



**VIA ELECTRONIC MAIL –**

January 20, 2022

Jake Janicek  
EH&S Specialist  
Caerus Oil and Gas LLC  
143 Diamond Avenue  
Parachute, Colorado 81635

**Subject: Report of Work Completed 4Q 2021  
Dumpline Release – COGCC Remediation Number 17035  
J17E  
Mamm Creek Field  
Garfield County, Colorado**

Dear Mr. Janicek:

WSP USA Inc. (WSP), on behalf of Caerus Oil and Gas, LLC (Caerus), conducted supplemental aquifer characterization testing and installation of a blower trailer skid to soil vapor extraction (SVE) well SVE1 to remediate hydrocarbons associated with the dumpline release at the J17E (Facility ID: 334782) pad location (Site). These activities were completed to further determine the viability of various remediation systems at the Site as well as to test the SVE remediation approach at the Site. All investigation activities prior to December 14, 2021 can be referenced in Colorado Oil and Gas Conservation Commission (COGCC) Document Number 402853537 and Remediation Number 17035. The Site is located in the Caerus Mamm Creek area of operation in Garfield County, Colorado (Figure 1).

## **AQUIFER CHARACTERIZATION ACTIVITIES**

On December 14, 2021, WSP personnel completed aquifer testing (i.e. slug testing) activities to determine the aquifer characteristics of the impacted groundwater plume previously delineated at the Site. The purpose of the slug tests was to determine the aquifer characteristics and support remediation design. Slug tests require the depression or elevation of static water in a well and the measurement of time it takes for the well to equilibrate to calculate the aquifers hydraulic conductivity. Slug tests were performed on monitoring well locations MW-08 and MW-09 to determine the hydraulic conductivity of the aquifer in the vicinity of documented exceedances of COGCC Table 915-1 Concentration Levels for benzene in groundwater at SB02-TB well. Locations MW-08 and MW-09 monitoring wells were chosen for the aquifer tests as they are screened in, and represent, points both up and downgradient of SB02-TB within the same aquifer.

The slug tests were performed by first inserting a vented pressure transducer (Level TROLL 500®) into the test well (MW-08 or MW-09) with a submersible cable connected to a Rugged Reader® tablet, allowing for the monitoring of depth to water, pressure, and temperature in the well in real-time. After the transducer was installed in well, the groundwater within the well was left to equilibrate. After groundwater had equilibrated, a three-foot long one-inch diameter slug was then inserted into the well (i.e. slug in test) causing the groundwater level to rise. Groundwater levels were then recorded with the pressured transducer at 10 second intervals until the groundwater level returned to approximately static water level. After the groundwater level returned to static, the slug was removed from the well (i.e. slug out test) causing the groundwater level to fall and groundwater levels again recorded with the pressure transducer on 10 second intervals until the level returned to static. The process was repeated on the remaining test well and resulting data recorded with pressure transducer was input into AQTESOLV® for analysis of the groundwater recovery from the slug tests.

WSP USA  
820 MEGAN AVENUE, UNIT B  
RIFLE CO 81650

Tel.: 970-285-9985  
wsp.com



Based on the slug test data, the Bouwer-Rice solution was applied to the slug test results to calculate the hydraulic conductivity of the aquifer. Analysis of the results are included in Enclosure A and indicate that the average hydraulic conductivity of the aquifer at the Site is  $5.1905 \times 10^{-4}$  feet per minute (ft/min) or 0.747 feet per day (ft/day), which is consistent for a semi-pervious aquifer composed of silt and mudstone. A site map illustrating the monitoring well locations is enclosed as Figure 2.

## SVE STARTUP AND OPERATION

On December 20, 2021, WSP personnel completed the setup of a blower trailer skid to SVE1 along with initial operations and maintenance (O&M) activities. The blower trailer skid is equipped with a 1/8 horsepower regenerative blower manufactured by GAST. Startup activities included connecting the blower to SVE1, documenting blower hours, adjusting/recording flow and vacuum, and collection of one effluent air sample. During O&M activities volatile organic compounds (VOCs) measurements were collected using a photoionization detector (PID) from SVE1 and nearby monitoring wells which included SB02-TB, MW08, and MW09 locations. PID readings ranged from 0.9 parts per million (ppm) in MW09 to 853 ppm in SVE1. The initial blower hours on the trailer skid prior to startup were 2388.9 hours.

Following measurement collection and running the system for approximately 30 minutes, one air sample was collected in a 1-liter Tedlar bag for laboratory analysis. The air sample was shipped under chain-of-custody protocol to ALS Environmental of Simi Valley, California for laboratory analysis of total volatile petroleum hydrocarbons (TVPH) as Gasoline by EPA TO-3 Modified and benzene toluene, ethylbenzene, and total xylenes (BTEX) by EPA TO-15 Modified. Results indicate a TVPH concentration of 17 milligrams per liter. The estimated TVPH air emissions based on the initial air sample data is 0.001 tons resulting from volatilization of hydrocarbons during operation of the system in December 2021. The rolling 12-month VOCs emissions estimate is well below the Colorado Department of Public Health and Environment (CDPHE) air permitting threshold of 2 tons VOCs per rolling 12-month period. An air emissions summary table is enclosed as Table 1. The laboratory analytical report is included as Enclosure B.

