EHS–International, Inc.

US GENERAL SERVICES ADMINISTRATION FEDERAL CENTER SOUTH UNDERGROUND STORAGE TANK ASSESSMENT FINAL REPORT

Prepared for:
US General Services Administration
400 15th Street SW
Auburn, WA 98001-6599

Prepared by:
EHS – International, Inc.
13228 NE 20th Street, Suite 100
Bellevue, Washington 98005

October 5, 2011

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UNDERGROUND STORAGE TANK ASSESSMENT
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1 INTRODUCTION

This final report documents a Underground Storage Tank Assessment (UST Assessment) at the Federal Center South facility. The UST Assessment was conducted for the U.S. General Services Administration (GSA) in an effort to determine the best solution to eliminate the potential environmental liability posed by three out of use USTs within the Federal Center South facility. Mr. Michael Levine of the US General Services Administration gave EHSI authorization to proceed with the UST Assessment project on August 18, 2011. The Federal Center South facility is located at 4735 E Marginal Way in Seattle, Washington (Figure 1).

1.1 INVESTIGATION PURPOSE

The UST Assessment was conducted to investigate the best mitigation method for the potential environmental liability associated with three, on-site, heating oil USTs.

1.2 PROJECT OBJECTIVES

The objectives of the UST Assessment were to:

- Review existing building as-built documentation to confirm the size of the USTs and to determine the nature of existing infrastructures (e.g., utilities, fill ports, vent lines) within the tank locations and their environs;
- Assess the site conditions within the UST location to determine access options to drain and clean the USTs;
- Test the content of the tanks for potential contaminants;
- Attempt to determine the quantity of remaining fluids in the USTs; and
- Prepare a cost estimate for temporary closure of the three site USTs.

1.3 REPORT ORGANIZATION

This report begins with a description of the Federal Center South property. A discussion of site conditions and field observations follow the Summary of Findings. Subsequent sections present the elements of EHSI's UST Assessment, regulatory review, and recommendations. Two figures and three supporting appendices follow the main text. Figure 1 is the Site Location Map and Figure 2 is the Site Plot Plan with the estimated UST locations. Appendix A contains select photographs of the Federal Center South property taken during the site visit phase of work, a copy of the analytical report is provided in Appendix B, and a summary costs for temporary closure the USTs is provided in Appendix C.

1.4 ASSESSMENT METHODS

Assessment methods consisted of a site visit, a review of existing as-built documentation, sampling and analyses of tank contents, a site walk with UST Services Contractors, regulatory review, a determination of the best practice for UST temporary closure, and formulation of a cost estimate for temporary closure.

1.5 TANK CONTENT TESTING

On September 7, 2001 EHSI field personnel collected fluid samples from the three Federal Center South USTs. The fluid samples were analyzed for total petroleum hydrocarbons as diesel and motor oil by test method NWTPH- Diesel Extended (Dx), for total Resource Conservation and Recovery Act (RCRA) regulated metals by EPA Test Method 200.8, for semivolatile compounds by EPA Test Method 8270D SIM, and polychlorinated biphenyls

(PCBs) by EPA Test Method 8082A.

2 ASSESSMENT RESULTS

2.1 PROPERTY OVERVIEW

The layout of the three underground fuel tanks and vicinity are shown on Figure 2. The tanks will be referred in this report (from north to south) as UST 1, UST 2, and UST 3. The tanks are located east of Building 1206, within the southeast corner the Federal Center South facility. It is assumed that the tanks were installed at the same time the surrounding buildings were constructed, sometime in the late 1930s. The boilers located in the southeastern corner of Building 1201 originally operated on Bunker C heating oil supplied from these tanks and we speculate that the boiler fuel was converted to heating oil (diesel) at some unknown time during the history of the site; currently the boilers operate on natural gas. It is assumed that the tanks were last used sometime in the late 1970s or early 1980s.

Two abandoned rail spurs are located east of the tanks. Portions of the parking lot and driveway west and northwest of the tanks are covered by a 9-inch thick concrete slab, topped with asphalt pavement; the remaining parking area to the northeast is asphalt-paved. Two underground vaults, each covered by a steel plate, observed in the parking area north of Building 1206 contain valves associated with the water fire hydrant lines.

2.2 REVIEW OF AVAILABLE DOCUMENTATION

The Federal Center South facilities manager, Mr. John Mutton, provided EHSI with a copy of a section of an as-built drawing that shows the location of the USTs. The as-built drawing shows that the USTs are located within the southeast portion of the Federal Center South property.

2.3 USTs DESCRIPTION

The three tanks are situated side by side, with their long axes oriented east-west. Concrete vaults containing the vent piping system are situated on top of the west end of each tank, and concrete vaults containing the fill ports are situated on top of the east end of each tank. Measurements taken from inside these vaults indicate that the top of each tank is situated approximately 4 feet below ground surface. The switch box associated with these tanks is located in an underground vault, immediately southwest of UST 3. Pipelines from each tank converge at one of two underground concrete vaults, each containing a fuel pump system. The pipelines delivered heating oil from the tanks to the boiler room in Building 1201 through piping located in an underground utility tunnel that connects buildings 1201 and 1206. Potential underground utilities in the vicinity of the tanks included a water line for the existing fire hydrant and a stormwater drainage system. Each tank has a capacity of 30,000 gallons. Based on measurements observed on a dipstick located inside the vent vault, Tank 1 contains 8.25 feet of liquid. UST 2 has 1-foot and UST 3 has 0.6-foot of black hydrocarbon sludge.

Typically Bunker C USTs had a smaller starter tank used to supply fuel to a heating source that would heat the Bunker C in order to lower the viscosity of the fuel and allow it to flow. EHSI found an extraneous fill port on the north side of UST 1. Review of as-built drawings did not show the presence of a starter tank for the former Bunker C storage system.

2.4 REGULATORY REVIEW

The City of Seattle Fire Department Fire Prevention Division (SFD) regulates all UST

closure activities within the City of Seattle. Based on the 30,000-gallon size of the Federal Center South USTs, the USTs meet Washington State UST Law (Chapter 173-360 WAC) temporary closure requirements. The Washington State UST Law requirements for temporary closure of a UST are as follow:

- Maintain UST system corrosion protection;
- Maintain UST system release detection;
- Clean the tank of product, or;
- Reduce the volume of product to one-inch of residue or 0.3 percent by weight of the total capacity of the UST system; and
- Leave vent line open and functioning; and cap and secure all other lines.

2.5 UST CONTENT ANALYSES RESULTS

Analytical results for the Federal Center South tank content samples indicated that the fluids in the tanks are primarily diesel-range TPH (C_{10}. C_{25}) with minor motor oil-range TPHs (C_{25}-C_{36}) fractions in UST 2 and UST 3. Chromium in a concentration of 2.77 mg/kg was detected in the fuel within UTS 1. However, no other RCRA regulated metals were detected in the fuel stored in the three USTs. Naphthalene was present in the fuel within the three USTs. No other semivolatiles were detected in the fuel within the three USTs. The fuel in the three USTs was free of PCB aroclors. A copy of the laboratory analytical report and chain-of-custody form are provided in Appendix B.

3 USTs TEMPORARY CLOSURE ESTIMATE

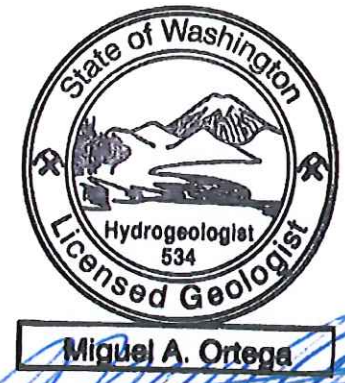
Based on site observation, we estimate the construction cost for draining, cleaning, and capping all existing supply/return lines of the Federal Center South USTs is $30,650. The UST Services Contractor will credit the US General Services Administration a fuel sale fee of $.50 per gallon of useable heating oil from the USTs. Additional anticipated costs for non-construction USTs temporary closure (i.e., site supervision, regulatory permitting, and Final Report) is $6,520. A summary of the UST Services for Temporary Clouse costs is provided in Appendix C.

4 RECOMMENDATION

Based on the results of our UST Assessment, we have determined that the most expedient and cost effective method to eliminate the environmental liability presented by the Federal Center South USTs is to drain, clean, and cap all existing supply/return lines to the USTs. The surplus fuel should be recycled and GSA should receive a credit from the selected UST Services Contractor for the recycled fuel. Once the USTs are drained of fuel and cleaned, they will have Temporary Closure status, and could remain out of service for a period of one year. GSA will need to either remove or abandon in place the USTs after one year's time under the Temporary Closure status.

5 SIGNATURE PAGE

This UST Assessment was prepared by the undersigned.



Miguel A. Ortega, L.G.
State of Washington License # 534

5 October 2011
Date

6 PROJECT LIMITATIONS

The conclusions presented in report are professional opinions based upon our visual observations and physical testing at the Federal Center South property. This report is intended exclusively for the purpose outline herein and at the site location and project indicated. This report is for the sole use of our client, the US General Services Administration. Opinions and conclusions presented herein apply to site conditions existing at the time of execution of our UST Assessment and do not necessarily apply to future changes or other prior conditions at the site of which EHSI is not aware and has not had the opportunity to evaluate. The scope of services performed in execution of this UST Assessment may not be appropriate to satisfy the needs of other users, and any use or re-use of the document or the findings, conclusions, or recommendations presented is at the sole risk of the said user.

EHSI's objective is to perform our work with care, exercising the customary thoroughness and competence of environmental consulting professionals in the relevant disciplines. Furthermore, we carried out our services in accordance with the standard for professional services by a consulting firm at the time those services were rendered. No expressed or implied representation or warranty is included or intended in our report except that our work was performed within the limits prescribed by our client, and with the customary thoroughness and competence of our profession.

FIGURES

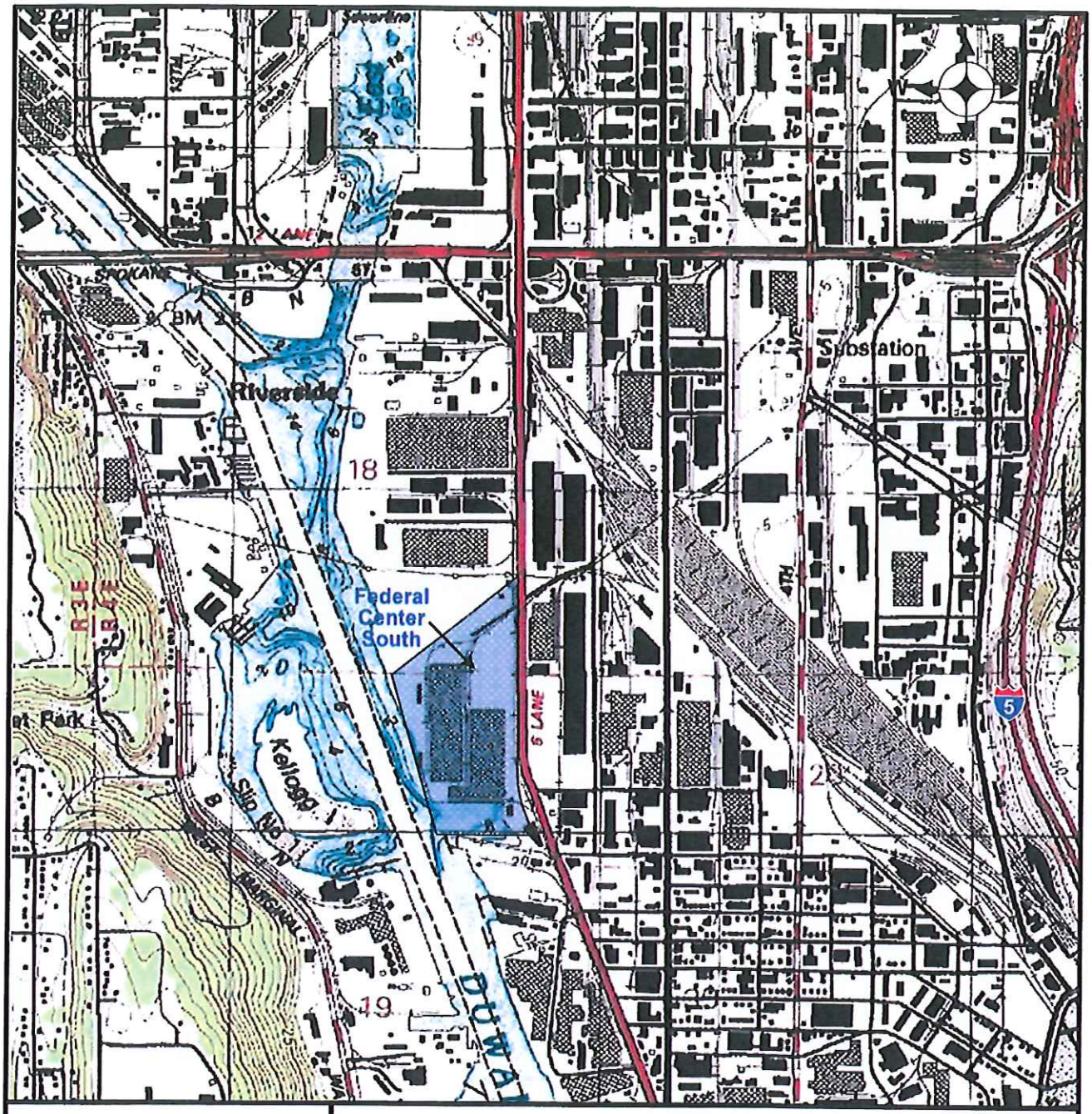


FIGURE 1

US GENERAL SERVICES ADMINISTRATION
FEDERAL CENTER SOUTH
UNDERGROUND STORAGE TANK ASSESSMENT
4735 E. MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

SITE LOCATION MAP

Reference: US Geological Survey Seattle, Washington 7.5-Minute Quadrangle Map Photo revised 1983

October 2011

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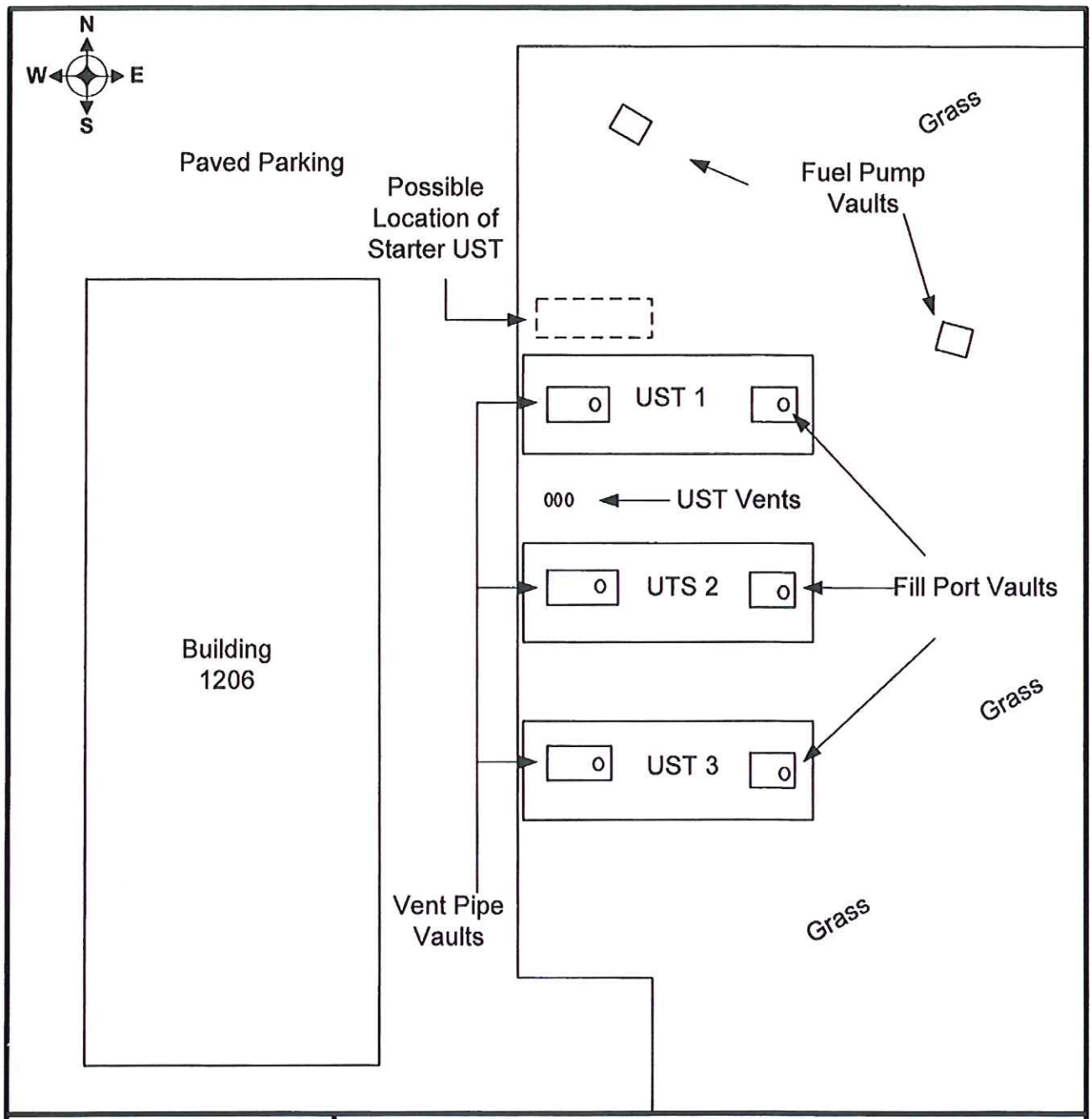

EXPLANATION

NOT TO SCALE

FIGURE 2

US GENERAL SERVICES ADMINISTRATION
FEDERAL CENTER SOUTH
UNDERGROUND STORAGE TANK ASSESSMENT
4735 E. MARGINAL WAY SOUTH
SEATTLE, WASHINGTON 98134

SITE PLOT PLAN

October 2011

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APPENDIX A: SELECT PROJECT PHOTOGRAPHS

Photograph 1: View of UST vent and fill vaults and the three tanks vents. Building 1206 is seen to the left of the UST structures and Building1201 is in the background right.

Photograph 2: View of the Federal Center South heating oil UST fill port on the north side of the Federal Center South UST 1. This may indicate the presence of a fourth tank at the Federal Center South facility.

Photograph 3: View of UST 3 fill port with dip stick on the east side of the tank.

Photograph 4: View of the USTs location from the west, in foreground is a fuel pump vault and the fill port vault are seen in the background.

APPENDIX B: COPY OF THE ANALYTICAL REPORT AND CHAIN OF CUSTODY

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
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RECEIVED
SEP 24 2011
EHS-International, Inc.

September 20, 2011

Miguel Ortega, Project Manager
EHSI
13228 NE 20th St., Suite 100
Bellevue, WA 98005

Dear Mr. Ortega:

Included are the results from the testing of material submitted on September 7, 2011 from the FCS UST Assessment 10327-01, F&BI 109080 project. There are 19 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.

Michael Erdahl
Project Manager

Enclosures
c: Shelby Nelson
EHS0920R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 7, 2011 by Friedman & Bruya, Inc. from the EHSI FCS UST Assessment 10327-01, F&BI 109080 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	EHSI
109080-01	FCS UST 1
109080-02	FCS UST 2
109080-03	FCS UST 3

All quality control requirements were acceptable.

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080
Date Extracted: 09/13/11
Date Analyzed: 09/14/11

RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx

Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
FCS UST 1 109080-01 1/10	980,000	<50,000	86
FCS UST 2 109080-02 1/10	430,000	170,000	133
FCS UST 3 109080-03 1/10	600,000	190,000	132
Method Blank 01-1689 MB 1/10	<10,000	<50,000	115

Analysis For Total Metals By EPA Method 200.8

Client ID:	FCS UST 1	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/08/11	Lab ID:	109080-01
Date Analyzed:	09/08/11	Data File:	109080-01.032
Matrix:	Product	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	78	60	125
Indium	88	60	125
Holmium	101	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	2.77
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	2.25

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	FCS UST 2	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/08/11	Lab ID:	109080-02
Date Analyzed:	09/08/11	Data File:	109080-02.033
Matrix:	Product	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	72	60	125
Indium	83	60	125
Holmium	95	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	FCS UST 3	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/08/11	Lab ID:	109080-03
Date Analyzed:	09/08/11	Data File:	109080-03.034
Matrix:	Product	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	73	60	125
Indium	84	60	125
Holmium	95	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 200.8

Client ID:	Method Blank	Client:	EHSI
Date Received:	NA	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/08/11	Lab ID:	I1-623 mb
Date Analyzed:	09/08/11	Data File:	I1-623 mb.028
Matrix:	Product	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	AP

Internal Standard:	% Recovery:	Lower Limit:	Upper Limit:
Germanium	75	60	125
Indium	84	60	125
Holmium	95	60	125

