INITIAL GROUNDWATER FORENSIC EVALUTION REPORT

Proposed Rite Aid Property
Former Round The Clock Deli
722 South Lincoln Street, Port Angeles, WA

WA DOE Facility ID: 63427274
VCP Project No. SW0962

Prepared for:

Port Angeles Retail, LLC
950 N. 72nd St. Suite 100
Seattle, WA 98103

Prepared By:

GeoPro LLC
Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

September 4, 2012

Contents

1 INTRODUCTION

1.1 Landowner Contact

Port Angeles Retail, LLC

950 N. 72nd St. Suite 100
Seattle, WA 98103

1.2 Purpose and Objectives

GeoPro LLC has prepared this report on behalf of Blue Mountain Environ. Consulting Co, Inc.based on guidance and suggestions provided by the Washington Department of Ecology (Ecology) during a meeting on May 21, 2012. Ecology has stated that the extent of the impacted groundwater has been defined; however, additional investigation is required to differentiate the sources of the contamination along South Lincoln Street, as other upgradient sources (ARCO) have been identified and these plumes are likely co-mingled. The area of interest includes property located at 722 South Lincoln Street, near the intersection of 8th Street and 7th Street, and northerly along Lincoln Street.

The purpose of this work is to identify the approximate footprint of a groundwater contamination plume migrating offsite through fingerprinting evaluation of groundwater samples.

Specific objectives of this investigation include:

- Collect groundwater samples from 6 existing monitor wells that may represent contamination from the Site and Arco;
- Evaluate the petroleum constituents analyzed in the groundwater samples which may allow for fingerprinting and differentiation of the contaminant plumes;

1.3 Location

The Site is located at 722 South Lincoln Street, Port Angeles, Washington (see Figure 1). It was previously known as Around The Clock Deli property included underground petroleum storage tanks (USTs) which have been removed. The Site is listed by the Washington Department of Ecology as Facility 63427274 as a Hazardous Waste Generator and a LUST facility. The property is under a Voluntary Cleanup Program (ID SW0962) to perform independent remedial activities related to known contamination. The locations of monitor wells sampled are shown in Figure 2.

2 BACKGROUND

2.1 Remedial Investigation

A report on the remedial investigation of the Site was completed by Kane Environmental Inc. in April 2008[1]. The following is a partial summary of the remedial investigation report.

- The Site has been a petroleum service station since about 1924, with at least 3 building and UST configurations.
- Soil and groundwater contamination at the Site is due to petroleum hydrocarbon constituents.
- 28 groundwater monitoring wells were installed in 2008 to determine the horizontal extent of the contaminant plume.
- A co-mingled plume of gasoline contaminated groundwater extends from approximately the northern boundary of the ARCO property on East 8th Street, northeasterly at least 400 feet to East 7th Street and is approximately 300 feet wide (northwest to southeast).
- The potential sources of contaminated soil within the Site are likely USTs, dispensers and pipeline.
- Gasoline contaminated groundwater is migrating north-northeasterly, in a distribution pattern enhanced by a now filled-in stream channel ("gulch) (see Figure 3) and other higher permeable features, such as, backfilled utility trenches.
- One Site UST had been abandoned in-place because it was located beneath the service building (subsequently removed).
- Offsite sources contributing to the contaminated groundwater plume may be the current ARCO location and a previous service station southeast across Lincoln Street.

3 GROUNDWATER SAMPLING

3.1 Groundwater Sampling Method and Procedure

Existing 0.75 inch diameter monitor wells KMW-2, KMW-5, KMW-6, KMW-7, KMW-12, and KMW-15 were sampled. The sampled wells were selected to represent the existing general horizontal extent of the identified groundwater contaminated plume(s). The following is the assumed groundwater flow direction of each well from the Site based on previous work:

KMW-12: upgradient, SE of Site, in landscaping on E. 8th Street adjacent to ARCO service station;

KMW-2: Site, outside of, and adjacent to, NE border of remedial excavation;

[1] 2008, April 11, Kane Environmental Inc., "Remedial Investigation, Proposed Rite Aid Store, 710 and 722 South Lincoln Street, 107-121 East Eighth Street and 717 South Laurel Street, Port Angeles, Washington 98362", prepared for Stantec, Inc., Kirkland, WA.

KMW-5: side-gradient, SE of Site, within North-bound lane S. Lincoln Street;

KMW-6: downgradient, East of Site, within North-bound lane of S. Lincoln Street;

KMW-7: downgradient, NE of Site, within North-bound lane of S. Lincoln Street;

KMW-15: downgradient, NE of Site, within parking lane East bound, E. 7th Street.

A Groundwater Sample Field Log was prepared during the sampling of each monitor well (see Appendix A). Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred. The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory. The samples were labeled without the proceeding "K" in the well number, that is, sample MW-5 was collected from well KMW-5. A free product sample from monitor well KMW-5 was collected into a 4 ounce clear wide mouth glass jar. Free product was also observed during sampling of wells KMW-2 and KMW-7 but insufficient product was available to place into a separate sampling container.

4 SAMPLING RESULTS

4.1 Groundwater Analyses

All groundwater samples were submitted to Friedman & Bruya, Inc. laboratory, Seattle, Washington for forensic analysis of petroleum constituents including petroleum hydrocarbons as gasoline and other volatile compounds. The laboratory report is included in Appendix B.

The following Table 1 compares the change in gasoline concentrations in samples from wells between 2008 and 2012. The DOE MTCA Method A cleanup level for gasoline is exceeded in all of the groundwater samples collected for this report.

Table 1 - Comparison Gasoline Concentrations 2008 and 2012

Monitor Well No.	2008	2012
KMW-12	40,000	4,800 µg/l
KMW-2	24,000 µg/l	95,000 µg/l
KMW-5	60,000 µg/l	51,000 µg/l
KMW-6	4,100 µg/l	6,300 µg/l
KMW-7	110,000 µg/l	64,000 µg/l
KMW-15	3,500 µg/l	5,900 µg/l

The following is a summary of the laboratory report by Freidman and Bruya.

- All samples contained gasoline and diesel range petroleum hydrocarbons.
- All samples contained motor oil range petroleum hydrocarbons except samples from KMW-12 and KW-15.
- Only the sample from KMW-5 had sufficient free product to perform an analysis of paraffins, isoparaffins, olefins, naphlenes and aromatics ("PIANO") and organometallic compounds. Such analyses are typically used to fingerprint petroleum products.
- Isolated chromatograph peaks for the MW-5 (well KMW-5) free product sample were not readily identified. Such peaks can be attributable to non-petroleum hydrocarbons.
- The amount of organic lead identified in the free product sample from well KMW-5 is consistent with gasoline manufactured before 1986.
- The organic manganese additive to gasoline MMT (Methylcyclopentadienyl manganese tricarbonyl) was introduced in 1958 and generally phased out by January 1996. MMT is allowed in unleaded gasoline, but when found together with organic lead, and evaluated as degraded leaded gasoline, the gasoline is probably a result of manufacturing prior to 1996.
- The gasoline in samples from KMW-2 (Site) and KMW-5 (SE of Site) have significant differences and are considered to be from different sources.
- If sufficient free product samples can be obtained from the contaminated plume(s), it is probable that further definition of the co-mingled products can be performed.

5 CONCLUSIONS

The following conclusions are based on the data collected during this initial forensic evaluation of groundwater samples to identify sources of the co-mingled groundwater contamination plume underlying South Lincoln Street and vicinity.

- Monitor well KMW-12 did not contain free product which was previously found in the well in October 2008. This well is the closest upgradient well sampled adjacent to the ARCO station.
- Significant differences exist between the gasoline analyzed in KMW-2 (Site) and KMW-5 (side-gradient). KMW-5 is apparently located within, or very near, a stream channel ("gulch") which has been backfilled during development. The sources of the gasoline in KMW-2 and KMW-5 are apparently different.
- The organic manganese (MMT) detected in the free product sample from KMW-5 suggests manufacturing of the gasoline between 1958 and early 1996. A gas station was active on the property southeast of KMW-5 from 1924 to sometime between 1955 and 1964 (see Figure 4). This gas station could have been active during the period when MMT was allowed as a gasoline additive.

6 RECOMMENDATIONS

The following recommendations are made to fulfill the request by DOE to evaluate the potential sources of the co-mingled contaminated groundwater plumes underlying South Lincoln Street and vicinity.

- Install larger diameter monitor wells which will allow a larger volume of free product to be collected for analysis.
- Collect free product from the larger diameter wells and perform a forensic evaluation for petroleum hydrocarbons and potential sources.

7 LIMITATIONS

This report has been prepared for use by the landowner and is not intended for use by others except the landowner(s) or landowner's agents. Each project and project site is unique and the information contained in this report is not applicable to other sites. Only the landowner should rely upon this report and all others should contact GeoPro LLC before applying or interpreting any information in this report.

GeoPro LLC does not accept liability or responsibility for detachment, partial use, separation, or reproduction without color, if used, which may depict significant information, by third parties and such use shall be at user's sole risk.

Records, documentation, and personal communication have been relied upon in good faith; however, no responsibility is accepted for errors or omissions of work by others. Services were performed in accordance with generally accepted professional practices, in the same or similar localities, related to the nature of the work accomplished, at the time services are rendered. GeoPro LLC is not responsible for references to regulatory terms, practices, numeric data, practices or conditions that may lead to other conclusions if such references are not in final form.

Conclusions and findings apply only to present conditions, and opinions expressed are subject to revision when additional or new information is presented and reviewed. This warranty is in lieu of all other warranties, either expressed or implied. It is possible that explorations failed to reveal the presence of hazardous materials at areas where hazardous materials were assumed, suspected or expected to exist (hazardous as used herein shall also mean contaminated and polluted). Through use of this report it is understand that failure to sample soil or water, or install groundwater monitor wells at locations through appropriate and mutually agreed-upon techniques does not guarantee that hazardous materials have, or will be, detected at such locations. Similarly, areas which in fact are unaffected by hazardous materials at the time of this report, may later, due to natural causes or human intervention, become contaminated. GeoPro LLC is not responsible for failing to locate hazardous materials which have not discovered at the time of this report or in the future. This report should not be construed as presenting a value to neither the Site nor the condition as to construction capabilities. In the event of changes in future development plans as understood at the time of this report, the conclusions and recommendations made herein shall be invalid until given the opportunity to review and modify this report in writing. Portions of an Agreement to perform professional services may or may not be disclosed in this report.

Respectfully submitted,

Richard C. Kent, R.G.