## CONCLUSIONS

WSP recommends Caerus continue SVE system operation and quarterly stack sampling to monitor system progress and ensure the air emissions remain below the CDPHE permitting threshold 2 tons of VOCs per rolling 12-month period.

Please contact us at (970) 618-4514 or (303) 548-5097 if you have any questions regarding this report or require additional information.

Kind regards,

A handwritten signature in blue ink, appearing to read 'D. Held'.

Dustin Held  
Sr. Consultant, Environmental Geologist

A handwritten signature in blue ink, appearing to read 'Parker Coit'.

Parker Coit, P.G.  
Sr. Consultant, Geologist

Encl.

## FIGURES

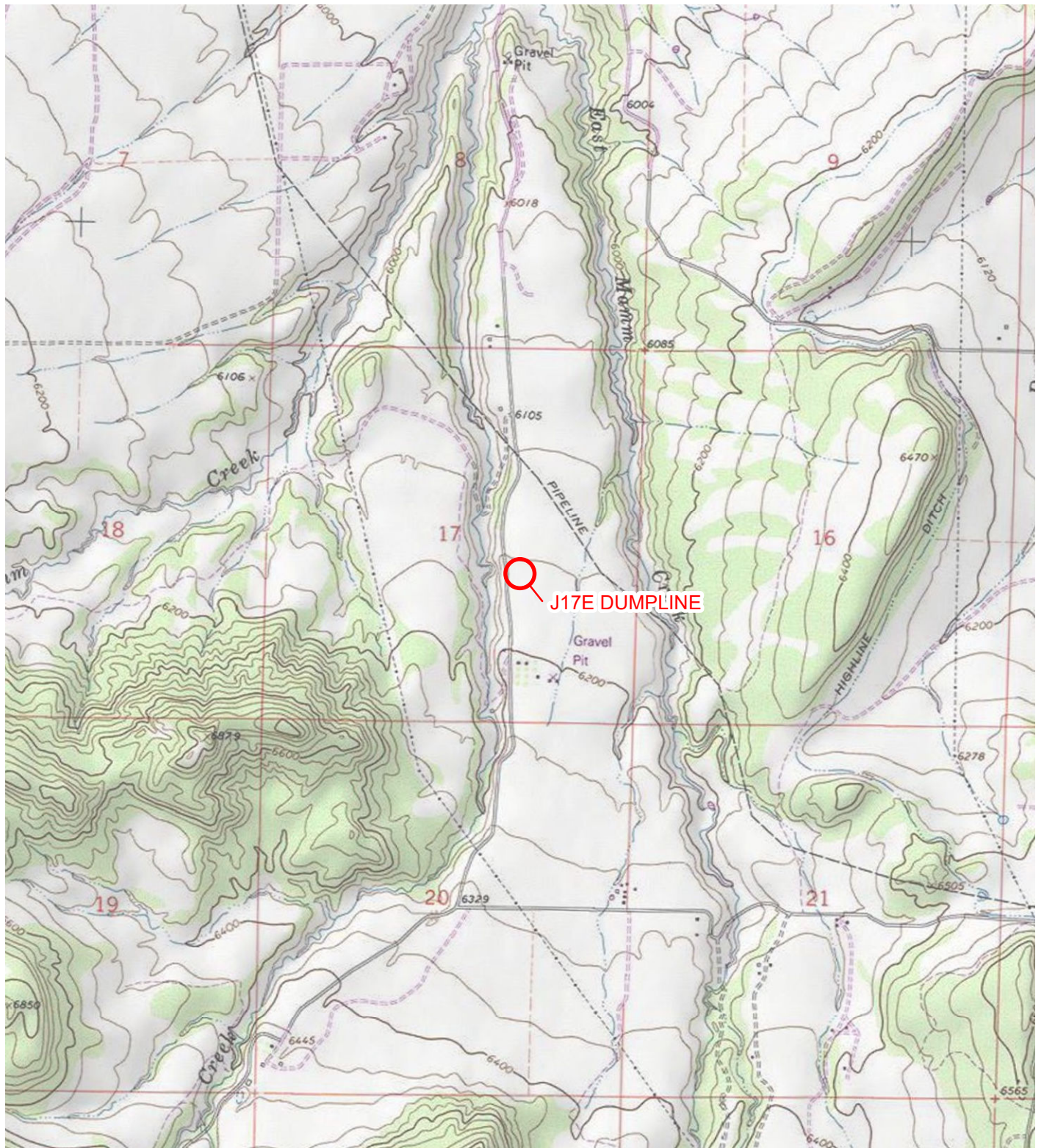


IMAGE COURTESY OF ESRI/USGS

# LEGEND

 SITE LOCATION

0 2,000 4,000  
Feet



FIGURE 1  
SITE LOCATION MAP  
J17E DUMPLINE  
NWSE SEC 17-T7S-R92W  
GARFIELD COUNTY, COLORADO  
CAERUS OIL AND GAS LLC





IMAGE COURTESY OF ESRI (MAXAR 2019)

