PRE-ACQUISITION SURVEY REPORT
REGION 3 SIGN CENTER

July 7, 2005

U.S. Fish & Wildlife Service
3 Kansas Street
Winona, MN 55987

PRE-ACQUISITION SURVEY REPORT
REGION 3 SIGN CENTER

TABLE OF CONTENTS

1.0 Introduction 1
1.1 Authorization 1
1.2 Scope of Work 1
1.3 Location 1
2.0 Historical Information 2
2.1 Interview with USFWS Personnel 2
2.2 Historical File Search 2
2.3 Appraisal Report 2
2.4 Review of Historical Photographs 2
3.0 On-Site Investigations 3
3.1 Geophysical Survey 3
3.2 Exploratory Excavation 3
4.0 Media Sampling 4
4.1 Soil Sampling 4
4.2 Exterior Transite Siding 4
4.3 Analytical Results 5
5.0 Discussion 6
6.0 Conclusion 6
7.0 Signature of Environmental Professional(s) 6
8.0 Qualifications of Environmental Professional(s) 6
Figures
Photographs
Appendices

PRE-ACQUISITION SURVEY REPORT
REGION 3 SIGN CENTER

1.0 INTRODUCTION

1.1 Authorization

In accordance with the U. S. Fish & Wildlife Service's (USFWS) Task Order #9850005P024, Mesa Applied Technologies, LLC. (MAT) prepared this *Pre-Acquisition Survey Report* for the Region 3 Sign Center located in Winona, MN. The purpose of the Survey was to collect and analyze site-specific data concerning potential environmental hazards identified in a previous appraisal conducted at the Sign Center on behalf of USFWS.

1.2 Scope of Work

The Pre-Acquisition Survey conducted by MAT involved a review of historical information, conduct of a limited geophysical survey, and limited excavation and soil sampling.

1.3 Location

The Region 3 Sign Center is located in Winona County, MN within the town of Winona near the corner of Kansas Street and 1st Avenue. A location map is provided as *Figure 1*.

2.0 HISTORICAL INFORMATION

2.1 Interview with USFWS Personnel

MAT interviewed several Sign Center personnel in June 2005, including Mr. Duane Gaulke (Sign Shop Manager) who has worked at the site since the 1970s. Anecdotal reports indicate that a small underground fuel storage tank and fuel pump had been located along the north side of the front loading dock of the Main Building. USFWS personnel were not certain whether the tank had previously been removed or filled in-place.

2.2 Historical File Search

At MAT's request, USFWS Region 3 personnel reviewed available file records and *Annual Reports* back to 1936, but were unable to find any reference to the underground storage tank or its removal.

2.3 Appraisal Report

The appraisal report previously prepared for USFWS and referenced in Section 1.1 included the following statement:

> *In researching data for the subject property, the appraiser was made aware that there may be an underground storage tank along the north side of the front loading dock of the Main Building. Mr. Duane Gaulke of USFWS was interviewed about the underground tank. Mr Gaulke believed the tank had been filled years ago, but to his knowledge had never been removed or tested for contamination. The underground tank is a possible source of an environmental hazard/liability. The appraiser strongly recommends that a Phase II environmental study be completed to determine if a hazard/liability exists.*
>
> *In addition, several of the buildings on the property appraised contain asbestos panel exterior siding. Asbestos is a known hazardous substance, but does not require remediation in all cases. An expert of environmental hazards should be consulted to determine a proper course of action regarding the asbestos siding.*

2.4 Review of Historical Photographs

MAT personnel reviewed several albums of old photographs archived at the Sign Center. Several of these photographs (Photos H1, H2) showed evidence of a fuel pump along the north side of the front loading dock. A third photograph (Photo H3) shows an area in front of the same loading dock after having been excavated. Copies of these photographs are provided in the *Photographs* section of this report.

3.0 ON-SITE INVESTIGATIONS

3.1 Geophysical Survey

MAT retained Braun Intertec (Minneapolis, MN) to conduct a geophysical survey in the vicinity of the underground fuel storage tank tentatively identified during review of the historical information summarized in Section 2.0. The geophysical survey was performed on June 2, 2005 using an EM-61 Metal Detector and a 250 MHz Ground Penetrating Radar (GPR) system in an attempt to identify the presence of any shallow metallic objects below the ground surface.

A 40 foot square grid was initially established along the north side of the front loading dock of the Main Building (see Photo 818). The perimeter of the grid area contained several metal obstacles (loading dock, steps and building materials). These materials produced a magnetic response to the system that may shadow response from buried targets such as tanks. The only noted responses in the grid surveyed were constant along the perimeter obstacles. These responses started approximately 6 feet in proximity from the metal objects.

The 250 MHz GPR antenna was then traversed across the same grid. This was done in attempt to locate targets that may have been shadowed by the metal obstacles. The GPR system was not able to positively identify a target within the established grid.

Braun Intertec subsequently prepared a letter report dated June 27, 2005. A copy of the report is included as *Appendix A*.

3.2 Exploratory Excavation

USFWS personnel assisted MAT in conducting a limited excavation in the asphalt parking lot along the north side of the front loading dock of the Main Building. The excavation began along the east edge of the concrete stairs and proceeded north towards the Shop Building (see Photos 794, 801, 813). The limits of the excavation were necessarily limited by the presence of existing structures and the loading dock.

An asphalt layer (4-5 inches thick) was generally underlain by what appeared to be clean fill sand (Photo 803). A limited amount of trash and debris (including bricks, glass, wood and clay drain pipe) were also present in the area excavated. At the north end of the excavation (near the Shop Building) an old electrical conduit (Photo 804) and what appeared to be an abandoned fill pipe (Photo 806) were discovered adjacent to a buried concrete slab.

MAT personnel used a MultiRAE® photoionization detector (PID) to screen the soils within the excavation. PID readings ranged from 0.0 - 3.0 ppm which are considered within the range of background. A 42 inch steel rod (0.5 inch diameter) was used to probe numerous areas with the excavation and inaccessible areas beneath the concrete loading dock down to a depth of 5 - 6 feet below grade (Photo 808). No evidence of a tank was discovered.

MAT personnel used a hand-held metal detector to screen the bottom of the excavation (Photo 812). Several small anomalies were discovered but, again, there was no evidence of a tank.

4.0 MEDIA SAMPLING

4.1 Soil Sampling

ITSI personnel collected two (2) soil samples from within the excavation. Sample SS-2 was collected at a depth of 32 inches below grade along the east wall of the loading dock in front of the Main Building in the vicinity of the historical fuel pump dispenser. Sample SS-3 was collected at a depth of 24 inches below grade beneath an overhanging concrete slab on the south side of the Shop Building. This location was selected since what appeared to be an abandoned fill pipe was discovered here. The location of the two sampling points is shown in Photo 815.

The soil samples were subsequently transported to Evergreen Analytical Laboratory (EAL) in Denver, CO for analysis. Samples were analyzed for gasoline (i.e. total volatile petroleum hydrocarbons [TVPH]), diesel (i.e. total extractable petroleum hydrocarbons [TEPH]), and total lead [Pb].

Laboratory results were returned from EAL on June 27, 2005. A summary of the results are provided in Section 4.3 and a copy of EAL's report is provided in *Appendix B*.

4.2 Exterior Transite Siding

In accordance with the appraisal referenced in Section 2.3, the exterior of the Main Building and the Shop Building were reportedly covered with asbestos transite siding. A sample of the transite siding (which was labeled as containing asbestos fibers [Photo 817]) and a surface soil sample directly beneath several panels of siding located along the north side of the Shop Building were collected by MAT personnel (Photo 816).

The samples were subsequently transported to Reservoirs Environmental, Inc. (REI) in Denver, CO for analysis of asbestos content by polarized light microscopy (PLM). Chain-of-custody documentation was maintained during the sample transport process.

Laboratory results were returned from REI on June 14, 2005. A summary of the results are provided in Section 4.3 and a copy of REI's report is provided in *Appendix B*.

4.3 Analytical Results

Analytical results are summarized in the following Table.

Sample ID	Sample Description	Analyte	Results
ES-1	Exterior transite siding	Chrysotile asbestos	15%
SS-1	Surface soil beneath panels of exterior transite siding	Chrysotile asbestos	< 1%
SS-2	Soil (32" bgs) along E wall of loading dock; Main Building	TVPH - Gasoline Range Organics	*U*
		TEPH - Diesel Range Organics	*U*
		Total Lead	380 *mg/kg*
SS-3	Soil (24" bgs) beneath slab along S wall; Shop Building	TVPH - Gasoline Range Organics	*U*
		TEPH - Diesel Range Organics	54 *mg/kg*
		Total Lead	73 *mg/kg*

U = Non-detect

5.0 DISCUSSION

Soil sample SS-3 exhibited a relatively minor concentration of diesel range organics. No other evidence of fuel contamination was noted within the excavation. Lead levels were below EPA's residential soil-lead hazard standard of 400 mg/kg found at 40 CFR 745 (*Lead; Identification of Dangerous Levels of Lead; Final Rule*).

