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RZA

RITTENHOUSE-ZEMAN & ASSOCIATES, INC
Geotechnical & Environmental Consultants
1400 140th Avenue N.E.
Bellevue, Washington 98005-4594
(206) 746-8020/FAX (206) 746-6364

30 July 1990

P-40

Exxon Company U.S.A.
P.O. Box 4415
Houston, Texas 77210-4415

RECEIVED
RE & E
Environmental Engineering
AUG 06 1990

Attention: Mr. Kevin Hunter
Environmental Engineer

Subject: Exxon Station No. 77106
Bellevue, Washington

Dear Kevin:

Please find enclosed a revised copy of our Summary Report: Underground Storage Tank Removal, submitted 26 February, 1990, for the above referenced project site. This revised copy has our conclusions presented on the cover letter rather than in the body of the report as you have requested. In addition, we have included the bailing and monitoring status reports previously submitted to Kris Gagnon for work conducted prior to the tank removals.

Originally, a contract was written for long term bailing and monitoring at the site with a contingency for soil gas (if possible) and soil borings/monitoring wells, if deemed appropriate. The contract number is 89112543 dated 31 August 1989.

Since the monitoring wells were destroyed during the subsequent tank removal/tank installation process, we recommend the installation of additional soil borings/monitoring wells to assess shallow soil and groundwater conditions that may be affected by any residual contamination not recovered during the tank removal operations.

Currently, only $3,974 23 of the original contract for bailing and monitoring and borings/wells has been spent. The original contract amount was for $24,000. According to the contract, expiration will be in September 1990. If deemed appropriate, we can expedite any additional work at the site prior to that time in order to comply with the existing contract.

If you should have any questions following your review of the enclosed reports, please do not hesitate to call. We appreciate the opportunity to be of continued service to Exxon Company U.S.A

Respectfully,
RITTENHOUSE-ZEMAN & ASSOCIATES

Timothy S. McCormack
Senior Hydrogeologist

cc: Dennis Bock

TSM·cao1

26 February 1990 W-6468

Exxon Company, U.S A
10655 N E. 4th Street, Suite 418
Bellevue, Washington 98004

Attention Mr Dennis Bock

Subject: Summary Report· Underground Storage Tank Removal
Exxon Service Station #77106
2724 84th Avenue N E
Bellevue, Washington

Gentlemen:

We are pleased to present herein a copy of the above referenced report This letter report presents our observations of underground petroleum product storage tank removal procedures accomplished at the subject site from 31 November to 12 December 1989 Analytical results for soil samples collected adjacent to these tank locations are also included with this report. Authorization to proceed with this study was provided by Exxon Company, U S A contract number 89143159 dated 31 October 1989 The results of our previous work on this site are presented in our "Limited Geotechnical Engineering Study", dated 21 August 1989 and our September 1989 Product and Groundwater Monitoring Status Report to Mr. Kris Gagnon

In our opinion, much of the petroleum impacted soils previously present at the subject site were removed and hauled off-site during the course of the tank removal operations These soils were hauled to Cedar Hills Landfill The subsurface soils consist of dense, glacial lake deposited silts, and interbedded glacial till lenses. Owing to the density of the soils and silt content, the rate of migration of the remaining subsurface contaminants is expected to be rather low. The visibly stained and odorous soils in the vicinity of the product line removed form the EP-1 tank excavation appeared to be the potential source area for contamination at this location. In addition, the isolated occurrence of sheens and noticeable product lenses

on groundwater at the bottom of this excavation suggests a source area for the product occurrence at monitoring wells MW-1 and MW-2 (measured previously in September and October 1989).

During the tank replacement, we recommended that perforated 4-inch diameter vapor extraction pipes be installed in between the new tanks in excavation pit EP-1 at a depth of approximately 7 feet below the ground surface, to facilitate subsequent remediation of residual contamination. The approximate locations of the vapor extraction lines are shown on the Site and Tank Removal Locations Plan, Figure 2.

Recent product monitoring of the existing monitoring wells at the project site (MW-1 was destroyed during recent tank replacement work) indicates detectable product thickness remaining in MW-2 (0.03 feet) and noticeable odors at MW-1 It is our opinion that this product, and the product measured and bailed out during September and October, 1989 has resulted from the previous pipe leakage that was evident during our tank removal observations. Now that the likely potential source area has been identified, we recommend continued monitoring of product thickness in well MW-3.

Respectfully submitted,

RITTENHOUSE-ZEMAN & ASSOCIATES, INC.

