David Benson
TRAMMELL CROW COMPANY
1001 Fourth Avenue
Suite 3720
Seattle, Washington 98154-1106

February 25, 1997

RE: ADDITIONAL SUBSURFACE INVESTIGATION
1001 FOURTH AVENUE
SEATTLE, WASHINGTON
PROJECT NO. 82250.0203

Dear David:

At the request of Trammell Crow Company, ATC Environmental Inc. (ATC), performed an Additional Subsurface Investigation at 1001 Fourth Avenue located in Seattle, Washington. The purpose of this investigation was to further define the extent of gasoline impact to soil and to assess groundwater conditions, if encountered. A previous investigation by ATC revealed the presence of elevated levels of gasoline-range petroleum hydrocarbons as well as benzene, toluene, ethylbenzene, and xylene (BTEX) in the project area soil (reference Site Characterization Report, April 26, 1996, ATC Project No. 82250.0202).

BACKGROUND

ATC's previous investigation (Site Characterization Report, April 26, 1996) included the drilling of two soil borings in the sidewalk along Madison Street beneath which the product lines from three underground storage tanks (USTs) traverse to a pump island located inside a parking garage (see Site Plan). Gasoline-range petroleum hydrocarbons and BTEX were found above MTCA Method A cleanup levels in soil samples from one of the borings (B-2) from near surface to 35 feet below ground surface (BGS). The other boring (B-1), located approximately 45 feet east of B-2, revealed no detection or only trace levels of gasoline-range petroleum hydrocarbons and BTEX well below MTCA Method A cleanup levels. Therefore, it was concluded that there had been a release from one or more product lines and that the area of impact was limited in the eastern direction (towards B-1). However, the extent of impact was not determined to the south (into Madison Street) or to the west (along the Madison Street sidewalk).

ATC recommended additional investigation to further define the extent of gasoline and BTEX impact to soil and to assess groundwater conditions, if encountered. This additional recommended investigation is the subject of this Additional Subsurface Investigation report.

SCOPE OF WORK

ATC's scope of work included the following:

- Advancement of three Geoprobes (B-3, B-4, and B-5) along the Madison Street area at the following three locations: B-3 located at the corner of Madison Street and Third Avenue next to the USTs; B-4 located in the Madison Street sidewalk approximately 45 feet west of B-2; and, B-5 located in Madison Street approximately 40 feet south of B-2.

0347 Seaview Ave., NW • Seattle, WA 98107 • (206) 781-1449 • FAX (206) 781-1543

- Collection of soil samples from each Geoprobe at 5 foot intervals where possible.
- All collected soil samples were submitted to the analyzing laboratory. The soil samples were analyzed for gasoline-range petroleum hydrocarbons and benzene, toluene, ethylbenzene, and xylene (BTEX) by Washington State Department of Ecology (DOE) Method WTPH-G/BTEX.

This scope of work supplemented ATC's previous investigation at this site which included two (2) soil borings (B-1 and B-2) along the Madison Street sidewalk. The attached Site Plan shows all boring locations to date.

GEOLOGY/HYDROGEOLOGY

Subsurface conditions encountered during this investigation are generally consistent with those encountered during the previous investigation. The project area is underlain variously by dense clayey silt, sandy silt, and silty sand with gravel.

Fill material consisting of interbedded sand, sandy silt/silty sand, and clay with occasional wood fragments was encountered in B-3 from the surface to 16 feet below ground surface (BGS). Native material consisting of interbedded fine sand and silt was encountered from 16 feet to 19 feet BGS. Dense clayey silt was encountered from 19 feet BGS to the total depth of 22 feet BGS. The Geoprobe could not be advanced deeper than 22 feet BGS into the dense clayey silt. No groundwater was encountered in B-3.

Silty sand and sandy silt was encountered in B-4 from the surface to 18 feet BGS. The silty sand/sandy silt became gravelly after 18 feet BGS to the total depth of 27 feet. No groundwater was encountered in B-4.

The Geoprobe could not be advanced deeper than 28 inches BGS in B-5 due to the presence of concrete. No groundwater was encountered in B-5.

INVESTIGATION

Three Geoprobes were advanced on June 30, 1996 and are identified as B-3, B-4, and B-5. B-3 was located at the corner of Madison Street and Third Avenue next to the USTs; B-4 was located in the Madison Street sidewalk approximately 45 feet west of B-2; and B-5 was located in Madison Street approximately 40 feet south of B-2. The Site Plan shows the location of the Geoprobes as well as boring locations B-1 and B-2 from the previous investigation.

Each probe was advanced to the maximum depth allowed by soil conditions. B-3 was advanced to a total depth of 27 feet BGS, B-4 to a total depth of 22 feet BGS, and B-5 to a total depth of 28 inches BGS. Soil samples were generally collected at five foot intervals. Soil samples were collected by driving a hollow-steel two-foot long Geoprobe sampling tube with acetate liner two feet into undisturbed soil. The soil was extracted from the tube liner and transferred to laboratory provided 4-ounce sample jars with Teflon-lined lids. A total of ten soil samples were collected.

ATC field procedures included decontamination of all sampling equipment using a three bucket system that included an Alconox/water wash, water rinse, and a deionized water rinse. Sampling equipment was decontaminated between each sampling event. Samples were immediately placed into a field ice chest and maintained in a chilled state until received at the laboratory. Samples were labeled with sample number, date, time, and project number. Chain of custody documentation was maintained with the samples until relinquished to the analyzing laboratory.

ANALYTICAL RESULTS

All ten (10) collected soil samples were submitted to Columbia Analytical Services, Bothell, Washington. The soil samples were all analyzed for gasoline-range petroleum hydrocarbons and benzene, toluene, ethylbenzene, and xylene (BTEX) by Washington State Department of Ecology (DOE) Method WTPH-G/BTEX.