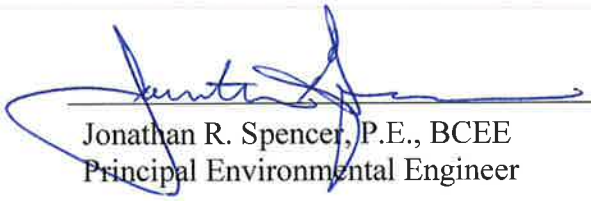
The exterior transite siding was confirmed to contain asbestos; however there was only trace evidence of asbestos in the soil sampled beneath the siding.

6.0 CONCLUSION

Although historical evidence suggests a fuel tank may was likely present within the parking lot, there is no evidence to suggest that the tank is still present. The discovery of a photograph (H-3) showing a previous excavation in the vicinity of where the fuel tank was believed to have been located and the presence of what appears to be clean fill in this area suggests that the tank may have been removed.

7.0 SIGNATURE OF ENVIRONMENTAL PROFESSIONAL(S)

This *Pre-Acquisition Survey Report* was conducted under the direction of the following environmental professional(s):



July 7, 2005

Jonathan R. Spencer, P.E., BCEE
Principal Environmental Engineer

Date

8.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONAL(S)

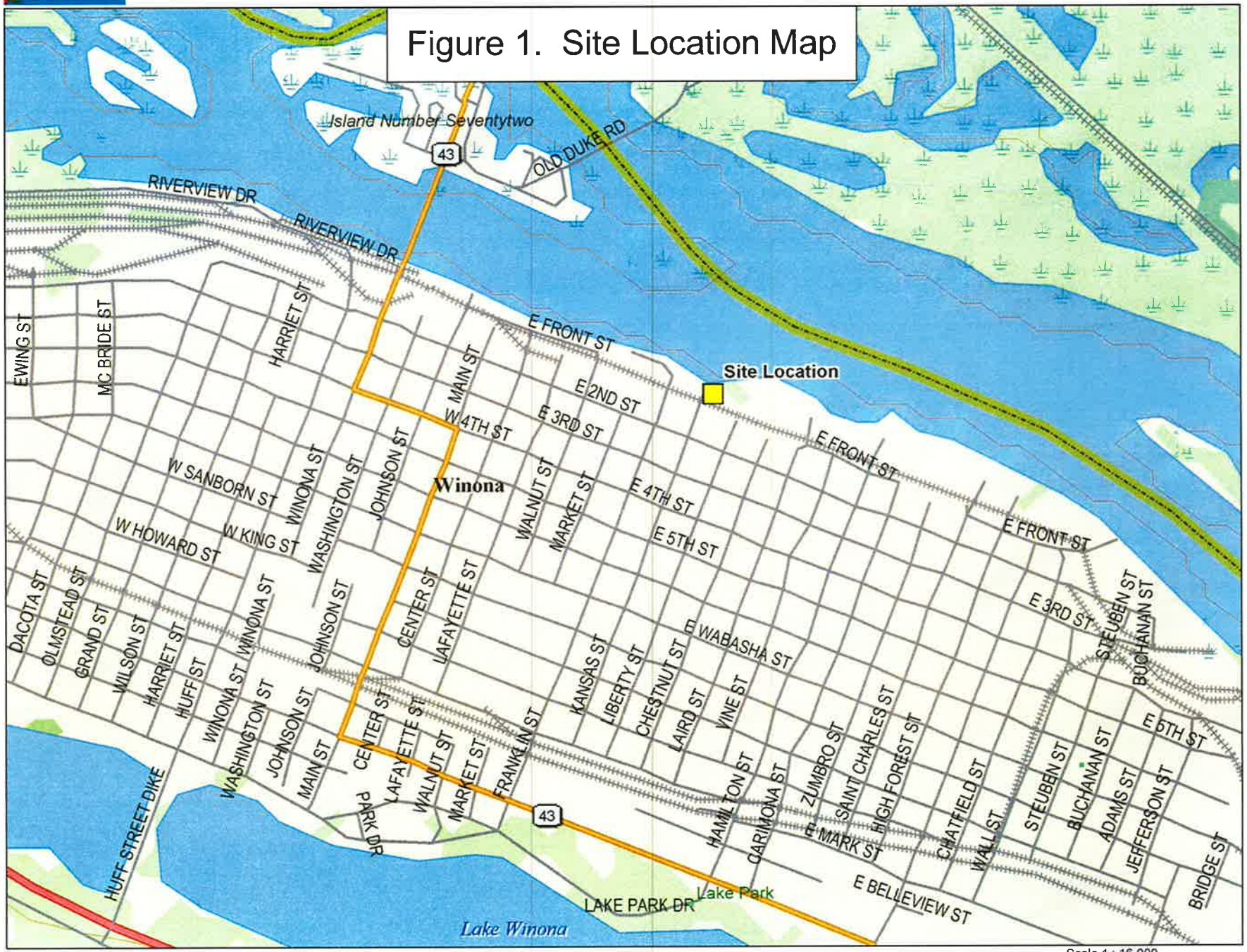
Resumes highlighting the qualifications of the environmental professional(s) responsible for conducting the *Pre-Acquisition Survey* and preparation of this report are included as *Appendix C*.

FIGURES

DeLORME

Topo USA® 5.0

Figure 1. Site Location Map



Data use subject to license.
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www.delorme.com

TN
MN (0.0°E)

Scale 1 : 16,000
0 400 800 1200 1600 2000 ft
0 140 280 420 560 700 m
1" = 1,333.3 ft

Data Zoom 13-0

PHOTOGRAPHS

Photo H1 - Photograph (dated July 19, 1979) showing a fuel pump adjacent to the front loading dock

Photo H2 - Photograph (undated) showing a fuel pump adjacent to the front loading dock

Photo H3 - Photograph (undated)
showing area adjacent to the front
loading dock after excavation

818. Geophysical survey area in parking lot

794. USFWS parking lot prior to excavation

801. Excavation area in front of loading dock

803. Clean fill sand encountered in excavation

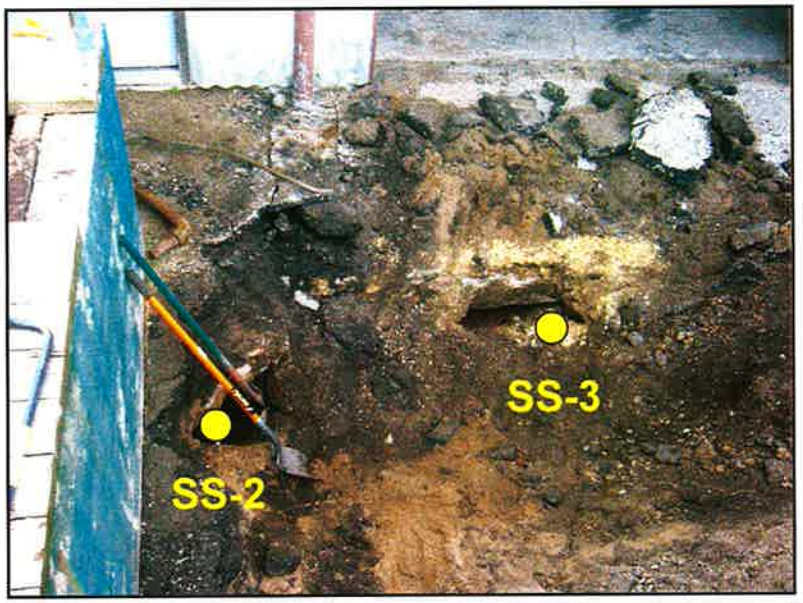
804. Abandoned electrical service within excavation

806. Abandoned fill pipe within excavation

808. Probing for steel tank within excavation

813. Parking area upon completion of excavation

812. Metal detector used to screen excavation



815. Soil sampling points within excavation area

816. Suspect ACM siding along N side of Shop

817. Label on exterior siding; Shop Building

APPENDIX A

Geophysical Survey Report (Braun Intertec)

BRAUN
INTERTEC

Braun Intertec Corporation
11001 Hampshire Avenue S.
Minneapolis, MN 55438

Phone: 952.995.2000
Fax: 952.995.2020
Web: braunintertec.com

June 27, 2005

Project BL-05-01974

Sent via Fax and US Mail
303.932.2221

Mr. John Spencer
New Horizons Environmental Consultants, Inc.
6585 W. Wright
Littleton, CO 80127-4806

Re: Geophysical Survey

Dear Mr. Spencer:

Braun Intertec Corporation is pleased to present this report on the Geophysical survey conducted at the U.S. Fish and Wildlife Sign Center in Winona, Minnesota.

