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. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION COMPANY	ANALYSIS DATE:	DECEMBER 29, 2015 06:52
ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 17, 2015 16:40
PRODUCER :	NIGHTHAWK PRODUCTION COMPANY	CYLINDER NO. :	0596
LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SEPARATOR SALES GAS CRESTED BUTTE 2-14		
FIELD DATA		SAMPLE TEMP. :	55.0
SAMPLE PRES. :	23.0	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; H2S LENGTH OF STAIN = 3PPM (1-11-16)		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0002	0.0003		
HELIUM	0.52	0.08	---	---
HYDROGEN	0.60	0.04	---	---
OXYGEN/ARGON	0.46	0.54	---	---
NITROGEN	46.31	47.65	---	---
CARBON DIOXIDE	2.31	3.73	---	---
METHANE	33.50130	19.74630	---	---
ETHANE	5.1845	5.7267	1.3817	1.3892
PROPANE	5.3089	8.5996	1.4576	1.4656
I-BUTANE	1.0624	2.2683	0.3467	0.3486
N-BUTANE	2.7865	5.9495	0.8752	0.8800
I-PENTANE	0.6429	1.7021	0.2318	0.2330
N-PENTANE	0.6953	1.8428	0.2508	0.2521
HEXANES PLUS	0.6180	2.1244	0.2529	0.2539
TOTALS	100.00000	100.00000	4.7967	4.8224

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0088	0.0252
TOLUENE	0.0037	0.0125
ETHYLBENZENE	0.0005	0.0020
XYLENES	0.0012	0.0048
TOTAL BTEX	0.0142	0.0445

BTU @		14.650	14.730
LOW	NET DRY REAL :	706.0 /scf	709.9 /scf
	NET WET REAL :	693.7 /scf	697.6 /scf
HIGH	GROSS DRY REAL :	774.4 /scf	778.6 /scf
	GROSS WET REAL :	760.9 /scf	765.1 /scf
	NET DRY REAL :	9859.0 /lb	9912.8 /lb
	GROSS DRY REAL :	10812.5 /lb	10871.5 /lb
	RELATIVE DENSITY (AIR=1):		0.9394
	COMPRESSIBILITY FACTOR :		0.99781

(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. :	06
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ACCOUNT NO. :		SAMPLE DATE :	DECEMBER 17, 2015 16:40
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LEASE NO. :		SAMPLED BY :	JOHN MOSER-EMPACT
NAME/DESCRIP :	SEPARATOR SALES GAS CRESTED BUTTE 2-14		
FIELD DATA		SAMPLE TEMP. :	55.0
SAMPLE PRES. :	23.0	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; H2S LENGTH OF STAIN = 3PPM (1-11-16)		

Componet	Mole %	Wt %
Helium	0.52	0.08
Hydrogen	0.60	0.04
Carbon Dioxide	2.31	3.73
Nitrogen	46.31	47.65
Methane	33.50130	19.74630
Ethane	5.1845	5.7267
Propane	5.3089	8.5996
Isobutane	1.0624	2.2683
n-Butane	2.7865	5.9495
Isopentane	0.6176	1.6369
n-Pentane	0.6953	1.8428
Cyclopentane	0.0253	0.0652
n-Hexane	0.1357	0.4296
Cyclohexane	0.0368	0.1138
Other Hexanes	0.2420	0.7623
Heptanes	0.1049	0.3849
Methycyclohexane	0.0273	0.0984
2,2,4 Trimethylpentane	0.0012	0.0050
Benzene	0.0088	0.0252
Toluene	0.0037	0.0125
Ethylbenzene	0.0005	0.0020
Xylenes	0.0012	0.0048
C8+ Heavies	0.0559	0.2859
Subtotal	99.53980	99.45970
Oxygen/Argon	0.46	0.54
Alcohols	0.0002	0.0003
Total	100.00000	100.00000

