

Summit Scientific

4653 Table Mountain Drive, Golden, Colorado 80403

303.277.9310

May 18, 2021

Karen Olson

PDC Energy

1775 Sherman St. STE. 3000

Denver, CO 80203

RE: DWR Permit #137465

Work Order #2105179

Enclosed are the results of analyses for samples received by Summit Scientific on 05/13/21 18:14. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Muri Premer". The signature is written in a cursive style with a large, stylized 'M' and 'P'.

Muri Premer For Paul Shrewsbury
President



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: DWR Permit #137465

Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
05/18/21 14:49

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EFF-051321-1255	2105179-01	Water	05/13/21 12:55	05/13/21 18:14
INF-051321-1355	2105179-02	Water	05/13/21 13:55	05/13/21 18:14

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.

2105179

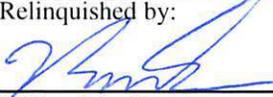
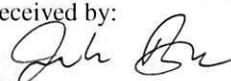
Summit Scientific

741 Corporate Circle Suite I ♦ Golden, Colorado 80401
303-277-9310 ♦ 303-374-5933 Fax

Client: PDC/Tasman
Address: 6855 W. 119th ave.
City/State/Zip: Broomfield, CO 80020
Phone: 9704816909 Fax:
Sampler Name: Max Dahlgren ~~Jake McCarver~~

Project Manager: MD Mark Longhurst Karen Olson
E-Mail: MD Mark.Longhurst@pdcc.com Karen.Olson@pdcc.com
Project Name: DWR Permit # 137465
Project Number: AFE # EX-000335

Sample Description	Date Sampled	Time Sampled	Number of Containers	Preservative				Matrix			Analyze For:				Special Instructions	
				HCl	HNO ₃	None	Other (Specify)	Groundwater	Soil	Air - Canister Serial #	Other (Specify)	DIG Gas	Composition Methan (Carbon)	DIG Methane (Hydrogen)		
EFF-051321-1255	5/13/21	1255	3			X		X								4th container for INF-051321 Sample is Iso Flask (FOAGY)
INF-051321-1355	5/13/21	1355	4			X		X					X	X	X	

Relinquished by: 	Date/Time: 5/13/21 1502	Received by: Tasman Lock Box	Date/Time: 5/13/21 1502	Turn Around Time (Check) Same Day <input type="checkbox"/> 72 Hours <input type="checkbox"/> 24 Hours <input checked="" type="checkbox"/> Standard <input type="checkbox"/> 48 Hours <input type="checkbox"/> Sample Integrity: Temperature Upon Receipt: <u>6</u> Intact: Yes <input checked="" type="checkbox"/> No <input type="checkbox"/>
Relinquished by: Tasman Lock Box	Date/Time: 5/13/21 1750	Received by: 	Date/Time: 5/13/21 1750	
Relinquished by:	Date/Time:	Received in Lab by:	Date/Time:	

Sample Receipt Checklist

S2 Work Order 2105179

Client: PDC / Tasman Client Project ID DWR Permit #137465

Shipped Via: H.D./P.U./FedEx/UPS/USPS/Other _____ Airbill #: _____

Matrix (check all that apply): Air Soil/Solid Water Other: _____
(Describe)

Temp (°C)	6
-----------	---

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.	✓			On ice
Were all samples received intact ⁽¹⁾ ?	✓			
Was adequate sample volume provided ⁽¹⁾ ?	✓			
If custody seals are present, are they intact ⁽¹⁾ ?			✓	
Are samples with holding times due within 48 hours sample due within 48 hours present?	✓			24 hours
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, H2SO4, NaOH, HNO3, 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.