Timothy S McCormack
Senior Hydrogeologist

Summary Report: Underground Storage Tank Removal

Exxon Service Station No. 77106

2724 - 84th Avenue N.E.

Bellevue, Washington

Prepared For

Exxon Company, U.S A.

10655 N.E. 4th Street, Suite 418

Bellevue, Washington 98004

Prepared By

Rittenhouse-Zeman & Associates, Inc.

1400 - 140th Avenue N E.

Bellevue, Washington 98005

February 1990

W-6468

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SUMMARY REPORT: UNDERGROUND STORAGE TANK REMOVAL
EXXON SERVICE STATION NO. 77106
2724 - 84TH AVENUE N E
BELLEVUE, WASHINGTON

W-6468

1.0 Introduction

The following report presents the results of Rittenhouse-Zeman & Associates observations and assessment of conditions during tank removal procedures at Exxon Station 77106 in Bellevue, Washington This work was accomplished in accordance with Exxon's Underground Storage Tank Removal and Observation specifications

2.0 SUMMARY

A brief summary of our observations and analytical laboratory results is presented below. The main body of this letter report should be consulted for detailed discussion of the report findings

- Prior to removal, underground storage tanks were decommissioned for safe removal from the site. A representative of the Clyde Hill Fire Department observed the tanks prior to their removal.

- Upon inspection, all underground storage tanks appeared visually to be in good structural condition, however a heating oil tank encountered during construction excavation procedures (tank #6) had a 1-foot square hole cut in the top and had been filled with pea gravel. Also, a gasoline product line and the fill pipe for the used oil tank (tank #5) appeared to have had some past leakage as evidenced by observation of soil conditions surrounding the pipe.

- Soils excavated adjacent to the gasoline storage tanks, used oil tank, and heating oil tanks exhibited detectable petroleum hydrocarbon odors These soils were stockpiled, characterized for disposal permitting purposes, and hauled to Cedar Hills Landfill Soils hauled to the landfill consisted of approximately 1,050 cubic yards from the gasoline storage tank excavation (EP-1), approximately 5 to 10 cubic yards from the used oil

tank excavation (EP-2), and approximately 30 cubic yards from the heating oil tank excavations (EP-3 and EP-4).

- Subsurface soils present at the site generally consisted of 2 to 4 feet of gravelly sand fill soils underlain by native, glacially consolidated silt extending to the bottom of the excavations.

- Analytical test results indicate that samples S-5 and S-7 from the bottom of the gasoline tank excavation pit (EP-1) exhibited elevated levels of BTEX above the current recommended Washington State Department of Ecology (Ecology) draft clean-up criteria levels for fuel contaminated soils, as did composite sample C-1 obtained from the EP-1 soil stockpile

- Samples S-8, S-9, and S-10 obtained from the vicinity of the diesel oil tank (tank #4) in EP-1 were analyzed for TPH Sample S-8 from below the tank exhibited a TPH concentration of 34 0 mg/kg which is below the current Ecology draft cleanup criteria of 200 ppm TPH in soils Samples S-9 and S-10 obtained from the east and west sidewalls both exhibited TPH concentrations less than the 5.0 mg/kg laboratory detection limit

- The soil sample (S-1) obtained from below the used oil tank (tank #5) in EP-2 exhibited a TPH concentration of 3,322 mg/kg. This sample was also analyzed for total metals lead and chromium, total organic halogens (TOX) and PCB's. Upon analysis, this sample exhibited lead and chromium concentrations of 14.4 and 41.2 mg/kg, respectively, well within background levels reported for these metals in soil. This sample exhibited TOX and PCB concentrations below the 10 mg/kg and 1 mg/kg laboratory detection limits, respectively.

- A composite sample (C-1) obtained from stockpiled soils from adjacent to heating tank #6 (not previously known to be present on the site) was analyzed and exhibited a TPH concentration of 275 mg/kg

- Soil samples obtained from the sidewalls and bottom of the excavation for the second heating oil tank (tank #7) exhibited TPH concentrations ranging from 6.2 to 17.2 mg/kg.

- At the time of our site visit, approximately 1 to 4 inches of groundwater was observed to be present in the bottom of the gasoline tank excavation (EP-1). Isolated areas of product were observed to be present on the water surface in this area.

