ALTA GEOSCIENCES, Inc.

Environmental & Geotechnical Solutions

INDOOR AIR SAMPLING AND ANALYSIS REPORT

ADEC File No. 2100.38.384

Former Norgetown Laundry Site
Anchorage, Alaska

Prepared for:

EEB Ltd.
Bellevue, Washington

February 2016

2020 Maltby Road, Suite 7-197
Bothell, Washington 98021

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Anchorage, Alaska

Prepared for:
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400-112th Ave N.E. Suite 230
Bellevue WA 98004

Prepared by:
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2020 Maltby Road
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Bothell, Washington 98021

Phone: (425) 485-1053
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Date:
February 18, 2016

The field work described herein was performed and this report prepared under the direct supervision of:

Alex Tula, L.G.
Principal consultant

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ACRONYMS & ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
ug/m^3	micrograms per cubic meter
NELAP	National Environmental Laboratory Accreditation Program
QA	quality assurance
PCE	tetrachloroethene
TCE	trichloroethene
WMS	Waterloo Membrane Sampler

EXECUTIVE SUMMARY

Indoor air sampling was conducted at four locations (plus one duplicate) in the former Norgetown Laundry building. The laundry/dry cleaning operation at the site was discontinued many years ago. The building has since been extensively remodeled and is now used for retail clothing sales. Sampling was performed using passive Waterloo Membrane Samplers (WMS) manufactured by Sirem Labs. Samplers were deployed on August 25, 2015, and retrieved on September 11, 2015. Samples were analyzed by Eurofins Air Toxics of Folsom, California.

The only analytes detected were trichloroethene (TCE) and tetrachloroethene (PCE). The maximum reported concentration of TCE was 1.1 ug/m3, well below ADEC's Target Indoor Air Concentration for commercial spaces (8.8 ug/m3).

PCE was detected in all five samples with a maximum concentration in one sample of 200 ug/m^3, slightly exceeding ADEC's Target Indoor Air Concentration for commercial spaces (180 ug/m^3). All four other samples were below ADEC's Target Indoor Air Concentration for commercial spaces. The sample which exceeded ADEC's criteria was collected from the storeroom area, near the former location of the dry cleaning machine. The storeroom is a semi-enclosed space with limited air circulation. The space is occupied only sporadically when inventory is being moved in or out.

The structure is routinely occupied by two adults during normal business hours with no permanent residents.

No evidence of adverse indoor air impacts was observed during the site inspection nor reported during completion of ADEC's *Building Inventory and Indoor Air Sampling Questionnaire.*

The one exceedance of ADEC target criteria is minimal and from an area only sporadically visited. No other evidence of significant air quality impacts was documented. Further investigation or mitigation of vapor intrusion at this site is not warranted.

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1.0 INTRODUCTION

This report has been prepared by ALTA Geosciences, Inc. (ALTA) of Bothell, Washington to document indoor air sampling activities that evaluated current conditions at the Former Norgetown Laundry Site in Anchorage, Alaska (Figure 1). The Site is located at 5477 East Northern Lights Boulevard, northwest of the intersection of Boniface Parkway and Northern Lights Boulevard. Numerous past investigations have been performed at this and adjacent sites as described in the Data Summary Report (ALTA, July, 1997) and in the *Site Characterization Report* (ALTA, July, 2000).

1.1 BACKGROUND

Low but elevated levels of tetrachloroethylene (PCE) have been documented in soil and groundwater in and near the Former Norgetown Laundry Site. Soil concentrations have, in a few samples, ranged up to 4 mg/kg PCE, but are most typically less than 0.5 mg/kg. Groundwater concentrations up to 1.2 mg/L PCE have been reported in the past, although April 1998 sampling results were less than 0.2 mg/L, and are most typically 0.01 to 0.06 mg/L. Reported groundwater concentrations have been steadily declining with time. No evidence of non-aqueous phase liquids (NAPL) has been found in any of the explorations at the Site, and concentrations of PCE in soil, groundwater, and soil gas are so low that the existence of NAPL at the Site is highly unlikely.

During the 1999 and 2000 sewer pipe remediation work at the Site, it was determined that the 4-inch cast-iron, bell and spigot sewer pipe outside the Laundry had apparently leaked through its joints. This pipe extended from the north building door, westward, then south across the front of the building, then westward again to the Value Village Mall building. Subgrade soil samples below the joints along this 140-foot length indicated elevated levels of PCE, and sludge samples from inside the pipe indicated PCE had been disposed of through the sewer pipe. Also during the 2000 pipe remediation, an abandoned 6-inch sewer pipe was found running northward from a tee at the north building door area. This pipe was approximately 43 feet long and capped at the far end. It contained sludge with very high values of PCE, indicated prior disposal of that chemical through the sewer. Subgrade soils below this section of pipe indicate some leakage of PCE through the pipe joints. Both the 4-inch and 6-inch pipes were removed, disposed of offsite, and the 4-inch pipe was replaced with new pipe.

No other specific source (or sources) or release mechanisms have been discovered to date. Aside from this sewer pipe area, no specific areas of significantly elevated soil concentrations of PCE have been discovered, despite numerous soil borings and sample analyses and an extensive soil gas survey (see *Site Characterization Report*). There is a possibility that sources offsite and unrelated to the laundry may

be contributing to the observed contaminant distributions. At present, the relative contribution of such sources and previously leaking sewer pipes cannot be assessed.

The laundry/dry cleaning operation at the site was discontinued many years ago and the building is currently in use as a retail clothing store. No further environmental work has been performed at the site since 2011.

1.2 PURPOSE AND SCOPE

The *Work Plan for Well Installation, Groundwater Monitoring, and Vapor Intrusion Preliminary Assessment* (ALTA, June 28, 2015, hereafter referred to as the Work Plan) specified the work that was to be completed at the Site in 2015, defined the sampling and data-gathering methods to be used for the field work, the sample handling methods, the chemical analysis methods, and quality assurance requirements. The well installation and groundwater monitoring portions of that work are described in a separate report

The purpose of this indoor air sampling effort was to evaluate current conditions with respect to indoor air quality and potential vapor intrusion. After discussions between ALTA and ADEC, four locations in the structure were selected for indoor air sampling as shown on Figure 2. These locations included:

- The two restrooms. These were selected because the sewer and water connections penetrate the floor slab and are potential conduits for vapor phase contaminants. Although remodeled, the restrooms are in the same location as when the laundry was in operation
- The central storage room, near where the dry cleaning machine was previously located.
- The main showroom area (see Photographs)

Additionally, a duplicate sample was planned for the main showroom.

ADEC's *Building Inventory and Indoor Air Sampling Questionnaire* was completed and is attached in Appendix A.

1.3 PROJECT TEAM

The indoor air sampling work was performed under the direct supervision of Alex Tula, L.G., a "qualified person" as defined under 18 AAC 75. Laboratory Analyses were performed by Eurofins Air Toxics of Folsom, California.

