

April 26, 2019

Great Western Operating Company, LLC
1801 Broadway, Suite 500
Denver, Colorado 80202

Attention: Ben Huggins, EHS Manager

Subject: Summary of Groundwater Sampling, Remediation, and Site Activities
Haas #1 Former Production Site
Weld County, Colorado
Project Number 160884.EC

Dear Mr. Huggins,

As requested, A. G. Wassenaar, Inc. (AGW) has conducted groundwater sampling and remediation activities at the Haas #1 former production site in Weld County, Colorado. The sampling activities were completed in September 2018, December 2018, and March 2019. The September and December events were the fifth and sixth sampling events to occur since AGW installed three (3) monitoring wells at the site in March 2017. The March 2019 sampling event was the first to occur since AGW installed three (3) additional monitoring wells at the site in January 2019. The previous sampling event was conducted in June 2018. Furthermore, AGW also installed a remedial aeration system at the site in December 2018. This letter summarizes the project activities and analytical results.

BACKGROUND

The site is located in the northeast $\frac{1}{4}$ of the southeast $\frac{1}{4}$ of Section 15, Township 6 North, Range 67 West; northwest of the intersection of Highway 392 and County Road 21 in Weld County, Colorado. The site formerly contained one (1) aboveground steel tank for condensate storage, one (1) aboveground tank for produced water storage, and one (1) separate earthen containment berm for the separator.

In March 2016, Great Western Operating Company, LLC (GWOC) requested that AGW visit the Haas #1 facility to collect soil samples following the excavation of approximately 250 cubic yards of visibly impacted soil in the vicinity of the former produced water storage vessel. On March 15, 2016, AGW collected soil samples from the walls and base of the excavation, and from the stockpiled soils. Based on the analytical results, impacted soils remained at the site.

GWOC notified the COGCC, Weld County, the Town of Windsor, and the surface owner of the historical release on March 22, 2016, and a Form 19 Spill/Release Report was submitted on March 24, 2016. A supplemental Spill/Release Report was submitted on April 1, 2016.

In May 2016, AGW completed additional soil and groundwater sampling to define the extent of impact in the vicinity of the release. The results of the May 3, 2016 investigation determined that groundwater had been impacted at the site, that impacted soil remained at the site, and additional excavation was needed.

To address the remaining impacted soils and groundwater at the site, on October 4 and October 5, 2016, the excavation at the Haas #1 facility was extended, and 650 cubic yards of additional impacted soils were removed. AGW conducted post-excavation soil sampling from each of the four (4) walls of the excavation. Based on the analytical results, impacted soils were removed laterally and to the depth of groundwater. 1,150 pounds of COGAC™ (Chemically Oxygenated Granular Activated Carbon) were incorporated into the soil and groundwater at the base of the excavation. COGAC™, a patented material manufactured by Remington Technologies, LLC, degrades contaminants via chemical oxidation and passive bio-stimulation, as well as mitigating desorbed contaminant mass. Additionally, PVC pipe was installed horizontally within the excavation to provide access to groundwater for possible future remediation efforts.

To monitor the effectiveness of the remediation activities, in March 2017, AGW installed and sampled three (3) monitoring wells at the Haas #1 site. Quarterly sampling events have taken place since March 2017 with the most recent occurring in September and December 2018, and March 2019. Remediation activities and a limited subsurface investigation that included the installation of three (3) new monitoring wells have taken place in November 2018 and January 2019, respectively. Details of the quarterly groundwater sampling events, remediation activities, additional investigations, and well installations are included below.

SEPTEMBER AND DECEMBER 2018 GROUNDWATER SAMPLING

AGW conducted the sixth and seventh groundwater sampling event of the three (3) onsite monitoring wells on September 20, 2018 and December 21, 2018.

Groundwater Elevation Measurements

Table 1, below, summarizes the groundwater depth measurements on September 20, 2018.

**Table 1: Groundwater Depths
Haas #1
September 20, 2018**

Well Number	Depth to Groundwater (TOC)*
MW-1	9.37
MW-2	9.21
MW-3	9.40

*Elevations are in feet below top of casing (TOC).

Based on the survey elevation data and groundwater levels collected on September 20, 2018, groundwater at the Haas #1 site flows to the south-southwest. Figure 1 in Attachment A illustrates the groundwater elevations and estimated flow direction.

Table 2, below, summarizes the groundwater depth measurements on December 21, 2018.

**Table 2: Groundwater Depths
Haas #1
December 21, 2018**

Well Number	Depth to Groundwater (TOC)*
MW-1	9.46
MW-2	9.31
MW-3	9.50

*Elevations are in feet below top of casing (TOC).

Based on the groundwater levels collected on December 21, 2018, groundwater at the Haas #1 site flows to the south-southwest. Figure 2 in Attachment A illustrates the groundwater elevations and estimated flow direction.

Groundwater Sampling Methods

On September 20 and December 21, 2018, AGW collected groundwater samples from monitoring wells MW-1, MW-2, and MW-3 for analytical testing. To collect the samples, AGW utilized a dedicated plastic bailer attached to nylon cord at each borehole. Each sample was transferred into three (3) acid-preserved glass vials supplied by the laboratory. The filled sample containers were immediately sealed, labeled, and placed into a cooler with ice (a preservative). The samples were delivered to Origins Laboratory, Inc. (Origins) of Denver, Colorado for analytical testing. During these projects, AGW followed chain-of-custody procedures in general accordance with Environmental Protection Agency (EPA) guidelines. For each event, Origins analyzed all three (3) groundwater samples for Benzene, Toluene, Ethylbenzene, and Xylenes (BTEX) using EPA Method 8260C.

Groundwater Analytical Results

Table 3, below, summarizes the groundwater analytical results for both the September 2018 and December 2018 sampling events. A copy of the laboratory reports is included in Attachment B. The results are also illustrated on Figure 3 in Attachment A.

**Table 3: Groundwater Analytical Results
Haas #1**

Sample Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-1	9/20/18	ND	ND	ND	ND
	12/21/18	ND	ND	ND	ND
MW-2	9/20/18	5.420	ND	0.354	1.020
	12/21/18	4.780	ND	0.235	0.538
MW-3	9/20/18	ND	ND	ND	ND
	12/21/18	ND	ND	ND	ND

Sample Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes
COGCC Table 910-1 Concentrations (mg/L)		0.005	1.0	0.70	10.0

All concentrations are in mg/L = Milligrams per liter, parts per million

ND = Not detected above laboratory detection limits

Analytes in **bold** exceed their respective COGCC Table 910-1 concentration

To evaluate the groundwater analytical results, AGW consulted the Table 910-1 Concentration Levels provided within COGCC 900 Series Rules for Exploration and Production Waste Management. Based on the analytical results, during the September and December 2018 sampling events groundwater from MW-1 and MW-3 did not contain BTEX concentrations greater than their respective COGCC Table 910-1. Groundwater collected from MW-2 has contained benzene concentrations in exceedance of the COGCC Table 910-1 value of 0.005 mg/L during all six sampling events, and concentrations continue to fluctuate.

REMEDIATION SYSTEM INSTALLATION

Based on the groundwater results from sampling events in 2017 and 2018, no considerable reduction of benzene in groundwater had occurred. AGW determined that biodegradation of benzene is an appropriate method for remediation at this site. It is likely that most available oxygen has been used up, and that oxygen supply may be the limiting factor in benzene degradation at this point. In August 2018, AGW proposed a cost-effective solution to increase the amount of oxygen by installing an aeration system near the impacted area. The system uses a small solar powered bubbler to introduce additional oxygen into the subsurface environment, reverting the anaerobic environment back to aerobic conditions, and in turn, reactivating the biodegradation of benzene.

As requested, AGW completed installation of the proposed aeration remediation system on November 30, 2018. Consisting of a small air pump, a power inverter, and one (1) solar cell, the aeration system was installed near MW-1, utilizing a slotted horizontal PVC pipe that was installed previously, when impacted soils were excavated at the site. Tubing from the pump was fed into the vertical access pipe and then into the horizontal remediation pipe, increasing the lateral extent to which oxygen can be introduced. Sunlight permitting, the system will run during the daytime and allow the system to equilibrate during evening hours. The system is completely standalone and may run as long as necessary, without any recurring costs. The system is enclosed with secure fencing to prevent vandalism of equipment.

JANUARY 2019 LIMITED SUBSURFACE INVESTIGATION AND MONITORING WELL INSTALLATION

GWOC received a request from the COGCC to conduct additional investigation in the location of the former produced water tank, and to further define the cross-gradient and downgradient extent of groundwater impact in MW-2.

Based on COGCC's request, AGW completed a limited subsurface investigation and the installation of three (3) additional monitoring wells in January 2019. The general scope of work included:

- Request subsurface utility locate services.

- Advance three (3) environmental boreholes to 15 feet below ground surface (bgs).
- Collect soil samples from the boreholes for field observation of contamination.
- Submit four (4) soil samples for analysis (three (3) from the borehole in the vicinity of the former produced water tank and one (1) from the borehole farthest downgradient).
- Install permanent monitoring wells in the three (3) boreholes.
- Develop and survey the installed monitoring wells.
- Submit three (3) groundwater samples for analytical testing (one (1) from each monitoring well).

Health and Safety Plan Development

AGW created a site-specific Health and Safety Plan (HASP) for activities by AGW employees at the site. The plan called for level D (lowest threat level) protection based on the anticipated chemicals of concern and their potential concentration.

Utility Clearances

In accordance with Colorado law, AGW and the project drilling contractor contacted the Utility Notification Center of Colorado (UNCC) and associated utility companies to locate public subsurface utilities in the proposed boring areas prior to borehole advancement. To evaluate the specific borehole locations to be drilled, AGW coordinated and attended site meetings with utility locate representatives. Based on the locates and meeting results, no subsurface utility conflicts were identified at the borehole locations.

Based on the location of utility markings, surface features, safety issues, and project goals, AGW identified the final borehole locations on the property.