GeoPro LLC

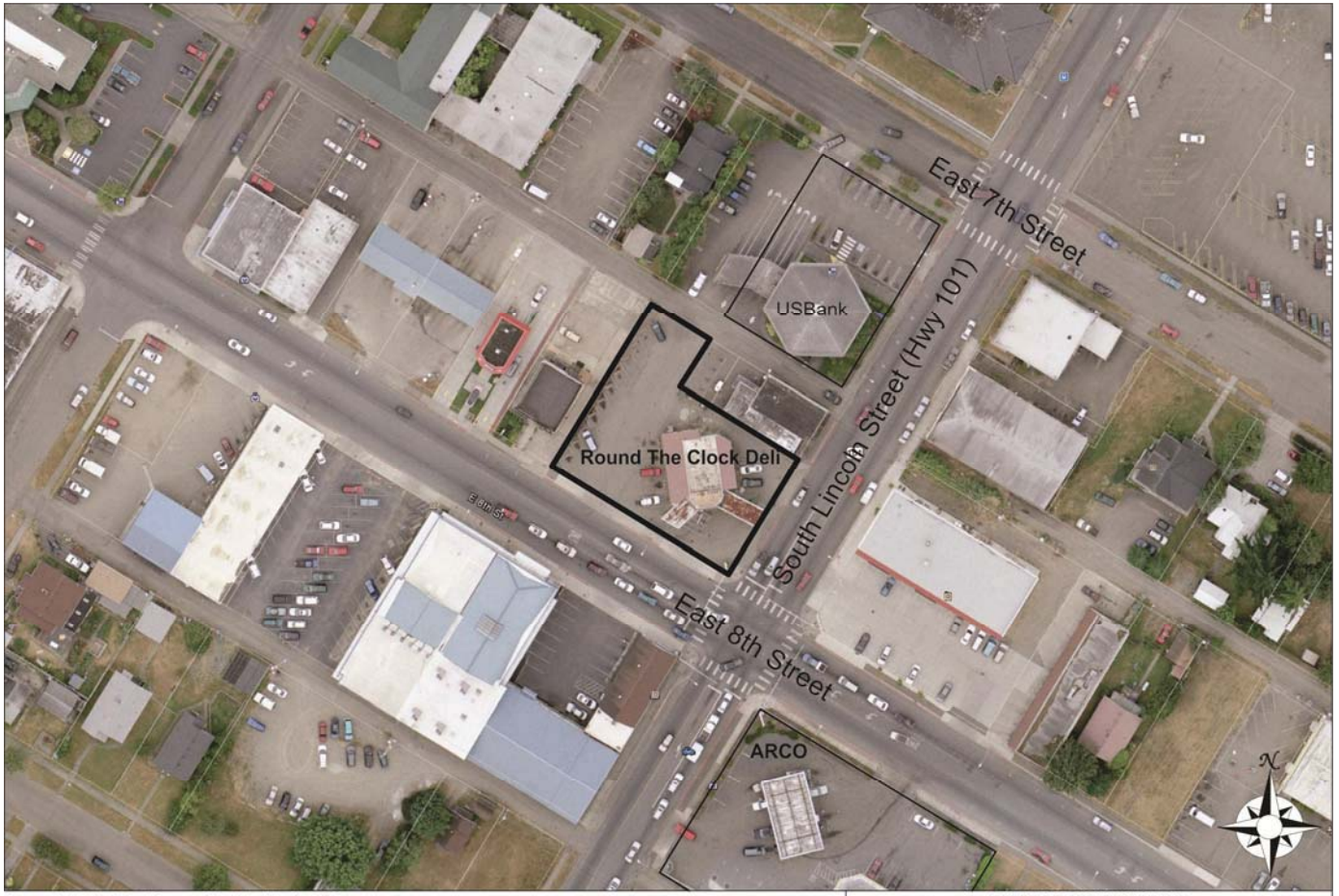

Figure 1 – Site Vicinity Map

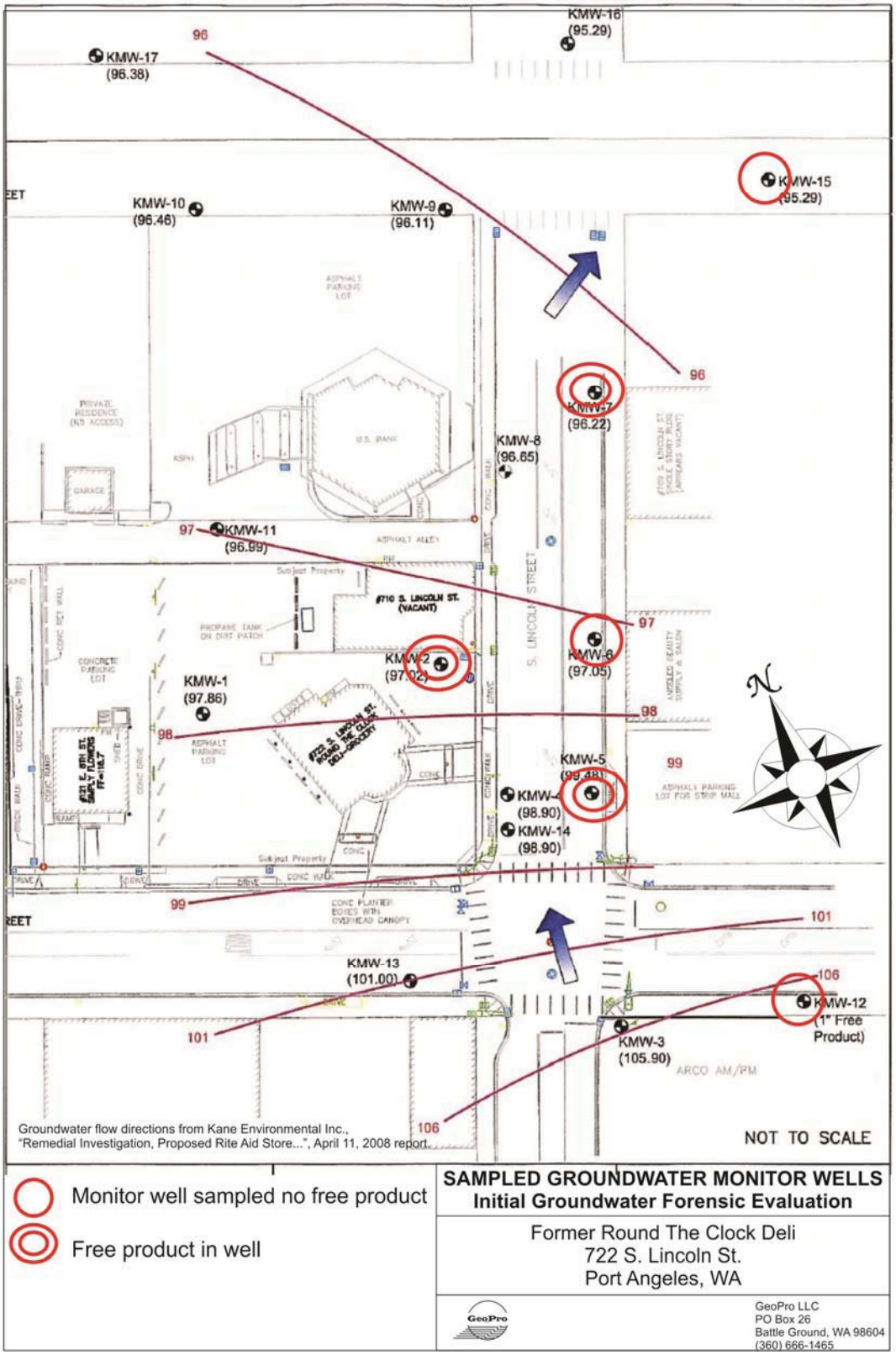

Figure 2 - Sampled Wells

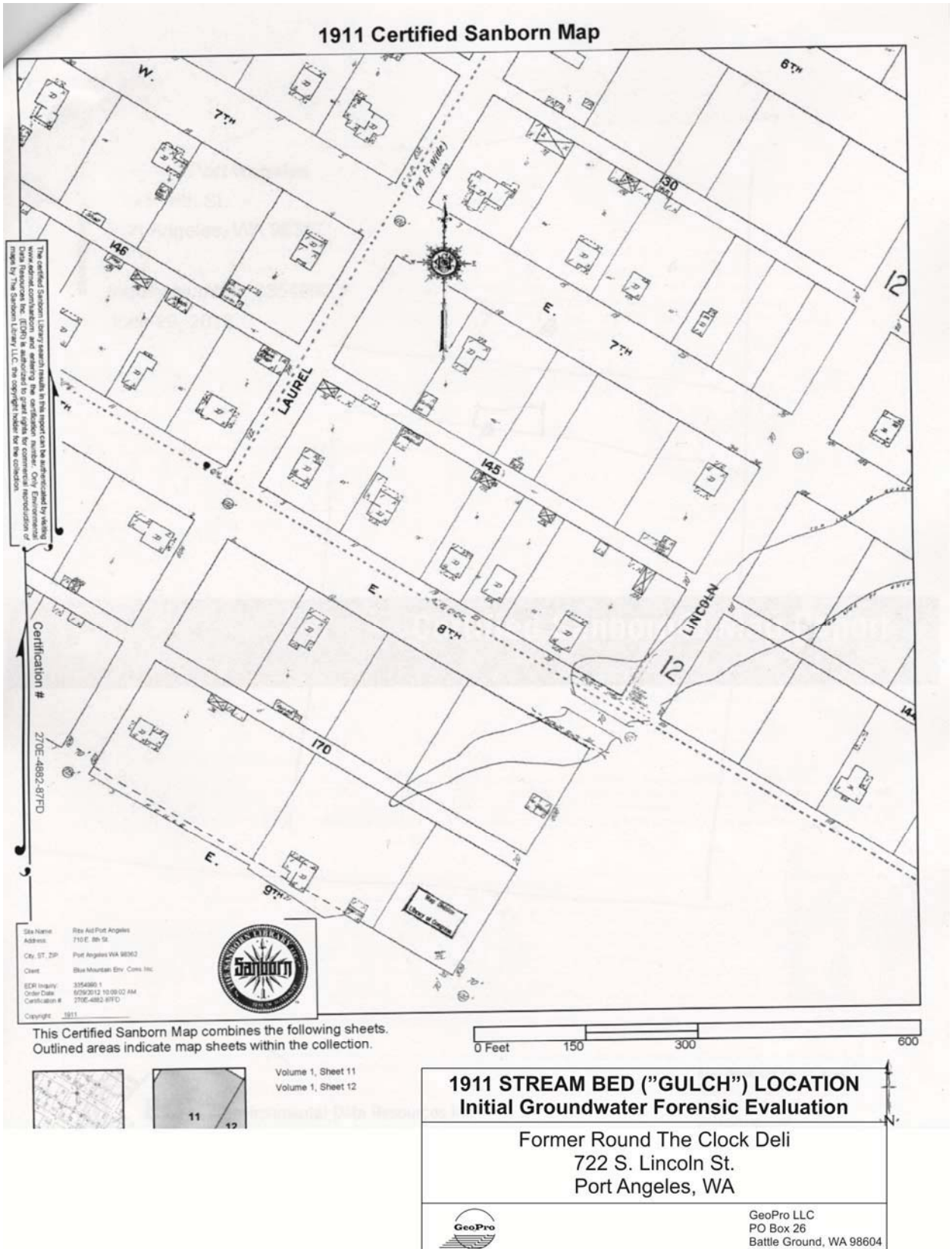

Figure 3 - 1911 Gulch Location

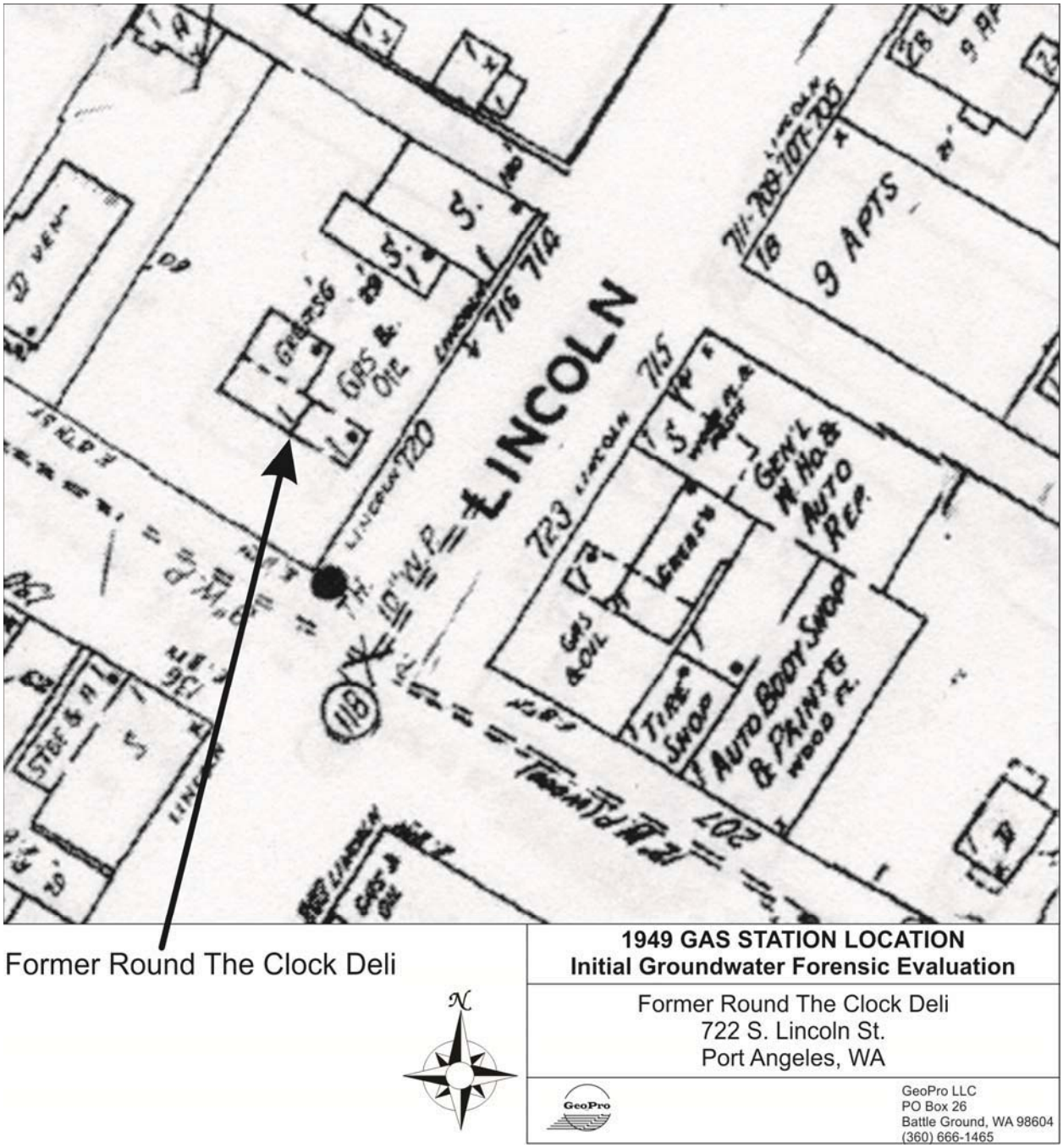

Figure 4 - 715-723 South Lincoln Street Gas Station & Auto Repair Facilities - 1949

APPENDICES

Appendix A
Groundwater Sample Field Logs

GeoPro LLC
Post Office Box 26
Battle Ground, WA 98604
(360) 666-1465

GROUNDWATER SAMPLE FIELD LOG

DAY/DATE: Saturday, July 14, 2012	SHEET 1 of 1
PROJECT NAME: Port Angeles Realty LLC Fingerprinting	PROJECT NO.: 120605
PROJECT LOCATION: 722 S Lincoln St., Port Angeles, WA	
Weather: ☒Fair ☐Overcast ☐Fog ☐Rain ☐Snow Temp.: ☐<0 ☐0-32 ☐33-54 ☒55-79 ☐>80 Humidity %: ☐<25 ☒26-49 ☐50-74 ☐>75	Wind: ☒Calm ☐Light ☐Moderate ☐Strong Wind from:☐N ☐NE ☐E ☐SE ☐S ☐SW ☐W ☐NW Precip.: ☒None ☐Mist ☐Light ☐Moderate ☐Heavy

WELL NO. : KMW-2	**SAMPLE NUMBER: MW-2**
Well depth: 22 ft / Screen length: 12-22 ft	Laboratory: Friedman & Bruya, Seattle WA
Well install date: August 14, 2007	COC and/or RFA Number:
Pre-sample SWL: 15.02 ft	Casing diameter: 0.75 inches
Time Sample Collected: 1110	Post-sample SWL: TD ft
Sample Turbidity: 342 ppm	Sample Conductance: 683 µS
Sample Color: light gray	Sample pH: 6.36
Sample Temperature: 68.0 °F	Sample Odor: strong petroleum

Sample Collection Method:

Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred.
The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Sample Shipment:
Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested:

Analyses for fingerprinting are to be selected by the laboratory.

Comments: SWL's measured from top of PVC. Sample collected at 14.9 ft.

Free product 0.93 feet thick in well.

SIGNATURE: 

PRINT NAME: Richard C. Kent, RG

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

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WELL NO. : KMW-5	**SAMPLE NUMBER: MW-5**
Well depth: 21 ft / Screen length: 11-21 ft	Laboratory: Friedman & Bruya, Seattle WA
Well install date: January 16, 2008	COC and/or RFA Number:
Pre-sample SWL: 13.95 ft	Casing diameter: 0.75 inches
Time Sample Collected: 0955	Post-sample SWL: 12.8 ft
Sample Turbidity: 628 ppm	Sample Conductance: 1233 µS
Sample Color: light gray	Sample pH: 7.06
Sample Temperature: 63.9 °F	Sample Odor: strong petroleum

Sample Collection Method:

Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred.
The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Sample Shipment:
Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested:

Analyses for fingerprinting are to be selected by the laboratory.

Comments: SWL's measured from top of PVC. Sample collected at 20 ft.

Free product approximated 1.87 feet thick within well. Free product placed in 4 oz. clear glass jar for analysis.

SIGNATURE: 

PRINT NAME: Richard C. Kent, RG

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

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WELL NO. : KMW-6	**SAMPLE NUMBER: MW-6**
Well depth: 22 ft / Screen length: 12-22 ft	Laboratory: Friedman & Bruya, Seattle WA
Well install date: January 6, 2008	COC and/or RFA Number:
Pre-sample SWL: 14.0 ft	Casing diameter: 0.75 inches
Time Sample Collected: 1028	Post-sample SWL: 17.65 ft
Sample Turbidity: 441 ppm	Sample Conductance: 890 µS
Sample Color: clear	Sample pH: 6.35
Sample Temperature: 66.6 °F	Sample Odor: moderate petroleum

Sample Collection Method:

Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred.
The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Sample Shipment:
Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested:

Analyses for fingerprinting are to be selected by the laboratory.

Comments: SWL's measured from top of PVC.

SIGNATURE: 

PRINT NAME: Richard C. Kent, RG

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

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GROUNDWATER SAMPLE FIELD LOG

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PROJECT LOCATION: 722 S Lincoln St., Port Angeles, WA	
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WELL NO. : KMW-7	**SAMPLE NUMBER: MW-7**
Well depth: 20 ft / Screen length: 10-20 ft	Laboratory: Friedman & Bruya, Seattle WA
Well install date: January 16, 2008	COC and/or RFA Number:
Pre-sample SWL: 12.11 ft	Casing diameter: 0.75 inches
Time Sample Collected: 1205	Post-sample SWL: 12.32 ft
Sample Turbidity: 184 ppm	Sample Conductance: 375 µS
Sample Color: light gray	Sample pH: 6.56
Sample Temperature: 66.7 °F	Sample Odor: very strong petroleum

Sample Collection Method:

Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred.
The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Sample Shipment:
Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested:

Analyses for fingerprinting are to be selected by the laboratory.

Comments: SWL's measured from top of PVC. Sample collected at 18 ft.

Free product noted by smear on tubing.

SIGNATURE: 

PRINT NAME: Richard C. Kent, RG

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

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WELL NO. : KMW-12	**SAMPLE NUMBER: MW-12**
Well depth: 17 ft / Screen length: 7-17 ft	Laboratory: Friedman & Bruya, Seattle WA
Well install date: February 22, 2008	COC and/or RFA Number:
Pre-sample SWL: 9.65 ft	Casing diameter: 0.75 inches
Time Sample Collected: 0815	Post-sample SWL: 10.23 ft
Sample Turbidity: 852 ppm	Sample Conductance: 1663 µS
Sample Color: clear	Sample pH: 5.98
Sample Temperature: 64.4 °F	Sample Odor: strong petroleum

Sample Collection Method:

Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred.
The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Sample Shipment:
Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested:

Analyses for fingerprinting are to be selected by the laboratory.

Comments: SWL's measured from top of PVC.

SIGNATURE: 

PRINT NAME: Richard C. Kent, RG

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

This groundwater sample field log and related information depict subsurface conditions only at a specific location and time. Hydrogeologic conditions at other locations may differ from conditions encountered and described in this log. The passage of time may result in a change in original well construction, geologic and hydrogeologic conditions and engineering properties at this location.

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WELL NO. : KMW-15	**SAMPLE NUMBER: MW-15**
Well depth: 18 ft / Screen length: 8-18 ft	Laboratory: Friedman & Bruya, Seattle WA
Well install date: February 21, 2008	COC and/or RFA Number:
Pre-sample SWL: 9.97 ft	Casing diameter: 0.75 inches
Time Sample Collected: 1233	Post-sample SWL: 10.95 ft
Sample Turbidity: 328 ppm	Sample Conductance: 664 µS
Sample Color: blebs of oil; light gray	Sample pH: 6.41
Sample Temperature: 66.2 °F	Sample Odor: moderate petroleum

Sample Collection Method:

Samples were collected with a low-flo (less than 1 gpm) Geopump™ Peristaltic Pump Series II by setting the 1/4-inch sample tubing initially near the approximate center of the well screen and lowered as necessary when drawdown occurred.
The monitor well was purged for one to two minutes prior to sampling for evaluation of plume and source comparisons through analyses of sample constituents. Due to the unusual small diameter of the monitor well, a shorter purge time was considered adequate.

Sample Shipment:
Water samples were placed in three 40 ml VOAs (preserved with HCl) and one amber liter glass (unpreserved) containers. The containers were filled to prevent air-entrapment, sealed, labeled, and placed in an ice chest at approximately 4°C (e.g. blu-ice) for transport to the laboratory.

Analysis Requested:

Analyses for fingerprinting are to be selected by the laboratory.

Comments: SWL's measured from top of PVC. Sample collected at 16 ft.

Rust bacteria in sample. Geologic log error screen depths.

SIGNATURE: 

PRINT NAME: Richard C. Kent, RG

Notes: 2-inch, Schedule 40 PVC casing = 0.163 gallons per foot; 6" Hole = 1.469 gallons per foot

Appendix B
Laboratory Report

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Bradley T. Benson, B.S.
Kurt Johnson, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
TEL: (206) 285-8282
e-mail: fbi@isomedia.com

August 28, 2012

Richard Kent
GeoPro, LLC
P.O. Box 26
Battle Ground, WA 98604

Dear Mr. Kent:

Included are the results from the testing of material submitted on July 17, 2012 from the Port Angeles Fingerprint 120605, F&BI 207213 project. The water and product samples submitted for forensic evaluation arrived in good condition. Upon arrival, the samples MW-12, MW-5, MW-5 (Product), MW-6, MW-2, MW-7, MW-15 and Trip Blank were placed in a refrigerator maintained at 4°C until removed for sample processing.

The sample MW-5 (Product) was diluted and analyzed using a gas chromatograph with a flame ionization detector (GC/FID). In addition, a small amount of product was present in the samples MW-5 and MW-2 and this product was also extracted and analyzed using GC/FID. The data generated yielded information on the boiling range and general chemical composition of the material present. The GC/FID traces are enclosed. A GC/FID trace of a standard consisting of normal alkanes is also provided for reference purposes.

In addition, the sample MW-5 (Product) was analyzed for paraffin, isoparaffin, aromatic, naphthene, and olefin (PIANO) constituents using a GC fitted with a mass spectrometer (MS); and organometallic compounds using a GC fitted with an electron capture detector (ECD) as well as an inductively coupled plasma mass spectrometer (ICP-MS). The samples MW-12, MW-5, MW-6, MW-2, MW-7, and MW-15 were also analyzed for total petroleum hydrocarbons as gasoline, diesel, and motor oil using GC/FID; and volatile organic compounds using a GC fitted with a mass spectrometer (MS). The results of this testing, including the associated quality assurance, are also enclosed. Please note that insufficient product volume was present in the samples MW-5 and MW-2 to complete the PIANO and organometallic testing.

Based on the data generated, the sample MW-5 (Product) contains gasoline. The general composition of this material indicates the gasoline has undergone substantial degradation. It should be noted that two isolated peaks were present on the GC/FID trace of the sample MW-5 (Product) at approximately 21 and 22 minutes which were not readily identified.

Review of the GC/ECD and ICP-MS results shows that organic lead and organic manganese additives were identified in the sample MW-5 (Product). The level of organic lead (50.9 ppm) in this sample correlates to a level of approximately 0.14 grams Pb/gallon. This level of organic lead is consistent with gasoline manufactured before 1986, when the EPA mandated a maximum level of 0.1 grams Pb/gallon in automotive gasoline.[1] The organic manganese additive MMT was introduced in 1958 and phased out of automotive gasoline sold in the United States in January 1996 or earlier, depending on geographic region.

Further review of the data generated shows that the sample MW-2 also contains gasoline. Comparison of the GC/FID traces generated shows that significant differences exist between the chemical composition of the gasoline present in the sample MW-2 and that present in the sample MW-5 (Product). Insufficient product was present in the sample MW-2 to perform the PIANO and organometallic testing.

If warranted, collection of additional product samples downgradient of the Rite Aid and Arco sites and testing of these samples for hydrocarbon fuel scan (HFS), PIANO, and organometallic compounds should be useful in further defining the extent of the product plumes at this site. In addition, testing of the sample MW-5 (Product) for Semivolatiles with Library Search using a GC fitted with a mass spectrometer (MS) may be useful in further characterizing the high boiling peaks present in this sample.

Please contact us if additional consultation is needed by our firm in the interpretation of the analytical results provided. We appreciate this opportunity to be of service to you and hope you will call if you should have any questions. We will hold your samples for 30 days before disposal unless directed otherwise.

Sincerely,

FRIEDMAN & BRUYA, INC.

Kurt Johnson
Chemist

Enclosures
mcp/KJ
NAA0828R.DOC

[1] Gibbs, L.M. “Gasoline Additives - When and Why”, SAE Transactions, Vol. 99, Paper 902104.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: 07/19/12
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID)

Sample ID	GC Characterization
MW-5	The GC trace using the flame ionization detector (FID) showed the presence of low boiling compounds. The patterns displayed by these peaks are indicative of gasoline. The low boiling compounds appear as a ragged pattern of peaks eluting from *n*-C_7 to *n*-C_{13} showing a maximum near *n*-C_{11}. This correlates with a temperature range of approximately 100°C to 240°C with a maximum near 200°C. Within this range, the GC/FID trace showed the presence of peaks, at varying levels, that are indicative of the xylenes, C3-benzenes, and methylnaphthalenes. These compounds are characteristic of the constituents commonly found in gasoline. The relative abundance of the volatile and semivolatile constituents present indicates that substantial degradation has occurred to the fuel. It should be noted that two isolated peaks are present on the GC/FID trace at approximately 21 and 22 minutes which were not readily identified. The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis.

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: 07/19/12
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID)

Sample ID	GC Characterization
MW-5 (Product)	The GC trace using the flame ionization detector (FID) showed the presence of low boiling compounds. The patterns displayed by these peaks are indicative of gasoline. The low boiling compounds appear as a ragged pattern of peaks eluting from *n*-C_7 to *n*-C_{13} showing a maximum near *n*-C_{11}. This correlates with a temperature range of approximately 100°C to 240°C with a maximum near 200°C. Within this range, the GC/FID trace showed the presence of peaks, at varying levels, that are indicative of the xylenes, C3-benzenes, and methylnaphthalenes. These compounds are characteristic of the constituents commonly found in gasoline. The relative abundance of the volatile and semivolatile constituents present indicates that substantial degradation has occurred to the fuel. It should be noted that two isolated peaks are present on the GC/FID trace at approximately 21 and 22 minutes which were not readily identified. The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis.

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: 07/19/12
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR FORENSIC EVALUATION BY CAPILLARY GAS CHROMATOGRAPHY USING A FLAME IONIZATION DETECTOR (FID)

Sample ID	GC Characterization
MW-2	The GC trace using the flame ionization detector (FID) showed the presence of low boiling compounds. The patterns displayed by these peaks are indicative of gasoline. The low boiling compounds appear as a ragged pattern of peaks eluting from *n*-C_7 to *n*-C_{13} showing a maximum near *n*-C_{10}. This correlates with a temperature range of approximately 100°C to 240°C with a maximum near 170°C. Within this range, the GC/FID trace showed the presence of peaks, at varying levels, that are indicative of the xylenes, C3-benzenes, and methylnaphthalenes. These compounds are characteristic of the constituents commonly found in gasoline. The relative abundance of the volatile and semivolatile constituents present indicates that substantial degradation has occurred to the fuel. The large peak seen near 25 minutes on the GC/FID trace is pentacosane, added as a quality assurance check for this GC analysis.

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: N/A
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR PARAFFINS, ISOPARAFFINS, OLEFINS, NAPHTHENES, AND AROMATICS

Results Reported as % by Weight

Laboratory ID 207213-03
Client ID MW-5 (Product)

Compound	Weight Percent
Propane	<0.01
Methanol	<0.01
Isobutane	<0.01
2-Methyl-1-propene	<0.01
Ethanol	<0.01
n-Butane	0.04
t-2-Butene	<0.01
c-2-Butene	<0.01
Isopropanol	<0.01
3-Methyl-1-butene	<0.01
Isopentane	0.37
tert-Butanol	<0.01
1-Pentene	0.01
2-Methyl-1-butene	0.03
n-Propanol	<0.01
n-Pentane	0.29
t-2-Pentene	0.29
c-2-Pentene	0.03
2-Methyl-2-butene	0.11
MTBE	<0.01
sec-Butanol	<0.01
4-Methyl-1-pentene	0.03
Isobutanol	<0.01
2,3-Dimethylbutane	0.15
Cyclopentane	0.13
2-Methylpentane	0.53
DIPE	<0.01
3-Methylpentane	0.49
1-Hexene	<0.01
ETBE	<0.01
n-Hexane	0.75

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: N/A
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR PARAFFINS, ISOPARAFFINS, OLEFINS, NAPHTHENES, AND AROMATICS

Results Reported as % by Weight

Laboratory ID 207213-03
Client ID MW-5 (Product)

Compound	Weight Percent
t-2-Hexene	0.09
2-Methyl-1-pentene	0.06
2-Methyl-2-pentene	0.06
c-2-Hexene	0.05
2,2-Dimethylpentane	0.03
2,4-Dimethylpentane	0.15
Methylcyclopentane	0.96
2,2,3-Trimethylbutane	0.01
Benzene	0.18
1-Methylcyclopentene	0.23
TAME	<0.01
3,3-Dimethylpentane	0.08
Cyclohexane	0.55
2-Methylhexane	0.55
2,3-Dimethylpentane	0.37
1,1-Dimethylcyclopentane	0.13
3-Methylhexane	0.77
c-1,3-Dimethylcyclopentane	0.59
3-Ethylpentane	0.09
Isooctane	0.49
t-1,2-Dimethylcyclopentane	0.75
1-Heptene	0.01
n-Heptane	1.01
t-3-Heptene	0.03
c-3-Heptene	0.02
t-2-Heptene	0.08
c-2-Heptene	0.05
2,2-Dimethylhexane	0.06
2,5-Dimethylhexane	0.22
Methylcyclohexane	1.39
2,4-Dimethylhexane	0.17

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: N/A
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR PARAFFINS, ISOPARAFFINS, OLEFINS, NAPHTHENES, AND AROMATICS

Results Reported as % by Weight

Laboratory ID 207213-03
Client ID MW-5 (Product)

Compound	Weight Percent
Ethylcyclopentane	0.47
t-1,c-2,4-Trimethylcyclopentane	0.55
t-1,c-2,3-Trimethylcyclopentane	0.93
2,3,4-Trimethylpentane	0.32
Toluene	0.74
2,3-Dimethylhexane	0.32
2-Methylheptane	0.93
3-Methylheptane	0.09
4-Methylheptane	0.26
3-Ethylhexane	0.08
1-Octene	0.01
1,2,3-Trimethylcyclopentane	0.24
t-1,2-Dimethylcyclohexane	1.12
n-Octane	1.19
1-Ethyl-1-methylcyclopentane	0.35
c-2-Octene	0.07
c-1,2-Dimethylcyclohexane	0.56
Isopropylcyclopentane	0.08
2,5-Dimethylheptane	0.18
3,5-Dimethylheptane	0.05
n-Propylcyclopentane	0.23
Ethylbenzene	0.79
2,3-Dimethylheptane	0.42
3,4-Dimethylheptane	0.07
2-Methyloctane	0.25
m-Xylene	1.67
p-Xylene	0.94
3-Methyloctane	0.47
1-Nonene	<0.01
3,3-Diethylpentane	<0.01
t-3-Nonene	0.14

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: N/A
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR PARAFFINS, ISOPARAFFINS, OLEFINS, NAPHTHENES, AND AROMATICS

Results Reported as % by Weight

Laboratory ID 207213-03
Client ID MW-5 (Product)

Compound	Weight Percent
c3-Nonene	0.07
o-Xylene	0.92
n-Nonane	1.18
Isobutylcyclopentane	0.05
t-2-Nonene	0.06
c-2-Nonene	0.02
Isopropylbenzene	0.25
3,3-Dimethyloctane	0.05
n-Butylcyclopentane	0.16
n-Propylbenzene	0.45
2,3-Dimethyloctane	0.14
1-Methyl-3-ethylbenzene	0.98
1-Methyl-4-ethylbenzene	0.50
2-Methylnonane	0.26
3-Ethyloctane	0.23
3-Methylnonane	0.23
1,3,5-Trimethylbenzene	0.68
1-Methyl-2-ethylbenzene	0.71
1,2,4-Trimethylbenzene	1.00
tert-Butylbenzene	<0.01
n-Decane	1.33
Isobutylbenzene	0.10
Isopropylcyclohexane	<0.01
sec-Butylbenzene	0.17
1-Methyl-3-isopropylbenzene	0.26
Isobutylcyclohexane	<0.01
1-Methyl-4-isopropylbenzene	0.31
1,2,3-Trimethylbenzene	0.70
Indan	0.28
1-Methyl-3-n-propylbenzene	0.41
1-Methyl-4-n-propylbenzene	0.22

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: N/A
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR PARAFFINS, ISOPARAFFINS, OLEFINS, NAPHTHENES, AND AROMATICS

Results Reported as % by Weight

Laboratory ID 207213-03
Client ID MW-5 (Product)

Compound	Weight Percent
n-Butylbenzene	0.47
1,3-Dimethyl-5-ethylbenzene	0.47
1,2-Diethylbenzene	0.06
1-Methyl-2-n-propylbenzene	0.19
1,4-Dimethyl-2-ethylbenzene	0.31
1,2-Dimethyl-4-ethylbenzene	0.42
1,3-Dimethyl-2-ethylbenzene	0.15
1,2-Dimethyl-3-ethylbenzene	0.12
n-Undecane	1.20
1,2,4,5-Tetramethylbenzene	0.24
2-Methylbutylbenzene	0.06
n-Pentylbenzene	0.09
Methylindan	0.27
1-tert-Butyl-3,5-dimethylbenzene	<0.01
1-tert-Butyl-4-ethylbenzene	<0.01
n-Dodecane	0.71
1,3,5-Triethylbenzene	<0.01
1,2,4-Triethylbenzene	<0.01
Naphthalene	0.32
n-Hexylbenzene	0.07
2-Methylnaphthalene	0.34
n-Tridecane	0.30
1-Methylnaphthalene	0.16
n-Tetradecane	0.06
n-Pentadecane	0.02

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: N/A
Date Analyzed: 07/20/12

RESULTS FROM THE ANALYSIS OF THE PRODUCT SAMPLE FOR PARAFFINS, ISOPARAFFINS, OLEFINS, NAPHTHENES, AND AROMATICS

Results Reported as % by Weight

Laboratory ID 207213-03
Client ID MW-5 (Product)

PIANO SUMMARY Compound	Weight Percent
Total Identified Compounds	43.81
Oxygenated Compounds	0.00
Hydrocarbon Compounds	43.81
Unidentified Compounds	56.19
Total	100

	Paraffins	Isoparaffins	Aromatics	Naphthenes	Olefins	Total
C3	<0.01					<0.01
C4	0.04	<0.01			<0.01	0.04
C5	0.29	0.37		0.13	0.47	1.26
C6	0.75	1.17	0.18	1.51	0.52	4.13
C7	1.01	2.05	0.74	3.34	0.19	7.33
C8	1.19	2.95	4.32	4.06	0.08	12.60
C9	1.18	1.45	5.56	0.21	0.29	8.69
C10	1.33	0.91	4.51	<0.01		6.75
C11	1.20		0.65			1.86
C12	0.71		0.07			0.78
C13	0.30					0.30
C14	0.06					0.06
C15	0.02					0.02
Total	8.07	8.89	16.03	9.26	1.55	43.81

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: 07/19/12 and 07/20/12
Date Analyzed: 07/19/12 and 07/20/12

