



September 24, 2019

CGRS, Inc

Drezden Kinnaird

1301 Academy Court

Fort Collins

CO 80524

Project Name - Impetro Snyder - Skim Pit

Project Number - 17721aa

Attached are your analytical results for Impetro Snyder - Skim Pit received by Origins Laboratory, Inc. September 18, 2019. This project is associated with Origins project number Y909272-01.

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



1725 Elk Place, Denver, CO 80211 | Phone: 303.433.1322 | Fax: 303.265.9645

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

CROSS REFERENCE REPORT

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS-S	Y909272-01	Soil	September 17, 2019 10:00	09/18/2019 09:10
SS-E	Y909272-02	Soil	September 17, 2019 10:10	09/18/2019 09:10
SS-W	Y909272-03	Soil	September 17, 2019 11:20	09/18/2019 09:10
SS-N	Y909272-04	Soil	September 17, 2019 10:40	09/18/2019 09:10
SS-C	Y909272-05	Soil	September 17, 2019 10:50	09/18/2019 09:10
SS-BG	Y909272-06	Soil	September 17, 2019 12:00	09/18/2019 09:10
Flowline-BG	Y909272-07	Soil	September 17, 2019 13:00	09/18/2019 09:10

Origins Laboratory, Inc.



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Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

Origins Laboratory

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

Sample Receipt Checklist

Origins Work Order: 909272

Client: CGRS Inc.

Client Project ID: 1772 Impetro Snyder

Checklist Completed by: SG

Shipped Via: 4A

(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Date/time completed: 9/18/19

Airbill #: N/A

Matrix(s) Received: (Check all that apply): ☒ Soil/Solid

☐ Water

☐ Other:

Cooler Number/Temperature: 1 / 2-6 °C

/ °C / °C / °C (Describe)

Thermometer ID: 7003

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"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is there ice present (document if blue ice is used)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are custody seals present on cooler? (if so, document in comments if they are signed and dated, broken or intact)	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Were all samples received intact ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Are short holding time analytes or samples with HTs due within 48 hours present ⁽¹⁾ ?	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	
Is a chain-of-custody (COC) present and filled out completely ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client with date and time recorded ⁽¹⁾ ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input 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"/>	<input type="checkbox"/>	<input 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 type="checkbox"/>	<input checked="" type="checkbox"/>	<input 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) OP

Date/Time Reviewed 9/19/19

Origins Laboratory, Inc.

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Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-S

9/17/2019 10:00:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc. Y909272-01 (Soil)

BTEX by EPA 8260D

Benzene	ND	0.002	mg/kg	1	B9I1805	KDK	09/18/2019	09/18/2019	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	128 %	70-130	"	"	"
Surrogate: Toluene-d8	95.5 %	70-130	"	"	"
Surrogate: 4-Bromofluorobenzene	105 %	70-130	"	"	"

Metals (Saturated Paste Prep)

Calcium	2.29	me/L	1	[none]	09/19/2019	09/19/2019
Magnesium	1.01	"	"	"	"	"
Sodium	0.65	"	"	"	"	"

pH in Soil by EPA 9045D

pH	10.0	pH Units	1	B9I1809	DJL	09/18/2019	09/18/2019
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SAR by 20B Saturated Paste

SAR	0.51		1	[none]	09/19/2019	09/19/2019
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.206	0.00500	mmhos/cm	1	B9I1810	DJL	09/18/2019	09/18/2019
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Origins Laboratory, Inc.



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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-S

9/17/2019 10:00:00AM

Analyte	Result	Reporting		Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
		Limit								

Origins Laboratory, Inc.
Y909272-01 (Soil)

TPH-Carbon Chain by EPA 8015D

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B91806	KDK	09/18/2019	09/19/2019	U
Diesel (C10-C28)	ND	50.0	"	"	"	KDK	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl	84.3 %	50-150	"	"	"
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Origins Laboratory, Inc.



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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-E

9/17/2019 10:10:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc. Y909272-02 (Soil)

BTEX by EPA 8260D

Benzene	ND	0.002	mg/kg	1	B9I1805	KDK	09/18/2019	09/19/2019	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	123 %	70-130	"	"	"
Surrogate: Toluene-d8	97.0 %	70-130	"	"	"
Surrogate: 4-Bromofluorobenzene	106 %	70-130	"	"	"

Metals (Saturated Paste Prep)

Calcium	1.35	me/L	1	[none]	09/19/2019	09/19/2019
Magnesium	0.43	"	"	"	"	"
Sodium	26.0	"	"	"	"	"

pH in Soil by EPA 9045D

pH	9.85	pH Units	1	B9I1809	DJL	09/18/2019	09/18/2019
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SAR by 20B Saturated Paste

SAR	27.56		1	[none]	09/19/2019	09/19/2019
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.220	0.00502	mmhos/cm	1	B9I1810	DJL	09/18/2019	09/18/2019
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Origins Laboratory, Inc.



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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-E

9/17/2019 10:10:00AM

Analyte	Result	Reporting		Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
		Limit								

Origins Laboratory, Inc.
Y909272-02 (Soil)

TPH-Carbon Chain by EPA 8015D

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B91806	KDK	09/18/2019	09/19/2019	U
Diesel (C10-C28)	ND	50.0	"	"	"	KDK	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl	85.4 %	50-150	"	"	"
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Origins Laboratory, Inc.



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1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-W

9/17/2019 11:20:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc. Y909272-03 (Soil)

BTEX by EPA 8260D

Benzene	ND	0.002	mg/kg	1	B9I1805	KDK	09/18/2019	09/18/2019	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4	131 %	70-130			"	"	"	S-07
Surrogate: Toluene-d8	95.0 %	70-130			"	"	"	
Surrogate: 4-Bromofluorobenzene	106 %	70-130			"	"	"	

Metals (Saturated Paste Prep)

Calcium	0.72	me/L	1	[none]		09/19/2019	09/19/2019
Magnesium	0.23	"	"	"		"	"
Sodium	20.48	"	"	"		"	"

pH in Soil by EPA 9045D

pH	10.1	pH Units	1	B9I1809	DJL	09/18/2019	09/18/2019
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SAR by 20B Saturated Paste

SAR	29.72		1	[none]		09/19/2019	09/19/2019
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.188	0.00507	mmhos/cm	1	B9I1810	DJL	09/18/2019	09/18/2019
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Origins Laboratory, Inc.



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1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-W

9/17/2019 11:20:00AM

Analyte	Result	Reporting		Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
		Limit								

Origins Laboratory, Inc.
Y909272-03 (Soil)

TPH-Carbon Chain by EPA 8015D

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B91806	KDK	09/18/2019	09/19/2019	U
Diesel (C10-C28)	ND	50.0	"	"	"	KDK	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl	81.7 %	50-150	"	"	"
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Origins Laboratory, Inc.



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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-C

9/17/2019 10:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc. Y909272-05 (Soil)

BTEX by EPA 8260D

Benzene	ND	0.002	mg/kg	1	B9I1805	KDK	09/18/2019	09/19/2019	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4
Surrogate: Toluene-d8
Surrogate: 4-Bromofluorobenzene

126 %
95.0 %
108 %

70-130
70-130
70-130

"
"
"

Metals (Saturated Paste Prep)

Calcium	1.72	me/L	1	[none]	09/19/2019	09/19/2019
Magnesium	0.41	"	"	"	"	"
Sodium	17.21	"	"	"	"	"

pH in Soil by EPA 9045D

pH	9.99	pH Units	1	B9I1809	DJL	09/18/2019	09/18/2019
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SAR by 20B Saturated Paste

SAR	16.68	1	[none]	09/19/2019	09/19/2019
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.212	0.00500	mmhos/cm	1	B9I1810	DJL	09/18/2019	09/18/2019
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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-C

9/17/2019 10:50:00AM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y909272-05 (Soil)

TPH-Carbon Chain by EPA 8015D

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B91806	KDK	09/18/2019	09/19/2019	U
Diesel (C10-C28)	ND	50.0	"	"	"	KDK	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl	82.3 %	50-150	"	"	"
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Origins Laboratory, Inc.