Results from B-3, adjacent to the south side of the UST location at the corner of Madison Street and Third Avenue, indicate no detection or trace levels of gasoline and BTEX below MTCA Method A cleanup levels from the 5, 10, 15, and 17 foot BGS samples. The deepest sample from B-3, Sample No. B-3-20 from the 20 to 22 foot BGS interval, indicated total xylenes and gasoline-range petroleum hydrocarbons above the MTCA Method A cleanup levels for these constituents. Total xylenes in B-3-20 were found at 86.1 parts per million (ppm) where the MTCA Method A cleanup level in soil is 20.0 ppm. Gasoline-range petroleum hydrocarbons in B-3-20 were found at 887 ppm where the MTCA Method A cleanup level in soil is 100 ppm. Results for benzene, toluene, and ethylbenzene in B-3-20 were below the MTCA Method A cleanup level in soil for these compounds. No deeper soil samples could be collected in B-3 due to the dense clayey silt encountered which halted deeper probing.

Results from B-4, in the Madison Street sidewalk, indicate no detection or only trace levels of gasoline and BTEX below MTCA Method A cleanup levels from all the collected depth intervals including the 5, 10, 15, 20 and 25 foot BGS samples.

No soil samples were collected from B-5 (located in Madison Street) since the Geoprobe could only be advanced to 28 inches BGS before encountering concrete.

The analytical results are presented in the following tables:

TABLE 1. ANALYTICAL RESULTS - TOTAL PETROLEUM HYDROCARBONS AS GASOLINE AND BENZENE, TOLUENE, ETHYLBENZENE, AND XYLENES (in parts per million)

Sample No./ Depth Interval	Benzene	Toluene	Ethyl-benzene	Total Xylenes	TPH as Gasoline
B-3-5 (5 to 7 ft. BGS)	ND	ND	ND	ND	ND
B-3-10 (10 to 12 ft. BGS)	ND	ND	ND	0.3	ND
B-3-15 (15 to 17 ft. BGS)	0.10	ND	1.5	2.1	25
B-3-17 (17 to 19 ft. BGS)	ND	ND	ND	ND	ND
B-3-20 (20 to 22 ft. BGS)	0.38	12.7	13.6	*86.1*	*887*
B-4-5 (5 to 7 ft. BGS)	ND	ND	ND	ND	ND
B-4-10 (10 to 12 ft. BGS)	ND	ND	ND	ND	ND
B-4-15 (15 to 17 ft. BGS)	0.06	ND	ND	ND	ND
B-4-20 (20 to 22 ft. BGS)	ND	ND	ND	ND	ND
B-4-25 (25 to 27 ft. BGS)	ND	ND	ND	ND	ND
Laboratory Method Reporting Limit (MRL)	0.05	0.1	0.1	0.1	5
MTCA Method A Cleanup Level	0.5	40.0	20.0	20.0	100.0

Italics - indicate results exceeding MTCA Method A cleanup level in soil

FINDINGS AND CONCLUSIONS

The results from ATC's previous investigation (Site Characterization Report, April 26, 1996) indicate that there were soils impacted above MTCA Method A cleanup levels at B-2. B-2 was located at the Madison Street sidewalk where the product lines traverse from the USTs to the pump island inside the garage. Gasoline-range petroleum hydrocarbons and BTEX were found above MTCA Method A cleanup levels in soil samples from B-2 from near surface to 35 feet below ground surface (BGS). The other boring from this investigation, B-1, located approximately 45 feet east of B-2, revealed no detection or only trace levels of gasoline-range petroleum hydrocarbons and BTEX well below MTCA Method A cleanup levels. Therefore, it was concluded that there had been a release from one or more product lines and that the area of impact was limited in the eastern direction (towards B-1).

Results from B-3, adjacent to the south side of the UST location at the corner of Madison Street and Third Avenue, indicate no detection or trace levels of gasoline and BTEX below MTCA Method A cleanup levels from the 5, 10, 15, and 17 foot BGS samples. The deepest sample from B-3, Sample No. B-3-20 from the 20 to 22 foot BGS interval, indicated total xylenes and gasoline-range petroleum hydrocarbons above the MTCA Method A cleanup levels for these constitiuents. Therefore, there appears to be a release in the area of the USTs. The release is likely from the product lines since product line from Tank No. 2 (6,500 gallon - super unleaded gasoline) failed the tank tightness test conducted in February of 1996. All three USTs have tested tight during this tank tightness test .

Results from B-4, located in the Madison Street sidewalk approximately 45 feet west of B-2, indicate no detection or only trace levels of gasoline and BTEX below MTCA Method A cleanup levels. Therefore, the release from the product lines beneath the Madison Street sidewalk appears limited to the area near B-2. This location is near where the product lines make a 90 degree bend ("elbow") to enter the parking garage where the pump island is located. Pipe fittings such as elbows are typical points of release in product piping.

Based on the findings of this investigation and the previous investigation, there are two areas of impacted soil. One of these locations is beneath the Madison Street sidewalk on the south side of the project area approximately mid-block between Third Avenue and Fourth Avenue. Boring No. B-2 indicated significant impact from gasoline and BTEX at this location from the near surface to 35 feet BGS. This is the location where the product lines from the USTs make a ninety degree turn into the building (to the pump island in the garage). The pipe elbow fittings could be the source of the release.

The other area of impact is at the UST location as indicated by the soil sample anayltical results of B-3. This source of impact may also be due to a product line release since a number of pipe fittings are usually present around the tanks. Another source may be due to previous overspill from tank filling. The tanks are less likely to be the source since the tanks have passed tank tightness testing. The area of impact does not likely extend to any appreciable depth beyond 20 feet BGS in the tank area based on the dense clayey silt that underlies the tank area that was encountered in B-3.

