

**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**MAIN PAGE**

LEASE #:		NAME/DESCRIP :	<b>CRESTED BUTTE 2-14 SALES GAS</b>
PROJECT NO. :	<b>201701044</b>	ANALYSIS NO. :	<b>05</b>
COMPANY NAME :	<b>NIGHTHAWK PRODUCTION CO</b>	ANALYSIS DATE:	JANUARY 18, 2017 14:16
OFFICE / BRANCH:	HIGHLANDS RANCH, CO	SAMPLE DATE :	JANUARY 11, 2017 09:55
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

**\*\*\*FIELD DATA\*\*\***

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	25 psig	CYLINDER NO. :	1827
LAB PRES:	psig	SAMPLED BY :	GALE MCENDREE
SAMPLE TEMP. :	67 °f	SAMPLING COMPANY:	EMPACT
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	<u>2</u> 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	0.0010	0.0010		
HELIUM	0.20	0.02	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.12	0.12	---	---
NITROGEN	17.7900	15.2800	---	---
CARBON DIOXIDE	1.34	1.81	---	---
METHANE	29.80200	14.66180	---	---
ETHANE	17.8843	16.4917	4.8148	4.7887
PROPANE	20.8958	28.2572	5.7947	5.7633
I-BUTANE	2.8865	5.1450	0.9507	0.9455
N-BUTANE	5.7856	10.3125	1.8357	1.8257
I-PENTANE	1.1932	2.6363	0.4360	0.4336
N-PENTANE	1.0404	2.3020	0.3795	0.3774
HEXANES PLUS	1.0412	2.9625	0.4215	0.4194
<b>TOTALS</b>	<b>100.00000</b>	<b>100.00000</b>	<b>14.6329</b>	<b>14.5536</b>

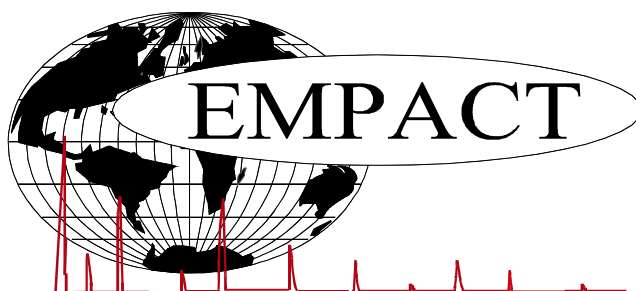
<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>BTU @</u>	<u>14.730</u>	<u>14.650</u>
BENZENE	0.0309	0.0740	<b>LOW</b> NET DRY REAL :	1448.0 /scf	1440.1 /scf
TOLUENE	0.0208	0.0588	NET WET REAL :	1422.8 /scf	1414.9 /scf
ETHYLBENZENE	0.0045	0.0147	<b>HIGH</b> GROSS DRY REAL :	1580.6 /scf	1572.0 /scf
XYLENES	0.0041	0.0134	GROSS WET REAL :	1553.1 /scf	1544.5 /scf
<b>TOTAL BTEX</b>	<b>0.0603</b>	<b>0.1609</b>	NET DRY REAL :	16878.3 /lb	16786.7 /lb
			GROSS DRY REAL :	18419.8 /lb	18319.7 /lb

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

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

**RELATIVE DENSITY (AIR=1):** 1.1251  
**COMPRESSIBILITY FACTOR :** 0.99319

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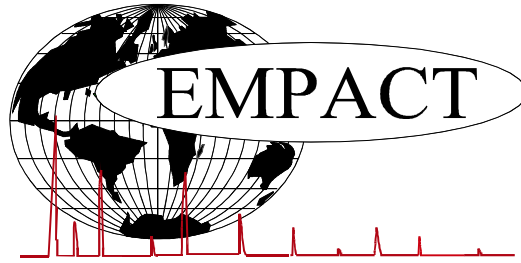
**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**GLYCALC INFORMATION**

PROJECT NO. :	201701044	ANALYSIS NO. :	05
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 18, 2017 14:16
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 09:55
PRODUCER :		CYLINDER NO. :	1827
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	CRESTED BUTTE 2-14 SALES GAS		
***FIELD DATA***		SAMPLE TEMP. :	67
SAMPLE PRES. :	25	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.20	0.02
Hydrogen	0.02	0.00
Carbon Dioxide	1.34	1.81
Nitrogen	17.79	15.28
Methane	29.80200	14.66180
Ethane	17.8843	16.4917
Propane	20.8958	28.2572
Isobutane	2.8865	5.1450
n-Butane	5.7856	10.3125
Isopentane	1.1329	2.5066
n-Pentane	1.0404	2.3020
Cyclopentane	0.0603	0.1297
n-Hexane	0.1759	0.4649
Cyclohexane	0.0541	0.1396
Other Hexanes	0.3967	1.0422
Heptanes	0.1851	0.5649
Methycyclohexane	0.0419	0.1262
2,2,4 Trimethylpentane	0.0012	0.0042
Benzene	0.0309	0.0740
Toluene	0.0208	0.0588
Ethylbenzene	0.0045	0.0147
Xylenes	0.0041	0.0134
C8+ Heavies	0.1260	0.4596
<u>Subtotal</u>	<u>99.87900</u>	<u>99.87900</u>
Oxygen/Argon	0.12	0.12
Alcohols	0.0010	0.0010
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

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**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**DHA COMPONENT LIST**

PROJECT NO. :	201701044	ANALYSIS NO. :	05
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 18, 2017 14:16
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 09:55
PRODUCER :		CYLINDER NO. :	1827
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	CRESTED BUTTE 2-14 SALES GAS		
***FIELD DATA***		SAMPLE TEMP. :	67
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	---	0.20	0.02	---	---
Hydrogen	---	0.02	0.00	---	---
Oxygen/Argon	---	0.12	0.12	---	---
Nitrogen	---	17.79	15.28	---	---
Carbon Dioxide	---	1.34	1.81	---	---
Methane	P1	29.80200	14.66180	---	---
Ethane	P2	17.8843	16.4917	4.815	4.789
Propane	P3	20.8958	28.2572	5.795	5.763
i-Butane	I4	2.8865	5.1450	0.951	0.946
Methanol	X1	0.0010	0.0010	0.000	0.000
n-Butane	P4	5.7856	10.3125	1.836	1.826
2,2-Dimethylpropane	I5	0.0203	0.0449	0.008	0.008
i-Pentane	I5	1.1126	2.4617	0.410	0.408
n-Pentane	P5	1.0403	2.3018	0.380	0.377
2,2-Dimethylbutane	I6	0.0030	0.0079	0.001	0.001
Cyclopentane	N5	0.0603	0.1297	0.018	0.018
2,3-Dimethylbutane	I6	0.0114	0.0301	0.005	0.005
2-Methylpentane	I6	0.0981	0.2593	0.041	0.041
3-Methylpentane	I6	0.1804	0.4768	0.074	0.073
UnknownC5s	U5	0.0001	0.0002	0.000	0.000
n-Hexane	P6	0.1759	0.4649	0.073	0.072
2,2-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Methylcyclopentane	N6	0.1007	0.2599	0.036	0.036
2,4-Dimethylpentane	I7	0.0029	0.0089	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0003	0.0009	0.000	0.000
Benzene	A6	0.0309	0.0740	0.009	0.009
3,3-Dimethylpentane	I7	0.0003	0.0009	0.000	0.000
Cyclohexane	N6	0.0541	0.1396	0.018	0.018
2-Methylhexane	I7	0.0135	0.0415	0.006	0.006
2,3-Dimethylpentane	I7	0.0085	0.0261	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0053	0.0160	0.002	0.002
3-Methylhexane	I7	0.0303	0.0931	0.014	0.014
1c,3-Dimethylcyclopentane	N7	0.0135	0.0407	0.006	0.006
1t,3-Dimethylcyclopentane	N7	0.0102	0.0307	0.005	0.005
3-Ethylpentane	I7	0.0033	0.0102	0.001	0.001

1t,2-Dimethylcyclopentane	N7	0.0315	0.0949	0.014	0.014
2,2,4-Trimethylpentane	I8	0.0012	0.0042	0.001	0.001
UnknownC6s	U6	0.0031	0.0082	0.001	0.001
n-Heptane	P7	0.0493	0.1515	0.023	0.023
1c,2-Dimethylcyclopentane	N7	0.0021	0.0063	0.001	0.001
Methylcyclohexane	N7	0.0419	0.1262	0.017	0.017
2,2-Dimethylhexane	I8	0.0028	0.0098	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0006	0.0021	0.000	0.000
Ethylcyclopentane	N7	0.0061	0.0184	0.002	0.002
2,5-Dimethylhexane	I8	0.0010	0.0035	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0002	0.0007	0.000	0.000
2,4-Dimethylhexane	I8	0.0016	0.0056	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0041	0.0141	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0010	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0073	0.0251	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0002	0.0007	0.000	0.000
Toluene	A7	0.0208	0.0588	0.007	0.007
2,3-Dimethylhexane	I8	0.0013	0.0046	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0009	0.0032	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0003	0.000	0.000
2-Methylheptane	I8	0.0125	0.0438	0.006	0.006
4-Methylheptane	I8	0.0026	0.0091	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0006	0.0021	0.000	0.000
3,4-Dimethylhexane	I8	0.0006	0.0021	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0003	0.0010	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0003	0.000	0.000
3-Methylheptane	I8	0.0031	0.0109	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0080	0.0275	0.004	0.004
3-Ethylhexane	I8	0.0014	0.0049	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0020	0.0069	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0007	0.0024	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0016	0.0055	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0015	0.0052	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0041	0.0141	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0029	0.0100	0.001	0.001
1c,2c,3-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
UnknownC7s	U7	0.0073	0.0224	0.003	0.003
n-Octane	P8	0.0172	0.0603	0.009	0.009
1c,4-Dimethylcyclohexane	N8	0.0008	0.0028	0.000	0.000
i-Propylcyclopentane	I8	0.0004	0.0014	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0005	0.0020	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0004	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0005	0.0017	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0037	0.0143	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0021	0.0083	0.001	0.001
2,4-Dimethylheptane	I9	0.0005	0.0020	0.000	0.000
4,4-Dimethylheptane	I9	0.0008	0.0032	0.000	0.000
Ethylcyclohexane	N8	0.0026	0.0090	0.001	0.001
n-Propylcyclopentane	N8	0.0006	0.0021	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
2,5-Dimethylheptane	I9	0.0005	0.0020	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0008	0.000	0.000
2,6-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000