2.0 SAMPLING AND ANALYSIS

2.1 INDOOR AIR SAMPLING

Indoor air sampling was performed in general accordance with ADEC's *Vapor Intrusion Guidance for Contaminated Sites* (October 2012).

As described in the Work Plan, Waterloo Membrane Samplers (manufactured by Sirem Labs) were used to collect the air samples. The samplers were placed at approximately four feet above the floor to reflect normal breathing space. Samplers were deployed on August 25, 2015, and retrieved on September 11, 2015. Sampling and sample handling was performed in accordance with *Directions for Collecting Indoor and Outdoor Air Samples with the Waterloo Membrane Sampler* (Sirem, current edition).

Samplers were shipped to the analytical laboratory via express air freight under Chain of Custody procedures.

2.2 LABORATORY ANALYSES

Laboratory analyses were performed by Eurofins Air Toxics of Folsom, California, a NELAP certified laboratory. Laboratory analysis results are summarized on Table 2. Laboratory analysis certificates are contained in Appendix B together with a Quality Control Summary Report and ADEC's Laboratory Data Review Checklist for air samples.

The QA summary includes a review, where appropriate, of holding times, blanks, matrix spike (MS) and laboratory control sample (LCS) recoveries, duplicate sample relative percent differences (RPDs), reporting limits, and overall assessment of data in the sample event. Field samples were reviewed to determine overall precision of sampling and analysis for VOCs. Laboratory data were evaluated using laboratory-supplied control criteria.

No data are rejected. The completeness objectives (greater than 85 percent complete) for this project are met. The precision and accuracy of the laboratory data, as measured by laboratory quality control indicators, suggest that the data are useable for the purposes of this project.

3.0 DISCUSSION OF RESULTS

Laboratory analysis results are shown on Table 1 and summarized below:

- The only analytes detected were trichloroethene (TCE) and PCE.
- TCE was reported in two samples at a maximum concentration of 1.1 ug/m^3, well below ADEC's Target Indoor Air Concentration for commercial spaces (8.8 ug/m^3).
- PCE was detected in all five samples. Four of the five samples were below ADEC's Target Indoor Air Concentration for commercial spaces (180 ug/m^3).
- The maximum concentration reported in any sample was 200 ug/m^3 (sample N-3), slightly exceeding ADEC's Target Indoor Air Concentration for commercial spaces
- Sample N-3 was collected from the storeroom area, near the former location of the dry cleaning machine. The storeroom is a semi-enclosed space with limited air circulation. The space is occupied only sporadically when inventory is being moved in or out.

The structure is routinely occupied by two adults during normal business hours with no permanent residents.

No evidence of adverse indoor air impacts was observed during the site inspection nor reported during completion of ADEC's *Building Inventory and Indoor Air Sampling Questionnaire.*

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4.0 CONCLUSIONS AND RECOMMENDATIONS

The one exceedance of ADEC target criteria is minimal and from an area only sporadically visited. No other evidence of significant air quality impacts was documented. Further investigation or mitigation of vapor intrusion at this site is not warranted.

TABLES

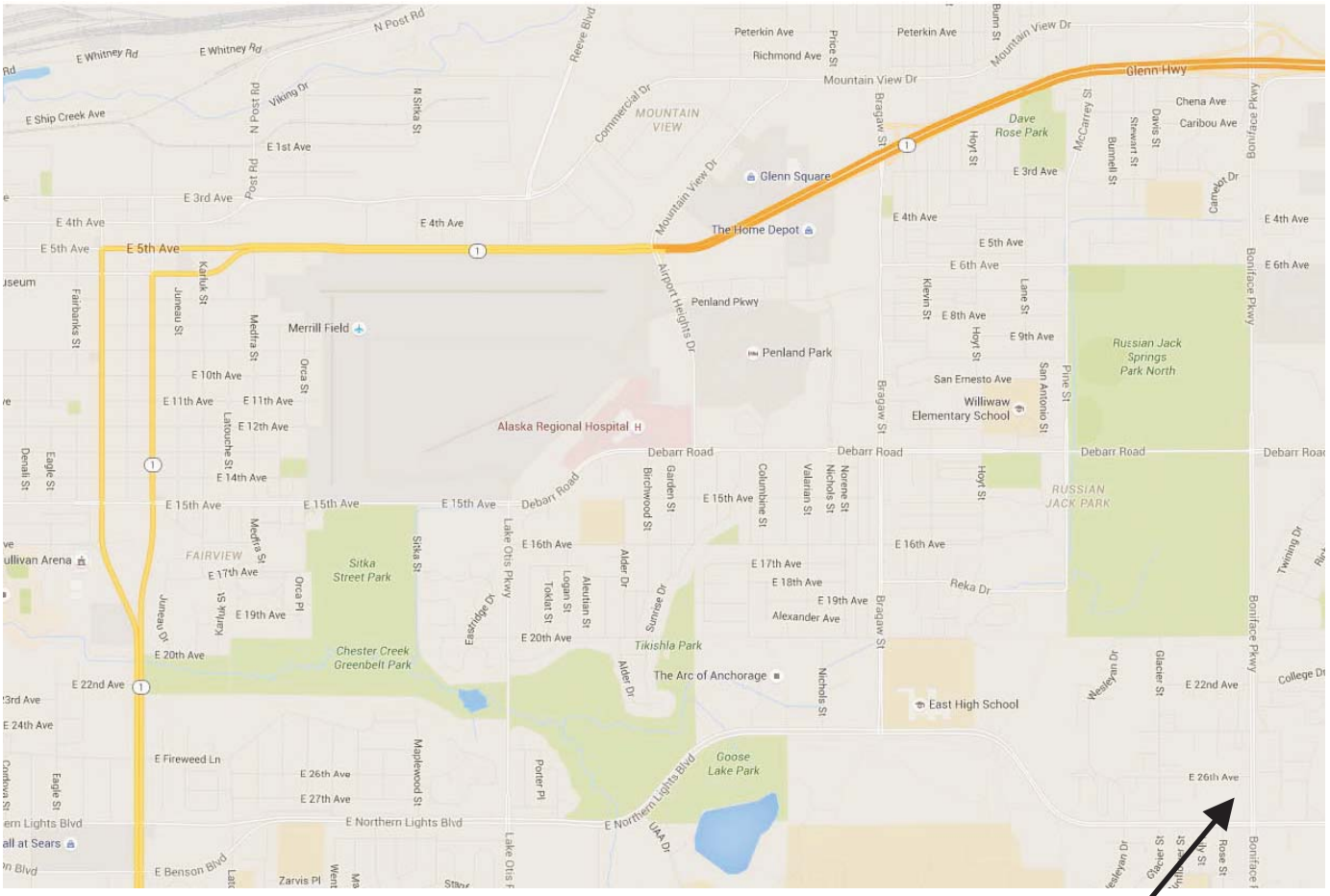
Table 1 - Indoor Air Sample Results (ug/m^3)

