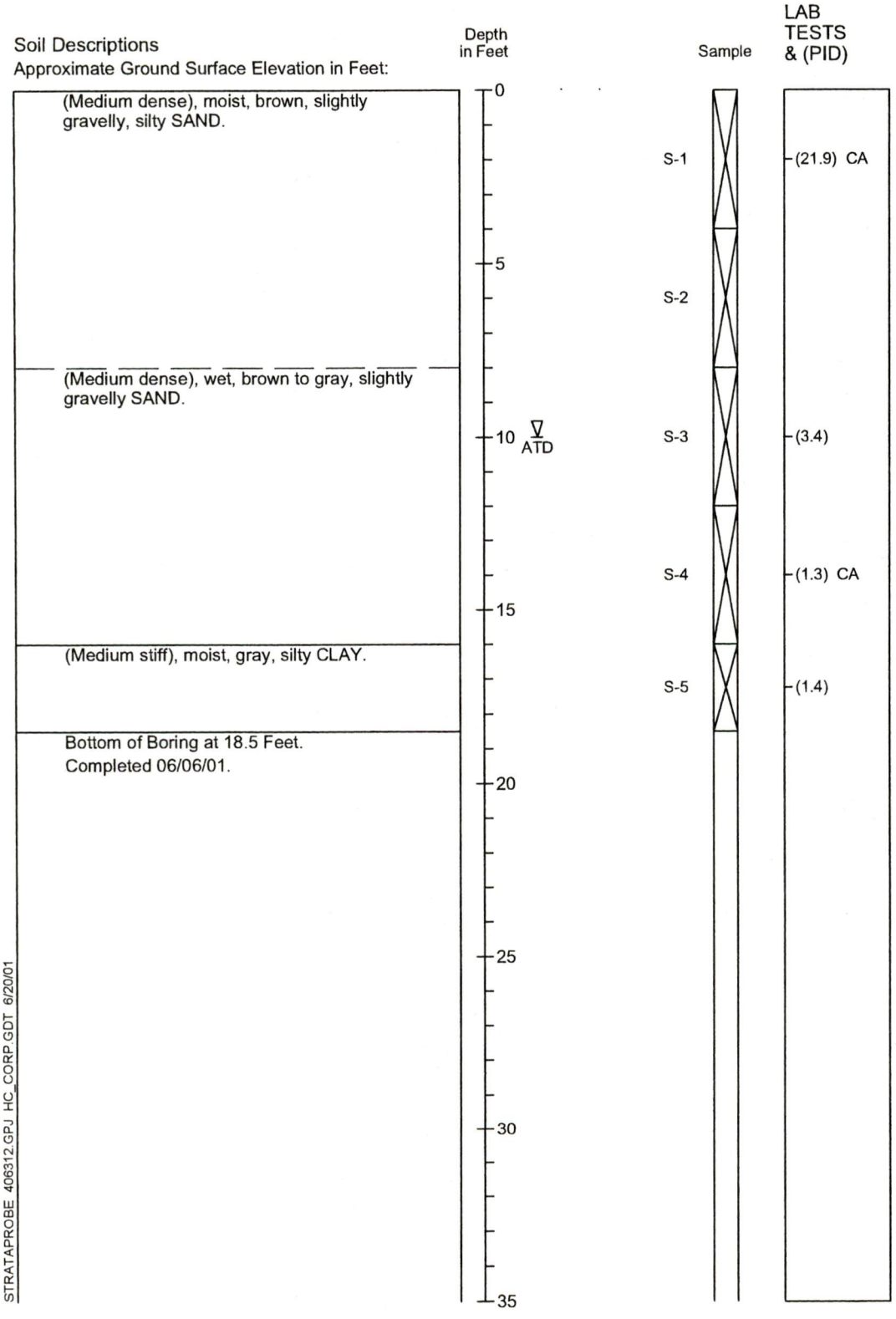
Figure A-25

Strataprobe Boring Log SP-25



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

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Figure A-26

Strataprobe Boring Log SP-26

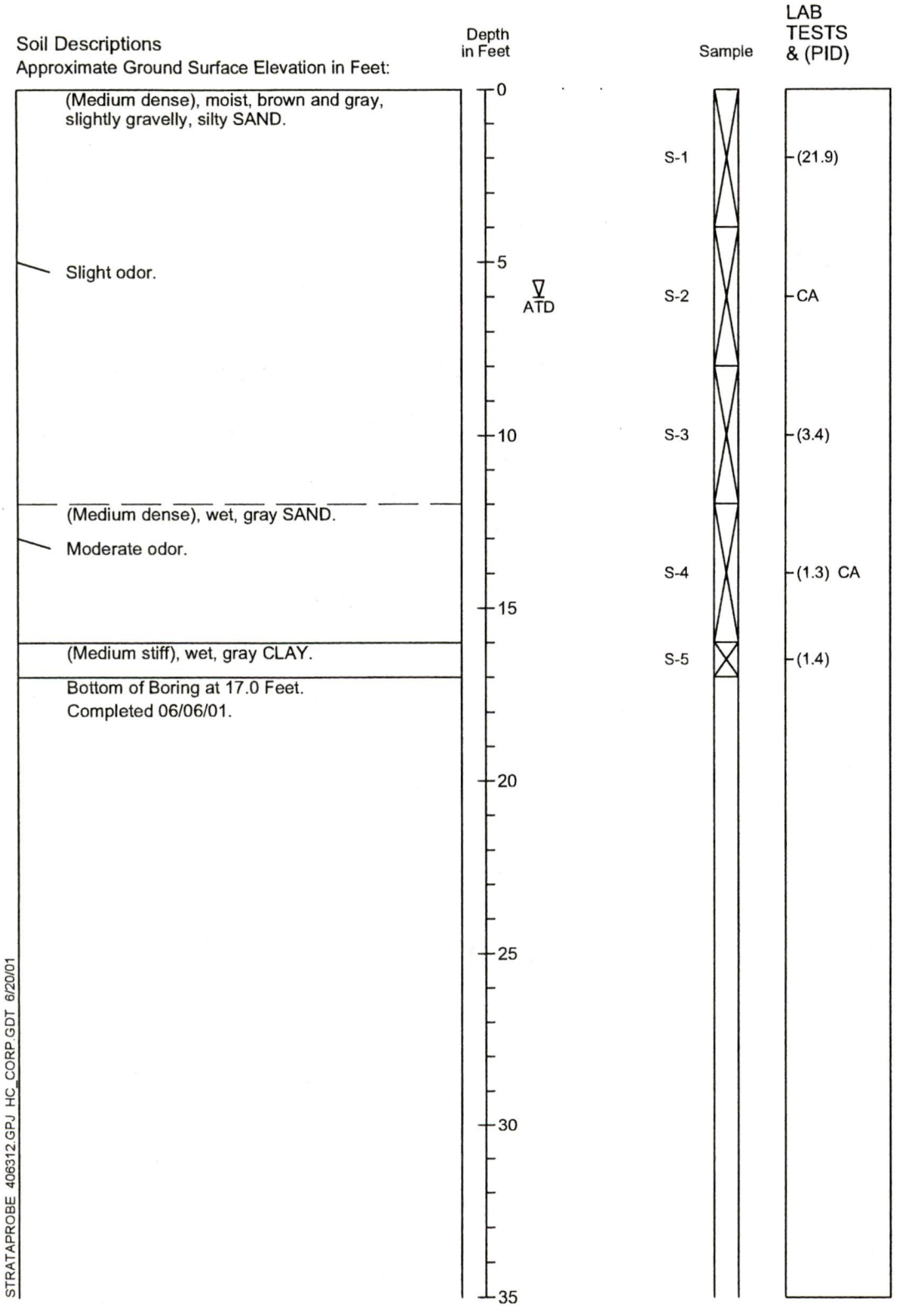

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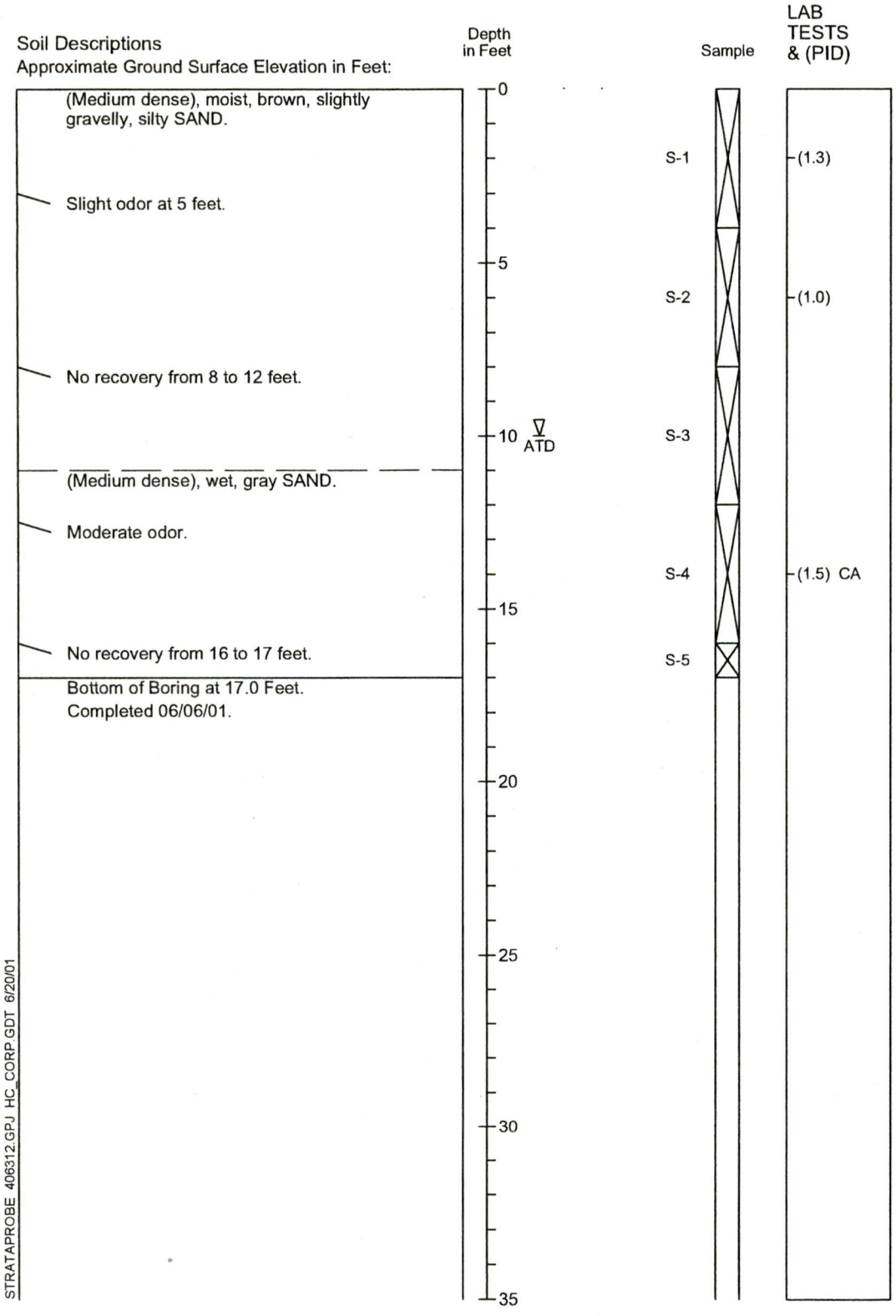
Figure A-27