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201512098	ANALYSIS NO. :	06
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FIELD DATA		SAMPLE TEMP. :	55.0
SAMPLE PRES. :	23.0	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; H2S LENGTH OF STAIN = 3PPM (1-11-16)		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.52	0.08	---	---
Hydrogen	---	0.60	0.04	---	---
Oxygen/Argon	---	0.46	0.54	---	---
Nitrogen	---	46.31	47.65	---	---
Carbon Dioxide	---	2.31	3.73	---	---
Methane	P1	33.50130	19.74630	---	---
Ethane	P2	5.1845	5.7267	1.382	1.389
Propane	P3	5.3089	8.5996	1.458	1.466
i-Butane	I4	1.0624	2.2683	0.347	0.349
n-Butane	P4	2.7865	5.9495	0.875	0.880
2,2-Dimethylpropane	I5	0.0059	0.0157	0.002	0.002
Ethanol	X2	0.0002	0.0003	0.000	0.000
i-Pentane	I5	0.6117	1.6212	0.223	0.224
n-Pentane	P5	0.6953	1.8428	0.251	0.252
2,2-Dimethylbutane	I6	0.0034	0.0108	0.001	0.001
Cyclopentane	N5	0.0253	0.0652	0.007	0.007
2,3-Dimethylbutane	I6	0.0121	0.0383	0.005	0.005
2-Methylpentane	I6	0.1164	0.3685	0.048	0.048
3-Methylpentane	I6	0.0587	0.1858	0.024	0.024
n-Hexane	P6	0.1357	0.4296	0.056	0.056
2,2-Dimethylpentane	I7	0.0002	0.0007	0.000	0.000
Methylcyclopentane	N6	0.0513	0.1586	0.018	0.018
2,4-Dimethylpentane	I7	0.0026	0.0096	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0002	0.0007	0.000	0.000
Benzene	A6	0.0088	0.0252	0.002	0.002
3,3-Dimethylpentane	I7	0.0003	0.0011	0.000	0.000
Cyclohexane	N6	0.0368	0.1138	0.012	0.012
2-Methylhexane	I7	0.0103	0.0379	0.005	0.005
2,3-Dimethylpentane	I7	0.0082	0.0302	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0018	0.0065	0.001	0.001
3-Methylhexane	I7	0.0133	0.0490	0.006	0.006
1c,3-Dimethylcyclopentane	N7	0.0080	0.0289	0.004	0.004
1t,3-Dimethylcyclopentane	N7	0.0070	0.0252	0.003	0.003
3-Ethylpentane	I7	0.0003	0.0011	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0138	0.0498	0.006	0.006
2,2,4-Trimethylpentane	I8	0.0012	0.0050	0.001	0.001

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UnknownC6s	U6	0.0001	0.0003	0.000	0.000
n-Heptane	P7	0.0309	0.1137	0.014	0.014
1c,2-Dimethylcyclopentane	N7	0.0008	0.0029	0.000	0.000
Methylcyclohexane	N7	0.0273	0.0984	0.011	0.011
2,2-Dimethylhexane	I8	0.0005	0.0021	0.000	0.000
1,1,3-Trimethylcyclopentane	N7	0.0026	0.0107	0.001	0.001
Ethylcyclopentane	N7	0.0019	0.0069	0.001	0.001
2,5-Dimethylhexane	I8	0.0005	0.0021	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0008	0.000	0.000
2,4-Dimethylhexane	I8	0.0007	0.0029	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0021	0.0087	0.001	0.001
3,3-Dimethylhexane	I8	0.0002	0.0008	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0030	0.0124	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0004	0.0017	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0037	0.0125	0.001	0.001
2,3-Dimethylhexane	I8	0.0006	0.0025	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0002	0.0008	0.000	0.000
2-Methylheptane	I8	0.0044	0.0185	0.002	0.002
4-Methylheptane	I8	0.0015	0.0063	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0002	0.0008	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0008	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0002	0.0008	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0040	0.0165	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0011	0.0045	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0003	0.0013	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0004	0.0017	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0002	0.0008	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0010	0.0041	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0011	0.0045	0.001	0.001
1c,2c,3-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
UnknownC7s	U7	0.0027	0.0100	0.001	0.001
n-Octane	P8	0.0064	0.0269	0.003	0.003
1c,4-Dimethylcyclohexane	N8	0.0003	0.0013	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0004	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0012	0.0056	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0004	0.0019	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
4,4-Dimethylheptane	I9	0.0002	0.0010	0.000	0.000
Ethylcyclohexane	N8	0.0007	0.0029	0.000	0.000
n-Propylcyclopentane	N8	0.0003	0.0013	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0005	0.0020	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0005	0.0020	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0008	0.000	0.000
3,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0002	0.0010	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0003	0.0014	0.000	0.000
2-Methyloctane	I9	0.0004	0.0019	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000

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3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0003	0.0014	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0005	0.0020	0.000	0.000
i-Butylcyclopentane	N9	0.0003	0.0014	0.000	0.000
UnknownC8s	U8	0.0018	0.0076	0.001	0.001
n-Nonane	P9	0.0012	0.0057	0.001	0.001
i-Propylbenzene	A9	0.0001	0.0004	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0001	0.0005	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Propylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0018	0.0085	0.001	0.001
n-Decane	P10	0.0002	0.0010	0.000	0.000
UnknownC10s	U10	0.0003	0.0016	0.000	0.000
n-Undecane	P11	0.0002	0.0011	0.000	0.000
Tetrahydronaphthalene	A10	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0001	0.0006	0.000	0.000
n-Dodecane	P12	0.0004	0.0025	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0006	0.000	0.000
1,4-Methyl-n-pentylbenzene	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	0.0002	0.0011	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0005	0.000	0.000
1-Methylnaphthalene	A11	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0003	0.0017	0.000	0.000
n-Tridecane	P13	0.0010	0.0068	0.001	0.001
UnknownC13s	U13	0.0007	0.0047	0.001	0.001
n-Tetradecane	P14	0.0013	0.0095	0.001	0.001
UnknownC14s	U14	0.0014	0.0102	0.001	0.001
n-Pentadecane	P15	0.0013	0.0101	0.001	0.001
UnknownC15s	U15	0.0017	0.0133	0.001	0.001
n-Hexadecane	P16	0.0007	0.0058	0.001	0.001
UnknownC16s	U16	0.0016	0.0133	0.001	0.001
n-Heptadecane	P17	0.0003	0.0026	0.000	0.000
UnknownC17s	U17	0.0008	0.0071	0.001	0.001
n-Octadecane	P18	0.0001	0.0009	0.000	0.000
UnknownC18s	U18	0.0008	0.0075	0.001	0.001
UnknownC19s	U19	0.0003	0.0030	0.000	0.000
TOTAL		100.00000	100.00000	4.7967	4.8224

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0088	0.0252
TOLUENE	0.0037	0.0125
ETHYLBENZENE	0.0005	0.0020
XYLENES	0.0012	0.0048
TOTAL BTEX	0.0142	0.0445

BTU @		14.650	14.730
LOW	NET DRY REAL :	706.0 **/scf**	709.9 **/scf**
	NET WET REAL :	693.7 **/scf**	697.6 **/scf**
HIGH	GROSS DRY REAL :	774.4 **/scf**	778.6 **/scf**
	GROSS WET REAL :	760.9 **/scf**	765.1 **/scf**
	NET DRY REAL :	9859.0 **/lb**	9912.8 **/lb**
	GROSS DRY REAL :	10812.5 **/lb**	10871.5 **/lb**
	RELATIVE DENSITY (AIR=1):		0.9394
	COMPRESSIBILITY FACTOR :		0.99781

(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