

# Summit Scientific

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4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

March 14, 2022

Vince DeCianne

Whiting Oil & Gas

retail

Denver, CO 80215

RE: Emerald #152 Closure

Work Order #2201279

Enclosed are the results of analyses for samples received by Summit Scientific on 01/24/22 10:50. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to read 'P. Shrewsbury', with a stylized, cursive script.

Paul Shrewsbury

President



Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
20220118-Emerald 152-WH@2ft	2201279-01	Soil	01/18/22 15:10	01/24/22 10:50
20220118-Emerald 152-AOC@4ft	2201279-02	Soil	01/18/22 15:15	01/24/22 10:50
20220118-Emerald 152-TP-DIS	2201279-03	Soil	01/18/22 15:20	01/24/22 10:50
20220118-Emerald 152-TP-Comp	2201279-04	Soil	01/18/22 15:25	01/24/22 10:50

Summit Scientific

*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.*

# Summit Scientific

S<sub>2</sub>

2201279

4653 Table Mountain Drive ♦ Golden, Colorado 80403  
303-277-9310 ♦ 303-374-5933 (f)

Page: 1 of 1

Client: Whiting Oil & Gas

Project Manager: Vince DeCianne

Address: 707 17th Street, Suite 3000

E-Mail: jveith@kleinfelder.com

City/State/Zip: Denver, CO 80202

kyle.waggoner@whiting.com

Phone: 970-309-6553

Project Name: Emerald 152 Closure

Sampler Name: Jordan Veith

Project Number: 20221740.001A

ID	Sample Description	Date Sampled	Time Sampled	# of containers	Preservative				Matrix				Analysis Requested							Special Instructions	
					HCl	HNO <sub>3</sub>	None	Other	Water	Soil	Air-Canister #	Other	COGCC Table 915-1	Arsenic, EC, pH, SAR	EC	SAR	pH	Arsenic			
1	20220118-Emerald 152-WH-027	1/18/2022	15:10	3			X			X				X							
2	20220118-Emerald 152-ACC@49		15:15	3			X			X				X							
3	20220118-Emerald 152-TP-DTS		15:20	3			X			X				X							
4	20220118-Emerald 152-TP-COR	✓	15:25	3			X			X				X							
5																					
6																					
7																					
8																					
9																					
10																					

*Handwritten signature: Jordan Veith, 1/18/2022*

Relinquished by: <i>[Signature]</i>	Date/Time: 1/17/22 1700	Received by: <i>[Signature]</i>	Date/Time: 1/24/22 1050	Turn Around Time (Check) Same Day _____ 72 hours _____ 24 hours _____ hours _____ <u>Standard</u> _____ 48 hours _____ Integrity: _____ Upon Receipt: <u>33</u> Samples Intact: _____ <u>Yes</u> No	Notes:
Relinquished by:	Date/Time:	Received by:	Date/Time:		
Relinquished by:	Date/Time:	Received by:	Date/Time:		

S<sub>2</sub>

2201279

## Sample Receipt Checklist

S2 Work Order#

Client: Whiting Oil & GasClient Project ID: Emerald 152 closureShipped Via: H.D./P.U./FedEx/UPS/USPS/Other

Airbill #:

☐ ☐ ☒ ☐ ☐

Matrix (check all that apply):

☐ Air☒ Soil/Solid☐ Water☐ Other:

(Describe)

Temp (°C)

3.3

Thermometer ID: G86A9201901378

	Yes	No	N/A	Comments (if any)
If samples require cooling, was the temperature at 4°C +/- 2°C <sup>(1)</sup> ? NOTE: If samples are delivered the same day of sampling, this requirement is met if there is evidence that cooling has begun.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	On ice.
Were all samples received intact <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Was adequate sample volume provided <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
If custody seals are present, are they intact <sup>(1)</sup> ?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples with holding times due within 48 hours sample due within 48 hours present?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ? Note the type of preservative in the Comments column – HCl, H <sub>2</sub> SO <sub>4</sub> , NaOH, HNO <sub>3</sub> , etc.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ? Record the pH in Comments.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	
If dissolved metals are requested, were samples field filtered?	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	

Additional Comments (if any):

<sup>(1)</sup> If NO, then contact the client before proceeding with analysis and note in case narrative.

JB

Custodian Printed Name or Initials

1/24/22

Date/Time



Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

**20220118-Emerald 152-WH@2ft  
2201279-01 (Soil)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	BFA0415	01/25/22	01/26/22	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		129 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		103 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		101 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	BFA0416	01/25/22	03/09/22	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		120 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

**20220118-Emerald 152-WH@2ft  
2201279-01 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BFA0431	01/26/22	01/27/22	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		63.2 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10		51.7 %	40-150		"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **01/18/22 15:10**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BFB0070	02/08/22	02/08/22	EPA 7196A	

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Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

**20220118-Emerald 152-AOC@4ft**  
**2201279-02 (Soil)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BFA0415	01/25/22	01/26/22	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		136 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		106 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		102 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BFA0416	01/25/22	03/09/22	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		115 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

**20220118-Emerald 152-AOC@4ft**  
**2201279-02 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BFA0431	01/26/22	01/27/22	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		52.2 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10		48.6 %	40-150		"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **01/18/22 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BFB0070	02/08/22	02/08/22	EPA 7196A	

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Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

**20220118-Emerald 152-TP-DIS**  
**2201279-03 (Soil)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/18/22 15:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Benzene	ND	0.0020	mg/kg	1	BFA0415	01/25/22	01/26/22	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: 1,2-Dichloroethane-d4		131 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		102 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **01/18/22 15:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
C10-C28 (DRO)	ND	50	mg/kg	1	BFA0416	01/25/22	03/09/22	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:20**

Analyte	Result	Reporting	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit							
Surrogate: o-Terphenyl		114 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

## 20220118-Emerald 152-TP-DIS

2201279-03 (Soil)

### Summit Scientific

#### PAH by EPA Method 8270D SIM

Date Sampled: 01/18/22 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BFA0431	01/26/22	01/27/22	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: 01/18/22 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		46.6 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10		40.2 %	40-150		"	"	"	"	

#### Hexavalent Chromium by EPA Method 7196

Date Sampled: 01/18/22 15:20

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BFB0070	02/08/22	02/08/22	EPA 7196A	

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Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