Analyte:	Concentration mg/kg (ppm)
Chromium	<1
Arsenic	<1
Selenium	<1
Silver	<1
Cadmium	<1
Barium	<1
Lead	<1

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080
Date Extracted: 09/08/11
Date Analyzed: 09/09/11

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Total Mercury
FCS UST 1 109080-01	<0.1
FCS UST 2 109080-02	<0.1
FCS UST 3 109080-03	<0.1
Method Blank	<0.1

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	FCS UST 1	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/13/11	Lab ID:	109080-01 1/10
Date Analyzed:	09/14/11	Data File:	091411.D
Matrix:	Product	Instrument:	GCMS6
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	146	50	150
Benzo(a)anthracene-d12	109	50	129

Compounds:	Concentration mg/kg (ppm)
Naphthalene	940 ve
Acenaphthylene	<50
Acenaphthene	330
Fluorene	580 ve
Phenanthrene	750 ve
Anthracene	<50
Fluoranthene	<50
Pyrene	<50
Benz(a)anthracene	<50
Chrysene	<50
Benzo(a)pyrene	<50
Benzo(b)fluoranthene	<50
Benzo(k)fluoranthene	<50
Indeno(1,2,3-cd)pyrene	<50
Dibenz(a,h)anthracene	<50
Benzo(g,h,i)perylene	<50

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	FCS UST 1	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/13/11	Lab ID:	109080-01 1/100
Date Analyzed:	09/14/11	Data File:	091416.D
Matrix:	Product	Instrument:	GCMS6
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	543 ds	50	150
Benzo(a)anthracene-d12	191 ds	50	129

Compounds:	Concentration mg/kg (ppm)
Naphthalene	1,000
Acenaphthylene	<500
Acenaphthene	500
Fluorene	880
Phenanthrene	800
Anthracene	<500
Fluoranthene	<500
Pyrene	<500
Benz(a)anthracene	<500
Chrysene	<500
Benzo(a)pyrene	<500
Benzo(b)fluoranthene	<500
Benzo(k)fluoranthene	<500
Indeno(1,2,3-cd)pyrene	<500
Dibenz(a,h)anthracene	<500
Benzo(g,h,i)perylene	<500

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	FCS UST 2	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/13/11	Lab ID:	109080-02 1/100
Date Analyzed:	09/14/11	Data File:	091413.D
Matrix:	Product	Instrument:	GCMS6
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	523	50	150
Benzo(a)anthracene-d12	0 ds	50	129

Compounds:	Concentration mg/kg (ppm)
Naphthalene	870
Acenaphthylene	<500
Acenaphthene	<500
Fluorene	<500
Phenanthrene	1,400
Anthracene	<500
Fluoranthene	<500
Pyrene	<500
Benz(a)anthracene	<500
Chrysene	<500
Benzo(a)pyrene	<500
Benzo(b)fluoranthene	<500
Benzo(k)fluoranthene	<500
Indeno(1,2,3-cd)pyrene	<500
Dibenz(a,h)anthracene	<500
Benzo(g,h,i)perylene	<500

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	FCS UST 3	Client:	EHSI
Date Received:	09/07/11	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/13/11	Lab ID:	109080-03 1/100
Date Analyzed:	09/14/11	Data File:	091414.D
Matrix:	Product	Instrument:	GCMS6
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	518	50	150
Benzo(a)anthracene-d12	0 ds	50	129

Compounds:	Concentration mg/kg (ppm)
Naphthalene	1,100
Acenaphthylene	<500
Acenaphthene	<500
Fluorene	<500
Phenanthrene	1,200
Anthracene	<500
Fluoranthene	<500
Pyrene	<500
Benz(a)anthracene	<500
Chrysene	<500
Benzo(a)pyrene	<500
Benzo(b)fluoranthene	<500
Benzo(k)fluoranthene	<500
Indeno(1,2,3-cd)pyrene	<500
Dibenz(a,h)anthracene	<500
Benzo(g,h,i)perylene	<500

Analysis For Semivolatile Compounds By EPA Method 8270D SIM

Client Sample ID:	Method Blank	Client:	EHSI
Date Received:	NA	Project:	FCS UST Assessment 10327-01, F&BI 109080
Date Extracted:	09/13/11	Lab ID:	01-1687 mb
Date Analyzed:	09/14/11	Data File:	091410.D
Matrix:	Product	Instrument:	GCMS6
Units:	mg/kg (ppm)	Operator:	YA

