

RZA - AGRA

(Rittenhouse-Zeman & Associates, Inc.)
Engineering & Environmental Services

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6 November 1991

W-7793

Mr. Jeffrey Michael Grieff
3700 Bank of California
900 4th Avenue
Seattle, Washington 98164-1002

Subject: Level III Site Remediation Report
Sturves Addition, Lots 1 and 2
12th Avenue and Fir Street
Seattle, Washington

Dear Mr. Grieff:

We are pleased to present our letter report describing remediation activities performed at the above referenced parcel. The purpose of our work was to remove petroleum hydrocarbon contaminated soils from former underground storage tank locations on the subject parcel and backfill the excavation to pre-existing grade. Site work was performed between 19 and 28 August 1991. Analytical test results from soil samples collected from the excavation cavity and excavated soils are included in this report. This report has been prepared for the exclusive use of Mr. Jeffrey Michael Grieff, and their agents for specific application to the above referenced project in accordance with generally accepted environmental remediation practices. 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.

PURPOSE AND SCOPE

Based on the findings of previous environmental site work performed at the subject parcel by others, contaminated soils were identified on the subject parcel. Due to the existence of contaminated soils on site, a remediation program consisting of removal of these materials supplemented with field screening, environmental sampling, analytical testing, and treatment procedures were initiated by the property owners and their agents.

SITE HISTORY/PREVIOUS SITE INVESTIGATIONS

Based on information we were able to obtain, the western half of lots 1 and 2 of the Sturves Addition was occupied by a gasoline/service station from 1941 to 1975. From 1975 to 1988 the site was utilized as an autobody shop. In 1989, the gas station sustained a fire. In May 1990, the existing building was subsequently demolished and five underground storage tanks associated with the service station were removed by Washington Wrecking. A composite sample collected by Washington Wrecking exhibited Total Petroleum Hydrocarbon (TPH) concentrations in excess of Washington Model Toxics Control Act (MTCA) cleanup guidelines for TPH in soil. Based on previous reports, an unspecified volume of contaminated soil was removed from the site and the excavation was backfilled with aggregate fill materials. Confirmatory sidewall and bottom soil samples were not collected prior to backfilling the excavation.

Soil samples collected from backhoe-excavated testpit and boring explorations performed on the site by others indicated the presence of TPH contaminated soils on the southern half of the property to a depth of approximately 18 feet below ground surface

Previous investigations of the site did not detail specific volumes, locations and contents of the former underground storage tanks. In addition, analytical testing of soils was performed by EPA method 418.1, which does not discriminate specific types of petroleum hydrocarbons.

REMEDIAL PROCEDURES

We arrived on site on 18 August 1991 to observe excavation of contaminated site soils and collect environmental soil samples to be submitted for analytical testing. The site soils were excavated with a track mounted backhoe and stockpiled with a front-end loader under subcontract to our firm. As excavation procedures progressed, representative samples of the excavated soils were periodically collected and submitted for analytical testing. Additionally, representative confirmatory soil samples were collected from the sidewalls and bottom of the excavation.

During earthwork, soils were deemed contaminated by either olfactory impressions and/or screening with an Organic Vapor Meter (OVM), which were confirmed by



analytical testing of excavated soils. The OVM portable photoionization detector does not provide an absolute measurement of contaminant concentrations, however, it does provide relative concentrations of volatile organic compounds having ionization potentials less than 10.2 electron volts (eV). Diesel contaminated soils, which are comprised dominantly of compounds with ionization potentials greater than 10.2 eV, were segregated based primarily on olfactory impressions, which were confirmed by analytical testing.

Observations regarding petroleum hydrocarbon odor are subjective. The presence of or ability to detect petroleum hydrocarbon odors is dependent upon climatic factors (temperature, wind, etc.) as well as observer fatigue and olfactory sensitivity.