Background

Braun Intertec Corporation visited the above-mentioned site on June 2, 2005, to conduct a Geophysical survey in attempt to locate a buried tank and/or construction debris. The survey was conducted using and EM-61 Metal Detector and a 250 MHz Ground Penetrating Radar (GPR) system.

An EM-61 system is a time-domain metal detector system, which operates by transmitting a primary magnetic field into the earth, recording secondary magnetic field returns. This system is capable of detecting metal targets up to depths of 10 feet under optimum conditions.

The 250 MHz GPR antenna operates much like radar used to locate airplanes in the sky. Radio waves are transmitted into the ground with subsequent reflections returning to the antenna being recorded digitally.

Procedure

Mr. Duane Gaulke of the U.S. Fish and Wildlife service directed Braun Intertec personnel as to the anticipated location of the possible tank. A 40-foot square grid was established in attempt to collect an EM-61 survey to locate a possible tank. The system is interfaced with GPS to produce a plan map of the reflection response. Due to site-specific obstacles (buildings and objects in close proximity) the GPS system could not receive satellite response, thus not allowing for the production of the plan map. The system was still operable with audio output response to be physically marked on site. The grid was surveyed with the EM-61 using this method.

The perimeter of the grid area contained several metal obstacles (loading dock, steps and building materials.) These materials produced a magnetic response to the system that may shadow response from buried targets such as tanks. The only noted responses in the grid surveyed were constant along the perimeter obstacles. These responses started approximately 6 feet in proximity from the metal objects.

The 250 MHz GPR antenna was then traversed across the same grid. This was done in attempt to locate targets that may have been shadowed by the metal obstacles. The GPR system was not able to positively identify a target in the mentioned grid.

Discussion

The Geophysical survey was not able to positively identify a target that would be consistent to that of a buried tank. The site conditions created a less successful survey than anticipated, but informative data was still collected. Although the specific location of interest, as explained by Mr. Gaulke, was in close proximity of the obstacles, the remainder of the grid was successfully scanned with no targets found within the limitations of the equipment.

General

Services performed by Braun Intertec for this project have been conducted with that level of care and skill ordinarily exercised by members of the profession currently practicing in this area under similar budget and time restraints. No warranty, express or implied, is made.

If you have any questions or concerns, or if we can be of further assistance, please call Nick Hansen at 952.995.2362 or Steve Flaten at 952.995.2348.

Sincerely,

BRAUN INTERTEC CORPORATION

Nicholas P. Hansen
Staff Scientist

Steven J. Flaten, AIA
Principal Senior Architect, Building Sciences

APPENDIX B

Laboratory Reports and Chain-of-Custody Documentation

Reservoirs Environmental, Inc.
2059 Bryant St. Denver, CO 80211
(303) 964-1986 Fax (303) 477-4275 Toll Free (866) RESI-ENV

June 14, 2005

Laboratory Code: **RES**
Subcontract Number: **NA**
Laboratory Report: **RES 116589-1**
Project Description: **1556**
Winona, MN

Jonathan Spencer
New Horizons Environmental Consultants, Inc.
6585 S. Wright Street
Littleton CO 80127-4806

Dear Customer,

Reservoirs Environmental, Inc. is an analytical laboratory accredited for the analysis of Industrial Hygiene and Environmental matrices by the National Voluntary Laboratory Accreditation Program (NVLAP), Lab Code # 101896 and the American Industrial Hygiene Association (AIHA), Lab ID 101533 - Accreditation Certificate #480. This laboratory is currently proficient in both Proficiency Testing and PAT programs respectively.

Reservoirs Environmental, Inc. has analyzed the following samples for asbestos content as per your request. The analysis has been completed in general accordance with the appropriate methodology as stated in the attached analysis table. The results have been submitted to your office.

RES 116589-1 is the job number assigned to this study. This report is considered highly confidential and the sole property of the customer. Reservoirs Environmental, Inc. will not discuss any part of this study with personnel other than those of the client. The results described in this report only apply to the samples analyzed. This report must not be used to claim endorsement of products or analytical results by NVLAP or any agency of the U.S. Government. This report shall not be reproduced except in full, without written approval from Reservoirs Environmental, Inc. Samples will be disposed of after sixty days unless longer storage is requested. If you have any questions about this report, please feel free to call 303-964-1986.

Sincerely,

Jeanne Spencer Orr
President

Analyst(s): _____
Paul D. LoScalzo Wenlong Liu
Paul F. Knappe Rich Wegrzyn
Michael Scales

RESERVOIRS ENVIRONMENTAL, INC.

NVLAP Accredited Laboratory # 101896
TDH Licensed Laboratory # 30-0136

TABLE PLM BULK ANALYSIS, PERCENTAGE COMPOSITION BY VOLUME

RES Job Number: **RES 116589-1**
Client: **New Horizons Environmental Consultants, Inc.**
Client Project Number / P.O.: **1556**
Client Project Description: **Winona, MN**
Date Samples Received: **June 9, 2005**
Analysis Type: **PLM, Short Report**
Turnaround: **3-5 Day**
Date Analyzed: **June 14, 2005**

Analyst: LW

Client Sample Number	Lab ID Number	LAYER	Physical Description	Sub Part (%)	Asbestos Content Mineral	Asbestos Content Visual Estimate (%)	Non Asbestos Fibers (%)	Non-Fibrous Components (%)
ES-1	EM 970664	A	Gray transite	100	**Chrysotile**	**15**	0	85
SS-1	EM 970665	A	Black soil	100	**Chrysotile**	**TR**	0	100

ND = None Detected
TR = Trace, < 1% Visual Estimate

Trem-Act = Tremolite-Actinolite

Digitally signed by Gina Date: 2005.06.14 13:40:05 -06'00'

Data QA

RESERVOIRS ENVIRONMENTAL, INC.

2959 Bryant St., Denver CO 80211

RES 116589

Due Date 6-14/6-16

Due Time 1:40PM

RESI Job # _____

Page 1 of 1

SAMPLES SUBMITTED BY:

Company NEW HORIZONS ENV.
Address 6585 S. WRIGHT
LITTLETON CO 80127
Contact J. SPENCER Phone 3/932-2220 Fax 3/932-2221 Pager
Contact Phone Fax Pager
Project Number and/or P.O. # 1556
Project Description/Location WINONA, MN

INVOICE TO (IF DIFFERENT)

Final Data/Deliverable Email Address

After Hours/Weekend CHARGE Amount $ _____ **Authorized by:** _____

Additional fees apply for after hours and holidays for all analysis types. Samples will be analyzed during normal laboratory hours unless otherwise arranged and specified on the chain of custody. Turnaround is subject to laboratory volume. You will be notified if delays are expected.

ASBESTOS LABORATORY HOURS:
Weekdays: 7am - 7pm; Saturday: 8am - 5pm

PCM/PLM ___ 2 Hour RUSH ___ 24 hour X 3-5 weekdays

TEM ___ 6 Hour RUSH ___ 24 hour ___ 3-5 weekdays

Prior Notice REQUIRED for TEM 6 Hour RUSH

METALS LABORATORY HOURS:
Weekdays: 8am - 5pm

AA/ICP ___ SPECIAL RUSH ___ 24 Hour ___ 3-5 Day

RCRA 8 ___ SPECIAL RUSH ___ 5 Day ___ 10 Day

TCLP ___ SPECIAL RUSH ___ 5 Day ___ 10 Day

Prior Notice REQUIRED for SPECIAL RUSH AA, RCRA or TCLP

RCRA and TCLP SPECIAL RUSH is 1 Day Turnaround

ANALYTICAL METHOD

AIR: [ ] PCM 7400A 7400B OSHA
[ ] TEM 4HBRA Level II 7402 ISO
Pres/Abs ISO Indirect Preps, Microvac
[ ] AA/ICP ___ Metal ___ RCRA 8
Dust Total Respirable

BULK: [X] PLM Short report, Long report, Point Count, Microvac
[ ] TEM VA Quant Semi-quant
[ ] AA/ICP ___ Metal ___ RCRA 8
Paint Soil Dust Wipe TCLP
(ASTM E 1792 approved wipes only)

WATER: [ ] TEM Drinking Waste Water
[ ] AA Water ___ Metal ___ RCRA 8
Drinking Waste Water

OTHER: [ ] Specify _____

Special Instructions _____

	Client Sample Number	Volume	EM #
1	ES-1	1 BAG	970664
2	SS-1	1 BAG	65
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			

Number of samples received 2 (Use as many additional sheets as needed)

NOTE: RE will analyze incoming samples based upon information received and will not be responsible for errors or omissions in calculations resulting from the inaccuracy of original data. By signing client/company representative agrees that submission of the following samples for requested analysis as indicated on this Chain of Custody shall constitute an analytical services agreement with guaranteed turns of RE 10 days.