## LEGEND

- ⊗ MONITORING WELL
- SOIL BORING
- ▲ AIR SPARGING WELL (AS)
- SOIL VAPOR EXTRACTION WELL (SVE)

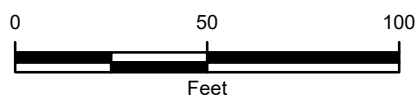


FIGURE 2  
SITE MAP  
J17E DUMPLINE  
NWSE SEC 17-T7S-R92W  
GARFIELD COUNTY, COLORADO  
CAERUS OIL AND GAS LLC



TABLE

TABLE 1

**EMISSIONS ESTIMATE SUMMARY  
J17E DUMPLINE RELEASE  
GARFIELD COUNTY, COLORADO  
CAERUS OIL AND GAS LLC**

Sample Information and Lab Analysis								
Date	Total Flow (cf)	Delta Flow (cf)	Benzene (ug/l)	Toluene (ug/l)	Ethyl Benzene (ug/l)	Xylenes (ug/l)	VOCs TVPH (ug/l)	PID (ppm)
12/20/21	1,836	1,836	17,000	6,000	5,200*	16,200*	17,000	2,141

Emission Calculations						
Date	Flow Rate (cfm)	Benzene (lb/hr)	Toluene (lb/hr)	Ethyl Benzene (lb/hr)	Xylenes (lb/hr)	VOCs TVPH (lb/hr)
12/20/21	8	0.49	0.17	0.15	0.46	0.49

Tons emitted over total operating time									
Date	Total Operational Hours	Delta Hours	Benzene (tons)	Toluene (tons)	Ethyl Benzene (tons)	Xylenes (tons)	TVPH (tons)	Cumulative TVPH (tons)	12 Month Rolling Throughput (tons)
12/20/21	2388.9**								
12/20/21	4.0	4.0	0.0010	0.0003	0.0003	0.0009	0.0010	0.0010	0.0
		Sum	0.001	0.000	0.000	0.001	0.001		

**NOTES:**

cf - cubic feet

ug/l - micrograms per liter

VOCs - volatile organic compounds

TVPH - total volatile petroleum hydrocarbons

cfm - cubic feet per minute

lb/hr - pounds per hour

lbs - pounds

PID - photo-ionization detector

ppm - part per million

\* - values were reported below the method reporting limit (MDL). The MDL value is included for calculation.