Analyte	Target Commercial Indoor Air Conc. (ug/m^3)[1]	*Sample ID and Location*				
		N-1	**N-2**	**N-3**	**N-4**	**N-5**
	Location>	South Restroom	North Restroom	Stockroom	Showroom	Showroom (Duplicate)
Vinyl Chloride	28	<6.9	<6.9	<6.9	<6.9	<6.9
1,1-Dichloroethane	77	<1.3	<1.3	<1.3	<1.3	<1.3
1,1-Dichloroethene	880	<5.9	<5.9	<5.9	<5.9	<5.9
trans-1,2-Dichloroethene	260	<2.6	<2.6	<2.6	<2.6	<2.6
cis-1,2-Dichloroethene	31	<1.1	<1.1	<1.1	<1.1	<1.1
1,1,1-Trichloroethane	21900	<1.4	<1.4	<1.4	<1.4	<1.4
Trichloroethene (TCE)	8.8	<0.79	<0.79	1.1	<0.79	0.81
Tetrachloroethene (PCE)	180	140	140	**200**	130	140

Notes:

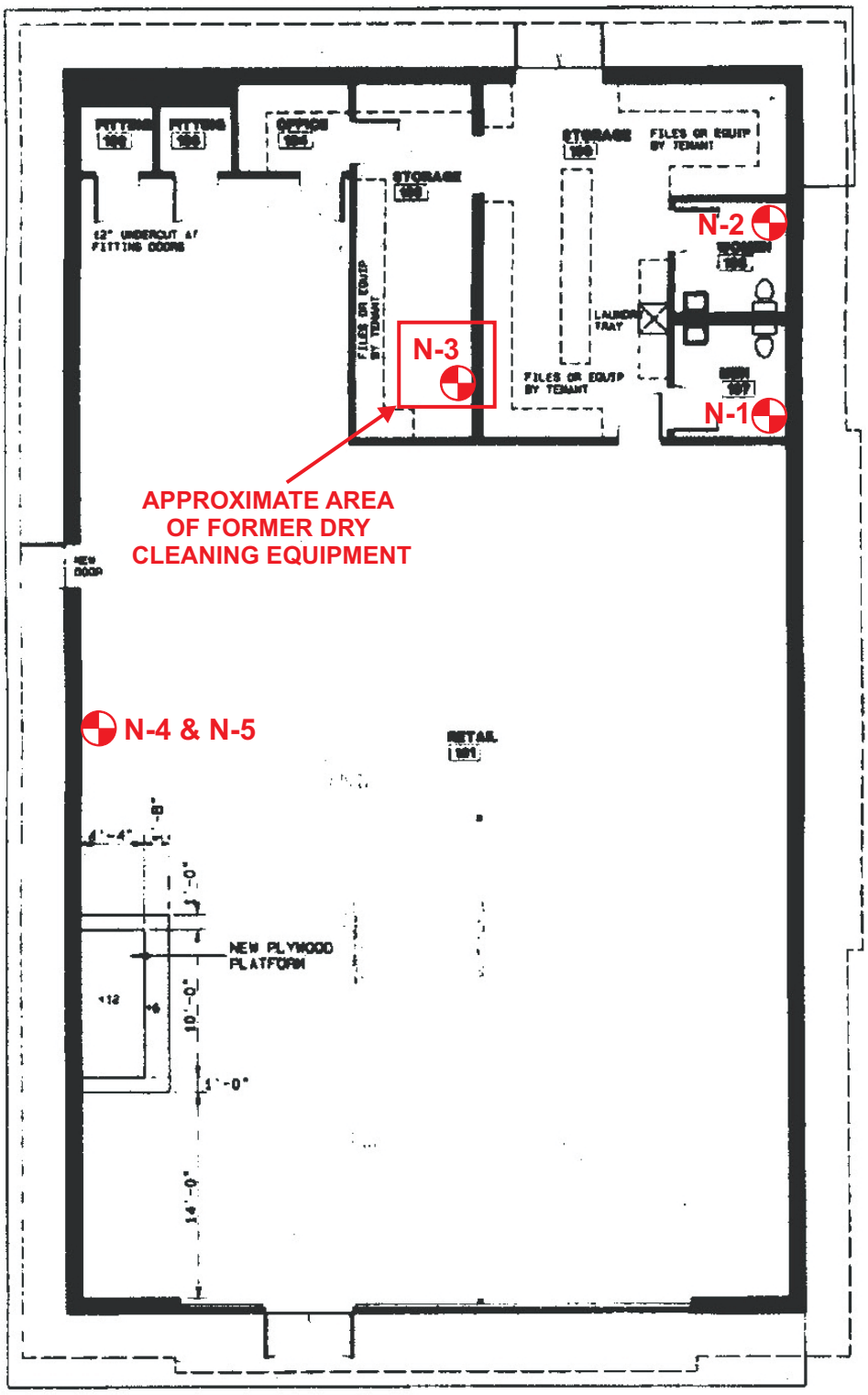
1. Target Commerical Indoor Air Concentration from *Vapor Intrusion Guidance for Contaminated Sites,* ADEC October 2012
2. <#.## = Analyte not detected at reporting limit shown
3. **BOLD** indicates exceedance of target criteria

FIGURES



SITE LOCATION

ALTA GEOSCIENCES, Inc. *Environmental & Geotechnical Solutions* Bothell, Washington *Prepared for:* *Legacy Commercial LLC*	**FORMER NORGETOWN LAUNDRY SITE** **SITE LOCATION**	**FIGURE** **1**



N-1 Indoor air sample location & sample number

ALTA GEOSCIENCES, Inc. *Environmental & Geotechnical Solutions* Bothell, Washington *Prepared for:* *EEB, Ltd.*	**FORMER NORGETOWN LAUNDRY SITE** *Anchorage, Alaska* **INDOOR AIR SAMPLE LOCATIONS**	FIGURE **2**

PHOTOGRAPHS

Main showroom looking south. Samples N-4 & N-5 to the right

Main showroom looking north. Restrooms are through the door on the far right

APPENDIX A

ADEC BUILDING INVENTORY AND INDOOR AIR SAMPLING QUESTIONNAIRE

ALASKA DEPARTMENT OF ENVIRONMENAL CONSERVATION
BUILDING INVENTORY AND INDOOR AIR SAMPLING QUESTIONNAIRE

This form should be prepared by a person familiar with indoor air assessments with assistance from a person knowledgeable about the building. Complete this form for each building where interior samples (e.g., indoor air, crawl space, or subslab soil gas samples) will be collected. Section I of this form should be used to assist in choosing an investigative strategy during workplan development. Section II should be used to assist in identification of complicating factors during a presampling building walk-through.