Relinquished By [signature] Date/Time 6-9-05 13:40

Laboratory Use Only

Received By [signature] Date/Time 6-9-05 1:40PM

Carrier [signature] Condition of package/custody seal upon receipt [signature]

RESULTS: Contact Page Phone Fax Email Date Time Initials

SPLITS: Authorization By/Time
Analytical Method/Turnaround
Results Due Results Out

Lab Bench/Count Sheets Received By
Time Date

rev 10/26/04

Phone: (303) 964-1986 Fax: (303) 477-4275 WATS: 1-866-RES-ENV (737-4368)
ONLY ALL PAGES NUMBER for PLM/TEM/PCM after hours use only 401-599-2187

Evergreen Analytical Laboratory

June 22, 2005

Jon Spencer
New Horizons Environmental Consultants, Inc
6585 So. Wright St.
Littleton, CO 80127

Lab Work Order: 05-4006
Client Project ID: 1556

Dear Jon Spencer:

Enclosed are the analytical results and invoice for the samples shown in the Laboratory Work Order Summary.

The enclosed data for testing performed at Evergreen Analytical Laboratory (EAL) have been reviewed for quality assurance. A case narrative is included to describe any anomalies associated with the samples or data.

EAL will dispose of all samples one month from the date of this letter. If you want samples returned, please advise us by mail or fax as soon as possible.

A copy of this project report and supporting data will be retained for a period of five years unless we are otherwise advised by you. A document retrieval charge will apply.

Thank you for using the services of Evergreen Analytical. If you have any questions concerning the analytical data, please contact me. Please direct other questions to Client Services.

Sincerely,

Carl Smits
Technical Director of Chemical Analysis

WORK ORDER Summary — Evergreen Analytical, Inc. — 05-4006

Rpt To: Jon Spencer
New Horizons Environmental Consultants, Inc
6585 So. Wright St.
Littleton, CO 80127
(303) 932-2220

Fax To: Jon Spencer

FX: (303) 932-2221

6/9/05 5:18:20 PM

Client Project ID: 1556

QC Level: Level I

Comments:

Sample ID	Client Sample ID	Matrix	Collection Date	Date Received	Test Code	Test Name	Hold	MS	Date Due	Hold Time
05-4006-01A	SS-2	Soil	6/08/05 0000	6/09/05	TVH_S *	8015: TVH-Gasoline	☐	☐	6/14/05	6/22/05
05-4006-01B	SS-2	Soil	6/08/05 0000	6/09/05	6010_S *	6010 Soil/Solids	☐	☐	6/23/05	12/05/05
05-4006-01B	SS-2	Soil	6/08/05 0000	6/09/05	TEH_S *	8015: TEH-Diesel	☐	☐	6/14/05	6/22/05
05-4006-02A	SS-3	Soil	6/08/05 0000	6/09/05	TVH_S *	8015: TVH-Gasoline	☐	☐	6/14/05	6/22/05
05-4006-02B	SS-3	Soil	6/08/05 0000	6/09/05	6010_S *	6010 Soil/Solids	☐	☐	6/23/05	12/05/05
05-4006-02B	SS-3	Soil	6/08/05 0000	6/09/05	TEH_S *	8015: TEH-Diesel	☐	☐	6/14/05	6/22/05

Definitions: * - Test Code has a Select List

CHAIN OF CUSTODY RECORD / ANALYTICAL SERVICES AGREEMENT **

Page 1 of 1

Evergreen Analytical Laboratory Inc.

4036 Youngfield St.
Wheat Ridge, Colorado 80033
(303) 425-6021
FAX (303) 425-6854
(877) 737-4521
e-mail info@evergreenanalytical.com

Report Results by: _____ (Date)*
Standard 2 working weeks ☐
UST Analyses per Fee Schedule ☒
* Rush: ☐ less than 24 hrs, 150% ☐ 1 - 2 work days, 100%
☐ 3 - 5 work days, 50% ☐ 6 - 9 work days, 25%
**Subject to surcharge & exceptions noted in fee schedule.

CLIENT INFORMATION

CLIENT NEW HORIZONS ENV.
ADDRESS 6585 S WRIGHT ST
CITY LITTLETON STATE CO ZIP 80127
PHONE 303/932-2220 FAX 303/932-2221 E-mail _____
REPORT BY ☒ MAIL ☐ FAX ☐ PDF ☐ EDD
REPORT CHROMATOGRAMS ☒ YES ☐ NO
REPORT TO (Mr/Ms) J. SPENCER
INVOICE TO " "
PROJECT I.D. 1556
P.O. # _____ EAL. QUOTE # _____
Sampler: _____ (sign)

NOTE: *Identify Known Hazards Below*

SAMPLE IDENTIFICATION	DATE SAMPLED	TIME	No. of Containers	MATRIX: 1) Drinking Water or 2) Discharge Water or 3) Ground Water (circle one)	MATRIX: Soil / Solid / Air / Gas	MATRIX: Oil / Sludge / Wipe	TCLP VOA/BNA/Pest/Herb/Metals (circle)	Volatile Organics 8260/624 (circle)	Semi-volatile Organics BNA, PAH, PNA 8270/625 (circle)	Pesticides 8081/8270/608 (circle)	PCBs/8082/608/screen (circle)	Herbicides 8151	BTEX 8021/602/8260/MTBE (circle)	TVPH 8015mod. (Gasoline)	TEPH 8015mod. (Diesel)	Total Metals-DW / NPDES / SW846 (circle & list metals below)	Dissolved Metals - DW / SW846 (circle & list metals below)	TRPH 418.1, O&G 413.1, 1664 (circle)	COD, NH_3, TOC, TP (circle)	Alk, BOD, pH, TDS, TSS (circle)	TOTAL PB	For Laboratory use only
SS-2	6/8													X	X						X	01
SS-3	6/8													X	X						X	02
Does this analysis involve property transfer? ☒ Yes or ☐ No														A	B						B	Sample Fraction
Instructions:																						

W.O.# 05-4006
B.O.F.# NA
C/S (O) NA / NA
C/S (I) AM / HD
Cooler Temp. °C 6
Seals Present Y / (N) NA
Seals Intact Y / N
Samples Pres. Y / N / (NA)
Headspace Y / (N) NA
By _____

** **Important Note:** See reverse side hereof for terms and conditions.

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time	Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Date/Time
	6/9/05 14:00		6/9/05 14:00				

Evergreen Analytical, Inc.

Date: *20-Jun-05*

Client Project ID: 1556
Lab Order: 05-4006

CASE NARRATIVE

SAMPLE RECEIVING

Sample(s) were hand delivered to the laboratory by the client.
Custody seals were not present.
The temperature of the sample(s) upon arrival was 6 °C.
Sample(s) were received in good condition, in the proper container, and within holding times.
VOC sample(s) were received with no headspace present. JD

QUALITY ASSURANCE

Analyses performed on samples in this work order meet the requirements of the EAL Quality Assurance Program. Analyses of RCRA samples meet the requirements of NELAC and Utah Rule R444-14.

CLIENT SERVICES

There are no anomalies to report. AMU

METALS ANALYSIS

Method 6010: There are no anomalies to report. WKH

GAS CHROMATOGRAPHY

Method TVH_S: There are no anomalies to report. JK

Method TEH_S: There are no anomalies to report. CS

Evergreen Analytical, Inc.

4036 Youngfield Street, Wheat Ridge, Colorado 80033-3862
(303) 425-6021

Client Sample ID: SS-2
Client Project ID: 1556
Date Collected: 6/8/05
Date Received: 6/9/05

Lab Work Order 05-4006
Lab Sample ID: 05-4006-01A
Sample Matrix: Soil

TOTAL VOLATILE HYDROCARBONS

Method: SW8015M **Prep Method: SW5035A**

Date Prepared: 6/10/05
Date Analyzed: 6/10/05
Lab File ID: TVB30610\022F
Method Blank: MB3061005
Dilution Factor: 5

Analytes	CAS Number	Result		LQL	Units
TVH-Gasoline	86290-81-5	U		1.0	mg/Kg
Surr: 1,2,4-Trichlorobenzene (S)	120-82-1	62	QC Limits:	56-209	%REC