\*\* - site startup hours on blower

## ENCLOSURE A – AQUIFER TEST ANALYSIS



## ENCLOSURE A

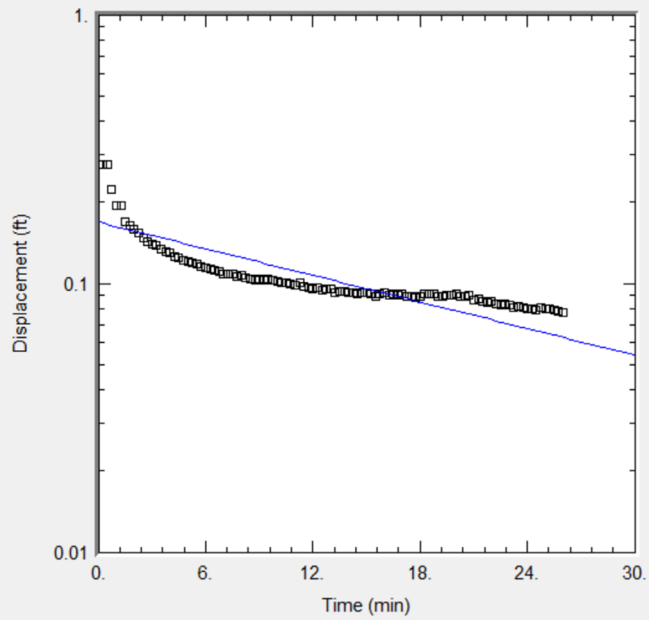
**CAERUS OIL AND GAS  
LLC**

**J17E ROWC 4Q 2021  
Mamm Creek Field  
Garfield County, Colorado**

**050820038**

**MW-08**

Slug In



Obs. Wells

□ MW08

Aquifer Model

Unconfined

Solution

Bouwer-Rice

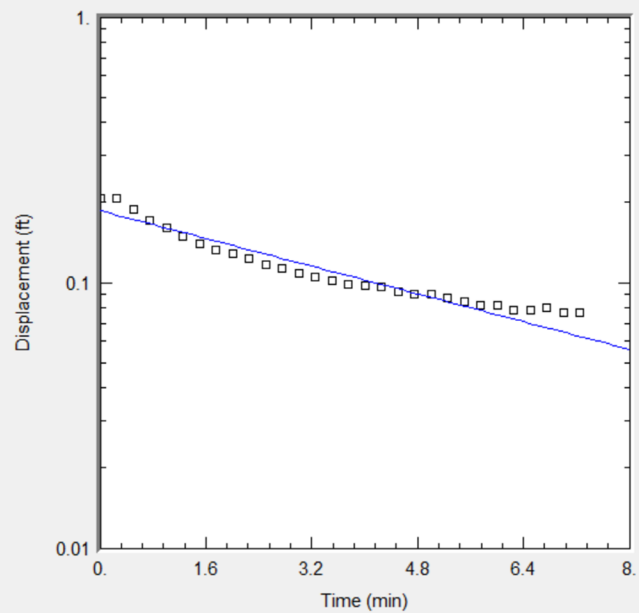
Parameters

$K = 0.0001051$  ft/min

$y0 = 0.1688$  ft

**MW-08**

Slug Out



Obs. Wells

□ MW08

Aquifer Model

Unconfined

Solution

Bouwer-Rice

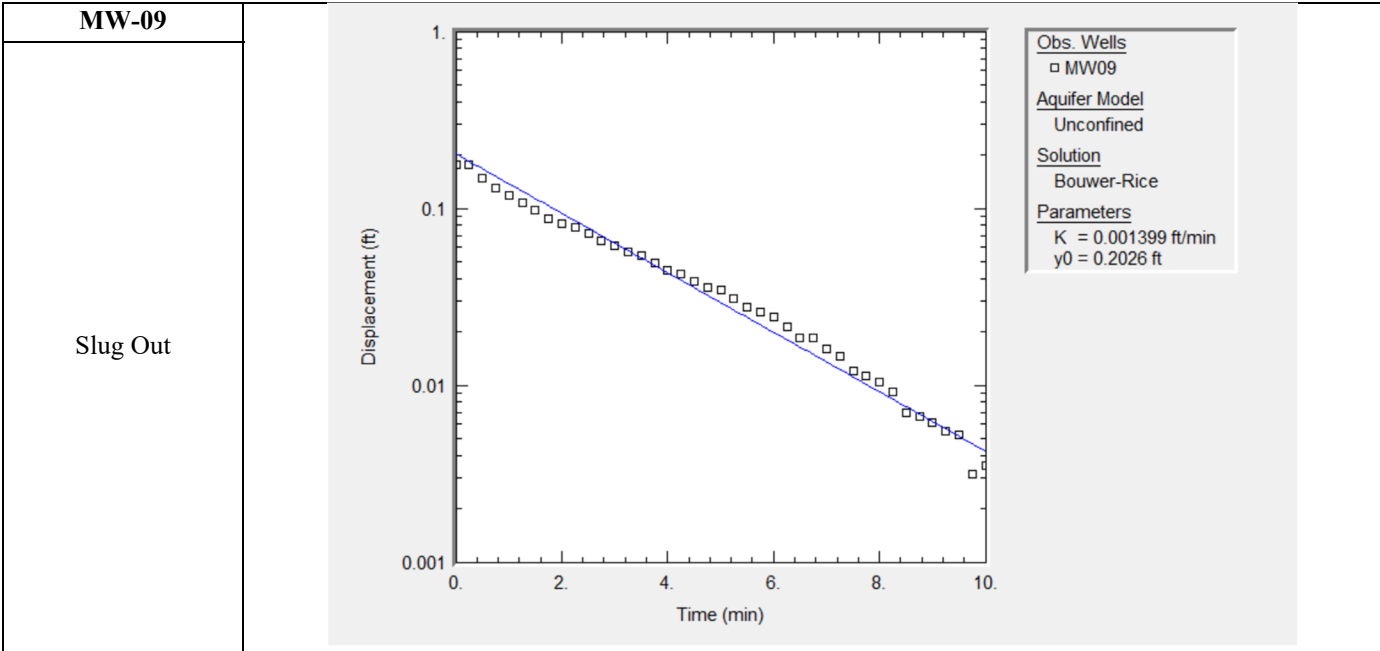
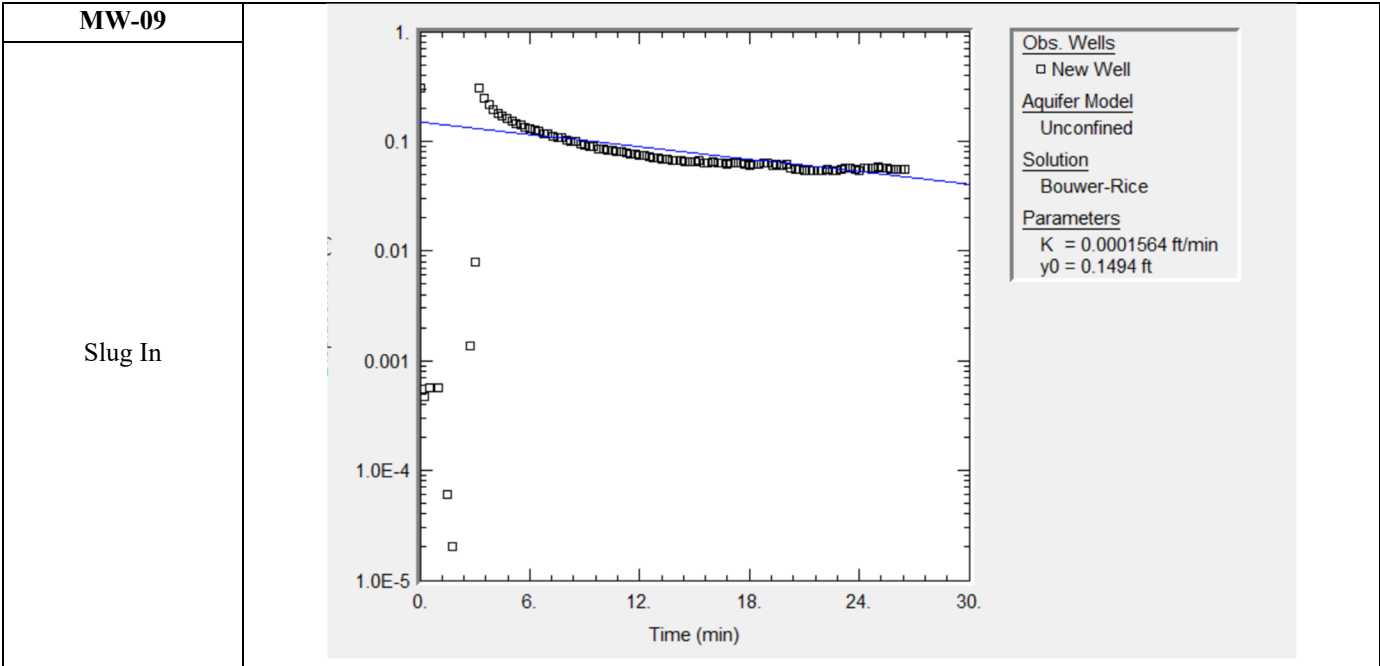
Parameters

