

SOIL & GROUNDWATER
SAMPLING AND TESTING

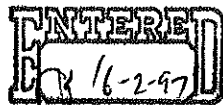
Hilton Hotel - Underground
Storage Tanks
Sixth Avenue & University Street
Seattle, Washington

R.C. HEDREEN COMPANY

RECEIVED

AUG 12 1996

DEPT. OF ECOLOGY



ENVIRONMENTAL ASSOCIATES, INC.

2122 - 112th Avenue North East, Suite B-100
Bellevue, Washington 98004
(206) 399-6041 (206) 455-9025
FAX: (206) 455-2316

RECEIVED

December 1, 1994

AUG 12 1996

JN 4327

DEPT. OF ECOLOGY

Mr. Jerry Heron
c/o R.C. Hedreen Company
P.O. Box 9006
Seattle, Washington 98109

Subject: SOIL AND GROUNDWATER SAMPLING AND TESTING
Hilton Hotel - Underground Storage Tanks
Sixth Avenue and University Street
Seattle, Washington

Dear Mr. Heron:

Environmental Associates, Inc., has completed a preliminary assessment of soil and groundwater conditions at the subject site in an effort to evaluate the potential for the presence of contamination in the vicinity of two abandoned-in-place underground storage tanks. This report, prepared in accordance with the terms of our proposal dated November 18, 1994, summarizes our field exploration and laboratory methods along with findings of the study and conclusions.

The contents of this report are confidential and are intended solely for your use and those of your representatives. Four copies of this report are being distributed you. No distribution or discussion of this report will take place without your prior approval in writing.

Based upon the results of our preliminary sampling and testing activities at the site, it appears that soil and groundwater proximal to the two underground storage tanks on the subject site contains measurable levels of petroleum hydrocarbons in excess of current Washington Department Of Ecology cleanup guidelines as offered under the Model Toxics Control Act (MTCA Chapter 173-340).

As discussed in greater detail in the recommendations section of this report, it is our opinion that the Washington Department of Ecology would not require a cleanup of this site. This opinion is based upon several factors including (1) the extreme difficulty which would attend a cleanup beneath the existing structure (2) the



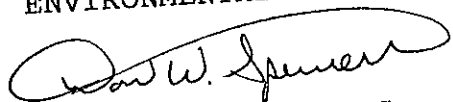
R.C. Hedreen Company
December 1, 1994

JN 4327
Page - 2

likelihood that the extent of the contamination is limited by virtue of the low permeability native soil types, and (3) current practices of the WDOE which typically accept the complication of existing structures as a basis for no further action. The owner may wish to confirm these presumptions directly with WDOE, if desired.

We appreciate the opportunity to be of service on this project and trust that the information will be of value in your planning efforts. If you have any questions or we may be of further service, please do not hesitate to contact us.

Respectfully submitted,
ENVIRONMENTAL ASSOCIATES, INC.



Don W. Spencer, M.Sc., P.G., CEI
President

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METHODOLOGY/SCOPE OF WORK

Following our conversation with Mr. Jerry Heron on November 16, 1994, we forwarded a proposal, on November 18, 1994 to provide environmental consulting services at the Hilton Hotel. The scope of work for this project included the following tasks:

- * Drilling and sampling one soil boring and groundwater if encountered;
- * Sampling groundwater from an elevator sump if no groundwater is encountered during drilling;
- * Laboratory analysis of soil and groundwater;
- * Preparation of this summary report.

All work performed by Environmental Associates, Inc., was conducted in general accordance with the guidelines and specifications prescribed in the cited document.

PROJECT BACKGROUND

Previous Work

The results of a Phase I Environmental Audit (Pacific Rim Environmental, Inc., May 1994) revealed that two underground storage tanks (USTs) were taken out of service, reportedly by filling them with concrete slurry in approximately 1985. A copy of a letter detailing the results of a field inspection by the Seattle Fire Department is included as Attachment 1, appended herewith. However, it is our understanding that no records of environmental conditions regarding soils and/or groundwater were made in the course of that work.

FINDINGS

Description of Current Assessment

As discussed earlier, the current site assessment was accomplished in two phases; the first involved a Phase I Environmental Audit of the subject property which led to conclusions regarding site history and the potential for exposure to potentially hazardous or dangerous substances.

Based upon the findings of the Phase I Audit and following liaison with Mr. Jerry Heron of R. C. Hedreen Company and U.S. Bank, one boring was made on the subject site on November 23, 1994 at the location noted on the Site Exploration Plan, Plate 2, appended herewith.

Surface Conditions

Improvements to the property include one 27 -story hotel building with nine parking levels located below the first room level. The building was reportedly erected in approximately 1970. The subject site is located in the downtown core of Seattle, in an area generally developed with high-rise buildings. The approximate location of the site is shown on the Vicinity Map, Plate 1, appended herewith.