Preparer's Name Alex Tula Date/Time Prepared 8 June 2015

Preparer's Affiliation ALTA Geosciences, Inc. Phone No. 425-485-1053

Purpose of Investigation ADEC request

SECTION I: BUILDING INVENTORY

1. OCCUPANT OR BUILDING PERSONNEL: Fashion City

Interviewed: Y / N

Last Name Borer First Name David

Address 5477 E. Northern Lights Blvd.

City Anchorage

Phone No. 907-332-0800

Number of Occupants/people at this location 2 Age of Occupants >35

2. OWNER or LANDLORD: (Check if same as occupant ____.) Legacy Commercial LLC

Interviewed: Y / N

Last Name Aydelotte First Name Monica

Address 400-112th Ave. NE, Suite 230

City Bellevue, WA 98004

Phone No. 425-460-4374

3. BUILDING CHARACTERISTICS

Type of Building: (Circle appropriate response.)

Residential	School	Commercial/Multi-use
Industrial	Church	Other ____

If the property is residential, what type? (Circle appropriate response.)

Ranch	2-Family	3-Family
Raised Ranch	Split Level	Colonial
Cape Cod	Contemporary	Mobile Home
Duplex	Apartment House	Townhouse/Condo
Modular	Log Home	Other_____

If multiple units, how many?_____

If the property is commercial, what type?

Business types(s) Retail sales

Does it include residences (i.e., multi-use)? Y / (N) If yes, how many?_____

Other characteristics:

Number of floors 1 Building age >40 years

Is the building insulated? (Y) / N How airtight? Tight / (Average) / Not Tight

Have occupants noticed chemical odors in the building? Y / N

If yes, please describe:_____

_____

4. AIRFLOW

Use air current tubes, tracer smoke, or knowledge about the building to evaluate airflow patterns and qualitatively describe:

Airflow between floors na

Airflow in building near suspected source

Outdoor air infiltration

Infiltration into air ducts

5. BASEMENT AND CONSTRUCTION CHARACTERISTICS (Circle all that apply.)

a. Above-grade construction:	wood frame	log	concrete	brick
	constructed on pilings with enclosed air space		constructed on pilings with open air space	
b. Basement type:	full	crawlspace	slab-on-grade	other None
c. Basement floor:	concrete	dirt	stone	other n/a
d. Basement floor:	unsealed	sealed	sealed with n/a	
e. Foundation walls:	poured	block	stone	other
f. Foundation walls:	unsealed	sealed	sealed with unknown	
g. The basement is:	wet	damp	dry	
h. The basement is:	finished	unfinished	partially finished	
i. Sump present?	Y / N			
j. Water in sump?	Y / N / not applicable			

Basement or lowest level depth below grade n/a (feet).

Identify potential soil vapor entry points and approximate size (e.g., cracks, utility ports, and drains).

_____

_____

6. HEATING, VENTING, and AIR CONDITIONING (Circle all that apply.)

Type of heating system(s) used in this building: (Circle all that apply – not just primary.)

Hot air circulation	Heat pump	Hot water baseboard	
Space heaters	Stream radiation	Radiant floor	
Electric baseboard	Wood stove	Outdoor wood boiler	Other_____

The primary type of fuel used is:

Natural gas	Fuel oil	Kerosene
Electric	Propane	Solar
Wood	Coal	

Domestic hot water tank is fueled by: Natural gas

Boiler/furnace is located in: Basement Outdoors Main floor Other_____

Do any of the heating appliances have cold-air intakes? Y / N

Type of air conditioning or ventilation used in this building:

Central air	Window units	Open windows	None
Commercial HVAC	Heat-recovery system	Passive air system	

Are there air distribution ducts present? Y / N

Describe the ventilation system in the building, its condition where visible, and the tightness of duct joints. Indicate the location of air supply and exhaust points on the floor plan.

_____

_____

_____

_____

Is there a radon mitigation system for the building/structure? Y / N Date of Installation_____

Is the system active or passive? Active/Passive

7. OCCUPANCY

Is basement/lowest level occupied? Full-time Occasionally Seldom Almost never n/a

Level	**General Use of Each Floor (e.g., family room, bedroom, laundry, workshop, or storage).**
Basement	n/a
1st Floor	Retail sales
2nd Floor	n/a
3rd Floor	n/a

8. WATER AND SEWAGE

Water supply: Public water Drilled well Driven well Dug well Other_____

Sewage disposal: Public sewer Septic tank Leach field Dry well Other_____

9. FLOOR PLANS

Draw a plan view sketch of the basement and first floor of the building. Indicate air sampling locations, possible indoor air pollution sources and PID meter readings. If the building does not have a basement, please note that.