$K = 0.0004157$  ft/min

$y0 = 0.1862$  ft



ENCLOSURE A		
CAERUS OIL AND GAS LLC	J17E ROWC 4Q 2021 Mamm Creek Field Garfield County, Colorado	050820038



## ENCLOSURE B – LABORATORY ANALYTICAL REPORT



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2655 Park Center Dr., Suite A  
Simi Valley, CA 93065  
T: +1 805 526 7161  
[www.alsglobal.com](http://www.alsglobal.com)

## LABORATORY REPORT

January 7, 2022

Jake Janicek  
Caerus Oil and Gas, LLC  
120 North Railroad Ave.  
Parachute, CO 81635

**RE: J17E**

Dear Jake:

Enclosed are the results of the sample submitted to our laboratory on December 21, 2021. For your reference, these analyses have been assigned our service request number P2106672.

All analyses were performed according to our laboratory's NELAP and DoD-ELAP-approved quality assurance program. The test results meet requirements of the current NELAP and DoD-ELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP and DoD-ELAP-accredited analytes, refer to the certifications section at [www.alsglobal.com](http://www.alsglobal.com). Results are intended to be considered in their entirety and apply only to the samples analyzed and reported herein.

If you have any questions, please call me at (805) 526-7161.

Respectfully submitted,

**ALS | Environmental**

  
By Sue Anderson at 4:16 pm, Jan 07, 2022

Sue Anderson  
Project Manager



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Simi Valley, CA 93065  
T: +1 805 526 7161  
[www.alsglobal.com](http://www.alsglobal.com)

Client: Caerus Oil and Gas LLC  
Project: J17E

Service Request No: P2106672

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## CASE NARRATIVE

The sample was received intact under chain of custody on December 21, 2021 and was stored in accordance with the analytical method requirements. Please refer to the sample acceptance check form for additional information. The results reported herein are applicable only to the condition of the sample at the time of sample receipt.

### Total Petroleum Hydrocarbons as Gasoline Analysis

The sample was analyzed for total petroleum hydrocarbons (TPH) as gasoline per modified EPA Method TO-3 using a gas chromatograph equipped with a flame ionization detector (FID). This procedure is described in laboratory SOP VOA-TPHG\_TO3. This method is included on the laboratory's DoD-ELAP scope of accreditation, however it is not part of the NELAP accreditation.

### Volatile Organic Compound Analysis

The sample was also analyzed for volatile organic compounds in accordance with EPA Method TO-15 from the Compendium of Methods for the Determination of Toxic Organic Compounds in Ambient Air, Second Edition (EPA/625/R-96/010b), January, 1999. This procedure is described in laboratory SOP VOA-TO15. The analytical system was comprised of a gas chromatograph/mass spectrometer (GC/MS) interfaced to a whole-air preconcentrator. According to the method, the use of Tedlar bags is considered a method modification. This method is included on the laboratory's NELAP and DoD-ELAP scope of accreditation. Any analytes flagged with an X are not included on the NELAP or DoD-ELAP accreditation.

