



The following analytical results were produced using the strictest quality control and most current methods:

COC #: N/A

Lab #: 3358-2017121210.1-2017121210.3

Quality Control #: 4950

Report Contents:

Pages 2-4: analytical results

Page 5: QA/QC analysis

Approved by:

Neil Ray

Neil Ray

Date: 12/15/17



Sample Matrix: Natural Gas  
 Sample Type: N/A  
 Preservative: Tedlar Bag  
 Sample Container: Tedlar Bag

Method(s): ASTM D 6228 -  
 Sulfur Compounds by Gas  
 Chromatography /Flame  
 Photometric Detector

Client: Kinder Morgan  
 Project Location: Doe Canyon  
 Sample Id.: DA Cluster  
 H2O Tank  
 Sample Temp.: N/A  
 Analysis Temp.: N/A  
 Pressure: N/A  
 Field Data: N/A  
 Sample Date: 12/04/17 Time: N/A  
 Sampled By: N/A  
 Analysis Date: 12/14/17  
 Analysis By: Jana Spence

Lab #: 3358-2017121210.1  
 Quality Control Report: 4950

### Analytical Results

<u>Gas Composition</u>	<u>ppm vol.</u>	<u>Grains/100 ft<sup>3</sup></u>
Hydrogen Sulfide	4.78	0.304
Carbonyl Sulfide	0.31	0.020
Methyl Mercaptan	0.22	0.014
Ethyl Mercaptan	0.30	0.019
Dimethyl Sulfide	0.08	0.005
Carbon Disulfide	0.00	0.000
2-Propanethiol	0.01	0.000
Tert-butyl Mercaptan	0.08	0.005
1-Propanethiol	0.01	0.000
Thiophene	0.06	0.004
N-Butanethiol+Diethyl Sulfide	0.03	0.002
Methyl Ethyl Sulfide	0.02	0.001
2-Methyl-1-Propanethiol	0.02	0.001
1-Methyl-1-Propanethiol	0.03	0.002
<b>Total Sulfur Compounds</b>	<b>5.93</b>	<b>0.378</b>

### Comments - Additional Data



Sample Matrix: Natural Gas  
Sample Type: N/A  
Preservative: Tedlar Bag  
Sample Container: Tedlar Bag

Method(s): ASTM D 6228 -  
Sulfur Compounds by Gas  
Chromatography /Flame  
Photometric Detector

Client: Kinder Morgan  
Project Location: Doe Canyon  
Sample Id.: T342 Doe Canyon

Sample Temp.: N/A  
Analysis Temp.: N/A  
Pressure: N/A  
Field Data: N/A  
Sample Date: 12/04/17 Time: N/A  
Sampled By: N/A  
Analysis Date: 12/14/17  
Analysis By: Jana Spence

Lab #: 3358-2017121210.2  
Quality Control Report: 4950

### Analytical Results

<u>Gas Composition</u>	<u>ppm vol.</u>	<u>Grains/100 ft<sup>3</sup></u>
Hydrogen Sulfide	5.65	0.360
Carbonyl Sulfide	0.63	0.040
Methyl Mercaptan	0.05	0.003
Ethyl Mercaptan	0.19	0.012
Dimethyl Sulfide	0.09	0.006
Carbon Disulfide	0.00	0.000
2-Propanethiol	0.01	0.000
Tert-butyl Mercaptan	0.12	0.008
1-Propanethiol	0.01	0.001
Thiophene	0.00	0.000
N-Butanethiol+Diethyl Sulfide	0.02	0.001
Methyl Ethyl Sulfide	0.01	0.001
2-Methyl-1-Propanethiol	0.01	0.001
1-Methyl-1-Propanethiol	0.05	0.003
<b>Total Sulfur Compounds</b>	6.84	0.436

### Comments - Additional Data



Sample Matrix: Natural Gas  
 Sample Type: N/A  
 Preservative: Tedlar Bag  
 Sample Container: Tedlar Bag

Method(s): ASTM D 6228 -  
 Sulfur Compounds by Gas  
 Chromatography /Flame  
 Photometric Detector

Client: Kinder Morgan  
 Project Location: Doe Canyon  
 Sample Id.: T351 Doe Canyon  
 GB  
 Sample Temp.: N/A  
 Analysis Temp.: N/A  
 Pressure: N/A  
 Field Data: N/A  
 Sample Date: 12/04/17 Time: N/A  
 Sampled By: N/A  
 Analysis Date: 12/14/17  
 Analysis By: Jana Spence

Lab #: 3358-2017121210.3  
 Quality Control Report: 4950

### **Analytical Results**

<b><u>Gas Composition</u></b>		
	<b><u>ppm vol.</u></b>	<b><u>Grains/100 ft<sup>3</sup></u></b>
Hydrogen Sulfide	2.33	0.148
Carbonyl Sulfide	0.10	0.006
Methyl Mercaptan	0.02	0.001
Ethyl Mercaptan	0.06	0.004
Dimethyl Sulfide	0.03	0.002
Carbon Disulfide	0.00	0.000
2-Propanethiol	0.00	0.000
Tert-butyl Mercaptan	0.09	0.006
1-Propanethiol	0.01	0.001
Thiophene	0.00	0.000
N-Butanethiol+Diethyl Sulfide	0.00	0.000
Methyl Ethyl Sulfide	0.01	0.001
2-Methyl-1-Propanethiol	0.00	0.000
1-Methyl-1-Propanethiol	0.01	0.001
<b>Total Sulfur Compounds</b>	<b>2.67</b>	<b>0.170</b>

### **Comments - Additional Data**



## QUALITY CONTROL ANALYSIS

Sample Matrix: Gas  
 Sample Type: Standard  
 Preservative: Aluminum Inert Cylinder  
 Sample Container: Industrial Cylinder

Sample Id.: Matheson Tri Gas  
 Reference Std.SX048765  
 Sample Temp.: 74° F  
 Analysis Date: 12/14/17  
 Analysis By: Neil Ray

Method(s): ASTM D 6228  
 Sulfur Compounds by Gas  
 Chromatography /Flame  
 Photometric Detector

Quality Control Report#: 4950

### Analytical Results

RESULTS	ACTUAL	ANALYSIS			
<u>Gas Composition</u>			MDL	RL	
	ppm vol.	ppm vol.	ppm vol.	ppb vol.	% Deviation
Hydrogen Sulfide	1.03	1.17	0.01	10	86.4
Carbonyl Sulfide	0.91	0.80	0.01	10	87.9
Methyl Mercaptan	1.08	0.89	0.01	10	82.4
Ethyl Mercaptan	1.05	1.21	0.01	10	84.8
Dimethyl Sulfide	1.07	0.91	0.01	10	85.0
Carbon Disulfide	1.10	0.89	0.01	10	80.9
2-Propanethiol	1.14	1.35	0.01	10	81.6
Tert-butyl Mercaptan	1.11	0.92	0.01	10	82.9
1-Propanethiol	1.15	0.95	0.01	10	82.6
Thiophene	1.02	1.18	0.01	10	84.3
N-Butanethiol+Diethyl Sulfide	2.21	2.44	0.01	10	89.6
Methyl Ethyl Sulfide	1.20	1.01	0.01	10	84.2
2-Methyl-1-Propanethiol	1.14	0.93	0.01	10	81.6
1-Methyl-1-Propanethiol	1.20	1.33	0.01	10	89.2