Basement: n/a

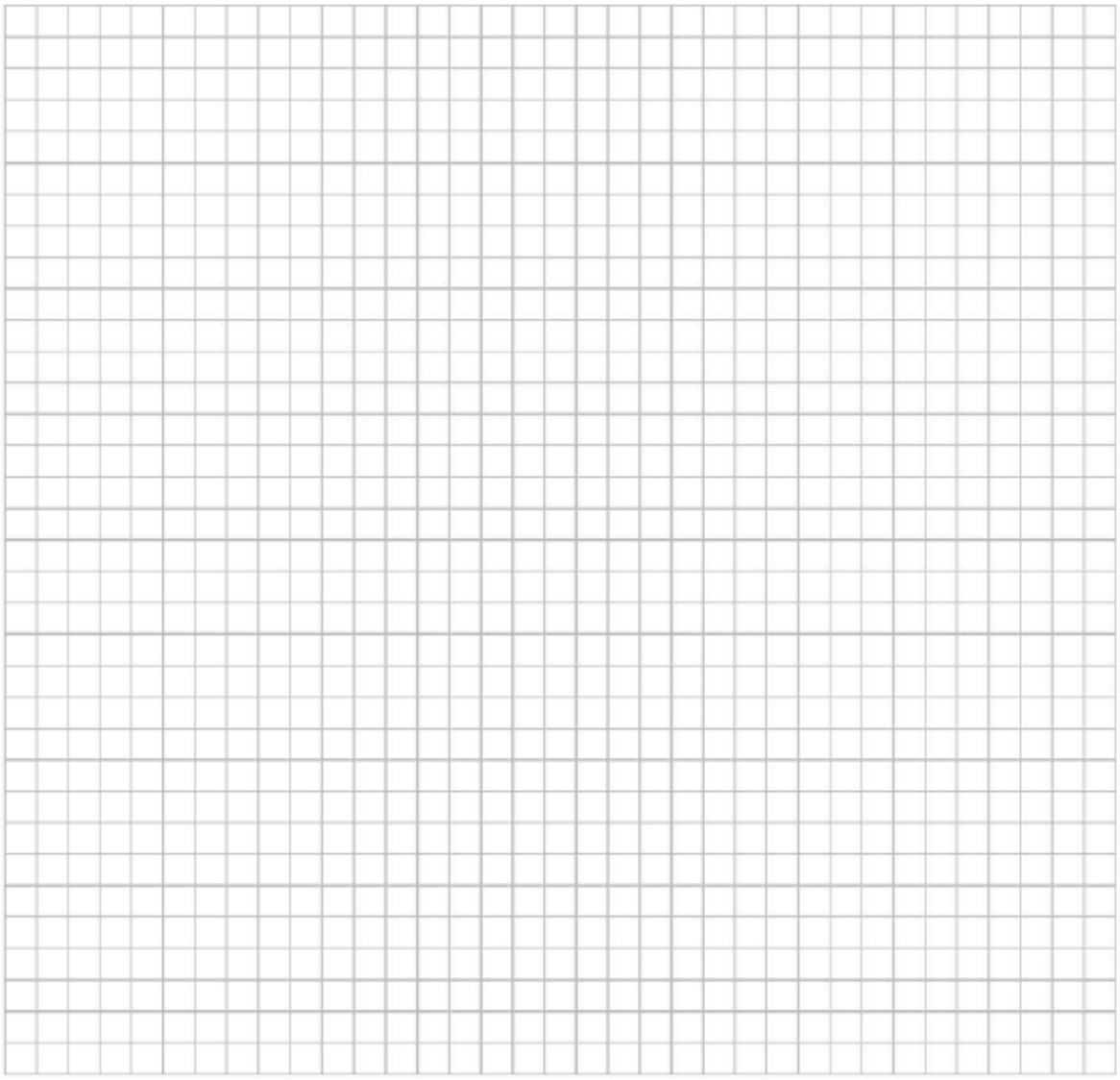
First Floor: see attachment

10. OUTDOOR PLOT

Draw a sketch of the area surrounding the building being sampled. If applicable, provide information on spill locations, potential air contamination sources (e.g., industries, gas stations, repair shops, landfills, etc.), outdoor air sampling locations and PID meter readings.

Also indicate compass direction, wind direction and speed during sampling, the location of the well and septic system, if applicable, and a qualifying statement to help locate the site on a topographic map.

see attachments



SECTION II: INDOOR AIR SAMPLING QUESTIONNAIRE

This section should be completed during a presampling walk-through. If indoor air sources of COCs are identified and removed, consider ventilating the building prior to sampling. However, ventilation and heating systems should be operating normally for 24 hours prior to sampling.

a) 1. FACTORS THAT MAY INFLUENCE INDOOR AIR QUALITY

Is there an attached garage? Y / (N)

Does the garage have a separate heating unit? Y / N / (NA)

Are petroleum-powered machines or vehicles stored in the garage (e.g., lawnmower, ATV, or car) Y / N / (NA)

Please specify_____

Has the building ever had a fire? Y / (N) When?_____

Is a kerosene or unvented gas space heater present? Y / (N) Where?_____

Is there a workshop or hobby/craft area? Y / (N) Where and type_____

Is there smoking in the building? Y / (N) How frequently?_____

Has painting/staining been done in the last six months? Y / (N) Where and when?_____

Is there new carpet, drapes or other textiles? (Y) / N Where and when? Complete remodel in 2008

Is there a kitchen exhaust fan? Y / (N) If yes, where is it vented?_____

Is there a bathroom exhaust fan? (Y) / N If yes, where is it vented? outside

Is there a clothes dryer? Y / (N) If yes, is it vented outside? Y / N

Are cleaning products, cosmetic products, or pesticides used that could interfere with indoor air sampling? Y / (N)

If yes, please describe_____

_____

_____

Do any of the building occupants use solvents at work? Y / (N)

(For example, is the building used for chemical manufacturing or a laboratory, auto mechanic or auto body shop, painting shop, fuel oil delivery area, or do any of the occupants work as a boiler mechanic, pesticide applicator, or cosmetologist?)

If yes, what types of solvents are used?_____

If yes, are his/her/their clothes washed at work? Y / N

Do any of the building occupants regularly use or work at a dry-cleaning service? (Circle appropriate response)

Yes, use dry cleaning regularly (weekly) No

Yes, use dry cleaning infrequently (monthly or less) Unknown

Yes, work at a dry cleaning services

2. PRODUCT INVENTORY FORM (For use during building walk-through.)

Make and model of field instrument used:_____

List specific products found in the residence that have the potential to affect indoor air quality:

Location	Product Description	Site (units)	Condition[1]	Chemical Ingredients	Field Instrument Reading (units)	Photo[2] Y / N

[1] Describe the condition of the product containers as **Unopened (UO), Used (U),** or **Deteriorated (D)**.

[2] Photographs of the front and back of product containers can replace the handwritten list of chemical ingredients. However, the photographs must be of good quality and ingredient labels must be legible.

This form was modified from:

ITRC (Interstate Technology and Regulatory Council). 2007. *Vapor Intrusion Pathway: A Practical Guideline*. VI-1. Washington, D.C.: Interstate Technology and Regulatory Council, Vapor Intrusion Team. Available at: www.itrcweb.org.

APPENDIX B

Laboratory Analysis Certificates

Quality Assurance Report

ADEC Laboratory Data Review Checklist for Air Samples

eurofins | Air Toxics

9/29/2015
Mr. Alex Tula
Alta Geosciences
2020 Maltby Rd
Suite 7197
Bothel WA 98021

Project Name: Norgetown
Project #: 16-08
Workorder #: 1509242

Dear Mr. Alex Tula

The following report includes the data for the above referenced project for sample(s) received on 9/16/2015 at Air Toxics Ltd.

The data and associated QC analyzed by Passive S.E. WMS are compliant with the project requirements or laboratory criteria with the exception of the deviations noted in the attached case narrative.

Thank you for choosing Eurofins Air Toxics Inc. for your air analysis needs. Eurofins Air Toxics Inc. is committed to providing accurate data of the highest quality. Please feel free the Project Manager: Kelly Buettner at 916-985-1000 if you have any questions regarding the data in this report.

Regards,

Kelly Buettner

Project Manager

eurofins | Air Toxics

WORK ORDER #: 1509242

Work Order Summary

CLIENT:	Mr. Alex Tula Alta Geosciences 2020 Maltby Rd Suite 7197 Bothel, WA 98021	**BILL TO:**	Mr. Alex Tula Alta Geosciences 2020 Maltby Rd Suite 7197 Bothel, WA 98021
PHONE:	425-485-1053	**P.O. #**	
FAX:		**PROJECT #**	16-08 Norgetown
DATE RECEIVED:	09/16/2015	**CONTACT:**	Kelly Buettner
DATE COMPLETED:	09/28/2015		

FRACTION #	NAME	TEST
01A	N-1	Passive S.E. WMS
02A	N-2	Passive S.E. WMS
03A	N-3	Passive S.E. WMS
04A	N-4	Passive S.E. WMS
05A	N-5	Passive S.E. WMS
06A	Lab Blank	Passive S.E. WMS
07A	LCS	Passive S.E. WMS
07AA	LCSD	Passive S.E. WMS

CERTIFIED BY: Heidi Mayo

Technical Director

DATE: 09/28/15

180 BLUE RAVINE ROAD, SUITE B FOLSOM, CA - 9563
(916) 985-1000 . (800) 985-5955 . FAX (916) 985-1020

LABORATORY NARRATIVE
Passive SE GC/MS
Alta Geosciences
Workorder# 1509242

Five WMS-SE samples were received on September 16, 2015. The laboratory extracted the charcoal sorbent bed of the passive sampler using carbon disulfide. An aliquot of the extract was injected into a GC/MS for identification and quantification of volatile organic compounds (VOCs).