Notice of Intent to Construct Monitoring Wells

On January 13, 2019, a Notice of Intent (NOI) to Construct Monitoring Holes was filed with the Colorado Division of Water Resources (DWR). The DWR requires that an NOI be filed at least three (3) business days prior to drilling and constructing the monitoring wells. Additionally, the monitoring wells will be used permanently for quarterly groundwater sampling, therefore, permit applications were submitted (with the \$100 fee for each well) and approved.

Laboratory Supplied Sampling Containers

Prior to conducting the drilling activities, AGW ordered required sampling containers and quality control blanks from Origins of Denver, Colorado.

Drilling and Soil Sampling Methods

To conduct the drilling activities, AGW retained Site Services Drilling, LLC. (Site Services) of Golden, Colorado. On January 17, 2019, Site Services utilized a drill rig to advance a total of three (3) boreholes, MW-4, MW-5, and MW-6, and assist with soil sample collection. To drill the boreholes, Site Services utilized 8-inch outside diameter hollow-stem augers.

The borehole locations were selected to identify potential contaminants migrating from the vicinity of the original contamination source, the former produced water vessel. Locations were chosen to further define the cross-gradient and downgradient extent of the contamination. MW-4 was advanced west of MW-2, in a cross-gradient location to the source. MW-5 was advanced south-southwest of the MW-2 in a

downgradient position. MW-6 was advanced in the vicinity of the former tank battery, east of MW-1 and northeast of MW-2. Figure 4 in Attachment A provides a satellite photo of the site with the approximate borehole locations.

During drilling, an AGW field geologist collected soil samples for field evaluation at approximate five (5) foot intervals. The soil samples were collected from a stainless-steel split-spoon sampler or from auger cuttings.

To control potential cross-contamination, Site Services cleaned the augers prior to use using a pressure washer and removed soils from the augers between boreholes. In addition, AGW cleaned the split-spoon core samplers, steel soil sampling scoop, and water level measuring tape prior to drilling and between uses with an Alconox® detergent and municipal water solution, followed by a municipal water rinse. The AGW field geologist also wore disposable nitrile gloves during sampling to help control potential cross-contamination.

Each borehole was advanced to a depth of 15 feet below ground surface (bgs). Soils encountered during this project generally consisted of approximately 1 to 5 feet of silty clay and sand fill overlying sands mixed with gravel. Sandy clays and clay lenses were generally encountered 5 to 10 feet bgs. Clayey to gravely sands extended below the clay layers to the maximum depth explored, 15 feet. There were no suspect odors or staining observed with the exception of black staining and an odor encountered in MW-6 at approximately 11 feet bgs. Groundwater was generally encountered 8 to 11 feet bgs during drilling. Additional soil details are included on the borehole logs in Attachment C.

To allow for field screening of the soil samples with a photoionization detector (PID), AGW placed a portion of each soil sample into a new sealable plastic bag. Selected soil samples were also placed into new laboratory-supplied glass jars for potential analytical testing.

Three (3) soil samples were collected from MW-6, at three (3) different depths, in the vicinity of the former produced water tank. One (1) soil sample was collected from MW-5, in the location farthest downgradient from the source. All four (4) soil samples were submitted for analytical testing. After collection, jars containing the analytical samples were immediately sealed, labeled, and placed into a cooler with ice (a preservative). On the day of collection, AGW delivered the four (4) soil samples to an independent laboratory for analytical testing. During this project, AGW followed chain-of-custody procedures in general accordance with U. S. Environmental Protection Agency (EPA) guidelines. A discussion of the laboratory methods and results is presented later in this report.

Soil Field Screening Methods

A portion of each borehole soil sample was transferred into a sealable plastic bag for field evaluation and screening with a PID. PID screening detects VOCs with an ionization potential of 10.6 electron volts (eV) or less, including many compounds found in refined petroleum products and solvents. This instrument provides a semi-quantitative analysis.

AGW accomplished the PID screening by inserting the PID probe into the individual sealed sample bags and recording the instrument response. Generally, PID readings greater than 10 parts per million (ppm, based on calibration to isobutylene) suggest the presence of VOCs above natural background concentrations. However, elevated soil moisture, humidity, and variations in contaminant composition,

temperature and soil type can bias the PID results. During this project, PID results ranged from 0.0 to 350.0 ppm. The specific PID results are presented on the soil boring logs in Attachment C.

Soil Analytical Methods

Following soil sample collection, AGW delivered the four (4) selected soil samples to Origins Laboratory in Denver, Colorado for chemical analysis. Origins analyzed the samples for benzene, toluene, ethylbenzene, total xylenes (BTEX) and gasoline range organics (GRO) by U.S. EPA Method 8260B and for diesel range organics (DRO) by U.S. EPA Method 8015B.

Soil Analytical Results

Table 4, below, summarizes the soil analytical results. A copy of the laboratory report is included in Attachment B. The analytical results are also illustrated on Figure 5 in Attachment A.

**Table 4: Soil Analytical Results
Haas #1
January 17, 2019**

Sample Number	pH	Electrical Conductivity (EC) ²	Benzene	Toluene	Ethylbenzene	Total Xylenes	TPH ¹	
							GRO	DRO
S-MW-6-1	7.92	0.240	ND	ND	ND	ND	ND	ND
S-MW-6-2	7.79	0.605	ND	ND	ND	ND	ND	ND
S-MW-6-3	7.71	0.346	ND	ND	ND	ND	2.23	ND
S-MW-5-1	NS ³	NS ³	ND	ND	ND	ND	ND	ND
COGCC Table 910-1 Concentrations (mg/kg)	6-9	<4.0	0.17	85.00	100.00	175.00	500.00	

All concentrations are in mg/kg, except when noted = Milligrams per kilograms, parts per million

ND = Not detected above laboratory detection limits

Analytes in **bold** exceed their respective COGCC Table 910-1 concentration

1-TPH: Total petroleum hydrocarbons. Value determined by adding DRO and GRO per COGCC Table 910-1 Rules

2-EC: Units in mmhos/cm

3- pH and EC were only analyzed in samples in the vicinity of the former produced water tank

To evaluate the soil analytical results, AGW compared the identified concentrations to concentration levels listed in Table 910-1 of the Colorado Oil and Gas Conservation Commission (COGCC) Rules and Regulations.

Based on the analytical results, one (1) soil sample collected from borehole MW-6 contained concentrations of GRO at levels greater than laboratory detection limits; however, the detected concentration was less than COGCC regulatory standards. None of the other soil samples contained concentrations at levels greater than the laboratory detection limit.

Monitoring Well Installation Methods

To allow for collection of representative groundwater samples, Site Services constructed monitoring wells in each of the boreholes using 2-inch diameter, schedule 40 polyvinylchloride (PVC) piping. Each well included a 10-foot section of machine slotted screen pipe (0.010-inch slots) with a bottom cap at the base of the borehole. Above each screened section, PVC riser pipe extended to approximately 6 inches below the ground surface. Commercial washed quartz sand (10/20) was then used to fill the space around each screened section to act as a filter pack. To control potential surface water infiltration, hydrated bentonite chips were used to fill the void around each riser pipe (above the screen and filter pack) to within approximately 12 inches of the surface. Each monitoring well pipe top was also sealed with a waterproof cap. To protect each monitoring well from potential surface damage, Site Services also installed steel flush-mount protective covers set in concrete. Well construction details are presented on the boring logs in Attachment C.

AGW prepared the required DWR monitoring well registration applications (Form GWS-46) and Well Construction Reports (Form GWS-31) for each well. The forms were mailed to the DWR with the required fee (\$100 per well) to register the wells. Copies of the Construction Reports and Registration forms will be retained by AGW.

Well Development and Groundwater Measurements

Following monitoring well installation, AGW developed monitoring wells MW-4, MW-5, and MW-6 on January 17, 2019 to remove excess sediment, maximize inflow of groundwater into the wells, and to allow for representative sample collection. Monitoring well development was accomplished by agitating the groundwater column in each well using a new dedicated plastic bailer attached to nylon cord. The purged liquids were transferred to a produced water tank at the nearby Simpson well pad for disposal. Following the removal of approximately three (3) or more well volumes (when possible) from each monitoring well, the extracted water was relatively clear.

During this project, AGW utilized a clean electronic water level indicator tape to measure the depth to groundwater at the three (3) new monitoring wells. The water level indicator tape was cleaned prior to, and between each use, with a solution of Alconox® detergent and municipal water, followed by municipal water and distilled water rinses.

Groundwater measurements were collected on January 17, 2019 for groundwater elevation calculations, gradient determination, and required purge volume prior to sampling. The three (3) new monitoring wells associated with this project were measured and used for groundwater field parameter measurements. Groundwater depths ranged from 9.42 to 9.57 feet bgs.

Table 5, below, summarizes the groundwater depth measurements for the January 2019 sampling event.

**Table 5: Groundwater Measurements
Haas #1
January 17, 2019**

Well Number	Depth to Groundwater (TOC)
MW-4	9.57
MW-5	9.42
MW-6	9.54

*Elevations are in feet below top of casing (TOC).

Groundwater Sampling Methods

Following soil sampling, AGW collected groundwater samples from each of the three (3) monitoring wells for analytical testing on January 17, 2019. Prior to collecting the samples, AGW measured the depth to groundwater at each location. On that date, groundwater in the three (3) monitoring wells measured between 9.42 and 9.57 feet bgs.

AGW collected groundwater samples from monitoring wells MW-4, MW-5, and MW-6 for analytical testing. To collect the samples, AGW utilized a dedicated plastic bailer attached to nylon cord at each borehole. Each sample was transferred into three (3) acid-preserved glass vials supplied by the laboratory. The filled sample containers were immediately sealed, labeled, and placed into a cooler with ice (a preservative). The samples were delivered to Origins of Denver, Colorado for analytical testing. During these projects, AGW followed chain-of-custody procedures in general accordance with EPA guidelines. For each event, Origins analyzed all three (3) groundwater samples for BTEX using EPA Method 8260C.

Groundwater Analytical Results

Table 6, below, summarizes the groundwater analytical results. A copy of the laboratory report is included in Attachment B. The results are also illustrated on Figure 6 in Attachment A.