GEOLOGIC SETTING

Regional Geology/Hydrology

Physiographically, the subject site is situated on the Seattle Drift Plain, a gently rolling, elevated plain which formed approximately 13,500 years ago during the last period of continental glaciation.

Published geologic maps for the site vicinity (Liesch, 1963) suggest that much of the material underlying the subject site has been modified extensively by excavation, filling, or construction. These man-made processes have greatly modified or obscured the original surficial geology. Materials which may underlie the site may include fill, and/or fine to medium grained sand interbedded with silt.

Topographically, the site is situated on a west-facing slope approximately 100 feet above sea level. Based upon inference from topography and local drainage patterns, it appears that shallow-seated groundwater (if present) in the vicinity of the subject property may flow toward the west- north west.

Although no site specific information has been developed by our firm with respect to depth to groundwater at this site, our experience in the area suggests that "perched" groundwater (if present) beneath the site may lie at a depth of approximately 15 to 20 feet beneath the ground surface. Natural drainage and groundwater flow has been substantially modified by construction activities in the downtown core of Seattle.

west-
southwest

Speculation
misleading

Subsurface Conditions

One boring was made on November 23, 1994 at the location noted on the Site Exploration Plan, Plate 2. Please refer to the boring log appended to this report as Plate 4 for a detailed description of conditions encountered at the location explored. Please refer to Attachment 2 for a description of technical procedures followed during drilling.

A brief review of the log appended to this report reveals that, with the exception of the concrete rubble and construction debris, in the upper one foot of boring B-1, stratigraphy (layering) at various depths was relatively uniform within the boring. The soils encountered consisted primarily of a surface mantle of concrete rubble and construction debris (0 to 1.0'), overlying a loose to medium dense silty sand with intercalated silt and clay to a maximum of 19.5 feet below ground surface.

As noted on the boring log, hydrocarbon vapors were detected, using a Gas Tech Number 800 Hand Pump and colorimetric indicator tubes, in the soil samples obtained from the boring.

No groundwater was encountered in the boring in the depth range explored. As illustrated on Plate 2, a sample of "groundwater" was obtained from the sump adjacent to the elevator shaft. The depth of the groundwater as measured from the floor of the parking garage was 21.58 feet, and the sump was located approximately 28 feet northwest of the tank installation.

Laboratory Analysis

Complete laboratory reports are presented in Attachment 3, appended herewith. A summary of the laboratory analysis results is provided below in Table 1 and Table 2.

Soil Sample Results

As gasoline was reported to have been stored in the USTs at the Hilton Hotel, two soil samples from the boring were analyzed using gas chromatography (GC) for total petroleum hydrocarbons (TPH) in accordance with WTPH-G along with analysis for gasoline constituents including benzene, toluene, ethylbenzene, and xylene (BTEX).

Analysis of the two selected soil samples from boring B-1, indicated that analyzed samples contained measurable concentrations of TPH, as gasoline and BTEX components. The results of the Washington Method WTPH-G + BTEX testing of soil are presented in Table 1 of this report. The results confirm concentrations in the gasoline boiling range exceeding MTCA Method A cleanup guidelines.

TABLE 1					
Results of Laboratory Analyses Soil Samples WTPH-G + BTEX (Results in parts per million)					
Sample I.D.	TPH (as gas)	Benzene	Toluene	Ethyl- benzene	Xylenes
4327 B-1-3	2,000	1.4	15	20	178
4327 B-1-5	5,500	21	260	100	430
M.D.L.	100	1.0	1.0	1.0	2.0
C.C.L.	100	0.5	40.0	20.0	20.0

Notes:

- (1) M.D.L. - Method Detection Limit
- (2) C.C.L. - Current Cleanup Levels for TPH and BTEX as published in Model Toxics Control Act (MTCA), Chapter 173-340-740 WAC. Method A Cleanup Levels - Soil.

"Groundwater" Sample Results

As gasoline was reported to have been stored in the USTs at the Hilton Hotel, a "groundwater" sample from the boring was analyzed using gas chromatography (GC) for total petroleum hydrocarbons (TPH) in accordance with WTPH-G along with analysis for gasoline constituents including benzene, toluene, ethylbenzene, and xylene (BTEX).

Analysis of the "groundwater" sample from the sump adjacent to the elevator pit, indicated that analyzed samples contained measurable concentrations of TPH, as gasoline and BTEX components with many constituents exceeding the MTCA Method A cleanup guidelines. The results of the Washington Method WTPH-G testing of "groundwater" are presented in Table 2 of this report.

TABLE 2					
Results of Laboratory Analyses "Groundwater" Sample WTPH-G + BTEX (Results in parts per billion)					
Sample I.D.	TPH (as gas)	Benzene	Toluene	Ethyl- benzene	Xylenes
4327-Water	760	240	7.3	14	47
M.D.L.	300	1.0	1.0	1.0	1.0
C.C.L.	1,000	5.0	40.0	30.0	20.0

Notes:

- (1) M.D.L. - Method Detection Limit
- (2) C.C.L. - Current Cleanup Levels for TPH and BTEX as published in Model Toxics Control Act (MTCA), Chapter 173-340-720 WAC. Method A Cleanup Levels - Groundwater.

CONCLUSIONS/RECOMMENDATIONS

General Discussion

At the time of this writing, what is known regarding subsurface conditions adjacent to the out-of-service underground storage tanks on this site is limited essentially to (1); the confirmed presence of gasoline residues in soils extending to a depth of at least 17.5 feet below the reference elevation of the garage floor, and (2); the confirmed presence of gasoline residues in "groundwater" collected in the sump located approximately 28 feet hydrologically downgradient from the tanks. A list of remaining unknowns would include but not necessarily be limited to the following:

- * The areal and vertical extent (i.e. volume) of the contamination encountered in our boring has not been determined, nor was such a determination the objective of this preliminary exploratory effort.
- * Uncertainty remains as to whether or not the groundwater quality finding is related to a condition created as a result of past use of operation of the underground storage tanks. Alternative explanations could conceivably include degradation of "background" quality of groundwater from other sources.

Regulatory Overview

As discussed in the executive summary presented in the cover letter to this report, it would be our assessment that if this project were to be competently reviewed by the Washington Department of Ecology (WDOE), it is unlikely that an order for "cleanup" would be forthcoming. The reasons for this conclusion are based upon:

- * The obvious limiting factors include the existing structural components of the building. Attempts to conduct a "conventional" dig-out type of cleanup in this highly developed configuration do not appear feasible. Current practices of the WDOE relating to UST cleanup are to the greatest extent "practicable", and they usually do not require cleanup under buildings, particularly where such action could result in damage to the structure.
- * As the existing USTs do not contain petroleum, the perceived continuing risk posed by them would be extremely low. ?
- * Given the existing pavement and other significant access restrictions, the potential for future incidental or casual interaction with the petroleum residues by ordinary citizens is unlikely.
- * Groundwater beneath the downtown core of Seattle is not being used as a resource aquifer, hence the potential for exposure to potable water supplies (such as wells, cisterns, reservoirs, etc.) posed by the condition discovered in this preliminary effort appears to be extremely low. ?
- * Referring to the test boring log attached as Plate 4, it appears that the lower permeability materials in the section of the boring encountered below a depth of 10 feet (silty-sand to clay-silt) may have served to attenuate, to some extent, the migration of petroleum from the tank hold area to other locations on the site. This would account for the high petroleum concentrations detected in these materials in the lab analyses and field screening. ?

As a formality in closing this regulatory subsections, please note that compliance with Chapter 173-340-300 (MTCA) as it relates to underground storage tanks would require the owner to communicate the findings of this report with the WDOE within 90 days.

Recommendations For Future Activities

Recommendations for future activities may be placed into two simple categories including (1) worker safety, and (2) possible interests of the owner and/or lender in enhanced definition of the extent of the petroleum residues.

With respect to worker safety, in the event that future subsurface work involves excavation, trenching, tunneling, etc., in the area described in this report, workers should be advised of the potential for the presence of petroleum residues in soil and groundwater. Workers should be instructed to implement all protective measures necessary to reduce risks for work with these materials as envisioned under OSHA, Washington Department of Labor and Industries (L & I), WDOE, American Petroleum Institute (API 1604), et seq.

In the event that the owner and/or lender determine that additional definition of the areal extent of the contamination is desired, similar methods to those employed in this preliminary effort could readily be employed to accomplish this goal.

LIMITATIONS

This report has been prepared for specific application to this project in a manner consistent with that level of care and skill normally exercised by members of the environmental science profession currently practicing under similar conditions in the area, and in accordance with our proposal dated November 18, 1994. This report is for the exclusive use of R. C. Hedreen Company along with U.S. Bank and their several representatives. No other warranty, expressed or implied, is made. If new information is developed in future site work which may include excavations, borings, studies, analyses, etc., Environmental Associates, Inc., must be retained to reevaluate the conclusions of this report and to provide amendments as required.

R.C. Hedreen Company
December 1, 1994

JN 4327
Page - 11

We appreciate the opportunity to be of service on this interesting project and trust that the information presented here will be useful to your planning efforts. If you have any questions or if we may be of further service, please do not hesitate to contact us.

Respectfully submitted,
ENVIRONMENTAL ASSOCIATES, INC.

Wally Hunsat for

Timothy A. Johnson
Environmental Geologist

EPA-Certified AHERA Building Inspector
I.D. No. J&J 941027 - B03
WDOE-Registered UST Site Assessor

Don W. Spencer

Don W. Spencer, M.Sc., P.G., CEI
President

Registered Site Assessor/Licensed UST Supervisor
Washington Department of Ecology

License: W00010 (Washington)
License: 11464 (Oregon)
License: 876 (California)

R.C. Hedreen Company
December 1, 1994

JN 4327
Page - 12

REFERENCES:

Liesch, B.A., Price, C.E. and Walters, K.L., 1963, Geology and Ground-Water Resources of Northwestern King County, Washington. Water Supply Bulletin No. 20, 58 pps., 3 plates, 9 figures, 9 tables.

United States Geologic Survey, 1983. Seattle South 7.5 x 15 Minute Quadrangle (1:25,000)



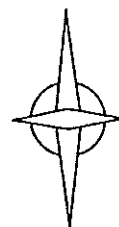
Probable Direction of Shallow-Seated Groundwater Flow



Site Location

Scale 1" = 2000'

N



ENVIRONMENTAL ASSOCIATES, INC.

2122 - 112th Avenue N.E., Ste. B-100
Bellevue, Washington 98004

VICINITY MAP

Hilton Hotel
Sixth Avenue At University Street
Seattle, Washington

Job Number:

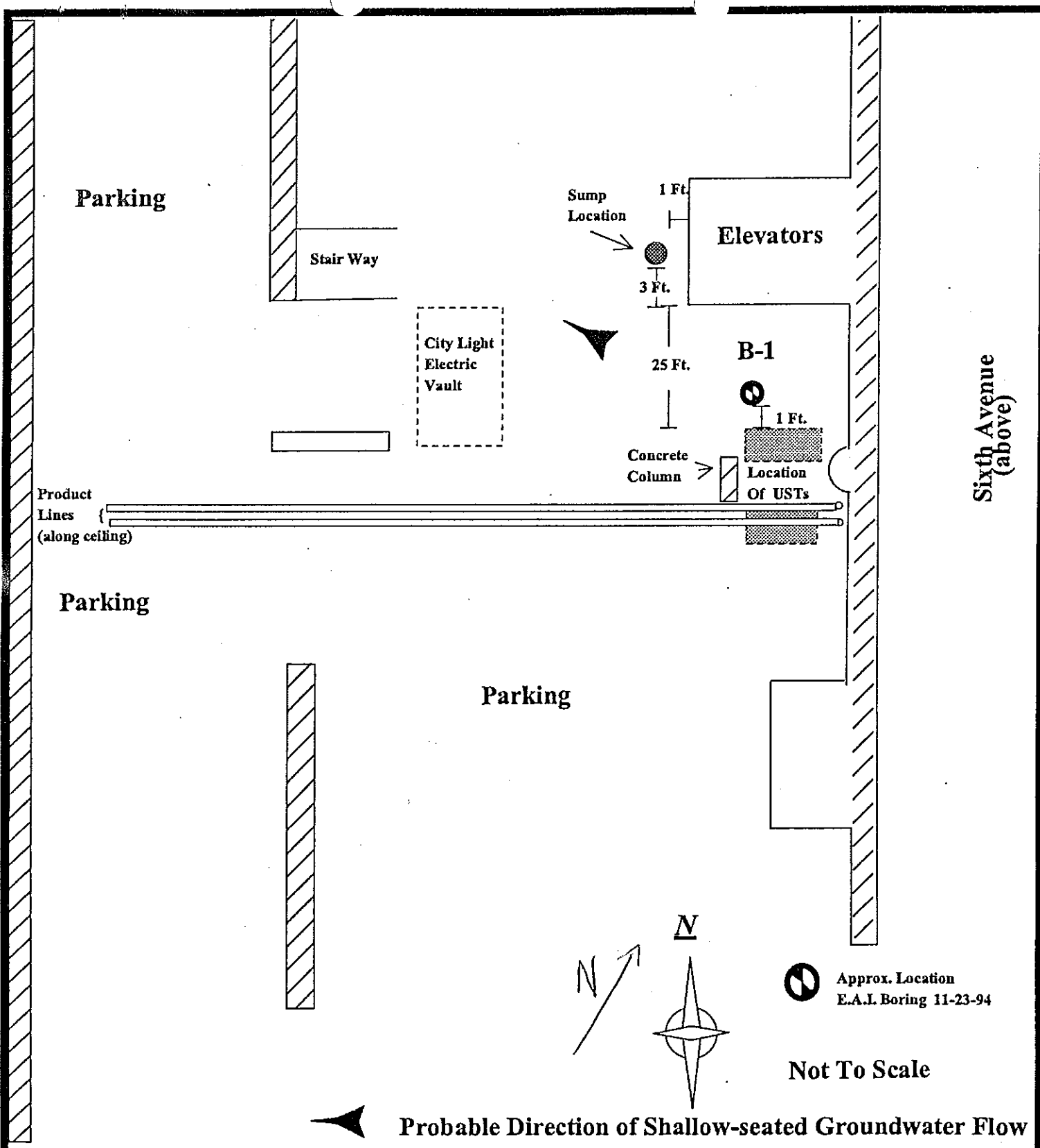
JN 4327

Date:

November 1994

Plate:

1



ENVIRONMENTAL ASSOCIATES, INC.