Analyst

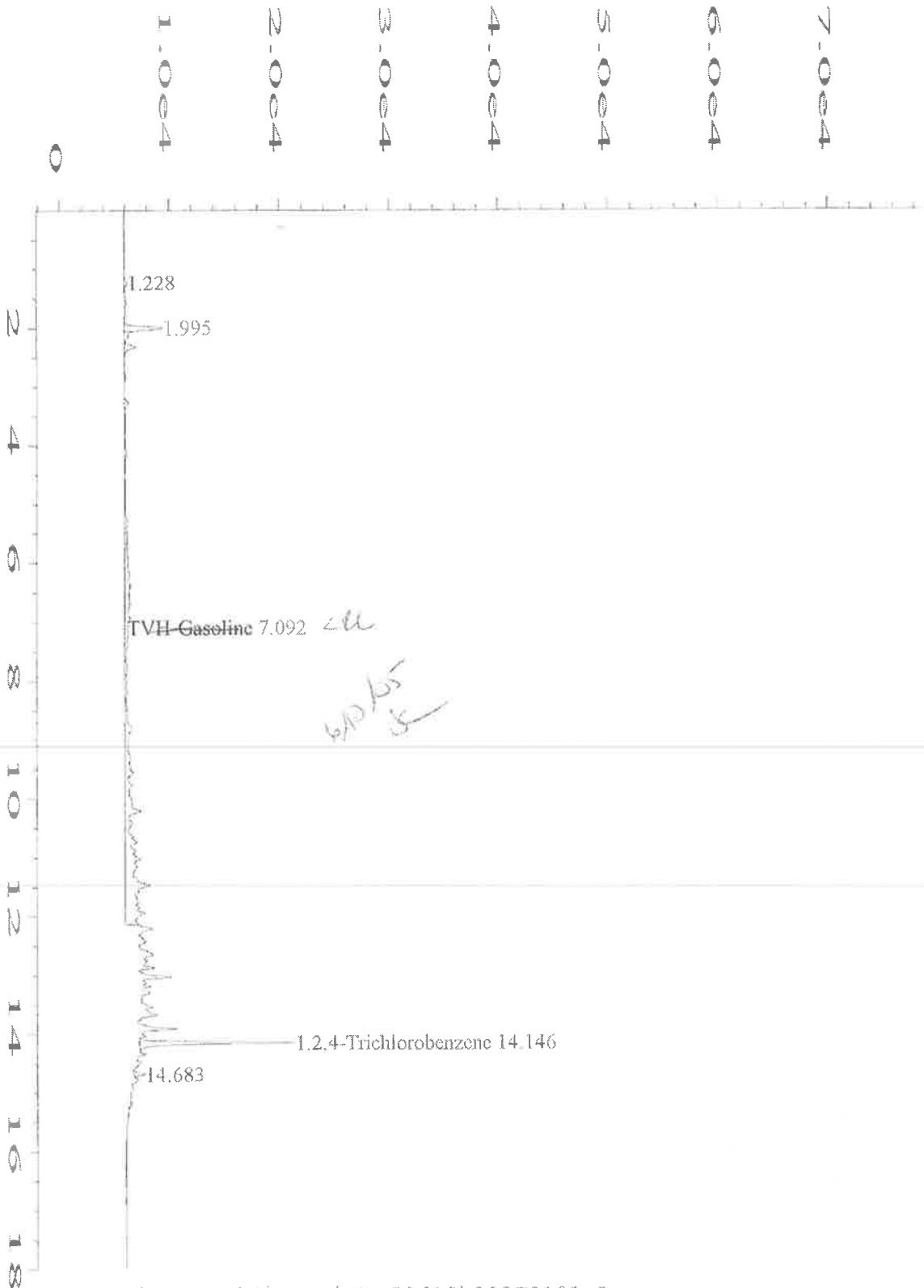
Approved

Notes: Total Xylenes consist of three isomers, two of which co-elute. The Xylene RL is for a single peak. Confirmation analysis was not performed.

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL)

Definitions: LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 6/12/05



Data File Name : C:\HPCHEM\3\DATA\TVB30610\022F0101.D
Operator : JMELSON
Instrument : TVHBTEX3
Sample Name : 05-4006-01A
Run Time Bar Code:
Acquired on : 10 Jun 05 10:40 PM
Report Created on: 10 Jun 05 10:58 PM
Last Recalib on : 19 MAY 05 08:30 AM
Multiplier : 1
Sample Info : SAMP
DF=5

Page Number : 1
Vial Number : 22
Injection Number : 1
Sequence Line : 1
Instrument Method: TV30518.MTH
Analysis Method : TV30518.MTH
Sample Amount : 0
ISTD Amount :

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(303) 425-6021

Client Sample ID: SS-3
Client Project ID: 1556
Date Collected: 6/8/05
Date Received: 6/9/05

Lab Work Order 05-4006
Lab Sample ID: 05-4006-02A
Sample Matrix: Soil

TOTAL VOLATILE HYDROCARBONS

Method: SW8015M **Prep Method: SW5035A**

Date Prepared: 6/10/05
Date Analyzed: 6/10/05
Lab File ID: TVB30610\023F
Method Blank: MB3061005
Dilution Factor: 5

Analytes	CAS Number	Result		LQL	Units
TVH-Gasoline	86290-81-5	U		1.0	mg/Kg
Surr: 1,2,4-Trichlorobenzene (S)	120-82-1	62	QC Limits:	56-209	%REC

Analyst

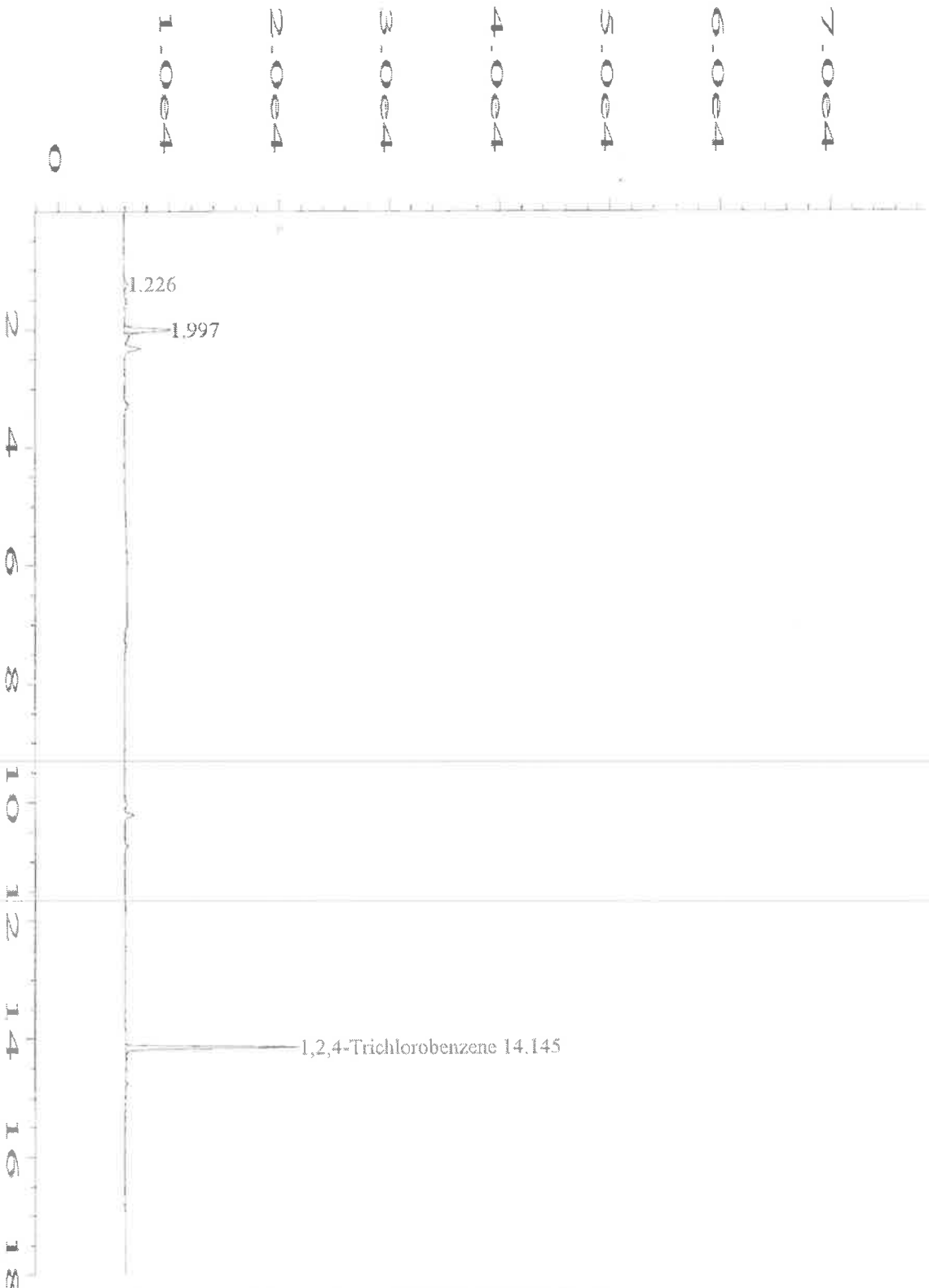
Approved

Notes: Total Xylenes consist of three isomers, two of which co-elute. The Xylene RL is for a single peak. Confirmation analysis was not performed.

