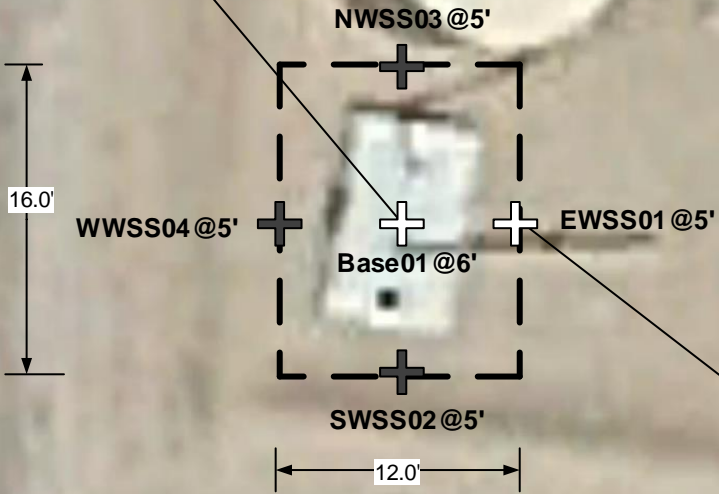


**Base01 @6'**  
B - <0.0020 mg/kg  
T - <0.0050 mg/kg  
E - <0.0050 mg/kg  
X - <0.010 mg/kg  
TPH - <50 mg/kg  
N - <0.010 mg/kg



**EWSS01 @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  
SAR - 0.399  
EC - 0.526 mmhos/cm  
pH - **9.43**

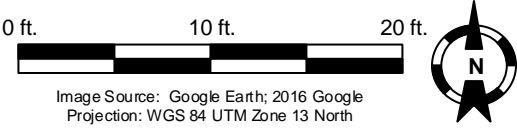
**Legend**

- + Excavation Sample Location
- + Excavation Sample Location (Not Submitted for Laboratory Analysis)
- - - Excavation Extent
- GPS Global Positioning System
- mg/kg Milligrams per Kilogram
- mmhos/cm Millihos per Centimeter

**Notes**

- 1) All locations are approximate unless otherwise noted.
- 2) Site infrastructure has been removed. Shown for illustrative purposes only.
- 3) **RED** value indicates a concentration greater than COGCC table 910-1 soil standard (see table below).

Contaminant of Concern	COGCC Soil 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 <sup>5</sup>
EC - Electrical Conductivity	<4mmhos/cm or 2x background
pH	6-9



DATE:	10/24/2017
DESIGNED BY:	B.Fields
DRAWN BY:	B.Fields



**TASMAN**  
GEOSCIENCES

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

**Noble Energy, Inc. – DJ Basin**  
**Herbst 27-03 Vault Removal – Location ID: 323316**  
NENE, Section 27, Township 5 North, Range 65 West  
Weld County, Colorado

Excavation Soil Analytical  
Results Map  
(October 18, 2017)

FIGURE 1

# Summit Scientific

---

741 Corporate Circle – Suite I ♦ Golden, Colorado 80401

303.277.9310 - laboratory ♦ 303.277.9531 - fax

October 24, 2017

Brandon Bruns  
Tasman Geosciences  
6899 Pecos Street  
Denver, CO 80221  
RE: Herbst 27-03

Enclosed are the results of analyses for samples received by Summit Scientific on 10/18/17 17:00. 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 For Ben Shrewsbury  
Laboratory Manager



Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

### ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EWSS01@5'	1710206-01	Soil	10/18/17 12:42	10/18/17 17:00
Base01@6'	1710206-02	Soil	10/18/17 12:59	10/18/17 17:00



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.*

## 1710206

Page 1 of 1

Project Manager: Brandon Bruns / Jacob Evans (Noble)  
E-Mail: bbruns@hysman-geo.com  
Project Name: Herbst 27-03  
Project Number: -

