



303-637-0150

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

**MAIN PAGE**

PROJECT NO. :	201410002	ANALYSIS NO. :	02
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	1066
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALE GAS 11:25 BIG SKY 13-11		
***FIELD DATA***		SAMPLE TEMP. :	112
SAMPLE PRES. :	34	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 2.0PPM (1-7PPM) 11:30		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0024	0.0058		
GLYCOLS	0.0026	0.0129		
HELIUM	0.73	0.10	---	---
HYDROGEN	0.02	0.00	---	---
OXYGEN/ARGON	0.39	0.41	---	---
NITROGEN	49.72	45.85	---	---
CARBON DIOXIDE	3.04	4.40	---	---
METHANE	25.72040	13.58030	---	---
ETHANE	4.3441	4.2994	1.1585	1.1648
PROPANE	6.0606	8.7962	1.6642	1.6733
I-BUTANE	1.2599	2.4103	0.4108	0.4130
N-BUTANE	4.2143	8.0622	1.3244	1.3316
I-PENTANE	1.0673	2.5320	0.3868	0.3890
N-PENTANE	1.4998	3.5616	0.5417	0.5447
HEXANES PLUS	1.9286	5.9793	0.8148	0.8183
<b>TOTALS</b>	<b>100.00000</b>	<b>100.00000</b>	<b>6.3012</b>	<b>6.3347</b>

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0027	0.0069	<b>LOW NET DRY REAL :</b>	795.2 /scf	799.6 /scf
TOLUENE	0.0032	0.0097	NET WET REAL :	781.3 /scf	785.7 /scf
ETHYLBENZENE	0.0014	0.0049	<b>HIGH GROSS DRY REAL :</b>	868.4 /scf	873.1 /scf
XYLENES	0.0033	0.0115	GROSS WET REAL :	853.2 /scf	858.0 /scf
<b>TOTAL BTEX</b>	<b>0.0106</b>	<b>0.0330</b>	NET DRY REAL :	9959.3 /lb	10013.7 /lb
			GROSS DRY REAL :	10875.4 /lb	10934.8 /lb

RELATIVE DENSITY (AIR=1): 1.0485  
 COMPRESSIBILITY FACTOR : 0.99734

(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 RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO  
 RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF ITS APPLICATION.



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

**GLYCALC INFORMATION**

PROJECT NO. :	201410002	ANALYSIS NO. :	02
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	1066
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALE GAS 11:25 BIG SKY 13-11		
***FIELD DATA***		SAMPLE TEMP. :	112
SAMPLE PRES. :	34	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 2.0PPM (1-7PPM) 11:30		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.73	0.10
Hydrogen	0.02	0.00
Carbon Dioxide	3.04	4.40
Nitrogen	49.72	45.85
Methane	25.72040	13.58030
Ethane	4.3441	4.2994
Propane	6.0606	8.7962
Isobutane	1.2599	2.4103
n-Butane	4.2143	8.0622
Isopentane	1.0299	2.4457
n-Pentane	1.4998	3.5616
Cyclopentane	0.0374	0.0863
n-Hexane	0.4359	1.2364
Cyclohexane	0.1030	0.2853
Other Hexanes	0.5925	1.6726
Heptanes	0.3968	1.3017
Methycyclohexane	0.1093	0.3532
2,2,4 Trimethylpentane	0.0005	0.0019
Benzene	0.0027	0.0069
Toluene	0.0032	0.0097
Ethylbenzene	0.0014	0.0049
Xylenes	0.0033	0.0115
C8+ Heavies	0.2800	1.0952
<u>Subtotal</u>	<u>99.60500</u>	<u>99.57130</u>
Oxygen/Argon	0.39	0.41
Alcohols	0.0024	0.0058
Glycols	0.0026	0.0129
<b>Total</b>	<b>100.00000</b>	<b>100.00000</b>

THE DATA PRESENTED HEREIN HAS BEEN ACQUIRED THROUGH JUDICIOUS APPLICATION OF CURRENT STATE-OF-THE ART ANALYTICAL TECHNIQUES. THE APPLICATIONS OF THIS INFORMATION IS THE RESPONSIBILITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, INC. ASSUMES NO RESPONSIBILITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.



