Phase II
Environmental Site Assessment Report

King County Metro South Annex Base
11911 East Marginal Way South
King County Parcel No. 102304-9066
Tukwila, Washington 98168

Prepared for:
King County Metro Transit Department
400 Yesler Way
Seattle, WA 98104

Otak, Inc.
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May 21, 2020
PBS Project No. 41484.004

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1.0 INTRODUCTION

PBS Engineering and Environmental Inc. (PBS) has conducted a Phase II Environmental Site Assessment at the King County Metro South Annex Base, located at 11911 E Marginal Way S, Tukwila, Washington (Site or subject property; see Figure 1). It is noted that the subject property does not include the facilities building or grounds located on the western portion of the parcel. The assessment was performed in general compliance with the ASTM International E1903-19 Standard Practice for Environmental Site Assessments: Phase II Environmental Site Assessment Process. PBS completed the scope of services under contract with Otak, Inc, in support of the redevelopment of the site into the King County Metro South Annex Base. This report summarizes the work performed at the site and presents the results of the investigation and PBS' conclusions.

1.1 Site Description

The Site occupies the eastern 13-acres of 16.15-acre King County Assessor's Parcel No 1023049066 in Tukwila, Washington. The Site operates as the Training and Safety Facility for King County Metro, which has been the occupant of the site since 1987. The site is currently mostly graded flat with some artificial topography including stormwater basins and a hill used for coach drivers training. The site currently contains several structures, parking lots, open storage, and a training yard. The elevation of the site is approximately 15-feet above mean sea level.

In order to support its new 250-bus (approximately) fleet, South Annex Base will include vehicle maintenance bays, steam bays, inspection bays, bus wash bays, bus fueling, full electric charging infrastructure, approximately 8,400 square feet of maintenance offices and spaces, approximately 7,500 square feet of parts storage, approximately 16,500 square feet of operator spaces (break, locker, restroom, dispatch, chief, superintendent), and miscellaneous other business functions required for base operations (safety, health and wellness, etc.). Consistent with King County's Green Building Ordinance and Strategic Climate Action Plan, the base will be designed and built to achieve LEEDv4 Platinum certification and operated with the highest feasible sustainable practices.

The project will include the following elements:

- Construction of a new maintenance and operations facility, including offices, up to 22 bus cleaning and maintenance bays, outdoor storage, and a basement level for maintenance work, constructed to LEEDv4 Platinum standards;
- Demountable fueling systems to support an interim hybrid diesel-electric fleet;
- Construction of retaining walls on the east side of the property;
- Maintenance and repair of existing pavement;
- Frontage improvements on East Marginal Way South;
- Probable roadway improvements and culvert replacement on South 120th Place;
- Potential signalization at East Marginal Way South and South 120th Place;
- Probable daylighting of the east branch of Riverton Creek and culvert replacement beneath South 120th Place;
- Probable daylighting of the northern portion of the west branch of Riverton Creek and culvert replacement beneath the internal access drive and parking lot on the South Facilities site; and
- Installation of an electric bus charging system anticipated to include a gantry system with vertical supports and ground-based electrical infrastructure.

2.0 REGIONAL GEOLOGY AND HYDROGEOLOGY

The subject property is located in the Duwamish River valley. It is underlain by Holocene aged alluvium composed mostly of unconsolidated silt, sand, and gravel valley fill with some clay.

An intermittent drainage (Riverton Creek) runs through and along the north boundary of the subject property, and the Site lies on a flat area within the river plain of the Duwamish River, which bends around the property approximately 1,100 feet to the north and 1,400 feet to the east. The direction of shallow unconfined groundwater flow is inferred to be toward the north-northwest.

3.0 BACKGROUND

3.1 Phase I Environmental Site Assessment (Subject Property)

PBS completed a Phase I Environmental Site Assessment (ESA) in July 2019 which reported the following findings:

1. The King County Metro South Facilities, a set of maintenance facilities associated with the subject property, are west-adjacent and share the same address as the subject property. The maintenance facilities were listed as a leaking UST (LUST) site (Site ID #7790) in 1995. Three USTs were removed from the site in 1994. A total of 4,000 cubic yards of soil was reportedly removed and remediated via thin spread on the subject property. After one year (1995) the soil was re-sampled and concentrations were reportedly below the MTCA Method A Cleanup Levels. The 'clean' soil was used as fill on the subject property and the remaining contaminated material was reportedly transferred off site. In 1997 soil and groundwater samples were collected and analyzed for contaminants of concern. Benzene was detected in groundwater in exceedance of the current MTCA Method A Cleanup Level. In 2015, Ecology completed a Site Hazard Analysis and the site received a ranking of 1 out of 5; 1 representing the highest level of concern and 5 being the lowest. Ecology confirmed the potential transport pathways to air, surface water (a class 3 creek is located 50-feet downgradient from the former UST area) and groundwater from their review of previous reports. Prior to the July 2019 Phase I ESA prepared by PBS, the groundwater contamination had not been adequately characterized and there was inadequate information to rule out the potential for the west adjacent property to have impacted the subject property. PBS considers this to be of high environmental concern to the subject property.

2. Several unused buses are parked and stored on the north end of the property. The potential for leaking lubricants, fuels or oil from the vehicles poses the potential for release to the ground surface. No staining or other indications of a release were present. Given the lack of staining and current use, they pose a low environmental concern.

3. Several 55-gallon barrels were observed at the north end of the property with no labels to indicate their original purpose. The drums are reportedly used to store water for driver training, and no staining or other indications of a release were present. Given the lack of staining and its current use, they pose a low environmental concern.

4. Several lead-acid vehicles batteries were observed being stored in the open at the south end of the property. No staining or other indications of a release were present. Given the lack of staining or visible degradation, they pose a low environmental concern.

5. A large container marked "Burner Fuel Only" and "Diesel #1" was observed being stored in the

open at the south end of the property. No staining or other indications of a release were present. Given the lack of staining or visible degradation, it poses a low environmental concern.

6. An unlabeled, empty gas can was being stored near the floor drain in the maintenance training garage. Given the lack of staining and lack of odor, it poses a low environmental concern.

7. The property was in agricultural (crop fields) use from the 1910s to the 1960s. The use of regulated agricultural chemicals (e.g., organochlorine pesticides and arsenical herbicides) is considered an acceptable practice. Spillage, mixing, or handling of these chemicals in bulk quantities or intense usage can result in hazardous soil conditions requiring remedial action in accordance with state or federal agencies. No information was available indicating hazardous soil conditions exist on the subject property; therefore, this is considered a de minimis environmental condition.

From these findings, the following recognized environmental conditions (RECs) were identified:

1. The west-adjacent South Facilities have been categorized as a rank 1 environmental hazard by Ecology. The incomplete remediation of soil and recorded residual soil, groundwater, and air contamination present at these adjacent facilities constitutes a REC.

2. The storage of old, potentially leaking vehicles on the subject property may result in a release of petroleum product to surface soils. This constitutes a REC.

3.2 Environmental Investigation of West-Adjacent Site

In 2019 and 2020, King County Metro commissioned groundwater and subsurface investigations at the west-adjacent South Facilities site to determine if contamination discovered during the mid-1990s was still present. Groundwater samples collected in October 2019 from wells in the vicinity of the replaced USTs revealed no detectable concentrations of the contaminants of concern. Samples collected from well SB-8 in the northeast corner of South Facilities, adjacent to the northwest corner of the Subject Property, in September 2019 contained concentrations of heavy oil range total petroleum hydrocarbons (TPH) in exceedance of MTCA Method A Cleanup Levels. Parametrix reported that *due to the extended period since installation of the monitoring wells and the observations of turbidity and drawdown in some wells during purging, the wells should be redeveloped and resampled to verify the results* (Parametrix, 2019).

PBS redeveloped the wells using surge, bail and pump techniques with a disposable bailer and electric submersible pump. Approximately 40 gallons of tap water were also introduced and then removed from the wells in an attempt to loosen sediment within the well filter pack, screen and zone of influence. Groundwater samples were collected from site wells on December 17, 2019 following well redevelopment. Analysis of groundwater samples collected in December 2019 did not detect contaminants of concern in exceedance of MTCA Method A Cleanup Levels (PBS, 2020).

Soil and groundwater samples were collected by push probe methodology in April 2020 at various locations at the South Facilities site to determine if contaminants revealed during the mid-1990s sampling events had possibly migrated towards the South Annex Base site. Initial findings of diesel- and heavy oil-range TPH in soil and groundwater samples were determined to likely be a result of biogenic interference in the samples as the soils underlying South Facilities have a high peat content, and concentrations of TPH were below laboratory reporting limits after the sample was passed through silica gel cleanup. Groundwater sampling completed in April 2020 indicated that migration of contaminants from the tank

area toward and onto the South Annex Base portion of the property is unlikely as groundwater flow is towards the northwest (Parametrix, 2020).

These investigations concluded that observed TPH concentrations did not represent residual contamination from the remediated LUST and that migration of TPH in groundwater from the South Facilities site has not impacted the Subject Property.

4.0 SITE INVESTIGATION

The purpose of the subsurface investigation was to investigate the soil and groundwater quality in the vicinity of the identified potential concerns. Six boring locations (E-1 to E-6) were chosen based on proximity to the inferred location of the REC's. Borings E-1 and E-2 were placed near the western boundary of the site adjacent to the South Facilities in order to identify any potential migration of soil and groundwater contamination from that site, and borings E-3 through E-6 were located throughout the vehicle storage yards and within the presumed 1997 remediation area to assess any existing impacts to soil and groundwater from those historical uses.

Prior to beginning the drilling investigation, PBS filed a public utility notification request. On March 30, 2020, PBS supervised a private utility locating company, Applied Professional Services of North Bend, WA, while they conducted borehole clearance for subsurface obstructions. Once the six boring locations were cleared for drilling, Holt Services of Puyallup, Washington, deployed a Geoprobe 5800 truck-mounted direct-push drilling rig to advance the borings on April 9, 2020, with supervision by PBS.

The drilling and sampling program included the advancement of six soil borings for collection of soil samples and "grab" groundwater samples. In each boring soils were logged continuously, noting grain size, density, color, odor, and moisture. During the advancement of boreholes, soil was screened for volatiles using a hand-held photoionization detector (PID). Cursory PID readings were taken along the runs of soil as they were brought to the surface. PID readings were also taken from select soil intervals by partially filling a sealable plastic bag and taking headspace readings within the bag. Borings were advanced to a total depth of 15 feet below ground surface (bgs).

Two soil samples were collected from each boring; shallow soil samples were collected at the interface between gravel fill and underlying native silt, approximately 4-6 feet bgs. The native silts have a lower hydraulic permeability than the overlying gravel fill. Shallow soil samples targeted contaminants which may have migrated down from the surface and been trapped on top of the lower permeability soils. Deep soil samples were taken at the top of first encountered saturated soils, approximately 10-12 feet bgs.

Groundwater was first encountered during drilling at depths ranging from 10 to 11 feet bgs. PVC well screens were temporarily installed in each borehole to facilitate collection of "grab" groundwater samples. Static groundwater stabilized in the temporary well screens at depths ranging from 6.6 to 7.2 feet bgs. Grab groundwater samples were collected from the well screens using a peristaltic pump and disposable polyethylene tubing at flow rates not exceeding 300 milliliters per minute.

Boring locations are presented in Figure 2: Site Plan. Boring logs describing the subsurface lithology, sample depths, and PID readings are presented in Appendix A.

A total of twelve soil samples and six grab groundwater samples were collected in laboratory-supplied containers, placed on ice in a cooler and transported to Friedman and Bruya Laboratory in Seattle, Washington, within specified holding times and under chain-of-custody documentation. Samples were submitted for the following analyses:

- Diesel range Total Petroleum Hydrocarbons (TPH) by EPA method NWTPH-Dx
- Gasoline range TPH by EPA method NWTPH-Gx
- Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX)

5.0 INVESTIGATION-DERIVED WASTES

Gloves, tubing and other disposable field supplies were disposed of as solid waste. Soil cuttings were placed in 55-gallon drums and stored onsite pending analytical results. One waste soil sample was collected of drilling spoils and submitted to the laboratory for the analyses presented in section 4 plus metals by EPA Method 6020. Contaminants were not detected in the waste soil sample above laboratory reporting limits, with the exception of metals, which were detected below applicable disposal criteria. As such cuttings were disposed of as clean soil. Analytical results of the waste soil sample are presented in Appendix B.

6.0 APPLICABLE REGULATIONS AND CLEANUP STANDARDS

Contaminated site assessment and cleanup is conducted in accordance with the substantive requirements of the Model Toxics Control Act (MTCA), Chapter 70.105D of the Revised Code of Washington (RCW) and its implementing regulations, Chapter 173-340 of the Washington Administrative Code (WAC).

Site assessment is performed under MTCA. This section summarizes the adopted criteria screening levels established for this site.

6.1 Soil and Groundwater Cleanup Standards

In accordance with MTCA, development of preliminary cleanup levels includes identifying potential exposure pathways for human and ecological impacts based on the planned land use. MTCA provides for three methods (Method A, B or C) for establishing cleanup standards. Method A (unrestricted land use) is typically used as the default standard levels. Method B and C are used when developing site-specific cleanup levels.

Considering the current land use and potential future land use, MTCA level A Cleanup Levels are the Adopted Criteria for screening levels at this time. Method A Cleanup Levels for soil and groundwater are presented in Tables 1 along with the contaminant concentrations.

7.0 FINDINGS

7.1 Soil Profile

A typical subsurface profile encountered on site is presented below:

Typical Subsurface Profile

Classification	Description	Approximate Depth Range (feet bgs)
Asphalt	Artificial Surface	0.0 to 0.25
Gravel (Fill)	Dense, gray, silty GRAVEL with sand; fine to coarse sand; fine to coarse subangular gravel; dry; fill.	0.5 to 5
Silt	Soft, dark brown, elastic SILT (MH) with sand and organics; medium to high plasticity; fine to medium sand; moist.	5 to 10
Sand	Variable thickness (1- to 4-foot) beds of medium dense, dark gray, poorly graded SAND (SP); fine to medium sand; occasional interbedding with thin lenses of silts (MH) and clays (CL)	10 to 15

Graphic boring logs are provided in Appendix A.

7.2 Analytical Results

No contaminants of concern were detected above laboratory reporting limits in the soil samples. Gasoline range TPH and BTEX were not detected above laboratory reporting limits and/or the adopted cleanup criteria in the groundwater samples.

Heavy Oil range TPH were detected above reporting limits but below the MTCA Method A Cleanup Level in groundwater samples from three borings (E-1, E-4, and E-5). Diesel range TPH were detected in the six groundwater samples collected from the site. Diesel range TPH concentrations exceeded the MTCA Method A cleanup level of 500 micrograms per liter (µg/L) in the sample from boring E-1 (E-1-W). However, each of the detections of diesel and heavy oil range TPH in water samples collected from the site were flagged by the laboratory because the sample chromatographic patterns did not resemble the fuel standard used for quantitation. The laboratory reported that the contaminant did not resemble diesel or heavy oil range TPH, and could be naturally occurring organic material or a fuel metabolite. Fuel metabolites are the byproducts of the degradation of total petroleum hydrocarbons via metabolism by microorganisms. These interfering byproducts can be removed from the sample with the use of a Silica Gel Column; this process is referred to as Silica Gel Cleanup. Silica gel cleanup can be used in column chromatography, such as that used in Method NWTPH-Dx, for the separation of analytes from interfering compounds of a different chemical polarity.