Qualifiers:
B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value.Value exceeds calibration range
H - Sample exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL)

Definitions:
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 6/12/05



Data File Name	: C:\HPCHEM\3\DATA\TVB30610\023F0101.D		
Operator	: JMELSON	Page Number	: 1
Instrument	: TVHBTEX3	Vial Number	: 23
Sample Name	: 05-4006-02A	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 1
Acquired on	: 10 Jun 05 11:17 PM	Instrument Method	: TV30518.MTH
Report Created on	: 10 Jun 05 11:35 PM	Analysis Method	: TV30518.MTH
Last Recalib on	: 19 MAY 05 08:30 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:
Sample Info	: SAMP		
	DF=5		

Evergreen Analytical, Inc.

Date: *12-Jun-05*

Work Order: 05-4006
Client Project ID: 1556

ANALYTICAL QC SUMMARY REPORT

BatchID: R17512

Sample ID: MB3061005	SampType: MBLK	TestCode: TVH_S	Run ID: TVHBTEX3_050610B	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: R17512	TestNo: SW8015M	FileID: TVB30610\003F	Analysis Date: 6/10/05	SeqNo: 324132

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TVH-Gasoline	U	1.0									
Surr: 1,2,4-Trichlorobenzene (S)	440.4	0	500	0	88.1	56	209	0	0		

Sample ID: LCS3061005	SampType: LCS	TestCode: TVH_S	Run ID: TVHBTEX3_050610B	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: R17512	TestNo: SW8015M	FileID: TVB30610\004F	Analysis Date: 6/10/05	SeqNo: 324135

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TVH-Gasoline	10.29	1.0	11	0	93.5	70	130	0	0		
Surr: 1,2,4-Trichlorobenzene (S)	590.7	0	500	0	118	56	209	0	0		

Sample ID: LCSD3061005	SampType: LCSD	TestCode: TVH_S	Run ID: TVHBTEX3_050610B	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: R17512	TestNo: SW8015M	FileID: TVB30610\005F	Analysis Date: 6/10/05	SeqNo: 324137

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TVH-Gasoline	10.03	1.0	11	0	91.2	70	130	10.29	2.51	30	
Surr: 1,2,4-Trichlorobenzene (S)	571	0	500	0	114	56	209	0	0	0	

Sample ID: 05-3994-01CMS	SampType: MS	TestCode: TVH_S	Run ID: TVHBTEX3_050610B	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: R17512	TestNo: SW8015M	FileID: TVB30610\009F	Analysis Date: 6/10/05	SeqNo: 324145

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TVH-Gasoline	9.49	1.0	11	0	86.3	61	117	0	0		
Surr: 1,2,4-Trichlorobenzene (S)	492.2	0	500	0	98.4	56	209	0	0		

Sample ID: 05-3994-01CMSD	SampType: MSD	TestCode: TVH_S	Run ID: TVHBTEX3_050610B	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: R17512	TestNo: SW8015M	FileID: TVB30610\010F	Analysis Date: 6/10/05	SeqNo: 324146

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
TVH-Gasoline	9.735	1.0	11	0	88.5	61	117	9.49	2.55	30	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
H - Sample exceeded analytical holding time

Print Date: 6/12/05

Work Order: 05-4006
Client Project ID: 1556

ANALYTICAL QC SUMMARY REPORT

BatchID: R17512

Sample ID: 05-3994-01CMSD	SampType: MSD	TestCode: TVH_S	Run ID: TVHBTEX3_050610B	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: R17512	TestNo: SW8015M	FileID: TVB30610\010F	Analysis Date: 6/10/05	SeqNo: 324146

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: 1,2,4-Trichlorobenzene (S)	535.6	0	500	0	107	56	209	0	0	0	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
H - Sample exceeded analytical holding time

Print Date: 6/12/05

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Client Project ID 1556
Date Received: 6/9/05

Lab Order: 05-4006
Date Prepared: 6/14/05
Units: mg/Kg

6010 SOIL/SOLID
Lead

Method: SW6010 **Prep Method: SW3050**

Lab ID	Client ID	Matrix	Date Collected	Date Analyzed	Results	LQL	DF
05-4006-01B	SS-2	Soil	6/8/05	6/15/05	380	6.0	1
05-4006-02B	SS-3	Soil	6/8/05	6/15/05	73	5.9	1

Analyst

Approved

Qualifiers:
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H - Sample exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL)

Definitions:
DF - Dilution Factor
PF - Prep Factor
LQL - Lower Quantitation Limit

Print Date: 6/16/05

Evergreen Analytical, Inc.

Date: *16-Jun-05*

Work Order: 05-4006
Client Project ID: 1556

ANALYTICAL QC SUMMARY REPORT

TestCode: 6010_S

Sample ID: **MB-7489**	SampType: **MBLK**	TestCode: **6010_S**	Run ID: **ICP_050616A**	Prep Date: **6/14/05**	Units: **mg/Kg**
	Batch ID: **7489**	TestNo: **SW6010**	FileID: **061505PM**	Analysis Date: **6/15/05**	SeqNo: **325866**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	U	7.3									

Sample ID: **LCS-7489**	SampType: **LCS**	TestCode: **6010_S**	Run ID: **ICP_050616A**	Prep Date: **6/14/05**	Units: **mg/Kg**
	Batch ID: **7489**	TestNo: **SW6010**	FileID: **061505PM**	Analysis Date: **6/15/05**	SeqNo: **325871**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	140.4	7.3	142	1.429	98.9	80.3	119.7	0	0		

Sample ID: **05-4026-01AMS**	SampType: **MS**	TestCode: **6010_S**	Run ID: **ICP_050616A**	Prep Date: **6/14/05**	Units: **mg/Kg**
	Batch ID: **7489**	TestNo: **SW6010**	FileID: **061505PM**	Analysis Date: **6/15/05**	SeqNo: **325874**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	172.6	6.0	163.9	38.21	82	75	125	0	0		

Sample ID: **05-4026-01AMSD**	SampType: **MSD**	TestCode: **6010_S**	Run ID: **ICP_050616A**	Prep Date: **6/14/05**	Units: **mg/Kg**
	Batch ID: **7489**	TestNo: **SW6010**	FileID: **061505PM**	Analysis Date: **6/15/05**	SeqNo: **325875**

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Lead	172.1	6.0	163.9	38.21	81.7	75	125	172.6	0.283	20	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
H - Sample exceeded analytical holding time

Print Date: 6/16/05

Evergreen Analytical, Inc.

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(303) 425-6021

Lab Order: 05-4006
Client Project ID: 1556
Matrix: Soil

Date Received: 6/9/05
Date Prepared: 6/10/05
Prep Batch ID: 7476
Units: mg/Kg

Total Extractable Hydrocarbons
Diesel Fuel (No. 2)

Method: SW8015M **Prep Method: SW3550A**

Lab ID	Client Sample ID	File ID	Date Collected	Date Analyzed	DF	Surr REC	Sample Results	LQL
05-4006-01B	SS-2	FID30616\030R	6/8/05	6/17/05	1	80%	< U	14
05-4006-02B	SS-3	FID30617\012R	6/8/05	6/17/05	1	91%	54	14