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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-BG

9/17/2019 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc. Y909272-06 (Soil)

BTEX by EPA 8260D

Benzene	ND	0.002	mg/kg	1	B9I1805	KDK	09/18/2019	09/18/2019	U
Toluene	ND	0.002	"	"	"	KDK	"	"	U
Ethylbenzene	ND	0.002	"	"	"	KDK	"	"	U
Xylenes, total	ND	0.002	"	"	"	KDK	"	"	U

Surrogate: 1,2-Dichloroethane-d4
Surrogate: Toluene-d8
Surrogate: 4-Bromofluorobenzene

130 %
96.4 %
107 %

70-130
70-130
70-130

"
"
"

"
"
"

"
"
"

Metals (Saturated Paste Prep)

Calcium	5.41		me/L	1	[none]		09/19/2019	09/19/2019	
Magnesium	1.18		"	"	"		"	"	
Sodium	0.95		"	"	"		"	"	

pH in Soil by EPA 9045D

pH	8.48		pH Units	1	B9I1809	DJL	09/18/2019	09/18/2019	
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SAR by 20B Saturated Paste

SAR	0.52			1	[none]		09/19/2019	09/19/2019	
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Specific Conductance by Modified 9050A

Specific Conductance (EC)	0.0267	0.00507	mmhos/cm	1	B9I1810	DJL	09/18/2019	09/18/2019	
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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

SS-BG

9/17/2019 12:00:00PM

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Analyst	Prepared	Analyzed	Notes
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Origins Laboratory, Inc.
Y909272-06 (Soil)

TPH-Carbon Chain by EPA 8015D

Gasoline (C6-C10)	ND	50.0	mg/kg	1	B91806	KDK	09/18/2019	09/19/2019	U
Diesel (C10-C28)	ND	50.0	"	"	"	KDK	"	"	U
Residual Range Organics (C28-C40)	ND	200	"	"	"	KDK	"	"	U

Surrogate: o-Terphenyl	77.3 %	50-150	"	"	"
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CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

Volatile Organic Compounds by GC/MS SW846 8260D - 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 B9I1805 - EPA 5030 (soil)

Blank (B9I1805-BLK1)

Prepared: 09/18/2019 Analyzed: 09/18/2019

Benzene	ND	0.002	mg/kg							U
Toluene	ND	0.002	"							U
Ethylbenzene	ND	0.002	"							U
Xylenes, total	ND	0.002	"							U
Surrogate: 1,2-Dichloroethane-d4	0.15		"	0.125	119		70-130			
Surrogate: Toluene-d8	0.12		"	0.125	97.7		70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125	107		70-130			

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Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9I1805 - EPA 5030 (soil)										
LCS (B9I1805-BS1)					Prepared: 09/18/2019 Analyzed: 09/18/2019					
Benzene	0.113	0.002	mg/kg	0.100		113	70-130			
Toluene	0.101	0.002	"	0.100		101	70-130			
Ethylbenzene	0.100	0.002	"	0.100		99.6	70-130			
m,p-Xylene	0.185	0.004	"	0.200		92.7	70-130			
o-Xylene	0.098	0.002	"	0.100		98.1	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.15		"	0.125		124	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		96.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		106	70-130			

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Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9I1805 - EPA 5030 (soil)										
Matrix Spike (B9I1805-MS1)		Source: Y909256-01			Prepared: 09/18/2019 Analyzed: 09/18/2019					
Benzene	0.097	0.002	mg/kg	0.100	0.0008	95.8	70-130			
Toluene	0.082	0.002	"	0.100	0.002	79.5	70-130			
Ethylbenzene	0.076	0.002	"	0.100	ND	76.4	70-130			
m,p-Xylene	0.139	0.004	"	0.200	0.001	69.0	70-130			QM-07
o-Xylene	0.076	0.002	"	0.100	0.0008	74.9	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.16		"	0.125		128	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		94.6	70-130			
Surrogate: 4-Bromofluorobenzene	0.14		"	0.125		109	70-130			

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

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

Batch B9I1805 - EPA 5030 (soil)

Matrix Spike Dup (B9I1805-MSD1)		Source: Y909256-01			Prepared: 09/18/2019 Analyzed: 09/18/2019					
Benzene	0.084	0.002	mg/kg	0.100	0.0008	82.8	70-130	14.5	20	
Toluene	0.072	0.002	"	0.100	0.002	69.8	70-130	12.6	20	QM-07
Ethylbenzene	0.065	0.002	"	0.100	ND	64.7	70-130	16.6	20	QM-07
m,p-Xylene	0.117	0.004	"	0.200	0.001	57.7	70-130	17.7	20	QM-07
o-Xylene	0.064	0.002	"	0.100	0.0008	63.6	70-130	16.2	20	QM-07
Surrogate: 1,2-Dichloroethane-d4	0.16		"	0.125		125	70-130			
Surrogate: Toluene-d8	0.12		"	0.125		97.3	70-130			
Surrogate: 4-Bromofluorobenzene	0.13		"	0.125		108	70-130			

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.

Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

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

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B9I1806 - EPA 3580										
Blank (B9I1806-BLK1)					Prepared: 09/18/2019 Analyzed: 09/18/2019					
Gasoline (C6-C10)	ND	25.0	mg/kg							U
Diesel (C10-C28)	ND	25.0	"							U
Residual Range Organics (C28-C40)	ND	100	"							U
Surrogate: o-Terphenyl	21.9		"	25.0		87.6	50-150			

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.

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

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

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

Batch B9I1806 - EPA 3580

LCS (B9I1806-BS1)

Prepared: 09/18/2019 Analyzed: 09/18/2019

Gasoline (C6-C10)	926	50.0	mg/kg	1000		92.6	70-130			
Diesel (C10-C28)	946	50.0	"	1000		94.6	70-130			
Residual Range Organics (C28-C40)	857	200	"	1000		85.7	70-130			
Surrogate: o-Terphenyl	50.9		"	50.0		102	50-150			

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.

Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

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

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

Batch B9I1806 - EPA 3580

Matrix Spike (B9I1806-MS1)		Source: Y909256-01			Prepared: 09/18/2019 Analyzed: 09/18/2019					
Gasoline (C6-C10)	852	50.0	mg/kg	1000	ND	85.2	70-130			
Diesel (C10-C28)	874	50.0	"	1000	ND	87.4	70-130			
Residual Range Organics (C28-C40)	818	200	"	1000	ND	81.8	70-130			
Surrogate: o-Terphenyl	44.5		"	50.0		89.0	50-150			

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.

Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

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

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

Batch B9I1806 - EPA 3580

Matrix Spike Dup (B9I1806-MSD1)		Source: Y909256-01			Prepared: 09/18/2019 Analyzed: 09/18/2019					
Gasoline (C6-C10)	982	50.0	mg/kg	1000	ND	98.2	70-130	14.2	35	
Diesel (C10-C28)	986	50.0	"	1000	ND	98.6	70-130	12.0	35	
Residual Range Organics (C28-C40)	921	200	"	1000	ND	92.1	70-130	11.9	35	
Surrogate: o-Terphenyl	54.4		"	50.0		109	50-150			

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.

Noelle Doyle Mathis, President

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

Extractable Petroleum Hydrocarbons by 8015D - Quality Control

Origins Laboratory, Inc.

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

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 B9I1809 - NO PREP

Duplicate (B9I1809-DUP1)		Source: Y909256-01			Prepared: 09/18/2019 Analyzed: 09/18/2019					
pH	7.79		pH Units		8.10			3.90	25	

Batch B9I1810 - NO PREP

Blank (B9I1810-BLK1)		Prepared: 09/18/2019 Analyzed: 09/18/2019								
Specific Conductance (EC)	0.00240	0.00500	mmhos/cm							
Duplicate (B9I1810-DUP1)		Source: Y909256-01			Prepared: 09/18/2019 Analyzed: 09/18/2019					
Specific Conductance (EC)	3.07	0.00502	mmhos/cm		3.11			1.39	25	

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.