				Preservative				Matrix				Analyze For:											
Sample Description	Date Sampled	Time Sampled	Number of Containers	HCl	HNO <sub>3</sub>	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	8260 BTEX	8260B GBTEXN	8015 DRO	pH, EC, SAR							Special Instructions	
EWSS0105'	10/18/17	1242	2			X			X				X	X	X								
Base 0106'	10/18/17	1259	1			X			X				X	X									
Relinquished by:  Date/Time: 10/18/17				Received by:  Date/Time: 10-18-17 17:00				Turn Around Time (Check) Same Day <input type="checkbox"/> 72 Hours <input checked="" type="checkbox"/> 24 Hours <input type="checkbox"/> Standard 48 Hours <input type="checkbox"/>										Notes:  1 on 16					
Relinquished by: _____ Date/Time: _____				Received by: _____ Date/Time: _____				Sample Integrity: Temperature Upon Receipt: 5.02 Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>															
Relinquished by: _____ Date/Time: _____				Received in Lab by: _____ Date/Time: _____																			

1710206

## Sample Receipt Checklist

S2 Work Order: \_\_\_\_\_

Client: TasmanClient Project ID: Herbst 27-03Shipped Via: P/U  
(UPS, FedEx, Hand Delivered, Pick-up, etc.)

Airbill #: \_\_\_\_\_

Matrix (check all that apply):      Air   X   Soil/Solid      Water      Other: \_\_\_\_\_  
(Describe)

Cooler ID					
Temp (°C)	<u>5.0°C</u>				

Thermometer ID: 61857155-K

	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 provided that there is evidence that cooling has begun.	<u>✓</u>			<u>on ice</u>
Were all samples received intact <sup>(1)</sup> ?	<u>✓</u>			
Was adequate sample volume provided <sup>(1)</sup> ?	<u>✓</u>			
If custody seals are present, are they intact <sup>(1)</sup> ?	<u>✓</u>			
Are short holding time analytes or samples with HTs due within 48 hours present?			<u>✓</u>	
Is a chain-of-custody (COC) form present and filled out completely <sup>(1)</sup> ?	<u>✓</u>			
Does the COC agree with the number and type of sample bottles received <sup>(1)</sup> ?	<u>✓</u>			
Do the sample IDs on the bottle labels match the COC <sup>(1)</sup> ?	<u>✓</u>			
Is the COC properly relinquished by the client w/ date and time recorded <sup>(1)</sup> ?	<u>✓</u>			
For volatiles in water – is there headspace present? If yes, contact client and note in narrative.			<u>✓</u>	
Are samples preserved that require preservation (excluding cooling) <sup>(1)</sup> ?			<u>✓</u>	
Note the type of preservative in the Comments column – HCl, H2SO4, NaOH, HNO3, ect				
If samples are acid preserved for metals, is the pH ≤ 2 <sup>(1)</sup> ?			<u>✓</u>	
Record the pH in Comments.				
If dissolved metals are requested, were samples field filtered?			<u>✓</u>	
Additional Comments (if any):				

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

Eric H  
Custodian Printed Name[Signature]  
Signature or Initials of Custodian10-18-17 17:00  
Date/Time





Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

**EWSS01@5'**  
**1710206-01 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/18/17 12:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1710201	10/19/17	10/21/17	8015M	

Date Sampled: **10/18/17 12:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		109 %	30-150		"	"	"	"	

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

Date Sampled: **10/18/17 12:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1710200	10/19/17	10/21/17	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: **10/18/17 12:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		102 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		98.0 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		99.2 %	21-167		"	"	"	"	

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

Date Sampled: **10/18/17 12:42**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Calcium	<b>367</b>	10.8	mg/kg dry	1	1710165	10/19/17	10/19/17	EPA 6020/Mod. USDA60 6(2, 3A)	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

**EWSS01@5'**  
**1710206-01 (Soil)**

**Summit Scientific**

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

<b>Magnesium</b>	<b>203</b>	5.39	mg/kg dry	1	1710165	10/19/17	10/19/17	EPA 6020/Mod. USDA60 6(2, 3A)
<b>Sodium</b>	<b>38.4</b>	5.39	"	"	"	"	"	"
<b>Sodium Adsorption Ratio</b>	<b>0.399</b>		units	"	1710225	10/20/17	10/20/17	"

**Physical Parameters by APHA/ASTM/EPA Methods**

Date Sampled: **10/18/17 12:42**

Analyte	Result	Reporting		Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit	Units						
<b>pH</b>	<b>9.43</b>	0.100	pH Units	1	1710234	10/23/17	10/23/17	EPA 9045	
<b>Specific Conductance (EC)</b>	<b>0.526</b>	0.0100	mmhos/cm	"	1710235	10/23/17	10/23/17	SM 2510B	
<b>% Solids</b>	<b>92.7</b>		%	"	1710199	10/19/17	10/19/17	% calculation	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