JB
Custodian Printed Name or Initials

John Boy
Signature of Custodian

5/13/21
Date/Time



PDC Energy
 1775 Sherman St. STE. 3000
 Denver CO, 80203

Project: DWR Permit #137465
 Project Number: AFE #EX-000335
 Project Manager: Karen Olson

Reported:
 05/18/21 14:49

EFF-051321-1255
2105179-01 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **05/13/21 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
Methane	3.4	1.0	mg/L	100	BEE0242	05/13/21	05/14/21	RSK-175 mod	
Ethane	2.6	0.10	"	10	"	"	"	"	
Propane	1.5	0.10	"	"	"	"	"	"	

Date Sampled: **05/13/21 12:55**

Analyte	Result	Reporting Limit	Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
<i>Surrogate: Ethene</i>		110 %	70-130		"	"	"	"	

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PDC Energy
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 Denver CO, 80203

Project: DWR Permit #137465

Project Number: AFE #EX-000335
 Project Manager: Karen Olson

Reported:
 05/18/21 14:49

INF-051321-1355
2105179-02 (Water)

Summit Scientific

Dissolved Gases by RSK-175

Date Sampled: **05/13/21 13:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
Methane	12	1.0		mg/L	100	BEE0242	05/13/21	05/14/21	RSK-175 mod	
Ethane	4.9	1.0		"	"	"	"	"	"	
Propane	2.6	1.0		"	"	"	"	"	"	

Date Sampled: **05/13/21 13:55**

Analyte	Result	Reporting		Units	Dilution	Batch	Prepared	Analyzed	Method	Notes
		Limit								
<i>Surrogate: Ethene</i>		110 %		70-130		"	"	"	"	

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PDC Energy
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Denver CO, 80203

Project: DWR Permit #137465

Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
05/18/21 14:49

Dissolved Gases by RSK-175 - Quality Control

Summit Scientific

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

Batch BEE0242 - GC

Blank (BEE0242-BLK1)

Prepared: 05/13/21 Analyzed: 05/14/21

Methane	ND	0.010	mg/L								
Ethane	ND	0.010	"								
Propane	ND	0.010	"								
<i>Surrogate: Ethene</i>	<i>0.0435</i>		<i>"</i>	<i>0.0364</i>		<i>120</i>	<i>70-130</i>				

LCS (BEE0242-BS1)

Prepared: 05/13/21 Analyzed: 05/14/21

Methane	0.030	0.010	mg/L	0.0428		70.4	70-130				
Ethane	0.083	0.010	"	0.0798		104	70-130				
Propane	0.12	0.010	"	0.139		86.1	70-130				
<i>Surrogate: Ethene</i>	<i>0.0847</i>		<i>"</i>	<i>0.0728</i>		<i>116</i>	<i>70-130</i>				

Duplicate (BEE0242-DUP1)

Source: 2105179-01

Prepared: 05/13/21 Analyzed: 05/14/21

Methane	5.0	1.0	mg/L		3.4			39.2	30		QR-03
Ethane	4.0	1.0	"		2.6			43.2	30		QR-03
Propane	3.4	1.0	"		1.5			75.2	30		QR-03
<i>Surrogate: Ethene</i>	<i>0.0700</i>		<i>"</i>	<i>0.0364</i>		<i>192</i>	<i>70-130</i>				<i>S-06</i>

Matrix Spike (BEE0242-MS1)

Source: 2105179-01

Prepared: 05/13/21 Analyzed: 05/14/21

Methane	3.9	1.0	mg/L	0.0428	3.4	NR	70-130				QM-05
Ethane	2.0	1.0	"	0.0798	2.6	NR	70-130				QM-05
Propane	1.4	0.10	"	0.139	1.5	NR	70-130				QM-05
<i>Surrogate: Ethene</i>	<i>0.0800</i>		<i>"</i>	<i>0.0728</i>		<i>110</i>	<i>70-130</i>				

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dig
Dolan Integration Group

Geochemistry for Energy

11025 Dover Street Unit 800
Westminster, CO 80021
p: 303.531.2030

Hydrocarbon Gas Composition and Stable Isotopes Data and Interpretation

Job #: 21055734
Lab #: DIG-025360
Client: Summit Scientific
Sample Name(s): INF-051321-1355

The analytical results, opinions, or interpretations contained in this report are based upon information and material supplied by the client for whose exclusive and confidential use this report has been made. The analytical results, opinions, or interpretations expressed represent the best judgment of Dolan Integration Group based on its experience, but any interpretation of test or other data, and any recommendation(s) based upon such interpretations, are opinions based upon inferences from measurements and empirical relationships and assumptions which are not infallible, and with respect to which professional engineers and analysts may differ. Accordingly, Dolan Integration Group makes no warranty or representation, expressed or implied, of any type, and expressly disclaims same as to the productivity, proper operations, or profitability of any oil, gas, coal, or other mineral, property, well, or sand in connection with which such report is used or relied upon for any reason whatsoever. This report shall not be reproduced, in whole or in part, without the written approval of Dolan Integration Group.

Dolan Integration Group shall use commercially reasonable efforts to maintain the Samples it receives from Customer in the condition in which same were initially received, and shall store, free of charge, any portion(s) of the Sample(s) not consumed or altered in the course of testing and analysis for a period of 60 days after their initial receipt, after which time the Samples will be destroyed. At Customer's written request and expense, Dolan Integration Group shall return unused Samples to Customer. At Customer's written request, Dolan Integration Group will also store and maintain Customer's Samples beyond the Free Storage Period for a monthly fee in accordance with Dolan Integration Group's the current storage rates. If Customer fails to timely pay any applicable storage charges, Dolan Integration Group shall

Analytical Report



Job #: 21055734
 Lab #: DIG-025360
 Client: Summit Scientific
 Sample Name: INF-051321-1355
 Date Sampled: 05/13/21
 Time Sampled: 13:55
 Sample Description: Isoflask
 Sampling Notes:
 Date Received: 05/14/21
 Date Analyzed: Gas Composition: 05/14/21 $\delta^{13}\text{C}$: 05/17/21 δD : 05/14/21
 Date Reported: 05/18/21
 Comments:

Measured Values:	Measured ppm	Analyte mol % ^a	HC mol %	$\delta^{13}\text{C}$ ‰ VPDB	δD ‰ VSMOW	Comments
Nitrogen (N ₂)	361657	35.50	-	-	-	
Oxygen + Argon (O ₂ +Ar)	78416	7.70	-	-	-	
Carbon Dioxide (CO ₂)	1277	0.13	-	-	-	
Helium (He) ^b	232	0.02	-	-	-	
Hydrogen (H ₂)	nd	nd	-	-	-	
Methane (CH ₄)	489071	48.01	84.74	-54.0	-271	
Ethane (C ₂ H ₆)	57764	5.67	10.01		-	
Ethene (C ₂ H ₄)	nd	nd	nd		-	
Propane (C ₃ H ₈)	23077	2.27	4.00		-	
iso-Butane (C ₄ H ₁₀)	2224	0.22	0.39		-	
n-Butane (C ₄ H ₁₀)	3808	0.37	0.66		-	
iso-Pentane (C ₅ H ₁₂)	547	0.05	0.09		-	
n-Pentane (C ₅ H ₁₂)	421	0.04	0.07		-	
Hexanes + (C ₆ H ₁₄)	209	0.02	0.04		-	

Calculated Values:	
Total HCs (ppm)	577121
Gas Wetness (mol % C ₂ +C ₁ +))	15.26
C ₁ /(C ₂ +C ₃) (mol/mol)	6

^a Analyte concentrations normalized to 100% (Mol. % is approximately equal to Vol. %)

^b Addition of helium negates the ability to detect native helium and may negate the ability to detect hydrogen.

HC= Hydrocarbons

nd = not detected

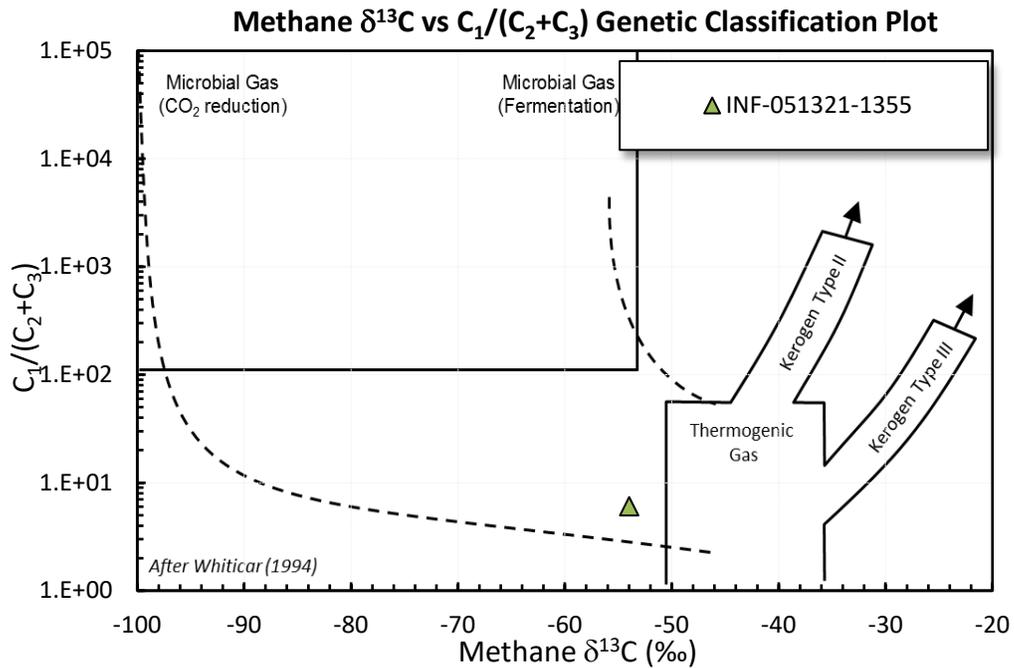
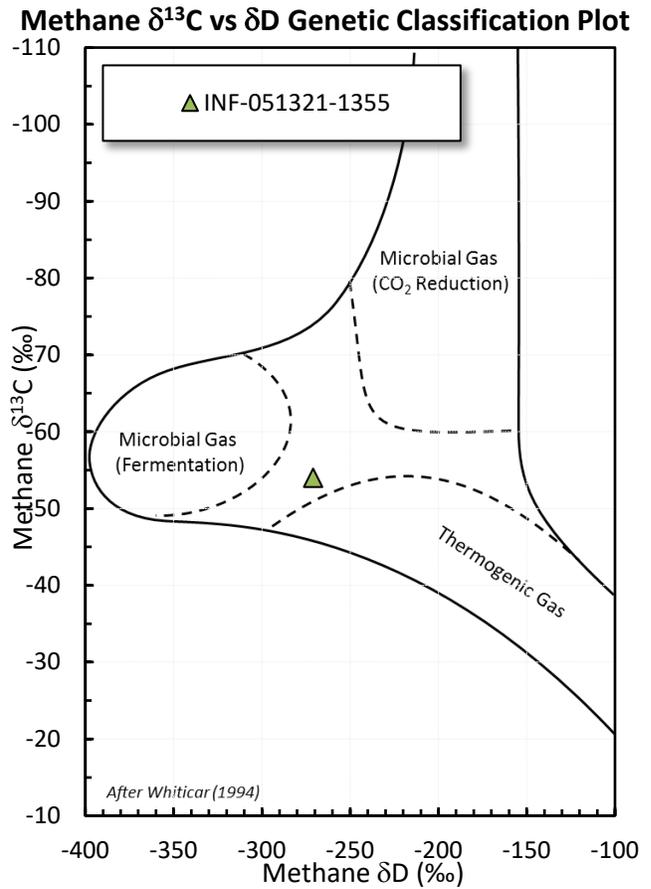
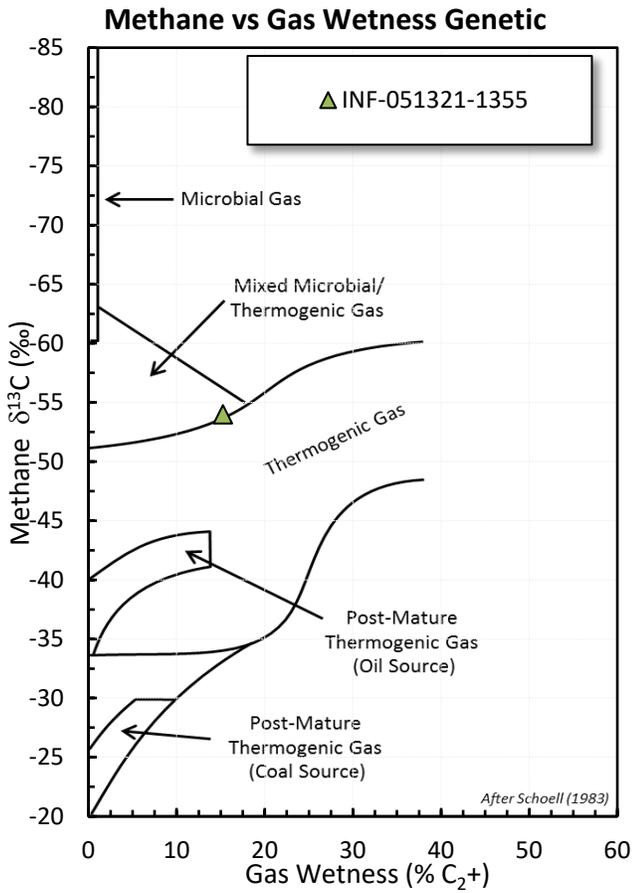
na = not analyzed

Stable isotope results based on multi-point laboratory calibration

Error $\delta^{13}\text{C}$ < 0.5 ‰

Error δD < 5.0 ‰

Stable Isotope Interpretive Plots





main 303.531.2030 • info@digforenergy.com • digforenergy.com
Office and Lab 11025 Dover St • Ste 800 • Westminster, CO 80021

JOB 21055734
DIG - 025360

Send Data to:	Send Invoice to (if different):	Additional Information:
Name: Muri Premer / Paul Shrewsbury	Name: Ben Shrewsbury	AFE #:
Company: Summit Scientific	Company: Summit Scientific	Project: 2105179
Address: 4653 Table Mountain Drive	Address: 4653 Table Mountain Drive	PO #:
City, State: Golden, CO 80403	City, State: Golden, CO 80403	Location:
Phone: 303-277-9310	Phone: 303-277-9310	Sampled By:
Email: mpremer@s2scientific.com / pshrewsbury@s2scientific.com	Email: bshrewsbury@s2scientific.com	API #:

Turnaround Time **: Standard (≤ 10 Business days) Rush (≤ 5 Business days) Expedited Rush (≤ 3 Business days)

Container Number	Sample Identification	Date Sampled	Time	Sample Type*	Gas Composition	d13C of Methane (C1)	d13C of Ethane (C2)	d13C of Propane+ (C3+)	d13C of Carbon Dioxide (CO2)	δD of Methane (C1)	Whole Oil Gas Chromatography	d18O and δD Isotopes of Water	RSK 175 Dissolved Gas Quantification
	INF-051321-1355	5/13/21	13:55	Water	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
				Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Chain of Custody Record Comments:

Relinquished by Signature	Company	Date	Time	Received by Signature	Company	Date	Time
<i>Muri Premer</i>	Summit Scientific	5/14/21	1240	<i>Ben Shrewsbury</i>	DSG	5/14/21	1243

*Gas composition vs RSK-175 - Gas composition is a basic analysis of the concentration (ppm) of gases within the headspace of the sample (headspace is created at the lab). RSK-175 is a specific analysis technique combined with calculations to give the total dissolved gas of each species in the water sample (mg/L). Why one or the other? Gas composition gives us a quick, general look at relative concentrations and ratios (e.g., gas wetness). RSK-175 gives us an exact total of gas present in the sample (headspace and dissolved in the water). Questions? Give us a call at 303-531-2030.

** Rush and Expedited Rush turnaround time analysis will incur additional costs at 2x and 3x the standard turnaround time pricing.



PDC Energy
1775 Sherman St. STE. 3000
Denver CO, 80203

Project: DWR Permit #137465

Project Number: AFE #EX-000335
Project Manager: Karen Olson

Reported:
05/18/21 14:49

Notes and Definitions

- S-06 The recovery of this surrogate is outside control limits due to sample dilution required from high analyte concentration and/or matrix interferences.
- QR-03 The RPD value for the sample duplicate or MS/MSD was outside of QC acceptance limits due to matrix interference. QC batch accepted based on LCS and/or LCSD recovery and/or RPD values.
- QM-05 The spike recovery was outside acceptance limits for the MS and/or MSD due to matrix interference. The associated LCS and/or LCSD were within acceptance limits, therefore the data are considered valid.
- 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