Excavated soils deemed contaminated were directly hauled by truck to Field-Shotwell Gravel Company in Port Angeles, Washington for treatment at a later date. Soils deemed non-contaminated were stockpiled on site to be used later as backfill for the excavation cavity.

Soil samples were taken at the discreet locations within the excavation and composited from stockpiles and placed into laboratory prepared containers. All sample containers were labeled to identify the project number test location, sample number, and depth interval, if applicable. All samples were immediately placed in a cooler until transported to cold storage at the laboratory. RZA's chain-of-custody procedures were used to document sampling integrity.

EXCAVATION PROCEDURES AND SUBSURFACE CONDITIONS

The excavation procedures were initiated in the south central portion of the property. The initial excavation revealed approximately 6 to 7 feet of non-odorous brown silty SAND, interpreted to the fill, overlying gray to green stained, variable gravelly, silty SAND to sandy SILT with concrete and organic debris. These soils exhibited strong odors of diesel fuel. Derek Fujimoto of H & I Automotive (occupying the existing building on the eastern side of the parcel) stated that this was approximately the location of the former diesel fuel tank. The upper non-odorous soils were stockpiled separately from the underlying contaminated soils. The odorous soils in this vicinity extended to a depth of approximately 20 feet, where a peat-rich silt horizon was encountered. The excavation

was extended to within approximately 18 to 20 feet of the existing building to the south (formerly occupied by a dry-cleaning business) and to within 9 to 10 feet of the sidewalk along the western portion of the subject parcel. The excavation was extended to the east exposing mildly odorous diesel contaminated soils along the sidewalls.

As the excavation extended to the north, gasoline contaminated soils were encountered at depths ranging from approximately 8 to 17 feet below the existing ground surface, assumably in the area of the former gasoline underground storage tanks and/or product lines. Soils excavated from this area exhibited OVM readings ranging from 150 to 450 ppm and were deemed contaminated. The excavation extended to within 25 feet of the northern property boundary, at which point only mildly contaminated gasoline soils were exposed along the excavation sidewalls. Groundwater was not encountered at any time during excavation procedures.

Site soils deemed contaminated were directly hauled by truck and trailer to Field Shotwell Gravel Company in Port Angeles to be stockpiled onsite and treated at a later date. A total of 761 tons of contaminated site soils were trucked to the treatment center. After the excavation was complete, representative sidewall and bottom samples were collected from the excavation to be submitted for analytical testing. Soil sampling procedures involved removal of test pit sidewall materials not impacted by the backhoe bucket prior to soil sample collection. Samples were taken at discrete location of the excavation and placed into prepared laboratory containers.

After the excavation was complete, the cavity was backfilled initially with concrete debris separated from fill materials along with non-contaminated site soils. After these soils were depleted, the excavation was filled to within four feet of pre-existing grade with imported, clean, gravelly sand followed by recycled concrete to pre-existing grade. Imported fill materials were supplied by General Construction of Seattle, Washington. All backfilled soils were placed in lifts of one foot or less and compacted with a single-drum vibratory roller to a firm, unyielding condition. The backfilling procedures were completed on 28 August 1991.

ANALYTICAL RESULTS AND CONCLUSIONS

Representative sidewall and bottom samples were collected from the excavation, as well as composite samples from the excavated materials and were sent to North Creek Analytical Services of Woodinville, Washington to be analyzed for Washington Total Petroleum Fuel Hydrocarbons - Diesel and/or Gasoline (WTPH-D & G) and total lead or TCLP lead. Specific analytical test methods chosen for individual samples was based on olfactory impressions, OVM readings and the sample locations relative to former tank positions. Analytical results are shown on Table 1.