Sample E-1 was selected for silica gel cleanup analysis due to it having the highest initially detected diesel range TPH concentration. Analysis of sample E-1-W by Method NWTPH-Dx with Silica Gel Cleanup did not detect diesel or heavy oil range TPH above laboratory reporting limits. The lack of diesel detections after Silica Gel Cleanup suggests that the detected hydrocarbons are either naturally decaying organic material or a highly weathered or degraded petroleum product. This conclusion is further supported by the observance of organic rich silty soils in the 5 to 10-foot depth range in environmental and geotechnical

soil borings across the site. This depth interval intersects the temporary well screen interval from which groundwater samples were collected for analysis.

Analytical results are presented in Table 1. Laboratory reports and chain of custody documentation, including chromatographs, are included in Appendix B.

8.0 CONCLUSIONS AND RECOMMENDATIONS

8.1 Conclusions

A summary of the pertinent findings of the Phase II Environmental Site Assessment are presented below:

- Six soil borings were advanced to investigate recognized environmental conditions previously identified in the Phase I Environmental Site Assessment. Soil and water samples were collected from each borehole and were analyzed for contaminants of concern.

- All contaminant concentrations in soil were below the laboratory method detection limit and/or the adopted cleanup criteria.

- Diesel concentrations in groundwater exceeded the adopted cleanup criteria in one location in the northwest corner of the Site (E-1). Supplemental analysis of the groundwater sample with diesel concentrations in exceedance of the adopted criteria after silica gel cleanup did not detect diesel or heavy oil range TPH above laboratory reporting limits. Laboratory results indicate the detected contaminant to be naturally occurring organic material or a weathered/degraded petroleum product.

- Boring E-1 is located in proximity to the west adjacent property with a confirmed release of diesel range TPH from a leaking underground storage tank system. The detections of diesel range TPH in groundwater in boring E-1 may be the results of migration of contaminants from the former UST system. Based on the weathered/degraded nature of the diesel range TPH detected in groundwater, the TPH constituents appear to be naturally degrading in the subsurface with time. TPH constituents were not detected in soil anywhere on the subject property, suggesting an offsite source for diesel range TPH concentrations in groundwater. As the UST system at the west adjacent property has since been removed and replaced, including the removal of TPH contaminated soils, the suspected source of TPH constituents in groundwater at the subject property has been eliminated. Given the elimination of the contaminant source, and apparent degradation of TPH constituents in groundwater, concentrations are expected to achieve cleanup levels by natural attenuation within a reasonable time frame.

8.2 Recommendations

Based on site observations and analytical results from the investigation there is no evidence of contamination in soil or groundwater with the exception of the E-1 location. Given a lack of contaminant source for groundwater in the E-1 location and apparent natural degradation of TPH constituents in groundwater, further investigation or cleanup at the site is not warranted based on the findings of this assessment.

9.0 LIMITATIONS

PBS has prepared this report for use by Otak, Inc., and King County Metro. This report is for the exclusive use of the client and is not to be relied upon by other parties. It is not to be photographed, photocopied, or similarly reproduced, in total or in part, without the expressed written consent of the client and PBS.

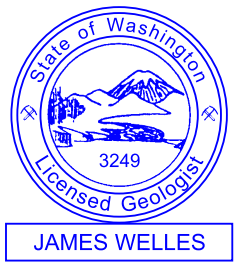
This study was limited to the tests, locations, and depths as indicated to determine the absence or presence of certain contaminants. The site as a whole may have other contamination that was not characterized by this study. The findings and conclusions of this report are not scientific certainties but, rather, are probabilities based on professional judgment concerning the significance of the data gathered during the course of this investigation. PBS is not able to represent that the site or adjoining land contain no hazardous substances or other latent conditions beyond that detected or observed by PBS.

Sincerely,
PBS Engineering and Environmental Inc.

Digitally signed by Nathan Dickey
Date: 2020.05.21 18:21:45 -07'00'

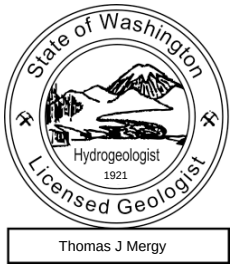
Nathan Dickey, GIT
Staff Geologist

Digitally signed by James Welles
Date: 2020.05.21 16:20:01 -07'00'



James Welles, LG
Sr. Project Geologist

Digitally signed by Thomas Mergy
Date: 2020.05.21 18:35:20 -07'00'



Thomas Mergy, LHG
Principal Hydrogeologist

10.0 REFERENCES

Some references, primarily internet-based and governmental resources, are cited within the text of this report and are not repeated on this page.

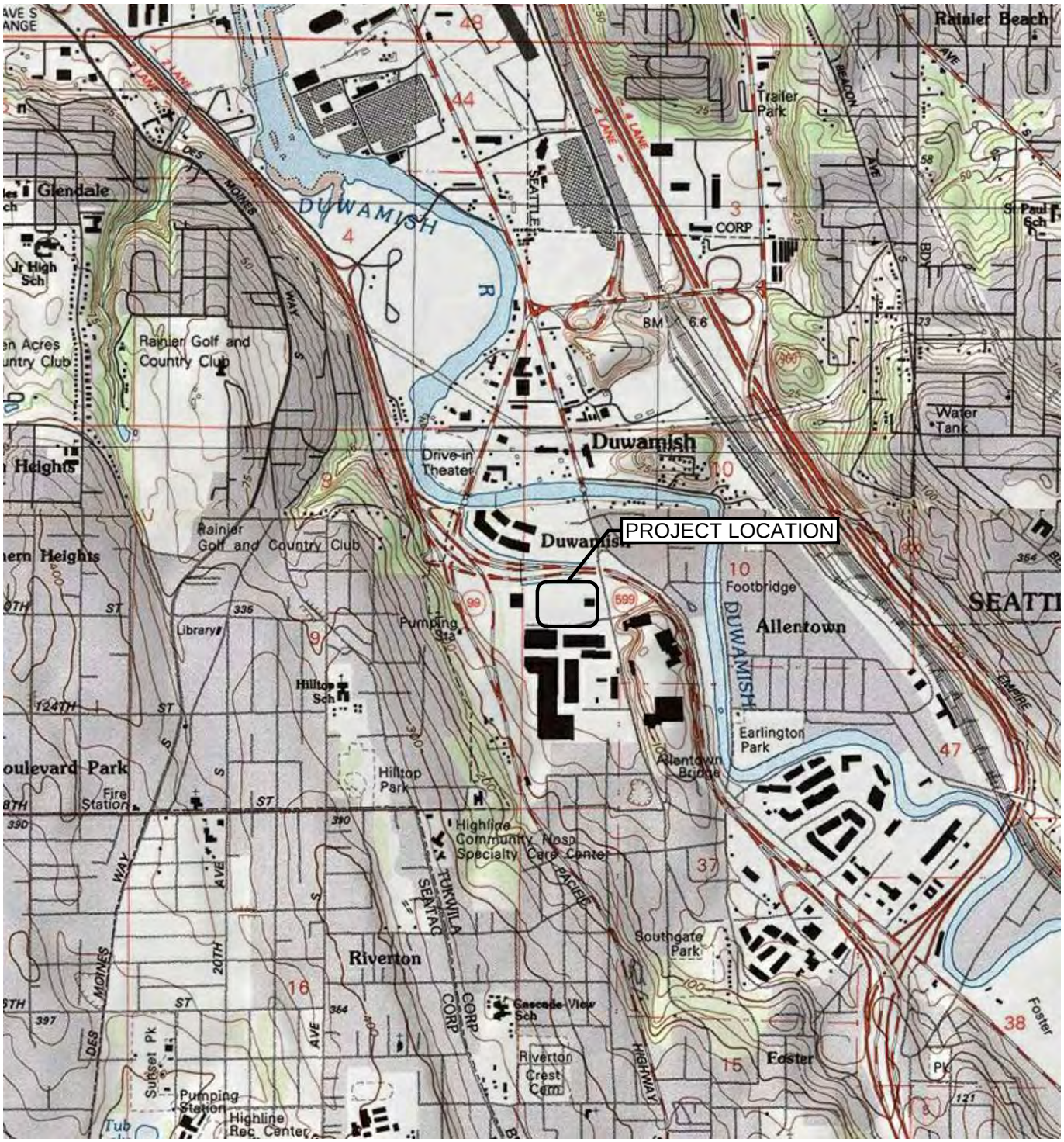
Parametrix, Inc. 2019. *South Base Facilities Annex Groundwater Status Update, East Marginal Way South, Tukwila, WA*. Prepared for King County Transit Division – Design & Construction Section. October 22, 2019.

Parametrix, Inc. 2020. *South Facilities Push Probe Investigation Results, East Marginal Way South, Tukwila, Washington*. Prepared for King County Transit Division – Design & Construction Section. April 21, 2020.

PBS Engineering and Environmental, Inc. 2019. *Phase I Environmental Site Assessment (ESA) King County Metro South Base Annex*, located at 11911 E Marginal Way S, Tukwila, Washington, July 8, 2019

PBS Engineering and Environmental, Inc. 2020. *Groundwater Sampling at King County Metro South Base Facilities,* 11911 E. Marginal Way S., Seattle WA 98168. Prepared for King County Metro Transit. January 10, 2020.

FIGURES



SOURCE: USGS DES MOINES, WA QUADRANGLE 1995

Scale 1" = 2000'

0' 1000' 2000' 4000'

PREPARED FOR: KING COUNTY METRO TRANSIT

VICINITY MAP

11911 EAST MARGINAL WAY SOUTH
TUKWILA, WA

MAY 2020
41484.004

FIGURE
1

LEGEND

E-1 ENVIRONMENTAL BORING LOCATION AND NUMBER

Scale 1" = 120'

0' 60' 120' 240'

PREPARED FOR: KING COUNTY METRO

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SOUTH BASE ANNEX

11911 EAST MARGINAL WAY SOUTH, TUKWILLA, WASHINGTON

SITE PLAN

PROJECT
41484.004
DATE
MAY 2020
SHEET ID
2

Filename: L:\Projects\41000\41484 Otak\41484.004 OTAK_KCMetroWO26_SouthAnnexBase_Geotech_Env\DWG\41484.004_Fig_1-2.dwg Layout Tab: 11X17 DRAWINGS User: Katie Breyman CAD Plot Date/Time: 4/30/2020 3:17:28 PM

TABLES

TABLE 1
ANALYTICAL RESULTS FOR SOIL AND GROUNDWATER
King County Metro South Base Annex Phase II Investigation
11911 E Marginal Way, Tukwila, Washington
PBS Project No. 41484.004

Location	Depth (feet bgs)	Result								
		TPH					BTEX			
		Gasoline	Diesel	Diesel *with SGC* [a]	Heavy Oil	Heavy Oil *with SGC* [a]	Benzene	Toluene	Ethyl-Benzene	Total Xylenes
Soil Samples (mg/kg)										
Adopted Criteria[b]		**100**	**2,000**	**2,000**	**2,000**	**2,000**	**0.03**	**7**	**6**	**9**
E-1	4	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	11	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-2	5	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	11	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-3	6	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	12	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-4	5.5	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	12	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-5	5.5	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	11	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
E-6	6	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
	12	< 5	< 50	--	< 250	--	< 0.02	< 0.02	< 0.02	< 0.06
Groundwater Grab Samples (µg/L)										
Adopted Criteria[b]		**1,000**	**500**	**500**	**500**	**500**	**5**	**1,000**	**700**	**1,000**
E-1	--	< 100	**640[c]**	< 50	480[c]	< 250	< 1	< 1	< 1	< 3
E-2	--	< 100	140[c]	--	< 250	--	< 1	< 1	< 1	< 3
E-3	6.9[d]	< 100	86[c]	--	< 250	--	< 1	< 1	< 1	< 3
E-4	6.6[d]	< 100	450[c]	--	440[c]	--	< 1	< 1	< 1	< 3
E-5	7.2[d]	< 100	310[c]	--	330[c]	--	< 1	< 1	< 1	< 3
E-6	7.1[d]	< 100	89[c]	--	< 250	--	< 1	< 1	< 1	< 3

Notes:
Gasoline range TPH analyzed by Northwest Total Petroleum Hydrocarbon Method - Volatile Petroleum Products (Extended) (NWTPH-Gx)
Diesel and heavy oil range TPH analyzed by Northwest Total Petroleum Hydrocarbon Method - Semi-volatile Petroleum Products (Extended) (NWTPH-Dx)
BTEX analyzed by Environmental Protection Agency Method 8021B
bold indicates concentration exceeds Adopted Criteria
< Analyte not detected at or above the indicated laboratory reporting limit
-- Not Analyzed / Not Measured

Abbreviations & Acronyms:
BTEX - Benzene, toluene, ethylbenzene and xylenes
mg/kg - milligrams per kilogram
µg/L - microgram per liter
bgs - below ground surface
toc - top of casing
SGC - Silica Gel Cleanup
TPH - total petroleum hydrocarbons

Footnotes:
[a] Sample extracts passed through a silica gel column prior to analysis (Silica Gel Cleanup)
[b] Washington State Department of Ecology Model Toxics Control Act Method A Cleanup Level for Unrestricted Land Use as established in WAC 173-340-900
[c] The sample chromatographic pattern does not resemble the fuel standard used for quantitation
[d] Depth to static groundwater from ground surface, measured in temporary well

APPENDIX A

Soil Boring Logs

PBS

KING COUNTY METRO SOUTH ANNEX
SEATTLE, WASHINGTON

PBS PROJECT NUMBER:
41484.004

BORING E-1

BORING E-1 LOCATION:
(See Site Plan)

DEPTH FEET	MATERIAL DESCRIPTION	PID (PPM)	SAMPLE NUMBER	RECOVERY (%)	COMMENTS/ WELL INSTALLATION
0.0	ASPHALT (3 inches)				Background PID: 0.0 Well Start: 8:30 am
	Dense, light gray, Silty GRAVEL (GM) with sand; non-plastic; fine to coarse sand; fine to coarse, sub-angular gravel; dry; FILL.	0.0			
2.0		0.0		53	
		0.0			
4.0			E-1-4		
	Medum stiff, dark brown, Sandy SILT (ML); low plasticity; fine sand; moist.	0.0			
6.0		0.0			
		0.0		53	No hydrocarbon odor.
8.0		0.0	E-1-W		
10.0	▽	0.0			Temporary well screen set from 6 to 11 ft bgs; low recharge.
	Medium dense, dark gray, poorly graded SAND (SP); no plasticity; fine to medium sand; wet.	0.0	E-1-11		
12.0		0.0		80	
		0.0			
14.0		0.0			
	Final Depth: 15 feet bgs. Groundwater encountered at 10.5 feet bgs.				
16.0					
18.0					
20.0					

BORING METHOD: Geoprobe
DRILLED BY: Holt Services
BORING BIT DIAMETER: 2¼-inch

LOGGED BY: N. Dickey
COMPLETED: 4/09/20

BORING LOG-ENV CORE 41484.004 E1-6 09APRIL2020 ENV - JW.GPJ DATATMPL.GDT PRINT DATE: 5/1/20:

PBS

KING COUNTY METRO SOUTH ANNEX
SEATTLE, WASHINGTON

PBS PROJECT NUMBER:
41484.004

BORING E-2

BORING E-2 LOCATION:
(See Site Plan)

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUND-WATER	PID (PPM)	SAMPLE NUMBER	SAMPLE/ TEMPORARY WELL(S)	RECOVERY (%)	COMMENTS/ WELL INSTALLATION
0.0		ASPHALT (3 inches)						Background PID: 0.0 Well Start: 9:45am
		Dense, light gray, silty GRAVEL (GM) with sand; non-plastic; fine to coarse sand; fine to coarse sub-angular gravel; dry; FILL.		0.0				
2.0				0.0			40	
4.0								
		Medium stiff, brown, Sandy SILT (ML) sand; low plasticity; fine sand; moist.		0.0	E-2-5			
6.0		- Becomes dark brown and medium plasticity; increased fines		0.0				
				0.0			80	No hydrocarbon odor.
8.0				0.0				
				0.0				
10.0			▽	0.0				
				0.0	E-2-11			
12.0				0.0	E-2-W		67	Temporary well screen set from 10 to 15 ft bgs; fast recharge.
		Medium dense, dark gray, poorly graded SAND (SP); no plasticity; fine to medium sand; wet.		0.0				
14.0								
		Final Depth: 15 feet bgs. Groundwater encountered at 10.5 feet bgs.						
16.0								
18.0								
20.0								

BORING METHOD: Geoprobe
DRILLED BY: Holt Services
BORING BIT DIAMETER: 2¼-inch

LOGGED BY: N. Dickey
COMPLETED: 4/09/20

BORING LOG-ENV CORE 41484.004 E1-6 09APRIL2020 ENV - JW.GPJ DATATMPL.GDT PRINT DATE: 5/1/20:

PBS

KING COUNTY METRO SOUTH ANNEX
SEATTLE, WASHINGTON

PBS PROJECT NUMBER:
41484.004

BORING E-3

BORING E-3 LOCATION:
(See Site Plan)

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUND-WATER	PID (PPM)	SAMPLE NUMBER	SAMPLE/ TEMPORARY WELL(S)	RECOVERY (%)	COMMENTS/ WELL INSTALLATION
0.0		ASPHALT (3 inches)						Background PID: 0.0-0.1 Well Start: 10:30am
		Dense; light gray, silty GRAVEL (GM) with sand; non-plastic; fine to coarse sand; fine to coarse sub-angular gravel; dry; FILL.		0.1				
2.0				0.1			60	
				0.0				
4.0								
				0.0				
6.0		Medium stiff, dark brown, elastic SILT (MH) with sand and organics; medium plasticity; fine sand; moist.		0.0	E-3-6			
			4/9/20 11:03	0.0				
		- Becomes grey-brown					60	No hydrocarbon odor.
8.0				0.0				
10.0				0.0				
		Loose, dark gray, poorly graded SAND (SP); no plasticity; fine to medium sand; wet.		0.0	E-3-W			
12.0				0.0	E-3-12		80	Temporary well screen set from 8.25 to 13.25 ft bgs; fast recharge.
				0.0				
14.0								
		Final Depth: 15 feet bgs. Static groundwater measured to be approximately 6.9 ft bgs at 11:03am.						
16.0								
18.0								
20.0								

BORING METHOD: Geoprobe
DRILLED BY: Holt Services
BORING BIT DIAMETER: 2¼-inch

LOGGED BY: N. Dickey
COMPLETED: 4/09/20

BORING LOG-ENV CORE 41484.004 E1-6 09APRIL2020 ENV - JW.GPJ DATATMPL.GDT PRINT DATE: 5/1/20:

PBS

KING COUNTY METRO SOUTH ANNEX
SEATTLE, WASHINGTON

PBS PROJECT NUMBER:
41484.004

BORING E-4

BORING E-4 LOCATION:
(See Site Plan)

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUND-WATER	PID (PPM)	SAMPLE NUMBER	SAMPLE/ TEMPORARY WELL(S)	RECOVERY (%)	COMMENTS/ WELL INSTALLATION
0.0		Topsoil (6 inches)						Background PID: 0.0 Well Start: 11:15am
		Dense, light gray, silty GRAVEL (GM) with sand; non-plastic; fine to coarse sand; fine to coarse sub-angular gravel; dry; [FILL].		0.0				
2.0							33	Driller notes low recovery due to large cobbles blocking core catcher.
4.0								11:22am: Background PID: 0.1
		- Becomes wet for bottom 3 inches of fill		0.0	E-4-5.5			
6.0		Soft, dark brown, elastic SILT (MH) with sand and organics; medium plasticity; fine sand; moist. Occasional <1" lenses of low plasticity gray SILT (ML) observed throughout.	4/9/20 11:50	0.1				
				0.1			70	No hydrocarbon odor.
8.0				0.1				
10.0				0.1				
		Medium dense, dark gray, poorly graded SAND (SP); no plasticity; fine to medium sand; wet.		0.0	E-4-W			
12.0				0.0	E-4-12		70	Temporary well screen set from 8.5 to 13.5 ft bgs; fast recharge.
				0.0				
14.0								
		Final Depth: 15 feet bgs. Static groundwater measured to be approximately 6.6 ft bgs at 11:03am.						
16.0								
18.0								
20.0								

BORING METHOD: Geoprobe
DRILLED BY: Holt Services
BORING BIT DIAMETER: 2¼-inch

LOGGED BY: N. Dickey
COMPLETED: 4/09/20

PBS

KING COUNTY METRO SOUTH ANNEX
SEATTLE, WASHINGTON

PBS PROJECT NUMBER:
41484.004

BORING E-5

BORING E-5 LOCATION:
(See Site Plan)

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUND-WATER	PID (PPM)	SAMPLE NUMBER	SAMPLE/ TEMPORARY WELL(S)	RECOVERY (%)	COMMENTS/ WELL INSTALLATION
0.0		ASPHALT (3 inches)						Background PID: 0.0 Well Start: 11:15am
		Dense, light gray, silty GRAVEL (GM) with sand; non-plastic; fine to coarse sand; fine to coarse sub-angular gravel; dry; FILL.		0.0				
2.0							30	
4.0				0.0				
6.0		Stiff, dark brown, elastic SILT (MH) with sand; medium plasticity; fine sand; moist. Occasional grey and brown <1" thick lenses of similar material. Crushed organic material observed at upper lithologic boundary.		0.0	E-5-5.5			
			4/9/20 12:30	0.0			55	No hydrocarbon odor.
8.0				0.0				
10.0				0.0				
				0.0	E-5-W1			
12.0				0.0			70	Temporary well screen set from 8.7 to 13.7 ft bgs; fast recharge.
		Medium dense, dark gray, poorly graded SAND (SP); no plasticity; fine to medium sand; wet.		0.0				
14.0								
		Final Depth: 15 feet bgs. Static groundwater measured to be approximately 7.2 ft bgs at 12:20am.						
16.0								
18.0								
20.0								

BORING METHOD: Geoprobe
DRILLED BY: Holt Services
BORING BIT DIAMETER: 2¼-inch

LOGGED BY: N. Dickey
COMPLETED: 4/09/20

BORING LOG-ENV CORE 41484.004 E1-6 09APRIL2020 ENV - JW.GPJ DATATMPL.GDT PRINT DATE: 5/1/20:

PBS

KING COUNTY METRO SOUTH ANNEX
SEATTLE, WASHINGTON

PBS PROJECT NUMBER:
41484.004

BORING E-6

BORING E-6 LOCATION:
(See Site Plan)

DEPTH FEET	GRAPHIC LOG	MATERIAL DESCRIPTION	GROUND-WATER	PID (PPM)	SAMPLE NUMBER	SAMPLE/ TEMPORARY WELL(S)	RECOVERY (%)	COMMENTS/ WELL INSTALLATION
0.0		ASPHALT (6 inches)						Background PID: 0.0 Well Start: 12:40am
		Dense, light gray, Silty GRAVEL (GM) with sand; non-plastic; fine to coarse sand; fine to coarse sub-angular gravel; dry; FILL.		0.0				
2.0				0.0			55	
				0.0				
4.0								
				0.0	E-6-5			
6.0		Medium stiff, dark brown, elastic SILT (MH) with sand and organics; medium plasticity; fine sand; moist. Occasional grey and brown <1" thick lenses of similar material. Crushed organic material observed at upper lithologic boundary.		0.0				
			4/9/20 13:15 ▼	0.0			50	No hydrocarbon odor.
8.0								
10.0			▽	0.0				
				0.0	E-6-W			
12.0				0.0	E-6-12		70	Temporary well screen set from 8.6 to 13.6 ft bgs; fast recharge.
		Medium dense, dark gray, poorly graded SAND (SP); no plasticity; fine to medium sand; wet.		0.0				
14.0								
		Final Depth: 15 feet bgs. Static groundwater measured to be approximately 7.1 ft bgs at 1:15pm.						
16.0								
18.0								
20.0								

BORING METHOD: Geoprobe
DRILLED BY: Holt Services
BORING BIT DIAMETER: 2¼-inch

LOGGED BY: N. Dickey
COMPLETED: 4/09/20

BORING LOG-ENV CORE 41484.004 E1-6 09APRIL2020 ENV - JW.GPJ DATATMPL.GDT PRINT DATE: 5/1/20:

APPENDIX B

Laboratory Reports
Chain-of-Custody Documentation

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 20, 2020

James Welles, Project Manager
PBS Engineering and Environmental, Inc.
214 E. Galer St, Suite 300
Seattle, WA 98102

Dear Mr Welles:

Included are the results from the testing of material submitted on April 9, 2020 from the KCM South Base Annex Phase II 41484.004, F&BI 004098 project. There are 12 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. 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: Nathan Dickey
PBS0420R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 9, 2020 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental KCM South Base Annex Phase II 41484.004, F&BI 004098 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	PBS Engineering and Environmental
004098 -01	E-1-4
004098 -02	E-1-11
004098 -03	E-1-W
004098 -04	E-2-5
004098 -05	E-2-11
004098 -06	E-2-W
004098 -07	E-3-6
004098 -08	E-3-12
004098 -09	E-3-W
004098 -10	E-4-5.5
004098 -11	E-4-12
004098 -12	E-4-W
004098 -13	E-5-5.5
004098 -14	E-5-11
004098 -15	E-5-W
004098 -16	E-6-6
004098 -17	E-6-12
004098 -18	E-6-W

All quality control requirements were acceptable.

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/10/20 and 04/15/20
Date Analyzed: 04/13/20 and 04/16/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
E-1-4 004098-01	<0.02	<0.02	<0.02	<0.06	<5	100
E-1-11 004098-02	<0.02	<0.02	<0.02	<0.06	<5	92
E-2-5 004098-04	<0.02	<0.02	<0.02	<0.06	<5	99
E-2-11 004098-05	<0.02	<0.02	<0.02	<0.06	<5	97
E-3-6 004098-07	<0.02	<0.02	<0.02	<0.06	<5	99
E-3-12 004098-08	<0.02	<0.02	<0.02	<0.06	<5	94
E-4-5.5 004098-10	<0.02	<0.02	<0.02	<0.06	<5	99
E-4-12 004098-11	<0.02	<0.02	<0.02	<0.06	<5	100
E-5-5.5 004098-13	<0.02	<0.02	<0.02	<0.06	<5	100
E-5-11 004098-14	<0.02	<0.02	<0.02	<0.06	<5	99
E-6-6 004098-16	<0.02	<0.02	<0.02	<0.06	<5	92

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/10/20 and 04/15/20
Date Analyzed: 04/13/20 and 04/16/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-150)
E-6-12 004098-17	<0.02	<0.02	<0.02	<0.06	<5	100
Method Blank 00-844 MB	<0.02	<0.02	<0.02	<0.06	<5	99

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/14/20
Date Analyzed: 04/14/20

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported as ug/L (ppb)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 52-124)
E-1-W 004098-03	<1	<1	<1	<3	<100	100
E-2-W 004098-06	<1	<1	<1	<3	<100	103
E-3-W 004098-09	<1	<1	<1	<3	<100	103
E-4-W 004098-12	<1	<1	<1	<3	<100	102
E-5-W 004098-15	<1	<1	<1	<3	<100	100
E-6-W 004098-18	<1	<1	<1	<3	<100	103
Method Blank 00-845 MB	<1	<1	<1	<3	<100	102

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/13/20
Date Analyzed: 04/13/20

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 41-152)
E-1-W 004098-03	640 x	480 x	103
E-2-W 004098-06	140 x	<250	97
E-3-W 004098-09	86 x	<250	107
E-4-W 004098-12	450 x	440 x	102
E-5-W 004098-15	310 x	330 x	104
E-6-W 004098-18	89 x	<250	99
Method Blank 00-897 MB	<50	<250	97

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/10/20
Date Analyzed: 04/10/20

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

Results Reported on a Dry Weight Basis
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 53-144)
E-1-4 004098-01	<50	<250	102
E-1-11 004098-02	<50	<250	102
E-2-5 004098-04	<50	<250	98
E-2-11 004098-05	<50	<250	103
E-3-6 004098-07	<50	<250	103
E-3-12 004098-08	<50	<250	93
E-4-5.5 004098-10	<50	<250	99
E-4-12 004098-11	<50	<250	101
E-5-5.5 004098-13	<50	<250	101
E-5-11 004098-14	<50	<250	100
E-6-6 004098-16	<50	<250	103

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/10/20
Date Analyzed: 04/10/20

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

Results Reported on a Dry Weight Basis
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 53-144)
E-6-12 004098-17	<50	<250	98
Method Blank 00-893 MB	<50	<250	102

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 004098-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	104	69-120
Toluene	mg/kg (ppm)	0.5	102	70-117
Ethylbenzene	mg/kg (ppm)	0.5	102	65-123
Xylenes	mg/kg (ppm)	1.5	107	66-120
Gasoline	mg/kg (ppm)	20	100	71-131

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF WATER SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING EPA METHOD 8021B AND NWTPH-Gx

Laboratory Code: 004076-01 (Duplicate)

Analyte	Reporting Units	Sample Result	Duplicate Result	RPD (Limit 20)
Benzene	ug/L (ppb)	<1	<1	nm
Toluene	ug/L (ppb)	<1	<1	nm
Ethylbenzene	ug/L (ppb)	<1	<1	nm
Xylenes	ug/L (ppb)	<3	<3	nm
Gasoline	ug/L (ppb)	<100	<100	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	ug/L (ppb)	50	100	65-118
Toluene	ug/L (ppb)	50	100	72-122
Ethylbenzene	ug/L (ppb)	50	103	73-126
Xylenes	ug/L (ppb)	150	100	74-118
Gasoline	ug/L (ppb)	1,000	104	69-134

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098

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	100	100	63-142	0

Date of Report: 04/20/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098

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

Laboratory Code: 004098-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	92	104	64-133	12

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	104	58-147

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.

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 the analyte were outside of acceptance criteria. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

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

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. 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 laboratory control sample(s) percent recovery and/or RPD were 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 analyte is likely due to laboratory contamination.

