

SS01@3'
B - <0.0020 mg/kg
T - <0.0050 mg/kg
E - <0.0050 mg/kg
X - <0.010 mg/kg
TPH - <50 mg/kg
N - <0.010 mg/kg
SAR - 0.0394
EC - 0.0801 mmhos/cm
pH - 7.70

SS05@5'
B - <0.0020 mg/kg
T - <0.0050 mg/kg
E - <0.0050 mg/kg
X - <0.010 mg/kg
TPH - <50 mg/kg
N - <0.010 mg/kg

Legend

- + Excavation Sample Location
+ Excavation Sample Location
(Not Submitted for Laboratory Analysis)
--- Excavation Extent

Notes

- 1) All locations are approximate unless otherwise noted
2) RED value indicates concentration greater than COGCC table 910-1 soil standard (see table below).
GPS – Global Positioning System
mg/kg – Milligrams Per Kilogram
mmhos/cm – Millimhos Per Centimeter

Contaminant of Concern	COGCC Concentration Standard
B - Benzene	0.17 mg/kg
T - Toluene	85 mg/kg
E - Ethylbenzene	100 mg/kg
X – Total Xylenes	175 mg/kg
TPH- Total Petroleum Hydrocarbons	500 mg/kg
N - Naphthalene	23 mg/kg
SAR – Sodium Absorption Ratio	<12 ⁵
EC – Electrical Conductivity	<4mmhos/cm or 2x background
pH	6-9



DATE:	09/07/2017
DESIGNED BY:	JW
DRAWN BY:	JW

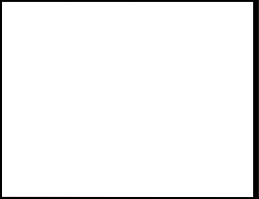


TASMAN
GEOSCIENCES

Tasman Geosciences, Inc.
6899 Pecos Street – Unit C
Denver, CO 80221

Noble Energy, Inc. – DJ Basin
Rothe BB 30-23 Vault Removal – Facility ID:419148
NWSE, Section 30, Township 5 North, Range 63 West
Weld County, Colorado

Excavation Soil Analytical
Results Map
(08/02/2017)



Summit Scientific

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

August 10, 2017

Brandon Bruns
Tasman Geosciences
6899 Pecos Street
Denver, CO 80221
RE: Rothe BB 30-23

Enclosed are the results of analyses for samples received by Summit Scientific on 08/03/17 09:30. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink, appearing to be 'Ben Shrewsbury', with a long, sweeping horizontal line extending to the right.

Ben Shrewsbury
Laboratory Manager



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/10/17 13:28

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
SS01@3'	1708028-01	Soil	08/02/17 15:15	08/03/17 09:30
SS05@6.5'	1708028-02	Soil	08/02/17 15:30	08/03/17 09:30

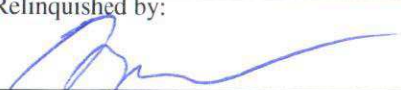
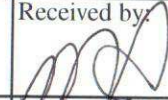
Summit Scientific

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.

1708028

Page 1 of 1

Project Manager:	Brandon Bruns, Invoice: Jacob Evans
E-Mail:	Bbruns@tasman-geo.com
Project Name:	Rothe BB 30-23
Project Number:	—

				Preservative				Matrix				Analyze For:										Special Instructions		
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR									
SS01@3'	8/2/17	1515	1			X			✓				X	X	X									
SS05@6.5'	8/2/17	1530	1			X			✓				X	X										
Relinquished by: 				Date/Time: 930 8/3/17		Received by: 				Date/Time: 8/3/17 930		Turn Around Time (Check)										Notes: on ice		
Relinquished by:				Date/Time:		Received by:				Date/Time:		Same Day		<input type="checkbox"/>		72 Hours		<input type="checkbox"/>		Standard			<input checked="" type="checkbox"/>	
												24 Hours		<input type="checkbox"/>		48 Hours		<input type="checkbox"/>						
Relinquished by:				Date/Time:		Received in Lab by:				Date/Time:		Sample Integrity:												
												Temperature Upon Receipt: 5.5°C												
												Intact: <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No												

1708028

Sample Receipt Checklist

S2 Work Order: _____

Client: Noble/TasmanClient Project ID: Rothe BB 30-23Shipped Via: P/U

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

Airbill #: _____

Matrix (check all that apply): _____ Air _____

☒ Soil/Solid

_____ Water _____

Other: _____

(Describe)

Cooler ID					
Temp (°C)	5.5				

Thermometer ID: 61857155-K

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

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

Custodian Printed Name

Signature or Initials of Custodian

Date/Time



Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/10/17 13:28

SS01@3'
1708028-01 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/02/17 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1708054	08/04/17	08/05/17	8015M	

Date Sampled: **08/02/17 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		110 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/02/17 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1708053	08/04/17	08/05/17	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/02/17 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		100 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		100 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		94.5 %	21-167		"	"	"	"	

