

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #: NAME/DESCRIP : **KONIG 2-31-11-59
SEPARATOR FLARING GAS**

PROJECT NO. : **201609141** ANALYSIS NO. : **01**
 COMPANY NAME : **CARRIZO OIL & GAS, INC** ANALYSIS DATE: **SEPTEMBER 30, 2016 07:33**
 OFFICE / BRANCH: **HOUSTON, TX** SAMPLE DATE : **SEPTEMBER 28, 2016 14:05**
 CUSTOMER REF: TO:
 PRODUCER : EFFECTIVE DATE:

FIELD DATA

SAMPLE CYCLE: SAMPLE TYPE: **SPOT**
 SAMPLE PRES. : **26.0** psig CYLINDER NO. : **0807**
 LAB PRES: psig SAMPLED BY : **JOHN MOSER**
 SAMPLE TEMP. : **94.0** °f SAMPLING COMPANY: **EMPACT**
 AMBIENT TEMP.: °f H2S BY STAIN TUBE: **6.0** ppm
 H2O BY STAIN TUBE: **-** #/mmcf CO2 BY STAIN TUBE: **-** Mol %
 FIELD COMMENTS: **NO PROBE**
 LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
ALCOHOLS	0.0002	0.0004		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.03	0.04	---	---
NITROGEN	1.0500	1.1100	---	---
CARBON DIOXIDE	3.30	5.48	---	---
METHANE	64.63780	39.12400	---	---
ETHANE	11.0061	12.4861	2.9580	2.9420
PROPANE	10.2438	17.0424	2.8361	2.8207
I-BUTANE	1.1014	2.4152	0.3617	0.3597
N-BUTANE	4.3366	9.5097	1.3742	1.3668
I-PENTANE	1.0925	2.9634	0.3919	0.3898
N-PENTANE	1.4487	3.9435	0.5279	0.5251
HEXANES PLUS	1.7229	5.8853	0.6979	0.6940
TOTALS	100.00000	100.00000	9.1477	9.0981

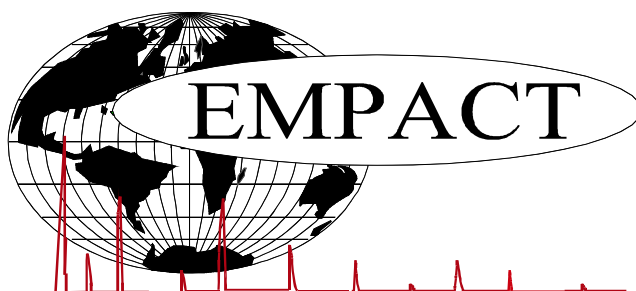
BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0600	0.1768	LOW NET DRY REAL :	1348.7 /scf	1341.4 /scf
TOLUENE	0.0252	0.0876	NET WET REAL :	1325.3 /scf	1318.0 /scf
ETHYLBENZENE	0.0023	0.0092	HIGH GROSS DRY REAL :	1478.3 /scf	1470.3 /scf
XYLENES	0.0034	0.0136	GROSS WET REAL :	1452.6 /scf	1444.6 /scf
TOTAL BTEX	0.0909	0.2872	NET DRY REAL :	19331.0 /lb	19226.1 /lb
			GROSS DRY REAL :	21199.9 /lb	21084.7 /lb

(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

*(DETAILED HYDROCARBON ANALYSIS/NJ 1993) ; ASTM D6730

RELATIVE DENSITY (AIR=1): 0.9144
 COMPRESSIBILITY FACTOR : 0.99485

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



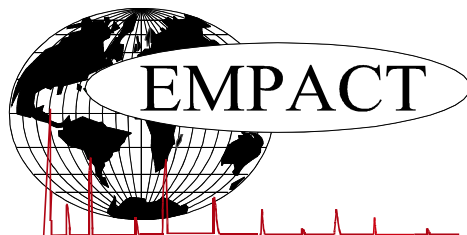
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GLYCALC INFORMATION

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ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 28, 2016 14:05
PRODUCER :		CYLINDER NO. :	0807
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	KONIG 2-31-11-59 SEPARATOR FLARING GAS		
FIELD DATA		SAMPLE TEMP. :	94.0
SAMPLE PRES. :	26.0	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	3.30	5.48
Nitrogen	1.05	1.11
Methane	64.63780	39.12400
Ethane	11.0061	12.4861
Propane	10.2438	17.0424
Isobutane	1.1014	2.4152
n-Butane	4.3366	9.5097
Isopentane	0.9536	2.5958
n-Pentane	1.4487	3.9435
Cyclopentane	0.1389	0.3676
n-Hexane	0.4124	1.3408
Cyclohexane	0.0956	0.3036
Other Hexanes	0.6548	2.1118
Heptanes	0.3051	1.1462
Methycyclohexane	0.0506	0.1874
2,2,4 Trimethylpentane	0.0031	0.0134
Benzene	0.0600	0.1768
Toluene	0.0252	0.0876
Ethylbenzene	0.0023	0.0092
Xylenes	0.0034	0.0136
C8+ Heavies	0.1104	0.4949
Subtotal	99.96980	99.95960
Oxygen/Argon	0.03	0.04
Alcohols	0.0002	0.0004
Total	100.00000	100.00000

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DHA COMPONENT LIST

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	SEPARATOR FLARING GAS		
FIELD DATA		SAMPLE TEMP. :	94.0
SAMPLE PRES. :	26.0	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		
	SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.03	0.04	---	---
Nitrogen	---	1.05	1.11	---	---
Carbon Dioxide	---	3.30	5.48	---	---
Methane	P1	64.63780	39.12400	---	---
Ethane	P2	11.0061	12.4861	2.958	2.942
Propane	P3	10.2438	17.0424	2.836	2.821
i-Butane	I4	1.1014	2.4152	0.362	0.360
n-Butane	P4	4.3366	9.5097	1.374	1.367
2,2-Dimethylpropane	I5	0.0043	0.0117	0.002	0.002
i-Pentane	I5	0.9493	2.5841	0.349	0.347
Acetone	X3	0.0002	0.0004	0.000	0.000
n-Pentane	P5	1.4485	3.9430	0.528	0.525
2,2-Dimethylbutane	I6	0.0023	0.0075	0.001	0.001
Cyclopentane	N5	0.1389	0.3676	0.041	0.041
2,3-Dimethylbutane	I6	0.0163	0.0530	0.007	0.007
2-Methylpentane	I6	0.2671	0.8684	0.112	0.111
3-Methylpentane	I6	0.1389	0.4516	0.057	0.057
UnknownC5s	U5	0.0002	0.0005	0.000	0.000
n-Hexane	P6	0.4124	1.3408	0.170	0.169
2,2-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Methylcyclopentane	N6	0.2259	0.7173	0.081	0.080
2,4-Dimethylpentane	I7	0.0073	0.0276	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0003	0.0011	0.000	0.000
Benzene	A6	0.0600	0.1768	0.017	0.017
3,3-Dimethylpentane	I7	0.0005	0.0019	0.000	0.000
Cyclohexane	N6	0.0956	0.3036	0.032	0.032
2-Methylhexane	I7	0.0330	0.1248	0.015	0.015
2,3-Dimethylpentane	I7	0.0173	0.0654	0.008	0.008
1,1-Dimethylcyclopentane	N7	0.0125	0.0463	0.005	0.005
3-Methylhexane	I7	0.0458	0.1731	0.021	0.021
1c,3-Dimethylcyclopentane	N7	0.0172	0.0637	0.008	0.008
1t,3-Dimethylcyclopentane	N7	0.0093	0.0344	0.004	0.004
3-Ethylpentane	I7	0.0089	0.0336	0.004	0.004
1t,2-Dimethylcyclopentane	N7	0.0441	0.1634	0.020	0.020
2,2,4-Trimethylpentane	I8	0.0031	0.0134	0.002	0.002
UnknownC6s	U6	0.0043	0.0140	0.002	0.002
n-Heptane	P7	0.0912	0.3448	0.042	0.042
1c,2-Dimethylcyclopentane	N7	0.0022	0.0081	0.001	0.001
Methylcyclohexane	N7	0.0506	0.1874	0.020	0.020

2,2-Dimethylhexane	I8	0.0017	0.0073	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0004	0.0017	0.000	0.000
Ethylcyclopentane	N7	0.0097	0.0359	0.004	0.004
2,5-Dimethylhexane	I8	0.0007	0.0030	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0026	0.000	0.000
2,4-Dimethylhexane	I8	0.0020	0.0086	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0036	0.0152	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0013	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0044	0.0186	0.002	0.002
2,3,4-Trimethylpentane	I8	0.0009	0.0039	0.000	0.000
Toluene	A7	0.0252	0.0876	0.008	0.008
2,3-Dimethylhexane	I8	0.0017	0.0073	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0009	0.0039	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0002	0.0008	0.000	0.000
2-Methylheptane	I8	0.0098	0.0422	0.005	0.005
4-Methylheptane	I8	0.0024	0.0103	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0009	0.0039	0.000	0.000
3,4-Dimethylhexane	I8	0.0005	0.0021	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0003	0.0013	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0019	0.0082	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0070	0.0296	0.004	0.004
3-Ethylhexane	I8	0.0018	0.0078	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0018	0.0076	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0005	0.0021	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0016	0.0068	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0017	0.0072	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0044	0.0186	0.002	0.002
1t,2-Dimethylcyclohexane	N8	0.0024	0.0101	0.001	0.001
1c,2c,3-Trimethylcyclopentane	N8	0.0003	0.0013	0.000	0.000
UnknownC7s	U7	0.0053	0.0200	0.002	0.002
n-Octane	P8	0.0151	0.0651	0.008	0.008
1c,4-Dimethylcyclohexane	N8	0.0010	0.0042	0.001	0.001
i-Propylcyclopentane	I8	0.0004	0.0017	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0002	0.0010	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0004	0.0019	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0004	0.0019	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0006	0.0025	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0036	0.0171	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0010	0.0048	0.001	0.001
2,4-Dimethylheptane	I9	0.0003	0.0014	0.000	0.000
4,4-Dimethylheptane	I9	0.0005	0.0024	0.000	0.000
Ethylcyclohexane	N8	0.0016	0.0068	0.001	0.001
n-Propylcyclopentane	N8	0.0005	0.0021	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0004	0.0019	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0014	0.000	0.000
3,5-Dimethylheptane	I9	0.0003	0.0014	0.000	0.000
2,6-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
Ethylbenzene	I8	0.0023	0.0092	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0038	0.000	0.000
2,3-Dimethylheptane	I9	0.0005	0.0024	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0056	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0020	0.000	0.000
3,4-Dimethylheptane	I9	0.0007	0.0034	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0013	0.0063	0.001	0.001
4-Ethylheptane	I9	0.0002	0.0010	0.000	0.000
4-Methyloctane	I9	0.0008	0.0039	0.000	0.000
2-Methyloctane	I9	0.0008	0.0039	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0004	0.0019	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0010	0.000	0.000

3-Methyloctane	I9	0.0008	0.0039	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0002	0.0009	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0015	0.0060	0.001	0.001
i-Butylcyclopentane	N9	0.0006	0.0029	0.000	0.000
UnknownC8s	U8	0.0007	0.0030	0.000	0.000
n-Nonane	P9	0.0040	0.0194	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0003	0.0014	0.000	0.000
i-Propylbenzene	A9	0.0005	0.0023	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0009	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0005	0.0024	0.000	0.000
3,3-Dimethyloctane	I10	0.0004	0.0021	0.000	0.000
n-Propylbenzene	A9	0.0006	0.0027	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0006	0.0032	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0018	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2-Methylethylbenzene	A9	0.0003	0.0014	0.000	0.000
2-Methylnonane	I10	0.0001	0.0005	0.000	0.000
3-Ethyl-octane	I10	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0002	0.0011	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0002	0.0010	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0011	0.000	0.000
UnknownC9s	U9	0.0048	0.0232	0.003	0.003
n-Decane	P10	0.0009	0.0048	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0011	0.000	0.000
3-Ethyl-nonane	I10	0.0001	0.0006	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0002	0.0010	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0010	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0006	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0032	0.0172	0.002	0.002
n-Undecane	P11	0.0002	0.0012	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0006	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0003	0.0018	0.000	0.000
TOTAL		100.00000	100.00000	9.1477	9.0981

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0600	0.1768	LOW NET DRY REAL :	1348.7 /scf	1341.4 /scf
TOLUENE	0.0252	0.0876	NET WET REAL :	1325.3 /scf	1318.0 /scf
ETHYLBENZENE	0.0023	0.0092	HIGH GROSS DRY REAL :	1478.3 /scf	1470.3 /scf
XYLENES	0.0034	0.0136	GROSS WET REAL :	1452.6 /scf	1444.6 /scf
TOTAL BTEX	0.0909	0.2872	NET DRY REAL :	19331.0 /lb	19226.1 /lb
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