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*The results of analyses are given in the attached laboratory report. All results are intended to be considered in their entirety, and ALS Environmental (ALS) is not responsible for utilization of less than the complete report.*

*Use of ALS Environmental (ALS)'s Name. Client shall not use ALS's name or trademark in any marketing or reporting materials, press releases or in any other manner ("Materials") whatsoever and shall not attribute to ALS any test result, tolerance or specification derived from ALS's data ("Attribution") without ALS's prior written consent, which may be withheld by ALS for any reason in its sole discretion. To request ALS's consent, Client shall provide copies of the proposed Materials or Attribution and describe in writing Client's proposed use of such Materials or Attribution. If ALS has not provided written approval of the Materials or Attribution within ten (10) days of receipt from Client, Client's request to use ALS's name or trademark in any Materials or Attribution shall be deemed denied. ALS may, in its discretion, reasonably charge Client for its time in reviewing Materials or Attribution requests. Client acknowledges and agrees that the unauthorized use of ALS's name or trademark may cause ALS to incur irreparable harm for which the recovery of money damages will be inadequate. Accordingly, Client acknowledges and agrees that a violation shall justify preliminary injunctive relief. For questions contact the laboratory.*



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[www.alsglobal.com](http://www.alsglobal.com)

ALS Environmental – Simi Valley

CERTIFICATIONS, ACCREDITATIONS, AND REGISTRATIONS

Agency	Web Site	Number
Alaska DEC	<a href="http://dec.alaska.gov/eh/lab.aspx">http://dec.alaska.gov/eh/lab.aspx</a>	17-019
Arizona DHS	<a href="http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home">http://www.azdhs.gov/preparedness/state-laboratory/lab-licensure-certification/index.php#laboratory-licensure-home</a>	AZ0694
Florida DOH (NELAP)	<a href="http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html">http://www.floridahealth.gov/licensing-and-regulation/environmental-laboratories/index.html</a>	E871020
Louisiana DEQ (NELAP)	<a href="http://www.deq.louisiana.gov/page/la-lab-accreditation">http://www.deq.louisiana.gov/page/la-lab-accreditation</a>	05071
Maine DHHS	<a href="http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml">http://www.maine.gov/dhhs/mecdc/environmental-health/dwp/professionals/labCert.shtml</a>	2018027
Minnesota DOH (NELAP)	<a href="http://www.health.state.mn.us/accreditation">http://www.health.state.mn.us/accreditation</a>	1776326
New Jersey DEP (NELAP)	<a href="http://www.nj.gov/dep/enforcement/oqa.html">http://www.nj.gov/dep/enforcement/oqa.html</a>	CA009
New York DOH (NELAP)	<a href="http://www.wadsworth.org/labcert/elap/elap.html">http://www.wadsworth.org/labcert/elap/elap.html</a>	11221
Oregon PHD (NELAP)	<a href="http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx">http://www.oregon.gov/oha/ph/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx</a>	4068-008
Pennsylvania DEP	<a href="http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx">http://www.dep.pa.gov/Business/OtherPrograms/Labs/Pages/Laboratory-Accreditation-Program.aspx</a>	68-03307 (Registration)
PJLA (DoD ELAP)	<a href="http://www.pjlabs.com/search-accredited-labs">http://www.pjlabs.com/search-accredited-labs</a>	65818 (Testing)
Texas CEQ (NELAP)	<a href="http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html">http://www.tceq.texas.gov/agency/qa/env_lab_accreditation.html</a>	T104704413-19-10
Utah DOH (NELAP)	<a href="http://health.utah.gov/lab/lab_cert_env">http://health.utah.gov/lab/lab_cert_env</a>	CA016272019-10
Washington DOE	<a href="http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html">http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html</a>	C946
<p>Analyses were performed according to our laboratory's NELAP and DoD-ELAP approved quality assurance program. A complete listing of specific NELAP and DoD-ELAP certified analytes can be found in the certifications section at <a href="http://www.alsglobal.com">www.alsglobal.com</a>, or at the accreditation body's website.</p> <p>Each of the certifications listed above have an explicit Scope of Accreditation that applies to specific matrices/methods/analytes; therefore, please contact the laboratory for information corresponding to a particular certification.</p>		

# ALS ENVIRONMENTAL

## DETAIL SUMMARY REPORT

Client: Caerus Oil and Gas LLC  
Project ID: J17E

Service Request: P2106672

Date Received: 12/21/2021  
Time Received: 11:00

Client Sample ID	Lab Code	Matrix	Date Collected	Time Collected	TO-3 Modified - TPHG Bag	TO-15 Modified - VOC Bags
20211220-J17E (SVE01)	P2106672-001	Air	12/20/2021	12:05	X	X



## COC number (for client tracking)

**Failure to complete all section of this form may delay analysis.**

[illegible]

Notes: (a) **DW** (Drinking water), **SW** (Surface water), **GW** (Ground water), **WW** (Waste water), **S** (Soil), **SL** (Sludge), **SE** (Sediment), **OS** (Other solid material)

**ALS Technichem (HK) Pty Ltd**  
**Address:** 11/F, Chung Shun Knitting Centre, 1-3 Wing Yip Street, Kwai Chung, N.T., Hong Kong  
**Tel:** +852 2610 1044  
**Fax:** +852 2610 2021  
**Em:**

# ALS Environmental Sample Acceptance Check Form

Client: Caerus Oil and Gas LLC Work order: P2106672  
 Project: J17E / J17E  
 Sample(s) received on: 12/21/21 Date opened: 12/21/21 by: ADAVID

**Note:** This form is used for all samples received by ALS. The use of this form for custody seals is strictly meant to indicate presence/absence and not as an indication of compliance or nonconformity. Thermal preservation and pH will only be evaluated either at the request of the client and/or as required by the method/SOP.

- |   | <b>Yes</b>                          | <b>No</b>                           | <b>N/A</b>                          |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1 Were <b>sample containers</b> properly marked with client sample ID?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 2 Did <b>sample containers</b> arrive in good condition?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 3 Were <b>chain-of-custody</b> papers used and filled out?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 4 Did <b>sample container labels</b> and/or tags agree with custody papers?                                     | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 5 Was <b>sample volume</b> received adequate for analysis?  | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 6 Are samples within specified holding times?   | <input checked="" type="checkbox"/> | <input type="checkbox"/>            | <input type="checkbox"/>            |
| 7 Was proper <b>temperature</b> (thermal preservation) of cooler at receipt adhered to?                         | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 8 Were <b>custody seals</b> on outside of cooler/Box/Container?   | <input type="checkbox"/>            | <input checked="" type="checkbox"/> | <input type="checkbox"/>            |
| Location of seal(s)? _____ Sealing Lid?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were signature and date included?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were seals intact?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 9 Do containers have appropriate <b>preservation</b> , according to method/SOP or Client specified information? | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Is there a client indication that the submitted samples are <b>pH</b> preserved?                                | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Were <b>VOA vials</b> checked for presence/absence of air bubbles?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Does the client/method/SOP require that the analyst check the sample pH and <u>if necessary</u> alter it?       | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 10 <b>Tubes:</b> Are the tubes capped and intact?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| 11 <b>Badges:</b> Are the badges properly capped and intact?  | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |
| Are dual bed badges separated and individually capped and intact?   | <input type="checkbox"/>            | <input type="checkbox"/>            | <input checked="" type="checkbox"/> |

Lab Sample ID	Container Description	Required pH *	Received pH	Adjusted pH	VOA Headspace (Presence/Absence)	Receipt / Preservation Comments
P2106672-001.01	1 L Zefon Bag					
P2106672-001.02	1 L Zefon Bag					

Explain any discrepancies: (include lab sample ID numbers): \_\_\_\_\_

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Caerus Oil and Gas LLC

**Client Project ID:** J17E

ALS Project ID: P2106672

### Total Petroleum Hydrocarbons (TPH) as Gasoline

Test Code: EPA TO-3 Modified

Instrument ID: HP 5890 II/GC21/FID

Analyst: Gilbert Gutierrez

Sampling Media: 1 L Zefon Bag(s)

Test Notes:

Date(s) Collected: 12/20/21

Date Received: 12/21/21

Date Analyzed: 12/21/21

Client Sample ID	ALS Sample ID	Injection Volume ml(s)	Result mg/m <sup>3</sup>	MRL mg/m <sup>3</sup>	Result ppmV	MRL ppmV	Data Qualifier
20211220-J17E (SVE01)	P2106672-001	0.050	17,000	360	4,900	100	
Method Blank	P211221-MB	1.0	ND	18	ND	5.1	

Parts Per Million results are based on a Molecular Weight of 86.18.

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** Caerus Oil and Gas LLC  
**Client Sample ID:** Duplicate Lab Control Sample  
**Client Project ID:** J17E

ALS Project ID: P2106672  
 ALS Sample ID: P211221-DLCS

**Test Code:** EPA TO-3 Modified  
**Instrument ID:** HP 5890 II/GC21/FID  
**Analyst:** Gilbert Gutierrez  
**Sampling Media:** 1 L Zefon Bag  
**Test Notes:**

**Date Collected:** NA  
**Date Received:** NA  
**Date Analyzed:** 12/21/21  
**Volume(s) Analyzed:** NA ml(s)

Compound	Spike Amount		Result		% Recovery		ALS	RPD	RPD	Data
	LCS / DLCS		LCS	DLCS	LCS	DLCS	Acceptance			
	mg/m <sup>3</sup>		mg/m <sup>3</sup>	mg/m <sup>3</sup>	LCS	DLCS	Limits		Limit	Qualifier
TPH as Gasoline	7,190		7,460	7,460	104	104	89-124	0	14	

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Caerus Oil and Gas LLC  
**Client Sample ID:** 20211220-J17E (SVE01)  
**Client Project ID:** J17E

ALS Project ID: P2106672  
 ALS Sample ID: P2106672-001

**Test Code:** EPA TO-15 Modified  
**Instrument ID:** Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
**Analyst:** Simon Cao  
**Sample Type:** 1 L Zefon Bag  
**Test Notes:**

**Date Collected:** 12/20/21  
**Date Received:** 12/21/21  
**Date Analyzed:** 12/22/21  
**Volume(s) Analyzed:** 0.00010 Liter(s)

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	17,000	5,000	5,400	1,600	
108-88-3	Toluene	6,600	5,200	1,700	1,400	
100-41-4	Ethylbenzene	ND	5,200	ND	1,200	
179601-23-1	m,p-Xylenes	ND	11,000	ND	2,500	
95-47-6	o-Xylene	ND	5,200	ND	1,200	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

## RESULTS OF ANALYSIS

Page 1 of 1

**Client:** Caerus Oil and Gas LLC

**Client Sample ID:** Method Blank

**Client Project ID:** J17E

ALS Project ID: P2106672

ALS Sample ID: P211222-MB

**Test Code:** EPA TO-15 Modified

**Instrument ID:** Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9

**Analyst:** Simon Cao

**Sample Type:** 1 L Zefon Bag

**Test Notes:**

Date Collected: NA

Date Received: NA

Date Analyzed: 12/22/21

Volume(s) Analyzed: 1.00 Liter(s)

CAS #	Compound	Result µg/m <sup>3</sup>	MRL µg/m <sup>3</sup>	Result ppbV	MRL ppbV	Data Qualifier
71-43-2	Benzene	ND	0.50	ND	0.16	
108-88-3	Toluene	ND	0.52	ND	0.14	
100-41-4	Ethylbenzene	ND	0.52	ND	0.12	
179601-23-1	m,p-Xylenes	ND	1.1	ND	0.25	
95-47-6	o-Xylene	ND	0.52	ND	0.12	

ND = Compound was analyzed for, but not detected above the laboratory reporting limit.

MRL = Method Reporting Limit - The minimum quantity of a target analyte that can be confidently determined by the referenced method.

# ALS ENVIRONMENTAL

## SURROGATE SPIKE RECOVERY RESULTS

Page 1 of 1

**Client:** Caerus Oil and Gas LLC  
**Client Project ID:** J17E

ALS Project ID: P2106672

**Test Code:** EPA TO-15 Modified  
**Instrument ID:** Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
**Analyst:** Simon Cao  
**Sample Type:** 1 L Zefon Bag(s)  
**Test Notes:**

**Date(s) Collected:** 12/20/21  
**Date(s) Received:** 12/21/21  
**Date(s) Analyzed:** 12/22/21

Client Sample ID	ALS Sample ID	1,2-Dichloroethane-d4	Toluene-d8	Bromofluorobenzene	Acceptance Limits	Data Qualifier
		Percent Recovered	Percent Recovered	Percent Recovered		
Method Blank	P211222-MB	106	99	98	70-130	
Lab Control Sample	P211222-LCS	102	96	97	70-130	
Duplicate Lab Control Sample	P211222-DLCS	102	96	97	70-130	
20211220-J17E (SVE01)	P2106672-001	102	98	98	70-130	

Surrogate percent recovery is verified and accepted based on the on-column result.

Reported results are shown in concentration units and as a result of the calculation, may vary slightly from the on-column percent recovery.

# ALS ENVIRONMENTAL

## LABORATORY CONTROL SAMPLE / DUPLICATE LABORATORY CONTROL SAMPLE SUMMARY

Page 1 of 1

**Client:** Caerus Oil and Gas LLC  
**Client Sample ID:** Duplicate Lab Control Sample  
**Client Project ID:** J17E

ALS Project ID: P2106672  
 ALS Sample ID: P211222-DLCS

**Test Code:** EPA TO-15 Modified  
**Instrument ID:** Tekmar AUTOCAN/Agilent 5973inert/6890N/MS9  
**Analyst:** Simon Cao  
**Sample Type:** 1 L Zefon Bag  
**Test Notes:**

**Date Collected:** NA  
**Date Received:** NA  
**Date Analyzed:** 12/22/21  
**Volume(s) Analyzed:** 0.125 Liter(s)

CAS #	Compound	Spike Amount	Result		% Recovery		ALS	RPD	RPD	Data
		LCS / DLCS µg/m³	LCS µg/m³	DLCS µg/m³	LCS	DLCS	Acceptance Limits			
71-43-2	Benzene	208	212	212	102	102	72-113	0	25	
108-88-3	Toluene	206	209	211	101	102	70-118	1	25	
100-41-4	Ethylbenzene	206	219	219	106	106	71-123	0	25	
179601-23-1	m,p-Xylenes	416	439	440	106	106	67-127	0	25	
95-47-6	o-Xylene	208	224	224	108	108	69-124	0	25	

Laboratory Control Sample percent recovery is verified and accepted based on the on-column result.  
 Reported results are shown in concentration units and as a result of the calculation, may vary slightly.