Surrogate QC Limits 20-167 %REC Surr: TBB

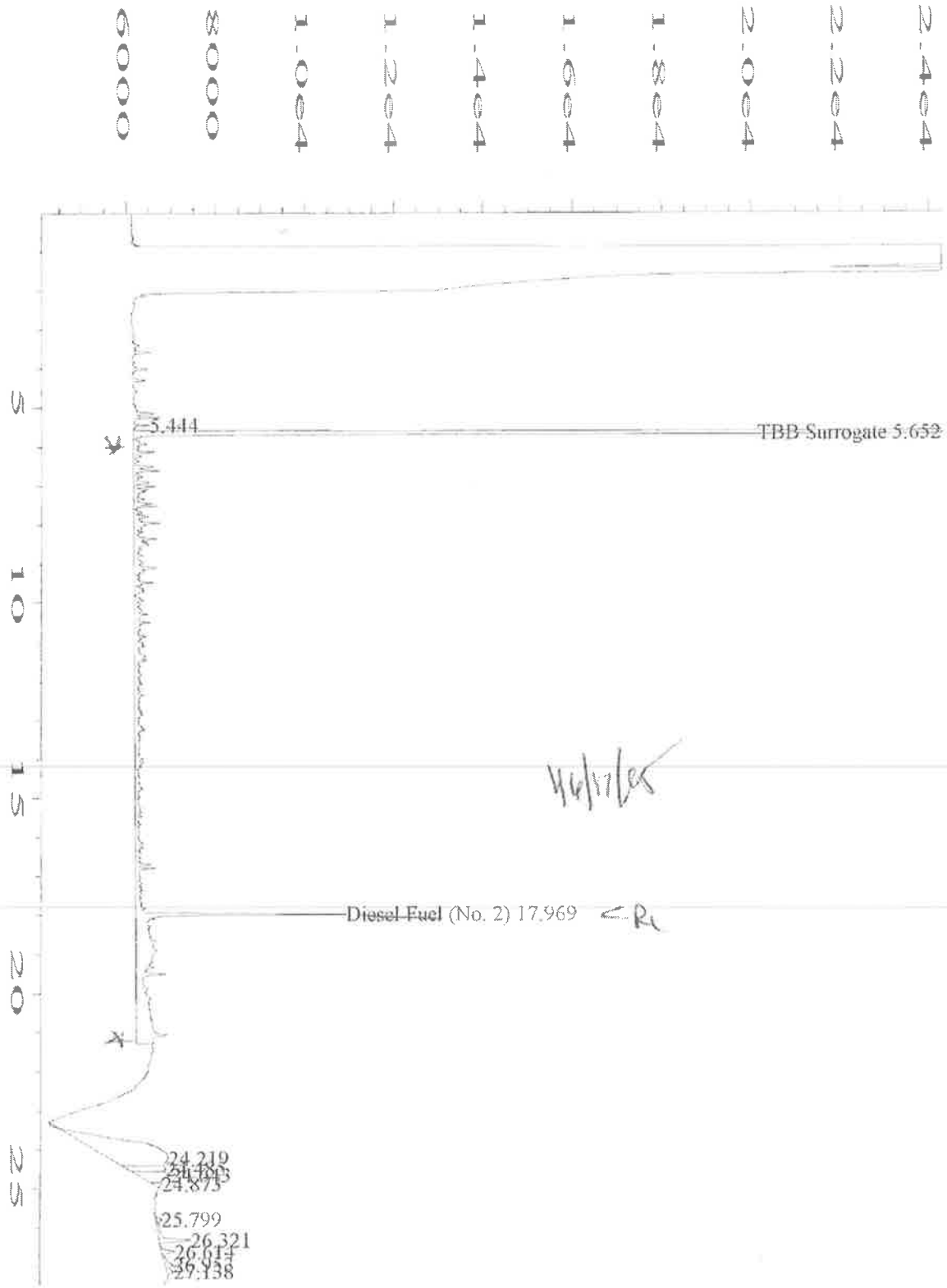
Analyst

Approved

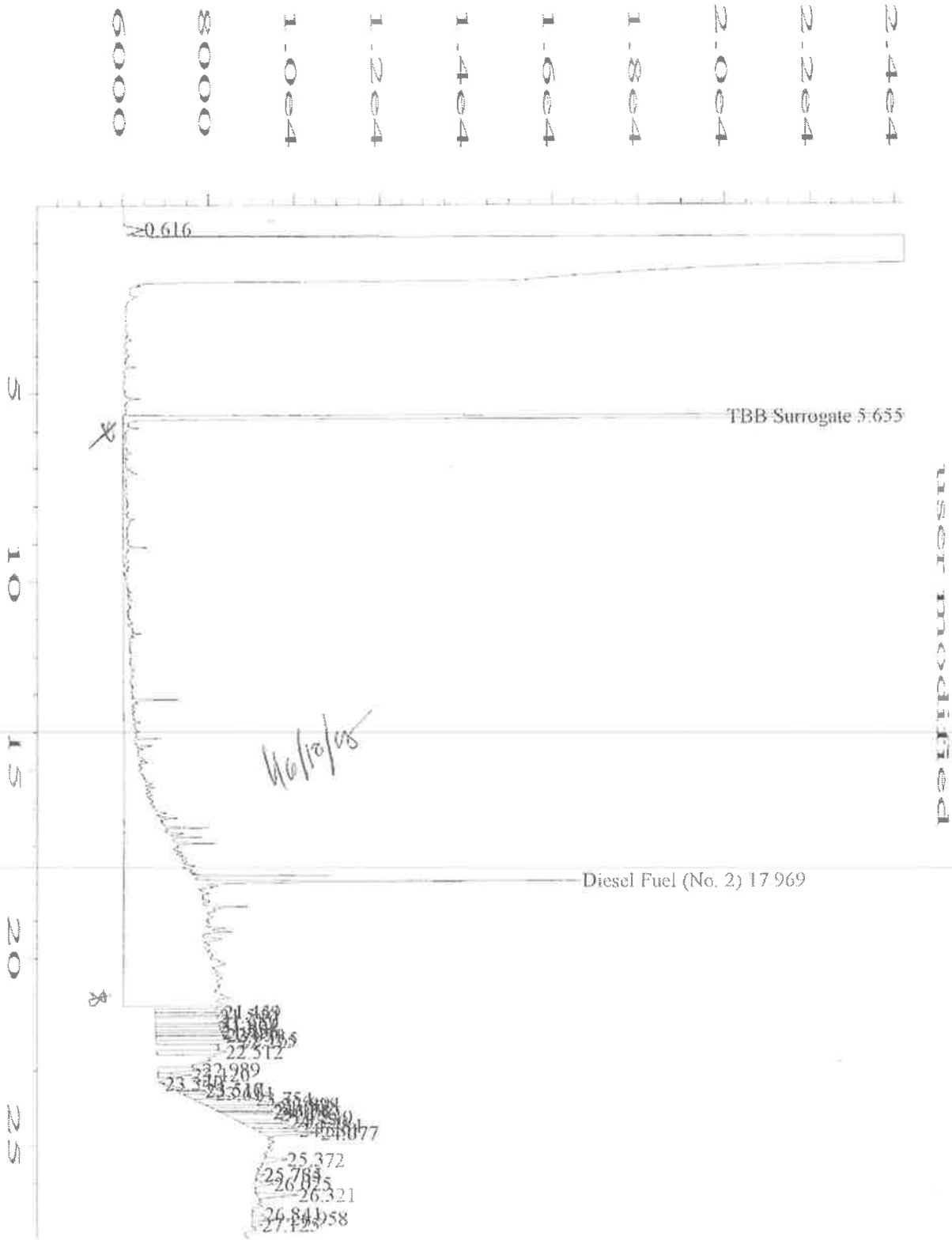
Qualifiers: B - Analyte detected in the associated Method Blank, value not subtracted from result
E - Extrapolated value. Value exceeds calibration range
H - Sample exceeded analytical holding time
J - Indicates an estimated value when the compound is detected, but is below the LQL
S - Spike Recovery outside accepted limits
U - Compound analyzed for but not detected
X - See case narrative
* -Value exceeded the Maximum Contamination Level (MCL)

Definitions: DF - Dilution Factor
LQL - Lower Quantitation Limit
Surr - Surrogate

Print Date: 6/20/05



Data File Name	: C:\HPCHEM\1\DATA\FID30616\030R0101.D		
Operator	: csharp	Page Number	: 1
Instrument	: FID3	Vial Number	: 30
Sample Name	: 05-4006-01B	Injection Number	: 1
Run Time Bar Code:		Sequence Line	: 1
Acquired on	: 17 Jun 05 03:26 AM	Instrument Method	: FID3BASE.MTH
Report Created on	: 17 Jun 05 11:09 AM	Analysis Method	: FD3R0616.MTH
Last Recalib on	: 17 JUN 05 09:09 AM	Sample Amount	: 0
Multiplier	: 1	ISTD Amount	:



Data File Name : C:\HPCHEM\1\DATA\FID30617\012R0101.D
Operator : csharp
Instrument : FID3
Sample Name : 05-4006-02B
Run Time Bar Code:
Acquired on : 17 Jun 05 11:51 PM
Report Created on: 18 Jun 05 06:35 PM
Last Recalib on : 17 JUN 05 09:09 AM
Multiplier : 1

Page Number : 1
Vial Number : 12
Injection Number : 1
Sequence Line : 1
Instrument Method: FID3BASE.MTH
Analysis Method : FD3R0616.MTH
Sample Amount : 0
ISTD Amount :

Evergreen Analytical, Inc.