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

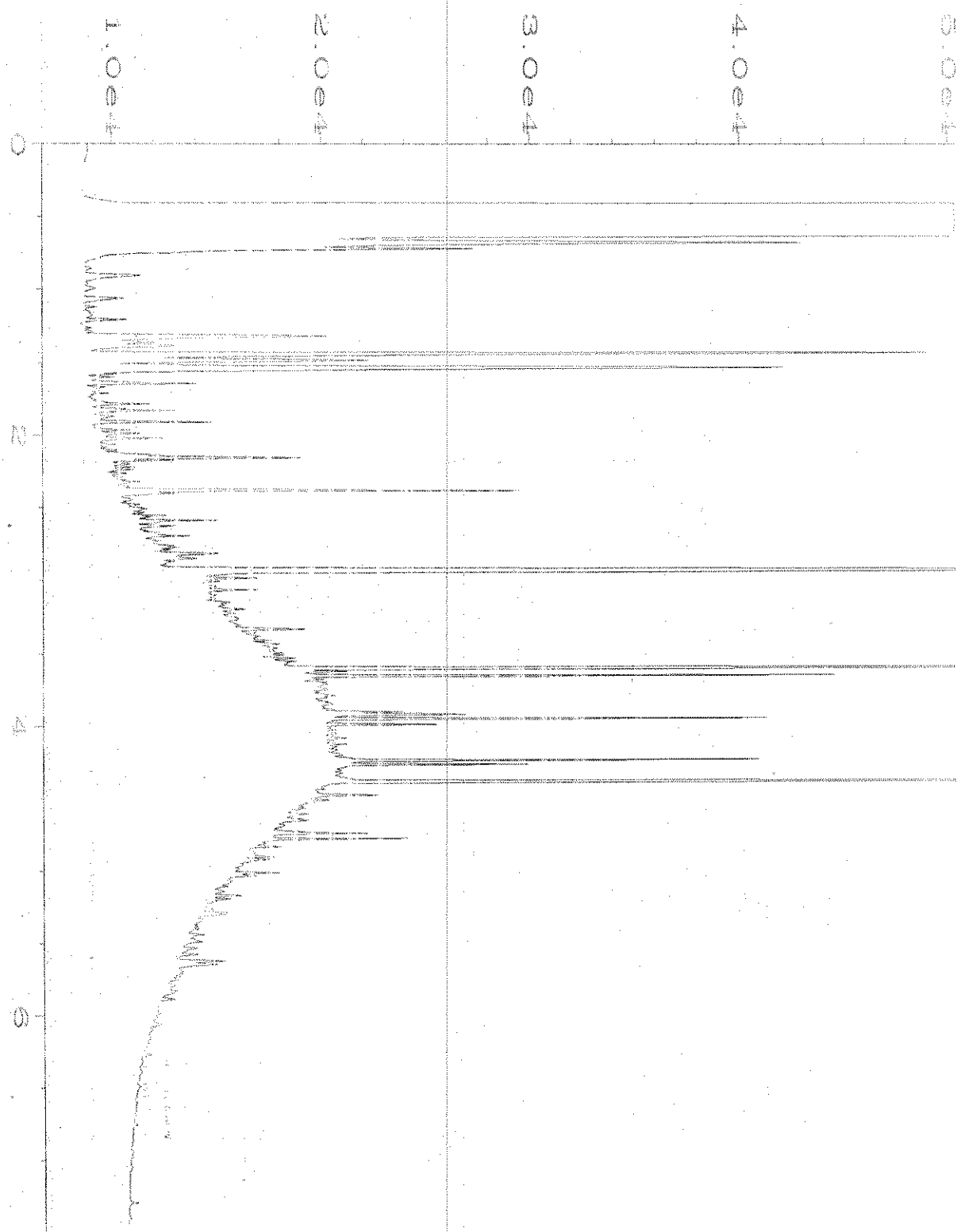
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

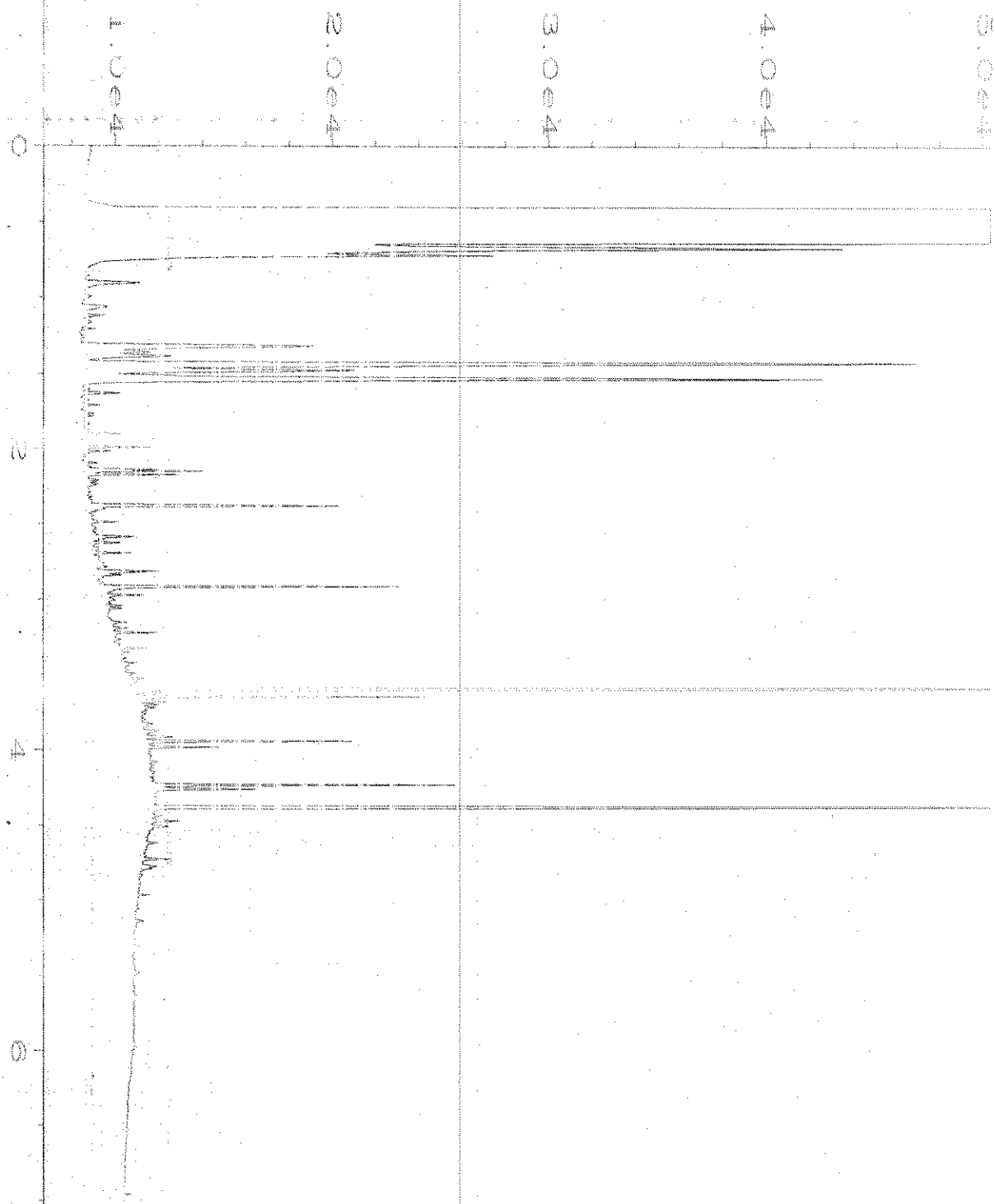
vo - The value reported fell outside the control limits established for this analyte.

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



Data File Name : C:\HPCHEM\1\DATA\04-13-20\009F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-03
Run Time Bar Code:
Acquired on : 13 Apr 20 12:56 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 9
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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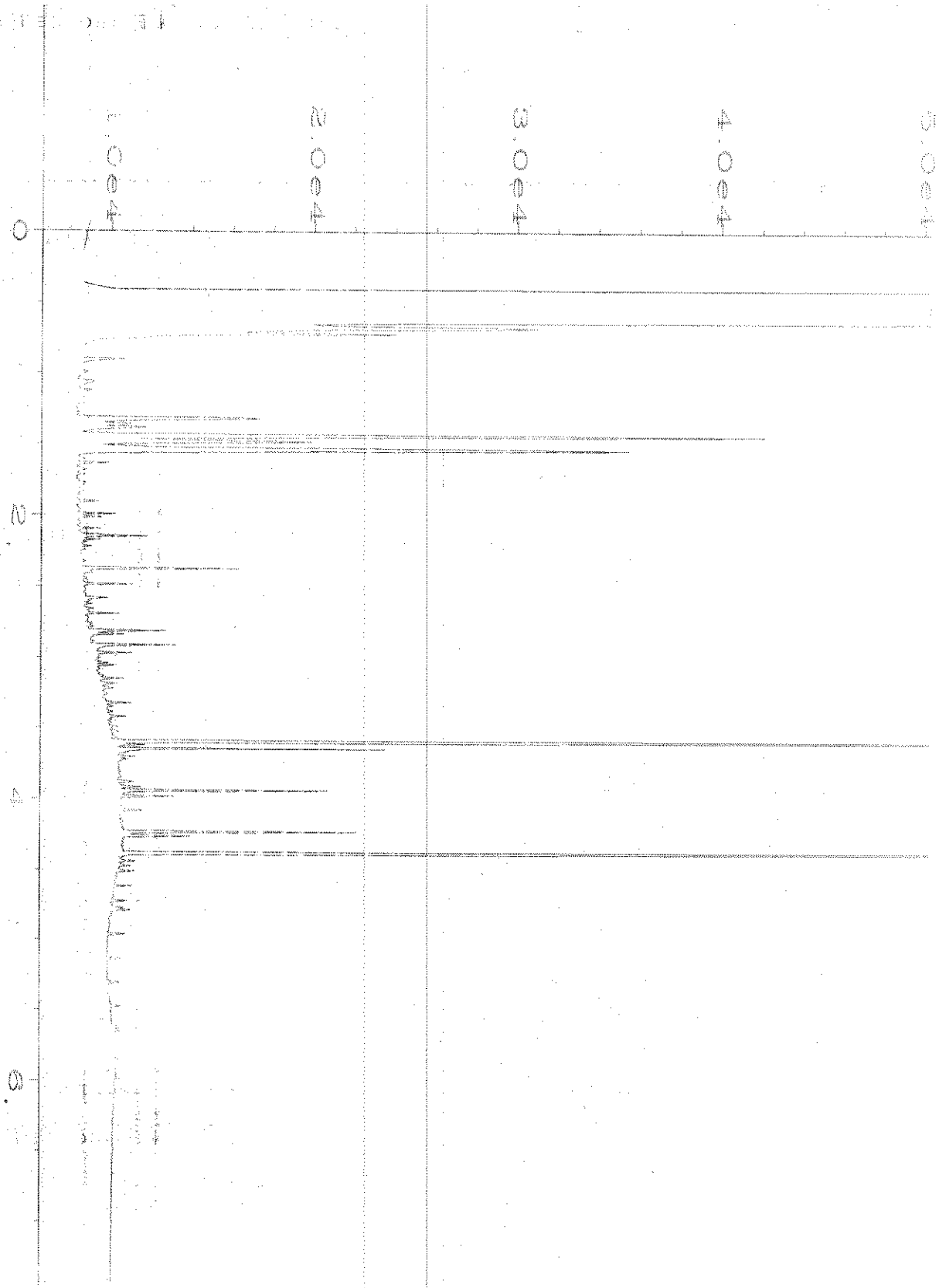
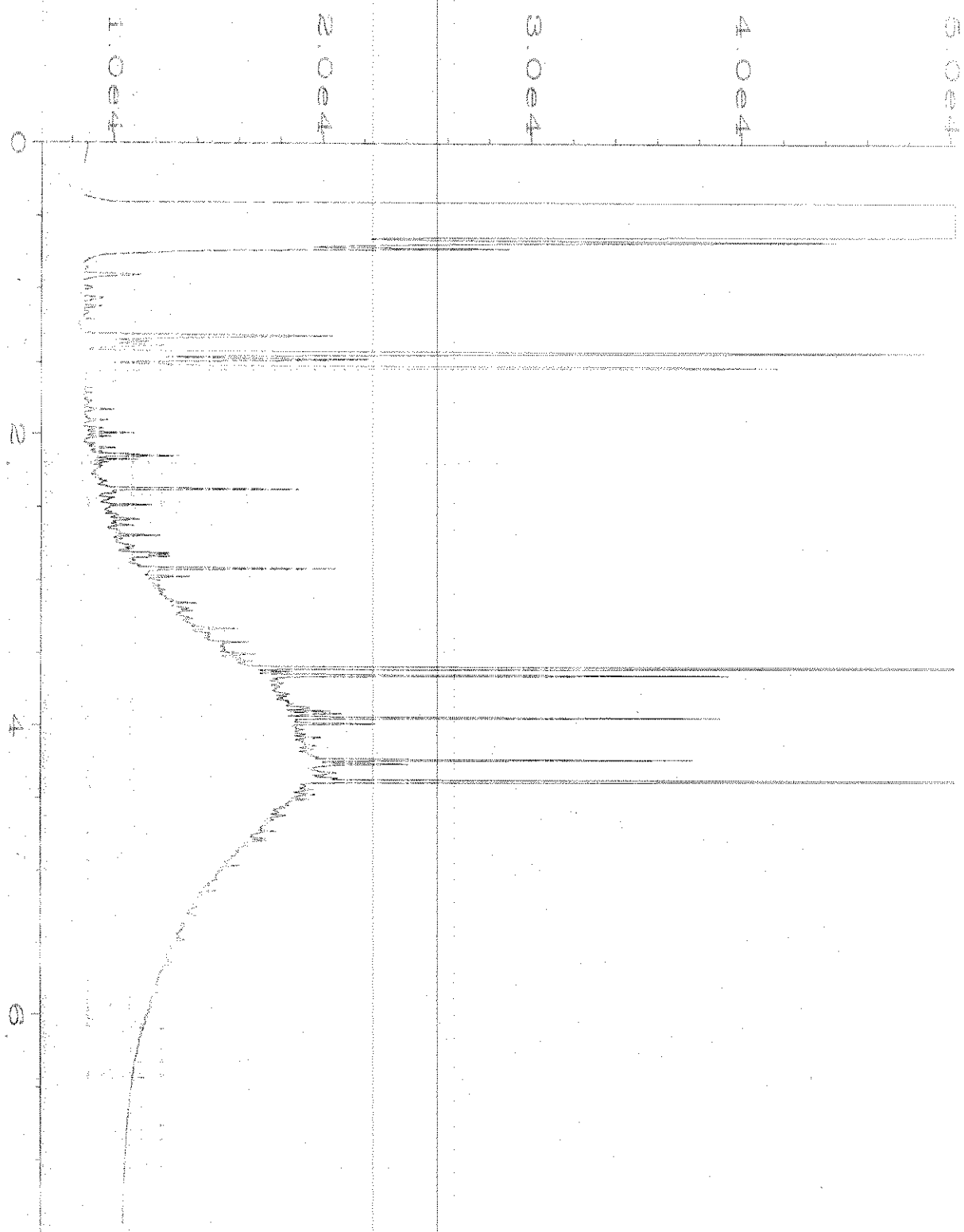
Operator : TL
Instrument : GC1
Sample Name : 004098-06
Run Time Bar Code:
Acquired on : 13 Apr 20 01:09 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 10
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