Soil samples S-5, S-6, S-7, and S-9, collected from the perimeter of the excavation, were analyzed for WTPH-G and BTEX. These samples exhibited TPH (as gasoline) concentrations ranging from non-detectable to 20 parts per million (ppm), which is below MTCA Method A regulatory guideline of 100 ppm for gasoline in soils. Samples S-6 exhibited a xylenes concentration of 0.22 ppm and sample S-7 exhibited a toluene concentration of 0.17 ppm and a xylenes concentration of 0.35 ppm. These concentrations are below MTCA Method A regulatory guidelines for these compounds. Soil samples S-1, S-2, S-3, S-4, S-8, and S-9, also collected from the base and perimeter of the excavation, were analyzed for WTPH-D. Sample S-4 exhibited a TPH concentration of 11 ppm, which is below MTCA Method A cleanup criteria of 200 ppm for diesel in soils. All other samples did not exhibit detectable concentrations of TPH as diesel. All of the soil samples collected from the sidewalls and base of the excavation were analyzed for lead by TCLP. None of the samples exhibited detectable concentrations of lead.

Table 1
Results of Analytical Testing

<u>Sample No.</u>	<u>Depth (feet)</u>	<u>WTPH-G</u>	<u>WTPH-D</u>	<u>Benezene</u>	<u>Toluene</u>	<u>Ethylbenzene</u>	<u>Xylenes</u>	<u>Lead</u>
Excavation Perimeter								<0.15
S-1	14	NT	<10	NT	NT	NT	1	<0.15
S-2	18	NT	<10	NT	NT	NT	1	<0.15
S-3	13	NT	<10	NT	NT	NT	1	<0.15
S-4	13	NT	11	NT	NT	NT	1	<0.15
S-5	10	<1.0	NT	<0.05	<0.10	<0.10	<0.10	<0.15
S-6	15	20	NT	<0.05	<0.10	<0.10	0.22	<0.15
S-7	17	2.0	NT	<0.05	0.17	<0.10	0.35	<0.15
S-8	13	NT	<10	NT	NT	NT	NT	<0.15
S-9	14	1.9	<10	<0.05	<0.10	<0.10	<0.10	<0.15
Stockpiled soil								
CC-1		<1.0	<10	<0.10	<0.10	<0.10	<0.10	0.19
C-1		NT	210	NT	NT	NT	NT	51
C-2		NT	140	NT	NT	NT	NT	61
C-3		220	22	<0.10	0.38	1.2	1.1	9.6
C-4		160	560	0.22	<0.10	0.22	1.8	0.38
C-5		270	530	<0.10	<0.10	<0.10	<0.10	<0.15
Notes								
Values expressed in parts per million								
ND - Not detected								
NT - Not tested								

Soil samples C-1 through C-5, collected from the soils hauled off-site, were analyzed for WTPH-G and/or WTPH-D, and total lead or lead by TCLP. These samples exhibited TPH as gasoline concentrations ranging from 160 ppm to 270 ppm and TPH as diesel ranging from 140 ppm to 560 ppm. Samples C-3 and C-4 also exhibited trace

6 November 1991

Page 7

concentrations of BTEX components. All samples exhibited lead concentrations ranging from non-detectable to 61 ppm. Sample CC-1, collected from the stockpile that was reused as backfill material, did not exhibit detectable concentrations of WTPH-G, WTPH-D, or BTEX, and exhibited a TCLP lead concentration of 0.19 ppm.

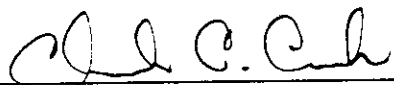
CONCLUSIONS AND RECOMMENDATIONS

In summary, the site soils were removed in general accordance with Ecology's "Guidance for Remediation of Releases from Underground Storage Tanks" for removal of contaminated soils. Based on analytical results and our observations during overexcavation procedures, virtually all of the petroleum hydrocarbon contaminated soils were removed from the vicinity of the former diesel and gasoline underground storage tanks and product lines. Due to difficulties of excavation and equipment access, however, there is a possibility that a minor amount of contaminated soils remain adjacent to or under the excavated area.