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

**DHA COMPONENT LIST**

PROJECT NO. :	201410002	ANALYSIS NO. :	02
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	1066
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALE GAS 11:25 BIG SKY 13-11		
***FIELD DATA***		SAMPLE TEMP. :	112
SAMPLE PRES. :	34	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 2.0PPM (1-7PPM) 11:30		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @	
				14.650	14.730
Helium	---	0.73	0.10	---	---
Hydrogen	---	0.02	0.00	---	---
Oxygen/Argon	---	0.39	0.41	---	---
Nitrogen	---	49.72	45.85	---	---
Carbon Dioxide	---	3.04	4.40	---	---
Methane	P1	25.72040	13.58030	---	---
Ethane	P2	4.3441	4.2994	1.159	1.165
Propane	P3	6.0606	8.7962	1.664	1.673
i-Butane	I4	1.2599	2.4103	0.411	0.413
n-Butane	P4	4.2142	8.0620	1.324	1.332
2,2-Dimethylpropane	I5	0.0078	0.0185	0.003	0.003
i-Pentane	I5	1.0221	2.4272	0.373	0.375
UnknownC4s	U4	0.0001	0.0002	0.000	0.000
n-Pentane	P5	1.4977	3.5566	0.542	0.545
t-Butanol	X4	0.0023	0.0056	0.001	0.001
2,2-Dimethylbutane	I6	0.0071	0.0201	0.003	0.003
Cyclopentane	N5	0.0374	0.0863	0.011	0.011
2,3-Dimethylbutane	I6	0.0305	0.0865	0.012	0.012
2-Methylpentane	I6	0.2887	0.8189	0.120	0.121
i-Butanol	X4	0.0001	0.0002	0.000	0.000
3-Methylpentane	I6	0.1465	0.4155	0.060	0.060
UnknownC5s	U5	0.0021	0.0050	0.001	0.001
n-Hexane	P6	0.4359	1.2364	0.179	0.180
2,2-Dimethylpentane	I7	0.0002	0.0007	0.000	0.000
Methylcyclopentane	N6	0.1197	0.3316	0.042	0.042
2,4-Dimethylpentane	I7	0.0087	0.0287	0.004	0.004
2,2,3-Trimethylbutane	I7	0.0006	0.0020	0.000	0.000
Benzene	A6	0.0027	0.0069	0.001	0.001
3,3-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Cyclohexane	N6	0.1030	0.2853	0.035	0.035
2-Methylhexane	I7	0.0494	0.1629	0.023	0.023
2,3-Dimethylpentane	I7	0.0133	0.0439	0.006	0.006
1,1-Dimethylcyclopentane	N7	0.0136	0.0439	0.006	0.006
3-Methylhexane	I7	0.0638	0.2104	0.029	0.029
1c,3-Dimethylcyclopentane	N7	0.0228	0.0737	0.010	0.010
1t,3-Dimethylcyclopentane	N7	0.0186	0.0601	0.009	0.009
3-Ethylpentane	I7	0.0025	0.0083	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0416	0.1345	0.019	0.019
2,2,4-Trimethylpentane	I8	0.0005	0.0019	0.000	0.000
n-Heptane	P7	0.1484	0.4894	0.068	0.068
1c,2-Dimethylcyclopentane	N7	0.0035	0.0113	0.002	0.002