Strataprobe Boring Log SP-27



STRATAPROBE 406312.GPJ HC_CORP.GDT 6/20/01

1. Refer to Figure A-1 for explanation of descriptions and symbols.
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Figure A-28

Strataprobe Boring Log SP-28

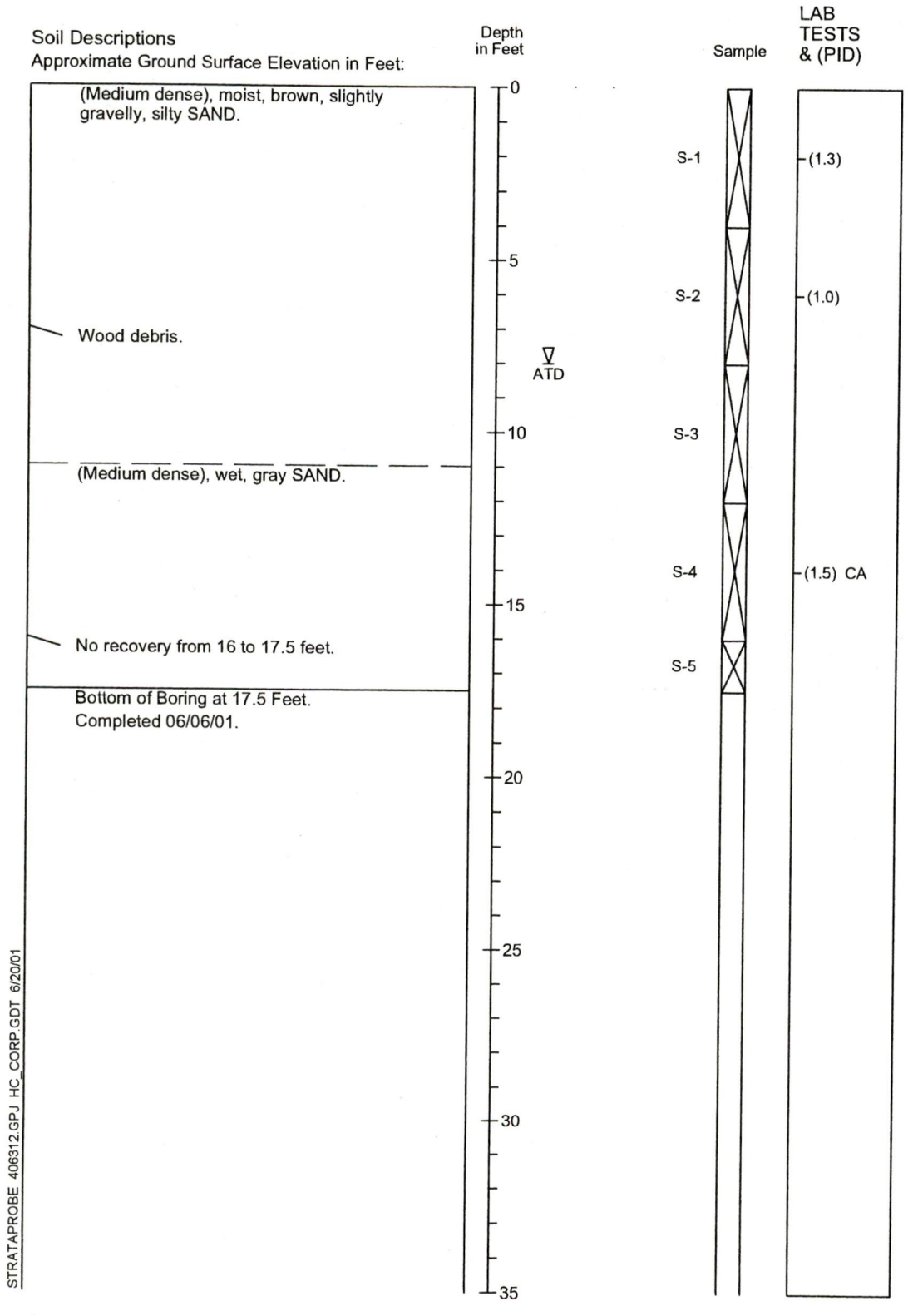

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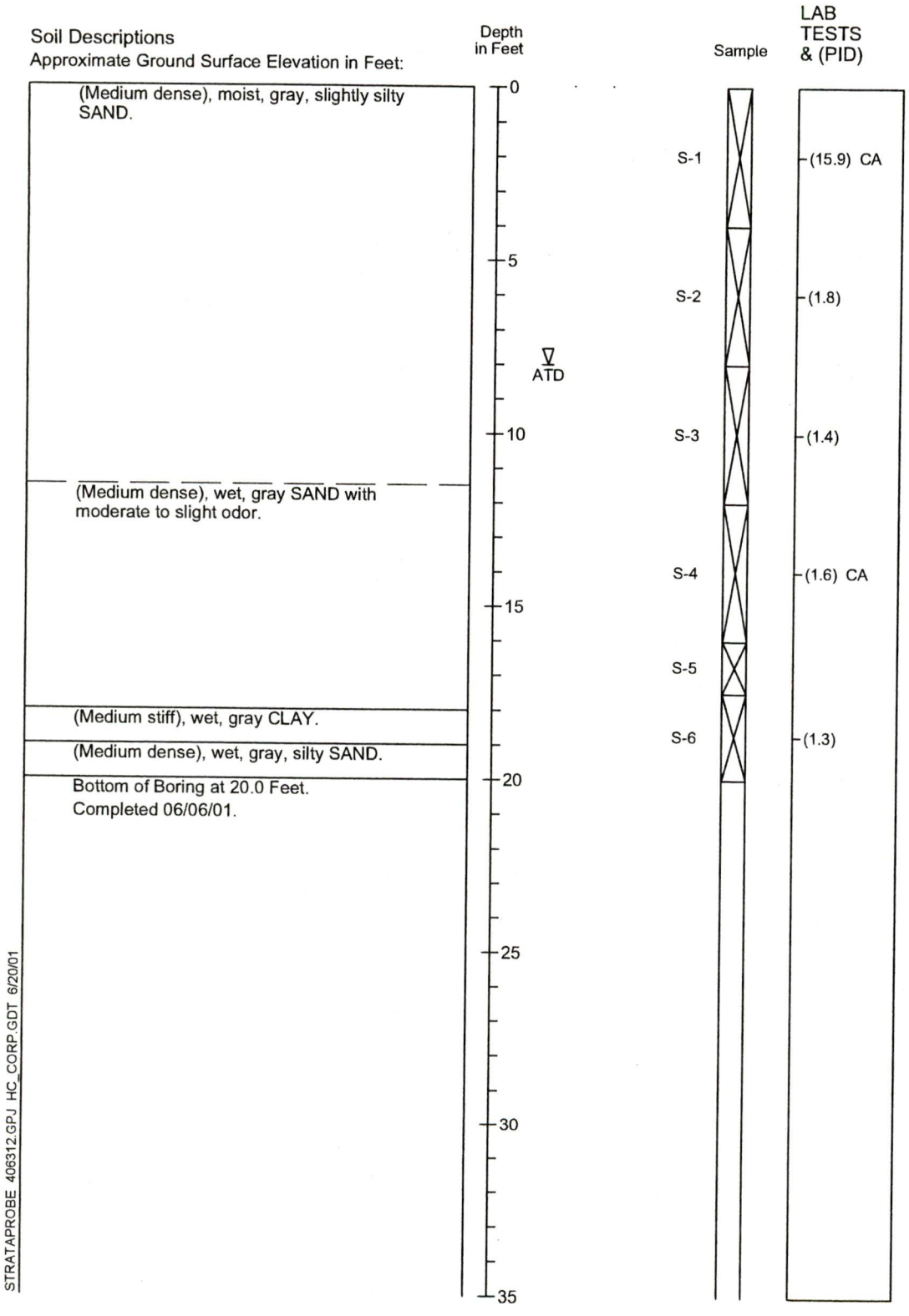
Figure A-29

Strataprobe Boring Log SP-29



1. Refer to Figure A-1 for explanation of descriptions and symbols.
2. Soil descriptions and stratum lines are interpretive and actual changes may be gradual.
3. Groundwater level, if indicated, is at time of drilling (ATD) or for date specified. Level may vary with time.

HARTCROWSER

J-4063-12 *06/01*

Figure A-30

APPENDIX B
CERTIFICATES OF ANALYSIS
ENVIRONMENTAL SERVICES NETWORK NORTHWEST, INC.

ESN NORTHWEST
Environmental Services Network

May 24, 2001

Jeremy Porter
Hart Crowser
1910 Fairview Ave. E
Seattle, WA 98102-3699

Dear Mr. Porter:

Please find enclosed the analytical data report for the Jacobson Terminals Project in Seattle, Washington. Soil and water samples were analyzed for PCB's by Method 8082 and VOC's by Method 8260 on May 21, 2001.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this work has been sent to Al Jacobson.