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

Respectfully submitted,

RZA-AGRA



Charles C. Cacek

Environmental Geologist



Lee Dorigan

Associate

Enclosures: Figure 1 - Site and Exploration Plan
Analytical Laboratory Certificates



AGRA

Earth & Environmental Group

FIR STREET

SIDEWALK

H & I AUTOMOTIVE

12th AVENUE S.

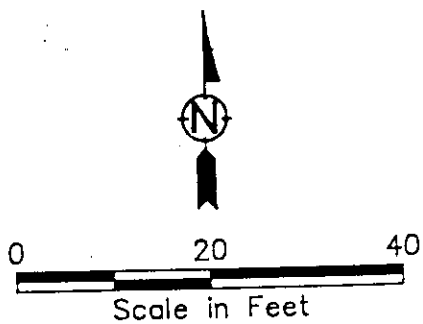
SIDEWALK

EXISTING BUILDING

EXCAVATION LIMITS

LEGEND

S-8
● INDICATES SOIL SAMPLE NUMBER
AND APPROXIMATE LOCATION



RZA-AGRA

ENGINEERING & ENVIRONMENTAL SERVICES

11335 N.E. 122nd Way
Suite 100
Kirkland, Washington
98034-6918

W.O. W-7793
DESIGN CCC
DRAWN DMW
DATE SEP 1991
SCALE NOTED

**STURUES ADDITION LOTS 1 & 2
SEATTLE, WASHINGTON**

SITE & SAMPLE LOCATION PLAN

FIGURE 1



18939 120th Avenue N.E., Suite 101 • Bothell, WA 98011
Phone (206) 481-9200 • FAX (206) 485-2992

Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition, Lots 1 & 2	Sampled:	Aug 20, 1991
11335 NE 122nd Way, #100	Matrix:	Soil	Received:	Aug 20, 1991
Kirkland, WA 98034	Analysis for:	Total Solids	Analyzed:	Aug 21, 1991
Attention: Charles Cacek	First Sample #:	108-0923	Reported:	Aug 21, 1991

LABORATORY ANALYSIS FOR: Total Solids

Sample Number	Sample Description	Sample Result %
108-0923	C-2	88
108-0924	C-3	80

North Creek Analytical routinely provides analytical results for soils, sediments or sludges in a wet weight "as received" basis.
To attain dry weight equivalents for regulatory compliance, divide the soil result by the decimal fraction of percent solids.

NORTH CREEK ANALYTICAL

A handwritten signature in black ink, appearing to read 'Scot Cocanour', is written over a horizontal line.

Scot Cocanour
Laboratory Director

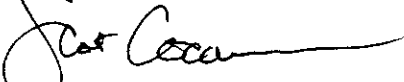
Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition, Lots 1 & 2	Sampled:	Aug 20, 1991
11335 NE 122nd Way, #100	Matrix Descript:	Soil	Received:	Aug 20, 1991
Kirkland, WA 98034	Analysis Method:	EPA 3550/8015	Extracted:	Aug 21, 1991
Attention: Charles Cacek	First Sample #:	108-0923	Analyzed:	Aug 21, 1991
			Reported:	Aug 22, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (WTPH-D)

Sample Number	Sample Description	Extractable Hydrocarbons mg/kg (ppm)	Surrogate Recovery %
108-0923	C-2	140	80
108-0924	C-3	22	76
BLK082191	Method Blank	N.D.	82

Detection Limits:	10
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Extractable Hydrocarbons are quantitated against a diesel fuel standard (nC11 - nC24). Surrogate recovery reported is for Octacosane. Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scott Cocanour
Laboratory Director

Rittenhouse Zeman & Associates 11335 NE 122nd Way, #100 Kirkland, WA 98034 Attention: Charles Cacek	Client Project ID: Sturves Addition, Lots 1 & 2 Matrix Descript: Soil Analysis Method: EPA 5030/8015/8020 First Sample #: 108-0924	Sampled: Aug 20, 1991 Received: Aug 20, 1991 Analyzed: Aug 20, 1991 Reported: Aug 21, 1991
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TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (WTPH-G/BTEX)