CGRS, Inc
1301 Academy Court
Fort Collins CO 80524

Drezden Kinnaird
Project Number: 17721aa
Project: Impetro Snyder - Skim Pit

Notes and Definitions

U Sample is Non-Detect.

S-07 High surrogate in sample, however sample is non-detect. High surrogate indicates result values are biased high.

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.

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.

Noelle Doyle Mathis, President



Friday, December 20, 2019

Sam Bradley
Impetro Resources LLC
2820 Logan Dr
Loveland, CO 80538

Re: ALS Workorder: 1912033
Project Name: Spotted Dog + Snyder
Project Number: 2019-12-04

Note: Spotted Dog = Young 14-1

Dear Mr. Bradley:

Three soil samples were received from Impetro Resources LLC, on 12/4/2019. The samples were scheduled for the following analysis:

Inorganics

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental
Lance R. Steere
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1912033

Inorganics:

The samples were analyzed following USDA Handbook 60 Chapter 6 procedures for the current revision of the following SOP and method:

<u>Analyte</u>	<u>Method</u>	<u>SOP #</u>
Electrical conductivity	USDA60	810 Draft
Sodium Adsorption Ratio	USDA60	810 Draft
Paste pH	USDA60	810 Draft

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1912033

Client Name: Impetro Resources LLC

Client Project Name: Spotted Dog + Snyder

Note: Spoted Dog = Young 14-1

Client Project Number: 2019-12-04

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Spotted Dog Back Ground	1912033-1		SOIL	25-Nov-19	14:25
Spotted Dog Spill Area	1912033-2		SOIL	25-Nov-19	14:30
Snyder Skim Pit North Wall	1912033-3		SOIL	20-Nov-19	10:30
Spotted Dog Back Ground	1912033-4		SatExtract	25-Nov-19	14:25
Spotted Dog Spill Area	1912033-5		SatExtract	25-Nov-19	14:30
Snyder Skim Pit North Wall	1912033-6		SatExtract	20-Nov-19	10:30



2225 Commerce Drive, Fort Collins, Colorado 80524
TF: (800) 443-1511 PH: (970) 490-1511 FX: (970) 490-1522

Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

ALS WORKORDER #

1912033

[illegible]



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Impero Workorder No: 1912033
Project Manager: LS Initials: CD Date: 12-4-19

1. Are airbills / shipping documents present and/or removable?	<u>DROP OFF</u>	YES	NO
2. Are custody seals on shipping containers intact?	<u>NONE</u>	YES	NO *
3. Are custody seals on sample containers intact?	<u>NONE</u>	YES	NO *
4. Is there a COC (chain-of-custody) present?		<u>YES</u>	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		<u>YES</u>	NO *
6. Are short-hold samples present?		<u>YES</u>	<u>NO</u> ^{CO5-17}
7. Are all samples within holding times for the requested analyses?		<u>YES</u>	NO *
8. Were all sample containers received intact? (not broken or leaking)		<u>YES</u>	NO *
9. Is there sufficient sample for the requested analyses?		<u>YES</u>	NO *
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)		<u>YES</u>	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	<u>N/A</u>	YES	NO *
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	<u>N/A</u>	YES	NO
13. Were the samples shipped on ice?		YES	<u>NO</u>
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #3 #5	RAD ONLY	YES <u>NO</u>
Cooler #: <u>1</u>			
Temperature (°C): <u>Am5</u>			
# of custody seals on cooler: <u>0</u>			
External mR/hr reading: <u>NA</u>			
Background mR/hr reading: <u>NA</u>			
Were external mR/hr readings ≤ two times background and within DOI acceptance criteria? YES / NO / <u>NA</u> (If no, see Form 008.)			

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

pH hold time 4 days from receipt.

Were unpreserved bottles pH checked? YES / NA
If applicable, was the client contacted? YES / NO / NA Contact: CD Date/Time: 12/6/19
Project Manager Signature / Date: [Signature] 12/6/19

Client: Impetro Resources LLC
Project: 2019-12-04 Spotted Dog + Snyder
Sample ID: Snyder Skim Pit North Wall
Legal Location:
Collection Date: 11/20/2019 10:30

Date: 20-Dec-19
Work Order: 1912033
Lab ID: 1912033-3
Matrix: SOIL
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Sodium Adsorption Ratio PASTE PH	7.5	USDA60	0.1	pH	1	Prep Date: 12/13/2019 PrepBy: LMC 12/13/2019

Client: Impetro Resources LLC
Project: 2019-12-04 Spotted Dog + Snyder
Sample ID: Snyder Skim Pit North Wall
Legal Location:
Collection Date: 11/20/2019 10:30

Date: 20-Dec-19
Work Order: 1912033
Lab ID: 1912033-6
Matrix: SATEXTRACT
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
ICP Metals						
			USDA60		Prep Date: 12/9/2019	PrepBy: JML
CALCIUM	130		10	MG/L	10	12/11/2019 14:14
MAGNESIUM	10		10	MG/L	10	12/11/2019 14:14
SODIUM	ND		10	MG/L	10	12/11/2019 14:14
Sodium Adsorption Ratio						
			USDA60		Prep Date: 12/13/2019	PrepBy: LMC
ELECTRICAL CONDUCTIVITY @ SATURATION	920		1	umhos/cm	1	12/13/2019
SODIUM ADSORPTION RATIO	0.23	S	0.54	NU	10	12/11/2019 14:14

Client: Impetro Resources LLC
Project: 2019-12-04 Spotted Dog + Snyder
Sample ID: Snyder Skim Pit North Wall
Legal Location:
Collection Date: 11/20/2019 10:30

Date: 20-Dec-19
Work Order: 1912033
Lab ID: 1912033-6
Matrix: SATEXTRACT
Percent Moisture:

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC	M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
U or ND - Result is less than the sample specific MDC.	L - LCS Recovery below lower control limit.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.	H - LCS Recovery above upper control limit.
Y2 - Chemical Yield outside default limits.	P - LCS, Matrix Spike Recovery within control limits.
W - DER is greater than Warning Limit of 1.42	N - Matrix Spike Recovery outside control limits
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.	NC - Not Calculated for duplicate results less than 5 times MDC
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.	B - Analyte concentration greater than MDC.
G - Sample density differs by more than 15% of LCS density.	B3 - Analyte concentration greater than MDC but less than Requested MDC.
D - DER is greater than Control Limit	
M - Requested MDC not met.	

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.
 S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.
 G - A pattern resembling gasoline was detected in this sample.
 D - A pattern resembling diesel was detected in this sample.
 M - A pattern resembling motor oil was detected in this sample.
 C - A pattern resembling crude oil was detected in this sample.
 4 - A pattern resembling JP-4 was detected in this sample.
 5 - A pattern resembling JP-5 was detected in this sample.
 H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
 L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
 Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C



Thursday, January 09, 2020

Sam Bradley
Impetro Resources LLC
2820 Logan Dr
Loveland, CO 80538

Re: ALS Workorder: 1912479
Project Name: Spotted Dog + Snyder
Project Number: 2019-12-04

Dear Mr. Bradley:

Three soil samples were received from Impetro Resources LLC, on 12/4/2019. The samples were scheduled for the following analyses:

GC/MS Volatiles

Total Extractable Petroleum Hydrocarbons (Diesel)

Total Volatile Petroleum Hydrocarbons (Gasoline)

The results for these analyses are contained in the enclosed reports.

The data contained in the following report have been reviewed and approved by the personnel listed below. In addition, ALS certifies that the analyses reported herein are true, complete and correct within the limits of the methods employed. Should this laboratory report need to be reproduced, it should be reproduced in full unless written approval has been obtained from ALS Environmental.

Thank you for your confidence in ALS Environmental. Should you have any questions, please call.