This summary is presented for introductory purposes only and should be used in conjunction with the full text of this report. Figure 1, the Site Vicinity Map, illustrates the project location and surrounding area Approximate site boundaries, former and current structures, and locations of underground storage tank excavations are shown on the Site and Tank Removal Locations Plan, Figure 2

3.0 PURPOSE AND SCOPE

The following report presents our detailed observations of underground petroleum product storage tank procedures accomplished on 31 October, 1, 7, and 27 November, and 12 December, 1989, at Exxon Service Station #77106, located at 2724 84th Avenue N.E. in Clyde Hill, Washington. The purpose of our observations and laboratory analyses were to screen soils for the presence of fugitive petroleum hydrocarbons in the immediate vicinity of the tank excavations and to document removal of underground storage tanks and contaminated soils. Our project scope of work included:

- Visual observation and photographic documentation of underground tank removal operations;

- Visual observation of underground tank conditions;

- Observation of the condition of soils utilizing an Organic Vapor Meter (OVM) and visual and olfactory sensory impressions;

- Collection and testing of soil samples from the gasoline tank excavation area for the volatile aromatic hydrocarbons benzene, toluene, ethyl benzene, and xylenes (BTEX) by EPA Method 8020.

- Collection and testing of soil samples from adjacent to the heating, fuel, and used oil tank excavations for total petroleum hydrocarbons (TPH) using EPA Method 418.1 and testing of soil samples collected from beneath the used oil tank for total organic halogens (TOX), and total metals lead and chromium, in addition to TPH

- Collection of representative composite soil samples from the excavation stockpiles and analysis for disposal characterization purposes, as required

- Preparation of this letter report.

In addition to the scope of work attached above, weekly site visits were made by RZA personnel from September through October, 1989 to measure free petroleum product thickness in three monitoring wells located along the western edge of the site During these site visits, free product occurring in the two northernmost wells was removed with a hand bailer and stored on-site in a 55 gallon drum.

This report has been prepared for the exclusive use of Exxon Company, U S A and their agents, for specific application to the above referenced project in accordance with generally accepted environmental monitoring practices No other warranty, express or implied, is made In the event that there are any subsequent changes on the existing site, the conclusions contained in this report should be reviewed, and modified, if necessary, to reflect those changes.

4.0 TANK REMOVAL OBSERVATIONS

Tank removal procedures occurred on 31 October, 1, 7, and 27 November, and 12 December, 1989. RZA representatives were present on-site at the request of Mr Dennis Bock of Exxon Company, U.S A. to observe and document the removal of underground petroleum storage tanks from the site. Seven tanks were encountered on the site. These tanks were removed from the site after being decommissioned (see Site and Tank Removal

Locations Plan, Figure 2). Table 1 below represents our understanding of tank capacities, product type, and observed construction material

Table 1
Underground Tanks

Quantity	Type	Estimated Capacity (gallons)	Former contents	Tank #	Date Removed
1	Steel	10,000	Gasoline	1	10/31/89
1	Steel	6,000	Gasoline	2	10/31/89
1	Steel	6,000	Gasoline	3	11/1/89
1	Steel	6,000	Diesel	4	11/1/89
1	Fiberglass	1,000	Used Oil	5	11/7/89
1	Steel	500	Heating Oil	6	11/26/89
1	Fiberglass	500	Heating Oil	7	12/12/89

Tank removal operations were completed by PEMCO, Inc. of Portland, Oregon, utilizing a Fiatallis FE 20 LC track-mounted backhoe and a Ford rubber-tired backhoe. Upon visual inspection, all underground tanks appeared to be in sound condition, and exhibited little evidence of structural compromise such as pitting or scaling. However, heating oil tank #6 previously had a 1-foot hole cut out in the tank top and had been filled with pea gravel. Also, a gasoline product line in EP-1 and the filler pipe for the used oil tank (tank #5) in EP-2 appeared to have had some past leakage.

5.0 SUBSURFACE CONDITIONS

Soils present in the sidewalls of the excavations generally consisted of 2 to 4 feet of gravelly sand fill soils underlain by native glacially consolidated silt. Tank backfill materials ranged from silty sand in EP-1 to pea gravel in EP-2

Soils excavated from around the gasoline storage tanks exhibited detectable petroleum hydrocarbon odors. References to odors should be considered subjective data since odors are strongly influenced by olfactory sensitivity and fatigue as well as temperature, air velocity,

and hydrocarbon degradation. These soils were field screened utilizing a combustible gas indicator (CGI). Excavated soils were stockpiled on Visqueen plastic sheeting, characterized for permitting purposes, and subsequently hauled off the site to Cedar Hills Landfill in King County, Washington for disposal.