Sample Number	Sample Description	Purgeable Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)	Surrogate Recovery %
108-0924	C-3	220	N.D.	0.38	1.2	1.1	89
BLK082091	Method Blank	N.D.	N.D.	N.D.	N.D.	N.D.	90

Detection Limits:	1.0	0.050	0.10	0.10	0.10
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Purgeable Hydrocarbons are quantitated against a gasoline standard (nC5 - nC14). Surrogate recovery reported is for Bromofluorobenzene. Analytes reported as N.D. were not present above the stated limit of detection.

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Scot Cocanour
Laboratory Director

Please Note:
The detection limit for Benzene in #108-0924 = 0.20 mg/kg.



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Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition, Lots 1 & 2	Sampled:	Aug 20, 1991
11335 NE 122nd Way, #100	Analysis Method:	EPA 7420	Received:	Aug 20, 1991
Kirkland, WA 98034	Analysis for:	Lead	Digested:	Aug 21, 1991
Attention: Charles Cacek	First Sample #:	108-0923	Analyzed:	Aug 21, 1991
	Matrix:	Soil	Reported:	Aug 21, 1991

METALS ANALYSIS FOR: Lead

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg
108-0923	C-2	7.5	61
108-0924	C-3	7.5	9.6
BLK082191	Method Blank	150µg/L	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL


Scot Cocanour
Laboratory Director

Rittenhouse Zeman & Associates
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Charles Cacek

Client Project ID: Sturves Addition, Lots 1 & 2
Method : EPA 8015
Sample Matrix : Soil
Units : mg/kg
QC Sample #: BLK082191

Analyst : S. Kouri

Extracted: Aug 21, 1991
Analyzed: Aug 21, 1991
Reported: Aug 22, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel Fuel
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Sample Conc.: N.D.

Spike Conc.
Added: 66


Conc. Matrix
Spike: 59

Matrix Spike
% Recovery: 89

Conc. Matrix
Spike Dup.: 56

Matrix Spike
Duplicate
% Recovery: 85

Relative
% Difference: 5.2

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition Lots 1 & 2	Sampled:	Aug 19, 1991
11335 NE 122nd Way, #100	Matrix Descript:	Soil	Received:	Aug 19, 1991
Kirkland, WA 98034	Analysis Method:	EPA 3550/8015	Extracted:	Aug 20, 1991
Attention: Charles Cacek	First Sample #:	108-0863	Analyzed:	Aug 20, 1991
			Reported:	Aug 20, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (WTPH-D)

Sample Number	Sample Description	Extractable Hydrocarbons mg/kg (ppm)	Surrogate Recovery %
108-0863	C-1	210	94
BLK082091	Method Blank	N.D.	96

Detection Limits: 10

Extractable Hydrocarbons are quantitated against a diesel fuel standard (nC11 - nC24). Surrogate recovery reported is for Octacosane. Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL
Scot Cocanour
Laboratory Director

Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition Lots 1 & 2	Sampled:	Aug 19, 1991
11335 NE 122nd Way, #100	Analysis Method:	EPA 7420	Received:	Aug 19, 1991
Kirkland, WA 98034	Analysis for:	Lead	Digested:	Aug 20, 1991
Attention: Charles Cacek	First Sample #:	108-0863	Analyzed:	Aug 20, 1991
	Matrix:	Soil	Reported:	Aug 20, 1991

METALS ANALYSIS FOR: Lead

Sample Number	Sample Description	Detection Limit mg/kg	Sample Result mg/kg
108-0863	C-1	7.5	51
BLK082091	Method Blank	150µg/L	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

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Scot Cocanour
Laboratory Director

Rittenhouse Zeman & Associates
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Charles Cacek

Client Project ID: Sturves Addition Lots 1 & 2
Method : EPA 7420
Sample Matrix : Soil
Units : mg/kg
QC Sample #: 108-0721