**Base01@6'**  
**1710206-02 (Soil)**

**Summit Scientific**

**Extractable Petroleum Hydrocarbons by 8015**

Date Sampled: **10/18/17 12:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
C10-C28 (DRO)	ND	50	mg/kg	1	1710201	10/19/17	10/21/17	8015M	

Date Sampled: **10/18/17 12:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: o-Terphenyl		111 %	30-150		"	"	"	"	

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

Date Sampled: **10/18/17 12:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Naphthalene	ND	0.010	mg/kg	1	1710200	10/19/17	10/21/17	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: **10/18/17 12:59**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Surrogate: 1,2-Dichloroethane-d4		99.8 %	23-173		"	"	"	"	
Surrogate: Toluene-d8		95.9 %	20-170		"	"	"	"	
Surrogate: 4-Bromofluorobenzene		100 %	21-167		"	"	"	"	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

**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 1710201 - EPA 3550A**

**Blank (1710201-BLK1)**

Prepared: 10/19/17 Analyzed: 10/21/17

C10-C28 (DRO) ND 50 mg/kg

Surrogate: o-Terphenyl 13.3 " 12.5 106 30-150

**LCS (1710201-BS1)**

Prepared: 10/19/17 Analyzed: 10/21/17

C10-C28 (DRO) 515 50 mg/kg 499 103 73-134

Surrogate: o-Terphenyl 14.8 " 12.5 118 30-150

**Matrix Spike (1710201-MS1)**

**Source: 1710203-01**

Prepared: 10/19/17 Analyzed: 10/21/17

C10-C28 (DRO) 495 50 mg/kg 499 10.6 97.0 50-148

Surrogate: o-Terphenyl 14.4 " 12.5 115 30-150

**Matrix Spike Dup (1710201-MSD1)**

**Source: 1710203-01**

Prepared: 10/19/17 Analyzed: 10/21/17

C10-C28 (DRO) 500 50 mg/kg 499 10.6 98.1 50-148 1.05 20

Surrogate: o-Terphenyl 13.7 " 12.5 110 30-150

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

**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 1710200 - EPA 5030 Soil MS**

**Blank (1710200-BLK1)**

Prepared: 10/19/17 Analyzed: 10/21/17

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	"							
Surrogate: 1,2-Dichloroethane-d4	0.0406		"	0.0400		102	23-173			
Surrogate: Toluene-d8	0.0397		"	0.0400		99.2	20-170			
Surrogate: 4-Bromofluorobenzene	0.0402		"	0.0400		100	21-167			

**LCS (1710200-BS1)**

Prepared: 10/19/17 Analyzed: 10/21/17

Naphthalene	ND	0.010	mg/kg				66-138			
Benzene	0.110	0.0020	"	0.100		110	58-130			
Toluene	0.110	0.0050	"	0.100		110	61-134			
Ethylbenzene	0.129	0.0050	"	0.0992		130	74-139			
m,p-Xylene	0.241	0.010	"	0.200		121	73-137			
o-Xylene	0.118	0.0050	"	0.0980		120	73-141			
Surrogate: 1,2-Dichloroethane-d4	0.0423		"	0.0400		106	23-173			
Surrogate: Toluene-d8	0.0398		"	0.0400		99.4	20-170			
Surrogate: 4-Bromofluorobenzene	0.0412		"	0.0400		103	21-167			

**Matrix Spike (1710200-MS1)**

**Source: 1710203-01**

Prepared: 10/19/17 Analyzed: 10/21/17

Naphthalene	ND	0.010	mg/kg		ND		10-158			
Benzene	0.109	0.0020	"	0.100	ND	109	30-131			
Toluene	0.111	0.0050	"	0.100	ND	111	30-134			
Ethylbenzene	0.126	0.0050	"	0.0992	ND	127	22-153			
m,p-Xylene	0.236	0.010	"	0.200	ND	118	10-159			
o-Xylene	0.118	0.0050	"	0.0980	ND	121	31-151			
Surrogate: 1,2-Dichloroethane-d4	0.0439		"	0.0400		110	23-173			
Surrogate: Toluene-d8	0.0401		"	0.0400		100	20-170			
Surrogate: 4-Bromofluorobenzene	0.0403		"	0.0400		101	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Brunns

**Reported:**  
10/24/17 09:35

**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 1710200 - EPA 5030 Soil MS**

Matrix Spike Dup (1710200-MSD1)		Source: 1710203-01			Prepared: 10/19/17		Analyzed: 10/21/17			
Naphthalene	ND	0.010	mg/kg		ND		10-158			42
Benzene	0.110	0.0020	"	0.100	ND	110	30-131	1.04		34
Toluene	0.114	0.0050	"	0.100	ND	114	30-134	2.80		30
Ethylbenzene	0.130	0.0050	"	0.0992	ND	131	22-153	3.07		24
m,p-Xylene	0.244	0.010	"	0.200	ND	122	10-159	3.04		68
o-Xylene	0.120	0.0050	"	0.0980	ND	122	31-151	1.01		38
Surrogate: 1,2-Dichloroethane-d4		0.0434	"	0.0400		109	23-173			
Surrogate: Toluene-d8		0.0399	"	0.0400		99.7	20-170			
Surrogate: 4-Bromofluorobenzene		0.0409	"	0.0400		102	21-167			

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

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

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

**Batch 1710165 - General Preparation**

**Blank (1710165-BLK1)**

Prepared & Analyzed: 10/19/17

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

**LCS (1710165-BS1)**

Prepared & Analyzed: 10/19/17

Calcium	544	10.0	mg/kg wet	500	109	82.9-118
Magnesium	538	5.00	"	500	108	77.1-123
Sodium	526	5.00	"	500	105	71-129

**Duplicate (1710165-DUP1)**

Source: 1710162-05

Prepared & Analyzed: 10/19/17

Calcium	605	12.0	mg/kg dry	578	4.42	200
Magnesium	840	6.00	"	950	12.3	200
Sodium	375	6.00	"	383	2.01	200

**Matrix Spike (1710165-MS1)**

Source: 1710162-05

Prepared & Analyzed: 10/19/17

Calcium	1180	12.0	mg/kg dry	600	578	100	75-125
Magnesium	1620	6.00	"	600	950	112	75-125
Sodium	1070	6.00	"	600	383	115	75-125

**Matrix Spike Dup (1710165-MSD1)**

Source: 1710162-05

Prepared & Analyzed: 10/19/17

Calcium	1220	12.0	mg/kg dry	600	578	107	75-125	3.44	25
Magnesium	1440	6.00	"	600	950	81.4	75-125	12.2	25
Sodium	1080	6.00	"	600	383	116	75-125	0.127	25

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03  
Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

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

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

**Batch 1710199 - General Preparation**

<b>Duplicate (1710199-DUP1)</b>	<b>Source: 1710184-01</b>			Prepared & Analyzed: 10/19/17						
% Solids	84.9		%		84.7			0.236	20	

**Batch 1710234 - General Preparation**

<b>LCS (1710234-BS1)</b>	Prepared & Analyzed: 10/23/17									
pH	9.18	0.100	pH Units		9.16	100	95-105			
<b>Duplicate (1710234-DUP1)</b>	<b>Source: 1710185-01</b>			Prepared & Analyzed: 10/23/17						
pH	8.67	0.100	pH Units		8.65			0.231	20	

**Batch 1710235 - General Preparation**

<b>Blank (1710235-BLK1)</b>	Prepared & Analyzed: 10/23/17									
Specific Conductance (EC)	ND	0.0100	mmhos/cm							
<b>LCS (1710235-BS1)</b>	Prepared & Analyzed: 10/23/17									
Specific Conductance (EC)	0.749	0.0100	mmhos/cm		0.750	99.9	90-110			
<b>Duplicate (1710235-DUP1)</b>	<b>Source: 1710185-01</b>			Prepared & Analyzed: 10/23/17						
Specific Conductance (EC)	34.2	0.0100	mmhos/cm		31.6			7.86	20	

Summit Scientific

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Tasman Geosciences  
6899 Pecos Street  
Denver CO, 80221

Project: Herbst 27-03

Project Number: [none]  
Project Manager: Brandon Bruns

**Reported:**  
10/24/17 09:35

### 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