ESN Northwest appreciates the opportunity to have provided analytical services to Hart Crowser for this project. It was a pleasure working with you, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A. Korosec
President

677 Woodland Square Lp. SE, Suite D ■ Lacey, Washington 98503 ■ 360.459.4670 ■ FAX 360.459.3432
Web Site: *www.ESN-USA.com* E-Mail: *esnnw@aol.com*

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10521-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TERMINALS
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		**MTH BLK**	**LCS**	**SP14-S5**	**SP16-S5**	**SP17-S5**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
A1221	0.50	nd		nd	nd	nd
A1232	0.50	nd		nd	nd	nd
A1242 (A1016)	0.20	nd	111%	nd	nd	nd
A1248	0.20	nd		nd	nd	nd
A1254	0.20	nd		nd	nd	nd
A1260	0.20	nd		nd	nd	nd
Surrogate recoveries:						
Tetrachloro-m-xylene		109%	104%	110%	115%	119%
Decachlorobiphenyl		110%	109%	110%	117%	118%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10521-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TERMINALS
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		**SP17-S6**	**SP18-S1**	**SP18-S2**	**SP18-S5**
Matrix	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/21/01	05/21/01	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01	05/21/01	05/21/01
A1221	0.50	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd
A1260	0.20	nd	**0.22**	nd	nd
Surrogate recoveries:					
Tetrachloro-m-xylene		135%	103%	113%	121%
Decachlorobiphenyl		135%	121%	113%	118%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10521-3
Client: HART CROWSER
Client Job Name: JACOBSON TERMINALS
Client Job Number: 4063-12
Printed: 5/19/01 15:04

Analytical Results

8260, µg/kg		MTH BLK	LCS	SP14-S5	SP16-S5	SP17-S5	SP17-S6	SP18-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Dichlorodifluoromethane	50	nd		nd	nd	nd	nd	nd
Chloromethane	50	nd		nd	nd	nd	nd	nd
Vinyl chloride	50	nd		nd	nd	nd	nd	nd
Bromomethane	50	nd		nd	nd	nd	nd	nd
Chloroethane	50	nd		nd	nd	nd	nd	nd
Trichlorofluoromethane	50	nd		nd	nd	nd	nd	nd
1,1-Dichloroethene	50	nd		nd	nd	nd	nd	nd
Methylene chloride	50	nd		nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	50	nd		nd	nd	nd	nd	nd
1,1-Dichloroethane	50	nd		nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	50	nd		nd	nd	nd	nd	nd
2,2-Dichloropropane	50	nd		nd	nd	nd	nd	nd
Chloroform	50	nd		nd	nd	nd	nd	nd
Bromochloromethane	50	nd		nd	nd	nd	nd	nd
1,1,1-Trichloroethane	50	nd		nd	nd	nd	nd	nd
1,2-Dichloroethane	50	nd		nd	nd	nd	nd	nd
1,1-Dichloropropene	50	nd		nd	nd	nd	nd	nd
Carbon tetrachloride	50	nd		nd	nd	nd	nd	nd
Benzene	50	nd	108%	nd	nd	nd	nd	nd
Trichloroethene	50	nd	105%	nd	nd	nd	nd	nd
1,2-Dichloropropane	50	nd		nd	nd	nd	nd	nd
Dibromomethane	50	nd		nd	nd	nd	nd	nd
Bromodichloromethane	50	nd		nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	50	nd		nd	nd	nd	nd	nd
Toluene	50	nd	103%	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	50	nd		nd	nd	nd	nd	nd
1,1,2-Trichloroethane	50	nd		nd	nd	nd	nd	nd
1,3-Dichloropropane	50	nd		nd	nd	nd	nd	nd
Dibromochloromethane	50	nd		nd	nd	nd	nd	nd
Tetrachloroethene	50	nd		nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	50	nd		nd	nd	nd	nd	nd
Chlorobenzene	50	nd	105%	nd	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	50	nd		nd	nd	nd	nd	nd
Ethylbenzene	50	nd		nd	nd	nd	nd	nd
Xylenes	50	nd		nd	nd	nd	nd	nd
Styrene	50	nd		nd	nd	nd	nd	nd
Bromoform	50	nd		nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd		nd	nd	nd	nd	nd
Isopropylbenzene	50	nd		nd	nd	nd	nd	nd
1,2,3-Trichloropropane	50	nd		nd	nd	nd	nd	nd
Bromobenzene	50	nd		nd	nd	nd	nd	nd
n-Propylbenzene	50	nd		nd	nd	nd	nd	nd
2-Chlorotoluene	50	nd		nd	nd	nd	nd	nd
4-Chlorotoluene	50	nd		nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	50	nd		nd	nd	nd	nd	nd
tert-Butylbenzene	50	nd		nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	50	nd		nd	nd	nd	nd	360
sec-Butylbenzene	50	nd		nd	nd	nd	nd	nd
1,3-Dichlorobenzene	50	nd		nd	nd	nd	nd	nd
1,4-Dichlorobenzene	50	nd		nd	nd	nd	nd	nd
Isopropyltoluene	50	nd		nd	nd	nd	nd	nd
1,2-Dichlorobenzene	50	nd		nd	nd	nd	nd	nd
n-Butylbenzene	50	nd		nd	nd	nd	nd	250
1,2-Dibromo-3-Chloropropane	50	nd		nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	50	nd		nd	nd	nd	nd	nd
Naphthalene	50	nd		nd	nd	nd	nd	820
Hexachloro-1,3-butadiene	50	nd		nd	nd	nd	nd	440
1,2,3-Trichlorobenzene	50	nd		nd	nd	nd	nd	260

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10521-3
Client: HART CROWSER
Client Job Name: JACOBSON TERMINALS
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		MTH BLK	LCS	SP14-S5	SP16-S5	SP17-S5	SP17-S6	SP18-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Surrogate recoveries								
Dibromofluoromethane		115%	115%	114%	112%	108%	112%	107%
Toluene-d8		108%	107%	106%	106%	106%	105%	107%
4-Bromofluorobenzene		118%	121%	122%	121%	121%	121%	116%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10521-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TERMINALS
Client Job Number:	4063-12
Printed:	5/19/01 15:04

Analytical Results

8260, µg/kg		SP18-S2	SP18-S5
Matrix	Soil	Soil	Soil
Date extracted	Reporting	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01
Dichlorodifluoromethane	50	nd	nd
Chloromethane	50	nd	nd
Vinyl chloride	50	nd	nd
Bromomethane	50	nd	nd
Chloroethane	50	nd	nd
Trichlorofluoromethane	50	nd	nd
1,1-Dichloroethene	50	nd	nd
Methylene chloride	50	nd	nd
trans-1,2-Dichloroethene	50	nd	nd
1,1-Dichloroethane	50	nd	nd
cis-1,2-Dichloroethene	50	nd	nd
2,2-Dichloropropane	50	nd	nd
Chloroform	50	nd	nd
Bromochloromethane	50	nd	nd
1,1,1-Trichloroethane	50	nd	nd
1,2-Dichloroethane	50	nd	nd
1,1-Dichloropropene	50	nd	nd
Carbon tetrachloride	50	nd	nd
Benzene	50	nd	nd
Trichloroethene	50	nd	nd
1,2-Dichloropropane	50	nd	nd
Dibromomethane	50	nd	nd
Bromodichloromethane	50	nd	nd
cis-1,3-Dichloropropene	50	nd	nd
Toluene	50	nd	nd
trans-1,3-Dichloropropene	50	nd	nd
1,1,2-Trichloroethane	50	nd	nd
1,3-Dichloropropane	50	nd	nd
Dibromochloromethane	50	nd	nd
Tetrachloroethene	50	nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd
Chlorobenzene	50	nd	nd
1,1,1,2-Tetrachloroethane	50	nd	nd
Ethylbenzene	50	nd	nd
Xylenes	50	nd	nd
Styrene	50	nd	nd
Bromoform	50	nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd
Isopropylbenzene	50	nd	nd
1,2,3-Trichloropropane	50	nd	nd
Bromobenzene	50	nd	nd
n-Propylbenzene	50	nd	nd
2-Chlorotoluene	50	nd	nd
4-Chlorotoluene	50	nd	nd
1,3,5-Trimethylbenzene	50	nd	nd
tert-Butylbenzene	50	nd	nd
1,2,4-Trimethylbenzene	50	nd	nd
sec-Butylbenzene	50	nd	nd
1,3-Dichlorobenzene	50	nd	nd
1,4-Dichlorobenzene	50	nd	nd
Isopropyltoluene	50	nd	nd
1,2-Dichlorobenzene	50	nd	nd
n-Butylbenzene	50	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd
1,2,4-Trichlorobenzene	50	nd	nd
Naphthalene	50	nd	nd
Hexachloro-1,3-butadiene	50	nd	nd
1,2,3-Trichlorobenzene	50	nd	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10521-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TERMINALS
Client Job Number:	4063-12

Analytical Results

8260, µg/kg		**SP18-S2**	**SP18-S5**
Matrix	Soil	Soil	Soil
Date extracted	Reporting	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01
Surrogate recoveries			
Dibromofluoromethane		118%	110%
Toluene-d8		102%	106%
4-Bromofluorobenzene		119%	120%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10521-3
Client: HART CROWSER
Client Job Name: JACOBSON TERMINALS
Client Job Number: 4063-12
Printed: 5/19/01 15:05

Analytical Results

8260, µg/L		MTH BLK	LCS	SP-17S	MS SP-17S	MSD SP-17S	RPD SP-17S
Matrix	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Dichlorodifluoromethane	1.0	nd		nd			
Chloromethane	1.0	nd		nd			
Vinyl chloride	1.0	nd		nd			
Bromomethane	1.0	nd		nd			
Chloroethane	1.0	nd		nd			
Trichlorofluoromethane	1.0	nd		nd			
1,1-Dichloroethene	1.0	nd		nd			
Methylene chloride	1.0	nd		nd			
trans-1,2-Dichloroethene	1.0	nd		nd			
1,1-Dichloroethane	1.0	nd		nd			
cis-1,2-Dichloroethene	1.0	nd		nd			
2,2-Dichloropropane	1.0	nd		nd			
Chloroform	1.0	nd		nd			
Bromochloromethane	1.0	nd		nd			
1,1,1-Trichloroethane	1.0	nd		nd			
1,2-Dichloroethane	1.0	nd		nd			
1,1-Dichloropropene	1.0	nd		nd			
Carbon tetrachloride	1.0	nd		nd			
Benzene	1.0	nd	108%	nd	111%	108%	
Trichloroethene	1.0	nd	105%	nd	108%	105%	
1,2-Dichloropropane	1.0	nd		nd			
Dibromomethane	1.0	nd		nd			
Bromodichloromethane	1.0	nd		nd			
cis-1,3-Dichloropropene	1.0	nd		nd			
Toluene	1.0	nd	103%	nd	106%	103%	
trans-1,3-Dichloropropene	1.0	nd		nd			
1,1,2-Trichloroethane	1.0	nd		nd			
1,3-Dichloropropane	1.0	nd		nd			
Dibromochloromethane	1.0	nd		nd			
Tetrachloroethene	1.0	nd		nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd			
Chlorobenzene	1.0	nd	105%	nd	108%	105%	
1,1,1,2-Tetrachloroethane	1.0	nd		nd			
Ethylbenzene	1.0	nd		nd			
Xylenes	1.0	nd		nd			
Styrene	1.0	nd		nd			
Bromoform	1.0	nd		nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd			
Isopropylbenzene	1.0	nd		nd			
1,2,3-Trichloropropane	1.0	nd		nd			
Bromobenzene	1.0	nd		nd			
n-Propylbenzene	1.0	nd		nd			
2-Chlorotoluene	1.0	nd		nd			
4-Chlorotoluene	1.0	nd		nd			
1,3,5-Trimethylbenzene	1.0	nd		nd			
tert-Butylbenzene	1.0	nd		nd			
1,2,4-Trimethylbenzene	1.0	nd		nd			
sec-Butylbenzene	1.0	nd		nd			
1,3-Dichlorobenzene	1.0	nd		nd			
1,4-Dichlorobenzene	1.0	nd		nd			
Isopropyltoluene	1.0	nd		nd			
1,2-Dichlorobenzene	1.0	nd		nd			
n-Butylbenzene	1.0	nd		nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd			
1,2,4-Trichlorobenzene	1.0	nd		nd			
Naphthalene	1.0	nd		nd			
Hexachloro-1,3-butadiene	1.0	nd		nd			
1,2,3-Trichlorobenzene	1.0	nd		nd			

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10521-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TERMINALS
Client Job Number:	4063-12

Analytical Results					MS	MSD	RPD
8260, µg/L		**MTH BLK**	**LCS**	**SP-17S**	**SP-17S**	**SP-17S**	**SP-17S**
Matrix	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Date analyzed	Limits	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01	05/21/01
Surrogate recoveries							
Dibromofluoromethane		115%	115%	115%	115%	115%	
Toluene-d8		108%	107%	105%	108%	105%	
4-Bromofluorobenzene		118%	121%	121%	112%	121%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

Sample Custody Record

S10521-3

Samples Shipped to: TEG

HART CROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4063-12 LAB NUMBER

PROJECT NAME Jacobsen Terminals

HART CROWSER CONTACT Jenny Porter

SAMPLED BY: D,2c

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	PCBs	8260	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	SP-18/S-1	402 glass	5/21/01	0835	soil	X	X	1	
	SP-18/S-2			0845		X	X	1	
	SP-15/S-3			0900		X	X	1	
	SP-16/S-5			1000		X	X	1	
	SP-14/S-5			1050		X	X	1	
	SP-17/S-5			1215		X	X	1	
	SP-17/S-6			1235		X	X	1	
	SP-17S	40 mL VOA		1145	H2O		X	3	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	5/21/01	SIGNATURE	5-21-01
PRINT NAME Derek Ormond	TIME	PRINT NAME Scott Jacobsen	TIME
COMPANY HC	1330	COMPANY Jacobsen Terminals	1330

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE		SIGNATURE	
PRINT NAME Michael Dee	TIME	PRINT NAME	TIME
COMPANY ESN		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. for Other Contract Requirements

TURNAROUND TIME:
☒ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☐ STANDARD
☐ 72 HOURS OTHER

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10524-8
Client:	HART CROWSER
Client Job Name:	JACOBSON
Client Job Number:	4063-12

Analytical Results

NWTPH-Dx, mg/kg		MTH BLK	SP-18 S-1
Matrix	Soil	Soil	Soil
Date extracted	Reporting	05/28/01	05/28/01
Date analyzed	Limits	05/28/01	05/28/01
Kerosene/Jet fuel	20	nd	nd
Diesel/Fuel oil	20	nd	2,000
Heavy oil	50	nd	nd
Surrogate recoveries:			
Fluorobiphenyl		105%	C
o-Terphenyl		94%	108%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10524-8
Client:	HART CROWSER
Client Job Name:	JACOBSON
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		MTH BLK	LCS	SP1-S4	SP2-S4	SP2-S5	SP3-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
A1221	0.50	nd		nd	nd	nd	nd
A1232	0.50	nd		nd	nd	nd	nd
A1242 (A1016)	0.20	nd	125%	nd	nd	nd	nd
A1248	0.20	nd		nd	nd	nd	nd
A1254	0.20	nd		nd	nd	nd	nd
A1260	0.20	nd		2.7	550	0.31	14
Surrogate recoveries:							
Tetrachloro-m-xylene		114%	99%	96%	101%	106%	102%
Decachlorobiphenyl		115%	94%	94%	121%	100%	108%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8082(PCBs), mg/kg		SP4-S3	SP4-S4	SP5-S1	SP5-S2	SP5-S5	DUPL SP5-S5
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
A1221	0.50	nd	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd	nd
A1260	0.20	530	3.4	18	3.6	0.43	0.55
Surrogate recoveries:							
Tetrachloro-m-xylene		104%	92%	105%	87%	97%	121%
Decachlorobiphenyl		132%	93%	113%	90%	99%	C

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10524-8
Client:	HART CROWSER
Client Job Name:	JACOBSON
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		SP6-S1	SP6-S3	SP6-S4	SP6-S5	SP7-S4	SP8-S2
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
A1221	0.50	nd	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd	nd
A1260	0.20	0.35	nd	25	1.2	nd	nd
Surrogate recoveries:							
Tetrachloro-m-xylene		95%	110%	113%	97%	104%	111%
Decachlorobiphenyl		96%	117%	119%	100%	109%	115%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10524-8
Client:	HART CROWSER
Client Job Name:	JACOBSON
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		**SP8-S4**	**SP9-S4**	**SP10-S5**	**SP11-S4**	DUPL **SP11-S4**	**SP12-S2**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
A1221	0.50	nd	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd	nd
A1260	0.20	nd	nd	nd	nd	nd	nd
Surrogate recoveries:							
Tetrachloro-m-xylene		117%	110%	118%	99%	98%	108%
Decachlorobiphenyl		114%	111%	118%	106%	110%	116%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8082(PCBs), mg/kg		SP12-S5	SP13-S4	SP14-S2	SP15-S5	SP15-S7	SP16-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
A1221	0.50	nd	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd	nd
A1260	0.20	nd	nd	nd	nd	nd	nd
Surrogate recoveries:							
Tetrachloro-m-xylene		116%	112%	109%	106%	102%	108%
Decachlorobiphenyl		117%	121%	119%	113%	110%	120%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8082(PCBs), mg/kg		SP17-S1	SP19-S3	SP19-S4	DUPL SP19-S4
Matrix	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01
A1221	0.50	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd
A1260	0.20	nd	820	0.50	0.31
Surrogate recoveries:					
Tetrachloro-m-xylene		121%	113%	116%	114%
Decachlorobiphenyl		134%	C	120%	123%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		MTH BLK	LCS	SP1-S4	SP2-S4	SP2-S5	SP3-S4	SP4-S3	SP4-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Dichlorodifluoromethane	50	nd		nd	nd	nd	nd	nd	nd
Chloromethane	50	nd		nd	nd	nd	nd	nd	nd
Vinyl chloride	50	nd		nd	nd	nd	nd	nd	nd
Bromomethane	50	nd		nd	nd	nd	nd	nd	nd
Chloroethane	50	nd		nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	50	nd		nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	50	nd		nd	nd	nd	nd	nd	nd
Methylene chloride	50	nd		nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	50	nd		nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	50	nd		nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	50	nd		nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	50	nd		nd	nd	nd	nd	nd	nd
Chloroform	50	nd		nd	nd	nd	nd	nd	nd
Bromochloromethane	50	nd		nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	50	nd		nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	50	nd		nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	50	nd		nd	nd	nd	nd	nd	nd
Carbon tetrachloride	50	nd		nd	nd	nd	nd	nd	nd
Benzene	50	nd	73%	nd	nd	nd	nd	nd	nd
Trichloroethene	50	nd	70%	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	50	nd		nd	nd	nd	nd	nd	nd
Dibromomethane	50	nd		nd	nd	nd	nd	nd	nd
Bromodichloromethane	50	nd		nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	50	nd		nd	nd	nd	nd	nd	nd
Toluene	50	nd	75%	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	50	nd		nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	50	nd		nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	50	nd		nd	nd	nd	nd	nd	nd
Dibromochloromethane	50	nd		nd	nd	nd	nd	nd	nd
Tetrachloroethene	50	nd		nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	50	nd		nd	nd	nd	nd	nd	nd
Chlorobenzene	50	nd	88%	nd	nd	nd	nd	790	nd
1,1,1,2-Tetrachloroethane	50	nd		nd	nd	nd	nd	nd	nd
Ethylbenzene	50	nd		nd	nd	nd	nd	nd	nd
Xylenes	50	nd		nd	nd	nd	nd	nd	nd
Styrene	50	nd		nd	nd	nd	nd	nd	nd
Bromoform	50	nd		nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd		nd	nd	nd	nd	nd	nd
Isopropylbenzene	50	nd		nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	50	nd		nd	nd	nd	nd	nd	nd
Bromobenzene	50	nd		nd	nd	nd	nd	nd	nd
n-Propylbenzene	50	nd		nd	nd	nd	nd	nd	nd
2-Chlorotoluene	50	nd		nd	nd	nd	nd	nd	nd
4-Chlorotoluene	50	nd		nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	50	nd		nd	nd	nd	nd	nd	nd
tert-Butylbenzene	50	nd		nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	50	nd		nd	nd	nd	nd	nd	nd
sec-Butylbenzene	50	nd		nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	50	nd		nd	840	nd	nd	250	nd
1,4-Dichlorobenzene	50	nd		nd	620	nd	nd	550	nd
Isopropyltoluene	50	nd		nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	50	nd		nd	nd	nd	nd	nd	nd
n-Butylbenzene	50	nd		nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd		nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	50	nd		nd	11,000	520	5,800	28,000	840
Naphthalene	50	nd		nd	nd	nd	nd	nd	210
Hexachloro-1,3-butadiene	50	nd		nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	50	nd		nd	790	nd	450	2,000	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		MTH BLK	LCS	SP1-S4	SP2-S4	SP2-S5	SP3-S4	SP4-S3	SP4-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Moisture, %				0%	15%	15%	15%	15%	15%
Surrogate recoveries									
Dibromofluoromethane		116%	113%	111%	110%	110%	108%	107%	107%
Toluene-d8		117%	117%	117%	116%	117%	117%	117%	116%
4-Bromofluorobenzene		122%	122%	121%	121%	121%	122%	123%	121%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP5-S1	SP5-S2	SP5-S5	SP6-S1	SP6-S3	SP6-S4	SP6-S5	SP7-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Dichlorodifluoromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Chloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Vinyl chloride	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromomethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Chloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
Methylene chloride	50	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Chloroform	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromochloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	50	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	50	nd	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Dibromomethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd	nd
Toluene	50	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	50	570	5,800	nd	nd	170	nd	nd	nd
1,1,1,2-Tetrachloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
Xylenes	50	nd	nd	nd	nd	nd	nd	nd	nd
Styrene	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromoform	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Isopropylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromobenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
n-Propylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	50	nd	nd	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	50	nd	100	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	50	nd	220	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	50	nd	nd	nd	nd	nd	930	680	410
1,4-Dichlorobenzene	50	nd	210	nd	nd	150	860	560	nd
Isopropyltoluene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	50	nd	nd	nd	nd	nd	180	nd	nd
n-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	50	nd	nd	900	nd	nd	45,000	2,700	1,600
Naphthalene	50	nd	nd	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	50	nd	nd	nd	nd	nd	2,500	nd	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP5-S1	SP5-S2	SP5-S5	SP6-S1	SP6-S3	SP6-S4	SP6-S5	SP7-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Moisture, %		15%	15%	15%	15%	15%	15%	15%	15%
Surrogate recoveries									
Dibromofluoromethane		108%	107%	111%	105%	104%	106%	106%	106%
Toluene-d8		115%	115%	114%	115%	115%	115%	114%	116%
4-Bromofluorobenzene		101%	110%	122%	124%	121%	117%	121%	124%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP8-S2	SP8-S4	SP9-S4	SP10-S5	SP11-S4	SP12-S2	SP12-S5	SP13-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Dichlorodifluoromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Chloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Vinyl chloride	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromomethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Chloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
Methylene chloride	50	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Chloroform	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromochloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	50	nd	nd	nd	nd	nd	nd	nd	nd
Benzene	50	nd	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Dibromomethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd	nd
Toluene	50	nd	nd	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	50	310	nd	140	nd	nd	nd	240	nd
1,1,1,2-Tetrachloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
Xylenes	50	nd	nd	nd	nd	nd	nd	nd	nd
Styrene	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromoform	50	nd	nd	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd	nd	nd	nd	nd	nd	nd
Isopropylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
Bromobenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
n-Propylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	50	nd	nd	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	50	nd	nd	450	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	50	nd	nd	150	nd	nd	nd	180	nd
Isopropyltoluene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
n-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd	nd
Naphthalene	50	nd	nd	140	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	50	nd	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP8-S2	SP8-S4	SP9-S4	SP10-S5	SP11-S4	SP12-S2	SP12-S5	SP13-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Moisture, %		15%	15%	15%	15%	15%	15%	15%	15%
Surrogate recoveries									
Dibromofluoromethane		108%	107%	108%	107%	109%	109%	113%	112%
Toluene-d8		116%	114%	114%	115%	113%	115%	108%	109%
4-Bromofluorobenzene		124%	121%	122%	122%	122%	122%	121%	121%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP14-S2	SP15-S5	SP15-S7	SP16-S1	SP16-S1 MS	SP16-S1 MSD	SP16-S1 RPD	SP17-S1
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Dichlorodifluoromethane	50	nd	nd	nd	nd				nd
Chloromethane	50	nd	nd	nd	nd				nd
Vinyl chloride	50	nd	nd	nd	nd				nd
Bromomethane	50	nd	nd	nd	nd				nd
Chloroethane	50	nd	nd	nd	nd				nd
Trichlorofluoromethane	50	nd	nd	nd	nd				nd
1,1-Dichloroethene	50	nd	nd	nd	nd				nd
Methylene chloride	50	nd	nd	nd	nd				nd
trans-1,2-Dichloroethene	50	nd	nd	nd	nd				nd
1,1-Dichloroethane	50	nd	nd	nd	nd				nd
cis-1,2-Dichloroethene	50	nd	nd	nd	nd				nd
2,2-Dichloropropane	50	nd	nd	nd	nd				nd
Chloroform	50	nd	nd	nd	nd				nd
Bromochloromethane	50	nd	nd	nd	nd				nd
1,1,1-Trichloroethane	50	nd	nd	nd	nd				nd
1,2-Dichloroethane	50	nd	nd	nd	nd				nd
1,1-Dichloropropene	50	nd	nd	nd	nd				nd
Carbon tetrachloride	50	nd	nd	nd	nd				nd
Benzene	50	nd	nd	nd	nd	107%	108%	1%	nd
Trichloroethene	50	nd	nd	nd	nd	107%	109%	2%	nd
1,2-Dichloropropane	50	nd	nd	nd	nd				nd
Dibromomethane	50	nd	nd	nd	nd				nd
Bromodichloromethane	50	nd	nd	nd	nd				nd
cis-1,3-Dichloropropene	50	nd	nd	nd	nd				nd
Toluene	50	nd	nd	nd	nd	105%	105%	0%	nd
trans-1,3-Dichloropropene	50	nd	nd	nd	nd				nd
1,1,2-Trichloroethane	50	nd	nd	nd	nd				nd
1,3-Dichloropropane	50	nd	nd	nd	nd				nd
Dibromochloromethane	50	nd	nd	nd	nd				nd
Tetrachloroethene	50	nd	nd	nd	nd				nd
1,2-Dibromoethane (EDB)	50	nd	nd	nd	nd				nd
Chlorobenzene	50	nd	nd	nd	nd	122%	120%	2%	nd
1,1,1,2-Tetrachloroethane	50	nd	nd	nd	nd				nd
Ethylbenzene	50	nd	nd	nd	nd				nd
Xylenes	50	nd	nd	nd	nd				nd
Styrene	50	nd	nd	nd	nd				nd
Bromoform	50	nd	nd	nd	nd				nd
1,1,2,2-Tetrachloroethane	50	nd	nd	nd	nd				nd
Isopropylbenzene	50	nd	nd	nd	nd				nd
1,2,3-Trichloropropane	50	nd	nd	nd	nd				nd
Bromobenzene	50	nd	nd	nd	nd				nd
n-Propylbenzene	50	nd	nd	nd	nd				nd
2-Chlorotoluene	50	nd	nd	nd	nd				nd
4-Chlorotoluene	50	nd	nd	nd	nd				nd
1,3,5-Trimethylbenzene	50	nd	nd	nd	nd				nd
tert-Butylbenzene	50	nd	nd	nd	nd				nd
1,2,4-Trimethylbenzene	50	nd	nd	nd	nd				nd
sec-Butylbenzene	50	nd	nd	nd	nd				nd
1,3-Dichlorobenzene	50	nd	nd	nd	nd				nd
1,4-Dichlorobenzene	50	nd	nd	nd	nd				nd
Isopropyltoluene	50	nd	nd	nd	nd				nd
1,2-Dichlorobenzene	50	nd	nd	nd	nd				nd
n-Butylbenzene	50	nd	nd	nd	nd				nd
1,2-Dibromo-3-Chloropropane	50	nd	nd	nd	nd				nd
1,2,4-Trichlorobenzene	50	nd	nd	nd	nd				nd
Naphthalene	50	nd	nd	nd	nd				nd
Hexachloro-1,3-butadiene	50	nd	nd	nd	nd				nd
1,2,3-Trichlorobenzene	50	nd	nd	nd	nd				nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