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
Anthracene-d10	106	50	150
Benzo(a)anthracene-d12	109	50	129

Compounds:	Concentration mg/kg (ppm)
Naphthalene	<5
Acenaphthylene	<5
Acenaphthene	<5
Fluorene	<5
Phenanthrene	<5
Anthracene	<5
Fluoranthene	<5
Pyrene	<5
Benz(a)anthracene	<5
Chrysene	<5
Benzo(a)pyrene	<5
Benzo(b)fluoranthene	<5
Benzo(k)fluoranthene	<5
Indeno(1,2,3-cd)pyrene	<5
Dibenz(a,h)anthracene	<5
Benzo(g,h,i)perylene	<5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080
Date Extracted: 09/13/11
Date Analyzed: 09/15/11

RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES FOR PCBs REPORTED AS AROCLORS USING EPA METHOD 8082A

Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Aroclor 1221	1232	1016	1242	1248	1254	1260	Surrogate (% Rec.) (Limit 49-135)
FCS UST 1 109080-01	<2	<2	<2	<2	<2	<2	<2	103
FCS UST 2 109080-02	<2	<2	<2	<2	<2	<2	<2	115
FCS UST 3 109080-03	<2	<2	<2	<2	<2	<2	<2	116
Method Blank 01-1692 MB	<2	<2	<2	<2	<2	<2	<2	84

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL EXTENDED USING METHOD NWTPH-Dx

Laboratory Code: 109080-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	980,000	930,000	5	0-20

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	100,000	119	118	79-144	1

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF PRODUCT SAMPLES FOR METALS USING EPA METHOD 200.8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Chromium	mg/kg (ppm)	50	99	100	70-130	1
Arsenic	mg/kg (ppm)	10	93	97	70-130	4
Selenium	mg/kg (ppm)	5	93	97	70-130	4
Silver	mg/kg (ppm)	10	105	107	70-130	2
Cadmium	mg/kg (ppm)	10	104	110	70-130	6
Barium	mg/kg (ppm)	50	103	105	70-130	2
Lead	mg/kg (ppm)	50	114	115	70-130	1

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF PRODUCT SAMPLES FOR TOTAL MERCURY USING EPA METHOD 1631E

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Mercury	mg/kg (ppm)	0.125	99	101	63-144	2

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF PRODUCT SAMPLES FOR PNA'S BY EPA METHOD 8270D SIM

Laboratory Code: 109080-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	Relative Percent Difference (Limit 20)
Naphthalene	mg/kg (ppm)	1,000	970	3
Acenaphthylene	mg/kg (ppm)	<50	<50	nm
Acenaphthene	mg/kg (ppm)	330	320	3
Fluorene	mg/kg (ppm)	880	880	0
Phenanthrene	mg/kg (ppm)	800	800	0
Anthracene	mg/kg (ppm)	<50	<50	nm
Fluoranthene	mg/kg (ppm)	<50	<50	nm
Pyrene	mg/kg (ppm)	<50	<50	nm
Benz(a)anthracene	mg/kg (ppm)	<50	<50	nm
Chrysene	mg/kg (ppm)	<50	<50	nm
Benzo(b)fluoranthene	mg/kg (ppm)	<50	<50	nm
Benzo(k)fluoranthene	mg/kg (ppm)	<50	<50	nm
Benzo(a)pyrene	mg/kg (ppm)	<50	<50	nm
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	<50	<50	nm
Dibenz(a,h)anthracene	mg/kg (ppm)	<50	<50	nm
Benzo(g,h,i)perylene	mg/kg (ppm)	<50	<50	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Naphthalene	mg/kg (ppm)	10	93	96	70-130	3
Acenaphthylene	mg/kg (ppm)	10	92	95	70-130	3
Acenaphthene	mg/kg (ppm)	10	93	96	70-130	3
Fluorene	mg/kg (ppm)	10	94	98	70-130	4
Phenanthrene	mg/kg (ppm)	10	92	96	70-130	4
Anthracene	mg/kg (ppm)	10	94	96	70-130	2
Fluoranthene	mg/kg (ppm)	10	93	96	70-130	3
Pyrene	mg/kg (ppm)	10	91	94	70-130	3
Benz(a)anthracene	mg/kg (ppm)	10	89	92	70-130	3
Chrysene	mg/kg (ppm)	10	95	97	70-130	2
Benzo(b)fluoranthene	mg/kg (ppm)	10	94	99	70-130	5
Benzo(k)fluoranthene	mg/kg (ppm)	10	96	97	70-130	1
Benzo(a)pyrene	mg/kg (ppm)	10	96	100	70-130	4
Indeno(1,2,3-cd)pyrene	mg/kg (ppm)	10	109	116	70-130	6
Dibenz(a,h)anthracene	mg/kg (ppm)	10	101	105	70-130	4
Benzo(g,h,i)perylene	mg/kg (ppm)	10	98	102	70-130	4

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/20/11
Date Received: 09/07/11
Project: FCS UST Assessment 10327-01, F&BI 109080

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF PRODUCT SAMPLES FOR POLYCHLORINATED BIPHENYLS AS AROCLOR 1016/1260 BY EPA METHOD 8082A

Laboratory Code: 109080-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	<2	<2	nm
Aroclor 1260	mg/kg (ppm)	<2	<2	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	% Recovery LCS	% Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Aroclor 1016	mg/kg (ppm)	25	93	105	60-151	12
Aroclor 1260	mg/kg (ppm)	25	104	107	53-144	3

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

A1 – More than one compound of similar molecule structure was identified with equal probability.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for this range fell outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte indicated may be due to carryover from previous sample injections.

d - The sample was diluted. Detection limits may be raised due to dilution.

ds - The sample was diluted. Detection limits are raised due to dilution and surrogate recoveries may not be meaningful.

dv - Insufficient sample was available to achieve normal reporting limits and limits are raised accordingly.

fb - Analyte present in the blank and the sample.

fc – The compound is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. The variability is attributed to sample inhomogeneity.

ht - Analysis performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of normal control limits. Compounds in the sample matrix interfered with the quantitation of the analyte.

j – The result is below normal reporting limits. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The analyte result in the laboratory control sample is out of control limits. The reported concentration should be considered an estimate.

jr - The rpd result in laboratory control sample associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the compound indicated is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

pr – The sample was received with incorrect preservation. The value reported should be considered an estimate.

ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

109080

SAMPLE CHAIN OF CUSTODY

ME 09/07/11

A02

Send Report To: Miguel Ortega
Company: EHSI
Address: 13224 NE 20th St, STE 100
City, State, ZIP: Bellevue WA 98005
Phone #: 425 455 2959 Fax #: 925 646-7247

SAMPLERS (signature):
PROJECT NAME/#: FCS UST Assessment 10327-01
PO #:
REMARKS:

Page # ___ of ___
TURNAROUND TIME
☐ Standard (2 Weeks)
☐ RUSH
Rush charges authorized by:

SAMPLE DISPOSAL
☐ Dispose after 30 days
☐ Return samples
☐ Will call with instructions

Sample ID	Lab ID	Date	Time	Sample Type	# of containers	NWTPH-Dx	NWTPH-Gx/BTEX	BTEX by EPA 8021B	VOCs by EPA 8260B	SVOCs by EPA 8270C	HFS	PAH Scan	PCB's & Pesticides	PCB Scan			Notes
FCS UST #1	01	9/7/11	1315	oil	1	X						X	X	X			
FCS UST #2	02		1325			X						X	X	X			
FCS UST #3	03		1335			X						X	X	X			

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282
Fax (206) 283-5044

	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:		Miguel Ortega	EHSI	9/7/11	3:30PM
Received by:		Michael E. Uhl	F&B	〃	〃
Relinquished by:					
Received by:					

Samples received at 24 °C

APPENDIX C: UST SERVICES COST SUMMARY

FEDERAL CENTER SOUTH USTs TEMPORARY CLOSURE COST ESTIMATE		
TASK	VENDOR	COST ESTIMATE
USTs Services for Temporary Closure	Wyser Construction	$30,650[1,2]
USTs Temporary Closure Services	EHS – International, Inc.	$6,520
	TOTAL:	**$37,170**

EXPLANATION:

[1]EHSI will add a 10% Markup if contracted to execute the entire USTs Temporary Closure Project; and

[2]Exclusive of credit for fuel recycling.