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE USING METHOD NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Gasoline Range	Surrogate (% Recovery) (Limit 51-134)
MW-12 207213-01 1/20	4,800	98
MW-5 207213-02 1/20	51,000	102
MW-6 207213-04 1/20	6,300	96
MW-2 207213-05 1/40	95,000	96
MW-7 207213-06 1/100	64,000	105
MW-15 207213-07 1/20	5,900	101
Method Blank 02-1282 MB	<100	94

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: 07/19/12
Date Analyzed: 07/20/12

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

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Diesel Range (C_{10}-C_{25})	Motor Oil Range (C_{25}-C_{36})	Surrogate (% Recovery) (Limit 50-150)
MW-12 207213-01	3,000	<250	126
MW-5 207213-02	13,000	2,100	118
MW-6 207213-04	500	330	116
MW-2 207213-05	22,000	750	146
MW-7 207213-06	7,700	360	139
MW-15 207213-07	1,000	<250	130
Method Blank 02-1281 MB	<50	<250	121

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-12	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	207213-01
Date Analyzed:	07/18/12	Data File:	071810.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	105	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<1,000 ca	2-Hexanone	<10
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2 pr	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	540 ve
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	410 ve
Methylene chloride	<5	o-Xylene	150
t-Butyl alcohol (TBA)	<50	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	50
trans-1,2-Dichloroethene	<1	Bromoform	<1
Diisopropyl ether (DIPE)	<1	n-Propylbenzene	130
1,1-Dichloroethane	<1	Bromobenzene	<1
Ethyl t-butyl ether (ETBE)	<1	1,3,5-Trimethylbenzene	28
2,2-Dichloropropane	<1	1,1,2,2-Tetrachloroethane	<1
cis-1,2-Dichloroethene	<1	1,2,3-Trichloropropane	<1
Chloroform	<1	2-Chlorotoluene	<1
2-Butanone (MEK)	<10	4-Chlorotoluene	<1
t-Amyl methyl ether (TAME)	<1	tert-Butylbenzene	<1
1,2-Dichloroethane (EDC)	<1	1,2,4-Trimethylbenzene	74
1,1,1-Trichloroethane	<1	sec-Butylbenzene	11
1,1-Dichloropropene	<1	p-Isopropyltoluene	4.5
Carbon tetrachloride	<1	1,3-Dichlorobenzene	<1
Benzene	920 ve	1,4-Dichlorobenzene	<1
Trichloroethene	<1	1,2-Dichlorobenzene	<1
1,2-Dichloropropane	<1	1,2-Dibromo-3-chloropropane	<10
Bromodichloromethane	<1	1,2,4-Trichlorobenzene	<1
Dibromomethane	<1	Hexachlorobutadiene	<1
4-Methyl-2-pentanone	<10	Naphthalene	210 ve
cis-1,3-Dichloropropene	<1	1,2,3-Trichlorobenzene	<1
Toluene	27	Butane	260 L
trans-1,3-Dichloropropene	<1	Pentane	220 L
1,1,2-Trichloroethane	<1	Isooctane	<10L

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-5	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	207213-02 1/100
Date Analyzed:	07/20/12	Data File:	071938.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	100	57	121
Toluene-d8	100	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<100,000 ca	2-Hexanone	<1,000
Dichlorodifluoromethane	<100	1,3-Dichloropropane	<100
Chloromethane	<1,000	Tetrachloroethene	<100
Vinyl chloride	<20 pr	Dibromochloromethane	<100
Bromomethane	<100	1,2-Dibromoethane (EDB)	<100
Chloroethane	<100	Chlorobenzene	<100
Trichlorofluoromethane	<100	Ethylbenzene	1,600
Acetone	<1,000	1,1,1,2-Tetrachloroethane	<100
1,1-Dichloroethene	<100	m,p-Xylene	5,400
Methylene chloride	<500	o-Xylene	1,800
t-Butyl alcohol (TBA)	<5,000	Styrene	<100
Methyl t-butyl ether (MTBE)	<100	Isopropylbenzene	140
trans-1,2-Dichloroethene	<100	Bromoform	<100
Diisopropyl ether (DIPE)	<100	n-Propylbenzene	260
1,1-Dichloroethane	<100	Bromobenzene	<100
Ethyl t-butyl ether (ETBE)	<100	1,3,5-Trimethylbenzene	560
2,2-Dichloropropane	<100	1,1,2,2-Tetrachloroethane	<100
cis-1,2-Dichloroethene	<100	1,2,3-Trichloropropane	<100
Chloroform	<100	2-Chlorotoluene	<100
2-Butanone (MEK)	<1,000	4-Chlorotoluene	<100
t-Amyl methyl ether (TAME)	<100	tert-Butylbenzene	<100
1,2-Dichloroethane (EDC)	<100	1,2,4-Trimethylbenzene	1,800
1,1,1-Trichloroethane	<100	sec-Butylbenzene	<100
1,1-Dichloropropene	<100	p-Isopropyltoluene	130
Carbon tetrachloride	<100	1,3-Dichlorobenzene	<100
Benzene	4,000	1,4-Dichlorobenzene	<100
Trichloroethene	<100	1,2-Dichlorobenzene	<100
1,2-Dichloropropane	<100	1,2-Dibromo-3-chloropropane	<1,000
Bromodichloromethane	<100	1,2,4-Trichlorobenzene	<100
Dibromomethane	<100	Hexachlorobutadiene	<100
4-Methyl-2-pentanone	<1,000	Naphthalene	500
cis-1,3-Dichloropropene	<100	1,2,3-Trichlorobenzene	<100
Toluene	2,600	Butane	<1,000 L
trans-1,3-Dichloropropene	<100	Pentane	<1,000 L
1,1,2-Trichloroethane	<100	Isooctane	<1,000 L

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-6	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	207213-04
Date Analyzed:	07/18/12	Data File:	071812.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	101	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<1,000 ca	2-Hexanone	<10
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2 pr	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	54
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	340 ve
Methylene chloride	<5	o-Xylene	120
t-Butyl alcohol (TBA)	<50	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	6.6
trans-1,2-Dichloroethene	<1	Bromoform	<1
Diisopropyl ether (DIPE)	<1	n-Propylbenzene	8.4
1,1-Dichloroethane	<1	Bromobenzene	<1
Ethyl t-butyl ether (ETBE)	<1	1,3,5-Trimethylbenzene	12
2,2-Dichloropropane	<1	1,1,2,2-Tetrachloroethane	<1
cis-1,2-Dichloroethene	<1	1,2,3-Trichloropropane	<1
Chloroform	<1	2-Chlorotoluene	<1
2-Butanone (MEK)	<10	4-Chlorotoluene	<1
t-Amyl methyl ether (TAME)	<1	tert-Butylbenzene	<1
1,2-Dichloroethane (EDC)	<1	1,2,4-Trimethylbenzene	35
1,1,1-Trichloroethane	<1	sec-Butylbenzene	<1
1,1-Dichloropropene	<1	p-Isopropyltoluene	<1
Carbon tetrachloride	<1	1,3-Dichlorobenzene	<1
Benzene	1,400 ve	1,4-Dichlorobenzene	<1
Trichloroethene	<1	1,2-Dichlorobenzene	<1
1,2-Dichloropropane	<1	1,2-Dibromo-3-chloropropane	<10
Bromodichloromethane	<1	1,2,4-Trichlorobenzene	<1
Dibromomethane	<1	Hexachlorobutadiene	<1
4-Methyl-2-pentanone	<10	Naphthalene	<1
cis-1,3-Dichloropropene	<1	1,2,3-Trichlorobenzene	<1
Toluene	19	Butane	170 L
trans-1,3-Dichloropropene	<1	Pentane	93 L
1,1,2-Trichloroethane	<1	Isooctane	<10 L

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-2	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	207213-05 1/100
Date Analyzed:	07/20/12	Data File:	072013.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	102	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<100,000 ca	2-Hexanone	<1,000
Dichlorodifluoromethane	<100	1,3-Dichloropropane	<100
Chloromethane	<1,000	Tetrachloroethene	<100
Vinyl chloride	<20 pr	Dibromochloromethane	<100
Bromomethane	<100	1,2-Dibromoethane (EDB)	<100
Chloroethane	<100	Chlorobenzene	<100
Trichlorofluoromethane	<100	Ethylbenzene	3,600
Acetone	<1,000	1,1,1,2-Tetrachloroethane	<100
1,1-Dichloroethene	<100	m,p-Xylene	16,000
Methylene chloride	<500	o-Xylene	5,800
t-Butyl alcohol (TBA)	<5,000	Styrene	<100
Methyl t-butyl ether (MTBE)	<100	Isopropylbenzene	190
trans-1,2-Dichloroethene	<100	Bromoform	<100
Diisopropyl ether (DIPE)	<100	n-Propylbenzene	620
1,1-Dichloroethane	<100	Bromobenzene	<100
Ethyl t-butyl ether (ETBE)	<100	1,3,5-Trimethylbenzene	1,200
2,2-Dichloropropane	<100	1,1,2,2-Tetrachloroethane	<100
cis-1,2-Dichloroethene	<100	1,2,3-Trichloropropane	<100
Chloroform	<100	2-Chlorotoluene	<100
2-Butanone (MEK)	<1,000	4-Chlorotoluene	<100
t-Amyl methyl ether (TAME)	<100	tert-Butylbenzene	<100
1,2-Dichloroethane (EDC)	<100	1,2,4-Trimethylbenzene	4,400
1,1,1-Trichloroethane	<100	sec-Butylbenzene	<100
1,1-Dichloropropene	<100	p-Isopropyltoluene	<100
Carbon tetrachloride	<100	1,3-Dichlorobenzene	<100
Benzene	330	1,4-Dichlorobenzene	<100
Trichloroethene	<100	1,2-Dichlorobenzene	<100
1,2-Dichloropropane	<100	1,2-Dibromo-3-chloropropane	<1,000
Bromodichloromethane	<100	1,2,4-Trichlorobenzene	<100
Dibromomethane	<100	Hexachlorobutadiene	<100
4-Methyl-2-pentanone	<1,000	Naphthalene	1,100
cis-1,3-Dichloropropene	<100	1,2,3-Trichlorobenzene	<100
Toluene	2,400	Butane	<1,000 L
trans-1,3-Dichloropropene	<100	Pentane	<1,000 L
1,1,2-Trichloroethane	<100	Isooctane	<1,000 L

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-7	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	207213-06
Date Analyzed:	07/18/12	Data File:	071814.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	57	121
Toluene-d8	102	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<1,000 ca	2-Hexanone	<10
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2 pr	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	1,300 ve
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	3,000 ve
Methylene chloride	<5	o-Xylene	2,000 ve
t-Butyl alcohol (TBA)	<50	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	160 ve
trans-1,2-Dichloroethene	<1	Bromoform	<1
Diisopropyl ether (DIPE)	<1	n-Propylbenzene	400 ve
1,1-Dichloroethane	<1	Bromobenzene	<1
Ethyl t-butyl ether (ETBE)	<1	1,3,5-Trimethylbenzene	620 ve
2,2-Dichloropropane	<1	1,1,2,2-Tetrachloroethane	<1
cis-1,2-Dichloroethene	<1	1,2,3-Trichloropropane	<1
Chloroform	<1	2-Chlorotoluene	<1
2-Butanone (MEK)	<10	4-Chlorotoluene	<1
t-Amyl methyl ether (TAME)	<1	tert-Butylbenzene	<1
1,2-Dichloroethane (EDC)	<1	1,2,4-Trimethylbenzene	700 ve
1,1,1-Trichloroethane	<1	sec-Butylbenzene	23
1,1-Dichloropropene	<1	p-Isopropyltoluene	11
Carbon tetrachloride	<1	1,3-Dichlorobenzene	<1
Benzene	23	1,4-Dichlorobenzene	<1
Trichloroethene	<1	1,2-Dichlorobenzene	<1
1,2-Dichloropropane	<1	1,2-Dibromo-3-chloropropane	<10
Bromodichlorom ethane	<1	1,2,4-Trichlorobenzene	<1
Dibromomethane	<1	Hexachlorobutadiene	<1
4-Methyl-2-pentanone	<10	Naphthalene	660 ve
cis-1,3-Dichloropropene	<1	1,2,3-Trichlorobenzene	<1
Toluene	590 ve	Butane	480 L
trans-1,3-Dichloropropene	<1	Pentane	230 L
1,1,2-Trichloroethane	<1	Isooctane	<10 L