						MS	MSD	RPD	
8260, µg/kg		**SP14-S2**	**SP15-S5**	**SP15-S7**	**SP16-S1**	**SP16-S1**	**SP16-S1**	**SP16-S1**	**SP17-S1**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Moisture, %		15%	15%	15%	15%	15%	15%	15%	15%
Surrogate recoveries									
Dibromofluoromethane		111%	110%	111%	109%	128%	129%		107%
Toluene-d8		108%	109%	108%	109%	89%	89%		109%
4-Bromofluorobenzene		120%	119%	120%	120%	115%	113%		120%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP19-S3	SP19-S4
Matrix	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01
Dichlorodifluoromethane	50	nd	nd
Chloromethane	50	nd	nd
Vinyl chloride	50	nd	nd
Bromomethane	50	nd	nd
Chloroethane	50	nd	nd
Trichlorofluoromethane	50	nd	nd
1,1-Dichloroethene	50	nd	nd
Methylene chloride	50	nd	nd
trans-1,2-Dichloroethene	50	nd	nd
1,1-Dichloroethane	50	nd	nd
cis-1,2-Dichloroethene	50	nd	nd
2,2-Dichloropropane	50	nd	nd
Chloroform	50	nd	nd
Bromochloromethane	50	nd	nd
1,1,1-Trichloroethane	50	nd	nd
1,2-Dichloroethane	50	nd	nd
1,1-Dichloropropene	50	nd	nd
Carbon tetrachloride	50	nd	nd
Benzene	50	450	nd
Trichloroethene	50	nd	nd
1,2-Dichloropropane	50	nd	nd
Dibromomethane	50	nd	nd
Bromodichloromethane	50	nd	nd
cis-1,3-Dichloropropene	50	nd	nd
Toluene	50	nd	nd
trans-1,3-Dichloropropene	50	nd	nd
1,1,2-Trichloroethane	50	nd	nd
1,3-Dichloropropane	50	nd	nd
Dibromochloromethane	50	nd	nd
Tetrachloroethene	50	nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd
Chlorobenzene	50	15,000	710
1,1,1,2-Tetrachloroethane	50	nd	nd
Ethylbenzene	50	nd	nd
Xylenes	50	nd	nd
Styrene	50	nd	nd
Bromoform	50	nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd
Isopropylbenzene	50	nd	nd
1,2,3-Trichloropropane	50	nd	nd
Bromobenzene	50	nd	nd
n-Propylbenzene	50	nd	nd
2-Chlorotoluene	50	nd	nd
4-Chlorotoluene	50	nd	nd
1,3,5-Trimethylbenzene	50	nd	nd
tert-Butylbenzene	50	nd	nd
1,2,4-Trimethylbenzene	50	nd	nd
sec-Butylbenzene	50	nd	nd
1,3-Dichlorobenzene	50	320	nd
1,4-Dichlorobenzene	50	1,400	nd
Isopropyltoluene	50	nd	nd
1,2-Dichlorobenzene	50	nd	nd
n-Butylbenzene	50	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd
1,2,4-Trichlorobenzene	50	900	190
Naphthalene	50	nd	nd
Hexachloro-1,3-butadiene	50	nd	nd
1,2,3-Trichlorobenzene	50	nd	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10524-8
Client:	HART CROWSER
Client Job Name:	JACOBSON
Client Job Number:	4063-12

Analytical Results

8260, µg/kg		**SP19-S3**	**SP19-S4**
Matrix	Soil	Soil	Soil
Date extracted	Reporting	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01
Moisture, %		15%	15%
Surrogate recoveries			
Dibromofluoromethane		110%	108%
Toluene-d8		108%	108%
4-Bromofluorobenzene		117%	119%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

8260, µg/L		MTH BLK	LCS	SP-15S	SP-15D	MS SP-15D	MSD SP-15D	RPD SP-15D
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Dichlorodifluoromethane	1.0	nd		nd	nd			
Chloromethane	1.0	nd		nd	nd			
Vinyl chloride	1.0	nd		nd	nd			
Bromomethane	1.0	nd		nd	nd			
Chloroethane	1.0	nd		nd	nd			
Trichlorofluoromethane	1.0	nd		nd	nd			
1,1-Dichloroethene	1.0	nd		nd	nd			
Methylene chloride	1.0	nd		nd	nd			
trans-1,2-Dichloroethene	1.0	nd		nd	nd			
1,1-Dichloroethane	1.0	nd		nd	nd			
cis-1,2-Dichloroethene	1.0	nd		nd	nd			
2,2-Dichloropropane	1.0	nd		nd	nd			
Chloroform	1.0	nd		nd	nd			
Bromochloromethane	1.0	nd		nd	nd			
1,1,1-Trichloroethane	1.0	nd		nd	nd			
1,2-Dichloroethane	1.0	nd		nd	nd			
1,1-Dichloropropene	1.0	nd		nd	nd			
Carbon tetrachloride	1.0	nd		nd	nd			
Benzene	1.0	nd	73%	nd	nd	70%	75%	7%
Trichloroethene	1.0	nd	70%	nd	nd	69%	74%	7%
1,2-Dichloropropane	1.0	nd		nd	nd			
Dibromomethane	1.0	nd		nd	nd			
Bromodichloromethane	1.0	nd		nd	nd			
cis-1,3-Dichloropropene	1.0	nd		nd	nd			
Toluene	1.0	nd	75%	nd	nd	73%	80%	8%
trans-1,3-Dichloropropene	1.0	nd		nd	nd			
1,1,2-Trichloroethane	1.0	nd		nd	nd			
1,3-Dichloropropane	1.0	nd		nd	nd			
Dibromochloromethane	1.0	nd		nd	nd			
Tetrachloroethene	1.0	nd		nd	nd			
1,2-Dibromoethane (EDB)	1.0	nd		nd	nd			
Chlorobenzene	1.0	nd	88%	22	nd	85%	93%	9%
1,1,1,2-Tetrachloroethane	1.0	nd		nd	nd			
Ethylbenzene	1.0	nd		nd	nd			
Xylenes	1.0	nd		nd	nd			
Styrene	1.0	nd		nd	nd			
Bromoform	1.0	nd		nd	nd			
1,1,2,2-Tetrachloroethane	1.0	nd		nd	nd			
Isopropylbenzene	1.0	nd		nd	nd			
1,2,3-Trichloropropane	1.0	nd		nd	nd			
Bromobenzene	1.0	nd		nd	nd			
n-Propylbenzene	1.0	nd		nd	nd			
2-Chlorotoluene	1.0	nd		nd	nd			
4-Chlorotoluene	1.0	nd		nd	nd			
1,3,5-Trimethylbenzene	1.0	nd		nd	nd			
tert-Butylbenzene	1.0	nd		nd	nd			
1,2,4-Trimethylbenzene	1.0	nd		nd	nd			
sec-Butylbenzene	1.0	nd		nd	nd			
1,3-Dichlorobenzene	1.0	nd		5.0	nd			
1,4-Dichlorobenzene	1.0	nd		7.1	nd			
Isopropyltoluene	1.0	nd		nd	nd			
1,2-Dichlorobenzene	1.0	nd		nd	nd			
n-Butylbenzene	1.0	nd		nd	nd			
1,2-Dibromo-3-Chloropropane	1.0	nd		nd	nd			
1,2,4-Trichlorobenzene	1.0	nd		nd	nd			
Naphthalene	1.0	nd		9.3	nd			
Hexachloro-1,3-butadiene	1.0	nd		nd	nd			
1,2,3-Trichlorobenzene	1.0	nd		nd	nd			

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10524-8
Client: HART CROWSER
Client Job Name: JACOBSON
Client Job Number: 4063-12

Analytical Results

						MS	MSD	RPD
8260, µg/L		**MTH BLK**	**LCS**	**SP-15S**	**SP-15D**	**SP-15D**	**SP-15D**	**SP-15D**
Matrix	Water	Water	Water	Water	Water	Water	Water	Water
Date extracted	Reporting	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Date analyzed	Limits	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01	05/25/01
Surrogate recoveries								
Dibromofluoromethane		116%	113%	115%	116%	115%	115%	
Toluene-d8		117%	117%	117%	116%	117%	116%	
4-Bromofluorobenzene		122%	122%	119%	121%	124%	123%	

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

Sample Custody Record

S10524-8

Samples Shipped to: _____

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4063-12 LAB NUMBER _____

PROJECT NAME Jamison

HART CROWSER CONTACT Jeremy Porter

SAMPLED BY: DRC

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	TPH-Dx	PCBs	8260	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	DO-1 S-2		5-23-01		SOIL	X	X	X		
	DO-2 S-1					X	X	X		
	DO-2 S-2					X	X	X		
	DO-2 S-5					X	X	X		
	DO-3 S-1					X	X	X		
	DO-3 S-2					X	X	X		
	DO-3 S-5					X	X	X		
	DO-1				H2O	X		X		
	DO-2					X		X		
	DO-3					X		X		

SILICA GEL CLEANUP FOR TPH-Dx

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Jeremy Porter	5-24-01	[illegible]	5/24
SIGNATURE Jeremy Porter	TIME	SIGNATURE [illegible]	TIME
PRINT NAME Jtc	1510	PRINT NAME EGN	1510
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

Report DO- results separate from SP- results.

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

Samples Shipped to: _____

SIUSC-8

HARTCROWSER

Har vse
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4063-12 LAB NUMBER _____

PROJECT NAME Jerusalem

HART CROWSER CONTACT Jeremy Porter

SAMPLED BY: DRO

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	REQUESTED ANALYSIS: PCBs	REQUESTED ANALYSIS: 8260	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	SP-6 S-5		5-22-01		SOIL	X	X		
	SP-7 S-4		5-22-01			X	X		
	SP-8 S-2					X	X		
	SP-8 S-4					X	X		
	SP-9 S-4					X	X		
	SP-10 S-5					X	X		
	SP-11 S-4					X	X		
	SP-12 S-5					X	X		
	SP-13 S-4					X	X		
	SP-12 S-2					X	X		
	SP-14 S-2					X	X		
	SP-15 S-5					X	X		

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Jeremy J Porter	5-24-01	[signature]	5/24/
SIGNATURE	TIME	SIGNATURE	TIME
Jeremy Porter	1510	[signature]	15[illegible]
PRINT NAME		PRINT NAME	
HC		ESN	
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

S10524-8

Samples Shipped to: _____

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB H063-12 LAB NUMBER _____

PROJECT NAME Jacobsen

HART CROWSER CONTACT Jeremy Porter

SAMPLED BY: DRO

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	PCB's	8260	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	SP-1 S-4		5-23-01		SOIL	X	X		
	SP-2 S-4		5-22-01			X	X		
	SP-2 S-5					X	X		
	SP-3 S-4					X	X		
	SP-4 S-3		5-23-01			X	X		
	SP-4 S-4					X	X		
	SP-5 S-1		5-22-01			X	X		
	SP-5 S-2					X	X		
	SP-5 S-5					X	X		
	SP-6 S-1		5-23-01			X	X		
	SP-6 S-3					X	X		
	SP-6 S-4					X	X		

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Jeremy Porter	5-24-01		5/24/1
SIGNATURE	TIME	SIGNATURE	TIME
Jeremy Porter	1510	ESN	1509
PRINT NAME		PRINT NAME	
HC			
COMPANY		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS:
☐YES ☐NO ☐N/A
GOOD CONDITION
☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND
☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____
for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

S105 2-1-0

Samples Shipped to: _____

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4063-12 LAB NUMBER _____

PROJECT NAME Jacobsen

HART CROWSER CONTACT Jeremy Porter

SAMPLED BY: DRO

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	PCBs	8260	TPH-Dx	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	SP-15 S-7		5-21-01		SOIL	X	X			
	SP-16 S-1		↓		↓	X	X			
	SP-12 S-1		↓			X	X			
	SP-19 S-3		5-23-01			X	X			
	SP-19 S-4		5-23-01		↓	X	X			
	SP-15-S		5-22-01		H_2O		X			
	SP-15-D		↓		↓		X			
	SP-185-1		5-21-01	~~5-21-01~~	SOIL			X		SILICA GEL CLEANUP FOR TPH-Dx

RELINQUISHED BY	DATE	RECEIVED BY	DATE
Jeremy J Porter	5-24-01	[signature]	5/24/1
SIGNATURE	TIME	SIGNATURE	TIME
Jeremy Porter	1510	[signature] ESN	1510
PRINT NAME		PRINT NAME	
COMPANY HC		COMPANY	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS:
☐YES ☐NO ☐N/A
GOOD CONDITION*
☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND
☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____
for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

ESN NORTHWEST
Environmental Services Network

June 19, 2001

Jeremy Porter
Hart Crowser
1910 Fairview Ave. E
Seattle, WA 98102-3699

Dear Mr. Porter:

Please find enclosed the analytical data report for the Jacobson Terminals Project in Seattle, Washington. Soil samples were analyzed for VOC's by Method 8260 and PCB's by Method 8082 and one water sample for Specific Halogenated Hydrocarbons and BTEX by Method 8021B on June 8, 2001.

The results of these analyses are summarized in the attached tables. All soil values are reported on a dry weight basis. Applicable detection limits and QA/QC data are included. An invoice for this work has been sent to Al Jacobson.

ESN Northwest appreciates the opportunity to have provided analytical services to Hart Crowser for this project. It was a pleasure working with you, and we are looking forward to the next opportunity to work together.

Sincerely,

Michael A Korosec

Michael A. Korosec
President

677 Woodland Square Lp. SE, Suite D ▪ Lacey, Washington 98503 ▪ 360.459.4670 ▪ FAX 360.459.3432
Web Site: *www.ESN-USA.com* E-Mail: *esnnw@aol.com*

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10607-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TEMINALS
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		MTH BLK	LCS	SP20-S4	SP20-S6	SP21-S3
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
A1221	0.50	nd		nd	nd	nd
A1232	0.50	nd		nd	nd	nd
A1242 (A1016)	0.20	nd	132%	nd	nd	nd
A1248	0.20	nd		nd	nd	nd
A1254	0.20	nd		nd	nd	nd
A1260	0.20	nd		nd	nd	J 0.12
Surrogate recoveries:						
Tetrachloro-m-xylene		104%	110%	90%	92%	69%
Decachlorobiphenyl		100%	73%	86%	90%	66%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10607-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TEMINALS
Client Job Number:	4063-12

Analytical Results		DUPL				
8082(PCBs), mg/kg		**SP21-S3**	**SP21-S4**	**SP22-S3**	**SP22-S5**	**SP23-S4**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
A1221	0.50	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd
A1260	0.20	J 0.16	nd	J 0.16	nd	nd
Surrogate recoveries:						
Tetrachloro-m-xylene		68%	69%	95%	86%	106%
Decachlorobiphenyl		70%	71%	94%	81%	100%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10607-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TEMINALS
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		SP24-S2	SP24-S4	SP25-S1	SP25-S4	SP26-S2	SP26-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
A1221	0.50	nd	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd	nd
A1260	0.20	17	nd	9.5	nd	nd	nd
Surrogate recoveries:							
Tetrachloro-m-xylene		77%	85%	86%	90%	68%	80%
Decachlorobiphenyl		89%	88%	96%	87%	71%	83%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10607-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TEMINALS
Client Job Number:	4063-12

Analytical Results

8082(PCBs), mg/kg		SP27-S4	SP27-S4 DUPL	SP28-S4	SP29-S1	SP29-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
A1221	0.50	nd	nd	nd	nd	nd
A1232	0.50	nd	nd	nd	nd	nd
A1242 (A1016)	0.20	nd	nd	nd	nd	nd
A1248	0.20	nd	nd	nd	nd	nd
A1254	0.20	nd	nd	nd	nd	nd
A1260	0.20	nd	nd	nd	0.60	nd
Surrogate recoveries:						
Tetrachloro-m-xylene		83%	81%	82%	79%	77%
Decachlorobiphenyl		78%	77%	79%	84%	75%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
na - not analyzed
C - coelution with sample peaks
M - matrix interference
J - estimated value
Results reported on dry-weight basis
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10607-3
Client: HART CROWSER
Client Job Name: JACOBSON TEMINALS
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		MTH BLK	LCS	SP20-S4	MS SP20-S4	MSD SP20-S4	RPD SP20-S4	SP20-S6
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Dichlorodifluoromethane	50	nd		nd				nd
Chloromethane	50	nd		nd				nd
Vinyl chloride	50	nd		nd				nd
Bromomethane	50	nd		nd				nd
Chloroethane	50	nd		nd				nd
Trichlorofluoromethane	50	nd		nd				nd
1,1-Dichloroethene	50	nd		nd				nd
Methylene chloride	50	nd		nd				nd
trans-1,2-Dichloroethene	50	nd		nd				nd
1,1-Dichloroethane	50	nd		nd				nd
cis-1,2-Dichloroethene	50	nd		nd				nd
2,2-Dichloropropane	50	nd		nd				nd
Chloroform	50	nd		nd				nd
Bromochloromethane	50	nd		nd				nd
1,1,1-Trichloroethane	50	nd		nd				nd
1,2-Dichloroethane	50	nd		nd				nd
1,1-Dichloropropene	50	nd		nd				nd
Carbon tetrachloride	50	nd		nd				nd
Benzene	50	nd	130%	nd	125%	130%	4%	nd
Trichloroethene	50	nd	123%	nd	117%	125%	7%	nd
1,2-Dichloropropane	50	nd		nd				nd
Dibromomethane	50	nd		nd				nd
Bromodichloromethane	50	nd		nd				nd
cis-1,3-Dichloropropene	50	nd		nd				nd
Toluene	50	nd	125%	nd	120%	124%	3%	nd
trans-1,3-Dichloropropene	50	nd		nd				nd
1,1,2-Trichloroethane	50	nd		nd				nd
1,3-Dichloropropane	50	nd		nd				nd
Dibromochloromethane	50	nd		nd				nd
Tetrachloroethene	50	nd		nd				nd
1,2-Dibromoethane (EDB)	50	nd		nd				nd
Chlorobenzene	50	nd	122%	nd	118%	124%	5%	nd
1,1,1,2-Tetrachloroethane	50	nd		nd				nd
Ethylbenzene	50	nd		nd				nd
Xylenes	50	nd		nd				nd
Styrene	50	nd		nd				nd
Bromoform	50	nd		nd				nd
1,1,2,2-Tetrachloroethane	50	nd		nd				nd
Isopropylbenzene	50	nd		nd				nd
1,2,3-Trichloropropane	50	nd		nd				nd
Bromobenzene	50	nd		nd				nd
n-Propylbenzene	50	nd		nd				nd
2-Chlorotoluene	50	nd		nd				nd
4-Chlorotoluene	50	nd		nd				nd
1,3,5-Trimethylbenzene	50	nd		nd				nd
tert-Butylbenzene	50	nd		nd				nd
1,2,4-Trimethylbenzene	50	nd		nd				nd
sec-Butylbenzene	50	nd		nd				nd
1,3-Dichlorobenzene	50	nd		nd				nd
1,4-Dichlorobenzene	50	nd		nd				nd
Isopropyltoluene	50	nd		nd				nd
1,2-Dichlorobenzene	50	nd		nd				nd
n-Butylbenzene	50	nd		nd				nd
1,2-Dibromo-3-Chloropropane	50	nd		nd				nd
1,2,4-Trichlorobenzene	50	nd		nd				nd
Naphthalene	50	nd		nd				130
Hexachloro-1,3-butadiene	50	nd		nd				nd
1,2,3-Trichlorobenzene	50	nd		nd				nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10607-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TEMINALS
Client Job Number:	4063-12

Analytical Results

8260, µg/kg		**MTH BLK**	**LCS**	**SP20-S4**	MS **SP20-S4**	MSD **SP20-S4**	RPD **SP20-S4**	**SP20-S6**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Moisture, %				15%	15%	15%	15%	15%
Surrogate recoveries								
Dibromofluoromethane		114%	111%	110%	112%	112%		111%
Toluene-d8		119%	120%	116%	119%	117%		117%
4-Bromofluorobenzene		123%	123%	123%	122%	121%		122%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10607-3
Client: HART CROWSER
Client Job Name: JACOBSON TEMINALS
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP21-S3	SP21-S4	SP22-S3	SP22-S5	SP23-S4	SP24-S2	SP24-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Dichlorodifluoromethane	50	nd	nd	nd	nd	nd	nd	nd
Chloromethane	50	nd	nd	nd	nd	nd	nd	nd
Vinyl chloride	50	nd	nd	nd	nd	nd	nd	nd
Bromomethane	50	nd	nd	nd	nd	nd	nd	nd
Chloroethane	50	nd	nd	nd	nd	nd	nd	nd
Trichlorofluoromethane	50	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd
Methylene chloride	50	nd	nd	nd	nd	nd	nd	nd
trans-1,2-Dichloroethene	50	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloroethane	50	nd	nd	nd	nd	nd	nd	nd
cis-1,2-Dichloroethene	50	1,400	nd	nd	nd	nd	nd	nd
2,2-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd
Chloroform	50	nd	nd	nd	nd	nd	nd	nd
Bromochloromethane	50	nd	nd	nd	nd	nd	nd	nd
1,1,1-Trichloroethane	50	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloroethane	50	nd	nd	nd	nd	nd	nd	nd
1,1-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd
Carbon tetrachloride	50	nd	nd	nd	nd	nd	nd	nd
Benzene	50	nd	nd	nd	nd	nd	nd	nd
Trichloroethene	50	nd	nd	nd	nd	nd	nd	nd
1,2-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd
Dibromomethane	50	nd	nd	nd	nd	nd	nd	nd
Bromodichloromethane	50	nd	nd	nd	nd	nd	nd	nd
cis-1,3-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd
Toluene	50	nd	nd	nd	nd	nd	nd	nd
trans-1,3-Dichloropropene	50	nd	nd	nd	nd	nd	nd	nd
1,1,2-Trichloroethane	50	nd	nd	nd	nd	nd	nd	nd
1,3-Dichloropropane	50	nd	nd	nd	nd	nd	nd	nd
Dibromochloromethane	50	nd	nd	nd	nd	nd	nd	nd
Tetrachloroethene	50	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd	nd	nd	nd	nd	nd
Chlorobenzene	50	nd	nd	nd	nd	nd	280	nd
1,1,1,2-Tetrachloroethane	50	nd	nd	nd	nd	nd	nd	nd
Ethylbenzene	50	nd	nd	nd	nd	nd	nd	nd
Xylenes	50	nd	nd	nd	nd	nd	nd	nd
Styrene	50	nd	nd	nd	nd	nd	nd	nd
Bromoform	50	nd	nd	nd	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd	nd	nd	nd	nd	nd
Isopropylbenzene	50	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichloropropane	50	nd	nd	nd	nd	nd	nd	nd
Bromobenzene	50	nd	nd	nd	nd	nd	nd	nd
n-Propylbenzene	50	nd	nd	nd	nd	nd	nd	nd
2-Chlorotoluene	50	nd	nd	nd	nd	nd	nd	nd
4-Chlorotoluene	50	nd	nd	nd	nd	nd	nd	nd
1,3,5-Trimethylbenzene	50	nd	nd	nd	nd	nd	nd	nd
tert-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trimethylbenzene	50	nd	nd	nd	nd	nd	nd	nd
sec-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd
1,3-Dichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd
1,4-Dichlorobenzene	50	nd	nd	nd	nd	nd	170	nd
Isopropyltoluene	50	nd	nd	nd	nd	nd	nd	nd
1,2-Dichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd
n-Butylbenzene	50	nd	nd	nd	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd	nd	nd	nd	nd	nd
1,2,4-Trichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd
Naphthalene	50	nd	nd	nd	nd	nd	nd	nd
Hexachloro-1,3-butadiene	50	nd	nd	nd	nd	nd	nd	nd
1,2,3-Trichlorobenzene	50	nd	nd	nd	nd	nd	nd	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10607-3
Client: HART CROWSER
Client Job Name: JACOBSON TEMINALS
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP21-S3	SP21-S4	SP22-S3	SP22-S5	SP23-S4	SP24-S2	SP24-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Moisture, %		15%	15%	15%	15%	15%	15%	15%
Surrogate recoveries								
Dibromofluoromethane		108%	107%	108%	107%	107%	105%	105%
Toluene-d8		117%	116%	116%	118%	116%	116%	115%
4-Bromofluorobenzene		124%	123%	122%	121%	122%	125%	122%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits
Acceptable Recovery limits: 65% TO 135%
Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10607-3
Client: HART CROWSER
Client Job Name: JACOBSON TEMINALS
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP25-S1	SP25-S4	SP25-S4	SP25-S4	SP25-S4	SP26-S2	SP26-S4
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Dichlorodifluoromethane	50	nd	nd				nd	nd
Chloromethane	50	nd	nd				nd	nd
Vinyl chloride	50	nd	nd				nd	nd
Bromomethane	50	nd	nd				nd	nd
Chloroethane	50	nd	nd				nd	nd
Trichlorofluoromethane	50	nd	nd				nd	nd
1,1-Dichloroethene	50	nd	nd				nd	nd
Methylene chloride	50	nd	nd				nd	nd
trans-1,2-Dichloroethene	50	nd	nd				nd	nd
1,1-Dichloroethane	50	nd	nd				nd	nd
cis-1,2-Dichloroethene	50	nd	nd				nd	nd
2,2-Dichloropropane	50	nd	nd				nd	nd
Chloroform	50	nd	nd				nd	nd
Bromochloromethane	50	nd	nd				nd	nd
1,1,1-Trichloroethane	50	nd	nd				nd	nd
1,2-Dichloroethane	50	nd	nd				nd	nd
1,1-Dichloropropene	50	nd	nd				nd	nd
Carbon tetrachloride	50	nd	nd				nd	nd
Benzene	50	nd	nd	120%	113%	6%	nd	nd
Trichloroethene	50	nd	nd	111%	105%	6%	nd	nd
1,2-Dichloropropane	50	nd	nd				nd	nd
Dibromomethane	50	nd	nd				nd	nd
Bromodichloromethane	50	nd	nd				nd	nd
cis-1,3-Dichloropropene	50	nd	nd				nd	nd
Toluene	50	nd	nd	111%	105%	6%	nd	nd
trans-1,3-Dichloropropene	50	nd	nd				nd	nd
1,1,2-Trichloroethane	50	nd	nd				nd	nd
1,3-Dichloropropane	50	nd	nd				nd	nd
Dibromochloromethane	50	nd	nd				nd	nd
Tetrachloroethene	50	nd	nd				nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd				nd	nd
Chlorobenzene	50	nd	nd	110%	104%	5%	4,400	340
1,1,1,2-Tetrachloroethane	50	nd	nd				nd	nd
Ethylbenzene	50	nd	nd				nd	nd
Xylenes	50	nd	nd				nd	nd
Styrene	50	nd	nd				nd	nd
Bromoform	50	nd	nd				nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd				nd	nd
Isopropylbenzene	50	nd	nd				nd	nd
1,2,3-Trichloropropane	50	nd	nd				nd	nd
Bromobenzene	50	nd	nd				nd	nd
n-Propylbenzene	50	nd	nd				nd	nd
2-Chlorotoluene	50	nd	nd				nd	nd
4-Chlorotoluene	50	nd	nd				nd	nd
1,3,5-Trimethylbenzene	50	nd	nd				nd	nd
tert-Butylbenzene	50	nd	nd				nd	nd
1,2,4-Trimethylbenzene	50	nd	nd				nd	nd
sec-Butylbenzene	50	nd	nd				nd	nd
1,3-Dichlorobenzene	50	nd	nd				nd	620
1,4-Dichlorobenzene	50	nd	nd				280	530
Isopropyltoluene	50	nd	nd				nd	nd
1,2-Dichlorobenzene	50	nd	nd				nd	nd
n-Butylbenzene	50	nd	nd				nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd				nd	nd
1,2,4-Trichlorobenzene	50	nd	nd				nd	26,000
Naphthalene	50	1,000	nd				170	nd
Hexachloro-1,3-butadiene	50	nd	nd				nd	nd
1,2,3-Trichlorobenzene	50	nd	nd				nd	1,800