As indicated by Trammell Crow Company, the three USTs are scheduled to be removed during the summer of 1997. A full assessment of the impact to the tank area can be accomplished during tank removal. Impacted soil can be removed during the tank removal process. However, the amount of soil which can be removed will be limited due to surrounding utilities, structures, and shoring placement for tank removal. The tank removal process and impacted soil excavation will also be limited by scheduling requirements due to the downtown location. Much of the work will be done at night and/or on weekends to minimize disruption to downtown activities including bus and trolley lines which are present in Madison Street and Third Avenue.

ATC recommends additional research into remedial alternatives to address the impacted areas. There are considerable limitations to the practical remedial options at the site based on the downtown location and the presence of structures, streets, and utilities. Excavation of the impacted area is one possible

alternative; however, excavation is likely to be expensive due to the depth of impact and required shoring.

A more practical remedial alternative would be the placement of one or more vapor extraction (VE) wells in the impacted area below the Madison Street sidewalk. The system would include the well(s), blower, and possibly a treatment system for the vapors if required by air quality regulations. The technology involves perforated well casing(s) installed in the impacted soil zone and a blower which draws the gasoline vapors and related constituents out of the soil and vents these vapors to the atmosphere. Some treatment of the vapors is preferred prior to venting to the atmosphere. Usually these types of systems operate for one or two years. This remedial technology is limited by soil permeability. Soil in the impacted area was noted to be sandy and, therefore, may be suitably permeable for vapor extraction.

LIMITATIONS

ATC has prepared this Additional Subsurface Investigation report in general accordance with the scope of work outlined in ATC's proposal dated May 16, 1996 (PN 49636), using reasonable efforts to attempt to identify the presence of potential contaminants in the area of study. ATC does not warrant that contamination that may exist in areas not investigated has been discovered. This report has been prepared solely for the internal use of Trammell Crow Company and its affiliates and may not be relied upon by another person for any reason, unless so indicated in writing by Trammell Crow Company.

If you have any questions regarding this report, please contact our office.

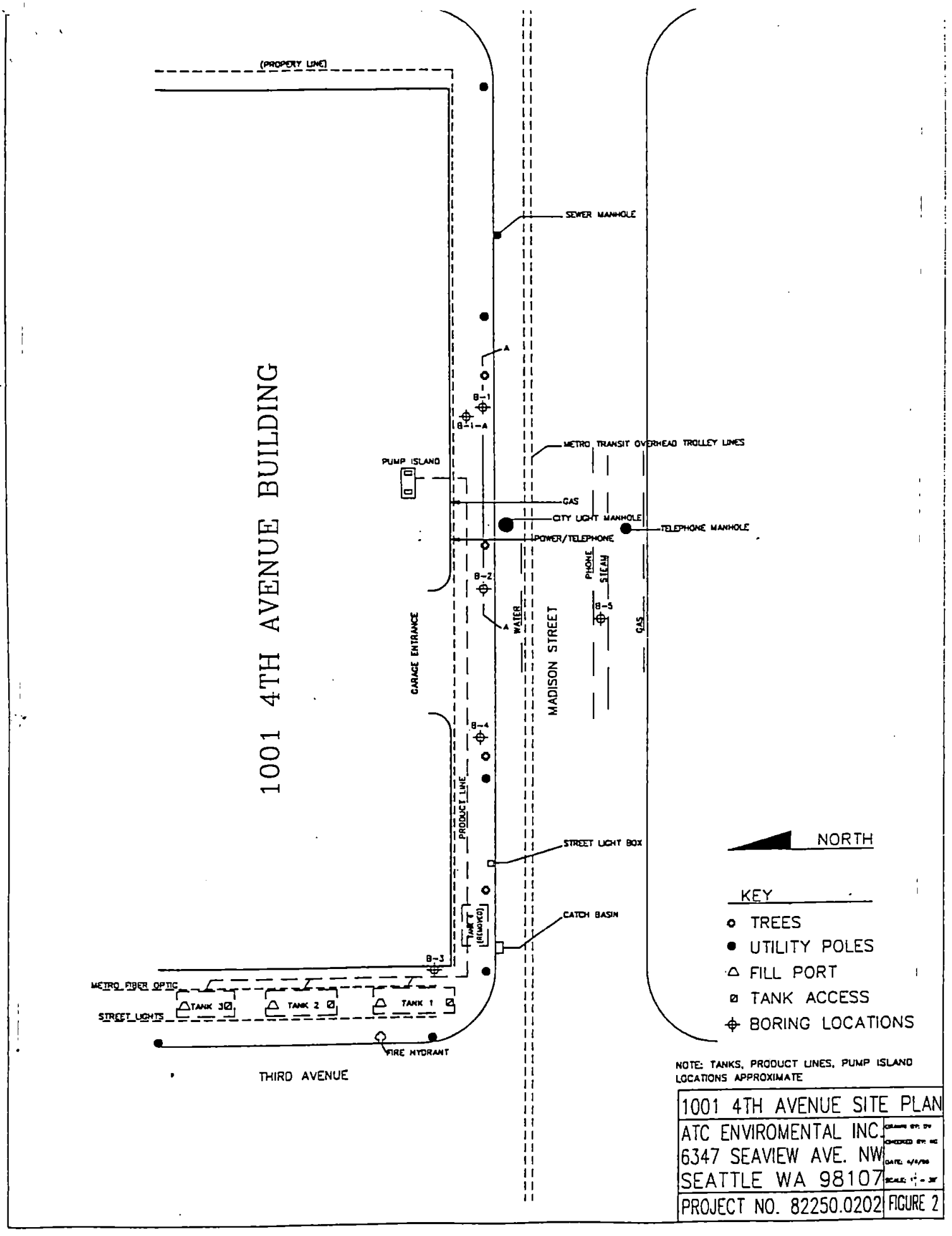
Sincerely,

ATC ENVIRONMENTAL INC.