1,1,3-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
Ethylbenzene	I8	0.0045	0.0147	0.002	0.002
1c,2t,4t-Trimethylcyclohexane	N9	0.0015	0.0058	0.001	0.001
2,3-Dimethylheptane	I9	0.0006	0.0024	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0018	0.0059	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0007	0.0023	0.000	0.000
3,4-Dimethylheptane	I9	0.0005	0.0020	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0016	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0008	0.000	0.000
4-Methyloctane	I9	0.0007	0.0028	0.000	0.000
2-Methyloctane	I9	0.0007	0.0028	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0003	0.0012	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0012	0.000	0.000
3-Methyloctane	I9	0.0012	0.0047	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0007	0.0027	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
3,3-Diethylpentane	I9	0.0002	0.0008	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0016	0.0052	0.001	0.001
i-Butylcyclopentane	N9	0.0007	0.0027	0.000	0.000
UnknownC8s	U8	0.0005	0.0018	0.000	0.000
n-Nonane	P9	0.0031	0.0122	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0007	0.0027	0.000	0.000
i-Propylbenzene	A9	0.0011	0.0041	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0008	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
n-Butylcyclopentane	N9	0.0005	0.0019	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
n-Propylbenzene	A9	0.0010	0.0037	0.000	0.000
3,6-Dimethyloctane	I10	0.0007	0.0031	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0003	0.0013	0.000	0.000
1,3-Methylethylbenzene	A9	0.0006	0.0022	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0007	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0002	0.0007	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
5-Methylnonane	I10	0.0003	0.0013	0.000	0.000
1,2-Methylethylbenzene	A9	0.0003	0.0011	0.000	0.000
2-Methylnonane	I10	0.0001	0.0004	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0004	0.000	0.000
3-Methylnonane	I10	0.0003	0.0013	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0006	0.0025	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0009	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0004	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC9s	U9	0.0056	0.0220	0.003	0.003
n-Decane	P10	0.0007	0.0031	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0002	0.0007	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0004	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0008	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0004	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
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,3-Dimethyl-2-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	0.0032	0.0140	0.002	0.002
n-Undecane	P11	0.0001	0.0005	0.000	0.000
2-Methylindan	A11	0.0001	0.0004	0.000	0.000
Naphthalene	A10	0.0001	0.0004	0.000	0.000
UnknownC11s	U11	0.0005	0.0024	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>14.6329</b>	<b>14.5536</b>

<b>BTEX COMPONENTS</b>	<b>MOLE%</b>	<b>WT%</b>	<b>BTU @</b>	<b>14.730</b>	<b>14.650</b>
BENZENE	0.0309	0.0740	<b>LOW NET DRY REAL :</b>	1448.0 /scf	1440.1 /scf
TOLUENE	0.0208	0.0588	NET WET REAL :	1422.8 /scf	1414.9 /scf
ETHYLBENZENE	0.0045	0.0147	<b>HIGH GROSS DRY REAL :</b>	1580.6 /scf	1572.0 /scf
XYLENES	0.0041	0.0134	GROSS WET REAL :	1553.1 /scf	1544.5 /scf
<b>TOTAL BTEX</b>	<b>0.0603</b>	<b>0.1609</b>	NET DRY REAL :	16878.3 /lb	16786.7 /lb
			GROSS DRY REAL :	18419.8 /lb	18319.7 /lb

RELATIVE DENSITY (AIR=1): 1.1251  
 COMPRESSIBILITY FACTOR : 0.99319

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

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

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