The mass of each target compound adsorbed by the sampler was converted to units of concentration using the sample deployment time and the sampling rate for each VOC. If sampling rates were calculated by the lab or the manufacturer, the concentration result has been flagged as an estimated value. Results are not corrected for desorption efficiency.

Receiving Notes

There were no receiving discrepancies.

Analytical Notes

To calculate ug/m3 concentrations in the Lab Blank, a sampling duration of 24245 minutes was applied. The assumed temperature used for the uptake rate is listed on the data page. If the field temperatures were provided, the rate was adjusted in the same manner as the field samples.

All Quality Control Limit exceedances and affected sample results are noted by flags. Each flag is defined at the bottom of this Case Narrative and on each Sample Result Summary page.

Definition of Data Qualifying Flags

Nine qualifiers may have been used on the data analysis sheets and indicates as follows:

B - Compound present in laboratory blank greater than reporting limit (background subtraction not performed).
J - Estimated value.
E - Exceeds instrument calibration range.
S - Saturated peak.
Q - Exceeds quality control limits.
U - Compound analyzed for but not detected above the reporting limit.
UJ- Non-detected compound associated with low bias in the CCV
N - The identification is based on presumptive evidence.
C - Estimated concentration due to calculated sampling rate

File extensions may have been used on the data analysis sheets and indicates as follows:
a-File was requantified
b-File was quantified by a second column and detector
r1-File was requantified for the purpose of reissue

eurofins | Air Toxics

Summary of Detected Compounds
VOC BY PASSIVE SAMPLER - GC/MS

Client Sample ID: N-1

Lab ID#: 1509242-01A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.050	0.53	13	140

Client Sample ID: N-2

Lab ID#: 1509242-02A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.050	0.53	13	140

Client Sample ID: N-3

Lab ID#: 1509242-03A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.050	0.79	0.069	1.1
Tetrachloroethene	0.050	0.53	19	200

Client Sample ID: N-4

Lab ID#: 1509242-04A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Tetrachloroethene	0.050	0.53	12	130

Client Sample ID: N-5

Lab ID#: 1509242-05A

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Trichloroethene	0.050	0.79	0.051	0.81
Tetrachloroethene	0.050	0.53	13	140

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Client Sample ID: N-1

Lab ID#: 1509242-01A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091821sim**	**Date of Collection: 9/11/15 11:35:00 AM**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 03:45 PM**	
		Date of Extraction: 9/18/15	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Vinyl Chloride	0.20	6.9	Not Detected	Not Detected
1,1-Dichloroethane	0.050	1.3	Not Detected	Not Detected
1,1-Dichloroethene	0.20	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	0.10	2.6	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.050	1.1	Not Detected	Not Detected
1,1,1-Trichloroethane	0.050	1.4	Not Detected	Not Detected
Trichloroethene	0.050	0.79	Not Detected	Not Detected
Tetrachloroethene	0.050	0.53	13	140

Temperature = 77.0F , duration time = 24225 minutes.

Container Type: WMS-SE

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130

eurofins | Air Toxics

Client Sample ID: N-2

Lab ID#: 1509242-02A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091822sim**	**Date of Collection: 9/11/15 11:35:00 AM**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 04:08 PM**	
		Date of Extraction: 9/18/15	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Vinyl Chloride	0.20	6.9	Not Detected	Not Detected
1,1-Dichloroethane	0.050	1.3	Not Detected	Not Detected
1,1-Dichloroethene	0.20	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	0.10	2.6	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.050	1.1	Not Detected	Not Detected
1,1,1-Trichloroethane	0.050	1.4	Not Detected	Not Detected
Trichloroethene	0.050	0.79	Not Detected	Not Detected
Tetrachloroethene	0.050	0.53	13	140

Temperature = 77.0F , duration time = 24220 minutes.

Container Type: WMS-SE

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130

eurofins | Air Toxics

Client Sample ID: N-3

Lab ID#: 1509242-03A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091823sim**	**Date of Collection: 9/11/15 11:50:00 AM**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 04:32 PM**	
		Date of Extraction: 9/18/15	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Vinyl Chloride	0.20	6.9	Not Detected	Not Detected
1,1-Dichloroethane	0.050	1.3	Not Detected	Not Detected
1,1-Dichloroethene	0.20	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	0.10	2.6	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.050	1.1	Not Detected	Not Detected
1,1,1-Trichloroethane	0.050	1.4	Not Detected	Not Detected
Trichloroethene	0.050	0.79	0.069	1.1
Tetrachloroethene	0.050	0.53	19	200

Temperature = 77.0F , duration time = 24245 minutes.

Container Type: WMS-SE

Surrogates	%Recovery	Method Limits
Toluene-d8	107	70-130

eurofins | Air Toxics

Client Sample ID: N-4

Lab ID#: 1509242-04A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091824sim**	**Date of Collection: 9/11/15 11:40:00 AM**
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 04:55 PM**
		Date of Extraction: 9/18/15

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Vinyl Chloride	0.20	6.9	Not Detected	Not Detected
1,1-Dichloroethane	0.050	1.3	Not Detected	Not Detected
1,1-Dichloroethene	0.20	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	0.10	2.6	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.050	1.1	Not Detected	Not Detected
1,1,1-Trichloroethane	0.050	1.4	Not Detected	Not Detected
Trichloroethene	0.050	0.79	Not Detected	Not Detected
Tetrachloroethene	0.050	0.53	12	130

Temperature = 77.0F , duration time = 24243 minutes.

Container Type: WMS-SE

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130

eurofins | Air Toxics

Client Sample ID: N-5

Lab ID#: 1509242-05A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091825sim**	**Date of Collection: 9/11/15 11:45:00 AM**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 05:19 PM**	
		Date of Extraction: 9/18/15	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Vinyl Chloride	0.20	6.9	Not Detected	Not Detected
1,1-Dichloroethane	0.050	1.3	Not Detected	Not Detected
1,1-Dichloroethene	0.20	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	0.10	2.6	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.050	1.1	Not Detected	Not Detected
1,1,1-Trichloroethane	0.050	1.4	Not Detected	Not Detected
Trichloroethene	0.050	0.79	0.051	0.81
Tetrachloroethene	0.050	0.53	13	140

Temperature = 77.0F , duration time = 24243 minutes.

