EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201405067	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS	ANALYSIS DATE:	MAY 13, 2014
ACCOUNT NO. :		SAMPLE DATE :	MAY 12, 2014
PRODUCER :		CYLINDER NO. :	0055
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SALES GAS @ 17:35 STATE 2-16-9-60		
FIELD DATA		SAMPLE TEMP. :	88
SAMPLE PRES. :	94	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 4.5 PPM (1-7 PPM) @ 17:40		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0009	0.0023		
HELIUM	0.02	0.00	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.02	0.03	---	---
NITROGEN	1.18	1.36	---	---
CARBON DIOXIDE	2.93	5.30	---	---
METHANE	69.15190	45.63070	---	---
ETHANE	10.8416	13.4090	2.8958	2.9116
PROPANE	9.5041	17.2382	2.6155	2.6297
I-BUTANE	0.9365	2.2389	0.3064	0.3081
N-BUTANE	3.2374	7.7397	1.0193	1.0249
I-PENTANE	0.6551	1.9389	0.2353	0.2366
N-PENTANE	0.7694	2.2833	0.2784	0.2799
HEXANES PLUS	0.7531	2.8290	0.3002	0.3016
TOTALS	100.00000	100.00000	7.6509	7.6924

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0254	0.0816
TOLUENE	0.0146	0.0553
ETHYLBENZENE	0.0014	0.0061
XYLENES	0.0026	0.0113
TOTAL BTEX	0.0440	0.1543

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1237.9 **/scf**	1244.7 **/scf**
	NET WET REAL :	1216.3 **/scf**	1223.1 **/scf**
HIGH	GROSS DRY REAL :	1360.3 **/scf**	1367.7 **/scf**
	GROSS WET REAL :	1336.5 **/scf**	1344.0 **/scf**
	NET DRY REAL :	19344.7 **/lb**	19450.3 **/lb**
	GROSS DRY REAL :	21259.8 **/lb**	21375.9 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8386
	COMPRESSIBILITY FACTOR :		0.99555

(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 RESPONSIBLITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO RESPONSIBLITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

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GLYCALC INFORMATION

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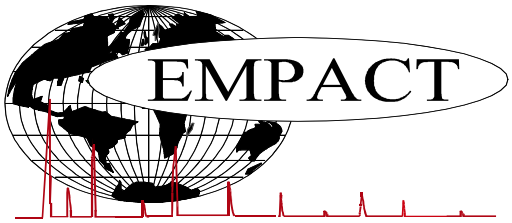
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; PROBE; LENGTH OF H2S STAIN @ 4.5 PPM (1-7 PPM) @ 17:40		

Componet	Mole %	Wt %
Helium	0.02	0.00
Hydrogen	0.00	0.00
Carbon Dioxide	2.93	5.30
Nitrogen	1.18	1.36
Methane	69.15190	45.63070
Ethane	10.8416	13.4090
Propane	9.5041	17.2382
Isobutane	0.9365	2.2389
n-Butane	3.2374	7.7397
Isopentane	0.5924	1.7580
n-Pentane	0.7694	2.2833
Cyclopentane	0.0627	0.1809
n-Hexane	0.1574	0.5579
Cyclohexane	0.0384	0.1329
Other Hexanes	0.2874	1.0111
Heptanes	0.1336	0.5469
Methycyclohexane	0.0285	0.1151
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0254	0.0816
Toluene	0.0146	0.0553
Ethylbenzene	0.0014	0.0061
Xylenes	0.0026	0.0113
C8+ Heavies	0.0637	0.3103
Subtotal	99.97910	99.96770
Oxygen/Argon	0.02	0.03
Alcohols	0.0009	0.0023
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.02	0.00	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.02	0.03	---	---
Nitrogen	---	1.18	1.36	---	---
Carbon Dioxide	---	2.93	5.30	---	---
Methane	P1	69.15190	45.63070	---	---
Ethane	P2	10.8416	13.4090	2.896	2.912
Propane	P3	9.5041	17.2382	2.616	2.630
i-Butane	I4	0.9365	2.2389	0.306	0.308
n-Butane	P4	3.2374	7.7397	1.019	1.025
2,2-Dimethylpropane	I5	0.0022	0.0065	0.001	0.001
i-Pentane	I5	0.5902	1.7515	0.215	0.217
Acetone	X3	0.0005	0.0012	0.000	0.000
i-Propanol	X3	0.0002	0.0005	0.000	0.000
n-Pentane	P5	0.7693	2.2830	0.278	0.280
t-Butanol	X4	0.0002	0.0006	0.000	0.000
2,2-Dimethylbutane	I6	0.0016	0.0057	0.001	0.001
Cyclopentane	N5	0.0627	0.1809	0.019	0.019
2,3-Dimethylbutane	I6	0.0129	0.0457	0.005	0.005
2-Methylpentane	I6	0.1175	0.4165	0.049	0.049
3-Methylpentane	I6	0.0620	0.2198	0.025	0.025
UnknownC5s	U5	0.0001	0.0003	0.000	0.000
n-Hexane	P6	0.1574	0.5579	0.065	0.065
2,2-Dimethylpentane	I7	0.0005	0.0021	0.000	0.000
Methylcyclopentane	N6	0.0931	0.3223	0.033	0.033
2,4-Dimethylpentane	I7	0.0036	0.0149	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0254	0.0816	0.007	0.007
3,3-Dimethylpentane	I7	0.0003	0.0012	0.000	0.000
Cyclohexane	N6	0.0384	0.1329	0.013	0.013
2-Methylhexane	I7	0.0156	0.0643	0.007	0.007
2,3-Dimethylpentane	I7	0.0078	0.0322	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0036	0.0145	0.001	0.001
3-Methylhexane	I7	0.0187	0.0771	0.009	0.009
1c,3-Dimethylcyclopentane	N7	0.0104	0.0420	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0093	0.0376	0.004	0.004
3-Ethylpentane	I7	0.0006	0.0025	0.000	0.000

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1t,2-Dimethylcyclopentane	N7	0.0194	0.0784	0.009	0.009
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
UnknownC6s	U6	0.0003	0.0011	0.000	0.000
n-Heptane	P7	0.0369	0.1521	0.017	0.017
1c,2-Dimethylcyclopentane	N7	0.0012	0.0049	0.001	0.001
Methylcyclohexane	N7	0.0285	0.1151	0.011	0.011
2,2-Dimethylhexane	I8	0.0023	0.0108	0.001	0.001
Ethylcyclopentane	N7	0.0050	0.0202	0.002	0.002
2,5-Dimethylhexane	I8	0.0008	0.0037	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0013	0.0061	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0026	0.0120	0.001	0.001
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0031	0.0143	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0005	0.0023	0.000	0.000
Toluene	A7	0.0146	0.0553	0.005	0.005
2,3-Dimethylhexane	I8	0.0010	0.0047	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0007	0.0033	0.000	0.000
2-Methylheptane	I8	0.0056	0.0263	0.003	0.003
4-Methylheptane	I8	0.0016	0.0075	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0010	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0010	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0009	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0026	0.0122	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0037	0.0171	0.002	0.002
3-Ethylhexane	I8	0.0004	0.0019	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0013	0.0060	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0019	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0037	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0007	0.0033	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0024	0.0111	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0018	0.0083	0.001	0.001
UnknownC7s	U7	0.0006	0.0025	0.000	0.000
n-Octane	P8	0.0080	0.0376	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0007	0.0033	0.000	0.000
i-Propylcyclopentane	I8	0.0002	0.0009	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	0.0006	0.0028	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0021	0.0109	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0008	0.0042	0.000	0.000
2,4-Dimethylheptane	I9	0.0003	0.0016	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0011	0.0051	0.000	0.000
n-Propylcyclopentane	N8	0.0005	0.0023	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,3-Dimethylheptane	I9	0.0002	0.0011	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	0.0004	0.0021	0.000	0.000
Ethylbenzene	I8	0.0014	0.0061	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0003	0.0016	0.000	0.000
2,3-Dimethylheptane	I9	0.0009	0.0047	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0061	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0004	0.0017	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0002	0.0011	0.000	0.000

4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0004	0.0021	0.000	0.000
2-Methyloctane	I9	0.0005	0.0026	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0002	0.0011	0.000	0.000
3-Methyloctane	I9	0.0006	0.0032	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0008	0.0035	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0021	0.000	0.000
UnknownC8s	U8	0.0001	0.0005	0.000	0.000
n-Nonane	P9	0.0016	0.0084	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0002	0.0010	0.000	0.000
i-Propylbenzene	A9	0.0003	0.0015	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	0.0016	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Propylbenzene	A9	0.0003	0.0015	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0005	0.0029	0.000	0.000
1,3-Methylethylbenzene	A9	0.0002	0.0010	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
5-Methylnonane	I10	0.0001	0.0006	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
2-Methylnonane	I10	0.0002	0.0012	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0002	0.0011	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0013	0.0069	0.001	0.001
n-Decane	P10	0.0005	0.0029	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0005	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
UnknownC10s	U10	0.0010	0.0058	0.001	0.001
n-Undecane	P11	0.0002	0.0013	0.000	0.000
UnknownC11s	U11	0.0003	0.0019	0.000	0.000
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
UnknownC12s	U12	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	7.6509	7.6924

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0254	0.0816
TOLUENE	0.0146	0.0553
ETHYLBENZENE	0.0014	0.0061
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HIGH	GROSS DRY REAL :	1360.3 **/scf**	1367.7 **/scf**
	GROSS WET REAL :	1336.5 **/scf**	1344.0 **/scf**
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	GROSS DRY REAL :	21259.8 **/lb**	21375.9 **/lb**
	RELATIVE DENSITY (AIR=1):		0.8386
	COMPRESSIBILITY FACTOR :		0.99555

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