



303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201403023	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 5, 2014
PRODUCER :		CYLINDER NO. :	0756
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:25 SPEAKER 3-27-8-61		
FIELD DATA		SAMPLE TEMP. :	60
SAMPLE PRES. :	36	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 2PPM (1-7PPM) @ 15:30		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0001	0.0003		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	1.11	1.24	---	---
CARBON DIOXIDE	2.68	4.70	---	---
METHANE	64.71600	41.37380	---	---
ETHANE	14.1399	16.9439	3.7785	3.7991
PROPANE	10.7974	18.9741	2.9721	2.9883
I-BUTANE	1.0747	2.4893	0.3516	0.3535
N-BUTANE	3.3945	7.8626	1.0688	1.0747
I-PENTANE	0.6525	1.8708	0.2334	0.2346
N-PENTANE	0.7352	2.1139	0.2665	0.2679
HEXANES PLUS	0.6697	2.4213	0.2653	0.2667
TOTALS	100.00000	100.00000	8.9362	8.9848

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0289	0.0899	LOW NET DRY REAL :	1285.3 /scf	1292.3 /scf
TOLUENE	0.0141	0.0518	NET WET REAL :	1262.8 /scf	1269.9 /scf
ETHYLBENZENE	0.0011	0.0047	HIGH GROSS DRY REAL :	1411.1 /scf	1418.8 /scf
XYLENES	0.0033	0.0140	GROSS WET REAL :	1386.4 /scf	1394.2 /scf
TOTAL BTEX	0.0474	0.1604	NET DRY REAL :	19452.1 /lb	19558.3 /lb
			GROSS DRY REAL :	21358.9 /lb	21475.6 /lb

RELATIVE DENSITY (AIR=1): 0.8657
 COMPRESSIBILITY FACTOR : 0.99516

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

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

THIS DATA HAS BEEN ACQUIRED THROUGH APPLICATION OF CURRENT STATE-OF-THE-ART ANALYTICAL TECHNIQUES.
 THE USE OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO
 RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.



303-637-0150

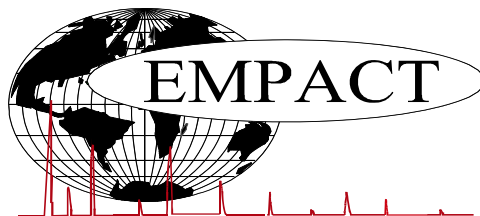
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201403023	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 5, 2014
PRODUCER :		CYLINDER NO. :	0756
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:25 SPEAKER 3-27-8-61		
FIELD DATA		SAMPLE TEMP. :	60
SAMPLE PRES. :	36	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 2PPM (1-7PPM) @ 15:30		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.68	4.70
Nitrogen	1.11	1.24
Methane	64.71600	41.37380
Ethane	14.1399	16.9439
Propane	10.7974	18.9741
Isobutane	1.0747	2.4893
n-Butane	3.3945	7.8626
Isopentane	0.5873	1.6886
n-Pentane	0.7352	2.1139
Cyclopentane	0.0652	0.1822
n-Hexane	0.1394	0.4787
Cyclohexane	0.0383	0.1284
Other Hexanes	0.2577	0.8783
Heptanes	0.1096	0.4346
Methycyclohexane	0.0268	0.1048
2,2,4 Trimethylpentane	0.0001	0.0004
Benzene	0.0289	0.0899
Toluene	0.0141	0.0518
Ethylbenzene	0.0011	0.0047
Xylenes	0.0033	0.0140
C8+ Heavies	0.0504	0.2357
Subtotal	99.98990	99.98970
Oxygen/Argon	0.01	0.01
Alcohols	0.0001	0.0003
Total	100.00000	100.00000

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.



EXTENDED NATURAL GAS ANALYSIS (*DHA)
DHA COMPONENT LIST

PROJECT NO. :	201403023	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MARCH 7, 2014
ACCOUNT NO. :		SAMPLE DATE :	MARCH 5, 2014
PRODUCER :		CYLINDER NO. :	0756
LEASE NO. :		SAMPLED BY :	GALE MCENDREE-EMPACT
NAME/DESCRIP :	SALES GAS @ 15:25		
	SPEAKER 3-27-8-61		
FIELD DATA		SAMPLE TEMP. :	60
SAMPLE PRES. :	36	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 2PPM (1-7PPM) @ 15:30		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	1.11	1.24	---	---
Carbon Dioxide	---	2.68	4.70	---	---
Methane	P1	64.71600	41.37380	---	---
Ethane	P2	14.1399	16.9439	3.779	3.799
Propane	P3	10.7974	18.9741	2.972	2.988
i-Butane	I4	1.0747	2.4893	0.352	0.354
n-Butane	P4	3.3945	7.8626	1.069	1.075
2,2-Dimethylpropane	I5	0.0030	0.0086	0.001	0.001
i-Pentane	I5	0.5843	1.6800	0.213	0.215
n-Pentane	P5	0.7352	2.1139	0.267	0.268
t-Butanol	X4	0.0001	0.0003	0.000	0.000
2,2-Dimethylbutane	I6	0.0018	0.0062	0.001	0.001
Cyclopentane	N5	0.0652	0.1822	0.019	0.019
2,3-Dimethylbutane	I6	0.0100	0.0344	0.004	0.004
2-Methylpentane	I6	0.1070	0.3675	0.044	0.044
3-Methylpentane	I6	0.0532	0.1827	0.022	0.022
n-Hexane	P6	0.1394	0.4787	0.057	0.057
2,2-Dimethylpentane	I7	0.0001	0.0004	0.000	0.000
Methylcyclopentane	N6	0.0857	0.2875	0.030	0.030
2,4-Dimethylpentane	I7	0.0033	0.0132	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0289	0.0899	0.008	0.008
3,3-Dimethylpentane	I7	0.0003	0.0012	0.000	0.000
Cyclohexane	N6	0.0383	0.1284	0.013	0.013
2-Methylhexane	I7	0.0132	0.0527	0.006	0.006
2,3-Dimethylpentane	I7	0.0062	0.0248	0.003	0.003
1,1-Dimethylcyclopentane	N7	0.0040	0.0157	0.002	0.002
3-Methylhexane	I7	0.0149	0.0595	0.007	0.007
1c,3-Dimethylcyclopentane	N7	0.0085	0.0333	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0076	0.0297	0.003	0.003
3-Ethylpentane	I7	0.0010	0.0040	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0153	0.0599	0.007	0.007
2,2,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0303	0.1210	0.014	0.014
1c,2-Dimethylcyclopentane	N7	0.0013	0.0051	0.001	0.001
Methylcyclohexane	N7	0.0268	0.1048	0.011	0.011
2,2-Dimethylhexane	I8	0.0021	0.0096	0.001	0.001
Ethylcyclopentane	N7	0.0035	0.0137	0.001	0.001
2,5-Dimethylhexane	I8	0.0006	0.0028	0.000	0.000
2,4-Dimethylhexane	I8	0.0011	0.0050	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0020	0.0089	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0023	0.0103	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0004	0.0018	0.000	0.000
Toluene	A7	0.0141	0.0518	0.005	0.005

2,3-Dimethylhexane	I8	0.0007	0.0032	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0005	0.0023	0.000	0.000
2-Methylheptane	I8	0.0047	0.0214	0.002	0.002
4-Methylheptane	I8	0.0013	0.0059	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0001	0.0004	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0009	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0021	0.0096	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0033	0.0147	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0018	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0011	0.0049	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0018	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0006	0.0027	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0006	0.0027	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0018	0.0081	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0017	0.0076	0.001	0.001
n-Octane	P8	0.0065	0.0296	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0006	0.0027	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0004	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0005	0.0022	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0019	0.0096	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0007	0.0036	0.000	0.000
2,4-Dimethylheptane	I9	0.0003	0.0015	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0010	0.0045	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0014	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
Ethylbenzene	I8	0.0011	0.0047	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0004	0.0020	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0011	0.0047	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0014	0.0059	0.001	0.001
3,4-Dimethylheptane (2)	I9	0.0002	0.0010	0.000	0.000
4-Methyloctane	I9	0.0003	0.0015	0.000	0.000
2-Methyloctane	I9	0.0004	0.0020	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0005	0.0026	0.000	0.000
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0005	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0008	0.0034	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0020	0.000	0.000
UnknownC8s	U8	0.0003	0.0014	0.000	0.000
n-Nonane	P9	0.0013	0.0067	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
i-Propylbenzene	A9	0.0003	0.0014	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0015	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0011	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0011	0.0056	0.001	0.001
n-Decane	P10	0.0002	0.0011	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0008	0.0045	0.000	0.000

UnknownC11s		U11	0.0001	0.0006	0.000	0.000
TOTAL			100.00000	100.00000	8.9362	8.9848
BTEX COMPONENTS	MOLE%	WT%	BTU @		14.650	14.730
BENZENE	0.0289	0.0899	LOW	NET DRY REAL :	1285.3 /scf	1292.3 /scf
TOLUENE	0.0141	0.0518		NET WET REAL :	1262.8 /scf	1269.9 /scf
ETHYLBENZENE	0.0011	0.0047	HIGH	GROSS DRY REAL :	1411.1 /scf	1418.8 /scf
XYLENES	0.0033	0.0140		GROSS WET REAL :	1386.4 /scf	1394.2 /scf
TOTAL BTEX	0.0474	0.1604		NET DRY REAL :	19452.1 /lb	19558.3 /lb
				GROSS DRY REAL :	21358.9 /lb	21475.6 /lb
				RELATIVE DENSITY (AIR=1):		0.8657
				COMPRESSIBILITY FACTOR :		0.99516

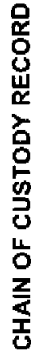
(CALC: GPA STD 2145 & TP-17 @ 14.696 & 60 F)

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

THIS DATA HAS BEEN ACQUIRED THROUGH APPLICATION OF CURRENT STATE-OF-THE-ART ANALYTICAL TECHNIQUES.

THE USE OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO

RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF ITS APPLICATION.



IMPACT ANALYTICAL
SYSTEMS INC.

365 S. MAIN ST.
BRIGHTON, CO
80601

(303) 637-0150

CHAIN OF CUSTODY RECORD

[illegible]

COMMENTS:

Relinquished by: (Signature)	Gale McEndree	Received by: (Signature)	<i>Gale McEndree</i>	Time: 8:20	Date: 3/6/14
Relinquished by: (Signature)		Received by: (Signature)		Time	Date
Laboratory: EMPACT Analytical		Received for Laboratory by: <i>Kimberly W. Jones</i>		Time 4:30	Date 3/11/14
Method of Shipment: EASI Courier		Dispatched by: (Signature)		Time:	Date