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	MW-15	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	207213-07
Date Analyzed:	07/18/12	Data File:	071816.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	99	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<1,000 ca	2-Hexanone	<10
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2 pr	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	780 ve
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	62
Methylene chloride	<5	o-Xylene	9.6
t-Butyl alcohol (TBA)	<50	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	54
trans-1,2-Dichloroethene	<1	Bromoform	<1
Diisopropyl ether (DIPE)	<1	n-Propylbenzene	110
1,1-Dichloroethane	<1	Bromobenzene	<1
Ethyl t-butyl ether (ETBE)	<1	1,3,5-Trimethylbenzene	1.4
2,2-Dichloropropane	<1	1,1,2,2-Tetrachloroethane	<1
cis-1,2-Dichloroethene	<1	1,2,3-Trichloropropane	<1
Chloroform	<1	2-Chlorotoluene	<1
2-Butanone (MEK)	<10	4-Chlorotoluene	<1
t-Amyl methyl ether (TAME)	<1	tert-Butylbenzene	<1
1,2-Dichloroethane (EDC)	<1	1,2,4-Trimethylbenzene	17
1,1,1-Trichloroethane	<1	sec-Butylbenzene	8.6
1,1-Dichloropropene	<1	p-Isopropyltoluene	2.1
Carbon tetrachloride	<1	1,3-Dichlorobenzene	<1
Benzene	230 ve	1,4-Dichlorobenzene	<1
Trichloroethene	<1	1,2-Dichlorobenzene	<1
1,2-Dichloropropane	<1	1,2-Dibromo-3-chloropropane	<10
Bromodichloromethane	<1	1,2,4-Trichlorobenzene	<1
Dibromomethane	<1	Hexachlorobutadiene	<1
4-Methyl-2-pentanone	<10	Naphthalene	33
cis-1,3-Dichloropropene	<1	1,2,3-Trichlorobenzene	<1
Toluene	14	Butane	500 L
trans-1,3-Dichloropropene	<1	Pentane	230 L
1,1,2-Trichloroethane	<1	Isooctane	<10 L

Analysis For Volatile Compounds By EPA Method 8260C

Client Sample ID:	Method Blank	Client:	GeoPro, LLC
Date Received:	NA	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	07/18/12	Lab ID:	02-1225 mb
Date Analyzed:	07/18/12	Data File:	071809.D
Matrix:	Water	Instrument:	GCMS4
Units:	ug/L (ppb)	Operator:	JS

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	103	57	121
Toluene-d8	101	63	127
4-Bromofluorobenzene	104	60	133

Compounds:	Concentration ug/L (ppb)	Compounds:	Concentration ug/L (ppb)
Ethanol	<1,000 ca	2-Hexanone	<10
Dichlorodifluoromethane	<1	1,3-Dichloropropane	<1
Chloromethane	<10	Tetrachloroethene	<1
Vinyl chloride	<0.2	Dibromochloromethane	<1
Bromomethane	<1	1,2-Dibromoethane (EDB)	<1
Chloroethane	<1	Chlorobenzene	<1
Trichlorofluoromethane	<1	Ethylbenzene	<1
Acetone	<10	1,1,1,2-Tetrachloroethane	<1
1,1-Dichloroethene	<1	m,p-Xylene	<2
Methylene chloride	<5	o-Xylene	<1
t-Butyl alcohol (TBA)	<50	Styrene	<1
Methyl t-butyl ether (MTBE)	<1	Isopropylbenzene	<1
trans-1,2-Dichloroethene	<1	Bromoform	<1
Diisopropyl ether (DIPE)	<1	n-Propylbenzene	<1
1,1-Dichloroethane	<1	Bromobenzene	<1
Ethyl t-butyl ether (ETBE)	<1	1,3,5-Trimethylbenzene	<1
2,2-Dichloropropane	<1	1,1,2,2-Tetrachloroethane	<1
cis-1,2-Dichloroethene	<1	1,2,3-Trichloropropane	<1
Chloroform	<1	2-Chlorotoluene	<1
2-Butanone (MEK)	<10	4-Chlorotoluene	<1
t-Amyl methyl ether (TAME)	<1	tert-Butylbenzene	<1
1,2-Dichloroethane (EDC)	<1	1,2,4-Trimethylbenzene	<1
1,1,1-Trichloroethane	<1	sec-Butylbenzene	<1
1,1-Dichloropropene	<1	p-Isopropyltoluene	<1
Carbon tetrachloride	<1	1,3-Dichlorobenzene	<1
Benzene	<0.35	1,4-Dichlorobenzene	<1
Trichloroethene	<1	1,2-Dichlorobenzene	<1
1,2-Dichloropropane	<1	1,2-Dibromo-3-chloropropane	<10
Bromodichloromethane	<1	1,2,4-Trichlorobenzene	<1
Dibromomethane	<1	Hexachlorobutadiene	<1
4-Methyl-2-pentanone	<10	Naphthalene	<1
cis-1,3-Dichloropropene	<1	1,2,3-Trichlorobenzene	<1
Toluene	<1	Butane	<10 L
trans-1,3-Dichloropropene	<1	Pentane	<10 L
1,1,2-Trichloroethane	<1	Isooctane	<10 L

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213
Date Extracted: 07/23/12
Date Analyzed: 08/15/12

RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES FOR ORGANIC LEAD SPECIATION AND MANGANESE BY METHOD 8082 MODIFIED

Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	TML	TMEL	DMDEL	MTEL	TEL	MMT	Surrogate (% Rec.) (Limit 50-150)
MW-5 (Product) 207213-03	D	ND	ND	ND	D jl	D jl	87
Method Blank	ND	ND	ND	ND	ND	ND	100

TML Tetramethyl Lead
TMEL Trimethylethyl Lead
DMDEL Dimethyldiethyl Lead
MTEL Methyltriethyl Lead
TEL Tetraethyl Lead
MMT Methylcyclopentadienyl Manganese Tricarbonyl

Analysis For Total Organic Lead and Manganese By EPA Method 200.8

Client ID:	MW-5 (Product)	Client:	GeoPro, LLC
Date Received:	07/17/12	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	08/23/12	Lab ID:	207213-03
Date Analyzed:	08/23/12	Data File:	207213-03.018
Matrix:	Product	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	btb

Analyte:	Concentration mg/kg (ppm)
Organic Lead	50.9
Organic Manganese	22.1

Analysis For Total Organic Lead and Manganese By EPA Method 200.8

Client ID:	Method Blank	Client:	GeoPro, LLC
Date Received:	NA	Project:	Port Angeles 120605, F&BI 207213
Date Extracted:	08/23/12	Lab ID:	I2-552 mb
Date Analyzed:	08/23/12	Data File:	I2-552 mb.015
Matrix:	Product	Instrument:	ICPMS1
Units:	mg/kg (ppm)	Operator:	btb

Analyte:	Concentration mg/kg (ppm)
Organic Lead	<1
Organic Manganese	<1

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR TPH AS GASOLINE USING METHOD NWTPH-Gx

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	ug/L (ppb)	1,000	97	95	69-134	2

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213

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

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	103	106	63-142	3

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR VOLATILES BY EPA METHOD 8260C

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Ethanol	ug/L (ppb)	2,500	51	61	28-187	18
Dichlorodifluoromethane	ug/L (ppb)	50	118	120	25-158	2
Chloromethane	ug/L (ppb)	50	113	115	45-156	2
Vinyl chloride	ug/L (ppb)	50	99	98	50-154	1
Bromomethane	ug/L (ppb)	50	91	90	55-143	1
Chloroethane	ug/L (ppb)	50	94	93	58-146	1
Trichlorofluoromethane	ug/L (ppb)	50	101	99	50-150	2
Acetone	ug/L (ppb)	250	100	100	60-155	0
1,1-Dichloroethene	ug/L (ppb)	50	89	88	67-136	1
Methylene chloride	ug/L (ppb)	50	86	86	39-148	0
t-Butyl alcohol (TBA)	ug/L (ppb)	2,500	113	113	46-163	0
Methyl t-butyl ether (MTBE)	ug/L (ppb)	50	89	86	64-147	3
trans-1,2-Dichloroethene	ug/L (ppb)	50	101	99	68-128	2
Diisopropyl ether (DIPE)	ug/L (ppb)	50	97	98	71-138	1
1,1-Dichloroethane	ug/L (ppb)	50	100	100	79-121	0
Ethyl t-butyl ether (ETBE)	ug/L (ppb)	50	93	94	67-149	1
2,2-Dichloropropane	ug/L (ppb)	50	104	102	55-143	2
cis-1,2-Dichloroethene	ug/L (ppb)	50	105	105	80-123	0
Chloroform	ug/L (ppb)	50	99	99	80-121	0
2-Butanone (MEK)	ug/L (ppb)	250	109	110	57-149	1
t-Amyl methyl ether (TAME)	ug/L (ppb)	50	98	100	64-147	2
1,2-Dichloroethane (EDC)	ug/L (ppb)	50	96	95	73-132	1
1,1,1-Trichloroethane	ug/L (ppb)	50	92	91	83-130	1
1,1-Dichloropropene	ug/L (ppb)	50	101	101	77-129	0
Carbon tetrachloride	ug/L (ppb)	50	104	104	75-158	0
Benzene	ug/L (ppb)	50	102	102	69-134	0
Trichloroethene	ug/L (ppb)	50	91	91	80-120	0
1,2-Dichloropropane	ug/L (ppb)	50	104	104	77-123	0
Bromodichloromethane	ug/L (ppb)	50	101	101	81-133	0
Dibromomethane	ug/L (ppb)	50	102	102	82-125	0
4-Methyl-2-pentanone	ug/L (ppb)	250	105	105	70-140	0
cis-1,3-Dichloropropene	ug/L (ppb)	50	105	104	82-132	1
Toluene	ug/L (ppb)	50	99	99	72-122	0
trans-1,3-Dichloropropene	ug/L (ppb)	50	103	102	80-136	1
1,1,2-Trichloroethane	ug/L (ppb)	50	99	100	75-124	1
2-Hexanone	ug/L (ppb)	250	103	105	64-152	2
1,3-Dichloropropane	ug/L (ppb)	50	101	100	76-126	1
Tetrachloroethene	ug/L (ppb)	50	104	105	76-121	1
Dibromochloromethane	ug/L (ppb)	50	104	105	84-133	1
1,2-Dibromoethane (EDB)	ug/L (ppb)	50	104	104	82-125	0
Chlorobenzene	ug/L (ppb)	50	100	100	83-114	0
Ethylbenzene	ug/L (ppb)	50	99	100	77-124	1
1,1,1,2-Tetrachloroethane	ug/L (ppb)	50	103	104	84-127	1
m,p-Xylene	ug/L (ppb)	100	100	100	83-125	0
o-Xylene	ug/L (ppb)	50	104	106	86-121	2
Styrene	ug/L (ppb)	50	103	103	85-127	0
Isopropylbenzene	ug/L (ppb)	50	102	101	87-122	1
Bromoform	ug/L (ppb)	50	109	108	74-136	1
n-Propylbenzene	ug/L (ppb)	50	103	103	74-126	0
Bromobenzene	ug/L (ppb)	50	105	105	80-121	0
1,3,5-Trimethylbenzene	ug/L (ppb)	50	101	101	80-126	0
1,1,2,2-Tetrachloroethane	ug/L (ppb)	50	104	104	66-126	0
1,2,3-Trichloropropane	ug/L (ppb)	50	101	100	67-124	1
2-Chlorotoluene	ug/L (ppb)	50	102	103	77-127	1
4-Chlorotoluene	ug/L (ppb)	50	104	104	78-128	0
tert-Butylbenzene	ug/L (ppb)	50	101	101	85-127	0
1,2,4-Trimethylbenzene	ug/L (ppb)	50	101	101	82-125	0
sec-Butylbenzene	ug/L (ppb)	50	99	99	80-125	0
p-Isopropyltoluene	ug/L (ppb)	50	101	101	82-127	0
1,3-Dichlorobenzene	ug/L (ppb)	50	100	101	85-116	1
1,4-Dichlorobenzene	ug/L (ppb)	50	99	99	84-121	0
1,2-Dichlorobenzene	ug/L (ppb)	50	98	99	85-116	1
1,2-Dibromo-3-chloropropane	ug/L (ppb)	50	98	98	57-141	0
1,2,4-Trichlorobenzene	ug/L (ppb)	50	95	97	72-130	2
Hexachlorobutadiene	ug/L (ppb)	50	87	88	53-141	1
Naphthalene	ug/L (ppb)	50	104	105	64-133	1
1,2,3-Trichlorobenzene	ug/L (ppb)	50	100	101	65-136	1

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213

QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF PRODUCT SAMPLES FOR ORGANIC LEAD AND MANGANESE BY EPA METHOD 8082 MODIFIED

Laboratory Code: 207162-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result
Tetramethyl lead	mg/kg (ppm)	ND	ND
Tetraethyl lead	mg/kg (ppm)	ND	ND
MMT	mg/kg (ppm)	ND	ND

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Tetramethyl lead	mg/kg (ppm)	25	126	128	70-130	2
Tetraethyl lead	mg/kg (ppm)	25	146 vo	152 vo	70-130	4
MMT	mg/kg (ppm)	25	220 vo	250 vo	70-130	13

Date of Report: 08/28/12
Date Received: 07/17/12
Project: Port Angeles Fingerprint 120605, F&BI 207213

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF PRODUCT SAMPLES FOR ORGANIC LEAD AND MANGANESE 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)
Organic Lead	mg/kg (ppm)	70.75	85	84	70-130	1
Organic Manganese	mg/kg (ppm)	12.5	89	91	70-130	2

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.