Soils from the used oil tank excavation also exhibited detectable petroleum hydrocarbon odors and sheen These soils were placed back in the used oil tank excavation until the laboratory analytical results were obtained, then these soils were also hauled to Cedar Hills Landfill for disposal During the process of digging trenches for new product lines, a previously unknown fuel oil tank (tank #6) was encountered and removed The contractor had excavated material which appeared to be contaminated from the tank excavation and had backfilled this area prior to our visit to the site. A second heating oil tank was removed on 12 December 1989 (tank #7) and soils in the vicinity which appeared to be petroleum hydrocarbon affected were excavated

6.0 SOIL SAMPLING

Discrete soil samples were collected from the gasoline and diesel excavation sidewalls and below each tank bottom. Samples were collected from the approximate midpoint of each of the sidewalls and below the bottom of each tank, (approximately 1 to 2 feet into native ground) Due to caving of soils under the pump island we were unable to obtain a sample from the south sidewall of EP-1, however soils in this area were observed to be visually free of any apparent fugitive petroleum hydrocarbons. A sample from below the used oil tank (tank #5) in EP-2 was obtained for testing. We were unable to obtain samples from within EP-3 in the vicinity of the first heating oil tank encountered (tank #6) as this area was backfilled prior to our arrival at the site. Samples were obtained from the sidewalls and bottom of the second heating oil tank excavation (tank #7 in EP-4) Representative composite samples were also submitted from stockpiled soils

The analytical results presented on the laboratory certificates, attached with this letter, are given in units of milligrams per kilogram (mg/kg) These are equivalent to parts per million (ppm) concentrations Once a sample had been collected, it was transferred by a stainless steel spoon to laboratory prepared containers and tightly sealed with a teflon-lined threaded cap

In order to minimize the risk of cross contamination between collected samples, the stainless steel sampling tools were decontaminated between sampling locations All sample containers were labelled to identify the project number, test location, and sample number. All samples were placed in a chilled chest and transferred to cold storage at the laboratory RZA's strict chain of custody procedures were used to document sample integrity

7.0 ANALYTICAL TEST RESULTS

Selected soil samples collected from the gasoline UST area were analyzed for BTEX by EPA Method 8020 (a gas chromatography/photoionization detection technique). Soil samples from the diesel oil and used oil tank excavations were analyzed for TPH by EPA Method 418.1 (an infrared spectroscopy technique) The soil sample collected from below the used oil tank was also analyzed for TOX (total organic halogens), and total metals lead and chromium. In addition, the composite sample C-1 from the gasoline tank excavation (EP-1) stockpile was analyzed for EP Toxicity lead, flashpoint, BTEX, and TPH

Analytical test results indicate that samples S-5 and S-7 from the bottom of the gasoline tank excavation (EP-1) exhibited elevated levels of BTEX (above the current draft Ecology clean-up criteria for fuel contaminated soils), as did composite sample C-1 obtained from the EP-1 soil stockpile. These stockpiled soils were further characterized for disposal purposes (see Table 2)

Samples S-8, S-9, and S-10, obtained from the vicinity of the diesel oil tank (tank #4) in EP-1, were analyzed for TPH Sample S-8 from below the tank exhibited a TPH concentration of 34 0 mg/kg. Samples S-9 and S-10 obtained from the east and west sidewalls both exhibited TPH concentrations less than the 5.0 mg/kg laboratory detection limit

The soil sample (S-1) obtained from below the used oil tank (tank #5) in EP-2 exhibited a TPH concentration of 3,322 mg/kg. This sample was also analyzed for total metals lead and chromium and total organic halogens (TOX). Analytical test results indicated total lead and chromium concentrations of 14 4 and 41 2 mg/kg, respectively, and TOX concentrations below the 10 mg/kg laboratory detection limit.

A composite sample (C-1) obtained from stockpiled soils from the vicinity of heating oil tank #6 (not previously known to be present on the site) was analyzed and exhibited a TPH

concentration of 275 mg/kg Soil samples S-1 through S-5 obtained from the sidewalls and bottom of the second heating tank (EP-4, tank #7) exhibited TPH concentrations ranging from 6 2 to 17 2 mg/kg.