Neil R. Gilham, CHMM
Project Manager

Terrence S. McDunner
Senior Project Manager

Attachment:
Site Plan
Boring Logs
Laboratory Analytical Reports



NOTE: TANKS, PRODUCT LINES, PUMP ISLAND LOCATIONS APPROXIMATE

1001 4TH AVENUE SITE PLAN	
ATC ENVIROMENTAL INC. 6347 SEAVIEW AVE. NW SEATTLE WA 98107	DRAWN BY: DV CHECKED BY: MC DATE: 4/4/96 SCALE: 1" = 30'
PROJECT NO. 82250.0202	FIGURE 2

NOP 01136

PROJECT ▷ 1001 4th Avenue	ATC ENVIRONMENTAL INC.	PROJECT NUMBER ▷ 82250.0203	
LOGGED BY ▷ Neil Gilham		START DATE ▷ 6/30/96	
CHECKED BY ▷		COMPLETION DATE ▷ 6/30/96	
GROUND SURFACE ELEVATION DATUM (FT–MSL) ▷ 110 Feet (Aprox.)		DRILLING COMPANY ▷ Cascade Drilling Woodinville, WA.	
DRILLING EQUIPMENT ▷ Modified Geoprobe			
BORING DEPTH(FT) ▷ 22	WELL DEPTH(FT) ▷ NA	WATER DEPTH(FT)–Initial: NA	Complete:
WELL MATERIALS ▷ NA		WELL SCREEN INTERVAL(FT) ▷ NA	
WELL CASING ELEVATION (FT–MSL) ▷ NA		OVM/OVA ▷ NA	
BACKFILL MATERIAL ▷ Bentonite Chip			

DEPTH (FT)	LITHOLOGY: DESCRIPTION	GRAPHIC	WELL	BLOW COUNT	OVM/OVA (PPM)	SAMPLE: RECOVERY %	SAMPLE: TYPE	SAMPLE: NUMBER	COMMENTS
0	10" Concrete Sidewalk								1" EXP. AGGR. Top 4" Sand Concrete 9" Concrete
	Olive Gray (5y 3/2) Damp Sandy Silt (SM) W/ Clay and Sand Interbeds. Wood Pieces. (Fill)								Fill Material
5					NA			B-3-5	Fill Material. Organic Odor
10								B-3-10	Fill Material. Incr. Sand Interbeds. Sp. Gravel Organic Odor
									Increasing Sand
15	Olive Gray (5y 3/2) Damp Sandy Silt Silty Sand Interbeds (SM)				2			B-3-15	Gasoline Odor
									Increasing Sand
	Med. Light Gray (NG) Damp. Fine Sand with Thin Dark Gray Silt Interbeds. Damp (SM/SW)				2			B-3-17	Sl. Gasoline Odor
20	Med. Dark Gray (N4) Sl. Damp. Hard. Silt with Sl. Clay (ML)				NA			B-3-20	Strong Gasoline Odor
									To hard to continue probing
	Bottom of boring at 33 feet BGS								
25									
30									

BORING DESIGNATION	BORING LOG	PAGE NUMBER	FIGURE NUMBER
B-3		1 OF 3	

NOP 01137

PROJECT ▷ 1001 4th Avenue	ATC ENVIRONMENTAL INC.	PROJECT NUMBER ▷ 82250.0203	
LOGGED BY ▷ Neil Gilham		START DATE ▷ 6/30/96	
CHECKED BY ▷		COMPLETION DATE ▷ 6/30/96	
GROUND SURFACE ELEVATION DATUM (FT–MSL) ▷ 115 Feet (Aprox.)		DRILLING COMPANY ▷ Cascade Drilling Woodinville, WA.	
DRILLING EQUIPMENT ▷ Modified Geoprobe			
BORING DEPTH(FT) ▷ 27	WELL DEPTH(FT) ▷ NA	WATER DEPTH(FT)–Initial: NA Complete:	
WELL MATERIALS ▷ NA		WELL SCREEN INTERVAL(FT) ▷ NA	
WELL CASING ELEVATION (FT–MSL) ▷ NA		OVM/OVA ▷ NA	
BACKFILL MATERIAL ▷ Bentonite Chip			

DEPTH (FT)	LITHOLOGY DESCRIPTION	GRAPHIC	WELL	BLOW COUNT	OVM/OVA (PPM)	SAMPLE RECOVERY %	SAMPLE TYPE	SAMPLE NUMBER	COMMENTS
0	7" Concrete Sidewalk								
5	Light Olive Gray (5y 5/2) to (5y 5/6) Light Olive Brown Interbedded, Silty Sand, Sandy Silt, Fine Sand, Damp (SM)				NA			B-4-5	
10	Grayish Brown (5YR 3/2) to Olive Gray (5Y 3/2) Silty Sand (SM)							B-4-10	
15	Grayish Brown (5YR 3/2) Silty Sand Sandy Silt, Damp (SM)							B-4-15	
20	Light (5Y 5/2) Olive Gray Interbedded/ Mixed Silty Sand, Sandy Silt, With Some Gravel (SM/GM)							B-4-20	
25	light (5/6 5/2) Olive Gray to Grayish (5YR 3/2) Brown Interbedded Mixed Silty Sand, Sandy Silt With Some Gravel (SM/GM)							B-4-25	
30	Bottom of boring at 27 feet BGS								

BORING DESIGNATION	BORING LOG	PAGE NUMBER	FIGURE NUMBER
B-4		2 OF 3	

NOP 01138

PROJECT ▷ 1001 4th Avenue	ATC ENVIRONMENTAL INC.	PROJECT NUMBER ▷ 82250.0203
LOGGED BY ▷ Neil Gilham		START DATE ▷ 6/30/96
CHECKED BY ▷		COMPLETION DATE ▷ 6/30/96
GROUND SURFACE ELEVATION DATUM (FT–MSL) ▷ 15 Feet (Approx.)		DRILLING COMPANY ▷ Cascade Drilling Woodinville, WA.
DRILLING EQUIPMENT ▷ Modified Geoprobe		
BORING DEPTH(FT) ▷ 28"	WELL DEPTH(FT) ▷ NA	WATER DEPTH(FT)–Initial: NA Complete:
WELL MATERIALS ▷ NA		WELL SCREEN INTERVAL(FT) ▷ NA
WELL CASING ELEVATION (FT–MSL) ▷ NA		OVM/OVA ▷ NA
BACKFILL MATERIAL ▷ Concrete		

DEPTH (FT)	LITHOLOGY: DESCRIPTION	GRAPHIC	WELL	BLOW COUNT	OVM/OVA (PPM)	SAMPLE: RECOVERY %	SAMPLE: TYPE	SAMPLE: NUMBER	COMMENTS
0	3" Asphalt Sandstone Cobblestone 8" Concrete 5" Silty Sandy Gravel 12" Concrete @ 28" – Refusal								Core Through Asphalt, Cobblestone, Concrete. Probe Refusal @ 28"
5									
10									
15									
20									
25									
30									

BORING DESIGNATION	BORING LOG	PAGE NUMBER	FIGURE NUMBER
B–5		3 OF 3	

NOP 01139

Columbia Analytical Services, Inc.

February 25, 1997

Service Request No: B9600520

Neil Gilham
ATC Environmental
6347 Seaview Ave. NW
Seattle, WA 98107

Re: 1001 4th Avenue

Dear Neil:

Enclosed are the results of the sample(s) submitted to our laboratory on June 30, 1996. For your reference, these analyses have been assigned our service request number B9600520.

All analyses were performed according to our laboratory's quality assurance program. All results are intended to be considered in their entirety, and Columbia Analytical Services, Inc. (CAS) is not responsible for use of less than the complete report. Results apply only to the samples analyzed.

Please call if you have any questions. My extension is 211.

Respectfully submitted,

Columbia Analytical Services, Inc.

C. Elliott

Colin B. Elliott
Lab Manager

CBE/

18912 North Creek Parkway, Suite 118 • Bothell, WA 98011 • 206/486-6983 • Fax 206/486-7695

COLUMBIA ANALYTICAL SERVICES, INC.

Analytical Report

Client:	ATC Environmental	**Service Request:**	B9600520
Project:	1001 4th Avenue	**Date Collected:**	6/30/96
Sample Matrix:	Soil	**Date Received:**	7/1/96
		Date Extracted:	7/2/96
		Date Analyzed:	7/2/96

BTEX and Total Petroleum Hydrocarbons as Gasoline
EPA Methods 5030A/8020 and Washington DOE Method WTPH-G
Units: mg/Kg (ppm)
Dry Weight Basis

	Analyte:	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH as Gasoline
	Method Reporting Limit:	0.05	0.1	0.1	0.1	5
Sample Name	**Lab Code**					
B-3-5	B9600520-01	ND	ND	ND	ND	ND
B-3-10	B9600520-02	ND	ND	ND	0.3	ND
B-3-15	B9600520-03	0.10	ND	1.5	2.1	25
B-3-17	B9600520-04	ND	ND	ND	ND	ND
B-3-20	B9600520-05	0.38	12.7	13.6	86.1	887
B-4-5	B9600520-06	ND	ND	ND	ND	ND
B-4-10	B9600520-07	ND	ND	ND	ND	ND
B-4-15	B9600520-08	0.06	ND	ND	ND	ND
B-4-20	B9600520-09(a)	ND	ND	ND	ND	ND
B-4-25	B9600520-10	ND	ND	ND	ND	ND
Method Blank	B9600520-SB	ND	ND	ND	ND	ND

(a) Result is from an analysis performed on 7/3/96.

Approved By: Col. Elliott Date: 2/25/97

SA/102194
00520PHC.DJ1 - SOIL 2/25/97

COLUMBIA ANALYTICAL SERVICES, INC.

QA/QC Report

Client:	ATC Environmental	**Service Request:**	B9600520
Project:	1001 4th Avenue	**Date Collected:**	6/30/96
Sample Matrix:	Soil	**Date Received:**	7/1/96
		Date Extracted:	7/2/96
		Date Analyzed:	7/2/96

Surrogate Recovery Summary
BTEX and Total Petroleum Hydrocarbons as Gasoline
EPA Methods 5030A/8020 and Washington DOE Method WTPH-G

Sample Name	Lab Code	Percent Recovery 4-BFB (PID - BTEX)	Percent Recovery 4-BFB (FID - GAS)
B-3-5	B9600520-01	93	90
B-3-10	B9600520-02	99	99
B-3-15	B9600520-03	101	101
B-3-17	B9600520-04	94	92
B-3-20	B9600520-05	77	97
B-4-5	B9600520-06	77	74
B-4-10	B9600520-07	72	73
B-4-15	B9600520-08	88	89
B-4-20	B9600520-09(a)	101	97
B-4-25	B9600520-10	75	74
Method Blank	B9600520-SB	112	110
	CAS Acceptance Limits:	69-112	69-111

(a) Result is from an analysis performed on 7/3/96.

Approved By: L. Elliott Date: 12/25/97

SURR2/111594

NOP 01142

Columbia Analytical Services inc.

CHAIN OF CUSTODY/LABORATORY ANALYSIS REQUEST

1317 South 13th Ave. • Kelso, WA 98626 • (360) 577-7222 • (800) 695-7222 • FAX (360) 636-1068

DATE 7/1/96 PAGE 1 OF 1

PROJECT NAME # 1001 4th AVENUE, 87250.0203

PROJECT MANAGER NEIL GICHAM

COMPANY/ADDRESS ATC ENVIRONMENTAL INC.

6347 SEAVIEW AVE NW

SEATTLE, WA 98107 PHONE 781-1449

SAMPLERS SIGNATURE

SAMPLE I.D.	DATE	APPROX. TIME	LAB I.D.	SAMPLE MATRIX	NUMBER OF CONTAINERS	TPH/Gas BTEX 5030/8015/8020 WA/418.1	REMARKS
B-3-5	6/30/96	1000	520-1	SOIL	1	✓	
B-3-10	"	"	2	"	1	✓	
B-3-15	"	"	3	"	1	✓	
B-3-17	"	"	4	"	1	✓	
B-3-20	"	"	5	"	1	✓	
B-4-5	"	1230	6	"	1	✓	
B-4-10	"	"	7	"	1	✓	
B-4-15	"	"	8	"	1	✓	
B-4-20	"	"	9	"	1	✓	
B-4-25	"	"	10	"	1	✓	

ANALYSIS REQUESTED

Base/Neu/Acid Organics GC/MS 625/8270 ☐
Volatile Organics GC/MS 624/8240 ☐
Halogenated or Aromatic Volatiles 601/8010 ☐ 602/8020 ☐
Pesticides/PCBs 608/8080 ☐
Total Petroleum Hydrocarbons EPA/418.1 ☐ ORI418.1 ☐ WA/418.1 ☐
TPH/Gas BTEX 5030/8015/8020 WA ☐ BTEX ☐
TPH/8015 Modified Diesel ☐ Hydrocarbon Scan ☐
TPH/HCID ☐ OR/HCID ☐ WA/HCID ☐
TCLP Metals ☐ VOA ☐ Semi VOA ☐ Pest/Herb ☐
Metals (total or dissolved) List Below
Cyanide
pH, Cond, Cl, SO_4, PO_4, F, Br NO_2, NO_3 (circle)
NH_3-N, COD, Total-P, TKN, TOC (circle)
Total Organic Halides (TOX) 9020 ☐ / (AOX) 1650A ☐

RELINQUISHED BY:

Signature
NEIL GICHAM
Printed Name
ATC
Firm
7/1/96
Date/Time

RECEIVED BY:

Signature
ERIC CHOINIERE
Printed Name
CAS
Firm
7/1/96 3:30p
Date/Time

TURNAROUND REQUIREMENTS

___ 24 hr ___ 48 hr. STD 5 day
___ Standard (10-15 working days)
___ Provide Verbal Preliminary Results
___ Provide FAX preliminary Results
Requested Report Date ___

REPORT REQUIREMENTS

___ I. Routine Report
___ II. Report (includes DUP MS. MSD, as required, may be charged as samples)
___ III. Data Validation Report (includes All Raw Data)
___ IV. CLP Deliverable Report

INVOICE INFORMATION:

P.O.# ___
Bill To ___

SAMPLE RECEIPT:

Shipping VIA: ___
Shipping #: ___
Condition: ___
Lab No: BG600520

RELINQUISHED BY:

Signature
Printed Name
Firm
Date/Time

RECEIVED BY:

Signature
Printed Name
Firm
Date/Time

SPECIAL INSTRUCTIONS/COMMENTS:

NOP 01143

BORING LOG

NO. B-1

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
								CONCRETE SIDEWALK - 3 INCHES
	NO WELL CONSTRUCTED						GM	GRAVELLY SILTY SAND WITH BRICK
							ML	GRAY CLAYEY SILT, MOIST, NO ODOR
5								NO SAMPLE AT 5 FEET
10		0 PPM	27-35-38		B-1-10		ML	GRAY CLAYEY SILT, V. STIFF TO HARD, DAMP, NO ODOR
15		0 PPM	19-28-31		B-1-15		ML	GRAY CLAYEY SILT W/ FINE SAND FILLED FISSURES, V. STIFF, DAMP, NO ODOR
20		0 PPM	20-21-23		B-1-20		ML	GRAY CLAYEY SILT W/ FINE SAND FILLED FISSURES, V. STIFF, DAMP, NO ODOR
25		0 PPM	27-38-41		B-1-25		ML	GRAY CLAYEY SILT W/ FINE SAND FILLED FISSURES, V. STIFF TO HARD, DAMP, NO ODOR

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 80 FEET
WATER ENCOUNTERED AT: NONE 0 TO 25 FEET
SURFACE ELEVATION: APPROX. 135 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

LOG 1 OF 4

/ /

BORING LOG

NO. B-1

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
	NO WELL CONSTRUCTED						ML	DRILLER NOTES CHANGE IN CONDITION
30		0 PPM	27-35-4		B-1-30		SM/SP	GRAY BROWN TO GRAY SANDY SILT W/ MED. SAND LENSES, HARD/DENSE, DAMP, SL. GAS ODOR
35		0 PPM	25-31-38		B-1-35		SM/SP	GRAY BROWN TO GRAY SANDY SILT W/ MED. SAND LENSES, SOME ORANGISH BROWN (FeOx) SAND LENSES, HARD/DENSE, DAMP, SL. GAS ODOR
40		0 PPM	35-50 for 6"		B-1-40		GM/SP	GRAY GRAVELLY SILTY SAND W/ SAND LENSES, DAMP, DENSE TO V. DENSE, NO ODOR
								COARSER GRAVEL
45		0 PPM	100 for 6"		B-1-45		GM	GRAY BROWN TO GRAY GRAVELLY SILTY SAND, CSE. GRAVEL TO 8 INCHES STUCK IN SHOE, V. DENSE, DAMP, NO ODOR
								DRILLER REPORTS WATER AT 47 FEET - PERCHED ZONE ON TOP OF CLAYEY SILT
50		0 PPM	50-50 for 3"		B-1-50		ML	GRAY CLAYEY SILT W/ FINE SAND FILLED FISSURES, V. STIFF TO HARD, SL. DAMP, NO ODOR

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 80 FEET
WATER ENCOUNTERED AT: PERCHED ZONE AT 47 TO 49 FEET
SURFACE ELEVATION: APPROX. 135 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

LOG 2 OF 4

/ /

BORING LOG

NO. B-1

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
55	NO WELL CONSTRUCTED	0 PPM	38-50 for 6"		B-1-55		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR
60		0 PPM	41-50 for 6"		B-1-60		SM	GRAY SILTY FINE SAND, WET, V. DENSE, NO ODOR
65		0 PPM	41-50 for 6"		B-1-65		SM	GRAY SILTY FINE SAND, WET, V. DENSE, NO ODOR
								DRILLER REPORTS INTO CLAYEY SILT AGAIN AT 68 FEET
70		0 PPM	35-50 for 6"		B-1-70		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR
75		0 PPM	26-42-56		B-1-75		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 80 FEET
WATER ENCOUNTERED AT: SATURATED ZONE 57 TO 67 FEET
SURFACE ELEVATION: APPROX. 135 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

BORING LOG

NO. B-1

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
80	NO WELL CONSTRUCTED	0 PPM	42-50 for 6"		B-1-80		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR
85								
90								
95								
100								

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 80 FEET
WATER ENCOUNTERED AT: NONE 75 TO 80 FEET
SURFACE ELEVATION: APPROX. 135 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

BORING LOG

NO. B-2

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
								CONCRETE SIDEWALK/DRIVEWAY APRON - 7 INCHES
	NO WELL CONSTRUCTED						GM	GRAVELLY SILTY SAND WITH BRICK
							ML	GRAY CLAYEY SILT
5		0 PPM	35-50 for 6"		B-2-5		GM	GRAY SILTY GRAVELLY SAND, DENSE TO V. DENSE, MOIST, NO ODOR
10		8 PPM	31-42-56		B-2-10		ML	GRAY CLAYEY SILT, HARD, DAMP, V. SL. GAS ODOR
15		51 PPM	32-32-35		B-2-15		SP	YELLOWISH ORANGE BROWN (FeOx) MED. SAND, DENSE, DAMP, GAS ODOR
20		75 PPM	35-50 for 6"		B-2-20		SM/SP	YELLOWISH ORANGE BROWN (FeOx) SILTY MED. SAND W/ GRAY CSE. SAND LENSES, DENSE TO V. DENSE, MOIST, GAS ODOR
25		85 PPM	39-50 for 6"		B-2-25		SM	GREENISH TO BROWNISH GRAY SANDY SILT, HARD/V. DENSE, MOIST, SL. GAS ODOR

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 65 FEET
WATER ENCOUNTERED AT: NONE 0 TO 25 FEET
SURFACE ELEVATION: APPROX. 130 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

BORING LOG NO. B-2

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
	NO WELL CONSTRUCTED							
30		34 PPM	38-50 for 6"		B-2-30		SM	BROWNISH GRAY SANDY SILT, HARD/V. DENSE, DAMP, SL. GAS ODOR
35		34 PPM	46-50 for 6"		B-2-35		SM	GREENISH GRAY SL. SANDY SILT W/ SILTY MED. SAND LENSES, HARD/V. DENSE, MOIST, GAS ODOR
40		14 PPM	38-50 for 6"		B-2-40		SM/SP	INTERBEDDED GRAY MED. SAND W/ BROWNISH GRAY SL. SANDY SILT, HARD/V. DENSE, MOIST, SL. GAS ODOR
45		0.4 PPM	32-41-56		B-2-45		ML	GRAY CLAYEY SILT, HARD, DAMP, NO ODOR
50		0 PPM	32-50 for 6"		B-2-50		ML	GRAY CLAYEY SILT, HARD, DAMP, NO ODOR

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 65 FEET
WATER ENCOUNTERED AT: NONE 25 TO 50 FEET
SURFACE ELEVATION: APPROX. 130 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

BORING LOG

NO. B-2

DEPTH (FT)	WELL CONSTRUCTION	OVA	BLOW COUNT	SAMPLE	SAMPLE NO.	GRAPHIC SYMBOL	LETTER SYMBOL	DESCRIPTION
55	NO WELL CONSTRUCTED	0 PPM	33-50 for 6"		B-2-55		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR
60		0 PPM	36-50 for 6"		B-2-60		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR
65		0 PPM	50 for 6"		B-2-65		ML	GRAY CLAYEY SILT, HARD, SL. DAMP, NO ODOR
70								
75								

LOGGED BY: NEIL GILHAM
DRILLER: CASCADE DRILLING
DRILL RIG: CME 75
BOREHOLE DIAMETER: 8 INCH
TOTAL DEPTH: 65 FEET
WATER ENCOUNTERED AT: NONE 50 TO 65 FEET
SURFACE ELEVATION: APPROX. 130 FEET

DATE DRILLED: 4/14/96
START TIME:
FINISH TIME:
DOWN TIME:
COMMENTS:

CLIENT: TRAMMELL CROW COMPANY
PROJECT NAME: 1001 4TH AVE PHASE II TASK II
PROJECT NO. 82250.0202
LOCATION: 1001 4TH AVENUE, SEATTLE, WA

ATC ENVIRONMENTAL INC.
6347 SEAVIEW AVENUE NW, SEATTLE, WA 98107

PROJECT ▷ Trammell Crow 1001 4th Avenue	ATC ENVIRONMENTAL INC.	PROJECT NUMBER ▷ 82250.0203
LOGGED BY ▷ Neil Gilham		START DATE ▷ 6/30/96
CHECKED BY ▷		COMPLETION DATE ▷ 6/30/96
GROUND SURFACE ELEVATION DATUM (FT–MSL) ▷ 110 Feet (Aprox.)		DRILLING COMPANY ▷ Cascade Drilling Woodinville, WA.
DRILLING EQUIPMENT ▷ Modified Geoprobe		
BORING DEPTH(FT) ▷ 22	WELL DEPTH(FT) ▷ NA	WATER DEPTH(FT)–Initial: NA Complete:
WELL MATERIALS ▷ NA		WELL SCREEN INTERVAL(FT) ▷ NA
WELL CASING ELEVATION (FT–MSL) ▷ NA		OVM/OVA ▷ NA
BACKFILL MATERIAL ▷ Bentonite Chip		