Container Type: WMS-SE

Surrogates	%Recovery	Method Limits
Toluene-d8	106	70-130

eurofins | Air Toxics

Client Sample ID: Lab Blank

Lab ID#: 1509242-06A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091813sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 12:37 PM**	
		Date of Extraction: 9/18/15	

Compound	Rpt. Limit (ug)	Rpt. Limit (ug/m3)	Amount (ug)	Amount (ug/m3)
Vinyl Chloride	0.20	6.9	Not Detected	Not Detected
1,1-Dichloroethane	0.050	1.3	Not Detected	Not Detected
1,1-Dichloroethene	0.20	5.9	Not Detected	Not Detected
trans-1,2-Dichloroethene	0.10	2.6	Not Detected	Not Detected
cis-1,2-Dichloroethene	0.050	1.1	Not Detected	Not Detected
1,1,1-Trichloroethane	0.050	1.4	Not Detected	Not Detected
Trichloroethene	0.050	0.79	Not Detected	Not Detected
Tetrachloroethene	0.050	0.53	Not Detected	Not Detected

Temperature = 77.0F , duration time = 24245 minutes.
Container Type: WMS-SE

Surrogates	%Recovery	Method Limits
Toluene-d8	103	70-130

eurofins | Air Toxics

Client Sample ID: LCS

Lab ID#: 1509242-07A

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091809sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 11:03 AM**	
		Date of Extraction: 9/18/15	

Compound	%Recovery	Method Limits
Vinyl Chloride	144 Q	50-140
1,1-Dichloroethane	94	70-130
1,1-Dichloroethene	116	70-130
trans-1,2-Dichloroethene	98	70-130
cis-1,2-Dichloroethene	93	70-130
1,1,1-Trichloroethane	100	70-130
Trichloroethene	101	70-130
Tetrachloroethene	94	70-130

Q = Exceeds Quality Control limits.

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130

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Client Sample ID: LCSD

Lab ID#: 1509242-07AA

VOC BY PASSIVE SAMPLER - GC/MS

File Name:	**10091810sim**	**Date of Collection: NA**	
Dil. Factor:	**1.00**	**Date of Analysis: 9/18/15 11:27 AM**	
		Date of Extraction: 9/18/15	

Compound	%Recovery	Method Limits
Vinyl Chloride	118	50-140
1,1-Dichloroethane	89	70-130
1,1-Dichloroethene	107	70-130
trans-1,2-Dichloroethene	98	70-130
cis-1,2-Dichloroethene	89	70-130
1,1,1-Trichloroethane	96	70-130
Trichloroethene	101	70-130
Tetrachloroethene	98	70-130

Container Type: NA - Not Applicable

Surrogates	%Recovery	Method Limits
Toluene-d8	105	70-130

PASSIVE SAMPLE COLLECTION

@Air Toxics LTD.

CHAIN-OF-CUSTODY RECORD

Sample Transportation Notice
Relinquishing signature on this document indicates that sample is being shipped in compliance with all applicable local, State, Federal, national, and international laws, regulations and ordinances of any kind. Air Toxics Limited assumes no liability with respect to the collection, handling or shipping of these samples. Relinquishing signature also indicates agreement to hold harmless, defend, and indemnify Air Toxics Limited against any claim, demand, or action, of any kind, related to the collection, handling, or shipping of samples. D.O.T. Hotline (800) 467-4922.

180 BLUE RAVINE ROAD, SUITE B
FOLSOM, CA 95630
(916) 985-1000 FAX (916) 985-1020

Project Manager: Alex Tula

Collected by: (Print and Sign) Jeremy Yancey

Company: AITa GeoScience Email: atula@aitageo.com

Address: 2020 Malby City: Bothell State: WA Zip: 98021

Phone: 425-485-1053 Fax: 425-984-0114

Project Info:
P.O. #:
Project #: 16-08
Project Name: Norgetown

Turn Around Time:
☒ Normal
☐ Rush
specify

Reporting Units:
☐ ppmv
☐ ppbv
☐ µg/m3
☐ mg/m3

Lab I.D.	Field Sample I.D. (Location)	Sampler #	Date of Deployment (mm/dd/yy)	Time of Deployment (hr : min)	Date of Retrieval (mm/dd/yy)	Time of Retrieval (hr : min)	Analysis Requested	Indoor Air	Outdoor Air	Workplace Monitoring	Other ( )
01A	N-1	JY	8-25-15	1550	9-11-15	1135	TO15	☒	☐	☐	☐
02A	N-2	JY	8-25-15	1555	9-11-15	1135	TO15	☒	☐	☐	☐
03A	N-3	JY	8-25-15	1545	9-11-15	1150	TO15	☒	☐	☐	☐
04A	N-4	JY	8-25-15	1537	9-11-15	1140	TO15	☒	☐	☐	☐
05A	N-5	JY	8-25-15	1542	9-11-15	1145	TO15	☒	☐	☐	☐
								☐	☐	☐	☐
								☐	☐	☐	☐
								☐	☐	☐	☐
								☐	☐	☐	☐
								☐	☐	☐	☐

Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
	9-14-15 1036	FedEx	9-16-15 0945
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time
Relinquished by: (signature)	Date/Time	Received by: (signature)	Date/Time

Sample Site Air Temperature:

Notes:

Lab Use Only	Shipper Name	Air Bill #	Temp (°C)	Condition	Custody Seals Intact?	Work Order #
	FedEx		MA	Good	Yes No (None)	1509242

QUALITY CONTROL SUMMARY

This QA summary includes a review, where appropriate, of holding times, blanks, matrix spike (MS) and laboratory control sample (LCS) recoveries, duplicate sample relative percent differences (RPDs), reporting limits, and overall assessment of data in the sample event. Each analysis that was performed is evaluated in the following subsections.

Field samples were reviewed to determine overall precision of sampling and analysis for VOCs.

Laboratory data were evaluated using laboratory-supplied control criteria. In the following method-specific discussions, only the criteria exceedances that impact data qualification or require assessment beyond laboratory documentation are discussed.

Samples were submitted to Eurofins Air Toxics (Eurofins) in Folsom, California. Five (5) air samples were submitted to the laboratory in one laboratory batch on September 16, 2015. The laboratory report did not include a sample receipt form; however, the case narrative stated that there were not sample receiving discrepancies.

No samples were collected as field duplicates or designated as matrix spike/matrix spike duplicate (MS/MSD) samples.

The sample results are reported under Eurofins job number 1509242. The laboratory report did not include a sample receipt form; therefore, a determination of sample condition upon receipt at the laboratory could not be made.

VOCs BY WATERLOO MEMBRANE SAMPLER – GC/MS

All data elements/indicators are in conformance with the project criteria, with the following exception:

- The LCS sample 1509242-07A had a high recovery for vinyl chloride (144% vs. limits of 50-140%). Vinyl chloride was not detected in the project samples and they are considered unaffected by the high LCS recovery.