**Table 6: Groundwater Analytical Results
Haas #1
January 17, 2019**

Sample Number	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-4	ND	ND	ND	ND
MW-5	ND	ND	ND	ND
MW-6	0.001	ND	0.013	0.007
COGCC Table 910-1 Concentrations (mg/L)	0.005	1.0	0.70	10.0

All concentrations are in mg/L = Milligrams per liter, parts per million

ND = Not detected above laboratory detection limits

Analytes in **bold** exceed their respective COGCC Table 910-1 concentration

To evaluate the groundwater analytical results, AGW consulted the Table 910-1 Concentration Levels provided within COGCC 900 Series Rules for Exploration and Production Waste Management. Based on

the analytical results, one (1) groundwater sample collected from MW-6 contained concentrations of benzene and ethylbenzene at levels greater than their respective laboratory detection limits; however, the detected concentrations are less than their respective COGCC Table 910-1 regulatory standards. None of the other groundwater samples contained concentrations at levels greater than the laboratory detection limit.

MARCH 2019 GROUNDWATER SAMPLING

AGW conducted the seventh groundwater sampling event of the three (3) original onsite monitoring wells, and the first since the installation of three (3) additional onsite monitoring wells, on March 27, 2019.

Groundwater Elevation Measurements

Table 7, below, summarizes the groundwater depth measurements on March 27, 2019.

**Table 7: Groundwater Depths
Haas #1
March 27, 2019**

Well Number	Depth to Groundwater (TOC)
MW-1	9.45
MW-2	9.30
MW-3	9.55
MW-4	9.55
MW-5	9.35
MW-6	9.45

*Elevations are in feet below top of casing (TOC).

Based on groundwater levels collected on March 27, 2019, groundwater at the Haas #1 site flows to the south-southwest.

Groundwater Sampling Methods

AGW collected groundwater samples from monitoring wells MW-1 through MW-6 for analytical testing. To collect the samples, AGW utilized a dedicated plastic bailer attached to nylon cord at each monitoring well. Each sample was transferred into three (3) acid-preserved glass vials supplied by the laboratory. The filled sample containers were immediately sealed, labeled, and placed into a cooler with ice (a preservative). The samples were delivered to Origins of Denver, Colorado for analytical testing. During these projects, AGW followed chain-of-custody procedures in general accordance with EPA guidelines. Origins analyzed all six (6) groundwater samples for BTEX using EPA Method 8260C.

Groundwater Analytical Results

Table 8, below, summarizes the historical groundwater analytical results including the results from the four (4) sampling events discussed above. A copy of the laboratory reports is included in Attachment B. The results are also illustrated on Figure 3, Figure 6 and Figure 7 in Attachment A.

**Table 8: Groundwater Analytical Results
Haas #1**

Sample Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-1	3/17/17	0.00147	ND	ND	0.00365
	9/22/17	0.0103	ND	ND	ND
	2/12/18	ND	ND	ND	ND
	6/12/18	ND	ND	ND	ND
	9/20/18	ND	ND	ND	ND
	12/21/18	ND	ND	ND	ND
	3/27/19	ND	ND	ND	ND
MW-2	3/17/17	7.290	0.791	0.535	2.380
	9/22/17	3.980	0.0373	0.170	0.464
	2/12/18	5.260	ND	0.333	1.100
	6/12/18	7.730	ND	0.406	1.510
	9/20/18	5.420	ND	0.354	1.020
	12/21/18	4.780	ND	0.235	0.538
	3/27/19	4.840	ND	0.294	0.620
MW-3	3/17/17	ND	ND	ND	ND
	9/22/17	ND	ND	ND	ND
	2/12/18	ND	ND	ND	ND
	6/12/18	ND	ND	ND	ND
	9/20/18	ND	ND	ND	ND
	12/21/18	ND	ND	ND	ND
	3/27/19	ND	ND	ND	ND

Sample Number	Date Sampled	Benzene	Toluene	Ethylbenzene	Total Xylenes
MW-4	1/17/19	ND	ND	ND	ND
	3/27/19	0.026	ND	ND	ND
MW-5	1/17/19	ND	ND	ND	ND
	3/27/19	ND	ND	ND	ND
MW-6	1/17/19	0.001	ND	0.013	0.007
	3/27/19	ND	ND	0.001	ND
COGCC Table 910-1 Concentrations (mg/L)		0.005	1.0	0.70	10.0

All concentrations are in mg/L = Milligrams per liter, parts per million

ND = Not detected above laboratory detection limits

Analytes in **bold** exceed their respective COGCC Table 910-1 concentration

To evaluate the groundwater analytical results, AGW consulted the Table 910-1 Concentration Levels provided within COGCC 900 Series Rules for Exploration and Production Waste Management. Based on the analytical results, the March 2019 sampling event indicated groundwater from MW-1, MW-3, MW-5, and MW-6 did not contain BTEX concentrations greater than their respective COGCC Table 910-1 standards. Groundwater collected from MW-4 contained slightly elevated levels of benzene (0.026 mg/L). Groundwater collected from MW-2 has contained benzene concentrations in exceedance of the COGCC Table 910-1 value of 0.005 mg/L during all seven (7) sampling events, and concentrations continue to fluctuate.

Surveying

To determine the relative ground surface and monitoring well casing elevations at the site, and to allow for groundwater flow direction and gradient calculations, AGW will conduct an elevation survey of the six (6) monitoring wells during the next quarterly groundwater sampling event.

DISCUSSION AND CONCLUSIONS

AGW conducted quarterly groundwater monitoring events in September 2018 and December 2018 at the former Haas #1 production facility. In November 2018, a remediation aeration system was installed near MW-1. Additionally, in January 2019, AGW conducted a limited subsurface investigation and installed three (3) additional monitoring wells at the site. On March 27, 2019 AGW conducted the first groundwater sampling event of three (3) original monitoring wells and three (3) newly installed monitoring wells.

Based on the analytical results, during the March 2019 sampling event groundwater from MW-1, MW-3, MW-5, and MW-6 did not contain BTEX concentrations greater than their respective COGCC Table 910-1 standards. Groundwater collected from MW-4 contained slightly elevated levels of benzene.

Groundwater collected from MW-2 has contained benzene concentrations in exceedance of the COGCC Table 910-1 value of 0.005 mg/L in every sampling event, and concentrations continue to fluctuate.

It may be too soon to see results from the newly installed aeration remediation system, therefore, ongoing quarterly groundwater monitoring will continue to determine the effectiveness of remediation efforts at the Haas #1 former production site. The next quarterly groundwater sampling event is scheduled for June 2019.

Thank you for your review of this report. If you have any questions or require further information, please call us at (303) 759-8373.

Sincerely,

A.G. WASSENAAR, INC.



Spencer T. Scott
Environmental Scientist



Rachel A. Peterson, P.G.
Principal Geologist

STS/rap

ATTACHMENT A

DIAGRAMS



Google Earth

100 ft

A.G. WASSENAAR | INC.

LEGEND

- MONITORING WELL LOCATION
- 90.00' - GROUNDWATER ELEVATION (FEET)
- GROUNDWATER ELEVATION CONTOUR

NOTE: ALL LOCATIONS ARE APPROXIMATE

HAAS #1
WELD COUNTY, COLORADO
AGW PROJECT NUMBER: 160884

FIGURE 1
GROUNDWATER ELEVATIONS
AND FLOW DIRECTION
September 20, 2018

N

0 45

APPROXIMATE SCALE
IN FEET



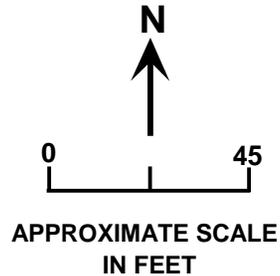
LEGEND

 - MONITORING WELL LOCATION
 90.00' - GROUNDWATER ELEVATION (FEET)
 - GROUNDWATER ELEVATION CONTOUR

NOTE: ALL LOCATIONS ARE APPROXIMATE

A. G. WASSENAAR | INC.

<p>HAAS #1 WELD COUNTY, COLORADO AGW PROJECT NUMBER: 160884</p>	<p>FIGURE 2 GROUNDWATER ELEVATIONS AND FLOW DIRECTION December 21, 2018</p>
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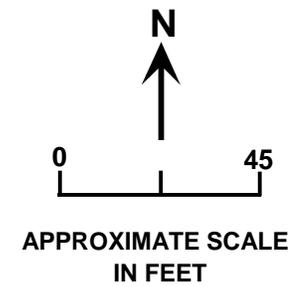
LEGEND

- ▲ - MONITORING WELL LOCATION
- B: BENZENE
- T: TOLUENE
- E: ETHYLBENZENE
- X: TOTAL XYLENES
- ND: Not detected above laboratory detection limits
- September 2018 / December 2018**

NOTE: All locations are approximate
 Concentrations in milligrams per liter (mg/L)
 Concentrations in BOLD exceed COGCC
 Table 910-1



HAAS #1 WELD COUNTY, COLORADO	FIGURE 3 GROUNDWATER ANALYTICAL RESULTS
AGW PROJECT NUMBER: 160884	September 20, 2018 December 21, 2018





LEGEND

- BOREHOLE LOCATION
 - MONITORING WELL

NOTE: All locations are approximate

A.G. WASSENAAR | INC.

<p>HAAS #1 WELD COUNTY, COLORADO AGW PROJECT NUMBER: 160884</p>	<p>FIGURE 4 BOREHOLE LOCATIONS January 17, 2019</p>
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N
↑

0 45

**APPROXIMATE SCALE
IN FEET**



MW-6-1
(3-4' bgs)
ND

MW-6-2
(7-9' bgs)
ND

MW-6-3
(10-12' bgs)
BTEX: ND
GRO: 2.23
DRO: ND

MW-4
NOT SAMPLED

MW-5-1
(5-10 bgs)
ND

LEGEND

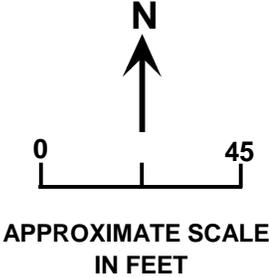
● - BOREHOLE LOCATION

B: BENZENE
T: TOLUENE
E: ETHYLBENZENE
X: TOTAL XYLENES
GRO: GASOLINE RANGE ORGANICS
DRO: DIESEL RANGE ORGANICS
ND: Not detected above laboratory detection limits
bgs: Below ground surface

NOTE: All locations are approximate
Concentrations in milligrams per liter (mg/L)

A.G. WASSENAAR | INC.