Analyst : M. Essig

Extracted: Aug 19, 1991
Analyzed: Aug 19, 1991
Reported: Aug 20, 1991

QUALITY CONTROL DATA REPORT

ANALYTE

Pb

Sample Conc.: 98

Spike Conc.
Added: 50

Conc. Matrix
Spike: 140

Matrix Spike
% Recovery: 84

Conc. Matrix
Spike Dup.: 150

Matrix Spike
Duplicate
% Recovery: 104

Relative
% Difference: 6.9

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Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

Rittenhouse Zeman & Associates
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Charles Cacek

Client Project ID: Sturves Addition Lots 1 & 2
Method : EPA 8015
Sample Matrix : Soil
Units : mg/kg
QC Sample #: BLK081991

Analyst : D. Harmon
Extracted: Aug 19, 1991
Analyzed: Aug 20, 1991
Reported: Aug 20, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel Fuel
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Sample Conc.: N.D.

**Spike Conc.
Added:** 66

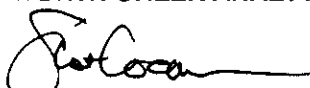
**Conc. Matrix
Spike:** 53

**Matrix Spike
% Recovery:** 80

**Conc. Matrix
Spike Dup.:** 56

**Matrix Spike
Duplicate
% Recovery:** 85

**Relative
% Difference:** 5.5

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Scot Cocanour
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition Lots 1 & 2	Sampled:	Aug 22, 1991
11335 NE 122nd Way, #100	Matrix:	Soil	Received:	Aug 26, 1991
Kirkland, WA 98034	Analysis for:	Total Solids	Analyzed:	Sep 11, 1991
Attention: Charles Cacek	First Sample #:	108-1154	Reported:	Sep 12, 1991

LABORATORY ANALYSIS FOR: Total Solids

Sample Number	Sample Description	Sample Result %
108-1154	CC-1	87
108-1155	C-4	89
108-1156	C-5	91
108-1157	S-1	89
108-1158	S-2	89
108-1159	S-3	84
108-1160	S-4	84
108-1161	S-5	91
108-1162	S-6	92
108-1163	S-7	85
108-1164	S-8	88

North Creek Analytical routinely provides analytical results for soils, sediments or sludges in a wet weight "as received" basis.
To attain dry weight equivalents for regulatory compliance, divide the soil result by the decimal fraction of percent solids.

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Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition Lots 1 & 2	Sampled:	Aug 22, 1991
11335 NE 122nd Way, #100	Matrix:	Soil	Received:	Aug 26, 1991
Kirkland, WA 98034	Analysis for:	Total Solids	Analyzed:	Sep 11, 1991
Attention: Charles Cacek	First Sample #:	108-1165	Reported:	Sep 12, 1991

LABORATORY ANALYSIS FOR: Total Solids

Sample Number	Sample Description	Sample Result %
108-1165	S-9	89

North Creek Analytical routinely provides analytical results for soils, sediments or sludges in a wet weight "as received" basis.
To attain dry weight equivalents for regulatory compliance, divide the soil result by the decimal fraction of percent solids.

NORTH CREEK ANALYTICAL


Scot Cocanour
Laboratory Director

1081154.RZA <2>

Rittenhouse Zeman & Associates 11335 NE 122nd Way, #100 Kirkland, WA 98034 Attention: Charles Cacek	Client Project ID: Sturves Addition Lots 1 & 2 Matrix Descript: Soil Analysis Method: EPA 5030/8015/8020 First Sample #: 108-1154	Sampled: Aug 2, 1991 Received: Aug 26, 1991 Analyzed: Sep 4, 1991 Reported: Sep 12, 1991
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TOTAL PETROLEUM FUEL HYDROCARBONS with BTEX DISTINCTION (WTPH-G/BTEX)