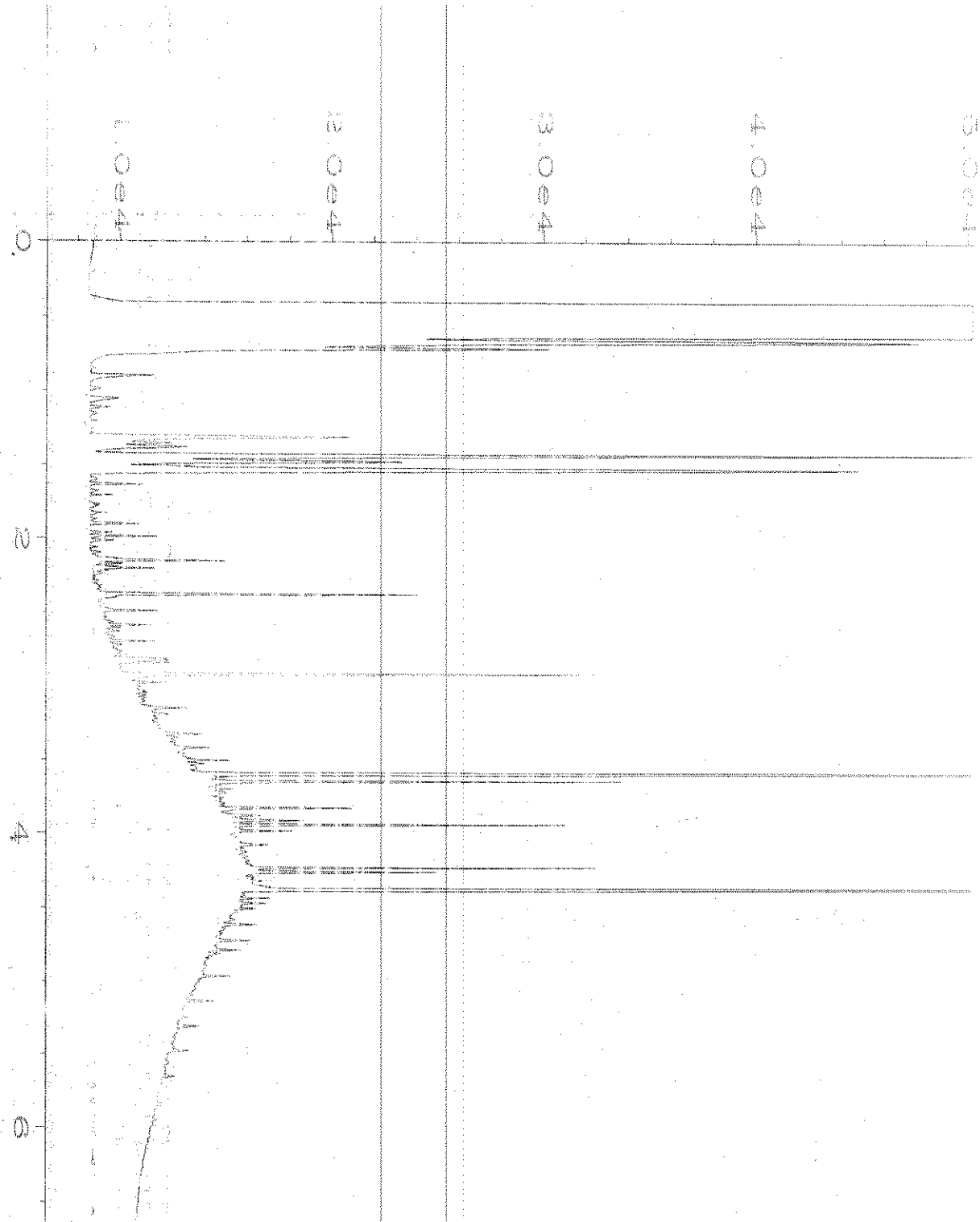
Data File Name : C:\HPCHEM\1\DATA\04-13-20\011F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-09
Run Time Bar Code:
Acquired on : 13 Apr 20 01:19 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 11
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



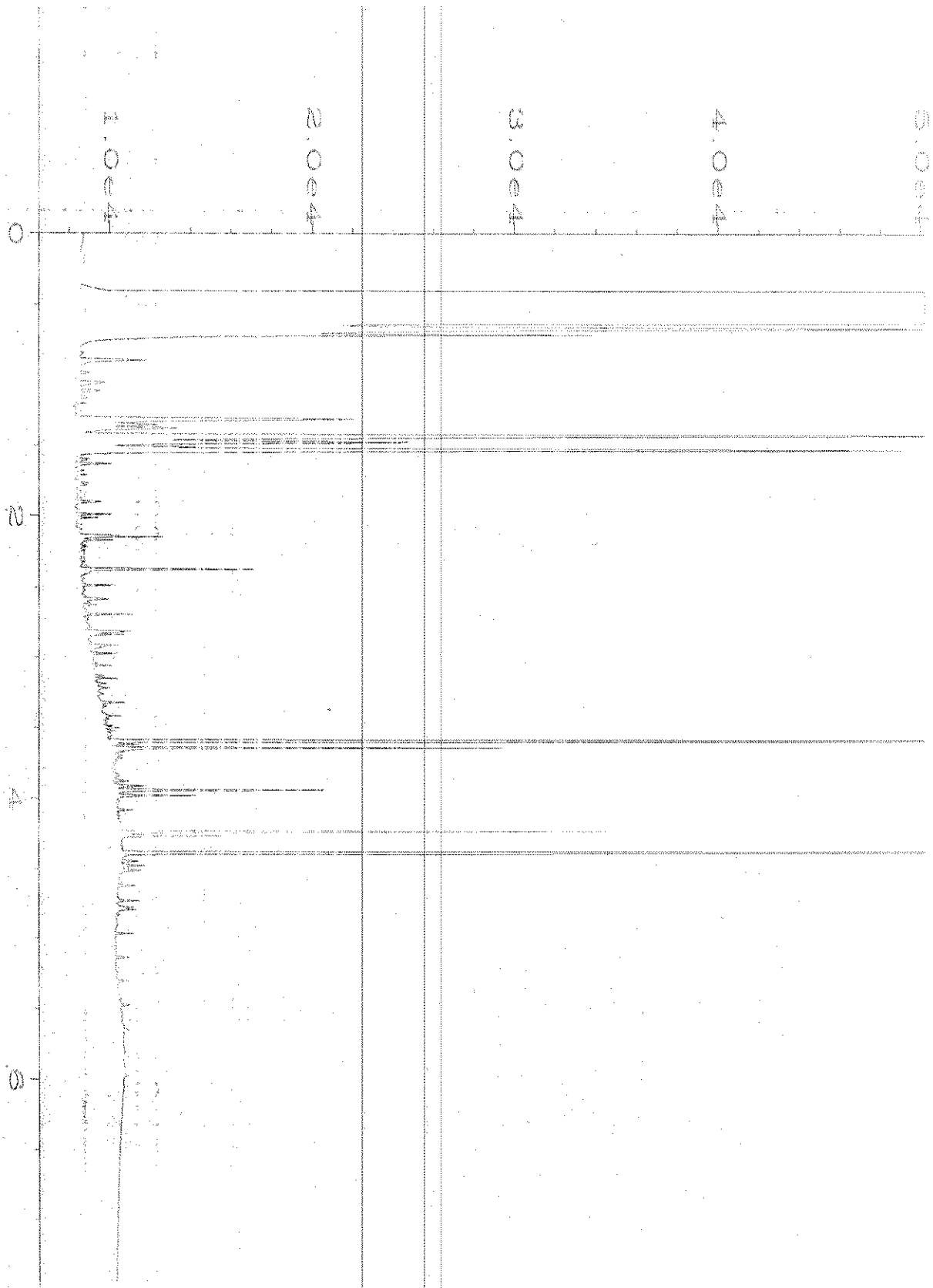
Data File Name : C:\HPCHEM\1\DATA\04-13-20\012F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-12
Run Time Bar Code:
Acquired on : 13 Apr 20 01:30 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 12
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



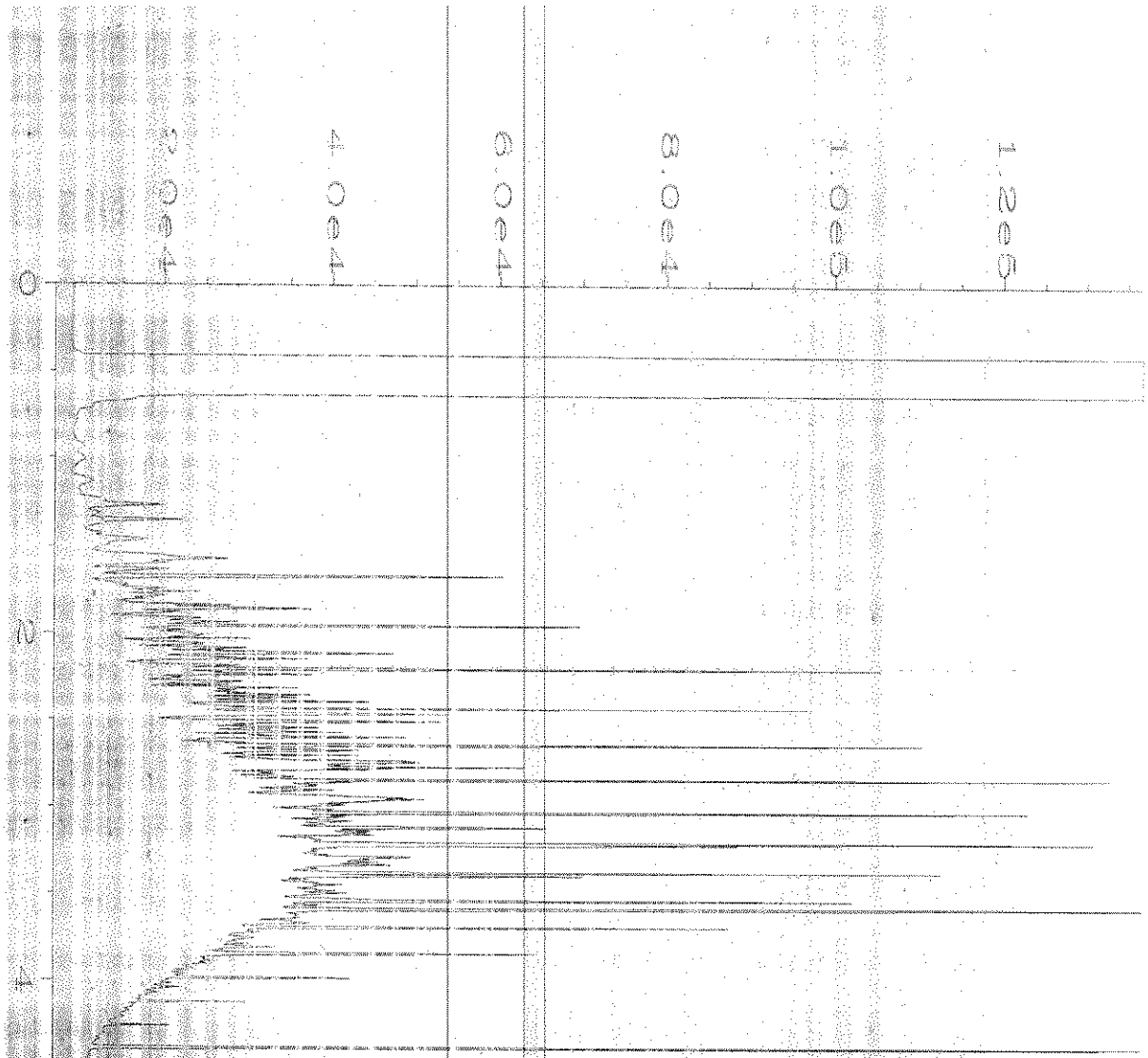
Data File Name : C:\HPCHEM\1\DATA\04-13-20\013F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-15
Run Time Bar Code:
Acquired on : 13 Apr 20 01:42 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 13
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



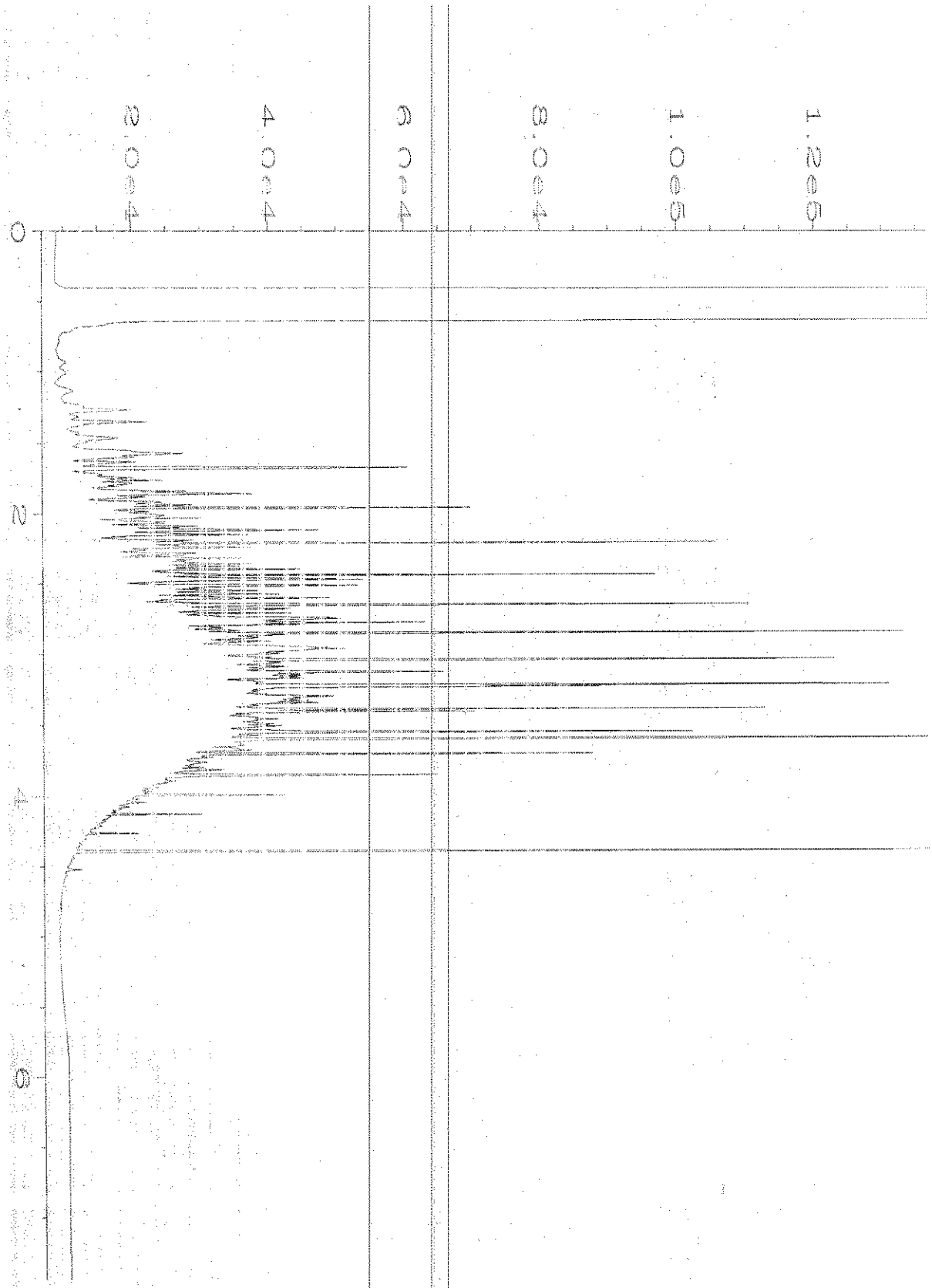
Data File Name : C:\HPCHEM\1\DATA\04-13-20\014F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-18
Run Time Bar Code:
Acquired on : 13 Apr 20 01:53 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 14
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\04-13-20\003F0301.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 58-146H
Run Time Bar Code:
Acquired on : 13 Apr 20 08:39 AM
Report Created on: 17 Apr 20 03:12 PM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\04-13-20\003F0301.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 58-146H
Run Time Bar Code:
Acquired on : 13 Apr 20 08:39 AM
Report Created on: 17 Apr 20 03:12 PM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