Date: *20-Jun-05*

Work Order: 05-4006
Client Project ID: 1556

ANALYTICAL QC SUMMARY REPORT

BatchID: 7476

Sample ID: MB-7476	SampType: MBLK	TestCode: TEH_S	Run ID: FID3_050610A	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: 7476	TestNo: SW8015M	FileID: FID30610\006R	Analysis Date: 6/10/05	SeqNo: 324759

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Fuel (No. 2)	U	14									
Surr: TBB	39.63	0	66.67	0	59.4	20	167	0	0		

Sample ID: LCS-7476	SampType: LCS	TestCode: TEH_S	Run ID: FID3_050610A	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: 7476	TestNo: SW8015M	FileID: FID30610\007R	Analysis Date: 6/10/05	SeqNo: 324760

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Fuel (No. 2)	601.5	14	666.7	0	90.2	56	130	0	0		
Surr: TBB	52.96	0	66.67	0	79.4	20	167	0	0		

Sample ID: 05-3998-01BMS	SampType: MS	TestCode: TEH_S	Run ID: FID3_050610A	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: 7476	TestNo: SW8015M	FileID: FID30610\009R	Analysis Date: 6/10/05	SeqNo: 324762

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Fuel (No. 2)	526.2	14	666.7	0	78.9	56	130	0	0		
Surr: TBB	41.04	0	66.67	0	61.6	20	167	0	0		

Sample ID: 05-3998-01BMSD	SampType: MSD	TestCode: TEH_S	Run ID: FID3_050610A	Prep Date: 6/10/05	Units: mg/Kg
	Batch ID: 7476	TestNo: SW8015M	FileID: FID30610\010R	Analysis Date: 6/10/05	SeqNo: 324763

Analyte	Result	LQL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel Fuel (No. 2)	549.2	14	664.7	0	82.6	56	130	526.2	4.27	21	
Surr: TBB	43.02	0	66.47	0	64.7	20	167	0	0	0	

Qualifiers:

ND - Not Detected at the Reporting Limit
J - Analyte detected below quantitation limits
S - Spike Recovery outside accepted recovery limits
R - RPD outside accepted recovery limits
B - Analyte detected in the associated Method Blank
H - Sample exceeded analytical holding time

Print Date: 6/20/05

APPENDIX C

Resumes of Environmental Professional(s) Conducting the Phase II Inventory

JONATHAN R. SPENCER, P.E., DEE

Board Certified Environmental Engineer / Senior Project Manager

PROFESSIONAL PROFILE

Mr. Spencer has more than 24 years of environmental engineering experience in the areas of remedial design, remedial construction management, process evaluation, regulatory compliance, litigation support, environmental audits, hazardous waste investigations, and water/wastewater management. In addition to founding *New Horizons Environmental Consultants, Inc.,* his experience includes management responsibility and technical oversight for two national environmental engineering consulting firms. He has served as project manager and principal engineer for a wide range of environmental engineering and remedial action projects in the United States and abroad. Mr. Spencer is an honors graduate from *Allegheny College* and subsequently received an M.S. degree in Environmental Systems Engineering from *Clemson University*. He is a licensed professional engineer in several states, a recipient of the *Danforth Leadership Award*, and is Board Certified by the American Academy of Environmental Engineers.

PROJECT EXPERIENCE

Hazardous / Radiological Waste Investigations, Audits, and Risk Assessments

- Developed and implemented sampling and analytical procedures for characterization of surface and subsurface radionuclide contamination at a former mine research facility. A gamma survey was performed and cores were analyzed for gross alpha / gross beta and for U / Th decay series radionuclides by gamma spectroscopy.
- Conducted feasibility and cost analyses for various synthetic organic chemical manufacturers evaluating the feasibility of their participation in EPA's Early Reduction Program for the emission of various Hazardous Air Pollutants under the Clean Air Act Amendments of 1990.
- Performed the preliminary environmental audit of baggage handling facilities and airplane service / maintenance activities at Mexico City International Airport.
- Performed numerous hazardous material site assessments, regulatory compliance audits, and property transfer evaluations for industrial and commercial clients.
- Provided a lead-based paint investigation and subsequent risk analysis at a housing urban development site with lead-contaminated building components.
- Conducted a health risk analysis for an elementary school which had been proposed to be located downwind of an existing municipal incinerator.
- Provided numerous sampling and on-site stabilization and/or removal programs for lead-contaminated soils in residential, industrial, and public school settings.

Remedial Design, Process Engineering, and Construction Management

- Conducted engineering design and construction management for the abandonment and closure-in-place of a brick lateral sewer contaminated with various poly-aromatic hydrocarbons (PAHs) beneath a dioxin-contaminated chemical site.
- Managed the construction of a 10-acre chemical distribution system designed to deliver a chemical reductant to dozens of individual "treatment cells" cells in order to bind uranium and molybdenum to subsurface soils located within the confines of a former tailings pond.

- Used an iterative, computer-based approach to design and optimize a multi-layered, composite cap over lead-contaminated soils which included a geo-synthetic clay liner (GCL), geo-membranes, a soil cover, and vegetative support.
- Designed and managed a remedial action program at an abandoned hide processing facility in western Iowa including a site-wide drum inventory, field screening characterization of waste streams, and decontamination and removal of contaminated process equipment and debris.
- Conducted engineering design and construction management for the demolition and disposal of 15 radiologically-contaminated buildings including the development of specific dismantling procedures, ACM removal, construction of decontamination pads, and demolition oversight.
- Managed installation of a Soil Vapor Extraction (SVE) system and associated groundwater interceptor network at a petroleum contaminated site in central WY.
- Provided design oversight for mobilization, staging, and stabilization / solidification of radiologically contaminated soils, placement into an on-site repository, and construction of a permanent cover system.
- Developed specifications for the removal and reclassification of PCB transformers and managed construction for decontamination of a warehouse contaminated with PCB transformer oils.
- Conducted engineering design and construction management for the emergency removal of lead-contaminated sediments in a rural creek bed using cofferdams and sand-filter beds.
- Conducted engineering design and construction management for the decontamination of a 60,000 ft^2 pesticide formulation plant in accordance with NJ Environmental Cleanup Responsibility Act requirements to allow subsequent commercial use of the buildings.
- Designed and managed a RI/FS program for a midwestern solvent transfer terminal contaminated with dioxins, volatile organics, and polynuclear aromatic hydrocarbons (PNAs).
- Conducted engineering design and construction management for the emergency removal of a leaking UST containing pentachlorophenol and tar sludges at a dioxin-contaminated site.
- Managed the technical review of work plans for metal speciation and soil sampling protocols at a Superfund site contaminated with mine tailings and primary smelter emissions.
- Designed and installed a shotcrete/membrane liner system used to reinforce a major storm water trunk line contaminated with dioxin and semivolatile organics.
- Provided design engineering services for a full-scale bioremediation system for the in-situ treatment of soils contaminated with a variety of VOCs and TPHs.
- Conducted engineering design and construction management for on-site stabilization and/or removal of lead-contaminated soils in residential, industrial, and public school settings.
- Managed numerous emergency response incidents involving industrial and transportation-related hazardous materials spills.

Litigation Support and Regulatory Compliance

- Performed a technical assessment / cost review of a remedial response program conducted by EPA at a former lead smelter site. Based on the review, it was concluded that program deficiencies resulted in per property remedial costs which were 70% above national norms.
- Performed a technical review of EPA oversight cost claims under their ARCS, REM, and TES contracts resulting in $248,000 in cost savings to the potentially responsible parties (PRPs).
- Prepared an independent remedial cost estimate and provided follow-up expert witness testimony for PRPs at a site involving industrial and residential soil-lead contamination.
- Designed and managed the evaluation of process modifications to correct violations involving multi-phased hazardous waste emissions from a cane sugar mill in Zacatepec, Mexico.

- Administered a multisite cooperative agreement with USEPA for hazardous waste sites in SC. Program responsibilities included reviewing engineering plans and specifications and oversight of remedial response activities and hydrogeological investigations at various sites.
- Developed and conducted various training courses including OSHA Hazardous Waste Operations and Emergency Response courses per 29 CFR 1910 and waste minimization seminars for industrial clients.

Water and Wastewater Management

- Designed and managed an innovative land treatment system to manage wastewater treatment needs for an environmentally sensitive high-density growth area along the eastern coast.
- Administered EPA's wastewater construction grants program for various municipalities in SC. Program responsibilities included a review of facility plans for evaluation of economic analyses, environmental impacts, infiltration/inflow, land use planning, population projections, stream analyses, and waste load determinations.

BUSINESS MANAGEMENT EXPERIENCE

- Founder and President of New Horizons Environmental Consultants with corporate responsibility for business development, financial performance, and oversight of engineering activities. Company has demonstrated increasing sales and profitability each year since its' inception.
- Managed growth of Earth Sciences Consultants / AWS Remediation's non-Shattuck time-billings revenues by 1,100% in initial 12-month period with significant market enhancement.
- Managed growth with REACT Environmental Engineers from 18 employees with annual sales of $1.5 million to a staff of 40 with annual revenues of $4 million.

EDUCATION

- Postgraduate coursework, Washington University, St. Louis, MO
- M.S., *Environmental Systems Engineering*, Clemson University, Clemson, SC
- B.S., *Mathematics / Environmental Biology*, Allegheny College, Meadville, PA
- SBDC's Colorado *Leading Edge Entrepreneurial Training Program*, Lakewood, CO
- OSHA 40-Hour *Hazardous Waste Site Activity* Training and Annual 8-Hour Refreshers
- OSHA 24-Hour *Hazardous Material Emergency Response* Training
- AHERA *Asbestos Supervisor* Training
- MSHA *New Miner* Training
- *Lead Awareness* Training

REGISTRATIONS AND CERTIFICATIONS

- *Professional Engineer*: Colorado, Missouri
- *Board Certified Environmental Engineer*, American Academy of Environmental Engineers
- Danforth Leadership Award

PROFESSIONAL AFFILIATIONS

- American Society of Civil Engineers (ASCE)
- American Academy of Environmental Engineers (AAEE)
- *Chi Epsilon*, National Civil Engineering Honor Society