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

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201512098	ANALYSIS NO. :	03
COMPANY NAME :	NIGHTHAWK PRODUCTION COMPANY	ANALYSIS DATE:	DECEMBER 23, 2015 08:23
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 17, 2015 12:15
PRODUCER :	NIGHTHAWK PRODUCTION COMPANY	CYLINDER NO. :	0750
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SEPARATOR SALES GAS CRAIG 4-4		
FIELD DATA		SAMPLE TEMP. :	45.0
SAMPLE PRES. :	27.0	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; H2S LENGTH OF STAIN = 0.5PPM (1-11-16)		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0008	0.0016		
HELIUM	0.26	0.04	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.04	0.05	---	---
NITROGEN	16.26	16.54	---	---
CARBON DIOXIDE	0.27	0.43	---	---
METHANE	50.38400	29.35800	---	---
ETHANE	12.1377	13.2565	3.2431	3.2608
PROPANE	11.1618	17.8773	3.0718	3.0886
I-BUTANE	1.5793	3.3341	0.5158	0.5186
N-BUTANE	4.2889	9.0544	1.3511	1.3585
I-PENTANE	1.2553	3.2799	0.4497	0.4522
N-PENTANE	1.2099	3.1707	0.4377	0.4401
HEXANES PLUS	1.1523	3.6075	0.4425	0.4448
TOTALS	100.00000	100.00000	9.5117	9.5636

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0977	0.2772
TOLUENE	0.0025	0.0084
ETHYLBENZENE	0.0001	0.0004
XYLENES	0.0004	0.0016
TOTAL BTEX	0.1007	0.2876

BTU @		14.650	14.730
LOW	NET DRY REAL :	1232.0 /scf	1238.8 /scf
	NET WET REAL :	1210.5 /scf	1217.2 /scf
HIGH	GROSS DRY REAL :	1349.3 /scf	1356.7 /scf
	GROSS WET REAL :	1325.7 /scf	1333.1 /scf
	NET DRY REAL :	16991.7 /lb	17084.4 /lb
	GROSS DRY REAL :	18612.1 /lb	18713.7 /lb
	RELATIVE DENSITY (AIR=1):		0.9497
	COMPRESSIBILITY FACTOR :		0.99530

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

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

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GLYCALC INFORMATION

PROJECT NO. :	201512098	ANALYSIS NO. :	03
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NAME/DESCRIP :	SEPARATOR SALES GAS CRAIG 4-4		
FIELD DATA		SAMPLE TEMP. :	45.0
SAMPLE PRES. :	27.0	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; H2S LENGTH OF STAIN = 0.5PPM (1-11-16)		

Componet	Mole %	Wt %
Helium	0.26	0.04
Hydrogen	0.00	0.00
Carbon Dioxide	0.27	0.43
Nitrogen	16.26	16.54
Methane	50.38400	29.35800
Ethane	12.1377	13.2565
Propane	11.1618	17.8773
Isobutane	1.5793	3.3341
n-Butane	4.2889	9.0544
Isopentane	1.1220	2.9403
n-Pentane	1.2099	3.1707
Cyclopentane	0.1333	0.3396
n-Hexane	0.2311	0.7234
Cyclohexane	0.0736	0.2250
Other Hexanes	0.6713	2.0858
Heptanes	0.0602	0.2175
Methycyclohexane	0.0039	0.0139
2,2,4 Trimethylpentane	0.0014	0.0058
Benzene	0.0977	0.2772
Toluene	0.0025	0.0084
Ethylbenzene	0.0001	0.0004
Xylenes	0.0004	0.0016
C8+ Heavies	0.0101	0.0485
Subtotal	99.95920	99.94840
Oxygen/Argon	0.04	0.05
Alcohols	0.0008	0.0016
Total	100.00000	100.00000

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201512098	ANALYSIS NO. :	03
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NAME/DESCRIP :	SEPARATOR SALES GAS CRAIG 4-4		
FIELD DATA		SAMPLE TEMP. :	45.0
SAMPLE PRES. :	27.0	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; H2S LENGTH OF STAIN = 0.5PPM (1-11-16)		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.26	0.04	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.04	0.05	---	---
Nitrogen	---	16.26	16.54	---	---
Carbon Dioxide	---	0.27	0.43	---	---
Methane	P1	50.38400	29.35800	---	---
Ethane	P2	12.1377	13.2565	3.243	3.261
Propane	P3	11.1618	17.8773	3.072	3.089
i-Butane	I4	1.5793	3.3341	0.516	0.519
n-Butane	P4	4.2889	9.0544	1.351	1.359
2,2-Dimethylpropane	I5	0.0067	0.0175	0.003	0.003
Ethanol	X2	0.0002	0.0003	0.000	0.000
i-Pentane	I5	1.1153	2.9228	0.408	0.410
Acetone	X3	0.0005	0.0011	0.000	0.000
i-Propanol	X3	0.0001	0.0002	0.000	0.000
n-Pentane	P5	1.2099	3.1707	0.438	0.440
2,2-Dimethylbutane	I6	0.0041	0.0128	0.002	0.002
Cyclopentane	N5	0.1333	0.3396	0.039	0.039
2,3-Dimethylbutane	I6	0.0102	0.0319	0.004	0.004
2-Methylpentane	I6	0.2801	0.8767	0.116	0.117
3-Methylpentane	I6	0.1558	0.4877	0.063	0.063
n-Hexane	P6	0.2311	0.7234	0.095	0.096
Methylcyclopentane	N6	0.2099	0.6416	0.074	0.075
2,4-Dimethylpentane	I7	0.0039	0.0142	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0003	0.0011	0.000	0.000
Benzene	A6	0.0977	0.2772	0.027	0.027
3,3-Dimethylpentane	I7	0.0002	0.0007	0.000	0.000
Cyclohexane	N6	0.0736	0.2250	0.025	0.025
2-Methylhexane	I7	0.0070	0.0255	0.003	0.003
2,3-Dimethylpentane	I7	0.0115	0.0418	0.005	0.005
1,1-Dimethylcyclopentane	N7	0.0035	0.0125	0.001	0.001
3-Methylhexane	I7	0.0021	0.0076	0.001	0.001
1c,3-Dimethylcyclopentane	N7	0.0084	0.0300	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0033	0.0118	0.002	0.002
3-Ethylpentane	I7	0.0013	0.0047	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0068	0.0243	0.003	0.003
2,2,4-Trimethylpentane	I8	0.0014	0.0058	0.001	0.001
UnknownC6s	U6	0.0112	0.0351	0.005	0.005
n-Heptane	P7	0.0038	0.0138	0.002	0.002
1c,2-Dimethylcyclopentane	N7	0.0003	0.0011	0.000	0.000
Methylcyclohexane	N7	0.0039	0.0139	0.002	0.002
2,2-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0003	0.0012	0.000	0.000
Ethylcyclopentane	N7	0.0006	0.0021	0.000	0.000
2,5-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000

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2,2,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0004	0.0016	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0006	0.0024	0.000	0.000
2,3,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0025	0.0084	0.001	0.001
2,3-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0006	0.0025	0.000	0.000
4-Methylheptane	I8	0.0001	0.0004	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0004	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0001	0.0004	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0005	0.0020	0.000	0.000
3-Ethylhexane	I8	0.0001	0.0004	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0002	0.0008	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0002	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0002	0.0008	0.000	0.000
UnknownC7s	U7	0.0069	0.0251	0.003	0.003
n-Octane	P8	0.0003	0.0012	0.000	0.000
1c,4-Dimethylcyclohexane	N8	0.0002	0.0008	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,2,3-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
Ethylbenzene	I8	0.0001	0.0004	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0003	0.0012	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0001	0.0004	0.000	0.000
3-Methyloctane	I9	0.0001	0.0005	0.000	0.000
UnknownC8s	U8	0.0003	0.0012	0.000	0.000
n-Nonane	P9	0.0001	0.0005	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0002	0.0010	0.000	0.000
UnknownC9s	U9	0.0007	0.0033	0.000	0.000
n-Decane	P10	0.0002	0.0010	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0003	0.0016	0.000	0.000
n-Undecane	P11	0.0003	0.0017	0.000	0.000
2-Methylindan	A11	0.0001	0.0005	0.000	0.000
1,3-Di-n-propylbenzene	A12	0.0001	0.0006	0.000	0.000
UnknownC11s	U11	0.0004	0.0023	0.000	0.000
n-Dodecane	P12	0.0003	0.0019	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0006	0.000	0.000
n-Hexylbenzene	A12	0.0001	0.0006	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0005	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0004	0.0023	0.000	0.000
n-Tridecane	P13	0.0002	0.0013	0.000	0.000
UnknownC13s	U13	0.0005	0.0033	0.000	0.000
n-Tetradecane	P14	0.0001	0.0007	0.000	0.000
UnknownC14s	U14	0.0001	0.0007	0.000	0.000
TOTAL		100.00000	100.00000	9.5117	9.5636

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0977	0.2772
TOLUENE	0.0025	0.0084
ETHYLBENZENE	0.0001	0.0004
XYLENES	0.0004	0.0016
TOTAL BTEX	0.1007	0.2876

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1232.0 /scf	1238.8 /scf
	NET WET REAL :	1210.5 /scf	1217.2 /scf
HIGH	GROSS DRY REAL :	1349.3 /scf	1356.7 /scf
	GROSS WET REAL :	1325.7 /scf	1333.1 /scf
	NET DRY REAL :	16991.7 /lb	17084.4 /lb
	GROSS DRY REAL :	18612.1 /lb	18713.7 /lb
	RELATIVE DENSITY (AIR=1):		0.9497
	COMPRESSIBILITY FACTOR :		0.99530

(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.

EMPACT Analytical Systems, Inc 365 S. Main Street, Brighton, CO 80601 303-637-0150