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Date Sampled: **08/02/17 15:15**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	468	10.7	mg/kg dry	1	1708067	08/07/17	08/07/17	EPA 6020/Mod. USDA60 6(2, 3A)	

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/10/17 13:28

SS01@3'
1708028-01 (Soil)

Summit Scientific

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis

Magnesium	200	5.34	mg/kg dry	1	1708067	08/07/17	08/07/17	EPA 6020/Mod. USDA60 6(2, 3A)
Sodium	47.9	5.34	"	"	"	"	"	"
Sodium Adsorption Ratio	0.467		units	"	1708087	08/08/17	08/08/17	"

Physical Parameters by APHA/ASTM/EPA Methods

Date Sampled: **08/02/17 15:15**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
pH	8.55	0.100	pH Units	1	1708059	08/04/17	08/04/17	EPA 9045	
Specific Conductance (EC)	0.420	0.0100	mmhos/cm	"	1708058	08/04/17	08/04/17	SM 2510B	
% Solids	93.7		%	"	1708060	08/04/17	08/04/17	% calculation	

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
08/10/17 13:28

SS05@6.5'
1708028-02 (Soil)

Summit Scientific

Extractable Petroleum Hydrocarbons by 8015

Date Sampled: **08/02/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1708054	08/04/17	08/05/17	8015M	

Date Sampled: **08/02/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		107 %	30-150		"	"	"	"	

Volatile Organic Compounds by EPA Method 8260B

Date Sampled: **08/02/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1708053	08/04/17	08/05/17	EPA 8260B	
Benzene	ND	0.0020	"	"	"	"	"	"	
Toluene	ND	0.0050	"	"	"	"	"	"	
Ethylbenzene	ND	0.0050	"	"	"	"	"	"	
Xylenes (total)	ND	0.010	"	"	"	"	"	"	
Gasoline Range Hydrocarbons	ND	50	"	"	"	"	"	"	

Date Sampled: **08/02/17 15:30**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		104 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		101 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		93.8 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
08/10/17 13:28

Extractable Petroleum Hydrocarbons by 8015 - Quality Control
Summit Scientific

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

Batch 1708054 - EPA 3550A

Blank (1708054-BLK1)

Prepared & Analyzed: 08/04/17

C10-C28 (DRO)	ND	50	mg/kg							
Surrogate: o-Terphenyl	13.2		"	12.5		106	30-150			

LCS (1708054-BS1)

Prepared & Analyzed: 08/04/17

C10-C28 (DRO)	606	50	mg/kg	499		122	73-134			
Surrogate: o-Terphenyl	14.6		"	12.5		117	30-150			

Matrix Spike (1708054-MS1)

Source: 1708027-01

Prepared & Analyzed: 08/04/17

C10-C28 (DRO)	606	50	mg/kg	499	37.2	114	50-148			
Surrogate: o-Terphenyl	14.4		"	12.5		116	30-150			

Matrix Spike Dup (1708054-MSD1)

Source: 1708027-01

Prepared & Analyzed: 08/04/17

C10-C28 (DRO)	565	50	mg/kg	499	37.2	106	50-148	7.03	20	
Surrogate: o-Terphenyl	13.5		"	12.5		108	30-150			

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/10/17 13:28

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 1708053 - EPA 5030 Soil MS

Blank (1708053-BLK1)

Prepared & Analyzed: 08/04/17

Naphthalene	ND	0.010	mg/kg							
Benzene	ND	0.0020	"							
Toluene	ND	0.0050	"							
Ethylbenzene	ND	0.0050	"							
Xylenes (total)	ND	0.010	"							
Gasoline Range Hydrocarbons	ND	50	"							
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0416</i>		<i>"</i>	<i>0.0400</i>		<i>104</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0403</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0395</i>		<i>"</i>	<i>0.0400</i>		<i>98.7</i>	<i>21-167</i>			

LCS (1708053-BS1)

Prepared & Analyzed: 08/04/17

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.0874	0.0020	"	0.100		87.4	58-130			
Toluene	0.0938	0.0050	"	0.100		93.8	61-134			
Ethylbenzene	0.0943	0.0050	"	0.0992		95.1	74-139			
m,p-Xylene	0.181	0.010	"	0.200		90.9	73-137			
o-Xylene	0.0928	0.0050	"	0.0980		94.7	73-141			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0403</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0411</i>		<i>"</i>	<i>0.0400</i>		<i>103</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0384</i>		<i>"</i>	<i>0.0400</i>		<i>96.1</i>	<i>21-167</i>			

Matrix Spike (1708053-MS1)