Methylcyclohexane	N7	0.1093	0.3532	0.044	0.044
2,2-Dimethylhexane	I8	0.0127	0.0478	0.006	0.006
Ethylcyclopentane	N7	0.0061	0.0197	0.002	0.002
2,5-Dimethylhexane	I8	0.0014	0.0053	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0015	0.0056	0.001	0.001
2,4-Dimethylhexane	I8	0.0048	0.0180	0.002	0.002
1c,2t,4-Trimethylcyclopentane	N8	0.0087	0.0321	0.004	0.004
3,3-Dimethylhexane	I8	0.0011	0.0041	0.001	0.001
1t,2c,4-Trimethylcyclopentane	N8	0.0123	0.0454	0.006	0.006
2,3,4-Trimethylpentane	I8	0.0004	0.0015	0.000	0.000
Toluene	A7	0.0032	0.0097	0.001	0.001
2,3-Dimethylhexane	I8	0.0041	0.0154	0.002	0.002
2-Methyl-3-ethylpentane	I8	0.0015	0.0056	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
2-Methylheptane	I8	0.0270	0.1015	0.014	0.014
4-Methylheptane	I8	0.0069	0.0259	0.004	0.004
3-Methyl-3-ethylpentane	I8	0.0019	0.0071	0.001	0.001
3,4-Dimethylhexane	I8	0.0011	0.0041	0.001	0.001
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0005	0.0018	0.000	0.000
3-Methylheptane	I8	0.0087	0.0327	0.004	0.004
1c,2t,3-Trimethylcyclopentane	N8	0.0203	0.0750	0.010	0.010
3-Ethylhexane	I8	0.0044	0.0166	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0059	0.0218	0.003	0.003
1,1-Dimethylcyclohexane	N8	0.0016	0.0059	0.001	0.001
3t-Ethylmethylcyclopentane	N8	0.0018	0.0066	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0013	0.0048	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0039	0.0144	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0063	0.0233	0.003	0.003
1t,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
UnknownC7s	U7	0.0036	0.0119	0.002	0.002
n-Octane	P8	0.0318	0.1195	0.016	0.016
1c,4-Dimethylcyclohexane	N8	0.0141	0.0521	0.007	0.007
i-Propylcyclopentane	I8	0.0006	0.0022	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0025	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0007	0.0030	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0014	0.0052	0.001	0.001
2,2-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0075	0.0312	0.004	0.004
2,2,3-Trimethylhexane	I9	0.0044	0.0186	0.002	0.002
2,4-Dimethylheptane	I9	0.0004	0.0017	0.000	0.000
4,4-Dimethylheptane	I9	0.0010	0.0042	0.001	0.001
Ethylcyclohexane	N8	0.0029	0.0107	0.001	0.001
n-Propylcyclopentane	N8	0.0018	0.0066	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0007	0.0029	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0034	0.000	0.000
3,3-Dimethylheptane	I9	0.0007	0.0030	0.000	0.000
3,5-Dimethylheptane	I9	0.0004	0.0017	0.000	0.000
2,6-Dimethylheptane	I9	0.0006	0.0025	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0011	0.0046	0.001	0.001
Ethylbenzene	I8	0.0014	0.0049	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0015	0.0062	0.001	0.001
2,3-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0015	0.0052	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0010	0.0035	0.000	0.000
3,4-Dimethylheptane	I9	0.0006	0.0025	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0007	0.0030	0.000	0.000
4-Ethylheptane	I9	0.0005	0.0021	0.000	0.000
4-Methyloctane	I9	0.0024	0.0101	0.001	0.001
2-Methyloctane	I9	0.0023	0.0097	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0010	0.0041	0.001	0.001