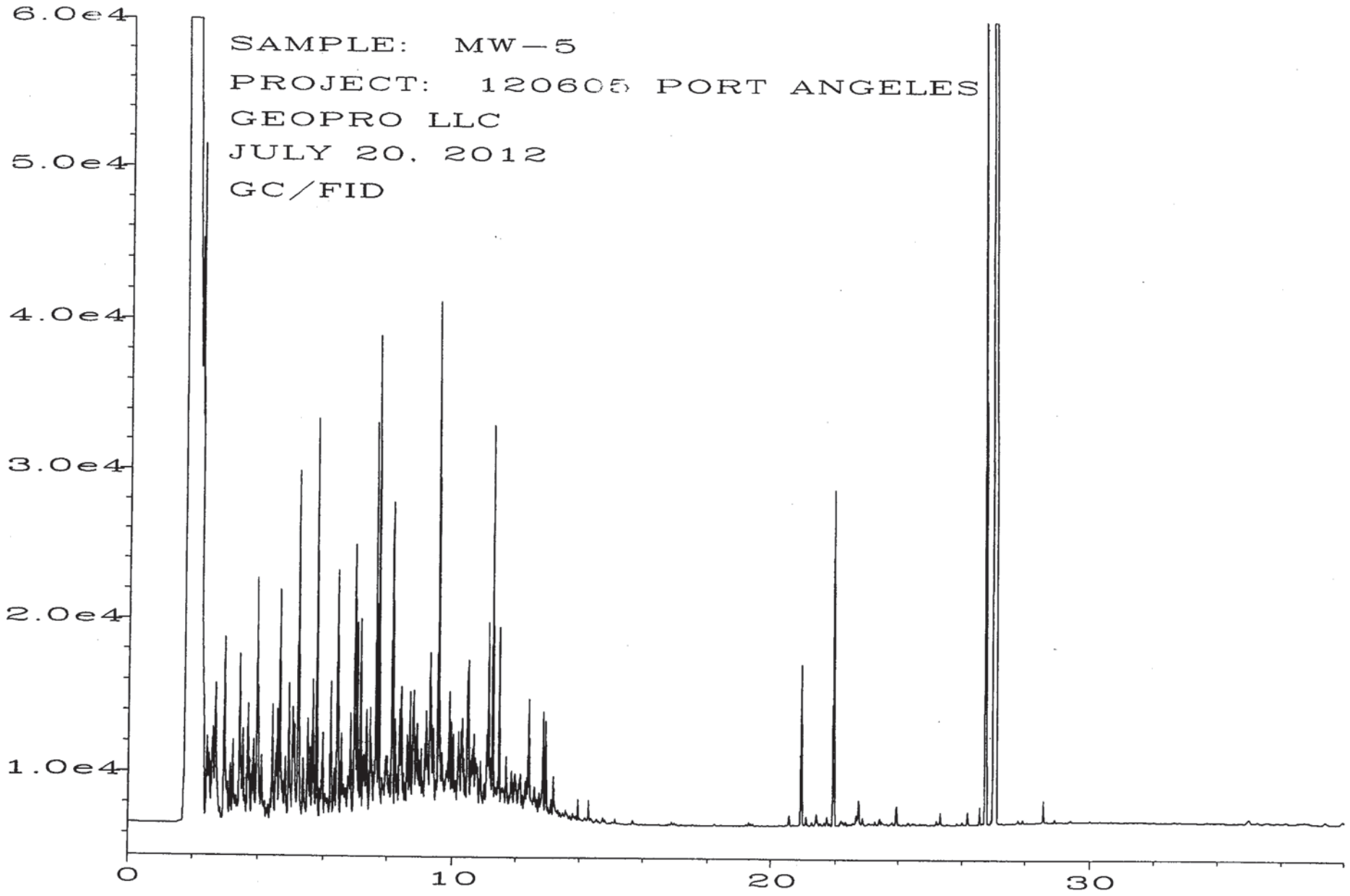
pc – The sample was received in a container not approved by the method. The value reported should be considered an estimate.

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

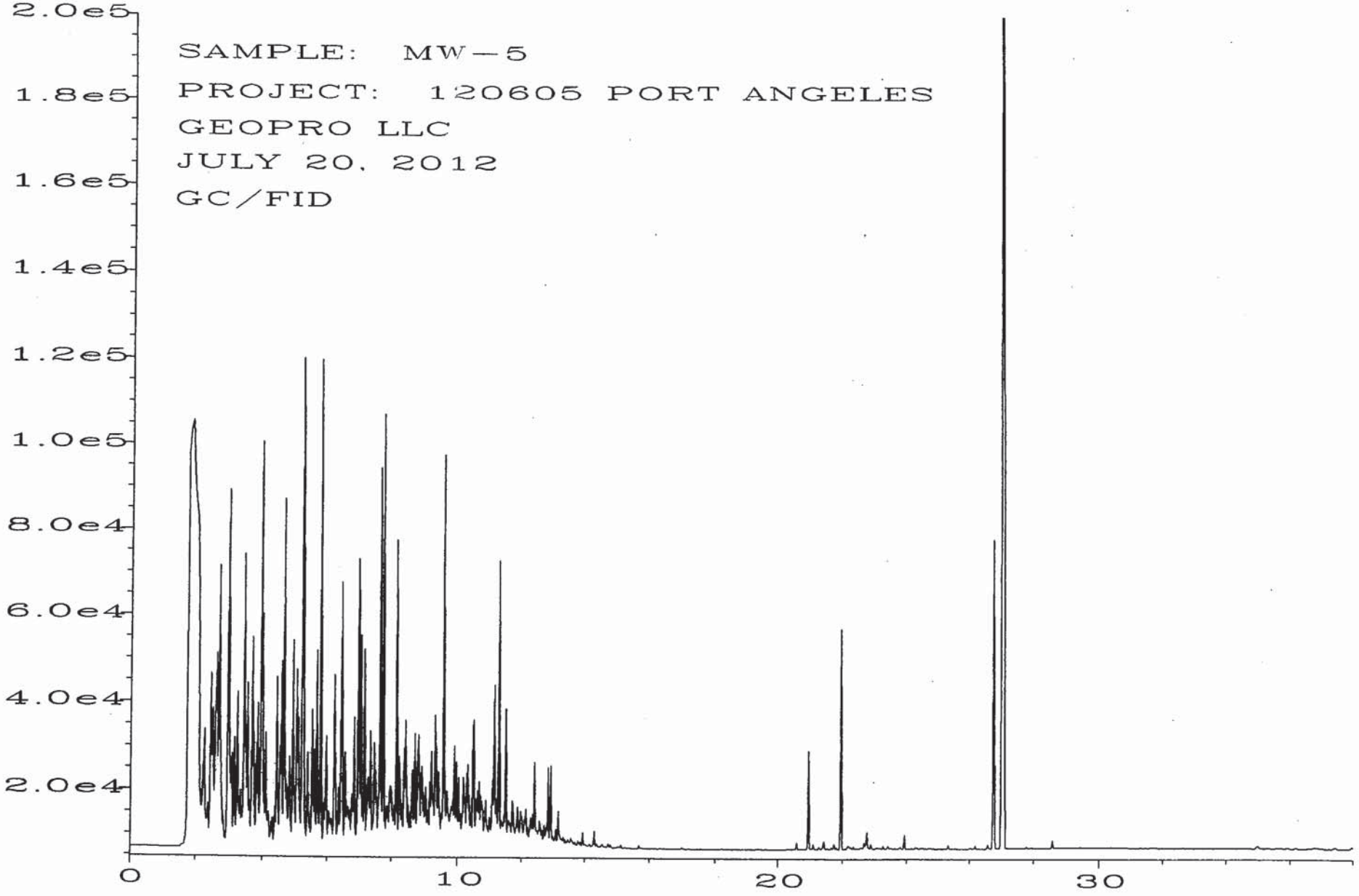
ve - Estimated concentration calculated for an analyte response above the valid instrument calibration range. A dilution is required to obtain an accurate quantification of the analyte.

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

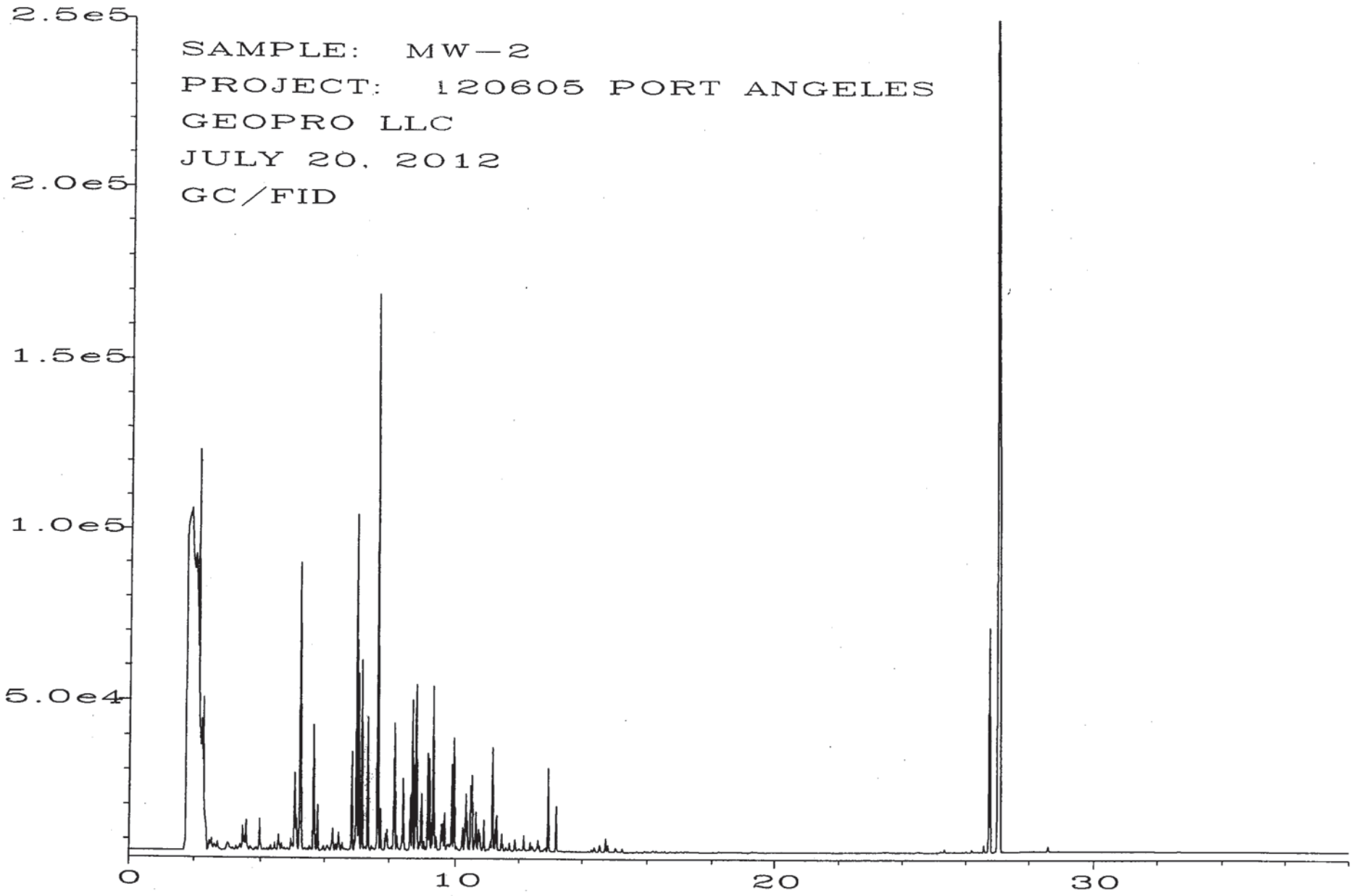
x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.



Sig. 1 in C:\HPCHEM\1\DATA\07-20-12\049F1401.D



Sig. 1 in C:\HPCHEM\1\DATA\07-20-12\050F1401.D



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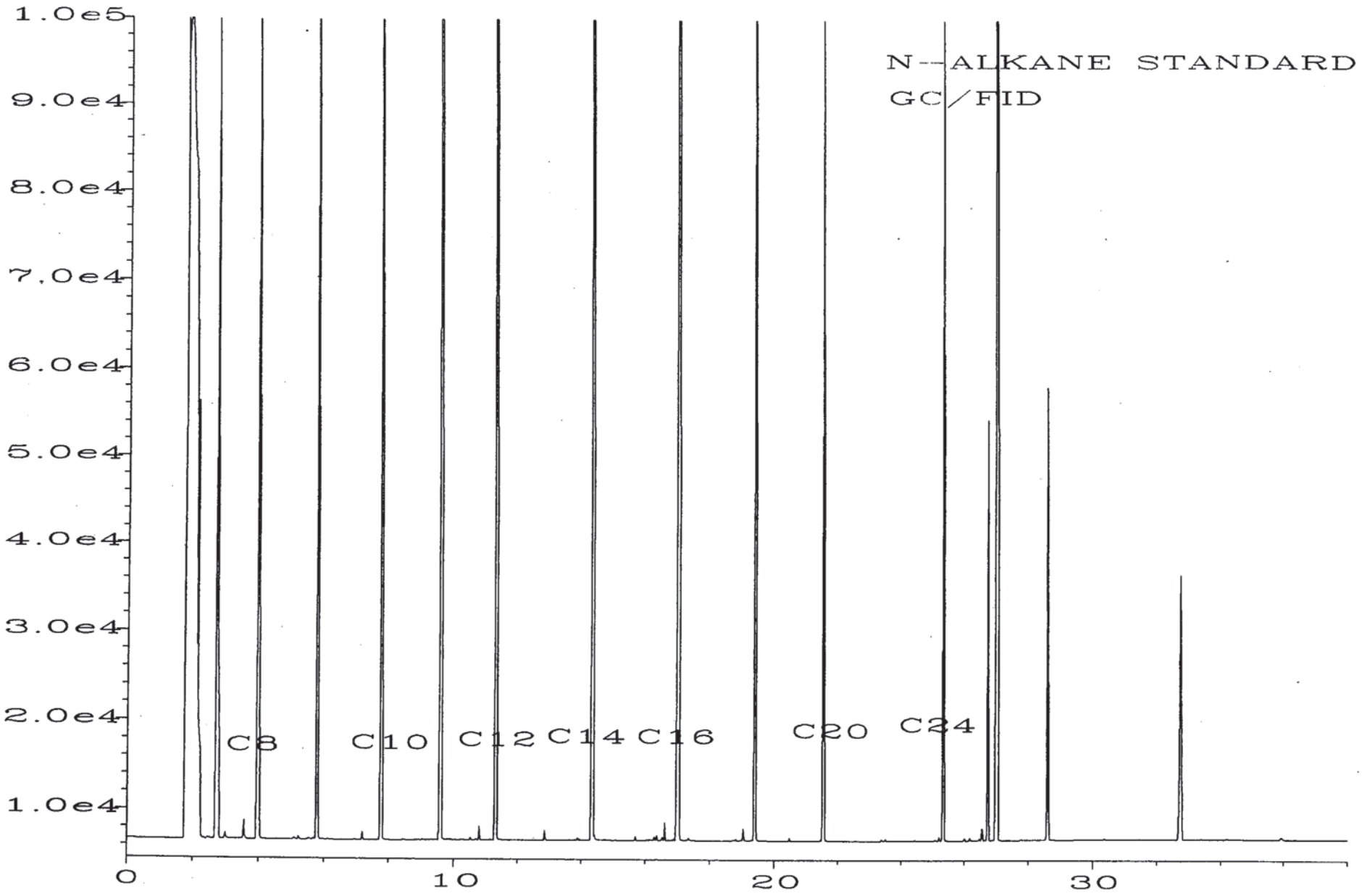

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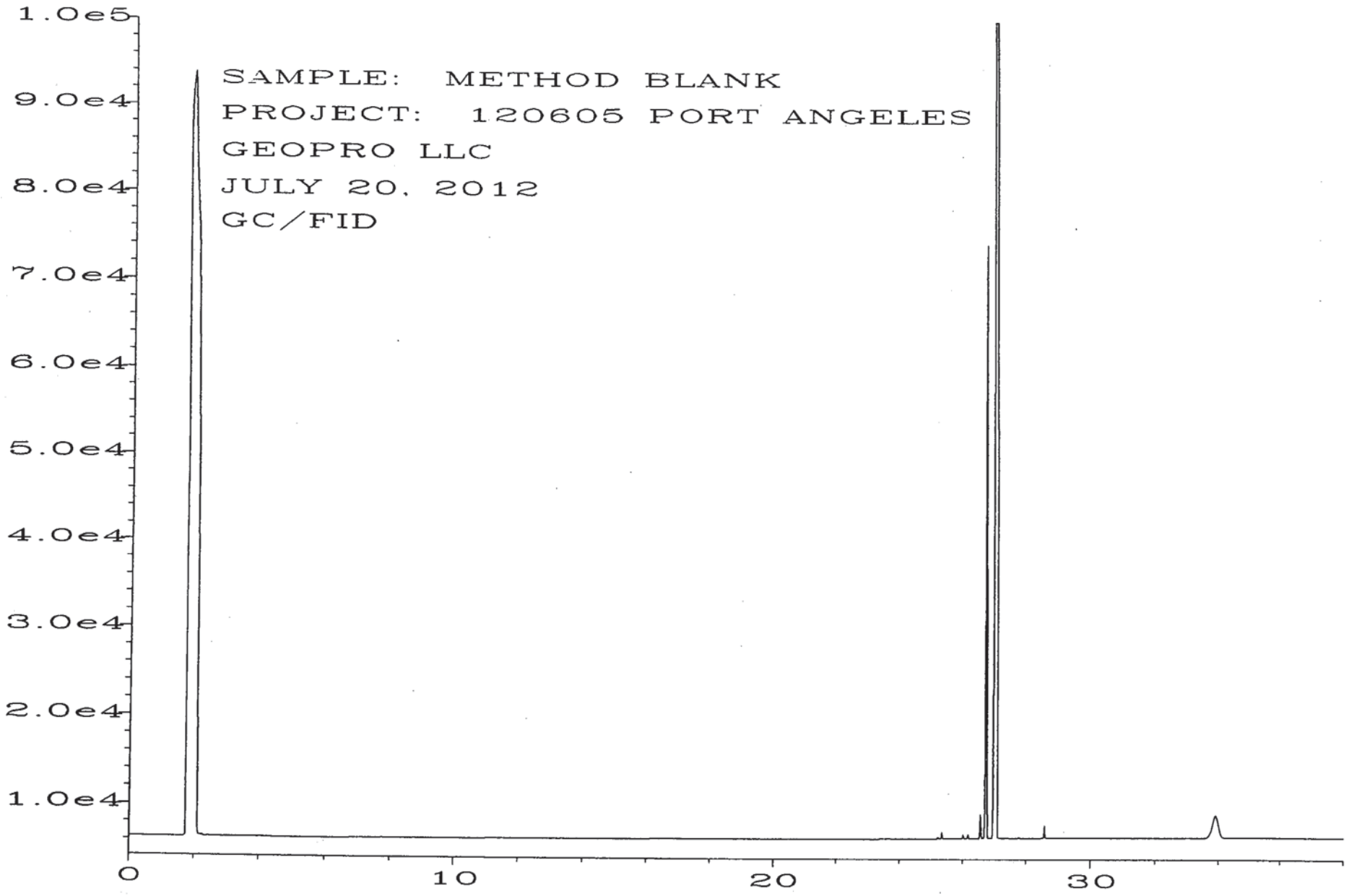

Sig. 1 in C:\HPCHEM\1\DATA\07-20-12\048F1401.D

207213 FRIEDMAN & BRUYA, Inc. MP 07-17-12 ATTN: BRAD BENSON V5/E03

3012 16th Ave. West
Seattle WA 98119
2062858282

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

CHAIN OF CUSTODY REPORT

Work Order #:

CLIENT: GEOPRO LLC.

INVOICE TO: Same

REPORT TO: GeoPro LLC
ADDRESS: PO Box 26
Battle Ground WA 98604
PHONE: 3606661465 FAX: Cell 3609075648

P.O. NUMBER:

PROJECT NAME: Port Angeles Finger print
PROJECT NUMBER: 120605
SAMPLED BY: Richard Kent

PRESERVATIVE: HCl + VOAs Liter-none

REQUESTED ANALYSES

	CLIENT SAMPLE IDENTIFICATION	SAMPLING DATE/TIME	HFS	PIANO	ECD 609.Pb	ICP 609.Pb	TPH-Dx	TPH-Gx	8260 Ext.							Lab ID	MATRIX (W, S, O)	# OF CONT.	LOCATION/ COMMENTS	TA WO ID
1	MW-12	7/14/12 0815					X	X	X							01 A-D	W	4	3 VOAs 1 amber liter	
2	MW-5	7/14/12 0955					X	X	X							02 A-D	W	4	↓	
3	MW-5	7/14/12 0955	X	X	X	X										03	free product	1	glass jar	
4	MW-6	7/14/12 1028					X	X	X							04 A-D	W	4	3 VOAs 1 amber liter	
5	MW-2	7/14/12 1110					X	X	X							05 A-D	W	4		
6	MW-7	7/14/12 1205					X	X	X							06 A-D	W	4		
7	MW-15	7/14/12 1233					X	X	X							07 A-D	W	4	↓	
8	TripBlank															08	W	1	* RD 7-17-12 Added in Lab	
9																				
10																				

TURNAROUND REQUEST
in Business Days *
Organic & Inorganic Analyses: 10 STD. | 7 | 5 | 4 | 3 | 2 | 1 | <1
Petroleum Hydrocarbon Analyses: 5 STD. | 4 | 3 | 2 | 1 | <1
OTHER Specify:
* Turnaround Requests less than standard may incur Rush Charges

RELEASED BY: Richard Kent	FIRM: GeoPro LLC	DATE: 7/16/12	TIME: 1030
RECEIVED BY: Nhan Phan	FIRM: FEBI	DATE: 7-17-12	TIME: 0930
RELEASED BY:	FIRM:	DATE:	TIME:
RECEIVED BY:	FIRM:	DATE:	TIME:

ADDITIONAL REMARKS:
X2 added per Kurt's conversation w/ Rick Kent CP 7/17/12

TEMP:

PAGE OF

TAL-1000 (021

Samples received at 6 °C