OVERALL ASSESSMENT

The following summary highlights the data evaluation findings for this sampling event:

- No data are rejected.
- The completeness objectives (greater than 85 percent complete) for this project are met.
- The precision and accuracy of the laboratory data, as measured by laboratory quality control indicators, suggest that the data are useable as qualified for the purposes of this project.

Contaminated Sites Program
Spill Prevention and Response Division
Alaska Department of Environmental Conservation

Laboratory Data Review Checklist for Air Samples

Completed by:	Rachel James		
Title:	Chemist, Argon, Inc.	Date:	01/20/2016
CS Report Name:		Report Date:	09/29/2015
Consultant Firm:	Alta Geosciences		
Laboratory Name:	Eurofins Air Toxics, Folsom, CA	Laboratory Report Number:	1509242
DEC File Number:		DEC Haz ID:	

1. Laboratory
   a. Did a NELAP-certified laboratory receive and perform all of the submitted sample analyses?
   ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   b. If the samples were transferred to another "network" laboratory or sub-contracted to an alternate laboratory, was the laboratory performing the analyses NELAP-approved?
   ☐ Yes ☐ No ☑ N/A (Please explain.)

   Comments:
   Samples were not subcontracted.

2. Chain of Custody (COC)
   a. Was the COC information completed, signed and dated (including released/received by)?
   ☐ Yes ☐ No ☑ N/A (Please explain.)

   Comments:
   The COC was not included in the laboratory report.

   b. Was the correct analyses requested?
   ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

3. Laboratory Sample Receipt Documentation

a. Was the sample condition documented? Were samples collected in gas-tight, opaque/dark Summa canisters or other DEC-approved containers? Was the canister vacuum/pressure checked, recorded upon receipt and were there no open valves?

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

Samples were collected in Waterloo Membrane Samplers and documentation of canister pressures was not necessary.

b. If there were any discrepancies, were they documented? Examples include incorrect sample containers/preservation, sample temperature outside of acceptable range, insufficient or missing samples, canister not holding a vacuum, etc.

☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

The laboratory report did not include a sample receipt form; however, the case narrative stated that there were no sample receiving discrepancies.

c. Was the data quality or usability affected? (Please explain.)

Comments:

Data quality or usability was not affected by the sample receipt documentation.

4. Case Narrative

a. Is there a case narrative and is it understandable?

☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

b. Were there any discrepancies, errors or QC failures identified by the lab?

☐ Yes ☑ No ☐ N/A (Please explain.)

Comments:

c. Were all corrective actions documented?

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

No corrective action documentation was necessary.

d. What is the effect on data quality/usability according to the case narrative?

Comments:

Data quality or usability was not affected by the case narrative.

5. Samples Results
   a. Was the correct analyses performed/reported as requested on COC?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Correct analyses were performed; however, the COC was not included in the laboratory report.

   b. Were the samples analyzed within 30 days of collection or within the time required by the method?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   c. Are the reported PQLs less than the Target Screening Level or the minimum required detection level for the project?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

   Reporting limits met the ADEC Indoor Air Target Levels (Commercial).

   d. Was the data quality or usability affected?

   Comments:

   Data quality or usability was not affected.

6. QC Samples
   a. Method Blank
      i. Was one method blank reported per analysis and 20 samples?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

      ii. Were all method blank results less than PQL?
      ☑ Yes ☐ No ☐ N/A (Please explain.)

   Comments:

      iii. If above PQL, what samples are affected?

   Comments:

   No samples were affected by the method blank.

iv. Do the affected sample(s) have data flags and, if so, are the data flags clearly defined?

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

No samples were affected by the method blank.

v. Was the data quality or usability affected? (Please explain.)

Comments:

Data quality or usability was not affected by the method blank.

b. Laboratory Control Sample/Duplicate (LCS/LCSD)

i. Was there one LCS/LCSD or one LCS and a sample/sample duplicate pair reported per analysis and 20 samples?

☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

ii. Accuracy – Were all percent recoveries (%R) reported and within method or laboratory limits? What were the project specified DQOs, if applicable?

☐ Yes ☑ No ☐ N/A (Please explain.)

Comments:

The LCS sample 1509242-07A had a high recovery for vinyl chloride (144% vs. limits of 50-140%).

iii. Precision – Were all relative percent differences (RPD) reported and were they less than method or laboratory limits? What were the project-specified DQOs, if applicable.

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

The laboratory did not calculate precision between the LCS and LCSD samples.

iv. If the %R or RPD is outside of acceptable limits, what samples are affected?

Comments:

No project samples detected vinyl chloride; therefore, they are unaffected by the high LCS recovery.

v. Do the affected sample(s) have data flags? If so, are the data flags clearly defined?

☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

Data flags were not necessary.

vi. Is the data quality or usability affected? (Please explain.)

Comments:

Data quality or usability was not affected by the LCS/LCSD samples.

c. Surrogates

i. Are surrogate recoveries reported for field, QC and laboratory samples?
☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

ii. Accuracy – Are all percent recoveries (%R) reported and within method or laboratory limits? What were the project-specified DQOs, if applicable?
☑ Yes ☐ No ☐ N/A (Please explain.)

Comments:

iii. Do the sample results with failed surrogate recoveries have data flags? If so, are the data flags clearly defined?
☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

No samples had failed surrogate recoveries.

iv. Was the data quality or usability affected? (Please explain.)

Comments:

Data quality or usability was not affected by the surrogates.

d. Field Duplicate

i. Was one field duplicate submitted per analysis and 10 type (soil gas, indoor air, etc.) samples?
☐ Yes ☑ No ☐ N/A (Please explain.)

Comments:

A field duplicate was not submitted.

ii. Were they or was it submitted blind to the lab?
☐ Yes ☐ No ☑ N/A (Please explain.)

Comments:

A field duplicate was not submitted.

iii. Precision – Were all relative percent differences (RPD) less than the specified DQOs? (Recommended: 25 %)

RPD (%) = Absolute value of: $\frac{(R_1-R_2)}{((R_1+R_2)/2)} \times 100$

Where R_1 = Sample Concentration
R_2 = Field Duplicate Concentration

☐Yes ☐No ☑N/A (Please explain.)

Comments:

A field duplicate was not submitted.

iv. Was the data quality or usability affected? (Please explain.)

Comments:

A field duplicate was not submitted.

e. Field Blank (If not used, explain why.)

☐Yes ☐No ☑N/A (Please explain.)

Comments:

An equipment blank was not necessary - Waterloo Membrane Samplers were disposable and sampling supplies were dedicated to each sample location.

i. Were all results less than the PQL?

☐Yes ☐No ☑N/A (Please explain.)

Comments:

An equipment blank was not necessary.

ii. If above PQL, what samples are affected?

Comments:

NA

iii. Was the data quality or usability affected? (Please explain.)

Comments:

No data quality or usability is affected by the lack of an equipment blank.

7. Other Data Flags/Qualifiers

a. Were other data flags/qualifiers defined and appropriate?

☑Yes ☐No ☐N/A (Please explain.)

Comments: