



Sample Matrix: Gas
 Sample Type: Spot
 Preservative: N/A
 Sample Container: 1646

Method(s): ASTM D 5443
 Multi-Isomer analysis by Gas
 Chromatography

Lab #: 2846-171013Q014
 Quality Control Report: 4872

Client: Kinder Morgan
 Project Location: Dolores, Co.
 Sample Id.: DC13 Wellhead
 Sample Temp.: 95°F
 Atmospheric Temp.: 50°F
 Pressure: 400 psig
 Field Data: N/A
 Sample Date: 10/10/17
 Time: 12:52
 Sampled By: Rick
 Analysis Date: 10/16/17
 Analysis By: Stephanie McDonald

Analytical Results

<u>Gas Composition</u>		
	<u>Mol %</u>	<u>GPM</u>
Nitrogen (N2):	3.6853	0.4053
Carbon Dioxide (CO2):	95.2159	16.2421
<u>Hydrocarbon Composition</u>	<u>Mol %</u>	<u>GPM</u>
Methane (CH4):	1.0445	0.1770
Ethane (C2H6):	0.0138	0.0037
Propane (C3H8):	0.0093	0.0026
Iso-Butane (C4H10):	0.0055	0.0018
N-Butane (C4H10):	0.0069	0.0022
Iso-Pentane (C5H12):	0.0041	0.0015
N-Pentane (C5H12):	0.0048	0.0017
Hexane+ (C6H14):	0.0098	0.0043
Totals	100.0000	16.8421

Comments - Additional Data

BTU -dry (BTU/ft3):	12.3	Z-Comp. Factor-dry:	0.99478
BTU -water vapor sat.(BTU/ft3):	13.2	Z-Comp. Factor-water vapor sat.:	0.98147
Specific Gravity -dry:	1.4962	14.65 psi Pressure Base	
Specific Gravity-water vapor sat.:	1.5165		

*See Next Page for Compositional breakdown of C6+ Fractions



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Analytical Results

<u>C6+ Fractions Composition</u>		
<u>Hexane Isomers (C6's)</u>		<u>Mol %</u>
2,2-dimethylbutane	P	0.0000
2,3-dimethylbutane	PN	0.0001
2-methylpentane	P	0.0006
3-methylpentane	P	0.0005
methylcyclopentane	N	0.0015
benzene	A	0.0000
cyclohexane	N	0.0007
n-hexane	P	0.0045
<u>Heptane Isomers (C7's)</u>		
2,2-dimethylpentane	P	0.0000
2,4-dimethylpentane		0.0001
3-methylhexane	P	0.0001
1,t3-dimethylcyclopentane	N	0.0000
1,c3-dimethylcyclopentane	N	0.0000
1,t2-dimethylcyclopentane	N	0.0000
toluene	A	0.0001
methylcyclohexane	N	0.0005
ethylcyclopentane	N	0.0000
n-heptane	P	0.0008
<u>Octane Isomers (C8's)</u>		
2,4 + 2,5-dimethylhexane	P	0.0000
1,t2,c4-trimethylcyclopentane	N	0.0000
1,t2,c3-trimethylcyclopentane	N	0.0000
2-methylheptane	P	0.0000
1,c2,t4-trimethylcyclopentane	N	0.0000
3-methylheptane	P	0.0000
1,c3-dimethylcyclohexane	N	0.0000
1,t4-dimethylcyclohexane	N	0.0000
methyl-ethylcyclopentanes	N	0.0000
1,c4 & 1,t3-dimethylcyclohexane	N	0.0000
1,c2-dimethylcyclohexane	N	0.0000
ethylcyclohexane	N	0.0000
ethylbenzene	A	0.0000
m + p-xylene	A	0.0000
o-xylene	A	0.0000
n-octane	P	0.0001

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<u>C6+ Fractions Composition (cont.)</u>		
<u>Nonane Isomers (C9's)</u>		Mol %
trimethylhexanes	P	0.0000
dimethylheptanes	P	0.0000
isopropylcyclopentane	N	0.0000
n-propylcyclopentane	N	0.0000
3-methyloctane	P	0.0000
trimethylcyclohexanes	N	0.0000
isopropylbenzene	A	0.0000
isopropylcyclohexane	N	0.0000
n-propylcyclohexane	N	0.0000
n-propylbenzene	A	0.0000
m-ethyltoluene	A	0.0000
p-ethyltoluene	A	0.0000
1,3,5-trimethylbenzene + 4&5-methylnonane	A/P	0.0000
o-ethyltoluene + 3-methylnonane	A/P	0.0000
1,2,3-trimethylbenzene	A	0.0000
n-nonane	P	0.0000
<u>Decane Isomers (C10's)</u>		
2-methylnonane	P	0.0000
tert-butylbenzene	A	0.0000
1,2,4-trimethylbenzene	A	0.0000
Isobutylcyclohexane + t-butylcyclohexane	N	0.0000
isobutylbenzene	A	0.0000
sec-butylbenzene	A	0.0000
n-butylcyclohexane	N	0.0000
1,3-diethylbenzene	A	0.0000
1,2-diethylbenzene + n-butylbenzene	A	0.0000
1,4-diethylbenzene	A	0.0000
n-decane	P	0.0000
unidentified C9 naphthenes + C10 paraffins		0.0000
unidentified C10 aromatics + C11 paraffins		0.0000
Ungrouped C10's		0.0000
<u>Undecane Isomers (C11's)</u>		
n-undecane	P	0.0000
<u>Dodecane Isomers (C12's)</u>		
isododecane +	P	0.0000

Comments - Additional Data

A – Aromatic (Ring Hydrocarbons), N – Naphthene (Cyclic Paraffins & Alkanes), P – Paraffin (Alkanes)



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Gas Composition		
	<u>ppm vol.</u>	<u>Grains/100 ft³</u>
Hydrogen Sulfide	0.80	0.051
Carbonyl Sulfide	0.33	0.021
Methyl Mercaptan	0.55	0.035
Ethyl Mercaptan	0.04	0.003
Dimethyl Sulfide	0.06	0.004
Carbon Disulfide	0.01	0.001
2-Propanethiol	0.01	0.000
Tert-butyl Mercaptan	0.48	0.031
1-Propanethiol	0.01	0.001
Thiophene	0.05	0.003
N-Butanethiol+Diethyl Sulfide	0.04	0.003
Methyl Ethyl Sulfide	0.01	0.001
2-Methyl-1-Propanethiol	0.05	0.003
1-Methyl-1-Propanethiol	0.04	0.003
Total Sulfur	2.48	0.158