**20220118-Emerald 152-TP-Comp  
2201279-04 (Soil)**

**Summit Scientific**

**Volatile Organic Compounds by EPA Method 8260B**

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Benzene	ND	0.0020	mg/kg	1	BFA0415	01/25/22	01/26/22	EPA 8260B	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
1,2,4-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
1,3,5-Trimethylbenzene	ND	0.0050	"	"	"	"	"	"	
Naphthalene	ND	0.0038	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	0.50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		126 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		109 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		103 %	21-167		"	"	"	"	

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	BFA0416	01/25/22	03/09/22	EPA 8015M	
C28-C36 (ORO)	ND	50	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		118 %	30-150		"	"	"	"	

**PAH by EPA Method 8270D SIM**

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Denver CO, 80215

Project: Emerald #152 Closure  
Project Number: 20221740.001A  
Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

**20220118-Emerald 152-TP-Comp  
2201279-04 (Soil)**

**Summit Scientific**

**PAH by EPA Method 8270D SIM**

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Acenaphthene	ND	0.00500	mg/kg	1	BFA0431	01/26/22	01/27/22	EPA 8270D SIM	
Anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) anthracene	ND	0.00500	"	"	"	"	"	"	
Benzo (a) pyrene	ND	0.00500	"	"	"	"	"	"	
Benzo (b) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Benzo (k) fluoranthene	ND	0.00500	"	"	"	"	"	"	
Chrysene	ND	0.00500	"	"	"	"	"	"	
Dibenz (a,h) anthracene	ND	0.00500	"	"	"	"	"	"	
Fluoranthene	ND	0.00500	"	"	"	"	"	"	
Fluorene	ND	0.00500	"	"	"	"	"	"	
Indeno (1,2,3-cd) pyrene	ND	0.00500	"	"	"	"	"	"	
Pyrene	ND	0.00500	"	"	"	"	"	"	
1-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	
2-Methylnaphthalene	ND	0.00500	"	"	"	"	"	"	

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 2-Methylnaphthalene-d10		54.5 %	40-150		"	"	"	"	
Surrogate: Fluoranthene-d10		66.7 %	40-150		"	"	"	"	

**Hexavalent Chromium by EPA Method 7196**

Date Sampled: **01/18/22 15:25**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Chromium, Hexavalent	ND	0.30	mg/kg dry	1	BFB0070	02/08/22	02/08/22	EPA 7196A	

Summit Scientific

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.



Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch BFA0415 - EPA 5030 Soil MS

##### Blank (BFA0415-BLK1)

Prepared: 01/25/22 Analyzed: 01/26/22

Benzene	ND	0.0020	mg/kg							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
1,2,4-Trimethylbenzene	ND	0.0050	"							
1,3,5-Trimethylbenzene	ND	0.0050	"							
Naphthalene	ND	0.0038	"							
Gasoline Range Hydrocarbons	ND	0.50	"							
Surrogate: 1,2-Dichloroethane-d4	0.0479		"	0.0400		120	23-173			
Surrogate: Toluene-d8	0.0410		"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene	0.0400		"	0.0400		100	21-167			

##### LCS (BFA0415-BS1)

Prepared: 01/25/22 Analyzed: 01/26/22

Benzene	0.0872	0.0020	mg/kg	0.100		87.2	70-130			
Toluene	0.0868	0.0050	"	0.100		86.8	70-130			
Ethylbenzene	0.0831	0.0050	"	0.100		83.1	70-130			
m,p-Xylene	0.161	0.010	"	0.200		80.7	70-130			
o-Xylene	0.0815	0.0050	"	0.100		81.5	70-130			
1,2,4-Trimethylbenzene	0.0872	0.0050	"	0.100		87.2	70-130			
1,3,5-Trimethylbenzene	0.0881	0.0050	"	0.100		88.1	70-130			
Naphthalene	0.104	0.0038	"	0.100		104	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0501		"	0.0400		125	23-173			
Surrogate: Toluene-d8	0.0413		"	0.0400		103	20-170			
Surrogate: 4-Bromofluorobenzene	0.0430		"	0.0400		107	21-167			

##### Matrix Spike (BFA0415-MS1)

Source: 2201240-01

Prepared: 01/25/22 Analyzed: 01/26/22

Benzene	0.0846	0.0020	mg/kg	0.100	ND	84.6	70-130			
Toluene	0.0906	0.0050	"	0.100	ND	90.6	70-130			
Ethylbenzene	0.0858	0.0050	"	0.100	ND	85.8	70-130			
m,p-Xylene	0.166	0.010	"	0.200	ND	82.9	70-130			
o-Xylene	0.0826	0.0050	"	0.100	ND	82.6	70-130			
1,2,4-Trimethylbenzene	0.0900	0.0050	"	0.100	ND	90.0	70-130			
1,3,5-Trimethylbenzene	0.0912	0.0050	"	0.100	ND	91.2	70-130			
Naphthalene	0.110	0.0038	"	0.100	ND	110	70-130			
Surrogate: 1,2-Dichloroethane-d4	0.0477		"	0.0400		119	23-173			
Surrogate: Toluene-d8	0.0432		"	0.0400		108	20-170			
Surrogate: 4-Bromofluorobenzene	0.0414		"	0.0400		104	21-167			

Summit Scientific

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Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

## Volatile Organic Compounds by EPA Method 8260B - Quality Control

### Summit Scientific

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

#### Batch BFA0415 - EPA 5030 Soil MS

##### Matrix Spike Dup (BFA0415-MSD1)

Source: 2201240-01

Prepared: 01/25/22 Analyzed: 01/26/22

Benzene	0.0826	0.0020	mg/kg	0.100	ND	82.6	70-130	2.37	30	
Toluene	0.0858	0.0050	"	0.100	ND	85.8	70-130	5.44	30	
Ethylbenzene	0.0838	0.0050	"	0.100	ND	83.8	70-130	2.37	30	
m,p-Xylene	0.161	0.010	"	0.200	ND	80.6	70-130	2.84	30	
o-Xylene	0.0823	0.0050	"	0.100	ND	82.3	70-130	0.400	30	
1,2,4-Trimethylbenzene	0.0874	0.0050	"	0.100	ND	87.4	70-130	2.98	30	
1,3,5-Trimethylbenzene	0.0875	0.0050	"	0.100	ND	87.5	70-130	4.13	30	
Naphthalene	0.119	0.0038	"	0.100	ND	119	70-130	8.10	30	
Surrogate: 1,2-Dichloroethane-d4	0.0472		"	0.0400		118	23-173			
Surrogate: Toluene-d8	0.0408		"	0.0400		102	20-170			
Surrogate: 4-Bromofluorobenzene	0.0409		"	0.0400		102	21-167			

Summit Scientific

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.



Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure  
Project Number: 20221740.001A  
Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

**Extractable Petroleum Hydrocarbons by 8015 - Quality Control**  
**Summit Scientific**

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

**Batch BFA0416 - EPA 3550A**

**Blank (BFA0416-BLK1)**

Prepared: 01/25/22 Analyzed: 01/27/22

C10-C28 (DRO)	ND	50	mg/kg
C28-C36 (ORO)	ND	50	"

**LCS (BFA0416-BS1)**

Prepared: 01/25/22 Analyzed: 01/27/22

C10-C28 (DRO)	477	50	mg/kg	500	95.4	70-130
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**Matrix Spike (BFA0416-MS1)**

Source: 2201240-01

Prepared: 01/25/22 Analyzed: 01/27/22

C10-C28 (DRO)	409	50	mg/kg	500	11.2	79.5	70-130
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**Matrix Spike Dup (BFA0416-MSD1)**

Source: 2201240-01

Prepared: 01/25/22 Analyzed: 01/27/22

C10-C28 (DRO)	389	50	mg/kg	500	11.2	75.5	70-130	5.03	20
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Summit Scientific

*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.*



Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure  
Project Number: 20221740.001A  
Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

## PAH by EPA Method 8270D SIM - Quality Control

### Summit Scientific

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

#### Batch BFA0431 - EPA 5030 Soil MS

##### Blank (BFA0431-BLK1)

Prepared: 01/26/22 Analyzed: 01/27/22

Acenaphthene	ND	0.00500	mg/kg							
Anthracene	ND	0.00500	"							
Benzo (a) anthracene	ND	0.00500	"							
Benzo (a) pyrene	ND	0.00500	"							
Benzo (b) fluoranthene	ND	0.00500	"							
Benzo (k) fluoranthene	ND	0.00500	"							
Chrysene	ND	0.00500	"							
Dibenz (a,h) anthracene	ND	0.00500	"							
Fluoranthene	ND	0.00500	"							
Fluorene	ND	0.00500	"							
Indeno (1,2,3-cd) pyrene	ND	0.00500	"							
Pyrene	ND	0.00500	"							
1-Methylnaphthalene	ND	0.00500	"							
2-Methylnaphthalene	ND	0.00500	"							
Surrogate: 2-Methylnaphthalene-d10	0.0202		"	0.0333		60.5	40-150			
Surrogate: Fluoranthene-d10	0.0177		"	0.0333		53.1	40-150			

##### LCS (BFA0431-BS1)

Prepared: 01/26/22 Analyzed: 01/27/22

Acenaphthene	0.0215	0.00500	mg/kg	0.0333		64.4	31-137			
Anthracene	0.0230	0.00500	"	0.0333		68.9	30-120			
Benzo (a) anthracene	0.0213	0.00500	"	0.0333		64.0	30-120			
Benzo (a) pyrene	0.0194	0.00500	"	0.0333		58.1	30-120			
Benzo (b) fluoranthene	0.0200	0.00500	"	0.0333		60.1	30-120			
Benzo (k) fluoranthene	0.0227	0.00500	"	0.0333		68.2	30-120			
Chrysene	0.0231	0.00500	"	0.0333		69.3	30-120			
Dibenz (a,h) anthracene	0.0197	0.00500	"	0.0333		59.1	30-120			
Fluoranthene	0.0233	0.00500	"	0.0333		69.8	30-120			
Fluorene	0.0219	0.00500	"	0.0333		65.8	30-120			
Indeno (1,2,3-cd) pyrene	0.0214	0.00500	"	0.0333		64.2	30-120			
Pyrene	0.0235	0.00500	"	0.0333		70.4	35-142			
1-Methylnaphthalene	0.0247	0.00500	"	0.0333		74.1	35-142			
2-Methylnaphthalene	0.0246	0.00500	"	0.0333		73.9	35-142			
Surrogate: 2-Methylnaphthalene-d10	0.0239		"	0.0333		71.6	40-150			
Surrogate: Fluoranthene-d10	0.0232		"	0.0333		69.6	40-150			

Summit Scientific

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Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

## PAH by EPA Method 8270D SIM - Quality Control

### Summit Scientific

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

#### Batch BFA0431 - EPA 5030 Soil MS

##### Matrix Spike (BFA0431-MS1)

Source: 2201187-01

Prepared: 01/26/22 Analyzed: 01/27/22

Acenaphthene	0.0125	0.00500	mg/kg	0.0333	ND	37.4	31-137				
Anthracene	0.0134	0.00500	"	0.0333	ND	40.2	30-120				
Benzo (a) anthracene	0.0142	0.00500	"	0.0333	ND	42.7	30-120				
Benzo (a) pyrene	0.0136	0.00500	"	0.0333	ND	40.8	30-120				
Benzo (b) fluoranthene	0.0139	0.00500	"	0.0333	ND	41.8	30-120				
Benzo (k) fluoranthene	0.0158	0.00500	"	0.0333	ND	47.3	30-120				
Chrysene	0.0156	0.00500	"	0.0333	ND	46.7	30-120				
Dibenz (a,h) anthracene	0.0145	0.00500	"	0.0333	ND	43.4	30-120				
Fluoranthene	0.0132	0.00500	"	0.0333	ND	39.7	30-120				
Fluorene	0.0124	0.00500	"	0.0333	ND	37.3	30-120				
Indeno (1,2,3-cd) pyrene	0.0157	0.00500	"	0.0333	ND	47.0	30-120				
Pyrene	0.0156	0.00500	"	0.0333	ND	46.7	35-142				
1-Methylnaphthalene	0.0176	0.00500	"	0.0333	ND	52.7	15-130				
2-Methylnaphthalene	0.0161	0.00500	"	0.0333	ND	48.2	15-130				
Surrogate: 2-Methylnaphthalene-d10	0.0171		"	0.0333		51.2	40-150				
Surrogate: Fluoranthene-d10	0.0155		"	0.0333		46.6	40-150				