2122 - 112th Avenue N.E., Ste. B-100
Bellevue, Washington 98004

SITE EXPLORATION PLAN

Hilton Hotel
Sixth Avenue At University Street
Seattle, Washington

Job Number:

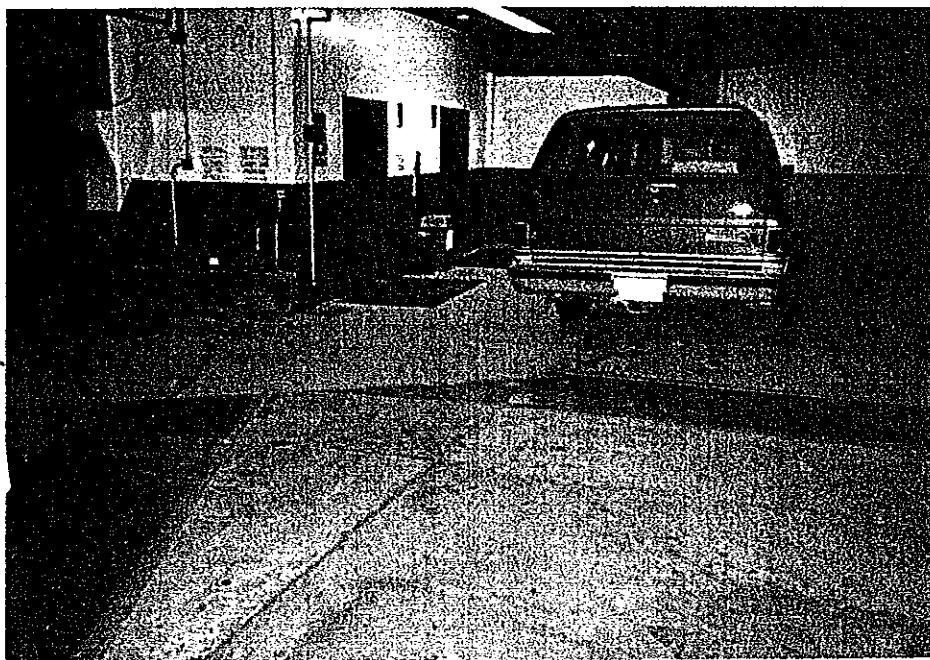
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Date:

November 1994

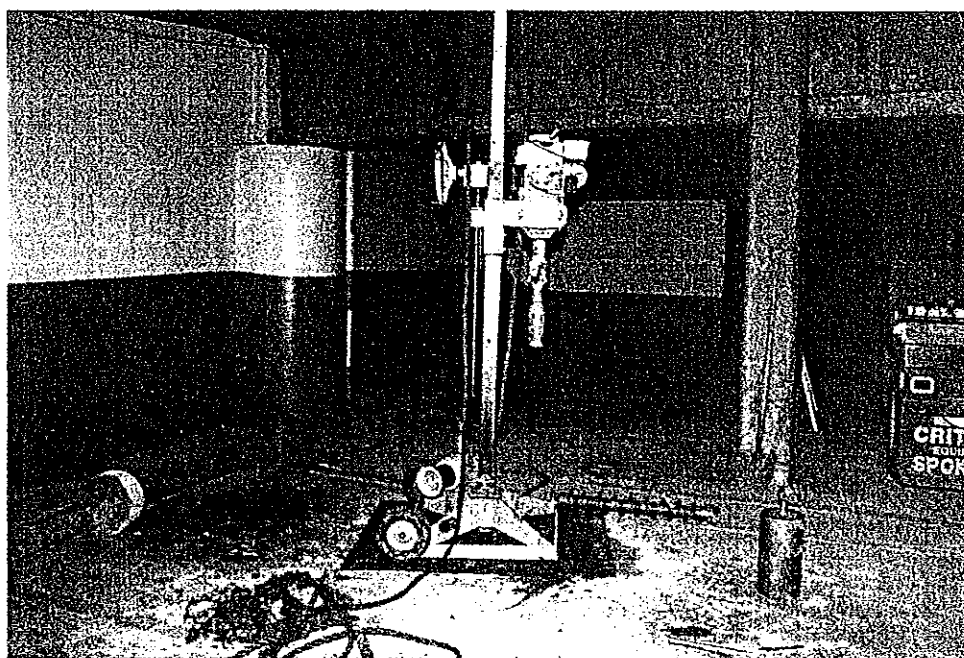
Plate:

2



Sump 2

"Groundwater" sample obtained from sump located adjacent to elevator shaft, dark oval, left side of photograph. USTs are located approximately 25 feet south of the elevator shaft (off photo toward the right).



Boring location of B-1 using Acker Soil Mechanic.



ENVIRONMENTAL ASSOCIATES, INC.

2122 - 112th Avenue N.E., Ste. B-100
Bellevue, Washington 98004

SITE PHOTOGRAPHS

Hilton Hotel
Sixth Avenue At University Street
Seattle, Washington

Job Number:

JN 4327

Date:

November 1994

Plate:

3

BORING B-1

Depth/ Sample	Moisture Content (%)	Blows/ Foot	USCS	DESCRIPTION	H.C. Head-space Analysis (ppm)
0				Surface - Concrete 6".	
			FL	Concrete Rubble with construction debris (6" - 2 feet).	
5		8	SP	Sand, (fine grained), with silt, medium brown to gray, loose, damp, slight petroleum odor.	50
2		8		Sand, (fine grained), with silt, medium brown to gray, loose, damp, strong petroleum odor.	800
10		32	SM	Silty Sand, (fine grained), with gravel upper 6" ; lower 6" Silt, with gravel, and clay dark gray to brown, dense, damp, strong petroleum odor.	>1,000
4		17	ML	Silt with Clay, medium brown to gray, damp, very stiff, strong petroleum odor.	>1,000
15		38	SM	Silty Sand, (fine grained) medium gray, dense, damp, strong petroleum odor.	>1,000
5					
20					

- * Boring drilled to 17.5 feet, sampled to 19.0 feet.
- * No groundwater was encountered during drilling.
- * HC headspace analysis measured using Gastec No. 800 Hand Pump and Gasoline Range Indicator tubes .
- * Strong olfactory indications of contamination in soil.



**ENVIRONMENTAL
ASSOCIATES, INC.**

2122 - 112th Avenue N.E., Ste. B-100
Bellevue, Washington 98004

TEST BORING LOG

Hilton Hotel
Sixth Avenue At University Street
Seattle, Washington

Job Number:

JN 4327

Date:

Nov. 1994

Logged by:

T.A.J.

Plate:

4

ATTACHMENT 1

TANK CLOSURE DOCUMENTATION

Seattle Fire Department

Claude Harris, Chief
Charles Royer, Mayor

November 5, 1985.

Gary D. Wenzel
G.W. Constructors
3568 W. Marginal Way S.W.
Seattle, Washington 98106

Re: Hilton Hotel - 6th Avenue & University Street

Dear Mr. Wenzel:

Please be advised that pursuant to a field inspection by members of this office, permission is granted to fill the underground fuel tank as mentioned in your letter of October 17, 1985.

The underground fuel tanks shall be filled with cement slurry or equivalent.

If you have any questions, please feel free to call Inspector Lindseth at 625-4077.

Very truly yours,

CLAUDE HARRIS, CHIEF
Seattle Fire Department

B.L. Hansen

B. L. Hansen, Fire Marshal

BLH:SML
se

SEA 3113

NOV 18 '94 12:11 SEAFIRST BANK

P.3/6



420 Washington Building
1325 Fourth Avenue
Seattle, WA 98101
(206) 624-1870

May 29, 1986

Mr. R.C. Hedreen
R.C. Hedreen Company
P.O. Box 9006
Seattle, Wa. 98109

Dear Dick:

The enclosed copy of the Washington State Storage Tank Notification form is for your records.

Ampco Parking, as operator of your property at the Hilton Garage has filed the enclosed information as required by Federal law and the Washington State Department of Ecology. We have answered the questionnaire to the best of our knowledge.

Please call me should you have any questions regarding the information given.

Sincerely,


James W. Groves
Branch Manager

Enclosure: Washington State Notification Form

NOV 18 '94 12:12 SEAFIRST BANK

P.4/6

WASHINGTON STATE UNDERGROUND STORAGE TANK NOTIFICATION FORM

NOTE: PLEASE READ ALL INSTRUCTIONS ON PAGES 1, 2 AND 3 BEFORE ENTERING INFORMATION.

- ABOVEGROUND TANKS MUST BE REPORTED IF THE CONNECTED UNDERGROUND PIPING COMPRISES AT LEAST 10% OF THE OVERALL STORAGE SYSTEM (TANK AND PIPING).
- A SEPARATE FORM MUST BE USED FOR EACH SITE EXCEPT FOR SITES WITH ONLY ONE TANK EACH. SEE THE GENERAL INSTRUCTIONS (PAGE 12) FOR THE DEFINITION OF A SITE AND DETAILS ON REPORTING SITES WITH ONE TANK EACH.
- THERE IS ROOM IN SECTION VI FOR INFORMATION CONCERNING 18 TANKS. IF YOU HAVE MORE THAN 18 TANKS, PHOTOGRAPHY BOTH PAGES OF SECTION VI BEFORE ENTERING ANY INFORMATION. IF YOU HAVE MORE THAN ONE SITE, EITHER OBTAIN MORE FORMS FROM THE DEPARTMENT OF ECOLOGY OR BE SURE TO ALSO PHOTOGRAPHY THIS PAGE.
- PLEASE TYPE OR PRINT IN INK. THE SIGNATURE UNDER "CERTIFICATION" (SECTION V) MUST BE SIGNED IN INK.

OWNERSHIP OF THE TANK(S)

Please enter information regarding the name of the tank(s). If the name(s) of the tank(s) is unknown, enter information regarding the name of the property where the tank(s) are located, or information regarding the former owner of the tank(s). Please circle the correct name, indicating who the information given refers to:

- A. DOWNGRADE DECISION ☐ CURRENT OWNER OF TANK(S) ☐ FORMER OWNER OF TANK(S) ☐ PROPERTY OWNER ☐

E. OTHER PLEASE SPECIFY:

UNIVERSITY PARKING

1305 4TH AVE

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

IN THE NAME OF THE TANK(S)

See the General Instructions (Page 12) for the definition of a site.

APCO PARKING

1305 4TH AVE

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

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WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

SEATTLE

WA 98101

IN THE TOTAL NUMBER OF TANKS AT THE SITE

1. Number of tanks containing petroleum, which are over 1000 gal.
2. Number of tanks which have mixed petroleum, but are not over 1000 gal.
3. Number of tanks containing regulated chemicals, which are over 1000 gal.
4. Number of tanks which have stored explosive chemicals but are not over 1000 gal.

TOTAL NUMBER OF TANKS: 2

Please mark this box if the site is located on land which is subject to an owner's reservation or an other federal trust lands.

V. CERTIFICATION

I certify under penalty of law that I have personally inspected and am familiar with the information submitted in this and all attached documents to the best of my knowledge and belief. The information submitted is true, accurate, and complete.

James M. Groves, Branch Manager, Arco Parking, Operator

Name and official title of owner or owner's authorized representative(s) or, in case of a partnership, the name and title of the person signing the form (PLEASE TYPE OR PRINT IN INK)

James M. Groves

5/5/85

Date Signed

PROPERTY PLEASE SIGN IN INK

*FEDERAL FACILITIES ONLY. Please give your BSA Facility Number (Building Number).

E. CONTACT PERSON AT THE TANK LOCATION

The contact person should be the individual responsible for reporting regarding the operation of the tank(s).

JOHN HANSON

Name (If name is known, please type it in)

OPERATIONS MANAGER

Name (If name is known, please type it in)

206-624-11870

STIC VES

[illegible]

SEA 3116

Part 3 of 3 - page 2

ATTACHMENT 2
TECHNICAL PROCEDURES

TECHNICAL PROCEDURES

A portable Acker Soil Mechanic drilling unit was employed to accomplish the drilling of boring B-1 2-inch I.D. auger equipment. The Environmental Associates, Inc., field sampling program is outlined briefly in the following paragraphs.

Soil Sampling

The drilling/sampling technique consisted of advancing the boring with the augers to the desired sampling depth. The drill string was secured, and the split-spoon sampler and connecting rods were lowered through the hollow augers. The sampler and rods were then driven eighteen (18) inches into native soils beyond the tip of the augers using a 140 pound hammer in general accordance with ASTM procedure D-1586. The sampler was then withdrawn and the sample transferred to laboratory prepared glassware with teflon-sealed lids.

During drilling and sampling, a field log was made by our field geologist for each boring. Information recorded versus corresponding depth on each log included soil type (Unified Soil Classification System), color, texture, moisture characteristics, estimated relative density, plasticity, and other observable qualities. In addition, a portion of each sample was subjected to head space analysis using a Gas Tech No. 800 Pump Kit with colorimetric indicator tubes to assess potential hydrocarbon vapor concentrations in soils. The results of head space analysis were recorded adjacent to the corresponding depth for each sample on the boring logs made in the field.

In an effort to preserve sample integrity, samples were stored in an iced chest, at or below 4 degrees centigrade during field sampling and transfer to the project laboratory. Each sample was clearly identified with respect to boring number, sample depth, date, field personnel, etc. EPA recommended sample management protocol including maintenance of chain of custody documentation, was observed at each stage of the project.

Groundwater Sampling

As no groundwater was encountered during drilling of boring B-1 and in an effort to provide a practical, cost-saving alternative to expensive installation of monitoring wells in an area further removed from the tanks during this initial exploration, groundwater was obtained from a recently constructed sump adjacent to the elevator shaft approximately 30 feet toward the southwest of boring B-1 using sterilized PTFE (teflon) bailer. Prior to sampling, the sump was purged of approximately 100 gallons of water using a positive lift displacement type pump. Samples were carefully poured into clean preconditioned, labeled receptacles (amber glass jars with teflon lids, and plastic bottles) furnished by the project laboratory. Sample management protocol is similar to that described for soils.

ATTACHMENT 3
LABORATORY REPORTS

November 30, 1994
Lab Traveler #:11-059

Tim Johnson
Environmental Associates, Inc.
2227 112th Avenue NE, Suite 120
Bellevue, WA 98004

Dear Tim:

Enclosed are the results of the analyses of samples submitted on November 23, 1994 from Project 4327.