<p>HAAS #1 WELD COUNTY, COLORADO</p> <p>AGW PROJECT NUMBER: 160884</p>	<p>FIGURE 5 SOIL ANALYTICAL RESULTS</p> <p>January 17, 2019</p>
---	---





LEGEND

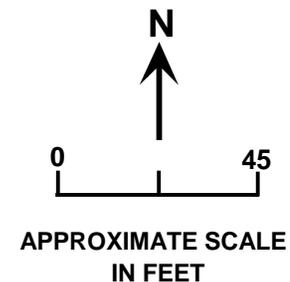
- ▲ - MONITORING WELL LOCATION
- B: BENZENE
- T: TOLUENE
- E: ETHYLBENZENE
- X: TOTAL XYLENES
- ND: Not detected above laboratory detection limits

NOTE: All locations are approximate
 Concentrations in milligrams per liter (mg/L)
 Concentrations in BOLD exceed COGCC
 Table 910-1

A.G. WASSENAAR | INC.

**HAAS #1
 WELD COUNTY, COLORADO
 AGW PROJECT NUMBER: 160884**

**FIGURE 6
 GROUNDWATER ANALYTICAL
 RESULTS
 January 17, 2019**





Google Earth

100 ft

LEGEND

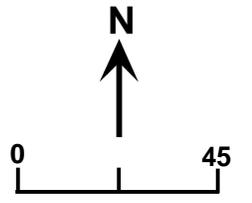
- ▲ - MONITORING WELL LOCATION
- B: BENZENE
- T: TOLUENE
- E: ETHYLBENZENE
- X: TOTAL XYLENES
- ND: Not detected above laboratory detection limits

NOTE: All locations are approximate
 Concentrations in milligrams per liter (mg/L)
 Concentrations in BOLD exceed COGCC
 Table 910-1

A.G. WASSENAAR | INC.

HAAS #1
WELD COUNTY, COLORADO
AGW PROJECT NUMBER: 160884

FIGURE 7
GROUNDWATER ANALYTICAL
RESULTS
 March 27, 2019



APPROXIMATE SCALE
IN FEET

ATTACHMENT B

LABORATORY ANALYTICAL REPORTS

September 26, 2018

A.G. Wassenaar

Rachel Peterson

2180 South Ivanhoe Street - Suite 5

Denver

CO 80222

Project Name - HAAS #1

Project Number - 160884.EC

Attached are your analytical results for HAAS #1 received by Origins Laboratory, Inc. September 20, 2018. This project is associated with Origins project number Y809285-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	Y809285-01	Water	September 20, 2018 13:15	09/20/2018 17:46
MW-2	Y809285-02	Water	September 20, 2018 13:25	09/20/2018 17:46
MW-3	Y809285-03	Water	September 20, 2018 13:05	09/20/2018 17:46

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 160884285 Client: A.G. Wassenaar
 Client Project ID: HAAS #1
 Checklist Completed by: SG Shipped Via: HD
 Date/time completed: 9/21/14 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Airbill #: N/A
 Matrix(s) Received: (Check all that apply): Soil/Solid Water Other:
 Cooler Number/Temperature: 1 / 7.6 °C / °C / °C (Describe)
 Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?		<input checked="" type="checkbox"/>		<u>Some Dry</u>
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)(pH <2 for samples preserved with HNO3, HCL, H2SO4) / (pH >10 for samples preserved with NaAsO2+NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) RP Date/Time Reviewed 9/24/18

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

MW-1

9/20/2018 1:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

Origins Laboratory, Inc.
Y809285-01 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B812102	KDK	09/21/2018	09/22/2018	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	97.9 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	100 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.7 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-2

9/20/2018 1:25:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

Origins Laboratory, Inc.
Y809285-02 (Water)

BTEX by EPA 8260C

Benzene	5420	50.0	ug/L	50	B812102	KDK	09/21/2018	09/22/2018	
Toluene	ND	50.0	"	"	"	KDK	"	"	U
Ethylbenzene	354	50.0	"	"	"	KDK	"	"	
Xylenes, total	1020	50.0	"	"	"	KDK	"	"	
Surrogate: 1,2-Dichloroethane-d4	97.6 %			84-121		"	"	"	
Surrogate: Toluene-d8	101 %			85-115		"	"	"	
Surrogate: 4-Bromofluorobenzene	98.4 %			84-114		"	"	"	

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-3

9/20/2018 1:05:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
---------	--------	-----------------	-------	----------	-------	---------	----------	----------	-------

Origins Laboratory, Inc.
Y809285-03 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B812102	KDK	09/21/2018	09/22/2018	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	97.8 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	99.8 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.1 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B812102 - EPA 5030B (Water)

Blank (B812102-BLK1)

Prepared: 09/21/2018 Analyzed: 09/21/2018

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.8	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.2	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B812102 - EPA 5030B (Water)

Blank (B812102-BLK2)

Prepared: 09/21/2018 Analyzed: 09/21/2018

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5	94.0		84-121			
Surrogate: Toluene-d8	62		"	62.5	99.9		85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	97.2		84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B812102 - EPA 5030B (Water)

LCS (B812102-BS1)

Prepared: 09/21/2018 Analyzed: 09/21/2018

Benzene	57.8	1.00	ug/L	50.0		116	73.3-129			
Toluene	55.8	1.00	"	50.0		112	76.2-123			
Ethylbenzene	54.8	1.00	"	50.0		110	73.6-130			
m,p-Xylene	108	2.00	"	100		108	76.1-126			
o-Xylene	55.2	1.00	"	50.0		110	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	59		"	62.5		94.0	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B812102 - EPA 5030B (Water)

LCS (B812102-BS2)

Prepared: 09/21/2018 Analyzed: 09/21/2018

Benzene	58.2	1.00	ug/L	50.0		116	73.3-129			
Toluene	55.7	1.00	"	50.0		111	76.2-123			
Ethylbenzene	54.6	1.00	"	50.0		109	73.6-130			
m,p-Xylene	108	2.00	"	100		108	76.1-126			
o-Xylene	55.3	1.00	"	50.0		111	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.5	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.7	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.6	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I2102 - EPA 5030B (Water)

Matrix Spike (B8I2102-MS1)	Source: Y809280-01			Prepared: 09/21/2018 Analyzed: 09/21/2018						
Benzene	64.4	1.00	ug/L	50.0	ND	129	74-130			
Toluene	63.0	1.00	"	50.0	ND	126	73-131			
Ethylbenzene	62.9	1.00	"	50.0	ND	126	76-132			
m,p-Xylene	124	2.00	"	100	ND	124	69-139			
o-Xylene	61.8	1.00	"	50.0	ND	124	74-131			
Surrogate: 1,2-Dichloroethane-d4	56		"	62.5		89.9	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.9	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I2102 - EPA 5030B (Water)

Matrix Spike (B8I2102-MS2)	Source: Y809280-08			Prepared: 09/21/2018 Analyzed: 09/21/2018						
Benzene	64.7	1.00	ug/L	50.0	ND	129	74-130			
Toluene	63.9	1.00	"	50.0	0.270	127	73-131			
Ethylbenzene	63.2	1.00	"	50.0	ND	126	76-132			
m,p-Xylene	124	2.00	"	100	0.250	124	69-139			
o-Xylene	62.0	1.00	"	50.0	ND	124	74-131			
Surrogate: 1,2-Dichloroethane-d4	56		"	62.5		89.9	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.3	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I2102 - EPA 5030B (Water)

Matrix Spike Dup (B8I2102-MSD1)	Source: Y809280-01			Prepared: 09/21/2018 Analyzed: 09/21/2018						
Benzene	63.9	1.00	ug/L	50.0	ND	128	74-130	0.810	20	
Toluene	63.1	1.00	"	50.0	ND	126	73-131	0.238	20	
Ethylbenzene	63.3	1.00	"	50.0	ND	127	76-132	0.587	20	
m,p-Xylene	123	2.00	"	100	ND	123	69-139	0.308	20	
o-Xylene	61.7	1.00	"	50.0	ND	123	74-131	0.0810	20	
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.4	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.4	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8I2102 - EPA 5030B (Water)

Matrix Spike Dup (B8I2102-MSD2)	Source: Y809280-08			Prepared: 09/21/2018 Analyzed: 09/21/2018						
Benzene	64.1	1.00	ug/L	50.0	ND	128	74-130	1.01	20	
Toluene	61.5	1.00	"	50.0	0.270	123	73-131	3.84	20	
Ethylbenzene	60.4	1.00	"	50.0	ND	121	76-132	4.54	20	
m,p-Xylene	120	2.00	"	100	0.250	119	69-139	4.03	20	
o-Xylene	60.5	1.00	"	50.0	ND	121	74-131	2.47	20	
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.8	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		98.3	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jen Pellegrini For Noelle Doyle Mathis, President

January 03, 2019

A.G. Wassenaar

Rachel Peterson

2180 South Ivanhoe Street - Suite 5

Denver

CO 80222

Project Name - HAAS #1

Project Number - 160884.EC

Attached are your analytical results for HAAS #1 received by Origins Laboratory, Inc. December 21, 2018. This project is associated with Origins project number Y812376-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	Y812376-01	Water	December 21, 2018 11:05	12/21/2018 14:12
MW-2	Y812376-02	Water	December 21, 2018 11:30	12/21/2018 14:12
MW-3	Y812376-03	Water	December 21, 2018 11:50	12/21/2018 14:12

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

www.originslaboratory.com

182376

page 1 of 1

ORIGINS
 LABORATORY, INC

Client: A.G. Wassenaar, Inc
 Address: 2180 S Ivanhoe St, #5 Denver CO 80222
 Telephone Number: 303-759-8100
 Email Address: scotts@agwco.com

Project Manager: Peterson@agwco.com
 Project Name: Hugs GW
 Project Number: 160884
 Samples Collected By: STS

Sample ID Description	Date Sampled	Time Sampled	# of Containers	Preservative				Matrix			Analysis	Sample Instructions	Turnaround Time
				Unpreserved	HCl	HNO ₃	Other	Groundwater	Soil	Air Summa #			
MW-1	12/21/18	1105	3	X	X	X		X			BTEX	pHEC/TDS	24 Hr <input type="checkbox"/>
MW-2	12/21/18	1130	3	X	X	X		X				BrClFISO4/NO3/NO2	Same Day <input type="checkbox"/>
MW-3	12/21/18	1151	3	X	X	X		X				Dissolved Metals	48 Hr <input type="checkbox"/>
												Methane/Ethane/Propane	72 Hr <input type="checkbox"/>
												Alk/Nitrate-Nitrite/TPO4	Standard <input checked="" type="checkbox"/>
												BART/TEX/SRO-DRO	
												Hold/Gas Composition	
Relinquished By: [Signature]	Date: 12/21/18	Time: 2:12		Received By: [Signature]	Date: 12-21-18	Time: 1/4/19							
Relinquished By: [Signature]	Date:	Time:		Received By:	Date:	Time:							

4.0 Date Results Needed

Origins Laboratory, Inc.

