



Certificate of Analysis

Number: 1030-16080829-006A

Houston Laboratories

8820 Interchange Drive

Houston, TX 77054

Phone 713-660-0901

Amanda Graves
Sandridge Energy
123 Robert S Kerr Ave.
Oklahoma City, OK 73102

Sep. 07, 2016

Station Name: Mutual
Station Number: 0780 3-8H
Sample Point: Separator
Cylinder No: 8206
Analyzed: 08/31/2016 11:39:28 by Patrick Weber

Sampled By: BB
Sample Of: Liquid Spot
Sample Date: 08/19/2016 12:15
Sample Conditions: 63 psig, @ 125 °F
Method: ASTM D-1946M/GPA-2286M

Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Carbon Monoxide	ND	ND		GPM TOTAL C2+
Oxygen	0.678	0.808		GPM TOTAL iC5+
Helium	ND	ND		
Hydrogen	ND	ND		
Nitrogen	11.919	12.432		
Carbon Dioxide	16.787	27.508		
Methane	51.597	30.820		
Ethane	9.081	10.166	2.429	
Ethylene	ND	ND	ND	
Propane	7.310	12.002	2.014	
Propylene	ND	ND	ND	
Iso-Butane	1.935	4.187	0.633	
n-Butane	ND	ND	ND	
Iso-Pentane	0.276	0.741	0.101	
n-Pentane	ND	ND	ND	
Hexanes Plus	0.417	1.336	0.149	
	100.000	100.000	5.326	

Calculated Physical Properties

	Total	C6+
Relative Density Real Gas	0.9271	2.9612
Calculated Molecular Weight	26.76	85.76
Compressibility Factor	0.9963	
Real Dry BTU at 14.73 Psia, 60°F	961	4527
Real Wet BTU at 14.73 Psia, 60°F	944	4448

Comments: Air Report

Hydrocarbon Laboratory Manager

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Hydrogen	NIL	NIL		
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Ethylene	NIL	NIL	NIL	
Propane	7.310	12.002	2.014	
Propylene	NIL	NIL	NIL	
Iso-Butane	1.935	4.187	0.633	
n-Butane	NIL	NIL	NIL	
Iso-Pentane	0.276	0.741	0.101	
n-Pentane	NIL	NIL	NIL	
Hexanes	0.155	0.467	0.057	
Heptanes Plus	0.262	0.869	0.092	
	100.000	100.000	5.326	

Calculated Physical Properties

	Total	C7+
Relative Density Real Gas	0.9271	3.0544
Calculated Molecular Weight	26.76	88.46
Compressibility Factor	0.9963	
Real Dry BTU at 14.73 Psia, 60°F	961	4571
Real Wet BTU at 14.73 Psia, 60°F	944	4492

Comments: Air Report

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Ethane	9.081	10.166	2.429	
Ethylene	ND	ND	ND	
Propane	7.310	12.002	2.014	
Propylene	ND	ND	ND	
Iso-Butane	1.935	4.187	0.633	
n-Butane	ND	ND	ND	
Iso-Pentane	0.276	0.741	0.101	
n-Pentane	ND	ND	ND	
i-Hexanes	0.128	0.380	0.046	
n-Hexane	0.027	0.087	0.011	
i-Heptanes	0.098	0.312	0.035	
n-Heptane	0.004	0.014	0.002	
Benzene	0.059	0.171	0.016	
Cyclohexane	0.036	0.114	0.012	
Toluene	0.033	0.113	0.011	
i-Octanes	0.020	0.091	0.010	
n-Octane	0.001	0.002	ND	
Ethylbenzene	0.002	0.008	0.001	
Xylenes	0.008	0.029	0.003	
i-Nonanes	0.001	0.008	0.001	
n-Nonane	ND	0.001	ND	
i-Decanes	ND	0.006	0.001	
n-Decane	ND	ND	ND	
Undecanes Plus	ND	ND	ND	
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Calculated Physical Properties	Total
Calculated Molecular Weight	26.76
GPA 2172-09 Calculation:	
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F	
Real Gas Dry BTU	961
Water Sat. Gas Base BTU	944
Relative Density Real Gas	0.9271
Compressibility Factor	0.9963
Comments: Air Report	

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Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Carbon Monoxide	ND	ND		GPM TOTAL C2+
Helium	ND	ND		GPM TOTAL iC5+
Hydrogen	ND	ND		
Nitrogen	9.672	10.113		
Carbon Dioxide	17.349	28.500		
Methane	53.324	31.928		
Ethane	9.385	10.533	2.510	
Ethylene	ND	ND	ND	
Propane	7.555	12.435	2.081	
Propylene	ND	ND	ND	
Iso-Butane	1.999	4.338	0.654	
n-Butane	ND	ND	ND	
Iso-Pentane	0.285	0.768	0.105	
n-Pentane	ND	ND	ND	
Hexanes Plus	0.431	1.385	0.155	
	100.000	100.000	5.505	

Calculated Physical Properties

	Total	C6+
Relative Density Real Gas	0.9248	2.9612
Calculated Molecular Weight	26.69	85.76
Compressibility Factor	0.9961	
Real Dry BTU at 14.73 Psia, 60°F	993	4527
Real Wet BTU at 14.73 Psia, 60°F	976	4448

Comments: Air Free Report

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Analytical Data

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Helium	ND	ND		GPM TOTAL iC5+
Hydrogen	ND	ND		
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Ethylene	ND	ND	ND	
Propane	7.555	12.435	2.081	
Propylene	ND	ND	ND	
Iso-Butane	1.999	4.338	0.654	
n-Butane	ND	ND	ND	
Iso-Pentane	0.285	0.768	0.105	
n-Pentane	ND	ND	ND	
Hexanes	0.161	0.486	0.059	
Heptanes Plus	0.270	0.899	0.096	
	100.000	100.000	5.505	

Calculated Physical Properties

	Total	C7+
Relative Density Real Gas	0.9248	3.0544
Calculated Molecular Weight	26.69	88.46
Compressibility Factor	0.9961	
Real Dry BTU at 14.73 Psia, 60°F	993	4571
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Comments: Air Free Report

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Analytical Data

Components	Mol. %	Wt. %	GPM at 14.73 psia	
Carbon Monoxide	ND	ND		GPM TOTAL C2+
Helium	ND	ND		5.505
Hydrogen	ND	ND		GPM TOTAL iC5+
Nitrogen	9.672	10.113		0.260
Carbon Dioxide	17.349	28.500		
Methane	53.324	31.928		
Ethane	9.385	10.533	2.510	
Ethylene	ND	ND	ND	
Propane	7.555	12.435	2.081	
Propylene	ND	ND	ND	
Iso-Butane	1.999	4.338	0.654	
n-Butane	ND	ND	ND	
Iso-Pentane	0.285	0.768	0.105	
n-Pentane	ND	ND	ND	
i-Hexanes	0.133	0.395	0.048	
n-Hexane	0.028	0.091	0.011	
i-Heptanes	0.100	0.322	0.037	
n-Heptane	0.004	0.015	0.002	
Benzene	0.061	0.177	0.017	
Cyclohexane	0.038	0.118	0.013	
Toluene	0.034	0.118	0.011	
i-Octanes	0.021	0.094	0.010	
n-Octane	0.001	0.002	ND	
Ethylbenzene	0.002	0.009	0.001	
Xylenes	0.008	0.029	0.003	
i-Nonanes	0.001	0.008	0.001	
n-Nonane	ND	0.001	ND	
i-Decanes	ND	0.006	0.001	
n-Decane	ND	ND	ND	
Undecanes Plus	ND	ND	ND	
	100.000	100.000	5.505	



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Calculated Molecular Weight	26.69
GPA 2172-09 Calculation:	
Calculated Gross BTU per ft³ @ 14.73 psia & 60°F	
Real Gas Dry BTU	993
Water Sat. Gas Base BTU	976
Relative Density Real Gas	0.9248
Compressibility Factor	0.9961

Comments: Air Free Report

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Analyzed: 09/02/2016 by EM

Sampled By: BB
Sample Of: Liquid Spot
Sample Date: 08/19/2016 12:15
Sample Conditions: 63 psig, @ 125 °F
Method: ASTM D-5504

Sulfur Analysis

SULFIDES	ppmw	MERCAPTANS	ppmw	DISULFIDES	ppmw
Hydrogen	ND	Methyl	ND	Carbon	ND
Carbonyl	0.1	Ethyl	1.5	Dimethyl	ND
Dimethyl	8.4	Isopropyl	ND	Methyl Ethyl	ND
Methyl Ethyl	ND	n-Propyl	ND	Diethyl	ND
Diethyl	ND	Isobutyl	ND	Di-iso-Propyl	ND
Di-iso-Propyl	ND	sec-Butyl	ND	Di-n-Propyl	ND
Di-n-Propyl	ND	tert-Butyl	ND	Di-iso-Butyl	ND
Di-iso-Butyl	ND	n-Butyl	ND	Di-sec-Butyl	ND
Di-sec-Butyl	ND	Isoamyl	ND	Di-tert-Butyl	ND
Di-tert-Butyl	ND	pri-Amyl	ND	Di-n-Butyl	ND
Di-n-Butyl	ND	n-Amyl	ND		
OTHER	ppmw	OTHER	ppmw	OTHER	ppmw
Misc. Sulfurs	ND	Thiophene	ND	Thiophane	ND
Sulfur Dioxide	ND				

Comments: Detection limit = 0.1 ppmw
ND = Not Detected

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Analytical Data

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Flash Gas	Proprietary	0.19	Cu.Ft./STBbl.		MES	09/02/2016
Flash Gas (Air Free)	Proprietary	0.18	Cu.Ft./STBbl.		MES	09/02/2016

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