We appreciate this opportunity to be of service to you on this project. If you have any questions regarding this report, please feel free to call me.

Sincerely,

Catherine A. Macchio
Project Chemist

Enclosures

Date of Report: November 30, 1994
Samples Submitted: November 23, 1994
Lab Traveler: 11-059
Project: 4327

EPA 602 & WTPH-G

Date Extracted: 11-28-94
Date Analyzed: 11-28-94

Matrix: Water
Units: ug/L (ppb)

Client ID	4327-H2O	Method PQL
Dilution Factor	1	
Benzene	180	1.00
Toluene	7.3	1.00
Ethyl Benzene	14	1.00
m,p-Xylene	17	1.00
o-Xylene	30	1.00
TPH-Gas	760	300
4-BFB		
Surrogate Recovery	107%	

Note: Sample PQL(practical quantitation limit)= Method PQL x dilution factor

Date of Report: November 30, 1994
 Samples Submitted: November 23, 1994
 Lab Traveler: 11-059
 Project: 4327

**EPA 602 & WTPH-G
 QUALITY CONTROL**

Date Extracted: 11-28-94
 Date Analyzed: 11-28-94

Matrix: Water
 Units: ug/L (ppb)

Sample Number		11-059-1	11-059-1	
	Blank	Original	Duplicate	RPD
Dilution Factor	1	1	1	
Benzene	ND	240 ^N	240 ^N	NA
Toluene	ND	7.3	6.5	10
Ethyl Benzene	ND	14	14	5.3
m,p-Xylene	ND	17	16	6.8
o-Xylene	ND	30	29	3.4
TPH-Gas	ND	760	720	4.6
4-BFB				
Surrogate Recovery	99%	107%	111%	

N-Data from 1:100 dilution.

Amount spiked insufficient for meaningful MS/MSD data recovery

Date of Report: November 30, 1994
 Samples Submitted: November 23, 1994
 Lab Traveler: 11-059
 Project: 4327

EPA 8020 & WTPH-G

Date Extracted: 11-28-94
 Date Analyzed: 11-28-94

Matrix: Soil
 Units: mg/Kg (ppm)

Client ID	4327 B1-3 10- 11.5	4327 B1-5 17.5-19.0	Method PQL
Dilution Factor	1000	1000	
Benzene	1.4	21	.001
Toluene	15	260 ^E	.001
Ethyl Benzene	20	100	.001
m,p-Xylene	120	350 ^E	.001
o-Xylene	58	170 ^E	.001
TPH-Gas	2000	5500	.100
4-BFB			
Surrogate Recovery	S	S	

Note: Sample PQL(practical quantitation limit)= Method PQL x dilution factor

E-Value reported exceeds the quantitation range. Value is an estimate.

S-Surrogate recovery data not available due to the necessary dilution of the sample.

Date of Report: November 30, 1994
Samples Submitted: November 23, 1994
Lab Traveler: 11-059
Project: 4327

**EPA 8020 & WTPH-G
QUALITY CONTROL**

Date Extracted: 11-28-94
Date Analyzed: 11-28-94

Matrix: Soil
Units: mg/Kg (ppm)

Sample Number		11-060-4	11-060-4	
	Blank	Original	Duplicate	RPD
Dilution Factor	50	50	50	
Benzene	ND	ND	ND	NA
Toluene	ND	ND	ND	NA
Ethyl Benzene	ND	ND	ND	NA
m,p-Xylene	ND	ND	ND	NA
o-Xylene	ND	ND	ND	NA
TPH-Gas	ND	ND	ND	NA
4-BFB				
Surrogate Recovery	99%	78%	77%	

Date of Report: November 30, 1994
 Samples Submitted: November 23, 1994
 Lab Traveler: 11-059
 Project: 4327

**EPA 8020 & WTPH-G
 QUALITY CONTROL**

Date Extracted: 11-28-94
 Date Analyzed: 11-28-94

Matrix: Soil
 Units: mg/Kg (ppm)

Sample Number spiked @ 1 ppm Dilution Factor	11-060-4 MS 50	Percent Recovery	11-060-4 MSD 50	Percent Recovery	RPD
Benzene	0.704	70%	0.768	77%	8.6
Toluene	0.722	72%	0.760	76%	5.1
Ethyl Benzene	0.712	71%	0.768	77%	7.6
m,p-Xylene	0.668	67%	0.706	70%	5.4
o-Xylene	0.713	71%	0.769	77%	7.5
4-BFB Surrogate Recovery	77%		80%		

Date of Report: November 30, 1994
Samples Submitted: November 23, 1994
Lab Traveler: 11-059
Project: 4327

Date Analyzed: 11-28-94

RESULTS OF DRY WEIGHT

Client ID	% Moisture
4327B1-3 10-11.5	18
4327B1-5 17.5-19.0	13