We appreciate this opportunity to be of continued service to Exxon Company, U.S A If you have any questions, please do not hesitate to call us at your earliest convenience

Respectfully submitted,

RITTENHOUSE-ZEMAN & ASSOCIATES, INC

Timothy J. Peter (for)

Stephen M. Evans
Geologist

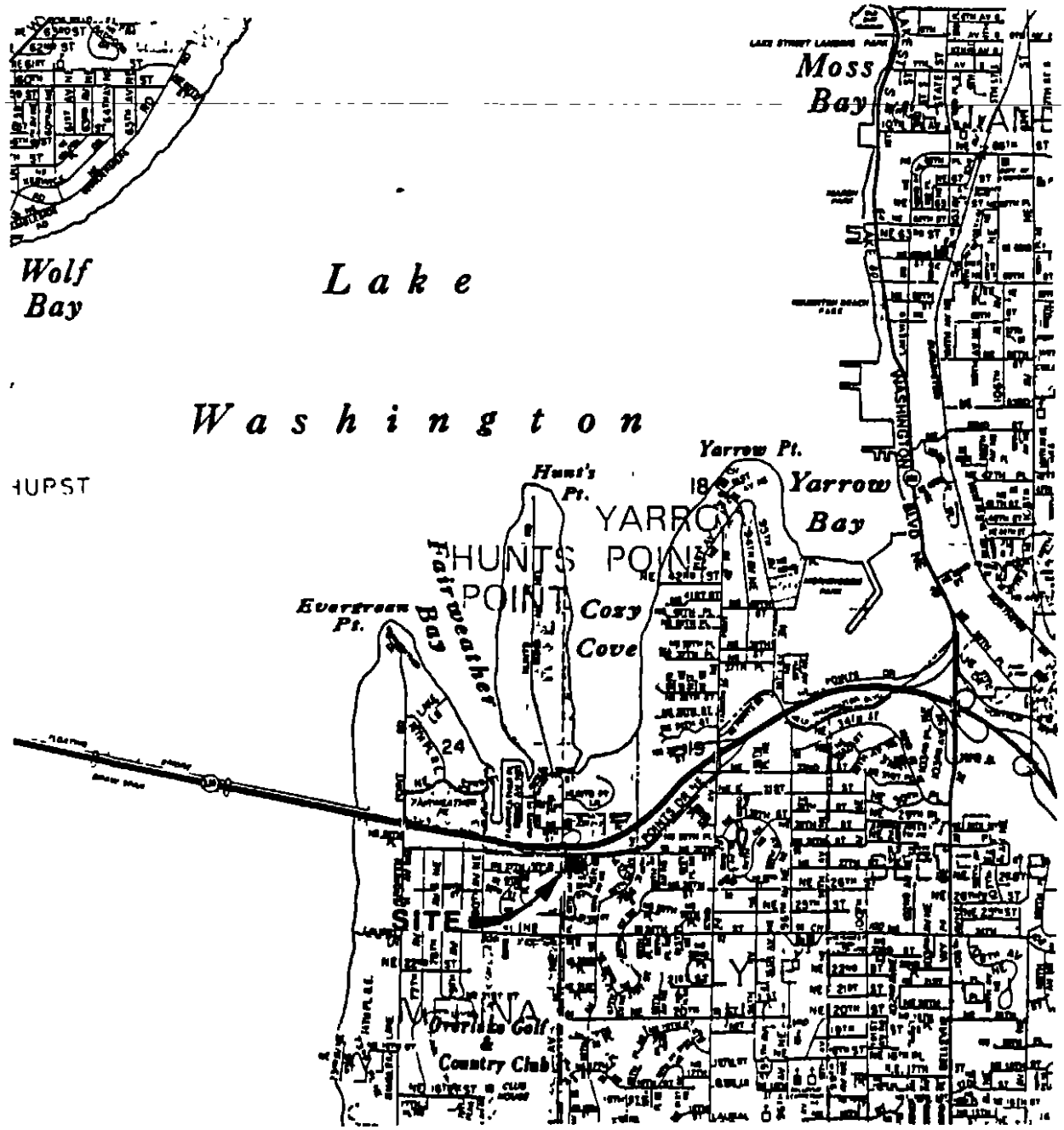
Timothy S. McCormack
Senior Hydrogeologist

Kurt W Groesch, P E
Associate

KURT W. GROESCH STATE OF WASHINGTON REGISTERED PROFESSIONAL ENGINEER

Enclosure. Figure 1, Site Vicinity Map
Figure 2, Site and Tank Removal Locations Plan
Table 2 - Summary of Analytical Test Results
Analytical Laboratory Test Reports