Sample Number	Sample Description	Purgeable Hydrocarbons mg/kg (ppm)	Benzene mg/kg (ppm)	Toluene mg/kg (ppm)	Ethyl Benzene mg/kg (ppm)	Xylenes mg/kg (ppm)	Surrogate Recovery %
108-1154	CC-1	N.D.	N.D.	N.D.	N.D.	N.D.	95
108-1155	C-4	160	0.22	N.D.	0.22	1.8	102
108-1156	C-5	270	N.D.	N.D.	N.D.	N.D.	100
108-1161	S-5	N.D.	N.D.	N.D.	N.D.	N.D.	94
108-1162	S-6	20	N.D.	N.D.	N.D.	0.22	99
108-1163	S-7	2.0	N.D.	0.17	N.D.	0.35	97
108-1165	S-9	1.9	N.D.	N.D.	N.D.	N.D.	94
BLK090491	Method Blank	N.D.	N.D.	N.D.	N.D.	N.D.	96

Detection Limits:	1.0	0.050	0.10	0.10	0.10
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Purgeable Hydrocarbons are quantitated against a gasoline standard (nC5 - nC14). Surrogate recovery reported is for Bromofluorobenzene. Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Please Note:

The detection limit for Toluene in #108-1155 = 0.20 mg/kg.
The detection limit for Benzene in #108-1156 = 0.08 and Toluene = 0.5 mg/kg.

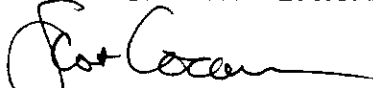
Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition Lots 1 & 2	Sampled:	Aug 22, 1991
11335 NE 122nd Way, #100	Matrix Descript:	Soil	Received:	Aug 26, 1991
Kirkland, WA 98034	Analysis Method:	EPA 3550/8015	Extracted:	Aug 30, 1991
Attention: Charles Cacek	First Sample #:	108-1154	Analyzed:	Sep 9, 1991
			Reported:	Sep 12, 1991

TOTAL PETROLEUM FUEL HYDROCARBONS (WTPH-D)

Sample Number	Sample Description	Extractable Hydrocarbons mg/kg (ppm)	Surrogate Recovery %
108-1154	CC-1	N.D.	84
108-1155	C-4	560	80
108-1156	C-5	530	Not Available
108-1157	S-1	N.D.	105
108-1158	S-2	N.D.	97
108-1159	S-3	N.D.	105
108-1160	S-4	11	94
108-1164	S-8	N.D.	75
108-1165	S-9	N.D.	68
BLK083091	Method Blank	N.D.	100

Detection Limits:	10
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Extractable Hydrocarbons are quantitated against a diesel fuel standard (nC11 - nC24). Surrogate recovery reported is for Octacosane. Analytes reported as N.D. were not present above the stated limit of detection.


NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Rittenhouse Zeman & Associates 11335 NE 122nd Way, #100 Kirkland, WA 98034 Attention: Charles Cacek	Client Project ID: Sturves Addition Lots 1 & 2 Analysis Method: EPA 1311/7420 Analysis for: Lead by TCLP First Sample #: 108-1154 Matrix: TCLP Extract	Sampled: Aug 22, 1991 Received: Aug 26, 1991 Digested: Sep 9, 1991 Analyzed: Sep 12, 1991 Reported: Sep 12, 1991
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METALS ANALYSIS FOR: Lead by TCLP

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L
108-1154	CC-1	0.15	0.19
108-1155	C-4	0.15	0.38
108-1156	C-5	0.15	N.D.
108-1157	S-1	0.15	N.D.
108-1158	S-2	0.15	N.D.
108-1159	S-3	0.15	N.D.
108-1160	S-4	0.15	N.D.
108-1161	S-5	0.15	N.D.
108-1162	S-6	0.15	N.D.
108-1163	S-7	0.15	N.D.
108-1164	S-8	0.15	N.D.
108-1165	S-9	0.15	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

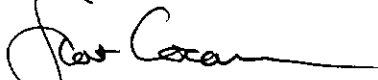
NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

Rittenhouse Zeman & Associates	Client Project ID:	Sturves Addition Lots 1 & 2	
11335 NE 122nd Way, #100	Analysis Method:	EPA 1311/7420	
Kirkland, WA 98034	Analysis for:	Lead by TCLP	Digested: Sep 9, 1991
Attention: Charles Cacek	First Sample #:	BLK090991	Analyzed: Sep 12, 1991
	Matrix:	TCLP Extract	Reported: Sep 12, 1991

METALS ANALYSIS FOR:**Lead by TCLP**

Sample Number	Sample Description	Detection Limit mg/L	Sample Result mg/L
BLK090991	Method Blank	0.15	N.D.

Analytes reported as N.D. were not present above the stated limit of detection.

NORTH CREEK ANALYTICALScot Cocanour
Laboratory Director

Rittenhouse Zeman & Associates
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Charles Cacek

Client Project ID: Sturves Addition Lots 1 & 2
Method : EPA 8020
Sample Matrix : Soil
Units : mg/kg
QC Sample #: 108-1366

Analyst : S. Stowell

Analyzed: Sep 4, 1991
Reported: Sep 12, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Benzene	Toluene	Ethyl Benzene	Xylenes
Sample Conc.:	N.D.	N.D.	N.D.	N.D.
Spike Conc. Added:	0.50	0.50	0.50	1.50
Conc. Matrix Spike:	0.37	0.39	0.45	1.30
Matrix Spike % Recovery:	74	78	90	87
Conc. Matrix Spike Dup.:	0.36	0.38	0.44	1.29
Matrix Spike Duplicate % Recovery:	72	76	88	86
Relative % Difference:	2.7	2.6	2.2	0.8

NORTH CREEK ANALYTICAL


Scot Cocanour
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

Rittenhouse Zeman & Associates
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Charles Cacek

Client Project ID: Sturves Addition Lots 1 & 2
Method : EPA 1311/7420
Sample Matrix : TCLP Extract
Units : mg/L
QC Sample #: 109-0001

Analyst : M. Essig

Extracted: Sep 6, 1991
Analyzed: Sep 9-10, 1991
Reported: Sep 12, 1991

QUALITY CONTROL DATA REPORT

ANALYTE

Pb

Sample Conc.: 0.37

Spike Conc.
Added: 1.3

Conc. Matrix
Spike: 1.5

Matrix Spike
% Recovery: 87

Conc. Matrix
Spike Dup.: 1.5

Matrix Spike
Duplicate
% Recovery: 87

Relative
% Difference: 0

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$

Rittenhouse Zeman & Associates
11335 NE 122nd Way, #100
Kirkland, WA 98034
Attention: Charles Cacek

Client Project ID: Sturves Addition Lots 1 & 2
Method : EPA 8015
Sample Matrix : Soil
Units : mg/kg
QC Sample #: BLK083091

Analyst : D. Harmon

Extracted: Aug 30, 1991
Analyzed: Sep 9, 1991
Reported: Sep 12, 1991

QUALITY CONTROL DATA REPORT

ANALYTE	Diesel
	Fuel

Sample Conc.: N.D.

Spike Conc.
Added: 66

Conc. Matrix
Spike: 57

Matrix Spike
% Recovery: 86

Conc. Matrix
Spike Dup.: 61

Matrix Spike
Duplicate
% Recovery: 93

Relative
% Difference: 7.0

NORTH CREEK ANALYTICAL

Scot Cocanour
Laboratory Director

% Recovery:	$\frac{\text{Conc. of M.S.} - \text{Conc. of Sample}}{\text{Spike Conc. Added}} \times 100$
Relative % Difference:	$\frac{\text{Conc. of M.S.} - \text{Conc. of M.S.D.}}{(\text{Conc. of M.S.} + \text{Conc. of M.S.D.}) / 2} \times 100$