##### Matrix Spike Dup (BFA0431-MSD1)

Source: 2201187-01

Prepared: 01/26/22 Analyzed: 01/27/22

Acenaphthene	0.0147	0.00500	mg/kg	0.0333	ND	44.0	31-137	16.1	30
Anthracene	0.0165	0.00500	"	0.0333	ND	49.5	30-120	20.7	30
Benzo (a) anthracene	0.0160	0.00500	"	0.0333	ND	47.9	30-120	11.5	30
Benzo (a) pyrene	0.0162	0.00500	"	0.0333	ND	48.5	30-120	17.4	30
Benzo (b) fluoranthene	0.0160	0.00500	"	0.0333	ND	48.1	30-120	13.9	30
Benzo (k) fluoranthene	0.0185	0.00500	"	0.0333	ND	55.6	30-120	16.0	30
Chrysene	0.0174	0.00500	"	0.0333	ND	52.3	30-120	11.2	30
Dibenz (a,h) anthracene	0.0170	0.00500	"	0.0333	ND	51.1	30-120	16.3	30
Fluoranthene	0.0153	0.00500	"	0.0333	ND	45.8	30-120	14.2	30
Fluorene	0.0153	0.00500	"	0.0333	ND	45.8	30-120	20.4	30
Indeno (1,2,3-cd) pyrene	0.0179	0.00500	"	0.0333	ND	53.6	30-120	13.1	30
Pyrene	0.0179	0.00500	"	0.0333	ND	53.6	35-142	13.7	30
1-Methylnaphthalene	0.0164	0.00500	"	0.0333	ND	49.1	15-130	7.05	50
2-Methylnaphthalene	0.0163	0.00500	"	0.0333	ND	48.9	15-130	1.26	50
Surrogate: 2-Methylnaphthalene-d10	0.0169		"	0.0333		50.8	40-150		
Surrogate: Fluoranthene-d10	0.0169		"	0.0333		50.7	40-150		

Summit Scientific

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Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**

03/14/22 09:41

## Hexavalent Chromium by EPA Method 7196 - Quality Control

### Summit Scientific

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

#### Batch BFB0070 - 3060A Mod

##### Blank (BFB0070-BLK1)

Prepared & Analyzed: 02/08/22

Chromium, Hexavalent ND 0.30 mg/kg wet

##### LCS (BFB0070-BS1)

Prepared & Analyzed: 02/08/22

Chromium, Hexavalent 27.9 0.30 mg/kg wet 25.0 112 80-120

##### Duplicate (BFB0070-DUP1)

Source: 2201215-01

Prepared & Analyzed: 02/08/22

Chromium, Hexavalent ND 0.30 mg/kg dry ND 20

##### Matrix Spike (BFB0070-MS1)

Source: 2201215-01

Prepared & Analyzed: 02/08/22

Chromium, Hexavalent 33.9 0.30 mg/kg dry 31.2 ND 109 75-125

##### Matrix Spike Dup (BFB0070-MSD1)

Source: 2201215-01

Prepared & Analyzed: 02/08/22

Chromium, Hexavalent 31.7 0.30 mg/kg dry 31.2 ND 102 75-125 6.46 20

Summit Scientific

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**Fremont**  
*Analytical*

3600 Fremont Ave. N.  
Seattle, WA 98103  
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info@fremontanalytical.com

**Summit Scientific**  
Paul Shrewsbury  
4653 Table Mountain Dr  
Golden, CO 80403

**RE: 2201279**  
**Work Order Number: 2201492**

March 08, 2022

**Attention Paul Shrewsbury:**

Fremont Analytical, Inc. received 4 sample(s) on 1/28/2022 for the analyses presented in the following report.

***Conductivity by SM 2510B***  
***pH by SM 4500H+B***  
***Sample Moisture (Percent Moisture)***  
***Sodium Adsorption Ratio***  
***Total Metals by EPA Method 6020B***

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes  
Project Manager

**CC:**  
Muri Premer

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing*  
*ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing*  
*Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Revision v1

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

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**CLIENT:** Summit Scientific  
**Project:** 2201279  
**Work Order:** 2201492

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**Work Order Sample Summary**

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2201492-001	20220118_Emerald152_WH@2ft	01/18/2022 3:10 PM	01/28/2022 11:59 AM
2201492-001	20220118_Emerald152_WH@2ft	01/18/2022 3:10 PM	01/28/2022 11:59 AM
2201492-002	20220118_Emerald152_AOC@4ft	01/18/2022 3:15 PM	01/28/2022 11:59 AM
2201492-002	20220118_Emerald152_AOC@4ft	01/18/2022 3:15 PM	01/28/2022 11:59 AM
2201492-003	20220118_Emerald152_TP_DIS	01/18/2022 3:20 PM	01/28/2022 11:59 AM
2201492-003	20220118_Emerald152_TP_DIS	01/18/2022 3:20 PM	01/28/2022 11:59 AM
2201492-004	20220118_Emerald152_TP_Comp	01/18/2022 3:25 PM	01/28/2022 11:59 AM
2201492-004	20220118_Emerald152_TP_Comp	01/18/2022 3:25 PM	01/28/2022 11:59 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

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**CLIENT:** Summit Scientific  
**Project:** 2201279

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**I. SAMPLE RECEIPT:**

Samples receipt information is recorded on the attached Sample Receipt Checklist.

**II. GENERAL REPORTING COMMENTS:**

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

**III. ANALYSES AND EXCEPTIONS:**

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

The following preparation methods were performed per client request:

Boron was prepared using Hot Water Soluble Method provided by client.

Conductivity, Sodium Adsorption Ratio, and pH were prepared using Saturated Paste Method provided by client.

Revision 1 includes correction to sample IDs per client request.

**Qualifiers:**

- \* - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

**Acronyms:**

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



## Analytical Report

Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-001

Collection Date: 1/18/2022 3:10:00 PM

Client Sample ID: 20220118\_Emerald152\_WH@2ft

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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### Total Metals by EPA Method 6020B

Batch ID: 35325 Analyst: EH

Arsenic	7.43	0.110		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Barium	127	0.548		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Cadmium	0.207	0.183		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Copper	12.2	0.913		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Lead	15.5	0.183		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Nickel	19.4	0.457		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Selenium	2.51	0.183		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Silver	ND	0.137		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Zinc	75.6	1.60		mg/Kg-dry	1	2/15/2022 5:22:42 PM

### Total Metals by EPA Method 6020B

Batch ID: 35299 Analyst: EH

Boron	0.0468	0.00953		mg/L	1	2/23/2022 1:11:28 PM
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### Sodium Adsorption Ratio

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.0767	0	Q	mEq/L	1	3/4/2022 10:44:00 AM
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#### NOTES:

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

### Sample Moisture (Percent Moisture)

Batch ID: R72968 Analyst: CB

Percent Moisture	15.1	0.500		wt%	1	2/2/2022 1:32:07 PM
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### Conductivity by SM 2510B

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	159	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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### pH by SM 4500H+B

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.76			pH	1	2/22/2022 2:45:00 PM
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Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-001

Collection Date: 1/18/2022 3:10:00 PM

Client Sample ID: 20220118\_Emerald152\_WH@2ft

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Total Metals by EPA Method 6020B**

Batch ID: 35325 Analyst: EH

Arsenic	7.43	0.110		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Barium	127	0.548		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Cadmium	0.207	0.183		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Copper	12.2	0.913		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Lead	15.5	0.183		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Nickel	19.4	0.457		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Selenium	2.51	0.183		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Silver	ND	0.137		mg/Kg-dry	1	2/15/2022 5:22:42 PM
Zinc	75.6	1.60		mg/Kg-dry	1	2/15/2022 5:22:42 PM

**Total Metals by EPA Method 6020B**

Batch ID: 35299 Analyst: EH

Boron	0.0468	0.00953		mg/L	1	2/23/2022 1:11:28 PM
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**Sodium Adsorption Ratio**

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.0767	0	Q	mEq/L	1	3/4/2022 10:44:00 AM
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**NOTES:**

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

**Sample Moisture (Percent Moisture)**

Batch ID: R72968 Analyst: CB

Percent Moisture	15.1	0.500		wt%	1	2/2/2022 1:32:07 PM
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**Conductivity by SM 2510B**

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	159	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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**pH by SM 4500H+B**

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.76			pH	1	2/22/2022 2:45:00 PM
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## Analytical Report

Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-002

Collection Date: 1/18/2022 3:15:00 PM

Client Sample ID: 20220118\_Emerald152\_AOC@4ft

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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### Total Metals by EPA Method 6020B

Batch ID: 35325 Analyst: EH

Arsenic	5.82	0.105		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Barium	92.1	0.523		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Cadmium	0.175	0.174		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Copper	9.99	0.872		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Lead	13.2	0.174		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Nickel	15.0	0.436		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Selenium	1.99	0.174		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Silver	ND	0.131		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Zinc	60.1	1.53		mg/Kg-dry	1	2/15/2022 5:25:24 PM

### Total Metals by EPA Method 6020B

Batch ID: 35299 Analyst: EH

Boron	0.0394	0.00967		mg/L	1	2/23/2022 1:12:38 PM
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### Sodium Adsorption Ratio

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.214	0	Q	mEq/L	1	3/4/2022 10:45:00 AM
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#### NOTES:

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

### Sample Moisture (Percent Moisture)

Batch ID: R72968 Analyst: CB

Percent Moisture	8.22	0.500		wt%	1	2/2/2022 1:32:07 PM
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### Conductivity by SM 2510B

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	579	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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### pH by SM 4500H+B

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.35			pH	1	2/22/2022 2:45:00 PM
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Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-002

Collection Date: 1/18/2022 3:15:00 PM

Client Sample ID: 20220118\_Emerald152\_AOC@4ft

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Total Metals by EPA Method 6020B**

Batch ID: 35325

Analyst: EH

Arsenic	5.82	0.105		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Barium	92.1	0.523		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Cadmium	0.175	0.174		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Copper	9.99	0.872		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Lead	13.2	0.174		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Nickel	15.0	0.436		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Selenium	1.99	0.174		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Silver	ND	0.131		mg/Kg-dry	1	2/15/2022 5:25:24 PM
Zinc	60.1	1.53		mg/Kg-dry	1	2/15/2022 5:25:24 PM

**Total Metals by EPA Method 6020B**

Batch ID: 35299

Analyst: EH

Boron	0.0394	0.00967		mg/L	1	2/23/2022 1:12:38 PM
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**Sodium Adsorption Ratio**

Batch ID: 35624

Analyst: ML

Sodium Adsorption Ratio (SAR)	0.214	0	Q	mEq/L	1	3/4/2022 10:45:00 AM
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**NOTES:**

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

**Sample Moisture (Percent Moisture)**

Batch ID: R72968

Analyst: CB

Percent Moisture	8.22	0.500		wt%	1	2/2/2022 1:32:07 PM
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**Conductivity by SM 2510B**

Batch ID: R73512

Analyst: SLL

Specific Conductance (Conductivity)	579	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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**pH by SM 4500H+B**

Batch ID: R73521

Analyst: ALT

Hydrogen Ion (pH)	8.35			pH	1	2/22/2022 2:45:00 PM
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Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-003

Collection Date: 1/18/2022 3:20:00 PM

Client Sample ID: 20220118\_Emerald152\_TP\_DIS

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Total Metals by EPA Method 6020B**

Batch ID: 35325 Analyst: EH

Arsenic	7.12	0.103		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Barium	167	0.514		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Cadmium	0.484	0.171		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Copper	11.4	0.856		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Lead	12.0	0.171		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Nickel	14.8	0.428		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Selenium	2.18	0.171		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Silver	ND	0.128		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Zinc	53.0	1.50		mg/Kg-dry	1	2/15/2022 5:28:07 PM

**Total Metals by EPA Method 6020B**

Batch ID: 35299 Analyst: EH

Boron	0.0561	0.00981		mg/L	1	2/23/2022 1:13:47 PM
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**Sodium Adsorption Ratio**

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.240	0	Q	mEq/L	1	3/4/2022 10:46:00 AM
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**NOTES:**

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

**Sample Moisture (Percent Moisture)**

Batch ID: R72968 Analyst: CB

Percent Moisture	6.53	0.500		wt%	1	2/2/2022 1:32:07 PM
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**Conductivity by SM 2510B**

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	136	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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**pH by SM 4500H+B**

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.69			pH	1	2/22/2022 2:45:00 PM
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Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-003

Collection Date: 1/18/2022 3:20:00 PM

Client Sample ID: 20220118\_Emerald152\_TP\_DIS

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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**Total Metals by EPA Method 6020B**

Batch ID: 35325 Analyst: EH

Arsenic	7.12	0.103		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Barium	167	0.514		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Cadmium	0.484	0.171		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Copper	11.4	0.856		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Lead	12.0	0.171		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Nickel	14.8	0.428		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Selenium	2.18	0.171		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Silver	ND	0.128		mg/Kg-dry	1	2/15/2022 5:28:07 PM
Zinc	53.0	1.50		mg/Kg-dry	1	2/15/2022 5:28:07 PM

**Total Metals by EPA Method 6020B**

Batch ID: 35299 Analyst: EH

Boron	0.0561	0.00981		mg/L	1	2/23/2022 1:13:47 PM
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**Sodium Adsorption Ratio**

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.240	0	Q	mEq/L	1	3/4/2022 10:46:00 AM
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**NOTES:**

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

**Sample Moisture (Percent Moisture)**

Batch ID: R72968 Analyst: CB

Percent Moisture	6.53	0.500		wt%	1	2/2/2022 1:32:07 PM
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**Conductivity by SM 2510B**

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	136	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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**pH by SM 4500H+B**

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.69			pH	1	2/22/2022 2:45:00 PM
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Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-004

Collection Date: 1/18/2022 3:25:00 PM

Client Sample ID: 20220118\_Emerald152\_TP\_Comp

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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### Total Metals by EPA Method 6020B

Batch ID: 35325 Analyst: EH

Arsenic	7.56	0.109		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Barium	206	0.547		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Cadmium	0.417	0.182		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Copper	13.4	0.912		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Lead	15.1	0.182		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Nickel	17.2	0.456		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Selenium	2.50	0.182		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Silver	ND	0.137		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Zinc	64.6	1.60		mg/Kg-dry	1	2/15/2022 5:30:50 PM

### Total Metals by EPA Method 6020B

Batch ID: 35299 Analyst: EH

Boron	0.0541	0.00968		mg/L	1	2/23/2022 1:14:57 PM
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### Sodium Adsorption Ratio

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.218	0	Q	mEq/L	1	3/4/2022 10:47:00 AM
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#### NOTES:

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

### Sample Moisture (Percent Moisture)

Batch ID: R72968 Analyst: CB

Percent Moisture	13.0	0.500		wt%	1	2/2/2022 1:32:07 PM
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### Conductivity by SM 2510B

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	145	1.00		μS/cm	1	2/22/2022 2:52:00 PM
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### pH by SM 4500H+B

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.75			pH	1	2/22/2022 2:45:00 PM
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## Analytical Report

Work Order: 2201492  
Date Reported: 3/8/2022

CLIENT: Summit Scientific  
Project: 2201279

Lab ID: 2201492-004

Collection Date: 1/18/2022 3:25:00 PM

Client Sample ID: 20220118\_Emerald152\_TP\_Comp

Matrix: Soil

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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### Total Metals by EPA Method 6020B

Batch ID: 35325 Analyst: EH

Arsenic	7.56	0.109		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Barium	206	0.547		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Cadmium	0.417	0.182		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Copper	13.4	0.912		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Lead	15.1	0.182		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Nickel	17.2	0.456		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Selenium	2.50	0.182		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Silver	ND	0.137		mg/Kg-dry	1	2/15/2022 5:30:50 PM
Zinc	64.6	1.60		mg/Kg-dry	1	2/15/2022 5:30:50 PM

### Total Metals by EPA Method 6020B

Batch ID: 35299 Analyst: EH

Boron	0.0541	0.00968		mg/L	1	2/23/2022 1:14:57 PM
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### Sodium Adsorption Ratio

Batch ID: 35624 Analyst: ML

Sodium Adsorption Ratio (SAR)	0.218	0	Q	mEq/L	1	3/4/2022 10:47:00 AM
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#### NOTES:

Q - Associated calibration verification is above acceptance criteria. Result may be high-biased.

### Sample Moisture (Percent Moisture)

Batch ID: R72968 Analyst: CB

Percent Moisture	13.0	0.500		wt%	1	2/2/2022 1:32:07 PM
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### Conductivity by SM 2510B

Batch ID: R73512 Analyst: SLL

Specific Conductance (Conductivity)	145	1.00		µS/cm	1	2/22/2022 2:52:00 PM
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### pH by SM 4500H+B

Batch ID: R73521 Analyst: ALT

Hydrogen Ion (pH)	8.75			pH	1	2/22/2022 2:45:00 PM
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**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

### Conductivity by SM 2510B

Sample ID: <b>MB-R73512</b>		SampType: <b>MBLK</b>			Units: <b>µS/cm</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73512</b>		
Client ID: <b>MBLKW</b>		Batch ID: <b>R73512</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502285</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Specific Conductance (Conductivity) ND 1.00

Sample ID: <b>LCS-R73512</b>		SampType: <b>LCS</b>			Units: <b>µS/cm</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73512</b>		
Client ID: <b>LCSW</b>		Batch ID: <b>R73512</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502286</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Specific Conductance (Conductivity) 978 1.00 1,000 0 97.8 92.2 107

Sample ID: <b>2201482-001ADUP</b>		SampType: <b>DUP</b>			Units: <b>µS/cm</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73512</b>		
Client ID: <b>BATCH</b>		Batch ID: <b>R73512</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502288</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Specific Conductance (Conductivity) 68.2 1.00 57.90 16.3 20

Sample ID: <b>LCSD-R73512</b>		SampType: <b>LCSD</b>			Units: <b>µS/cm</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73512</b>		
Client ID: <b>LCSW02</b>		Batch ID: <b>R73512</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502308</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Specific Conductance (Conductivity) 988 1.00 1,000 0 98.8 92.2 107 978.0 1.02 20

**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

pH by SM 4500H+B

Sample ID: <b>MB-R73521</b>		SampType: <b>MBLK</b>			Units: <b>pH</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73521</b>		
Client ID: <b>MBLKW</b>		Batch ID: <b>R73521</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502534</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Hydrogen Ion (pH) 7.75

Sample ID: <b>LCS-R73521</b>		SampType: <b>LCS</b>			Units: <b>pH</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73521</b>		
Client ID: <b>LCSW</b>		Batch ID: <b>R73521</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502535</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Hydrogen Ion (pH) 7.11 7.000 0 102 95 105

Sample ID: <b>2201482-001ADUP</b>		SampType: <b>DUP</b>			Units: <b>pH</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73521</b>		
Client ID: <b>BATCH</b>		Batch ID: <b>R73521</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502537</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Hydrogen Ion (pH) 8.78 8.490 3.36 10

Sample ID: <b>LCSD-R73521</b>		SampType: <b>LCSD</b>			Units: <b>pH</b>		Prep Date: <b>2/22/2022</b>			RunNo: <b>73521</b>		
Client ID: <b>LCSW02</b>		Batch ID: <b>R73521</b>			Analysis Date: <b>2/22/2022</b>			SeqNo: <b>1502557</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Hydrogen Ion (pH) 7.16 7.000 0 102 95 105 7.110 0.701 10



**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

### Total Metals by EPA Method 6020B

Sample ID: <b>MB-35325</b>	SampType: <b>MBLK</b>	Units: <b>mg/Kg</b>				Prep Date: <b>2/10/2022</b>				RunNo: <b>73298</b>		
Client ID: <b>MBLKS</b>	Batch ID: <b>35325</b>					Analysis Date: <b>2/14/2022</b>				SeqNo: <b>1497056</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Arsenic	ND	0.0938										
Barium	ND	0.469										
Cadmium	ND	0.156										
Copper	ND	0.781										
Lead	ND	0.156										
Nickel	ND	0.391										
Selenium	ND	0.156										
Zinc	ND	1.37										

Sample ID: <b>LCS-35325</b>		SampType: <b>LCS</b>		Units: <b>mg/Kg</b>		Prep Date: <b>2/10/2022</b>		RunNo: <b>73298</b>			
Client ID: <b>LCSS</b>		Batch ID: <b>35325</b>				Analysis Date: <b>2/14/2022</b>		SeqNo: <b>1497057</b>			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Barium	41.9	0.480	40.00	0	105	80	120				

Sample ID: <b>2202148-003AMS</b>		SampType: <b>MS</b>		Units: <b>mg/Kg-dry</b>		Prep Date: <b>2/10/2022</b>			RunNo: <b>73298</b>		
Client ID: <b>BATCH</b>		Batch ID: <b>35325</b>		Analysis Date: <b>2/14/2022</b>					SeqNo: <b>1497060</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	54.8	0.112	46.83	3.833	109	75	125				
Barium	156	0.562	46.83	87.83	145	75	125				S
Cadmium	2.54	0.187	2.342	0.07615	105	75	125				
Copper	64.1	0.937	46.83	11.72	112	75	125				
Lead	28.7	0.187	23.42	3.423	108	75	125				
Nickel	71.3	0.468	46.83	19.09	111	75	125				
Selenium	5.33	0.187	4.683	0.8090	96.4	75	125				
Silver	1.94	0.140	2.342	0.04153	81.0	75	125				
Zinc	92.2	1.64	46.83	30.62	131	75	125				S

**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

### Total Metals by EPA Method 6020B

Sample ID: <b>2202148-003AMS</b>	SampType: <b>MS</b>	Units: <b>mg/Kg-dry</b>				Prep Date: <b>2/10/2022</b>				RunNo: <b>73298</b>		
Client ID: <b>BATCH</b>	Batch ID: <b>35325</b>					Analysis Date: <b>2/14/2022</b>				SeqNo: <b>1497060</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

**NOTES:**

S - Analyte concentration was too high for accurate spike recovery(ies).

Sample ID: <b>2202148-003AMSD</b>	SampType: <b>MSD</b>			Units: <b>mg/Kg-dry</b>		Prep Date: <b>2/10/2022</b>			RunNo: <b>73298</b>		
Client ID: <b>BATCH</b>	Batch ID: <b>35325</b>			Analysis Date: <b>2/14/2022</b>					SeqNo: <b>1497061</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	55.7	0.114	47.56	3.833	109	75	125	54.83	1.61	20	S
Barium	156	0.571	47.56	87.83	144	75	125	155.7	0.323	20	
Cadmium	2.74	0.190	2.378	0.07615	112	75	125	2.536	7.62	20	
Copper	64.8	0.951	47.56	11.72	112	75	125	64.05	1.10	20	
Lead	30.9	0.190	23.78	3.423	116	75	125	28.69	7.54	20	
Nickel	73.6	0.476	47.56	19.09	115	75	125	71.30	3.12	20	
Selenium	5.96	0.190	4.756	0.8090	108	75	125	5.325	11.3	20	
Silver	2.16	0.143	2.378	0.04153	89.2	75	125	1.937	11.0	20	
Zinc	89.0	1.66	47.56	30.62	123	75	125	92.16	3.50	20	

**NOTES:**

S - Analyte concentration was too high for accurate spike recovery(ies).

Sample ID: <b>MB-35325</b>	SampType: <b>MBLK</b>	Units: <b>mg/Kg</b>	Prep Date: <b>2/10/2022</b>	RunNo: <b>73298</b>							
Client ID: <b>MBLKS</b>	Batch ID: <b>35325</b>		Analysis Date: <b>2/15/2022</b>	SeqNo: <b>1497816</b>							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Silver	ND	0.117									

Sample ID: <b>LCS-35325</b>	SampType: <b>LCS</b>	Units: <b>mg/Kg</b>				Prep Date: <b>2/10/2022</b>			RunNo: <b>73298</b>		
Client ID: <b>LCSS</b>	Batch ID: <b>35325</b>	Analysis Date: <b>2/15/2022</b>						SeqNo: <b>1497817</b>			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	40.7	0.0960	40.00	0	102	80	120				
Cadmium	2.27	0.160	2.000	0	113	80	120				

**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

### Total Metals by EPA Method 6020B

Sample ID: <b>LCS-35325</b>		SampType: <b>LCS</b>		Units: <b>mg/Kg</b>		Prep Date: <b>2/10/2022</b>			RunNo: <b>73298</b>		
Client ID: <b>LCSS</b>		Batch ID: <b>35325</b>					Analysis Date: <b>2/15/2022</b>			SeqNo: <b>1497817</b>	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Copper	43.2	0.800	40.00	0	108	80	120				
Lead	22.6	0.160	20.00	0	113	80	120				
Nickel	42.4	0.400	40.00	0	106	80	120				
Selenium	4.12	0.160	4.000	0	103	80	120				
Silver	2.28	0.120	2.000	0	114	80	120				
Zinc	39.1	1.40	40.00	0	97.7	80	120				

Sample ID: <b>MB-35299</b>		SampType: <b>MBLK</b>		Units: <b>mg/L</b>		Prep Date: <b>2/8/2022</b>			RunNo: <b>73530</b>			
Client ID: <b>MBLKS</b>		Batch ID: <b>35299</b>					Analysis Date: <b>2/23/2022</b>			SeqNo: <b>1502856</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Boron	ND	0.0100										

Sample ID: <b>LCS-35299</b>		SampType: <b>LCS</b>		Units: <b>mg/L</b>		Prep Date: <b>2/8/2022</b>			RunNo: <b>73530</b>			
Client ID: <b>LCSS</b>		Batch ID: <b>35299</b>					Analysis Date: <b>2/23/2022</b>			SeqNo: <b>1502857</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Boron	6.17	0.0100	5.000	0	123	70	130					

Sample ID: <b>2201482-001BDUP</b>		SampType: <b>DUP</b>			Units: <b>mg/L</b>		Prep Date: <b>2/8/2022</b>			RunNo: <b>73530</b>		
Client ID: <b>BATCH</b>		Batch ID: <b>35299</b>						Analysis Date: <b>2/23/2022</b>			SeqNo: <b>1502859</b>	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	
Boron	0.188	0.00959						0.1770	6.06	20		

**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

### Total Metals by EPA Method 6020B

Sample ID: <b>2201482-001BMS</b>	SampType: <b>MS</b>	Units: <b>mg/L</b>				Prep Date: <b>2/8/2022</b>			RunNo: <b>73530</b>		
Client ID: <b>BATCH</b>	Batch ID: <b>35299</b>	Analysis Date: <b>2/23/2022</b>						SeqNo: <b>1502860</b>			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Boron	2.74	0.00995	4.975	0.1770	51.4	75	125				S

**NOTES:**

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: <b>2201482-001BMSD</b>	SampType: <b>MSD</b>	Units: <b>mg/L</b>				Prep Date: <b>2/8/2022</b>			RunNo: <b>73530</b>		
Client ID: <b>BATCH</b>	Batch ID: <b>35299</b>	Analysis Date: <b>2/23/2022</b>						SeqNo: <b>1502861</b>			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Boron	2.56	0.00989	4.946	0.1770	48.2	75	125	2.735	6.55	20	S

**NOTES:**

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

**Work Order:** 2201492  
**CLIENT:** Summit Scientific  
**Project:** 2201279

## QC SUMMARY REPORT

### Sodium Adsorption Ratio

Sample ID: <b>MB-35624</b>		SampType: <b>MBLK</b>			Units: <b>µg/L</b>		Prep Date: <b>3/7/2022</b>			RunNo: <b>73809</b>		
Client ID: <b>MBLKW</b>		Batch ID: <b>35624</b>			Analysis Date: <b>3/4/2022</b>					SeqNo: <b>1510862</b>		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Calcium	ND	1,000									
Magnesium	ND	500									
Sodium	ND	1,000									

Sample ID: <b>LCS-35624</b>		SampType: <b>LCS</b>			Units: <b>µg/L</b>		Prep Date: <b>3/7/2022</b>			RunNo: <b>73809</b>		
Client ID: <b>LCSW</b>		Batch ID: <b>35624</b>			Analysis Date: <b>3/4/2022</b>			SeqNo: <b>1510863</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Calcium	6,050	1,000	5,000	0	121	50	150				
Magnesium	5,560	500	5,000	0	111	50	150				
Sodium	6,000	1,000	5,000	0	120	50	150				

Sample ID: <b>2201482-001ADUP</b>		SampType: <b>DUP</b>			Units: <b>mEq/L</b>		Prep Date: <b>3/7/2022</b>			RunNo: <b>73809</b>		
Client ID: <b>BATCH</b>		Batch ID: <b>35624</b>			Analysis Date: <b>3/4/2022</b>			SeqNo: <b>1510906</b>				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Sodium Adsorption Ratio (SAR)	0.00880	0						0.01540	54.5	30	R
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**NOTES:**

R - High RPD observed.

Client Name: **SUMSCI**

Work Order Number: **2201492**

Logged by: **Brianna Barnes**

Date Received: **1/28/2022 11:59:00 AM**

### Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
2. How was the sample delivered? FedEx

### Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☒ No ☐
5. Custody Seals present on shipping container/cooler?  
(Refer to comments for Custody Seals not intact) Yes ☐ No ☐ Not Present ☒
6. Was an attempt made to cool the samples? Yes ☐ No ☒ NA ☐
7. Were all items received at a temperature of >2°C to 6°C \* Unknown prior to receipt. Yes ☐ No ☐ NA ☒
8. Sample(s) in proper container(s)? Yes ☒ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
10. Are samples properly preserved? Yes ☒ No ☐
11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
14. Does paperwork match bottle labels? Yes ☒ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
16. Is it clear what analyses were requested? Yes ☒ No ☐
17. Were all holding times able to be met? Yes ☒ No ☐

### Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:

Date:

By Whom:

Via:

☐ eMail

☐ Phone

☐ Fax

☐ In Person

Regarding:

Client Instructions:

19. Additional remarks:

### Item Information

Item #	Temp °C
Sample	12.5

\* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



# Fremont

ANALYTICAL

3600 Fremont Ave N.  
Seattle, WA 98103  
Tel: 206-352-3790  
Fax: 206-352-7178

## Chain of Custody Record & Laboratory Services Agreement

Date: 1.26.22 Page: 1 of 1

Project Name: 2201279

Laboratory Project No (Internal): 2201492  
Special Remarks:

Client: Summit Scientific

Project No:

Address: 4653 Table Mountain Drive

Collected by:

City, State, Zip: Golden, CO, 80403

Location:

Telephone: 303-277-9310

Report To (PM):

Sample Disposal: ☐ Return to client ☒ Disposal by lab (after 30 days)

Fax: PM Email: mpremer@s2scientific.com, pshrewsbury@s2scientific.com

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	SAR, EC, pH B Metals										Comments
1 20220118-FM0152-WH02H	1.18.22	1570	S	X	X	X								By hot water soluble
2 11-AOC04ft		1575		X	X	X								SAR, EC, pH by saturated
3 11-TP-DIS		1520		X	X	X								Paste
4 11-152-TP-comp		1525		X	X	X								Metals: As, Ba, Cd, Cu, Pb, Ni
5														Se, Ag, Zn
6														
7														
8														
9														
10														

\*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

Turn-around Time: ☒ Standard ☐ 2 Day ☐ 3 Day ☐ Next Day ☐ Same Day (specify)

\*\*Metals (Circle): ☐ Nitrate ☐ Nitrite ☐ Chloride ☐ Sulfate ☐ Bromide ☐ O-Phosphate ☐ Fluoride ☐ Nitrate+Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above and that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished	Date/Time	Received	Date/Time
<i>[Signature]</i>	1.26.22	<i>[Signature]</i>	1/26/22 11:59
Relinquished	Date/Time	Received	Date/Time
<i>[Signature]</i>		<i>[Signature]</i>	



Whiting Oil & Gas  
retail  
Denver CO, 80215

Project: Emerald #152 Closure

Project Number: 20221740.001A

Project Manager: Vince DeCianne

**Reported:**  
03/14/22 09:41

### Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference