

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #: _____ NAME/DESCRIP : **BIG SKY 4-11 SALES GAS**

PROJECT NO. : **201701043** ANALYSIS NO. : **02**

COMPANY NAME : **NIGHTHAWK PRODUCTION COMPANY** ANALYSIS DATE: **JANUARY 17, 2017 07:44**

OFFICE / BRANCH: **HIGHLANDS RANCH, CO** SAMPLE DATE : **JANUARY 10, 2017 15:45**

CUSTOMER REF: _____ TO: _____

PRODUCER : _____ EFFECTIVE DATE: _____

*****FIELD DATA*****

SAMPLE CYCLE: _____ SAMPLE TYPE: **SPOT**

SAMPLE PRES. : **25** psig CYLINDER NO. : **1930**

LAB PRES: _____ psig SAMPLED BY : **GALE MCENDREE**

SAMPLE TEMP. : **74** °f SAMPLING COMPANY **EMPACT**

AMBIENT TEMP.: _____ °f H2S BY STAIN TUBE: **17** ppm

H2O BY STAIN TUBE: **-** #/mmcf CO2 BY STAIN TUBE: **-** Mol %

FIELD COMMENTS: **NO PROBE**

LAB COMMENTS: _____

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.730</u>	<u>GPM @ 14.650</u>
ALCOHOLS	0.0003	0.0003		
HELIUM	0.63	0.08	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.39	0.42	---	---
NITROGEN	51.7600	48.7400	---	---
CARBON DIOXIDE	2.93	4.33	---	---
METHANE	26.17410	14.11750	---	---
ETHANE	3.4494	3.4863	0.9244	0.9193
PROPANE	5.6362	8.3539	1.5564	1.5479
I-BUTANE	1.2724	2.4858	0.4170	0.4147
N-BUTANE	3.9890	7.7931	1.2600	1.2531
I-PENTANE	0.9842	2.3839	0.3577	0.3558
N-PENTANE	1.2903	3.1291	0.4682	0.4657
HEXANES PLUS	1.4941	4.6801	0.6215	0.6188
TOTALS	100.00000	100.00000	5.6052	5.5753

<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>BTU @</u>	<u>14.730</u>	<u>14.650</u>
BENZENE	0.0032	0.0084	LOW NET DRY REAL :	739.3 /scf	735.3 /scf
TOLUENE	0.0034	0.0105	NET WET REAL :	726.4 /scf	722.4 /scf
ETHYLBENZENE	0.0004	0.0014	HIGH GROSS DRY REAL :	808.3 /scf	803.9 /scf
XYLENES	0.0024	0.0086	GROSS WET REAL :	794.2 /scf	789.9 /scf
TOTAL BTEX	0.0094	0.0289	NET DRY REAL :	9460.2 /lb	9408.8 /lb
			GROSS DRY REAL :	10338.5 /lb	10282.4 /lb

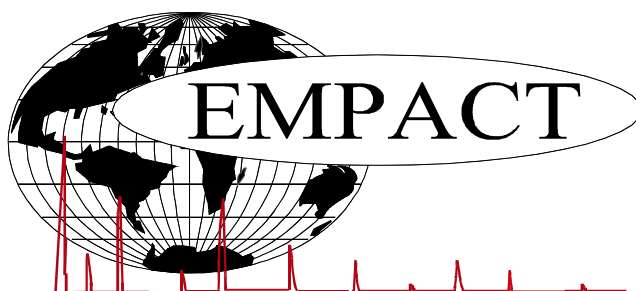
(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

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

RELATIVE DENSITY (AIR=1): 1.0259

COMPRESSIBILITY FACTOR : 0.99758

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.



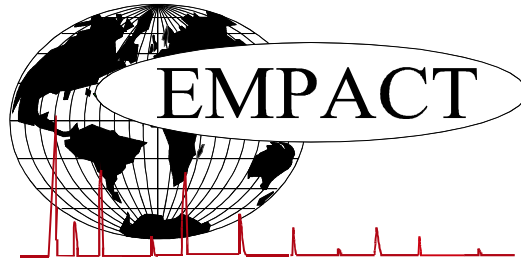
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GLYCALC INFORMATION

PROJECT NO. :	201701043	ANALYSIS NO. :	02
COMPANY NAME :	NIGHTHAWK PRODUCTION COMPANY	ANALYSIS DATE:	JANUARY 17, 2017 07:44
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 10, 2017 15:45
PRODUCER :		CYLINDER NO. :	1930
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	BIG SKY 4-11 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	74
SAMPLE PRES. :	25	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.63	0.08
Hydrogen	0.00	0.00
Carbon Dioxide	2.93	4.33
Nitrogen	51.76	48.74
Methane	26.17410	14.11750
Ethane	3.4494	3.4863
Propane	5.6362	8.3539
Isobutane	1.2724	2.4858
n-Butane	3.9890	7.7931
Isopentane	0.9404	2.2806
n-Pentane	1.2903	3.1291
Cyclopentane	0.0438	0.1033
n-Hexane	0.3402	0.9854
Cyclohexane	0.0888	0.2512
Other Hexanes	0.4950	1.4264
Heptanes	0.2889	0.9684
Methycyclohexane	0.0914	0.3016
2,2,4 Trimethylpentane	0.0012	0.0046
Benzene	0.0032	0.0084
Toluene	0.0034	0.0105
Ethylbenzene	0.0004	0.0014
Xylenes	0.0024	0.0086
C8+ Heavies	0.1792	0.7136
<u>Subtotal</u>	<u>99.60970</u>	<u>99.57970</u>
Oxygen/Argon	0.39	0.42
<u>Alcohols</u>	<u>0.0003</u>	<u>0.0003</u>
Total	100.00000	100.00000

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DHA COMPONENT LIST

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SAMPLE PRES. :	25	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

<u>COMPONENT</u>	<u>PIANO #</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.730</u>	<u>GPM @ 14.650</u>
Helium	---	0.63	0.08	---	---
Oxygen/Argon	---	0.39	0.42	---	---
Nitrogen	---	51.76	48.74	---	---
Carbon Dioxide	---	2.93	4.33	---	---
Methane	P1	26.17410	14.11750	---	---
Ethane	P2	3.4494	3.4863	0.924	0.919
Propane	P3	5.6362	8.3539	1.556	1.548
i-Butane	I4	1.2724	2.4858	0.417	0.415
Methanol	X1	0.0003	0.0003	0.000	0.000
n-Butane	P4	3.9890	7.7931	1.260	1.253
2,2-Dimethylpropane	I5	0.0084	0.0204	0.003	0.003
i-Pentane	I5	0.9320	2.2602	0.342	0.340
n-Pentane	P5	1.2891	3.1262	0.468	0.466
2,2-Dimethylbutane	I6	0.0057	0.0165	0.002	0.002
Cyclopentane	N5	0.0438	0.1033	0.013	0.013
2,3-Dimethylbutane	I6	0.0204	0.0591	0.008	0.008
2-Methylpentane	I6	0.1119	0.3241	0.046	0.046
3-Methylpentane	I6	0.2461	0.7129	0.101	0.100
UnknownC5s	U5	0.0012	0.0029	0.000	0.000
n-Hexane	P6	0.3402	0.9854	0.141	0.140
2,2-Dimethylpentane	I7	0.0002	0.0007	0.000	0.000
Methylcyclopentane	N6	0.1098	0.3106	0.039	0.039
2,4-Dimethylpentane	I7	0.0061	0.0205	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0009	0.0030	0.000	0.000
Benzene	A6	0.0032	0.0084	0.001	0.001
3,3-Dimethylpentane	I7	0.0003	0.0010	0.000	0.000
Cyclohexane	N6	0.0888	0.2512	0.030	0.030
2-Methylhexane	I7	0.0291	0.0980	0.013	0.013
2,3-Dimethylpentane	I7	0.0086	0.0290	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0103	0.0340	0.004	0.004
3-Methylhexane	I7	0.0429	0.1445	0.020	0.020
1c,3-Dimethylcyclopentane	N7	0.0165	0.0545	0.008	0.008
1t,3-Dimethylcyclopentane	N7	0.0131	0.0432	0.006	0.006
3-Ethylpentane	I7	0.0035	0.0118	0.002	0.002
1t,2-Dimethylcyclopentane	N7	0.0313	0.1033	0.014	0.014

2,2,4-Trimethylpentane	I8	0.0012	0.0046	0.001	0.001
UnknownC6s	U6	0.0011	0.0032	0.000	0.000
n-Heptane	P7	0.1082	0.3644	0.050	0.050
1c,2-Dimethylcyclopentane	N7	0.0025	0.0082	0.001	0.001
Methylcyclohexane	N7	0.0914	0.3016	0.037	0.037
2,2-Dimethylhexane	I8	0.0073	0.0280	0.003	0.003
1,1,3-Trimethylcyclopentane	N7	0.0017	0.0064	0.001	0.001
Ethylcyclopentane	N7	0.0041	0.0136	0.002	0.002
2,5-Dimethylhexane	I8	0.0015	0.0058	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0003	0.0011	0.000	0.000
2,4-Dimethylhexane	I8	0.0027	0.0104	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0061	0.0230	0.003	0.003
3,3-Dimethylhexane	I8	0.0006	0.0023	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0092	0.0347	0.004	0.004
2,3,4-Trimethylpentane	I8	0.0002	0.0008	0.000	0.000
Toluene	A7	0.0034	0.0105	0.001	0.001
2,3-Dimethylhexane	I8	0.0023	0.0088	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0011	0.0042	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0174	0.0668	0.009	0.009
4-Methylheptane	I8	0.0036	0.0138	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0014	0.0054	0.001	0.001
3,4-Dimethylhexane	I8	0.0007	0.0027	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0005	0.0019	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0007	0.000	0.000
3-Methylheptane	I8	0.0055	0.0211	0.003	0.003
1c,2t,3-Trimethylcyclopentane	N8	0.0127	0.0479	0.006	0.006
3-Ethylhexane	I8	0.0039	0.0150	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0041	0.0155	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0009	0.0034	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0010	0.0038	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0010	0.0038	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0025	0.0094	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0003	0.0013	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0041	0.0155	0.002	0.002
1c,2c,3-Trimethylcyclopentane	N8	0.0004	0.0015	0.000	0.000
UnknownC7s	U7	0.0096	0.0323	0.004	0.004
n-Octane	P8	0.0286	0.1098	0.015	0.015
1c,4-Dimethylcyclohexane	N8	0.0014	0.0053	0.001	0.001
i-Propylcyclopentane	I8	0.0002	0.0007	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0004	0.0017	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0009	0.0034	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0046	0.0195	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0025	0.0108	0.001	0.001
2,4-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
4,4-Dimethylheptane	I9	0.0007	0.0030	0.000	0.000
Ethylcyclohexane	N8	0.0023	0.0087	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
2,5-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
3,3-Dimethylheptane	I9	0.0005	0.0022	0.000	0.000
3,5-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
2,6-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
Ethylbenzene	I8	0.0004	0.0014	0.000	0.000

1c,2t,4t-Trimethylcyclohexane	N9	0.0013	0.0055	0.001	0.001
1,3-Dimethylbenzene (m-Xylene)	A8	0.0012	0.0043	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0018	0.000	0.000
3,4-Dimethylheptane	I9	0.0006	0.0026	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0008	0.0035	0.000	0.000
4-Ethylheptane	I9	0.0003	0.0013	0.000	0.000
4-Methyloctane	I9	0.0013	0.0056	0.001	0.001
2-Methyloctane	I9	0.0012	0.0052	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0004	0.0017	0.000	0.000
3-Ethylheptane	I9	0.0004	0.0017	0.000	0.000
3-Methyloctane	I9	0.0020	0.0086	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0006	0.0026	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
3,3-Diethylpentane	I9	0.0002	0.0009	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0007	0.0025	0.000	0.000
i-Butylcyclopentane	N9	0.0011	0.0047	0.001	0.001
UnknownC8s	U8	0.0007	0.0027	0.000	0.000
n-Nonane	P9	0.0077	0.0332	0.004	0.004
1,1-Methylethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
i-Propylbenzene	A9	0.0008	0.0032	0.000	0.000
i-Propylcyclohexane	N9	0.0003	0.0013	0.000	0.000
2,2-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0009	0.0038	0.001	0.001
3,3-Dimethyloctane	I10	0.0003	0.0015	0.000	0.000
n-Propylbenzene	A9	0.0011	0.0044	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0019	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0004	0.0019	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0016	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0004	0.0016	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0006	0.0029	0.000	0.000
1,2-Methylethylbenzene	A9	0.0004	0.0016	0.000	0.000
2-Methylnonane	I10	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0004	0.0019	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0023	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0009	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC9s	U9	0.0088	0.0380	0.005	0.005
n-Decane	P10	0.0016	0.0077	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0002	0.0008	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0005	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0003	0.0013	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0004	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0005	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC10s	U10	0.0029	0.0139	0.002	0.002
n-Undecane	P11	0.0004	0.0021	0.000	0.000
UnknownC11s	U11	0.0007	0.0037	0.000	0.000

n-Dodecane	P12	<u>0.0001</u>	<u>0.0006</u>	<u>0.000</u>	<u>0.000</u>
TOTAL		100.00000	100.00000	5.6052	5.5753

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0032	0.0084	LOW NET DRY REAL :	739.3 /scf	735.3 /scf
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XYLENES	0.0024	0.0086	GROSS WET REAL :	794.2 /scf	789.9 /scf
TOTAL BTEX	0.0094	0.0289	NET DRY REAL :	9460.2 /lb	9408.8 /lb
			GROSS DRY REAL :	10338.5 /lb	10282.4 /lb

RELATIVE DENSITY (AIR=1): 1.0259
 COMPRESSIBILITY FACTOR : 0.99758

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

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