SME cao1



EXXON STATION No. 77106
84th AVENUE N.E.
CLYDE HILL, WASHINGTON

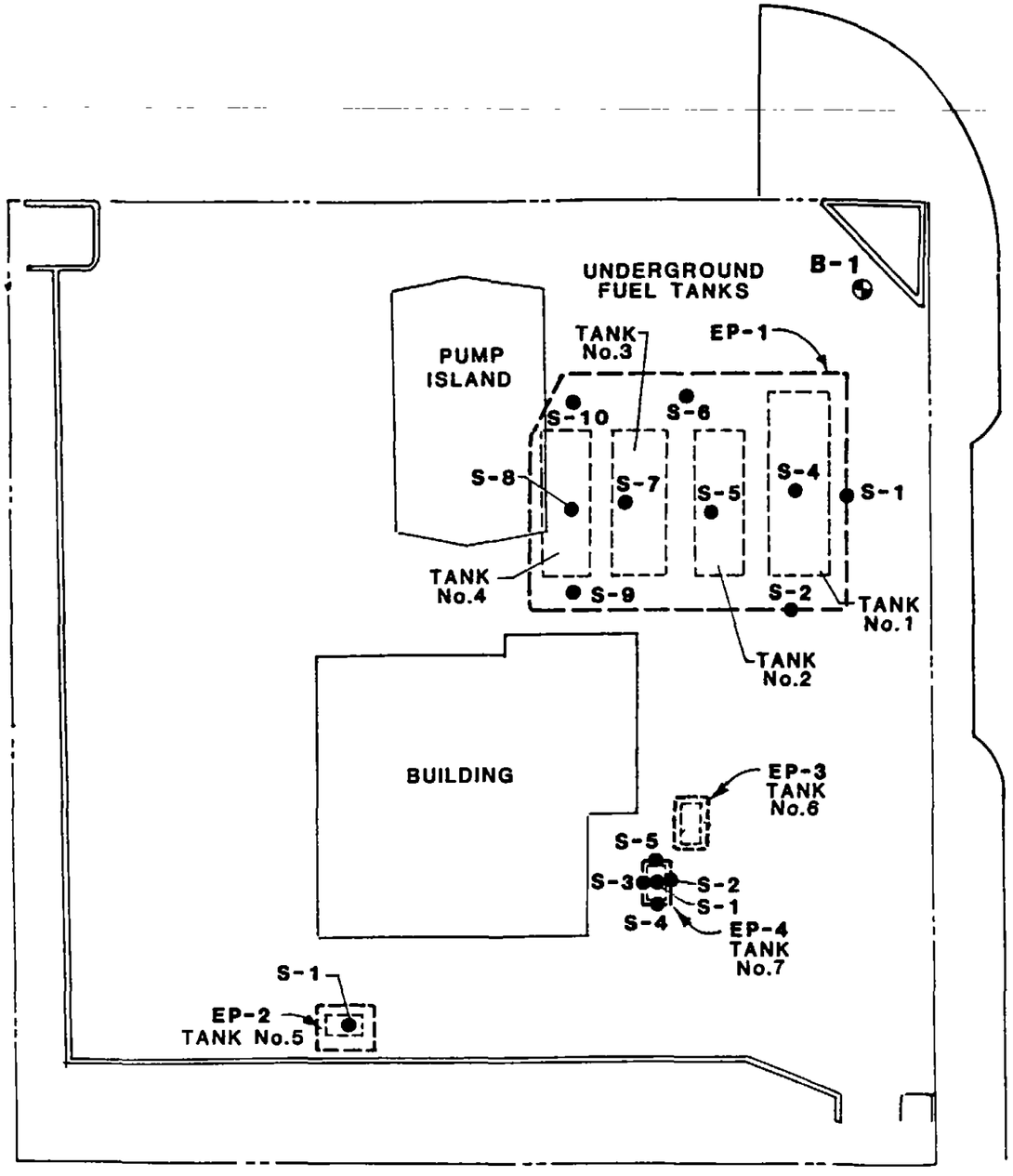
SITE VICINITY MAP

FIGURE 1

W.O. W-6468
BY SME
DATE JAN 1990
SCALE N.T.S.

RITTENHOUSE-ZEMAN & ASSOCIATES, INC.
Geotechnical & Hydrogeological Consultants
1400 140th Avenue N.E.
Bellevue WA 98005

RZA



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APPROXIMATE SCALE IN FEET

EXPLANATION

B-1 INDICATES BORING NUMBER AND APPROXIMATE LOCATION

S-10 INDICATES SOIL SAMPLE NUMBER AND APPROXIMATE LOCATION

EP-1 INDICATES TANK EXCAVATION NUMBER AND APPROXIMATE LOCATION

EXXON STATION No. 77106
84th AVENUE N.E.
CLYDE HILL, WASHINGTON

SITE & TANK REMOVAL LOCATIONS PLAN

FIGURE 2

WO W-6468
BY SME
DATE JAN 1990
SCALE NOTED

RITTENHOUSE-ZEMAN & ASSOCIATES, INC
Geotechnical & Environmental Consultants
1400 140th Avenue N.E.
Bellevue Washington 98005
RZA

TABLE 2

SUMMARY OF ANALYTICAL TEST RESULTS (ppm)

Clyde Hill Exxon

W-6468

Date	Sample	Location	Benzene	Toluene	Ethyl Benzene	Xylenes	TPH	TOX	Cr	Pb
10/31/89	C-1	EP-1 , stockpile	0.88	5.62	8.33	42.7	127	NT	NT	0.1*
"	S-1	" , N. sidewall	<0.05	<0.05	0.75	1.75	NT	NT	NT	NT
"	S-2	" , E. sidewall	<0.05	<0.05	<0.05	<0.05	NT	NT	NT	NT
"	S-4	" , bottom(tank 1)	<0.05	<0.05	<0.05	0.69	NT	NT	NT	NT
"	S-5	" , bottom(tank 2)	10.7	56.4	8.1	210	NT	NT	NT	NT
"	S-6	" , W. sidewall	<0.05	<0.05	<0.05	1.10	NT	NT	NT	NT
11/1/89	S-7	" , bottom(tank 3)	24.6	8.7	13.2	194	NT	NT	NT	NT
"	S-8	" , bottom(tank 4)	NT	NT	NT	NT	34 0	NT	NT	NT
"	S-9	" , E. sidewall	NT	NT	NT	NT	<5.0	NT	NT	NT
"	S-10	" , W. sidewall	NT	NT	NT	NT	<5.0	NT	NT	NT
11/7/89	S-1	EP-2 , bottom(tank 5)	NT	NT	NT	NT	3,322	<10	41.2	14.4
11/27/89	C-1	EP-3 , stockpile	NT	NT	NT	NT	275	NT	NT	NT
12/12/89	S-1	EP-4 , bottom(tank 7)	NT	NT	NT	NT	17.2	NT	NT	NT
"	S-2	" , N. sidewall	NT	NT	NT	NT	15.7	NT	NT	NT
"	S-3	" , S. sidewall	NT	NT	NT	NT	6.5	NT	NT	NT
"	S-4	" , E. sidewall	NT	NT	NT	NT	6.2	NT	NT	NT
"	S-5	" , W. sidewall	NT	NT	NT	NT	15.7	NT	NT	NT

NT - Not Tested

*EP tox extractable lead

^Total metal analysis

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Rittenhouse-Zeman Date: November 6, 1989

Report On: Analysis of Soil Lab No.: 8346-1

IDENTIFICATION:
Samples Received on 11-01-89
Project: W-6306 Clyde Hill Exxon

ANALYSIS:

Lab Sample No. RUSH 1 Client ID: C-1

Benzene, mg/kg	0.88
Toluene, mg/kg	5.62
Ethyl Benzene, mg/kg	8.33
Xylenes, mg/kg	42.7

(BTEX by EPA SW-846 Method 8020)

Total Petroleum Hydocarbons, mg/kg 127
by EPA Method 418.1

Flash (PMCC^{o}F) ..... > 200

Sample was analyzed for EP toxicity in accordance with "Test Methods for Evaluating Solid Waste", EPA SW-846, 3rd Edition, Sept. 1986.

Contaminant	Concentration (mg/l)	Max Conc., (mg/l)
Lead	0.1	5.0

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14 TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 8346-1
Date: November 6, 1989
Client: Rittenhouse-Zeman

Client ID: C-1
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	127	111	13.4	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14 TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

Report To: Rittenhouse-Zeman Date: November 9, 1989

Report On: Analysis of Soil Lab No.: 8346-2

IDENTIFICATION:
Samples Received on 11-01-89
Project: W-6306 Clyde Hill Exxon

ANALYSIS:

Lab Sample No.	2	3	4
Client ID	EP-1,S-1	EP-1,S-2	EP-1S-4
Benzene, mg/kg	< 0.05	< 0.05	< 0.05
Toluene, mg/kg	< 0.05	< 0.05	< 0.05
Ethyl Benzene, mg/kg	0.75	< 0.05	< 0.05
Xylenes, mg/kg	1.75	< 0.05	0.69
BTEX by EPA SW-846 Method 8020			

Lab Sample No.	5	6	7
Client ID	EP-1,S-5	EP-1,S-6	EP-1,S-7
Benzene, mg/kg	10.7	< 0.05	24.6
Toluene, mg/kg	56.4	< 0.05	8.7
Ethyl Benzene, mg/kg	8.1	< 0.05	13.2
Xylenes, mg/kg	210	1.10	194
BTEX by EPA SW-846 Method 8020			

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922 5047

Report To: Rittenhouse-Zeman Date: November 6, 1989

Report On: Analysis of Soil Lab No.: 8378

IDENTIFICATION:
Samples Received on 11-03-89
Project: W-6306 Clyde Hill Exxon

ANALYSIS:

Lab Sample No.	Client ID	Total Petroleum Hydrocarbons, mg/kg
1	EP-1 S-8	34.0
2	EP-1 S-9	< 5.0
3	EP-1 S-10	< 5.0

(TPH by EPA Method 418.1)

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SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 8378
Date: November 6, 1989
Client: Rittenhouse-Zeman

Client ID: EP-1 S-9
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	< 5.0	< 5.0	---	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922 5047

Report To: Rittenhouse-Zeman Date: December 13, 1989

Report On: Analysis of Soil Lab No.: 8911

IDENTIFICATION:
Samples Received on 12-13-89
Project: W-6488 Clyde Hill Exxon

ANALYSIS:

Lab Sample No.	Client Identification	Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1
1	EP-4, S-1	17.2
2	EP-4, S-2	15.7
3	EP-4, S-3	6.5
4	EP-4, S-4	6.2
5	EP-4, S-5	15.7

SOUND ANALYTICAL SERVICES

STAN P. PALMQUIST

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922 5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 8911
Date: December 13, 1989
Client: Rittenhouse-Zeman
Client ID: EP-4, S-5
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*
Total Petroleum Hydrocarbons	15.7	15.6	0.6

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS
4430 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922 5047

Report To: Rittenhouse-Zeman Date: November 9, 1989

Report On: Analysis of Soil Lab No.: 8437

IDENTIFICATION:
Samples Received on 11-08-89
Project: W-6306 Clyde Hill Exxon

ANALYSIS: Former Waste Oil Tank Area Soils

Lab Sample No. 1 Client ID: EP-2, S-1

Composite

Total Petroleum Hydrocarbons, mg/kg by EPA Method 418.1	3,322
Total Halogens, mg/kg	< 10
PCB - Type	ND
PCB, mg/kg	< 1
Chromium, mg/kg	41.2
Lead, mg/kg	14.4

Approx. 75 yds³

within background for soils in Puget Sound Area

SOUND ANALYTICAL SERVICES

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SOUND ANALYTICAL SERVICES, INC.

SPECIALIZING IN INDUSTRIAL & TOXIC WASTE ANALYSIS

4630 PACIFIC HIGHWAY EAST, SUITE B-14, TACOMA, WASHINGTON 98424 - TELEPHONE (206)922-2310 - FAX (206)922-5047

QUALITY CONTROL REPORT

DUPLICATES

Lab No: 8437
Date: November 13, 1989
Client: Rittenhouse-Zeman

Client ID: EP-2, S-1
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*	
Total Petroleum Hydrocarbons	3,322	3,082	7.5	

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100

west / Fuel oil Tank

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Report To: Rittenhouse-Zeman Date: November 28, 1989

Report On: Analysis of Soil Lab No.: 8681

IDENTIFICATION:
Samples Received on 11-27-89
Project: W-6468 Clyde Hill Exxon
Client ID: EP-3 C-1

ANALYSIS: Former Fuel oil Tank Area Soils

Composite

Total Petroleum Hydrocarbons, mg/kg 275
by EPA Method 418.1

~ 30 yds³

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QUALITY CONTROL REPORT

DUPLICATES

Lab No: 8681
Date: November 28, 1989
Client: Rittenhouse-Zeman
Client ID: EP-3 C-1
Matrix: Soil
Units: mg/kg

Compound	Sample(S)	Duplicate(D)	RPD*
Total Petroleum Hydrocarbons	275	274	0.4

*RPD = relative percent difference
= [(S - D) / ((S + D) / 2)] x 100