DEPTH (FT)	LITHOLOGY DESCRIPTION	GRAPHIC	WELL	BLOW COUNT	OVM/OVA (PPM)	SAMPLE RECOVERY %	SAMPLE TYPE	SAMPLE NUMBER	COMMENTS
0	10" Concrete Sidewalk								
	Olive Gray (5y 3/2) Damp Sandy Silt (SM) W/ Clay and Sand Interbeds, Wood Pieces, (Fill)								1" EXP. AGGR. Top 4" Sand Concrete 9" Concrete
									Fill Material
5					NA			B-3-5	
									Fill Material, Organic Odor
10								B-3-10	Fill Material, Incr. Sand Interbeds, Sp. Gravel Organic Odor
									Increasing Sand
15	Olive Gray (5y 3/2) Damp Sandy Silt Silty Sand Interbeds (SM)				2			B-3-15	Gasoline Odor
									Increasing Sand
	Med. Light Gray (NG) Damp, Fine Sand with Thin Dark Gray Silt Interbeds, Damp (SM/SW)				2			B-3-17	Sl. Gasoline Odor
20	Med. Dark Gray (N4) Sl. Damp, Hard, Silt with Sl. Clay (ML)				NA			B-3-20	Strong Gasoline Odor
									To hard to continue probing
	Bottom of boring at 35 feet BGS								
25									
30									

BORING DESIGNATION	BORING LOG	PAGE NUMBER	FIGURE NUMBER
B-3		1 OF 3	

PROJECT ▷ Trammell Crow 1001 4th Avenue	ATC ENVIRONMENTAL INC.	PROJECT NUMBER ▷ 82250.0203	
LOGGED BY ▷ Neil Gilham		START DATE ▷ 6/30/96	
CHECKED BY ▷		COMPLETION DATE ▷ 6/30/96	
GROUND SURFACE ELEVATION DATUM (FT-MSL) ▷ 115 Feet (Aprox.)		DRILLING COMPANY ▷ Cascade Drilling Woodinville, WA.	
DRILLING EQUIPMENT ▷ Modified Geoprobe			
BORING DEPTH(FT) ▷ 27	WELL DEPTH(FT) ▷ NA	WATER DEPTH(FT)-Initial: NA Complete:	
WELL MATERIALS ▷ NA		WELL SCREEN INTERVAL(FT) ▷ NA	
WELL CASING ELEVATION (FT-MSL) ▷ NA		OVM/OVA ▷ NA	
BACKFILL MATERIAL ▷ Bentonite Chip			

DEPTH (FT)	LITHOLOGY DESCRIPTION	GRAPHIC	WELL	BLOW COUNT	OVM/OVA (PPM)	SAMPLE RECOVERY %	SAMPLE TYPE	SAMPLE NUMBER	COMMENTS
0	7" Concrete Sidewalk								
5	Light Olive Gray (5y 5/2) to (5y 5/6) Light Olive Brown Interbedded, Silty Sand, Sandy Silt, Fine Sand, Damp (SM)				NA			B-4-5	
10	Grayish Brown (5YR 3/2) to Olive Gray (5Y 3/2) Silty Sand (SM)							B-4-10	
15	Grayish Brown (5YR 3/2) Silty Sand Sandy Silt, Damp (SM)							B-4-15	
20	Light (5Y 5/2) Olive Gray Interbedded/ Mixed Silty Sand, Sandy Silt, With Some Gravel (SM/GM)							B-4-20	
25	light (5/6 5/2) Olive Gray to Grayish (5YR 3/2) Brown Interbedded Mixed Silty Sand, Sandy Silt With Some Gravel (SM/GM)							B-4-25	
	Bottom of boring at 27 feet BGS								
30									

BORING DESIGNATION	BORING LOG	PAGE NUMBER	FIGURE NUMBER
B-4		2 OF 3	

PROJECT ▷ Trammell Crow 1001 4th Avenue	ATC ENVIRONMENTAL INC.	PROJECT NUMBER ▷ 82250.0203	
LOGGED BY ▷ Neil Gilham		START DATE ▷ 6/30/96	
CHECKED BY ▷		COMPLETION DATE ▷ 6/30/96	
GROUND SURFACE ELEVATION DATUM (FT–MSL) ▷ 115 Feet (Approx.)		DRILLING COMPANY ▷ Cascade Drilling Woodinville, WA.	
DRILLING EQUIPMENT ▷ Modified Geoprobe			
BORING DEPTH(FT) ▷ 28"	WELL DEPTH(FT) ▷ NA	WATER DEPTH(FT)–Initial: NA Complete:	
WELL MATERIALS ▷ NA		WELL SCREEN INTERVAL(FT) ▷ NA	
WELL CASING ELEVATION (FT–MSL) ▷ NA		OVM/OVA ▷ NA	
BACKFILL MATERIAL ▷ Concrete			

DEPTH (FT)	LITHOLOGY: DESCRIPTION	GRAPHIC	WELL	BLOW COUNT	OVM/OVA (PPM)	SAMPLE: RECOVERY %	SAMPLE: TYPE	SAMPLE: NUMBER	COMMENTS
0	3" Asphalt Sandstone Cobblestone 8" Concrete 5" Silty Sandy Gravel 12" Concrete @ 28" – Refusal								Core Through Asphalt, Cobblestone, Concrete. Probe Refusal @ 28"
5									
10									
15									
20									
25									
30									

BORING DESIGNATION	BORING LOG	PAGE NUMBER	FIGURE NUMBER
B–5		3 OF 3	