Sincerely,

ALS Environmental

For Lance R. Steere
Project Manager

ALS Environmental – Fort Collins is accredited by the following accreditation bodies for various testing scopes in accordance with requirements of each accreditation body. All testing is performed under the laboratory management system, which is maintained to meet these requirement and regulations. Please contact the laboratory or accreditation body for the current scope testing parameters.

ALS Environmental – Fort Collins	
Accreditation Body	License or Certification Number
AIHA	214884
Alaska (AK)	UST-086
Alaska (AK)	CO01099
Arizona (AZ)	AZ0742
California (CA)	06251CA
Colorado (CO)	CO01099
Florida (FL)	E87914
Idaho (ID)	CO01099
Kansas (KS)	E-10381
Kentucky (KY)	90137
PJ-LA (DoD ELAP/ISO 170250)	95377
Louisiana (LA)	05057
Maryland (MD)	285
Missouri (MO)	175
Nebraska(NE)	NE-OS-24-13
Nevada (NV)	CO000782008A
New York (NY)	12036
North Dakota (ND)	R-057
Oklahoma (OK)	1301
Pennsylvania (PA)	68-03116
Tennessee (TN)	2976
Texas (TX)	T104704241
Utah (UT)	CO01099
Washington (WA)	C1280



1912479

The samples were past hold time at time of request.

GC/MS Volatiles:

The samples were analyzed using GC/MS following the current revision of SOP 525 based on SW-846 Method 8260C.

The samples were stored at ambient temperature before analysis.

All remaining acceptance criteria were met.

GRO:

The samples were analyzed following the current revision of SOP 425 generally based on SW-846 Methods 8000C and 8015D. TVPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C6 to C10.

All acceptance criteria were met.

DRO:

The samples were analyzed following the current revision of SOP 406 generally based on SW-846 Methods 8000C and 8015D. TEPH is a multicomponent mixture and is quantitated by summing the entire carbon range, rather than individual peaks. The carbon range integrated in this test extends from C10 to C28.

All acceptance criteria were met.

ALS -- Fort Collins

Sample Number(s) Cross-Reference Table

OrderNum: 1912479

Client Name: Impetro Resources LLC

Client Project Name: Spotted Dog + Snyder

Client Project Number: 2019-12-04

Client PO Number:

Client Sample Number	Lab Sample Number	COC Number	Matrix	Date Collected	Time Collected
Spotted Dog Back Ground	1912479-1		SOIL	25-Nov-19	14:25
Spotted Dog Spill Area	1912479-2		SOIL	25-Nov-19	14:30
Snyder Skim Pit North Wall	1912479-3		SOIL	20-Nov-19	10:30



Chain-of-Custody

Turnaround time for samples received after 2 p.m. will be calculated beginning from the next business day.

ALS WORKORDER #

1912033

[illegible]



ALS Environmental - Fort Collins
CONDITION OF SAMPLE UPON RECEIPT FORM

Client: Impero

Workorder No: 1912033

Project Manager: LS

Initials: CD

Date: 12-4-19

1. Are airbills / shipping documents present and/or removable?	<u>DROP OFF</u>	YES	NO
2. Are custody seals on shipping containers intact?	<u>NONE</u>	YES	NO *
3. Are custody seals on sample containers intact?	<u>NONE</u>	YES	NO *
4. Is there a COC (chain-of-custody) present?		<u>YES</u>	NO *
5. Is the COC in agreement with samples received? (IDs, dates, times, # of samples, # of containers, matrix, requested analyses, etc.)		<u>YES</u>	NO *
6. Are short-hold samples present?		<u>YES</u>	<u>NO</u> ¹²⁻⁴⁻¹⁹
7. Are all samples within holding times for the requested analyses?		<u>YES</u>	NO *
8. Were all sample containers received intact? (not broken or leaking)		<u>YES</u>	NO *
9. Is there sufficient sample for the requested analyses?		<u>YES</u>	NO *
10. Are samples in proper containers for requested analyses? (form 250, Sample Handling Guidelines)		<u>YES</u>	NO *
11. Are all aqueous samples preserved correctly, if required? (excluding volatiles)	<u>N/A</u>	YES	NO *
12. Are all samples requiring no headspace (VOC, GRO, RSK/MEE, radon) free of bubbles > 6 mm (1/4 inch) diameter? (i.e. size of green pea)	<u>N/A</u>	YES	NO
13. Were the samples shipped on ice?		YES	<u>NO</u>
14. Were cooler temperatures measured at 0.1-6.0°C?	IR gun used*: #3 #5	RAD ONLY	YES <u>NO</u>
Cooler #: <u>1</u>			
Temperature (°C): <u>Arab</u>			
# of custody seals on cooler: <u>0</u>			
External mR/hr reading: <u>NA</u>			
Background mR/hr reading: <u>NA</u>			
Were external mR/hr readings ≤ two times background and within DO1 acceptance criteria? YES / NO / <u>NA</u> (If no, see Form 008.)			

* Please provide details here for NO responses to gray boxes above - for 2 thru 5 & 7 thru 12, notify PM & continue w/ login.

pH hold time 4 days from receipt.

Were unpreserved bottles pH checked? YES / NA

All client bottle ID's vs ALS lab ID's double-checked by: CD

If applicable, was the client contacted? YES / NO / NA

Contact: LS

Date/Time: 12/6/19

Project Manager Signature / Date: LS 12/6/19

Client: Impetro Resources LLC
Project: 2019-12-04 Spotted Dog + Snyder
Sample ID: Snyder Skim Pit North Wall
Legal Location:
Collection Date: 11/20/2019 10:30

Date: 09-Jan-20
Work Order: 1912479
Lab ID: 1912479-3
Matrix: SOIL
Percent Moisture: 9.3

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
Diesel Range Organics			SW8015M_MO		Prep Date: 12/30/2019	PrepBy: LML
OIL RANGE ORGANICS	32	H	4.4	MG/KG	1	1/7/2020 13:31
DIESEL RANGE ORGANICS	ND		4.4	MG/KG	1	1/7/2020 13:31
Surr: O-TERPHENYL	88		48-148	%REC	1	1/7/2020 13:31
Gasoline Range Organics			SW8015		Prep Date: 12/30/2019	PrepBy: LML
GASOLINE RANGE ORGANICS	ND		0.54	MG/KG	1	12/30/2019 14:45
Surr: 2,3,4-TRIFLUOROTOLUENE	98		76-126	%REC	1	12/30/2019 14:45
GC/MS Volatiles			SW8260		Prep Date: 12/31/2019	PrepBy: JXK
BENZENE	ND		5.4	UG/KG	1	12/31/2019 12:45
TOLUENE	ND		5.4	UG/KG	1	12/31/2019 12:45
ETHYLBENZENE	ND		5.4	UG/KG	1	12/31/2019 12:45
M+P-XYLENE	ND		7.6	UG/KG	1	12/31/2019 12:45
O-XYLENE	ND		5.4	UG/KG	1	12/31/2019 12:45
Surr: DIBROMOFLUOROMETHANE	109		61-134	%REC	1	12/31/2019 12:45
Surr: TOLUENE-D8	96		57-135	%REC	1	12/31/2019 12:45
Surr: 4-BROMOFLUOROBENZENE	91		52-151	%REC	1	12/31/2019 12:45

Client: Impetro Resources LLC
Project: 2019-12-04 Spotted Dog + Snyder
Sample ID: Snyder Skim Pit North Wall
Legal Location:
Collection Date: 11/20/2019 10:30

Date: 09-Jan-20
Work Order: 1912479
Lab ID: 1912479-3
Matrix: SOIL
Percent Moisture: 9.3

Analyses	Result	Qual	Report Limit	Units	Dilution Factor	Date Analyzed
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Explanation of Qualifiers

Radiochemistry:

- "Report Limit" is the MDC	M3 - The requested MDC was not met, but the reported activity is greater than the reported MDC.
U or ND - Result is less than the sample specific MDC.	L - LCS Recovery below lower control limit.
Y1 - Chemical Yield is in control at 100-110%. Quantitative yield is assumed.	H - LCS Recovery above upper control limit.
Y2 - Chemical Yield outside default limits.	P - LCS, Matrix Spike Recovery within control limits.
W - DER is greater than Warning Limit of 1.42	N - Matrix Spike Recovery outside control limits
* - Aliquot Basis is 'As Received' while the Report Basis is 'Dry Weight'.	NC - Not Calculated for duplicate results less than 5 times MDC
# - Aliquot Basis is 'Dry Weight' while the Report Basis is 'As Received'.	B - Analyte concentration greater than MDC.
G - Sample density differs by more than 15% of LCS density.	B3 - Analyte concentration greater than MDC but less than Requested MDC.
D - DER is greater than Control Limit	
M - Requested MDC not met.	