004098

SAMPLE CHAIN OF CUSTODY ME 04/09/20

VS4/VW2/COS

Page # 1 of 2

Report To James Welles

Company PBS

Address Seattle

City, State, ZIP

Phone Email james.welles@pbsusa.com nathan.dickey@pbsusa.com

SAMPLERS (*signature*)

PROJECT NAME: KCM South Base Annex Phase II

PO #: 41484.004

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
E-1-4	01 A-E	4/9/20	0840	S	5		X	X	X								
E-1-1	02 V		0850	S	5												
E-1-W	03 A-D		0920	W	4												
E-2-5	04 A-E		0950	S	5												
E-2-1	05 V		1000	S	5												
E-2-W	06 A-D		1005	W	4												
E-3-6	07 A-E		1040	S	5												
E-3-12	08 V		1050	S	5												
E-3-W	09 A-D		1100	W	4												Samples received at 4 °C
E-4-5.5	10 A-E		1220	S	5												

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Dickey	PBS	4/9	1520
Received by:	Eric Lom	ERS	4/9/20	1520
Relinquished by:				
Received by:				

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

SAMPLE CHAIN OF CUSTODY ME 04/09/20

VS4 / VW2 / COS

004098

Page # 2 of 2

Report To

Company PBS

Address

City, State, ZIP

Phone Email

SAMPLERS (*signature*)

PROJECT NAME: KCM South Base Annex Phase II

PO #: 41484.004

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM					Notes
E-4-12	11 A-E	4/9/20	1130	S	5		X	X	X								
E-4-W	12 A-D	"	1150	W	4		"	"	"								
E-5-5.5	13 A-E		1205	S	5												
E-5-11	14 V		1210	S	5												
E-5-W	15 A-D		1230	W	4												
E-6-6	16 A-E		1250	S	5												
E-6-12	17 V		1300	S	5												
E-6-W	18 A-D		1315	W	4												
	4																Samples received at 4°C

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Ricker	PBS	4/9/20	1520
Received by:	ERIC YOUNG	F E B	4/9/20	1520
Relinquished by:				
Received by:				

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 24, 2020

James Welles, Project Manager
PBS Engineering and Environmental, Inc.
214 E. Galer St, Suite 300
Seattle, WA 98102

Dear Mr Welles:

Included are the additional results from the testing of material submitted on April 9, 2020 from the KCM South Base Annex Phase II 41484.004, F&BI 004098 project. There are 4 pages included in this report.

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: Nathan Dickey
PBS0424R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 9, 2020 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental KCM South Base Annex Phase II 41484.004, F&BI 004098 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	PBS Engineering and Environmental
004098 -01	E-1-4
004098 -02	E-1-11
004098 -03	E-1-W
004098 -04	E-2-5
004098 -05	E-2-11
004098 -06	E-2-W
004098 -07	E-3-6
004098 -08	E-3-12
004098 -09	E-3-W
004098 -10	E-4-5.5
004098 -11	E-4-12
004098 -12	E-4-W
004098 -13	E-5-5.5
004098 -14	E-5-11
004098 -15	E-5-W
004098 -16	E-6-6
004098 -17	E-6-12
004098 -18	E-6-W

All quality control requirements were acceptable.

Date of Report: 04/24/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098
Date Extracted: 04/13/20
Date Analyzed: 04/22/20

RESULTS FROM THE ANALYSIS OF WATER SAMPLES FOR TOTAL PETROLEUM HYDROCARBONS AS DIESEL AND MOTOR OIL USING METHOD NWTPH-Dx
Sample Extracts Passed Through a Silica Gel Column Prior to Analysis
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 41-152)
E-1-W 004098-03	<50	<250	95
Method Blank 00-897 MB	<50	<250	102

Date of Report: 04/24/20
Date Received: 04/09/20
Project: KCM South Base Annex Phase II 41484.004, F&BI 004098

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 Silica Gel

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	ug/L (ppb)	2,500	104	104	61-133	0

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.

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 the analyte were outside of acceptance criteria. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

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

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. 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 laboratory control sample(s) percent recovery and/or RPD were 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 analyte is likely due to laboratory contamination.

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

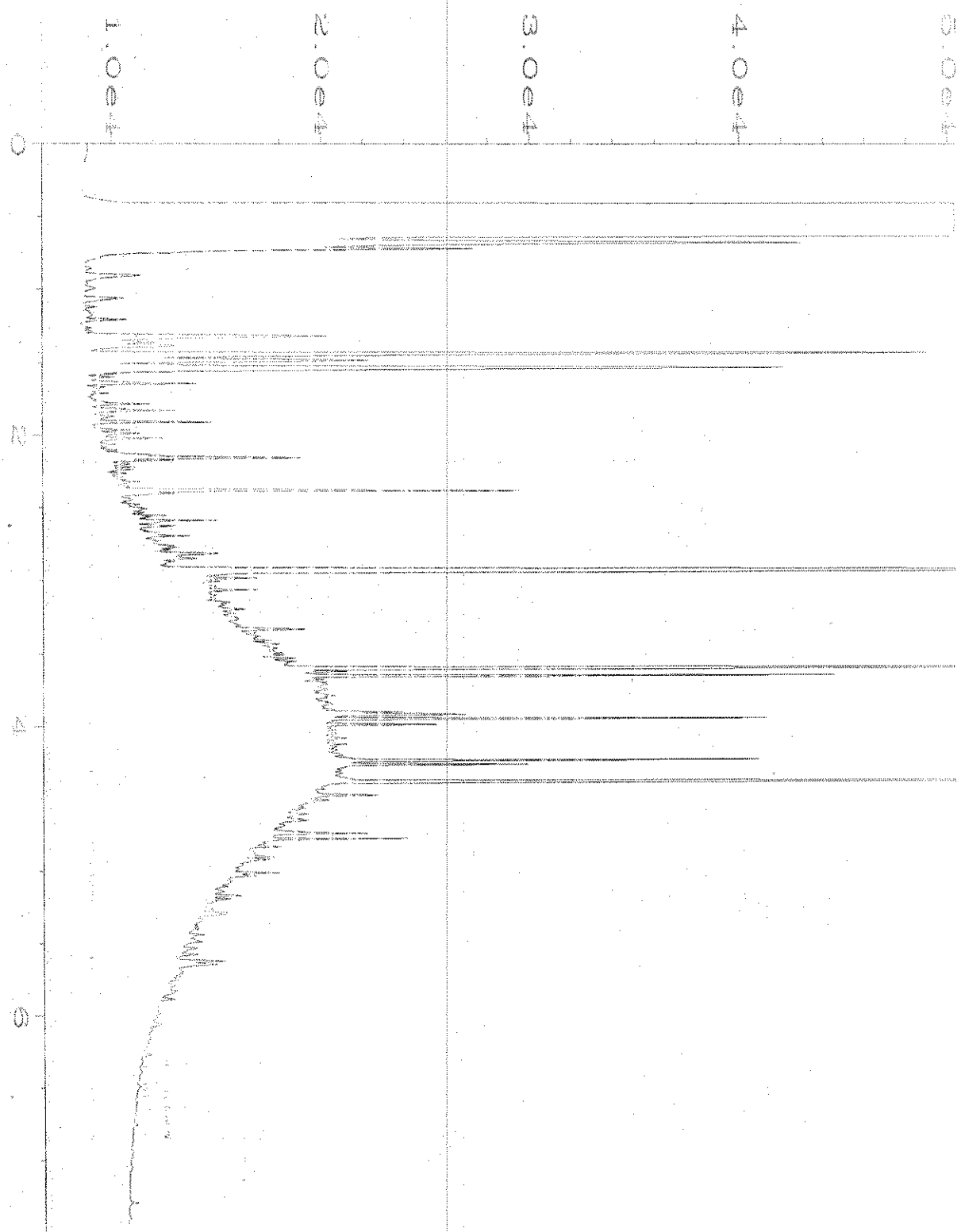
nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

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.



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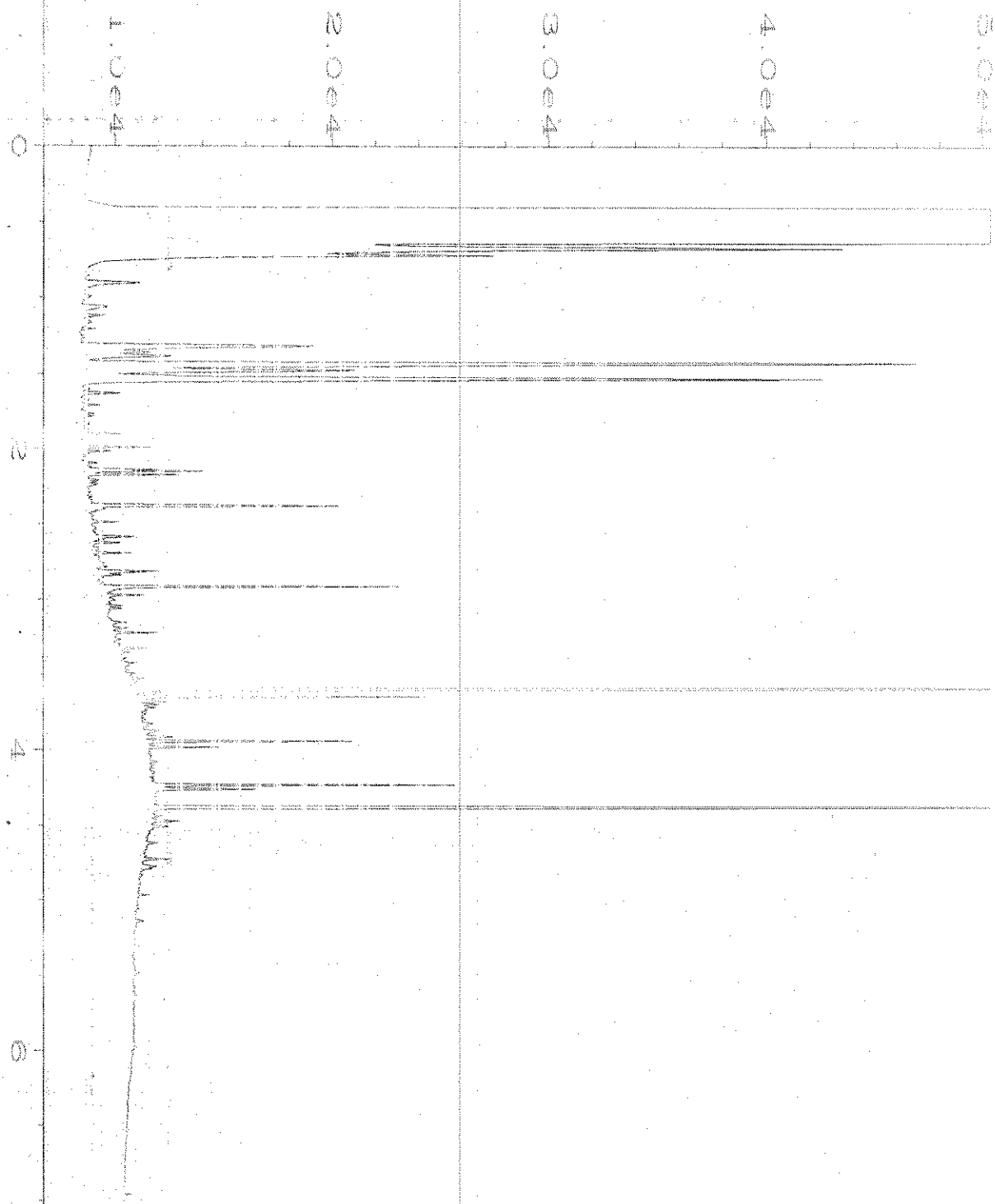
Operator : TL
Instrument : GC1
Sample Name : 004098-03
Run Time Bar Code:
Acquired on : 13 Apr 20 12:56 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 9
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



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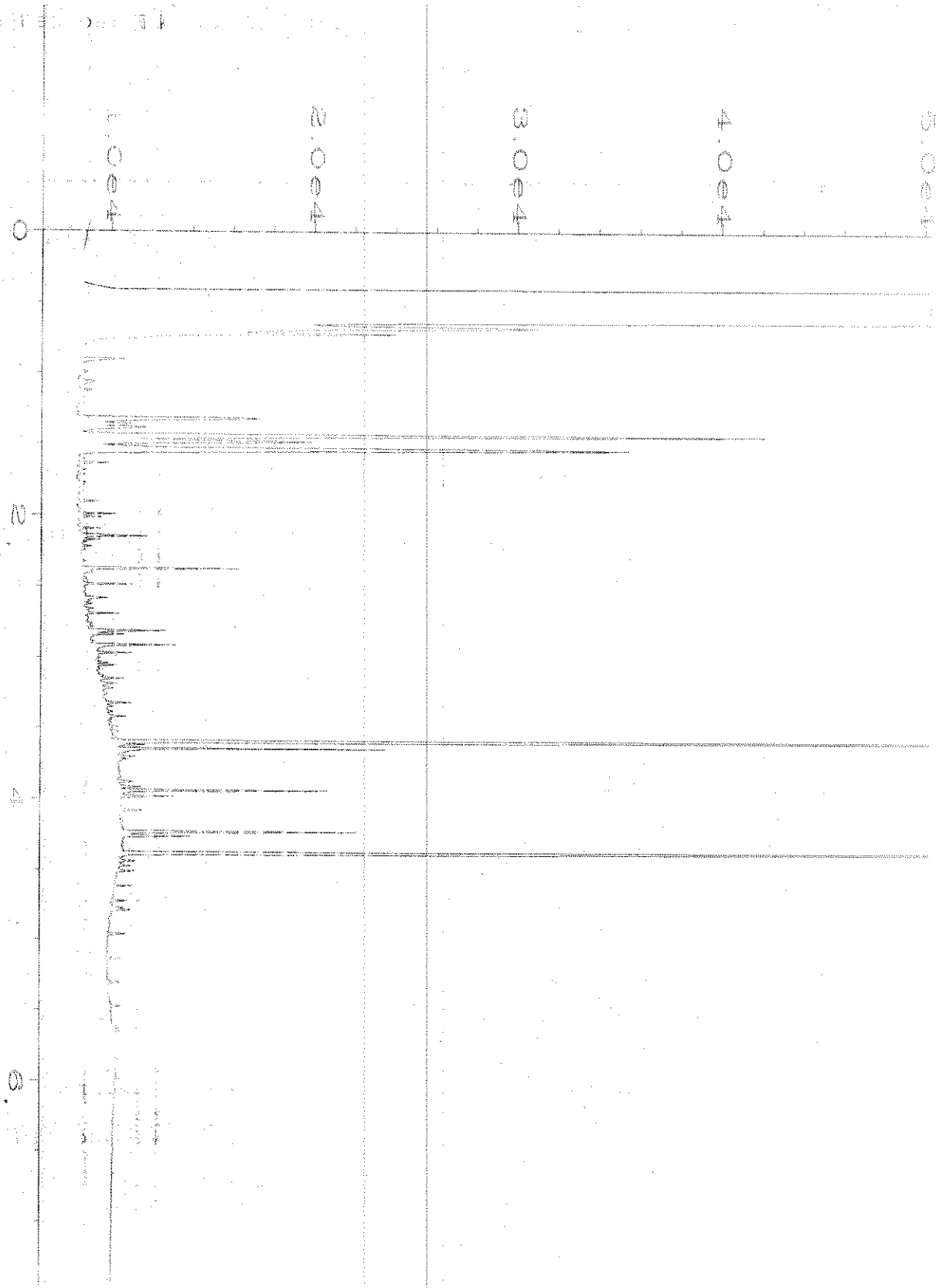
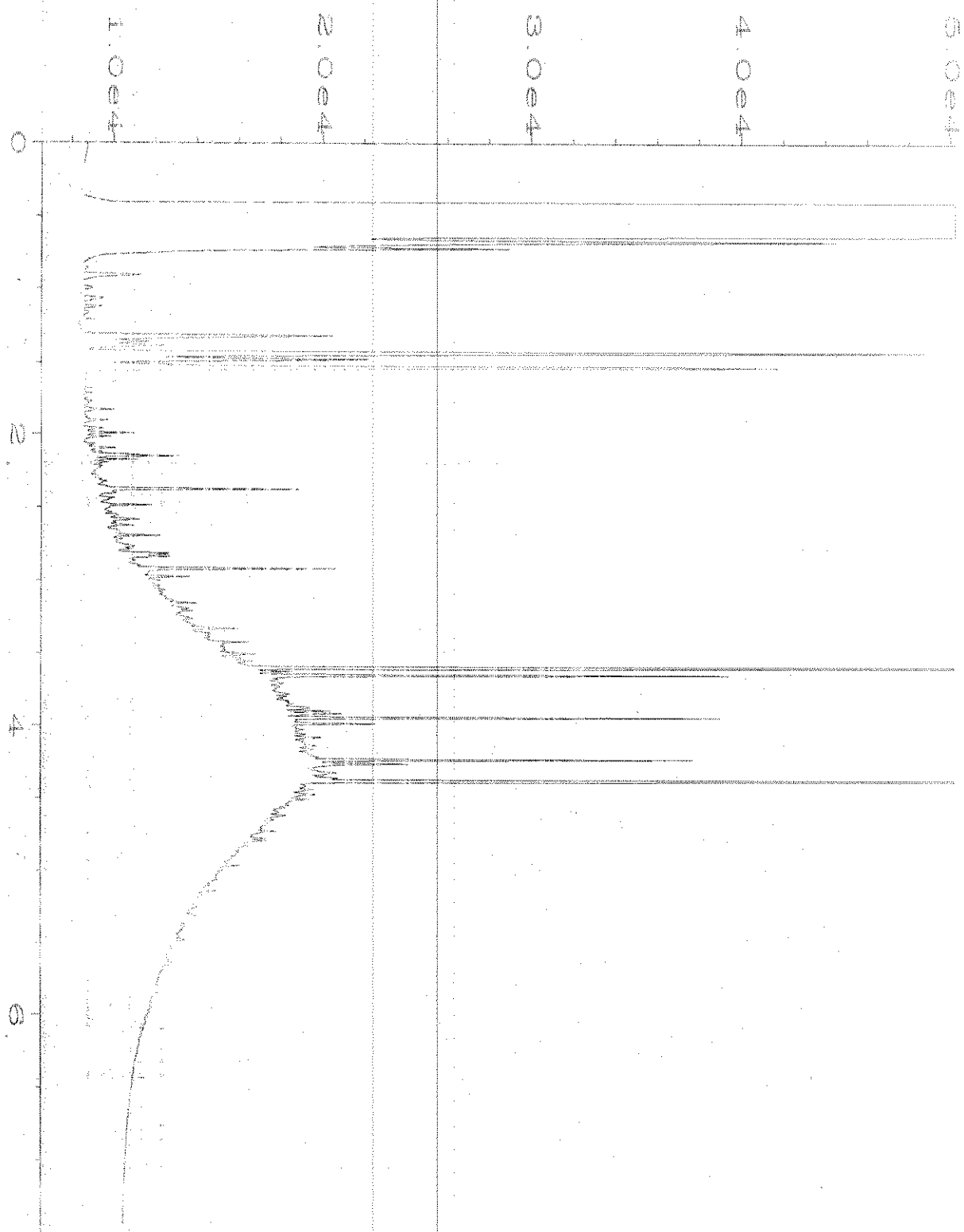
Operator : TL
Instrument : GC1
Sample Name : 004098-06
Run Time Bar Code:
Acquired on : 13 Apr 20 01:09 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 10
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



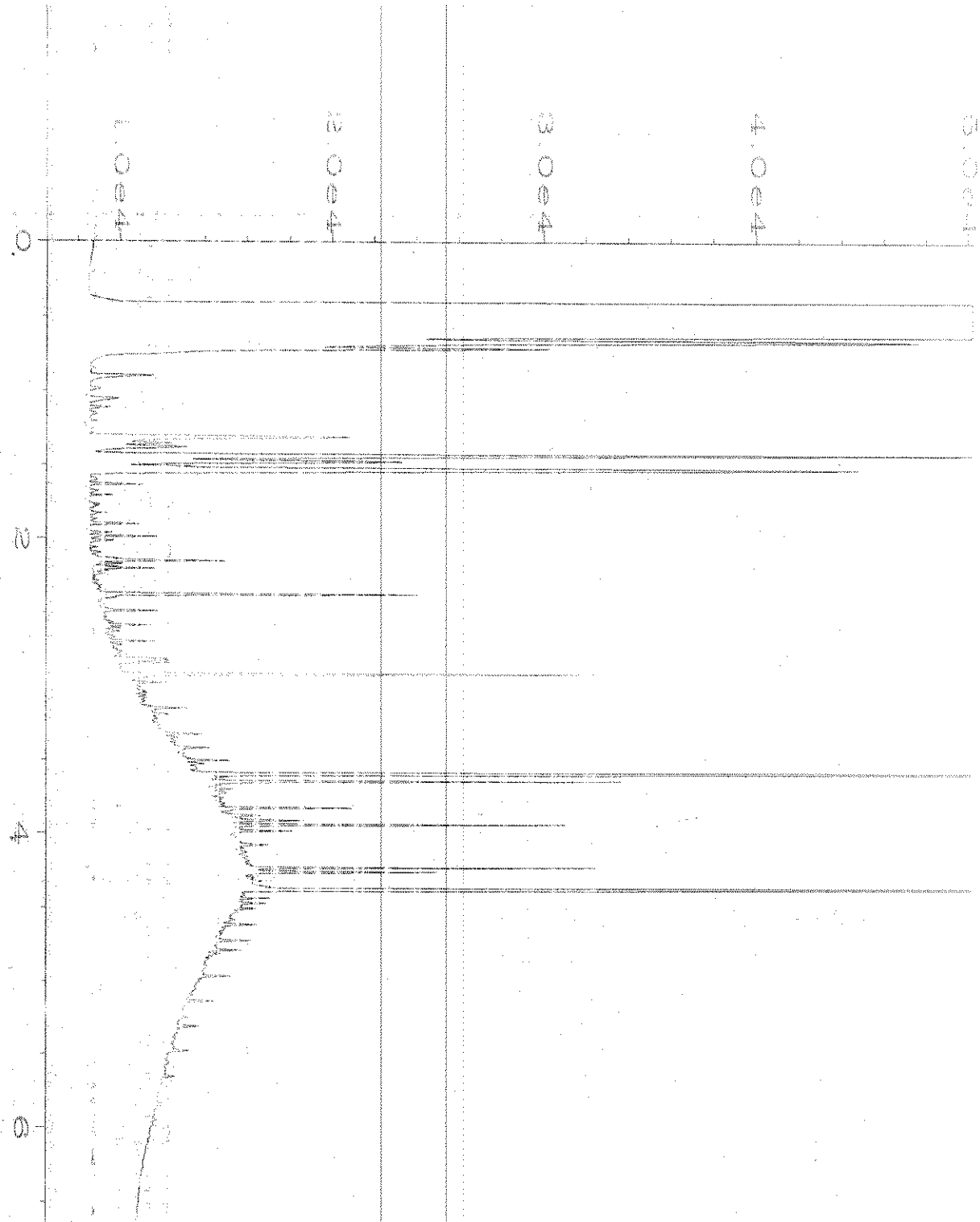
Data File Name : C:\HPCHEM\1\DATA\04-13-20\011F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-09
Run Time Bar Code:
Acquired on : 13 Apr 20 01:19 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 11
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



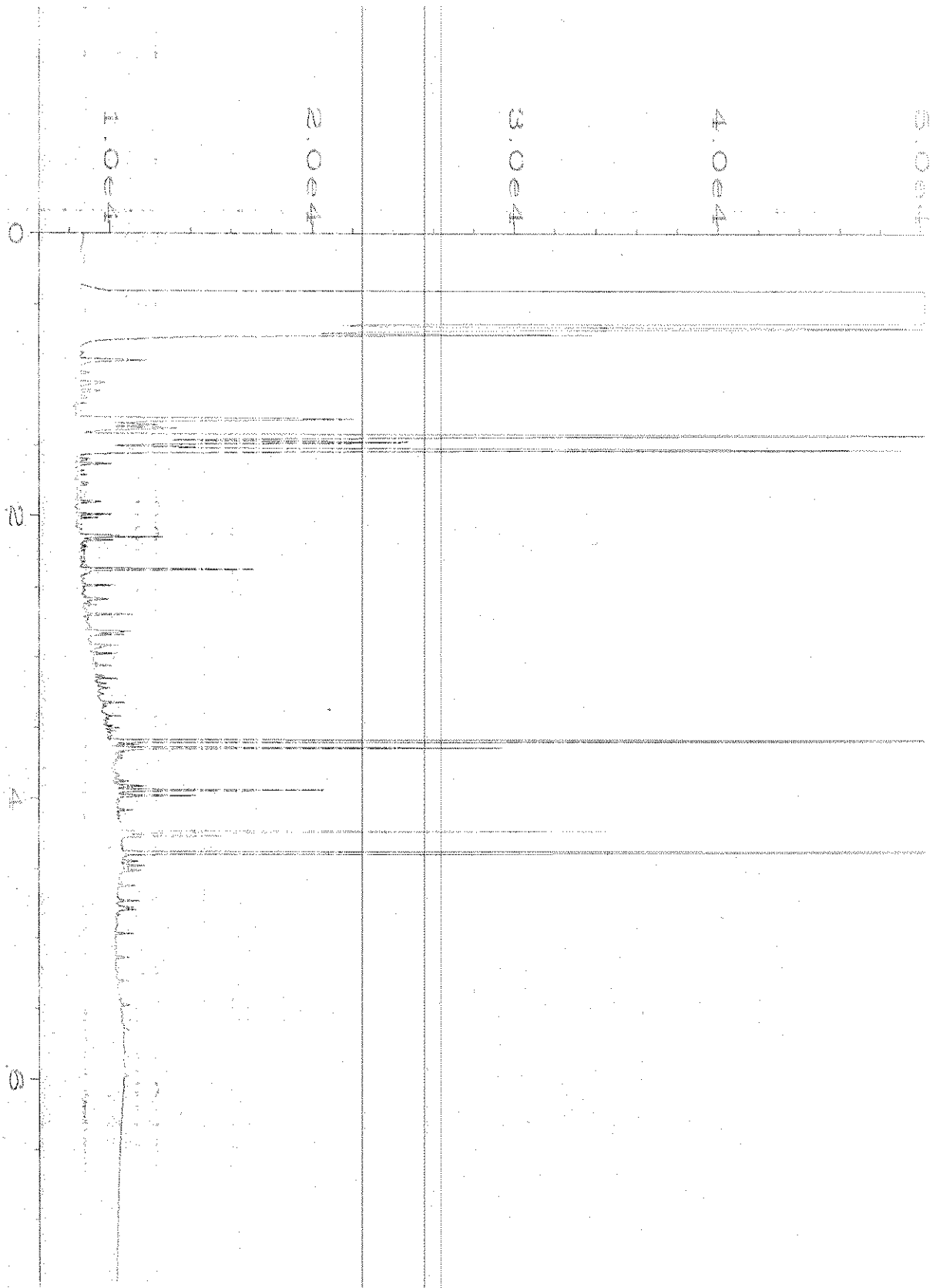
Data File Name : C:\HPCHEM\1\DATA\04-13-20\012F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-12
Run Time Bar Code:
Acquired on : 13 Apr 20 01:30 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 12
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



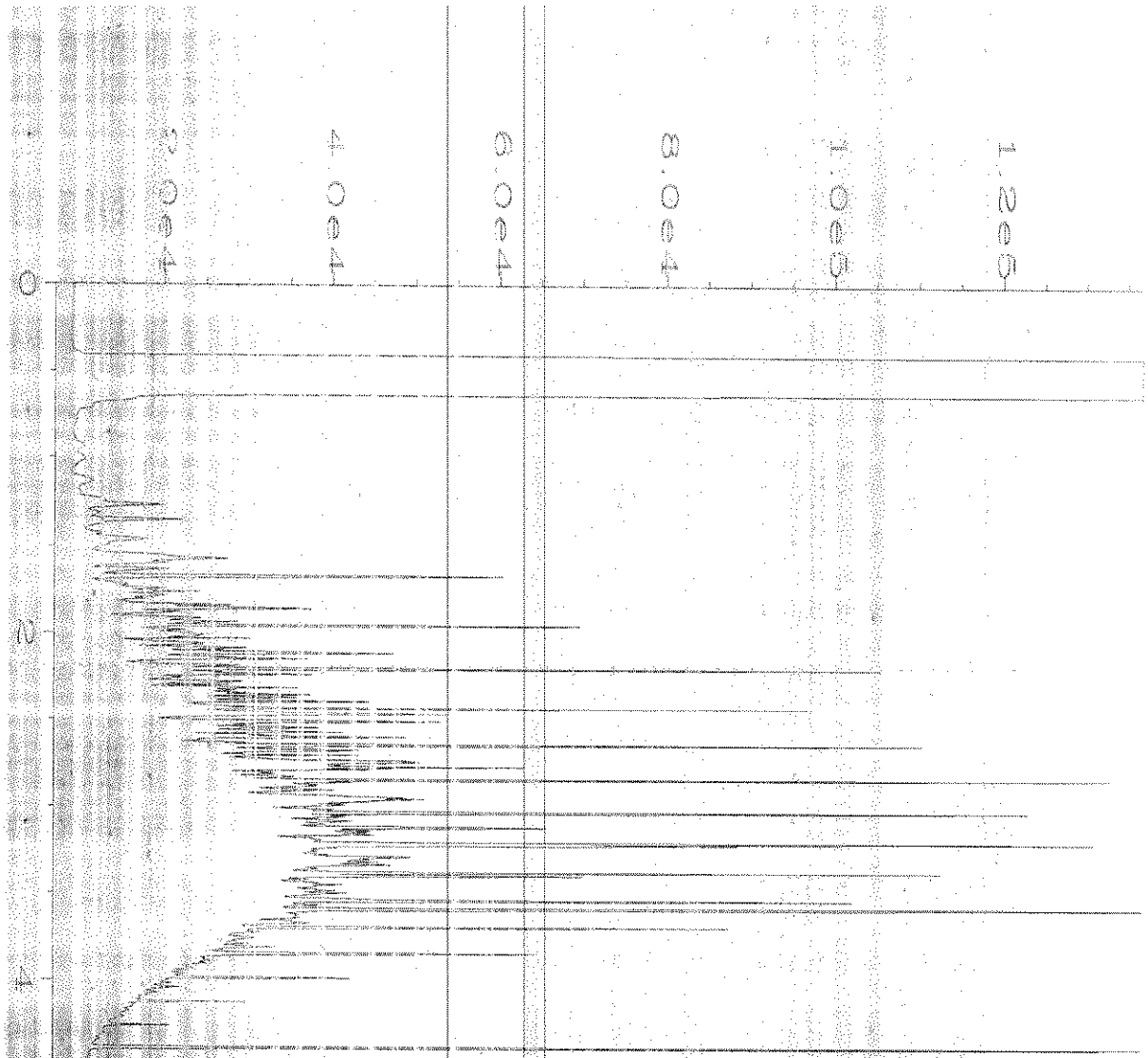
Data File Name : C:\HPCHEM\1\DATA\04-13-20\013F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-15
Run Time Bar Code:
Acquired on : 13 Apr 20 01:42 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 13
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



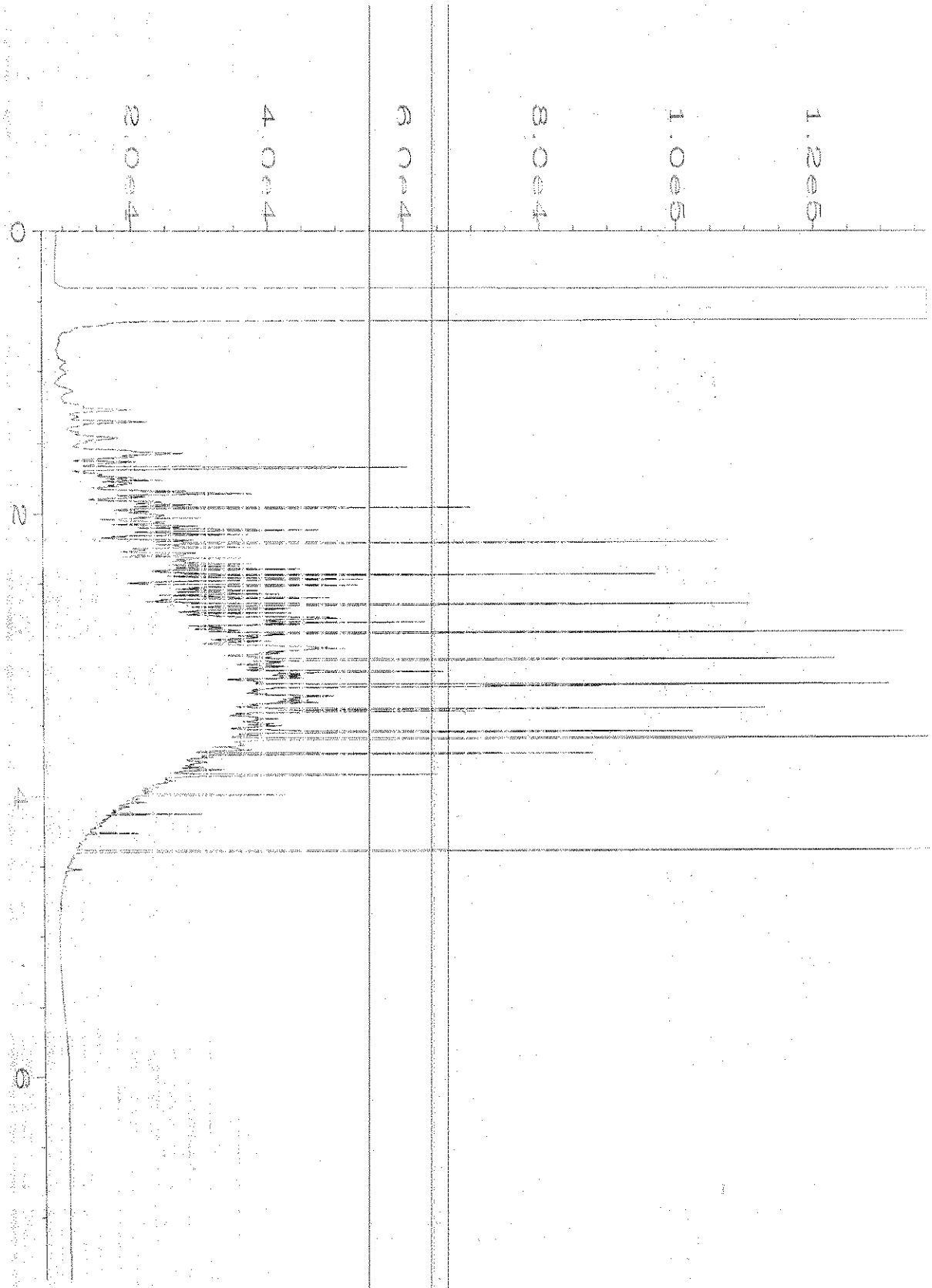
Data File Name : C:\HPCHEM\1\DATA\04-13-20\014F0401.D
Operator : TL
Instrument : GC1
Sample Name : 004098-18
Run Time Bar Code:
Acquired on : 13 Apr 20 01:53 PM
Report Created on: 14 Apr 20 08:06 AM

Page Number : 1
Vial Number : 14
Injection Number : 1
Sequence Line : 4
Instrument Method: DX.MTH
Analysis Method : DX.MTH



Data File Name : C:\HPCHEM\1\DATA\04-13-20\003F0301.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 58-146H
Run Time Bar Code:
Acquired on : 13 Apr 20 08:39 AM
Report Created on: 17 Apr 20 03:12 PM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH



Data File Name : C:\HPCHEM\1\DATA\04-13-20\003F0301.D
Operator : TL
Instrument : GC1
Sample Name : 500 Dx 58-146H
Run Time Bar Code:
Acquired on : 13 Apr 20 08:39 AM
Report Created on: 17 Apr 20 03:12 PM

Page Number : 1
Vial Number : 3
Injection Number : 1
Sequence Line : 3
Instrument Method: DX.MTH
Analysis Method : DEFAULT.MTH

004098

SAMPLE CHAIN OF CUSTODY ME 04/09/20

VS4/VW2/COS

Page # 1 of 2

Report To James Welles

Company PBS

Address Seattle

City, State, ZIP

Phone Email james.welles@pbs-ss.com nathan.dickey@pbsusa.com

SAMPLERS (*signature*)

PROJECT NAME: KCM South Base Annex Phase II

PO #: 41484.004

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Dx w/SG					Notes
						ANALYSES REQUESTED												
E-1-4	01 A-E	4/9/20	0840	S	5		X	X	X									● - per TM 4/21 2 DAY TAT
E-1-11	02		0850	S	5													
E-1-W	03 A-D		0920	W	4								●					
E-2-5	04 A-E		0950	S	5													
E-2-11	05		1000	S	5													
E-2-W	06 A-D		1005	W	4													
E-3-6	07 A-E		1040	S	5													
E-3-12	08		1050	S	5													
E-3-W	09 A-D		1100	W	4													Samples received at 4 °C
E-4-5.5	10 A-E		1220	S	5													

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Dickey	PBS	4/9	1520
Received by:	Eric Hon	RCB	4/9/20	1520
Relinquished by:				
Received by:				

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

004098

SAMPLE CHAIN OF CUSTODY ME 04/09/20

VS4 / VW2 / COS

Page # 2 of 2

Report To

Company PBS

Address

City, State, ZIP

Phone Email

SAMPLERS (signature)

PROJECT NAME: KCM South Base Area Phase II

PO #: 41484.004

REMARKS

INVOICE TO

TURNAROUND TIME
- [x] Standard Turnaround
- [ ] RUSH
- Rush charges authorized by:

SAMPLE DISPOSAL
- [x] Dispose after 30 days
- [ ] Archive Samples
- [ ] Other

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM	Notes
E-4-12	11 A-E	4/9/20	1130	S	5		X	X	X				
E-4-W	12 A-D		1150	W	4								
E-5-5.5	13 A-E		1205	S	5								
E-5-11	14 V		1210	S	5								
E-5-W	15 A-D		1230	W	4								
E-6-6	16 A-E		1250	S	5								
E-6-12	17 V		1300	S	5								
E-6-W	18 A-D		1315	W	4								
	4												Samples received at 4°C

ANALYSES REQUESTED

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by:	Nathan Ricky	PBS	4/9/20	1520
Received by:	Eric Young	F&B	4/9/20	1520
Relinquished by:				
Received by:				

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

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

April 14, 2020

James Welles, Project Manager
PBS Engineering and Environmental, Inc.
214 E. Galer St, Suite 300
Seattle, WA 98102

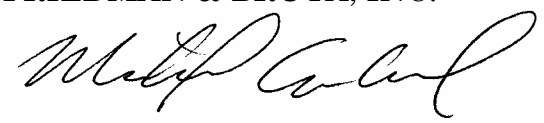
Dear Mr Welles:

Included are the results from the testing of material submitted on April 9, 2020 from the KCM SBA Soil Drum 41484.004, F&BI 004099 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. 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
PBS0414R.DOC

CASE NARRATIVE

This case narrative encompasses samples received on April 9, 2020 by Friedman & Bruya, Inc. from the PBS Engineering and Environmental KCM SBA Soil Drum 41484.004, F&BI 004099 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID	PBS Engineering and Environmental
004099 -01	Soil-Comp

All quality control requirements were acceptable.

Date of Report: 04/14/20
Date Received: 04/09/20
Project: KCM SBA Soil Drum 41484.004, F&BI 004099
Date Extracted: 04/10/20
Date Analyzed: 04/10/20

RESULTS FROM THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES AND TPH AS GASOLINE USING METHODS 8021B AND NWTPH-Gx

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

Sample ID Laboratory ID	Benzene	Toluene	Ethyl Benzene	Total Xylenes	Gasoline Range	Surrogate (% Recovery) (Limit 50-132)
Soil-Comp 004099-01	<0.02	<0.02	<0.02	<0.06	<5	101
Method Blank 00-842 MB2	<0.02	<0.02	<0.02	<0.06	<5	101

Date of Report: 04/14/20
Date Received: 04/09/20
Project: KCM SBA Soil Drum 41484.004, F&BI 004099
Date Extracted: 04/10/20
Date Analyzed: 04/10/20

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

Results Reported on a Dry Weight Basis
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 48-168)
Soil-Comp 004099-01	<50	<250	105
Method Blank 00-891 MB2	<50	<250	107

Analysis For Total Metals By EPA Method 6020B

Client ID:	Soil-Comp	Client:	PBS Engineering and Environmental
Date Received:	04/09/20	Project:	41484.004, F&BI 004099
Date Extracted:	04/10/20	Lab ID:	004099-01
Date Analyzed:	04/10/20	Data File:	004099-01.038
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
Arsenic	6.14
Barium	53.7
Cadmium	<1
Chromium	11.9
Lead	8.84
Mercury	<1
Selenium	<1
Silver	<1

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	PBS Engineering and Environmental
Date Received:	NA	Project:	41484.004, F&BI 004099
Date Extracted:	04/10/20	Lab ID:	I0-212 mb2
Date Analyzed:	04/10/20	Data File:	I0-212 mb2.037
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

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

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QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR BENZENE, TOLUENE, ETHYLBENZENE, XYLENES, AND TPH AS GASOLINE USING METHOD 8021B AND NWTPH-Gx

Laboratory Code: 004090-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Toluene	mg/kg (ppm)	<0.02	<0.02	nm
Ethylbenzene	mg/kg (ppm)	<0.02	<0.02	nm
Xylenes	mg/kg (ppm)	<0.06	<0.06	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	102	69-120
Toluene	mg/kg (ppm)	0.5	102	70-117
Ethylbenzene	mg/kg (ppm)	0.5	102	65-123
Xylenes	mg/kg (ppm)	1.5	107	66-120
Gasoline	mg/kg (ppm)	20	100	71-131

Date of Report: 04/14/20
Date Received: 04/09/20
Project: KCM SBA Soil Drum 41484.004, F&BI 004099

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

Laboratory Code: 004088-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	86	100	73-135	15

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	86	74-139

Date of Report: 04/14/20
Date Received: 04/09/20
Project: KCM SBA Soil Drum 41484.004, F&BI 004099

QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES FOR TOTAL METALS USING EPA METHOD 6020B

Laboratory Code: 004047-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	3.09	74 b	76 b	75-125	3 b
Barium	mg/kg (ppm)	50	42.7	100	109	75-125	9
Cadmium	mg/kg (ppm)	10	<1	96	98	75-125	2
Chromium	mg/kg (ppm)	50	13.3	91	90	75-125	1
Lead	mg/kg (ppm)	50	1.51	92	94	75-125	2
Mercury	mg/kg (ppm	5	<1	97	99	75-125	2
Selenium	mg/kg (ppm)	5	<1	92	92	75-125	0
Silver	mg/kg (ppm)	10	<1	88	92	75-125	4

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	82	80-120
Barium	mg/kg (ppm)	50	106	80-120
Cadmium	mg/kg (ppm)	10	109	80-120
Chromium	mg/kg (ppm)	50	105	80-120
Lead	mg/kg (ppm)	50	104	80-120
Mercury	mg/kg (ppm)	5	106	80-120
Selenium	mg/kg (ppm)	5	98	80-120
Silver	mg/kg (ppm)	10	102	80-120

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.

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 the analyte were outside of acceptance criteria. The value reported is an estimate.

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

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

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

hs - Headspace was present in the container used for analysis.

ht – The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. 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 laboratory control sample(s) percent recovery and/or RPD were 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 analyte 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 with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

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.