Source: 1708027-01

Prepared & Analyzed: 08/04/17

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.0848	0.0020	"	0.100	ND	84.8	30-131			
Toluene	0.0891	0.0050	"	0.100	ND	89.1	30-134			
Ethylbenzene	0.0883	0.0050	"	0.0992	ND	89.0	22-153			
m,p-Xylene	0.171	0.010	"	0.200	ND	85.5	10-159			
o-Xylene	0.0859	0.0050	"	0.0980	ND	87.6	31-151			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	<i>0.0420</i>		<i>"</i>	<i>0.0400</i>		<i>105</i>	<i>23-173</i>			
<i>Surrogate: Toluene-d8</i>	<i>0.0404</i>		<i>"</i>	<i>0.0400</i>		<i>101</i>	<i>20-170</i>			
<i>Surrogate: 4-Bromofluorobenzene</i>	<i>0.0375</i>		<i>"</i>	<i>0.0400</i>		<i>93.8</i>	<i>21-167</i>			

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
08/10/17 13:28

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 1708053 - EPA 5030 Soil MS

Matrix Spike Dup (1708053-MSD1)		Source: 1708027-01			Prepared & Analyzed: 08/04/17					
Naphthalene	ND	0.010	mg/kg		ND		10-158		42	
Benzene	0.0761	0.0020	"	0.100	ND	76.1	30-131	10.9	34	
Toluene	0.0807	0.0050	"	0.100	ND	80.7	30-134	9.82	30	
Ethylbenzene	0.0807	0.0050	"	0.0992	ND	81.4	22-153	8.98	24	
m,p-Xylene	0.158	0.010	"	0.200	ND	79.4	10-159	7.49	68	
o-Xylene	0.0806	0.0050	"	0.0980	ND	82.3	31-151	6.27	38	
Surrogate: 1,2-Dichloroethane-d4	0.0425		"	0.0400		106	23-173			
Surrogate: Toluene-d8	0.0402		"	0.0400		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0382		"	0.0400		95.5	21-167			

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/10/17 13:28

Soluble Nutrients by EPA 6020/Mod. USDA60 6(2, 3A) - Dry Weight Basis - Quality Control
Summit Scientific

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

Batch 1708067 - General Preparation

Blank (1708067-BLK1)

Prepared & Analyzed: 08/07/17

Calcium	ND	10.0	mg/kg wet
Magnesium	ND	5.00	"
Sodium	ND	5.00	"

LCS (1708067-BS1)

Prepared & Analyzed: 08/07/17

Calcium	485	10.0	mg/kg wet	500	97.1	82.9-118
Magnesium	460	5.00	"	500	92.0	77.1-123
Sodium	466	5.00	"	500	93.3	71-129

Duplicate (1708067-DUP1)

Source: 1708027-01

Prepared & Analyzed: 08/07/17

Calcium	1400	11.8	mg/kg dry	1400	0.0949	200
Magnesium	414	5.92	"	420	1.34	200
Sodium	24.2	5.92	"	30.3	22.3	200

Matrix Spike (1708067-MS1)

Source: 1708027-01

Prepared & Analyzed: 08/07/17

Calcium	1860	11.8	mg/kg dry	592	1400	78.7	75-125
Magnesium	998	5.92	"	592	420	97.5	75-125
Sodium	607	5.92	"	592	30.3	97.3	75-125

Matrix Spike Dup (1708067-MSD1)

Source: 1708027-01

Prepared & Analyzed: 08/07/17

Calcium	1900	11.8	mg/kg dry	592	1400	85.4	75-125	2.12	25
Magnesium	923	5.92	"	592	420	85.0	75-125	7.74	25
Sodium	565	5.92	"	592	30.3	90.3	75-125	7.03	25

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23
Project Number: [none]
Project Manager: Brandon Brunns

Reported:
08/10/17 13:28

Physical Parameters by APHA/ASTM/EPA Methods - Quality Control
Summit Scientific

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

Batch 1708058 - General Preparation

Blank (1708058-BLK1)

Prepared & Analyzed: 08/04/17

Specific Conductance (EC) ND 0.0100 mmhos/cm

LCS (1708058-BS1)

Prepared & Analyzed: 08/04/17

Specific Conductance (EC) 0.750 0.0100 mmhos/cm 0.750 100 90-110

Duplicate (1708058-DUP1)

Source: 1708027-01

Prepared & Analyzed: 08/04/17

Specific Conductance (EC) 0.391 0.0100 mmhos/cm 0.392 0.243 20

Batch 1708059 - General Preparation

LCS (1708059-BS1)

Prepared & Analyzed: 08/04/17

pH 6.02 0.100 pH Units 6.00 100 95-105

Duplicate (1708059-DUP1)

Source: 1708027-01

Prepared & Analyzed: 08/04/17

pH 8.77 0.100 pH Units 8.80 0.341 20

Batch 1708060 - General Preparation

Duplicate (1708060-DUP1)

Source: 1708027-01

Prepared & Analyzed: 08/04/17

% Solids 83.1 % 84.4 1.55 20

Summit Scientific

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Tasman Geosciences
6899 Pecos Street
Denver CO, 80221

Project: Rothe BB 30-23

Project Number: [none]
Project Manager: Brandon Bruns

Reported:
08/10/17 13:28

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