Inorganics:

B - Result is less than the requested reporting limit but greater than the instrument method detection limit (MDL).
 U or ND - Indicates that the compound was analyzed for but not detected.
 E - The reported value is estimated because of the presence of interference. An explanatory note may be included in the narrative.
 M - Duplicate injection precision was not met.
 N - Spiked sample recovery not within control limits. A post spike is analyzed for all ICP analyses when the matrix spike and or spike duplicate fail and the native sample concentration is less than four times the spike added concentration.
 Z - Spiked recovery not within control limits. An explanatory note may be included in the narrative.
 * - Duplicate analysis (relative percent difference) not within control limits.
 S - SAR value is estimated as one or more analytes used in the calculation were not detected above the detection limit.

Organics:

U or ND - Indicates that the compound was analyzed for but not detected.
 B - Analyte is detected in the associated method blank as well as in the sample. It indicates probable blank contamination and warns the data user.
 E - Analyte concentration exceeds the upper level of the calibration range.
 J - Estimated value. The result is less than the reporting limit but greater than the instrument method detection limit (MDL).
 A - A tentatively identified compound is a suspected aldol-condensation product.
 X - The analyte was diluted below an accurate quantitation level.
 * - The spike recovery is equal to or outside the control criteria used.
 + - The relative percent difference (RPD) equals or exceeds the control criteria.
 G - A pattern resembling gasoline was detected in this sample.
 D - A pattern resembling diesel was detected in this sample.
 M - A pattern resembling motor oil was detected in this sample.
 C - A pattern resembling crude oil was detected in this sample.
 4 - A pattern resembling JP-4 was detected in this sample.
 5 - A pattern resembling JP-5 was detected in this sample.
 H - Indicates that the fuel pattern was in the heavier end of the retention time window for the analyte of interest.
 L - Indicates that the fuel pattern was in the lighter end of the retention time window for the analyte of interest.
 Z - This flag indicates that a significant fraction of the reported result did not resemble the patterns of any of the following petroleum hydrocarbon products:
 - gasoline
 - JP-8
 - diesel
 - mineral spirits
 - motor oil
 - Stoddard solvent
 - bunker C

ALS -- Fort Collins

Date: 1/9/2020 9:30:3

Client: Impetro Resources LLC

QC BATCH REPORT

Work Order: 1912479

Project: 2019-12-04 Spotted Dog + Snyder

Batch ID: HC191230-61-1

Instrument ID: FUELS-1

Method: SW8015

LCS	Sample ID: HC191230-61				Units: MG/KG		Analysis Date: 12/30/2019 12:35				
Client ID:	Run ID: HC191230-6A				Prep Date: 12/30/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	2.5	0.5	2.5		100	79-118				20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.476		0.5		95	76-126					

LCSD	Sample ID: HC191230-61				Units: MG/KG		Analysis Date: 12/30/2019 15:08				
Client ID:	Run ID: HC191230-6A				Prep Date: 12/30/2019			DF: 1			
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
GASOLINE RANGE ORGANICS	2.42	0.5	2.5		97	79-118		2.5	3	20	
Surr: 2,3,4-TRIFLUOROTOLUENE	0.475		0.5		95	76-126			0		

MB		Sample ID: HC191230-61		Units: MG/KG		Analysis Date: 12/30/2019 12:57	
Client ID:		Run ID: HC191230-6A		Prep Date: 12/30/2019		DF: 1	
Analyte		Result	ReportLimit	Qual			
GASOLINE RANGE ORGANICS		ND	0.5				
Surr: 2,3,4-TRIFLUOROTOLUENE		0.477		95	76-126		

The following samples were analyzed in this batch:

1912479-1	1912479-2	1912479-3
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Client: Impetro Resources LLC
Work Order: 1912479
Project: 2019-12-04 Spotted Dog + Snyder

QC BATCH REPORT

Batch ID: **HC191230-84-2** Instrument ID: **FUELS-1** Method: **SW8015M_MO**

LCS	Sample ID: HC191230-84			Units: MG/KG			Analysis Date: 1/7/2020 11:47				
Client ID:	Run ID: HC200107-8A			Prep Date: 12/30/2019			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
OIL RANGE ORGANICS	66.2	4	62.5		106	30-150				20	
DIESEL RANGE ORGANICS	54.8	4	62.5		88	30-150				20	
Surr: O-TERPHENYL	8.72		12.5		70	48-148					

LCSD	Sample ID: HC191230-84			Units: MG/KG			Analysis Date: 1/7/2020 12:13				
Client ID:	Run ID: HC200107-8A			Prep Date: 12/30/2019			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
OIL RANGE ORGANICS	67.2	4	62.5		108	30-150		66.2	2	20	
DIESEL RANGE ORGANICS	55	4	62.5		88	30-150		54.8	0	20	
Surr: O-TERPHENYL	8.8		12.5		70	48-148			1		

MB	Sample ID: HC191230-84			Units: MG/KG			Analysis Date: 1/7/2020 11:21				
Client ID:	Run ID: HC200107-8A			Prep Date: 12/30/2019			DF: 1				
Analyte	Result	ReportLimit									Qual
OIL RANGE ORGANICS	ND	4									
DIESEL RANGE ORGANICS	ND	4									
Surr: O-TERPHENYL	9.98				80	48-148					

The following samples were analyzed in this batch:

1912479-1	1912479-2	1912479-3
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Client: Impetro Resources LLC
Work Order: 1912479
Project: 2019-12-04 Spotted Dog + Snyder

QC BATCH REPORT

Batch ID: **VL191231-2-2** Instrument ID: **HPV2** Method: **SW8260**

LCS	Sample ID: VL191231-2			Units: UG/KG			Analysis Date: 12/31/2019 10:02				
Client ID:	Run ID: VL191231-2A			Prep Date: 12/31/2019			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
BENZENE	39.2	5	40		98	73-126				30	
TOLUENE	38.5	5	40		96	71-127				30	
ETHYLBENZENE	38.8	5	40		97	74-127				30	
M+P-XYLENE	79.5	7	80		99	79-126				30	
O-XYLENE	40.3	5	40		101	77-125				30	
Surr: DIBROMOFLUOROMETHANE	52.8		50		106	61-134					
Surr: TOLUENE-D8	48.5		50		97	57-135					
Surr: 4-BROMOFLUOROBENZENE	47.8		50		96	52-151					

LCSD	Sample ID: VL191231-2			Units: UG/KG			Analysis Date: 12/31/2019 10:24				
Client ID:	Run ID: VL191231-2A			Prep Date: 12/31/2019			DF: 1				
Analyte	Result	ReportLimit	SPK Val	SPK Ref Value	%REC	Control Limit	Decision Level	RPD Ref	RPD	RPD Limit	Qual
BENZENE	36.5	5	40		91	73-126		39.2	7	30	
TOLUENE	36.6	5	40		92	71-127		38.5	5	30	
ETHYLBENZENE	37	5	40		92	74-127		38.8	5	30	
M+P-XYLENE	74.6	7	80		93	79-126		79.5	6	30	
O-XYLENE	37.9	5	40		95	77-125		40.3	6	30	
Surr: DIBROMOFLUOROMETHANE	52.6		50		105	61-134			1		
Surr: TOLUENE-D8	49.3		50		99	57-135			2		
Surr: 4-BROMOFLUOROBENZENE	48.3		50		97	52-151			1		

MB		Sample ID: VL191231-2		Units: UG/KG		Analysis Date: 12/31/2019 11:11	
Client ID:		Run ID: VL191231-2A		Prep Date: 12/31/2019		DF: 1	
Analyte	Result	ReportLimit					Qual
BENZENE	ND	5					
TOLUENE	ND	5					
ETHYLBENZENE	ND	5					
M+P-XYLENE	ND	7					
O-XYLENE	ND	5					
Surr: DIBROMOFLUOROMETHANE	51.8			104	61-134		
Surr: TOLUENE-D8	48.7			97	57-135		
Surr: 4-BROMOFLUOROBENZENE	45.5			91	52-151		

The following samples were analyzed in this batch:

1912479-1	1912479-2	1912479-3
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Total Extractable Petroleum Hydrocarbons / DRO (8015) Quantitation Report

ALSLG-Fort Collins

Sample : 1912479-1

Filename : \\gcserver\gcdata\Projects\GC8\Data\2020\drooro200107\09661.dat

Acquisition Date : 1/7/2020 12:39:22 PM

Instrument : GC8 (Offline)

Quantitation Date : 1/8/2020 8:16:54 AM

Data Acquired By : lainey.lloyd

Last Method Update : 1/8/2020 8:12:03 AM

Data Processed By : lainey.lloyd

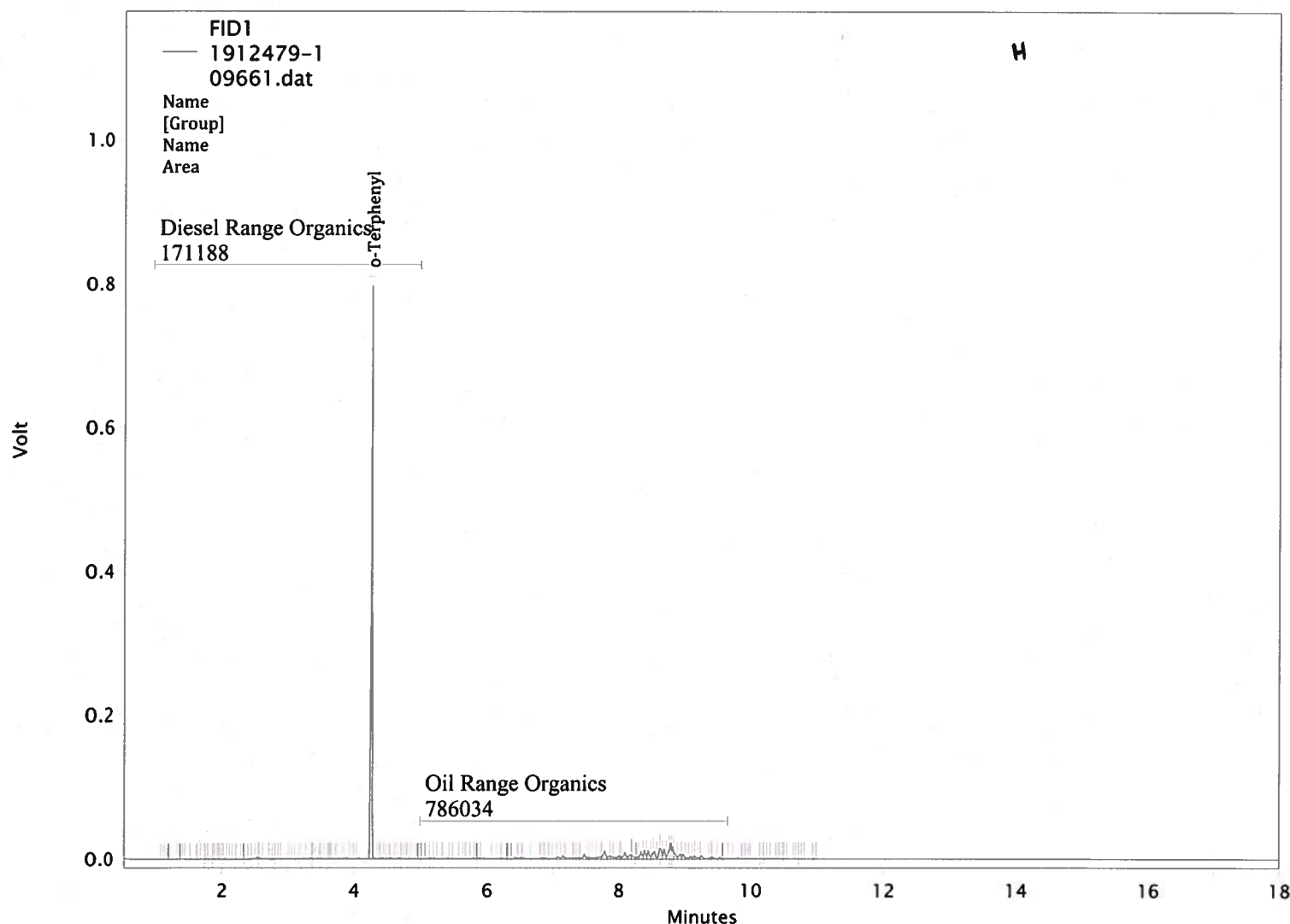
Method : \\gcserver\gcdata\Projects\GC8\Method\2020\drooro190807G.met Inj. Vol. (uL) : 2

Sequence : \\gcserver\gcdata\Projects\GC8\Sequence\2020\DRO+ORO\drooro200107.seq Vial : 6

Data Description : {Data Description}

FID1 Results

Compound Name	RT	Expected RT	Peak Area	Integration Codes	Conc.	Conc. Units
o-Terphenyl	4.27	4.26	1030164	TL	39.738 ✓	ug/mL
Diesel Range Organics			171188		0.000	ug/mL
Oil Range Organics			786034		35.330 ✓	ug/mL



Column : ZB-1HT (15M x 0.25mm x 0.25u)

(1st int. code is for peak start, 2nd int code is for peak stop) B=baseline, f=force start or stop, l=ended by int. off event, N=begin negative peak, P=end negative peak, H=forward horiz, h=backward horiz, M=manual baseline or peak, m=move baseline start/stop, S=shoulder, T=tangent skim, V=valley, v=forced valley point, x=split peak, E=end of chromatogram encountered, R=reset baseline, L=lowest point horiz.

Printed On : 1/8/2020 8:16:55 AM

Total Extractable Petroleum Hydrocarbons / DRO (8015) Quantitation Report

ALSLG-Fort Collins

Sample : 1912479-2

Filename : \\gcserver\gcdata\Projects\GC8\Data\2020\drooro200107\09662.dat

Acquisition Date : 1/7/2020 1:05:14 PM

Instrument : GC8 (Offline)

Quantitation Date : 1/8/2020 8:16:57 AM

Data Acquired By : laineey.lloyd

Last Method Update : 1/8/2020 8:12:03 AM

Data Processed By : laineey.lloyd

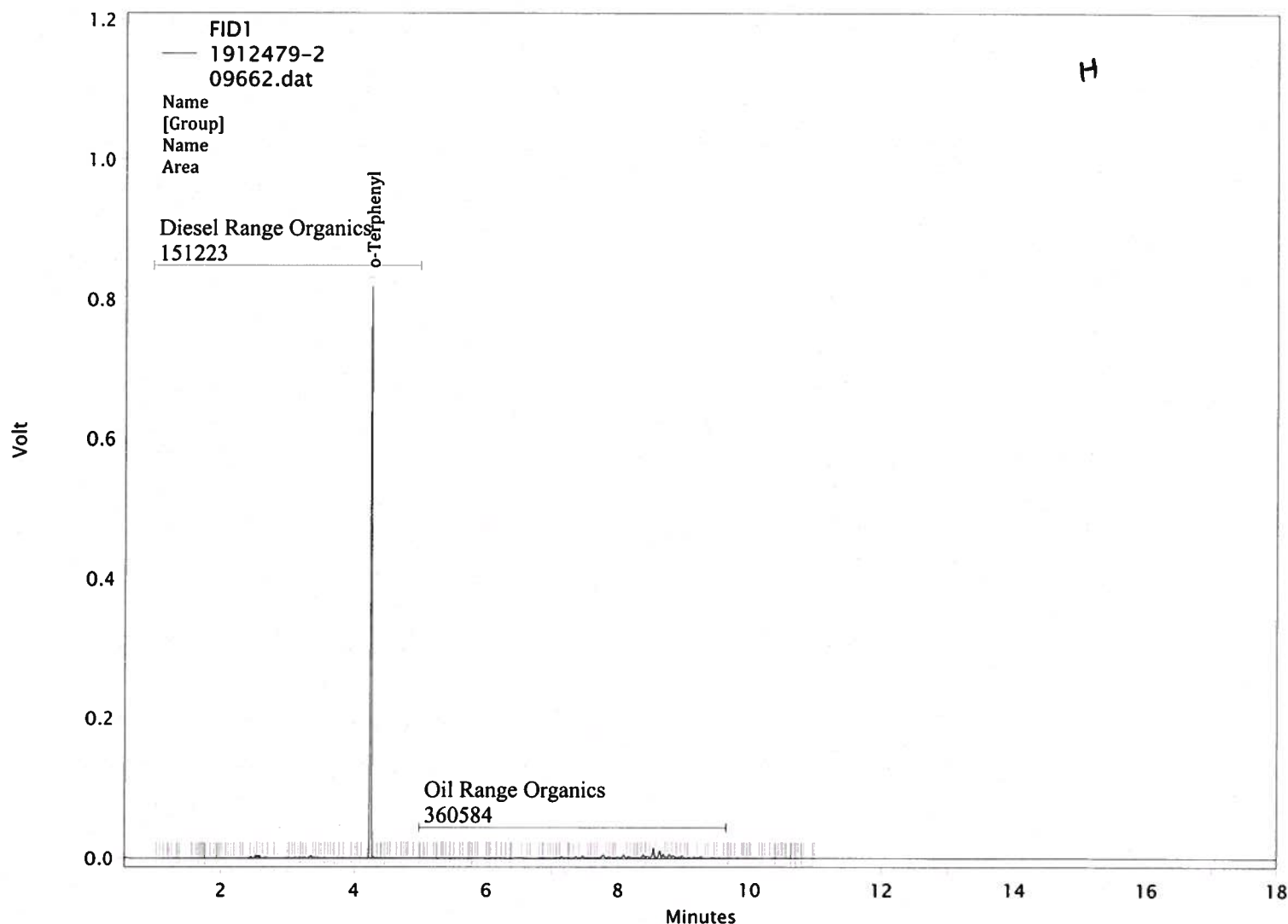
Method : \\gcserver\gcdata\Projects\GC8\Method\2020\drooro190807G.met Inj. Vol. (uL) : 2

Sequence : \\gcserver\gcdata\Projects\GC8\Sequence\2020\DRO+ORO\drooro200107.seq Vial : 7

Data Description : {Data Description}

FID1 Results

Compound Name	RT	Expected RT	Peak Area	Integration Codes	Conc.	Conc. Units
o-Terphenyl	4.27	4.26	1034218	LT	39.911 ✓	ug/mL
Diesel Range Organics			151223		0.000	ug/mL
Oil Range Organics			360584		16.226 ✓	ug/mL



Column : ZB-1HT (15M x 0.25mm x 0.25u)

(1st int. code is for peak start, 2nd int code is for peak stop) B=baseline, f=force start or stop, l=ended by int. off event, N=begin negative peak, P=end negative peak, H=forward horiz, h=backward horiz, M=manual baseline or peak, m=move baseline start/stop, S=shoulder, T=tangent skim, V=valley, v=forced valley point, x=split peak, E=end of chromatogram encountered, R=reset baseline, L=lowest point horiz.

Printed On : 1/8/2020 8:16:58 AM

Total Extractable Petroleum Hydrocarbons / DRO (8015) Quantitation Report

ALSLG-Fort Collins

Sample : 1912479-3

Filename : \\gcserver\gcdata\Projects\GC8\Data\2020\drooro200107\09663.dat

Acquisition Date : 1/7/2020 1:31:03 PM

Instrument : GC8 (Offline)

Quantitation Date : 1/8/2020 8:17:00 AM

Data Acquired By : lainey.lloyd

Last Method Update : 1/8/2020 8:12:03 AM

Data Processed By : lainey.lloyd

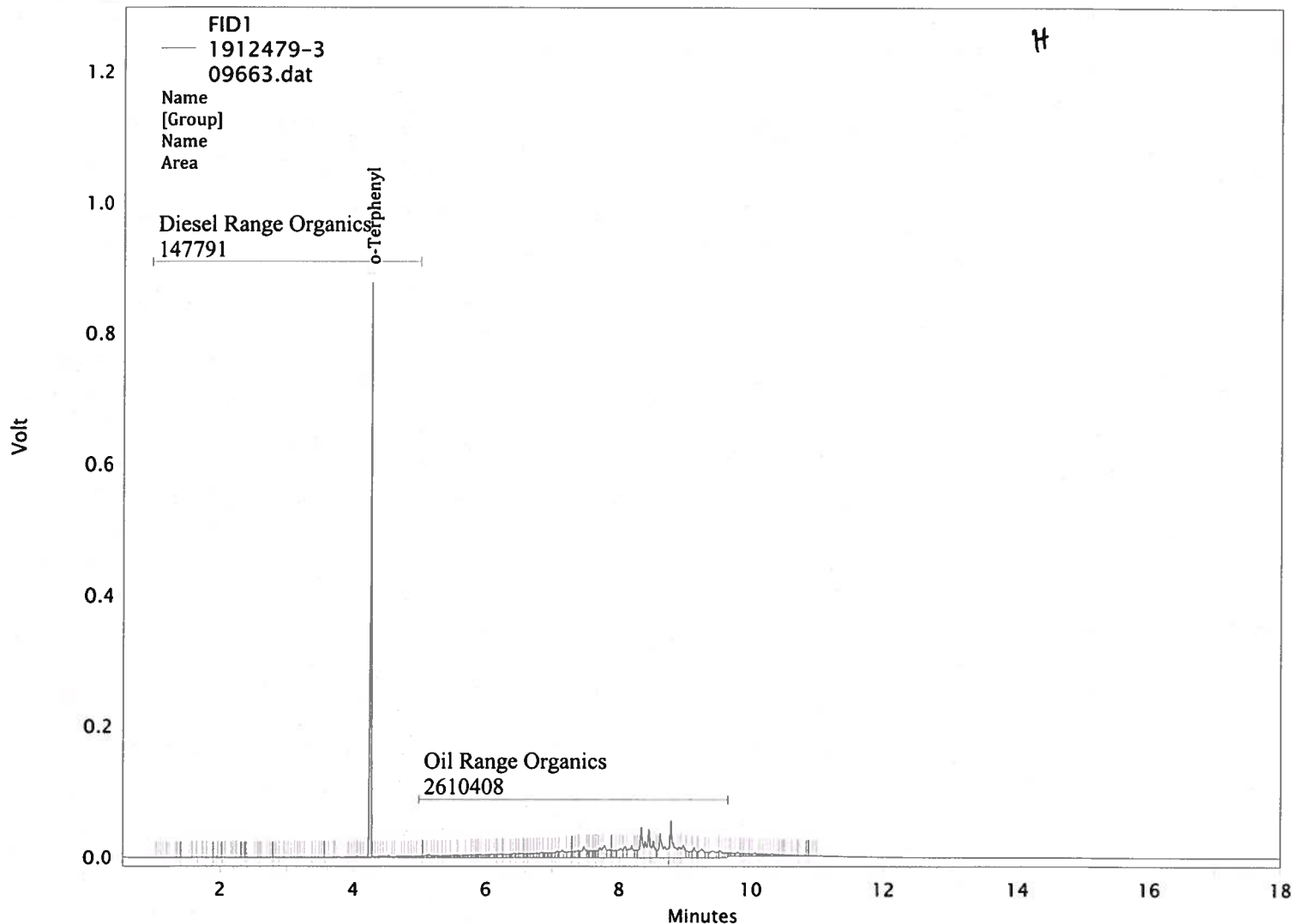
Method : \\gcserver\gcdata\Projects\GC8\Method\2020\drooro190807G.met Inj. Vol. (uL) : 2

Sequence : \\gcserver\gcdata\Projects\GC8\Sequence\2020\DRO+ORO\drooro200107.seq Vial : 8

Data Description : {Data Description}

FID1 Results

Compound Name	RT	Expected RT	Peak Area	Integration Codes	Conc.	Conc. Units
o-Terphenyl	4.27	4.26	1126621	TL	43.904 ✓	ug/mL
Diesel Range Organics			147791		0.000 ✓	ug/mL
Oil Range Organics			2610408		117.049 ✓	ug/mL



Column : ZB-1HT (15M x 0.25mm x 0.25u)

(1st int. code is for peak start, 2nd int code is for peak stop) B=baseline, f=force start or stop, l=ended by int. off event, N=begin negative peak, P=end negative peak, H=forward horiz, h=backward horiz, M=manual baseline or peak, m=move baseline start/stop, S=shoulder, T=tangent skim, V=valley, v=forced valley point, x=split peak, E=end of chromatogram encountered, R=reset baseline, L=lowest point horiz.

Printed On : 1/8/2020 8:17:01 AM

Total Extractable Petroleum Hydrocarbons / DRO (8015) Retention Time Marker

ALSLG-Fort Collins

Sample : DRO+ORO RTM

Filename : \\gcserver\gcdata\Projects\GC8\Data\2020\drooro200107\09656.dat

Acquisition Date : 1/7/2020 10:30:08 AM

Instrument : GC8 (Offline)

Quantitation Date : 1/8/2020 8:06:55 AM

Data Acquired By : lainey.lloyd

Last Method Update : 1/8/2020 8:06:47 AM

Data Processed By : lainey.lloyd

Method : \\gcserver\gcdata\Projects\GC8\Method\2020\drooro190807G.met

Inj. Vol. (uL) : 2

Sequence : \\gcserver\gcdata\Projects\GC8\Sequence\2020\DRO+ORO\drooro200107.seq

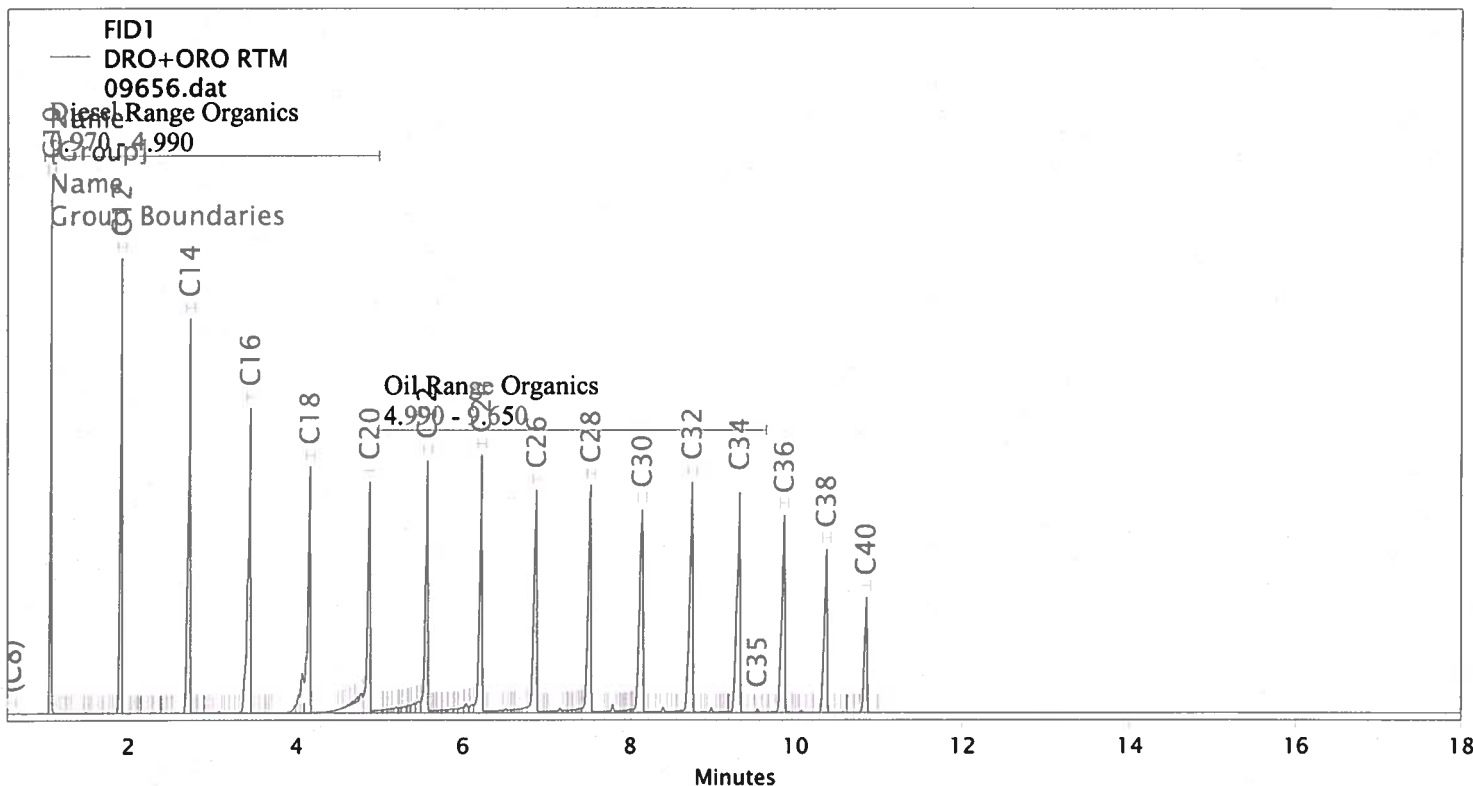
Vial

: 1

Data Description : ST180911-1

FID1 Results

Compound Name	RT	Integration Codes	Peak Start Time	Peak Stop Time
C10	1.07	LL	1.02	1.13
C12	1.93	LL	1.87	1.95
C14	2.74	LL	2.63	2.75
C16	3.46	LL	3.32	3.50
C18	4.17	TL	4.10	4.22
C20	4.89	LL	4.81	4.90
C22	5.58	LL	5.50	5.60
C24	6.23	LL	6.14	6.26
C26	6.89	LL	6.78	6.92
C28	7.54	LL	7.42	7.55
C30	8.16	LL	8.05	8.18
C32	8.76	LL	8.64	8.80
C34	9.33	LL	9.21	9.37
C35	9.55	LL	9.51	9.59
C36	9.87	VV	9.77	9.90
C38	10.38	VV	10.29	10.41
C40	10.86	VV	10.78	10.90



Column : ZB-1HT (15M x 0.25mm x 0.25u)

(1st int. code is for peak start, 2nd int code is for peak stop) B=baseline, f=force start or stop, l=ended by int. off event, N=begin negative peak, P=end negative peak, H=forward horiz, h=backward horiz, M=manual baseline or peak, m=move baseline start/stop, S=shoulder, T=tangent skim, V=valley, v=forced valley point, x=split peak, E=end of chromatogram encountered, R=reset baseline, L=lowest point horiz.

Printed On : 1/8/2020 8:08:06 AM