Jefe Pellegrini

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4812376

Client: A.G. Wassenaar

Client Project ID: Haas GW

Checklist Completed by: JP

Shipped Via: HD
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 12/21/18

Airbill #: NA

Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____ (Describe)

Cooler Number/Temperature: 1 / 4.0 °C / _____ °C / _____ °C / _____ °C

Thermometer ID: TC03

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity) / (pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	<input checked="" type="checkbox"/>			HCl
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date, time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by: [Signature] (Project Manager)

12-24-18
 Date/Time Reviewed

Origins Laboratory, Inc.

[Signature]

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

MW-1

12/21/2018 11:05:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y812376-01 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B8L3101	KDK	12/31/2018	01/01/2019	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	98.4 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	99.2 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.6 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-2

12/21/2018 11:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y812376-02 (Water)

BTEX by EPA 8260C

Benzene	4780	100	ug/L	100	B8L3101	KDK	12/31/2018	01/02/2019	
Toluene	ND	100	"	"	"	KDK	"	"	U
Ethylbenzene	235	100	"	"	"	KDK	"	"	
Xylenes, total	538	100	"	"	"	KDK	"	"	

Surrogate: 1,2-Dichloroethane-d4	95.3 %	84-121			"	"			
Surrogate: Toluene-d8	92.2 %	85-115			"	"			
Surrogate: 4-Bromofluorobenzene	96.4 %	84-114			"	"			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-3

12/21/2018 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y812376-03 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B8L3101	KDK	12/31/2018	01/02/2019	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	95.2 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	91.7 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	96.4 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B8L3101 - EPA 5030B (Water)

Blank (B8L3101-BLK1)

Prepared: 12/31/2018 Analyzed: 12/31/2018

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		100	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B8L3101 - EPA 5030B (Water)

Blank (B8L3101-BLK2)

Prepared: 12/31/2018 Analyzed: 12/31/2018

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5		100	84-121			
Surrogate: Toluene-d8	63		"	62.5		101	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		100	84-114			

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B8L3101 - EPA 5030B (Water)

LCS (B8L3101-BS1)

Prepared: 12/31/2018 Analyzed: 12/31/2018

Benzene	43.7	1.00	ug/L	50.0		87.4	73.3-129			
Toluene	42.2	1.00	"	50.0		84.4	76.2-123			
Ethylbenzene	42.1	1.00	"	50.0		84.1	73.6-130			
m,p-Xylene	81.9	2.00	"	100		81.9	76.1-126			
o-Xylene	41.4	1.00	"	50.0		82.8	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	62		"	62.5		98.5	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.5	85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.7	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B8L3101 - EPA 5030B (Water)

LCS (B8L3101-BS2)

Prepared: 12/31/2018 Analyzed: 12/31/2018

Benzene	49.1	1.00	ug/L	50.0		98.3	73.3-129			
Toluene	48.6	1.00	"	50.0		97.1	76.2-123			
Ethylbenzene	48.0	1.00	"	50.0		96.0	73.6-130			
m,p-Xylene	94.8	2.00	"	100		94.8	76.1-126			
o-Xylene	47.7	1.00	"	50.0		95.4	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.7	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.7	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B8L3101 - EPA 5030B (Water)

Matrix Spike (B8L3101-MS1)	Source: Y812360-12			Prepared: 12/31/2018 Analyzed: 12/31/2018						
Benzene	48.6	1.00	ug/L	50.0	ND	97.1	74-130			
Toluene	45.8	1.00	"	50.0	ND	91.6	73-131			
Ethylbenzene	46.0	1.00	"	50.0	ND	92.1	76-132			
m,p-Xylene	90.8	2.00	"	100	ND	90.8	69-139			
o-Xylene	45.4	1.00	"	50.0	ND	90.9	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.3	84-121			
Surrogate: Toluene-d8	62		"	62.5		98.7	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.1	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8L3101 - EPA 5030B (Water)

Matrix Spike (B8L3101-MS2)	Source: Y812363-07			Prepared: 12/31/2018 Analyzed: 12/31/2018						
Benzene	51.2	1.00	ug/L	50.0	ND	102	74-130			
Toluene	47.1	1.00	"	50.0	ND	94.2	73-131			
Ethylbenzene	47.8	1.00	"	50.0	ND	95.6	76-132			
m,p-Xylene	93.3	2.00	"	100	ND	93.3	69-139			
o-Xylene	46.4	1.00	"	50.0	ND	92.7	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.5	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.9	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8L3101 - EPA 5030B (Water)

Matrix Spike Dup (B8L3101-MSD1)	Source: Y812360-12			Prepared: 12/31/2018 Analyzed: 12/31/2018						
Benzene	49.2	1.00	ug/L	50.0	ND	98.5	74-130	1.39	20	
Toluene	46.2	1.00	"	50.0	ND	92.4	73-131	0.891	20	
Ethylbenzene	46.4	1.00	"	50.0	ND	92.7	76-132	0.671	20	
m,p-Xylene	91.4	2.00	"	100	ND	91.4	69-139	0.604	20	
o-Xylene	46.2	1.00	"	50.0	ND	92.5	74-131	1.72	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.8	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.1	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.9	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
---------	--------	-----------------	-------	-------------	---------------	------	-------------	-----	-----------	-------

Batch B8L3101 - EPA 5030B (Water)

Matrix Spike Dup (B8L3101-MSD2)	Source: Y812363-07			Prepared: 12/31/2018 Analyzed: 12/31/2018						
Benzene	48.3	1.00	ug/L	50.0	ND	96.5	74-130	5.95	20	
Toluene	47.4	1.00	"	50.0	ND	94.8	73-131	0.614	20	
Ethylbenzene	46.6	1.00	"	50.0	ND	93.3	76-132	2.52	20	
m,p-Xylene	92.1	2.00	"	100	ND	92.1	69-139	1.27	20	
o-Xylene	46.0	1.00	"	50.0	ND	92.1	74-131	0.714	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		95.8	84-121			
Surrogate: Toluene-d8	62		"	62.5		99.7	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

Origins Laboratory, Inc.



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A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

Jen Pellegrini For Noelle Doyle Mathis, President

January 21, 2019

A.G. Wassenaar

Rachel Peterson

2180 South Ivanhoe Street - Suite 5

Denver

CO 80222

Project Name - HAAS #1

Project Number - 160884.EC

Attached are your analytical results for HAAS #1 received by Origins Laboratory, Inc. January 17, 2019. This project is associated with Origins project number Y901220-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-4	Y901220-01	Water	January 17, 2019 13:30	01/17/2019 17:40
MW-5	Y901220-02	Water	January 17, 2019 14:10	01/17/2019 17:40
MW-6	Y901220-03	Water	January 17, 2019 15:00	01/17/2019 17:40
S-6-1	Y901220-04	Soil	January 17, 2019 11:50	01/17/2019 17:40
S-6-2	Y901220-05	Soil	January 17, 2019 12:00	01/17/2019 17:40
S-6-3	Y901220-06	Soil	January 17, 2019 12:10	01/17/2019 17:40
S-5-1	Y901220-07	Soil	January 17, 2019 10:30	01/17/2019 17:40

Origins Laboratory, Inc.



The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: 4901220 Client: AG Wassenaar
 Client Project ID: HAAS #1
 Checklist Completed by: JP Shipped Via: HD
 (UPS, FedEx, Hand Delivered, Pick-up, etc.)
 Date/time completed: 1/18/19 Airbill #: NA
 Matrix(s) Received: (Check all that apply): Soil/Solid Water Other:
 Cooler Number/Temperature: 1/4.1 °C / °C / °C / °C (Describe)
 Thermometer ID: TOUB

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤ 6°C ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? if yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked ⁽¹⁾ ? (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)	<input checked="" type="checkbox"/>			<u>HCL</u>
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by: [Signature] (Project Manager)

Date/Time Reviewed: 1/21/19

Origins Laboratory, Inc.

Jefe Pellegrini

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.

A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

MW-4

1/17/2019 1:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-01 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B9A2101	JTD	01/21/2019	01/21/2019	U
Toluene	ND	1.00	"	"	"	JTD	"	"	U
Ethylbenzene	ND	1.00	"	"	"	JTD	"	"	U
Xylenes, total	ND	1.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.7 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	97.5 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	102 %	84-114			"	"	"	"	

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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-5

1/17/2019 2:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-02 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B9A2101	JTD	01/21/2019	01/21/2019	U
Toluene	ND	1.00	"	"	"	JTD	"	"	U
Ethylbenzene	ND	1.00	"	"	"	JTD	"	"	U
Xylenes, total	ND	1.00	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	111 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	95.5 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.5 %	84-114			"	"	"	"	

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-6

1/17/2019 3:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-03 (Water)

BTEX by EPA 8260C

Benzene	1.07	1.00	ug/L	1	B9A2101	JTD	01/21/2019	01/21/2019	
Toluene	ND	1.00	"	"	"	JTD	"	"	U
Ethylbenzene	13.3	1.00	"	"	"	JTD	"	"	
Xylenes, total	6.80	1.00	"	"	"	JTD	"	"	

Surrogate: 1,2-Dichloroethane-d4	112 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	93.1 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.0 %	84-114			"	"	"	"	

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 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

S-6-1

1/17/2019 11:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-04 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9A1804	JTD	01/18/2019	01/18/2019	U
Surrogate: <i>o</i> -Terphenyl	79.6 %	59-131			"	"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B9A1803	JTD	01/18/2019	01/18/2019	U
Benzene	ND	0.002	"	"	"	JTD	"	"	U
Toluene	ND	0.002	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.002	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.002	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	110 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	96.6 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	99.3 %	70-130			"	"	"	"	

pH in Soil by EPA 9045D

pH	7.92		pH Units	1	B9A1807	OLAB	01/18/2019	01/18/2019	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.240	0.00507	mmhos/cm	"	B9A1808	OLAB	01/18/2019	"	
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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

S-6-2

1/17/2019 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-05 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9A1804	JTD	01/18/2019	01/18/2019	U
Surrogate: <i>o</i> -Terphenyl	83.2 %	59-131			"	"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B9A1803	JTD	01/18/2019	01/21/2019	U
Benzene	ND	0.002	"	"	"	JTD	"	"	U
Toluene	ND	0.002	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.002	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.002	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	92.1 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	97.2 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	95.6 %	70-130			"	"	"	"	

pH in Soil by EPA 9045D

pH	7.79		pH Units	1	B9A1807	OLAB	01/18/2019	01/18/2019	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.605	0.00504	mmhos/cm	"	B9A1808	OLAB	01/18/2019	"	
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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

S-6-3

1/17/2019 12:10:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-06 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9A1804	JTD	01/18/2019	01/18/2019	U
Surrogate: <i>o</i> -Terphenyl	89.8 %	59-131			"	"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	2.23	0.200	mg/kg	1	B9A1803	JTD	01/18/2019	01/21/2019	
Benzene	ND	0.002	"	"	"	JTD	"	"	U
Toluene	ND	0.002	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.002	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.002	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	90.2 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	95.2 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	102 %	70-130			"	"	"	"	

pH in Soil by EPA 9045D

pH	7.71		pH Units	1	B9A1807	OLAB	01/18/2019	01/18/2019	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.346	0.00505	mmhos/cm	"	B9A1808	OLAB	01/18/2019	"	
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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

S-5-1

1/17/2019 10:30:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y901220-07 (Soil)

Diesel Range Organics (DRO/TEPH) by EPA 8015C

Diesel (C10-C28)	ND	50.0	mg/kg	1	B9A1804	JTD	01/18/2019	01/18/2019	U
Surrogate: <i>o</i> -Terphenyl	86.3 %	59-131			"	"	"	"	

GBTEX by EPA 8260C

Gasoline Range Hydrocarbons	ND	0.200	mg/kg	1	B9A1803	JTD	01/18/2019	01/21/2019	U
Benzene	ND	0.002	"	"	"	JTD	"	"	U
Toluene	ND	0.002	"	"	"	JTD	"	"	U
Ethylbenzene	ND	0.002	"	"	"	JTD	"	"	U
Xylenes, total	ND	0.002	"	"	"	JTD	"	"	U

Surrogate: 1,2-Dichloroethane-d4	92.5 %	70-130			"	"	"	"	
Surrogate: Toluene-d8	96.9 %	70-130			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.5 %	70-130			"	"	"	"	

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Rachel Peterson
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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Blank (B9A1803-BLK1)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	0.14		"	0.125		113	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.0	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.3	70-130			

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Rachel Peterson
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 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Blank (B9A1803-BLK2)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		95.2	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		99.3	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		97.6	70-130			

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Blank (B9A1803-BLK3)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Gasoline Range Hydrocarbons	ND	0.200	mg/kg							U
Benzene	ND	0.002	"							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	0.14		"	0.125		108	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		97.5	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		99.3	70-130			

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 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

LCS (B9A1803-BS1)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Benzene	0.108	0.002	mg/kg	0.100		108	77.1-124			
Toluene	0.102	0.002	"	0.100		102	74.5-128			
Ethylbenzene	0.094	0.002	"	0.100		94.3	66.4-127			
m,p-Xylene	0.197	0.004	"	0.200		98.4	76.6-124			
o-Xylene	0.097	0.002	"	0.100		96.7	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	0.14		"	0.125		110	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.9	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		96.2	70-130			

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

LCS (B9A1803-BS2)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Benzene	0.109	0.002	mg/kg	0.100		109	77.1-124			
Toluene	0.110	0.002	"	0.100		110	74.5-128			
Ethylbenzene	0.114	0.002	"	0.100		114	66.4-127			
m,p-Xylene	0.229	0.004	"	0.200		115	76.6-124			
o-Xylene	0.115	0.002	"	0.100		115	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		93.2	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		99.5	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		100	70-130			

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

LCS (B9A1803-BS3)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Benzene	0.118	0.002	mg/kg	0.100		118	77.1-124			
Toluene	0.117	0.002	"	0.100		117	74.5-128			
Ethylbenzene	0.110	0.002	"	0.100		110	66.4-127			
m,p-Xylene	0.229	0.004	"	0.200		115	76.6-124			
o-Xylene	0.112	0.002	"	0.100		112	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		105	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		95.2	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		96.3	70-130			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Matrix Spike (B9A1803-MS1)	Source: Y901210-01			Prepared: 01/18/2019 Analyzed: 01/18/2019						
Benzene	0.107	0.002	mg/kg	0.100	0.0009	106	71.8-126			
Toluene	0.103	0.002	"	0.100	ND	103	65.1-130			
Ethylbenzene	0.098	0.002	"	0.100	ND	98.1	62.2-130			
m,p-Xylene	0.203	0.004	"	0.200	ND	101	46.5-137			
o-Xylene	0.100	0.002	"	0.100	0.0004	99.4	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		107	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.2	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		98.3	70-130			

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Rachel Peterson
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 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Matrix Spike (B9A1803-MS2)	Source: Y901223-01			Prepared: 01/18/2019 Analyzed: 01/18/2019						
Benzene	0.092	0.002	mg/kg	0.100	ND	92.5	71.8-126			
Toluene	0.092	0.002	"	0.100	ND	91.6	65.1-130			
Ethylbenzene	0.096	0.002	"	0.100	ND	95.7	62.2-130			
m,p-Xylene	0.195	0.004	"	0.200	0.0009	97.4	46.5-137			
o-Xylene	0.099	0.002	"	0.100	0.0004	98.5	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		99.1	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.2	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		104	70-130			

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Matrix Spike (B9A1803-MS3)	Source: Y901220-04			Prepared: 01/18/2019 Analyzed: 01/18/2019						
Benzene	0.112	0.002	mg/kg	0.100	ND	112	71.8-126			
Toluene	0.110	0.002	"	0.100	ND	110	65.1-130			
Ethylbenzene	0.104	0.002	"	0.100	0.0006	104	62.2-130			
m,p-Xylene	0.215	0.004	"	0.200	0.002	107	46.5-137			
o-Xylene	0.106	0.002	"	0.100	0.0009	105	54.2-134			
Surrogate: 1,2-Dichloroethane-d4	0.13		"	0.125		105	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.4	70-130			
Surrogate: 4-Bromofluorobenzene	0.12		"	0.125		97.7	70-130			

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Matrix Spike Dup (B9A1803-MSD1)	Source: Y901210-01			Prepared: 01/18/2019 Analyzed: 01/18/2019						
Benzene	0.116	0.002	mg/kg	0.100	0.0009	115	71.8-126	8.23	11.3	
Toluene	0.116	0.002	"	0.100	ND	116	65.1-130	11.6	15.4	
Ethylbenzene	0.115	0.002	"	0.100	ND	115	62.2-130	15.9	19.6	
m,p-Xylene	0.236	0.004	"	0.200	ND	118	46.5-137	15.2	19.2	
o-Xylene	0.114	0.002	"	0.100	0.0004	114	54.2-134	13.6	17.9	
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		98.8	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		98.1	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		101	70-130			

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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Matrix Spike Dup (B9A1803-MSD2)	Source: Y901223-01			Prepared: 01/18/2019 Analyzed: 01/18/2019						
Benzene	0.106	0.002	mg/kg	0.100	ND	106	71.8-126	13.3	11.3	QR-02
Toluene	0.104	0.002	"	0.100	ND	104	65.1-130	12.5	15.4	
Ethylbenzene	0.107	0.002	"	0.100	ND	107	62.2-130	11.2	19.6	
m,p-Xylene	0.217	0.004	"	0.200	0.0009	109	46.5-137	10.9	19.2	
o-Xylene	0.110	0.002	"	0.100	0.0004	110	54.2-134	10.6	17.9	
Surrogate: 1,2-Dichloroethane-d4	0.12		"	0.125		96.6	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		97.2	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		102	70-130			

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1803 - EPA 5030 (soil)

Matrix Spike Dup (B9A1803-MSD3)	Source: Y901220-04			Prepared: 01/18/2019 Analyzed: 01/18/2019						
Benzene	0.109	0.002	mg/kg	0.100	ND	109	71.8-126	2.05	11.3	
Toluene	0.114	0.002	"	0.100	ND	114	65.1-130	3.42	15.4	
Ethylbenzene	0.118	0.002	"	0.100	0.0006	118	62.2-130	12.6	19.6	
m,p-Xylene	0.244	0.004	"	0.200	0.002	121	46.5-137	12.7	19.2	
o-Xylene	0.116	0.002	"	0.100	0.0009	115	54.2-134	9.47	17.9	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.11</i>		<i>"</i>	<i>0.125</i>		<i>87.3</i>	<i>70-130</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.13</i>		<i>"</i>	<i>0.125</i>		<i>101</i>	<i>70-130</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.13</i>		<i>"</i>	<i>0.125</i>		<i>103</i>	<i>70-130</i>			

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A2101 - EPA 5030B (Water)

Blank (B9A2101-BLK1)

Prepared: 01/21/2019 Analyzed: 01/21/2019

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	70		"	62.5		111	84-121			
Surrogate: Toluene-d8	60		"	62.5		96.1	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A2101 - EPA 5030B (Water)

LCS (B9A2101-BS1)

Prepared: 01/21/2019 Analyzed: 01/21/2019

Benzene	45.3	1.00	ug/L	50.0		90.6	73.3-129			
Toluene	44.8	1.00	"	50.0		89.6	76.2-123			
Ethylbenzene	46.8	1.00	"	50.0		93.6	73.6-130			
m,p-Xylene	96.9	2.00	"	100		96.9	76.1-126			
o-Xylene	47.4	1.00	"	50.0		94.7	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	75		"	62.5		120	84-121			
Surrogate: Toluene-d8	60		"	62.5		96.1	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

Origins Laboratory, Inc.



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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A2101 - EPA 5030B (Water)

Matrix Spike (B9A2101-MS1)	Source: Y901220-01			Prepared: 01/21/2019 Analyzed: 01/21/2019						
Benzene	54.8	1.00	ug/L	50.0	0.630	108	74-130			
Toluene	55.1	1.00	"	50.0	0.200	110	73-131			
Ethylbenzene	57.2	1.00	"	50.0	0.440	114	76-132			
m,p-Xylene	117	2.00	"	100	1.12	116	69-139			
o-Xylene	55.1	1.00	"	50.0	0.580	109	74-131			
Surrogate: 1,2-Dichloroethane-d4	57		"	62.5		91.2	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		101	84-114			

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 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A2101 - EPA 5030B (Water)

Matrix Spike Dup (B9A2101-MSD1)	Source: Y901220-01			Prepared: 01/21/2019 Analyzed: 01/21/2019						
Benzene	54.7	1.00	ug/L	50.0	0.630	108	74-130	0.183	20	
Toluene	51.7	1.00	"	50.0	0.200	103	73-131	6.40	20	
Ethylbenzene	50.3	1.00	"	50.0	0.440	99.7	76-132	12.9	20	
m,p-Xylene	105	2.00	"	100	1.12	104	69-139	11.4	20	
o-Xylene	51.0	1.00	"	50.0	0.580	101	74-131	7.73	20	
Surrogate: 1,2-Dichloroethane-d4	65		"	62.5		105	84-121			
Surrogate: Toluene-d8	59		"	62.5		94.9	85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5		97.7	84-114			

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9A1804 - EPA 3550B

Blank (B9A1804-BLK1)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Diesel (C10-C28) ND 50.0 mg/kg U

Surrogate: o-Terphenyl 38 " 50.0 75.3 59-131

Blank (B9A1804-BLK2)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Diesel (C10-C28) ND 50.0 mg/kg U

Surrogate: o-Terphenyl 42 " 50.0 84.7 59-131

Blank (B9A1804-BLK3)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Diesel (C10-C28) ND 50.0 mg/kg U

Surrogate: o-Terphenyl 40 " 50.0 79.4 59-131

LCS (B9A1804-BS1)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Diesel (C10-C28) 983 50.0 mg/kg 1000 98.3 64-121

Surrogate: o-Terphenyl 50 " 50.0 99.6 59-131

LCS (B9A1804-BS2)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Diesel (C10-C28) 877 50.0 mg/kg 1000 87.7 64-121

Surrogate: o-Terphenyl 44 " 50.0 88.3 59-131

LCS (B9A1804-BS3)

Prepared: 01/18/2019 Analyzed: 01/18/2019

Diesel (C10-C28) 914 50.0 mg/kg 1000 91.4 64-121

Surrogate: o-Terphenyl 45 " 50.0 90.4 59-131

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Rachel Peterson
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 Project: HAAS #1

Extractable Petroleum Hydrocarbons by 8015C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9A1804 - EPA 3550B										
Matrix Spike (B9A1804-MS1)		Source: Y901213-01			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Diesel (C10-C28)	1050	50.0	mg/kg	1000	172	87.9	53-125			
Surrogate: o-Terphenyl	45		"	50.0		90.8	59-131			
Matrix Spike (B9A1804-MS2)		Source: Y901223-01			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Diesel (C10-C28)	1030	50.0	mg/kg	1000	ND	103	53-125			
Surrogate: o-Terphenyl	47		"	50.0		94.9	59-131			
Matrix Spike (B9A1804-MS3)		Source: Y901220-04			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Diesel (C10-C28)	1060	50.0	mg/kg	1000	ND	106	53-125			
Surrogate: o-Terphenyl	47		"	50.0		94.0	59-131			
Matrix Spike Dup (B9A1804-MSD1)		Source: Y901213-01			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Diesel (C10-C28)	1080	50.0	mg/kg	1000	172	91.0	53-125	2.85	20	
Surrogate: o-Terphenyl	46		"	50.0		92.5	59-131			
Matrix Spike Dup (B9A1804-MSD2)		Source: Y901223-01			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Diesel (C10-C28)	954	50.0	mg/kg	1000	ND	95.4	53-125	7.93	20	
Surrogate: o-Terphenyl	45		"	50.0		89.3	59-131			
Matrix Spike Dup (B9A1804-MSD3)		Source: Y901220-04			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Diesel (C10-C28)	936	50.0	mg/kg	1000	ND	93.6	53-125	12.5	20	
Surrogate: o-Terphenyl	42		"	50.0		83.2	59-131			

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Classical Chemistry Parameters - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9A1807 - NO PREP										
Duplicate (B9A1807-DUP1)		Source: Y901220-04			Prepared: 01/18/2019 Analyzed: 01/18/2019					
pH	7.87		pH Units		7.92			0.633	25	
Batch B9A1808 - NO PREP										
Blank (B9A1808-BLK1)		Prepared: 01/18/2019 Analyzed: 01/18/2019								
Specific Conductance (EC)	0.00350	0.00500	mmhos/cm							
Duplicate (B9A1808-DUP1)		Source: Y901220-04			Prepared: 01/18/2019 Analyzed: 01/18/2019					
Specific Conductance (EC)	0.241	0.00509	mmhos/cm		0.240			0.374	25	

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A.G. Wassenaar

2180 South Ivanhoe Street - Suite 5

Denver CO 80222

Rachel Peterson

Project Number: 160884.EC

Project: HAAS #1

Notes and Definitions

U Sample is Non-Detect.

QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

Origins Laboratory, Inc.



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Jen Pellegrini For Noelle Doyle Mathis, President

April 03, 2019

A.G. Wassenaar

Rachel Peterson

2180 South Ivanhoe Street - Suite 5

Denver

CO 80222

Project Name - HAAS #1

Project Number - 160884.EC

Attached are your analytical results for HAAS #1 received by Origins Laboratory, Inc. March 28, 2019. This project is associated with Origins project number Y903407-01.

The analytical results in the following report were analyzed under the guidelines of EPA Methods. These methods are identified as follows; "SW" are defined in SW-846, "EPA" are defined in 40CFR part 136 and "SM" are defined in the most current revision of Standard Methods For the Examination of Water and Wastewater.

The analytical results apply specifically to the samples and analyses specified per the attached Chain of Custody. As such, this report shall not be reproduced except in full, without the written approval of Origin's laboratory.

Unless otherwise noted, the analytical results for all soil samples are reported on a wet weight basis. All analytical analyses were performed under NELAP guidelines unless noted by a data qualifier.

Any holding time exceedances, deviations from the method specifications or deviations from Origins Laboratory's Standard Operating Procedures are outlined in the case narrative.

Thank you for selecting Origins for your analytical needs. Please contact us with any questions concerning this report, or if we can help with anything at all.

Origins Laboratory, Inc.
303.433.1322
o-squad@oelabinc.com



A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-1	Y903407-01	Water	March 27, 2019 12:00	03/28/2019 08:55
MW-2	Y903407-02	Water	March 27, 2019 13:00	03/28/2019 08:55
MW-3	Y903407-03	Water	March 27, 2019 12:30	03/28/2019 08:55
MW-4	Y903407-04	Water	March 27, 2019 13:45	03/28/2019 08:55
MW-5	Y903407-05	Water	March 27, 2019 12:15	03/28/2019 08:55
MW-6	Y903407-06	Water	March 27, 2019 13:15	03/28/2019 08:55

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Origins Laboratory

F-012207-01-R1
 Effective Date: 01/09/12

Sample Receipt Checklist

Origins Work Order: Y903407

Client: A.G. Wassenaar

Client Project ID: HAAS #1

Checklist Completed by: JG

Shipped Via: HD
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 3/28/2019

Airbill #: N/A

Matrix(s) Received: (Check all that apply): Soil/Solid Water Other: _____
(Describe)

Cooler Number/Temperature: 1 / 3.1 °C _____ / _____ °C _____ / _____ °C _____ / _____ °C

Thermometer ID: T003

Requirement Description	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature between 0°C to ≤6°C ^{(1)?}	<input checked="" type="checkbox"/>			
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>			
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Are custody seals present on each sample container? (if so, document in comments if they are signed and dated, broken or intact)		<input checked="" type="checkbox"/>		
Were all samples received intact ^{(1)?}	<input checked="" type="checkbox"/>			
Was adequate sample volume provided ^{(1)?}	<input checked="" type="checkbox"/>			
Are short holding time analytes or samples with HTs due within 48 hours preserved ^{(1)?}		<input checked="" type="checkbox"/>		
Is a chain-of-custody (COC) present and filled out completely ^{(1)?}	<input checked="" type="checkbox"/>			
Does the COC agree with the number and type of sample bottles received ^{(1)?}	<input checked="" type="checkbox"/>			
Do the sample IDs on the bottle labels match the COC ^{(1)?}	<input checked="" type="checkbox"/>			
Is the COC properly relinquished by the client with date and time recorded ^{(1)?}	<input checked="" type="checkbox"/>			
For volatiles in water – is there headspace (> ¼ inch bubble) present? If yes, contact client and note in narrative.		<input checked="" type="checkbox"/>		
Are samples preserved that require preservation and was it checked ^{(1)?} (note ID of confirmation instrument used in comments) / (preservation is not confirmed for subcontracted analyses in order to insure sample integrity)/(pH <2 for samples preserved with HNO ₃ , HCL, H ₂ SO ₄) / (pH >10 for samples preserved with NaAsO ₂ +NaOH, ZnAc+NaOH)		<input checked="" type="checkbox"/>		
Additional Comments (if any):				

⁽¹⁾If NO, then contact the client before proceeding with analysis and note date/time and person contacted as well as the corrective action to in the additional comments (above) and the case narrative.

Reviewed by (Project Manager) JG

Date/Time Reviewed 3/29/19

Origins Laboratory, Inc.



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A.G. Wassenaar
2180 South Ivanhoe Street - Suite 5
Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

MW-1

3/27/2019 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y903407-01 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B9C2903	KDK	03/29/2019	03/30/2019	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	99.4 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	102 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	97.0 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-2

3/27/2019 1:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y903407-02 (Water)

BTEX by EPA 8260C

Benzene	4840	50.0	ug/L	50	B9C2903	KDK	03/29/2019	03/30/2019	
Toluene	ND	50.0	"	"	"	KDK	"	"	U
Ethylbenzene	294	50.0	"	"	"	KDK	"	"	
Xylenes, total	620	50.0	"	"	"	KDK	"	"	
Surrogate: 1,2-Dichloroethane-d4	96.8 %			84-121		"	"	"	
Surrogate: Toluene-d8	101 %			85-115		"	"	"	
Surrogate: 4-Bromofluorobenzene	99.9 %			84-114		"	"	"	

Origins Laboratory, Inc.



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 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-3

3/27/2019 12:30:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y903407-03 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B9C2903	KDK	03/29/2019	03/30/2019	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	97.4 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	101 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	98.8 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



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Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

MW-4

3/27/2019 1:45:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y903407-04 (Water)

BTEX by EPA 8260C

Benzene	26.4	1.00	ug/L	1	B9C2903	KDK	03/29/2019	03/30/2019	
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	97.0 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	100 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	96.6 %	84-114			"	"	"	"	

Origins Laboratory, Inc.



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A.G. Wassenaar
 2180 South Ivanhoe Street - Suite 5
 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-5

3/27/2019 12:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y903407-05 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B9C2903	KDK	03/29/2019	03/30/2019	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	ND	1.00	"	"	"	KDK	"	"	U
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	98.2 %	84-121			"	"	"	"	
Surrogate: Toluene-d8	102 %	85-115			"	"	"	"	
Surrogate: 4-Bromofluorobenzene	96.9 %	84-114			"	"	"	"	

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

MW-6

3/27/2019 1:15:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y903407-06 (Water)

BTEX by EPA 8260C

Benzene	ND	1.00	ug/L	1	B9C2903	KDK	03/29/2019	03/30/2019	U
Toluene	ND	1.00	"	"	"	KDK	"	"	U
Ethylbenzene	1.21	1.00	"	"	"	KDK	"	"	
Xylenes, total	ND	1.00	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	97.3 %	84-121			"	"	"		
Surrogate: Toluene-d8	102 %	85-115			"	"	"		
Surrogate: 4-Bromofluorobenzene	98.3 %	84-114			"	"	"		

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

Blank (B9C2903-BLK1)

Prepared: 03/29/2019 Analyzed: 03/29/2019

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	63		"	62.5	101		84-121			
Surrogate: Toluene-d8	64		"	62.5	103		85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	97.7		84-114			

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Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

Blank (B9C2903-BLK2)

Prepared: 03/29/2019 Analyzed: 03/29/2019

Benzene	ND	1.00	ug/L							U
Toluene	ND	1.00	"							U
Ethylbenzene	ND	1.00	"							U
Xylenes, total	ND	1.00	"							U
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5	97.4		84-121			
Surrogate: Toluene-d8	63		"	62.5	101		85-115			
Surrogate: 4-Bromofluorobenzene	61		"	62.5	98.0		84-114			

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Rachel Peterson
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 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

LCS (B9C2903-BS1)

Prepared: 03/29/2019 Analyzed: 03/29/2019

Benzene	43.9	1.00	ug/L	50.0		87.8	73.3-129			
Toluene	42.8	1.00	"	50.0		85.5	76.2-123			
Ethylbenzene	42.9	1.00	"	50.0		85.7	73.6-130			
m,p-Xylene	86.4	2.00	"	100		86.4	76.1-126			
o-Xylene	43.9	1.00	"	50.0		87.9	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	61		"	62.5		97.0	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.0	84-114			

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 Denver CO 80222

Rachel Peterson
 Project Number: 160884.EC
 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

LCS (B9C2903-BS2)

Prepared: 03/29/2019 Analyzed: 03/29/2019

Benzene	52.8	1.00	ug/L	50.0		106	73.3-129			
Toluene	50.4	1.00	"	50.0		101	76.2-123			
Ethylbenzene	48.7	1.00	"	50.0		97.4	73.6-130			
m,p-Xylene	99.1	2.00	"	100		99.1	76.1-126			
o-Xylene	49.1	1.00	"	50.0		98.2	76.6-124			
Surrogate: 1,2-Dichloroethane-d4	58		"	62.5		92.4	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.8	84-114			

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 Denver CO 80222

Rachel Peterson
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 Project: HAAS #1

Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

Matrix Spike (B9C2903-MS1)	Source: Y903387-11			Prepared: 03/29/2019 Analyzed: 03/29/2019						
Benzene	52.0	1.00	ug/L	50.0	ND	104	74-130			
Toluene	50.5	1.00	"	50.0	ND	101	73-131			
Ethylbenzene	48.4	1.00	"	50.0	ND	96.9	76-132			
m,p-Xylene	98.6	2.00	"	100	ND	98.6	69-139			
o-Xylene	48.8	1.00	"	50.0	ND	97.5	74-131			
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.7	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.6	84-114			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
Origins Laboratory, Inc.

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

Matrix Spike (B9C2903-MS2)	Source: Y903387-12			Prepared: 03/29/2019 Analyzed: 03/29/2019						
Benzene	50.9	1.00	ug/L	50.0	ND	102	74-130			
Toluene	48.8	1.00	"	50.0	ND	97.6	73-131			
Ethylbenzene	47.6	1.00	"	50.0	ND	95.3	76-132			
m,p-Xylene	97.4	2.00	"	100	ND	97.4	69-139			
o-Xylene	48.9	1.00	"	50.0	ND	97.9	74-131			
Surrogate: 1,2-Dichloroethane-d4	58		"	62.5		92.4	84-121			
Surrogate: Toluene-d8	63		"	62.5		100	85-115			
Surrogate: 4-Bromofluorobenzene	63		"	62.5		100	84-114			

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Volatile Organic Compounds by GC/MS SW846 8260C - Quality Control
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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

Matrix Spike Dup (B9C2903-MSD1)	Source: Y903387-11			Prepared: 03/29/2019 Analyzed: 03/29/2019						
Benzene	51.0	1.00	ug/L	50.0	ND	102	74-130	1.96	20	
Toluene	48.5	1.00	"	50.0	ND	96.9	73-131	4.08	20	
Ethylbenzene	47.4	1.00	"	50.0	ND	94.8	76-132	2.21	20	
m,p-Xylene	96.4	2.00	"	100	ND	96.4	69-139	2.23	20	
o-Xylene	48.6	1.00	"	50.0	ND	97.1	74-131	0.432	20	
Surrogate: 1,2-Dichloroethane-d4	60		"	62.5		96.2	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		99.5	84-114			

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Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Batch B9C2903 - EPA 5030B (Water)

Matrix Spike Dup (B9C2903-MSD2)	Source: Y903387-12			Prepared: 03/29/2019 Analyzed: 03/29/2019						
Benzene	50.9	1.00	ug/L	50.0	ND	102	74-130	0.0589	20	
Toluene	48.2	1.00	"	50.0	ND	96.3	73-131	1.30	20	
Ethylbenzene	47.1	1.00	"	50.0	ND	94.2	76-132	1.12	20	
m,p-Xylene	96.1	2.00	"	100	ND	96.1	69-139	1.34	20	
o-Xylene	48.4	1.00	"	50.0	ND	96.7	74-131	1.19	20	
Surrogate: 1,2-Dichloroethane-d4	58		"	62.5		93.3	84-121			
Surrogate: Toluene-d8	64		"	62.5		102	85-115			
Surrogate: 4-Bromofluorobenzene	62		"	62.5		98.6	84-114			

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Denver CO 80222

Rachel Peterson
Project Number: 160884.EC
Project: HAAS #1

Notes and Definitions

U Sample is Non-Detect.

ND Analyte NOT DETECTED at or above the reporting limit

RPD Relative Percent Difference

All soil results are reported at a wet weight basis.

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Jen Pellegrini For Noelle Doyle Mathis, President

ATTACHMENT C

SOIL BORING LOGS

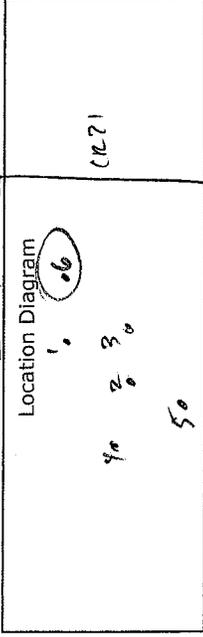
A.G. Wassenaar

Geotechnical and Environmental Consultants

INC.

2180 South Ivanhoe Street, Suite 5
 Denver, Colorado 80222-5710
 303-759-8373 Fax 303-759-4874
 www.agwassenaar.com

Murraydale Dr



Geologist: ALB
 Driller: Adam
 Helper: Don
 Auger Type: 8" hydraulic split auger
 Boring Number: 6 (MHW-6)

Water Level Observations
 WL (while drilling) ~9
 WL (while sampling) _____
 WL (after _____ hrs) _____

AW 9.54 +dw 15.05

Project Number 110384

40.48607, -104.87051

1150 no debris/staining

Sample No.	Depth or Elevation (feet)		Sampling Method	Split Spoon Blows				Length Recovered In Feet	PID Reading	Strata Change	Sample Description
	From	To		9"	6"	6"	6"				
1	6	4						30		dark brn silty clay w/ gravel	
2	4	9						345		1" sandy layers after 7'	
3	9	15					2.5	309		Sample @ 11-9' 12:100 no debris/staining wet med brn sand	
										black staining obs @ 11 ft clean below	
										Sample 10/12' 12:10	