3-Ethylheptane	I9	0.0008	0.0034	0.000	0.000
3-Methyloctane	I9	0.0041	0.0173	0.002	0.002
1c,2t,4c-Trimethylcyclohexane	I9	0.0007	0.0029	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
3,3-Diethylpentane	I9	0.0004	0.0017	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0008	0.0028	0.000	0.000
i-Butylcyclopentane	N9	0.0011	0.0046	0.001	0.001
UnknownC8s	U8	0.0005	0.0019	0.000	0.000
n-Nonane	P9	0.0088	0.0372	0.005	0.005
1,1-Methylethylcyclohexane	N9	0.0042	0.0174	0.002	0.002
i-Propylbenzene	A9	0.0005	0.0020	0.000	0.000
i-Propylcyclohexane	N9	0.0004	0.0016	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
2,6-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
n-Butylcyclopentane	N9	0.0013	0.0054	0.001	0.001
3,3-Dimethyloctane	I10	0.0004	0.0019	0.000	0.000
n-Propylbenzene	A9	0.0015	0.0059	0.001	0.001
3,6-Dimethyloctane	I10	0.0003	0.0014	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0006	0.0028	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0016	0.000	0.000
1,4-Methylethylbenzene	A9	0.0004	0.0016	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0005	0.0020	0.000	0.000
2,3-Dimethyloctane	I10	0.0003	0.0014	0.000	0.000
5-Methylnonane	I10	0.0011	0.0052	0.001	0.001
1,2-Methylethylbenzene	A9	0.0007	0.0028	0.000	0.000
2-Methylnonane	I10	0.0001	0.0005	0.000	0.000
3-Ethyloctane	I10	0.0002	0.0009	0.000	0.000
3-Methylnonane	I10	0.0007	0.0033	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0003	0.0012	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0013	0.000	0.000
i-Butylcyclohexane	N10	0.0004	0.0018	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0005	0.000	0.000
i-Butylbenzene	A10	0.0002	0.0009	0.000	0.000
sec-Butylbenzene	A10	0.0001	0.0004	0.000	0.000
UnknownC9s	U9	0.0085	0.0359	0.005	0.005
n-Decane	P10	0.0032	0.0150	0.002	0.002
1,2,3-Trimethylbenzene	A9	0.0002	0.0008	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	0.0009	0.0041	0.001	0.001
1,2-Methyl-i-propylbenzene	A10	0.0003	0.0013	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0005	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Diethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0002	0.0009	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0002	0.0010	0.000	0.000
UnknownC10s	U10	0.0056	0.0262	0.003	0.003
n-Undecane	P11	0.0011	0.0057	0.001	0.001
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0004	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0001	0.0005	0.000	0.000
sec-Pentylbenzene	A11	0.0001	0.0005	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0005	0.000	0.000
Triethylene Glycol	GL6	0.0026	0.0129	0.002	0.002
UnknownC11s	U11	0.0015	0.0077	0.001	0.001

n-Dodecane	P12	0.0004	0.0022	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0002	0.0010	0.000	0.000
1,2,3,4,5-Pentamethylbenzene	A13	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0004	0.0021	0.000	0.000
n-Tridecane	P13	0.0001	0.0006	0.000	0.000
UnknownC13s	U13	0.0001	0.0006	0.000	0.000
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>6.3052</b>	<b>6.3387</b>

<b>BTEX COMPONENTS</b>	<b>MOLE%</b>	<b>WT%</b>	<b>BTU @</b>	<b>14.650</b>	<b>14.730</b>
BENZENE	0.0027	0.0069	<b>LOW NET DRY REAL :</b>	795.2 /scf	799.6 /scf
TOLUENE	0.0032	0.0097	NET WET REAL :	781.3 /scf	785.7 /scf
ETHYLBENZENE	0.0014	0.0049	<b>HIGH GROSS DRY REAL :</b>	868.4 /scf	873.1 /scf
XYLENES	0.0033	0.0115	GROSS WET REAL :	853.2 /scf	858.0 /scf
<b>TOTAL BTEX</b>	<b>0.0106</b>	<b>0.0330</b>	NET DRY REAL :	9959.3 /lb	10013.7 /lb
			GROSS DRY REAL :	10875.4 /lb	10934.8 /lb

RELATIVE DENSITY (AIR=1): 1.0485  
 COMPRESSIBILITY FACTOR : 0.99734

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

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

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