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10607-3
Client: HART CROWSER
Client Job Name: JACOBSON TEMINALS
Client Job Number: 4063-12

Analytical Results

				MS	MSD	RPD		
8260, µg/kg		**SP25-S1**	**SP25-S4**	**SP25-S4**	**SP25-S4**	**SP25-S4**	**SP26-S2**	**SP26-S4**
Matrix	Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01	06/08/01
Moisture, %		15%	15%				15%	15%
Surrogate recoveries								
Dibromofluoromethane		105%	103%	111%	114%		103%	106%
Toluene-d8		115%	116%	115%	115%		115%	115%
4-Bromofluorobenzene		132%	122%	122%	122%		121%	121%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number: S10607-3
Client: HART CROWSER
Client Job Name: JACOBSON TEMINALS
Client Job Number: 4063-12

Analytical Results

8260, µg/kg		SP27-S4	SP28-S4	SP29-S1	SP29-S4
Matrix	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01
Dichlorodifluoromethane	50	nd	nd	nd	nd
Chloromethane	50	nd	nd	nd	nd
Vinyl chloride	50	nd	nd	nd	nd
Bromomethane	50	nd	nd	nd	nd
Chloroethane	50	nd	nd	nd	nd
Trichlorofluoromethane	50	nd	nd	nd	nd
1,1-Dichloroethene	50	nd	nd	nd	nd
Methylene chloride	50	nd	nd	nd	nd
trans-1,2-Dichloroethene	50	nd	nd	nd	nd
1,1-Dichloroethane	50	nd	nd	nd	nd
cis-1,2-Dichloroethene	50	nd	nd	nd	nd
2,2-Dichloropropane	50	nd	nd	nd	nd
Chloroform	50	nd	nd	nd	nd
Bromochloromethane	50	nd	nd	nd	nd
1,1,1-Trichloroethane	50	nd	nd	nd	nd
1,2-Dichloroethane	50	nd	nd	nd	nd
1,1-Dichloropropene	50	nd	nd	nd	nd
Carbon tetrachloride	50	nd	nd	nd	nd
Benzene	50	nd	nd	nd	nd
Trichloroethene	50	nd	nd	nd	nd
1,2-Dichloropropane	50	nd	nd	nd	nd
Dibromomethane	50	nd	nd	nd	nd
Bromodichloromethane	50	nd	nd	nd	nd
cis-1,3-Dichloropropene	50	nd	nd	nd	nd
Toluene	50	nd	nd	nd	nd
trans-1,3-Dichloropropene	50	nd	nd	nd	nd
1,1,2-Trichloroethane	50	nd	nd	nd	nd
1,3-Dichloropropane	50	nd	nd	nd	nd
Dibromochloromethane	50	nd	nd	nd	nd
Tetrachloroethene	50	nd	nd	nd	nd
1,2-Dibromoethane (EDB)	50	nd	nd	nd	nd
Chlorobenzene	50	nd	nd	nd	nd
1,1,1,2-Tetrachloroethane	50	nd	nd	nd	nd
Ethylbenzene	50	nd	nd	nd	nd
Xylenes	50	nd	nd	nd	nd
Styrene	50	nd	nd	nd	nd
Bromoform	50	nd	nd	nd	nd
1,1,2,2-Tetrachloroethane	50	nd	nd	nd	nd
Isopropylbenzene	50	nd	nd	nd	nd
1,2,3-Trichloropropane	50	nd	nd	nd	nd
Bromobenzene	50	nd	nd	nd	nd
n-Propylbenzene	50	nd	nd	nd	nd
2-Chlorotoluene	50	nd	nd	nd	nd
4-Chlorotoluene	50	nd	nd	nd	nd
1,3,5-Trimethylbenzene	50	nd	nd	nd	nd
tert-Butylbenzene	50	nd	nd	nd	nd
1,2,4-Trimethylbenzene	50	nd	nd	nd	nd
sec-Butylbenzene	50	nd	nd	nd	nd
1,3-Dichlorobenzene	50	380	nd	nd	490
1,4-Dichlorobenzene	50	280	nd	210	250
Isopropyltoluene	50	nd	nd	nd	nd
1,2-Dichlorobenzene	50	nd	nd	nd	nd
n-Butylbenzene	50	nd	nd	nd	nd
1,2-Dibromo-3-Chloropropane	50	nd	nd	nd	nd
1,2,4-Trichlorobenzene	50	3,200	160	nd	nd
Naphthalene	50	nd	nd	nd	nd
Hexachloro-1,3-butadiene	50	nd	nd	nd	nd
1,2,3-Trichlorobenzene	50	280	nd	nd	nd

ESN SEATTLE CHEMISTRY LABORATORY
(425) 957-9872, fax (425) 957-9904

ESN Job Number:	S10607-3
Client:	HART CROWSER
Client Job Name:	JACOBSON TEMINALS
Client Job Number:	4063-12

Analytical Results

8260, µg/kg		**SP27-S4**	**SP28-S4**	**SP29-S1**	**SP29-S4**
Matrix	Soil	Soil	Soil	Soil	Soil
Date extracted	Reporting	06/08/01	06/08/01	06/08/01	06/08/01
Date analyzed	Limits	06/08/01	06/08/01	06/08/01	06/08/01
Moisture, %		15%	15%	15%	15%
Surrogate recoveries					
Dibromofluoromethane		105%	108%	105%	105%
Toluene-d8		116%	113%	116%	115%
4-Bromofluorobenzene		122%	121%	122%	122%

Data Qualifiers and Analytical Comments

nd - not detected at listed reporting limits

Acceptable Recovery limits: 65% TO 135%

Acceptable RPD limit: 35%

Sample Custody Record

SW607-3

Samples Shipped to: TEL

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4063-12 LAB NUMBER

PROJECT NAME Jacobsen Terminals

HART CROWSER CONTACT Jeremy Porter

SAMPLED BY: Derek Ormerod

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	PCB's	8260	8021B	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	IW-3I	40mL VOA	6/7/01	1150	H_2O			X	3	Preserved w/ HCl
	SP-20/S-4	402 glass	6/6/01	0915	soil	X	X		1	No preservative
	SP-20/S-6			0925		X	X		1	
	SP-21/S-3			0955		X	X		1	
	SP-21/S-4			1000		X	X		1	
	SP-22/S-3			1035		X	X		1	
	SP-22/S-5			1100		X	X		1	
	~~SP-23/S-2~~			~~1250~~	~~D.I.W.~~					
	SP-23/S-4			1155		X	X		1	
	SP-24/S-2			1255		X	X		1	
	SP-24/S-4			1305		X	X		1	
	SP-25/S-1			1325		X	X		1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	6/7/01	SIGNATURE	6/7/01
PRINT NAME Derek Ormerod	TIME	PRINT NAME Michael Dan	TIME
COMPANY HC	1610	COMPANY ESN	1610
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	TIME	SIGNATURE	TIME
PRINT NAME		PRINT NAME	
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

13 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian

Sample Custody Record

S10607-3

Samples Shipped to: ESN / TEG

HARTCROWSER

Hart Crowser, Inc.
1910 Fairview Avenue East
Seattle, Washington 98102-3699
Phone: 206-324-9530 FAX: 206-328-5581

JOB 4063-12 LAB NUMBER

PROJECT NAME Jacobson Terminals

HART CROWSER CONTACT Jeremy Porter

SAMPLED BY: DRO

LAB NO.	SAMPLE ID	DESCRIPTION	DATE	TIME	MATRIX	REQUESTED ANALYSIS: PCB's	REQUESTED ANALYSIS: 8260	NO. OF CONTAINERS	OBSERVATIONS/COMMENTS/ COMPOSITING INSTRUCTIONS
	SP-25/S-4	4 oz glass	6/6/01	1340	Soil	X	X	1	
	SP-26/S-4			1435		X	X	1	
	SP-26/S-2			1425		X	X	1	
	SP-27/S-4			1510		X	X	1	
	SP-28/S-4			1600		X	X	1	
	SP-29/S-1			1620		X	X	1	
	SP-29/S-4			1635		X	X	1	

RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE: DRO	6/7/01	SIGNATURE:	06/07/01
PRINT NAME: Derek Ommen	TIME	PRINT NAME: Michael Dee	TIME
COMPANY: ITC	1610	COMPANY: ESN	1610
RELINQUISHED BY	DATE	RECEIVED BY	DATE
SIGNATURE	/	SIGNATURE	
PRINT NAME	TIME	PRINT NAME	TIME
COMPANY		COMPANY	

SPECIAL SHIPMENT HANDLING OR STORAGE REQUIREMENTS:

7 TOTAL NUMBER OF CONTAINERS

SAMPLE RECEIPT INFORMATION
CUSTODY SEALS: ☐YES ☐NO ☐N/A
GOOD CONDITION ☐YES ☐NO
TEMPERATURE _____
SHIPMENT METHOD: ☐HAND ☐COURIER ☐OVERNIGHT

COOLER NO.: STORAGE LOCATION:

See Lab Work Order No. _____ for Other Contract Requirements

TURNAROUND TIME:
☐ 24 HOURS ☐ 1 WEEK
☐ 48 HOURS ☒ STANDARD
☐ 72 HOURS OTHER _____

White and Yellow Copies to Lab Pink to Project Manager Lab to Return White Copy to Hart Crowser Gold to Sample Custodian