



303-637-0150

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

**MAIN PAGE**

PROJECT NO. :	201410002	ANALYSIS NO. :	04
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	0768
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 11:50 BIG SKY 14-11		
***FIELD DATA***		SAMPLE TEMP. :	100
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.75PPM (1-7PPM) 11:55		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0037	0.0074	---	---
HELIUM	0.98	0.14	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.33	0.37	---	---
NITROGEN	59.13	57.94	---	---
CARBON DIOXIDE	2.28	3.51	---	---
METHANE	23.96700	13.44560	---	---
ETHANE	2.7777	2.9212	0.7400	0.7440
PROPANE	4.0145	6.1913	1.1015	1.1075
I-BUTANE	0.8948	1.8190	0.2916	0.2932
N-BUTANE	2.8629	5.8198	0.8987	0.9037
I-PENTANE	0.6946	1.7510	0.2517	0.2530
N-PENTANE	0.9190	2.3190	0.3315	0.3333
HEXANES PLUS	1.1358	3.7657	0.4697	0.4715
<b>TOTALS</b>	<b>100.00000</b>	<b>100.00000</b>	<b>4.0847</b>	<b>4.1062</b>

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0031	0.0085	LOW NET DRY REAL :	581.2 /scf	584.4 /scf
TOLUENE	0.0027	0.0087	NET WET REAL :	571.0 /scf	574.2 /scf
ETHYLBENZENE	0.0010	0.0037	HIGH GROSS DRY REAL :	635.9 /scf	639.4 /scf
XYLENES	0.0034	0.0126	GROSS WET REAL :	624.8 /scf	628.3 /scf
<b>TOTAL BTEX</b>	<b>0.0102</b>	<b>0.0335</b>	NET DRY REAL :	7738.2 /lb	7780.5 /lb
			GROSS DRY REAL :	8465.8 /lb	8512.0 /lb

RELATIVE DENSITY (AIR=1): 0.9852  
 COMPRESSIBILITY FACTOR : 0.99826

(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.  
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303-637-0150

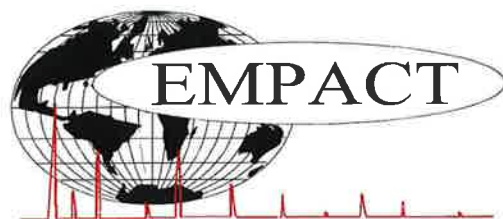
**EXTENDED NATURAL GAS ANALYSIS (\*DHA)**

**GLYCALC INFORMATION**

PROJECT NO. :	201410002	ANALYSIS NO. :	04
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	0768
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 11:50 BIG SKY 14-11		
***FIELD DATA***		SAMPLE TEMP. :	100
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.75PPM (1-7PPM) 11:55		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.98	0.14
Hydrogen	0.01	0.00
Carbon Dioxide	2.28	3.51
Nitrogen	59.13	57.94
Methane	23.96700	13.44560
Ethane	2.7777	2.9212
Propane	4.0145	6.1913
Isobutane	0.8948	1.8190
n-Butane	2.8629	5.8198
Isopentane	0.6686	1.6872
n-Pentane	0.9190	2.3190
Cyclopentane	0.0260	0.0638
n-Hexane	0.2441	0.7357
Cyclohexane	0.0573	0.1687
Other Hexanes	0.3501	1.0499
Heptanes	0.2336	0.8149
Methycyclohexane	0.0678	0.2328
2,2,4 Trimethylpentane	0.0004	0.0016
Benzene	0.0031	0.0085
Toluene	0.0027	0.0087
Ethylbenzene	0.0010	0.0037
Xylenes	0.0034	0.0126
CB+ Heavies	0.1723	0.7286
<u>Subtotal</u>	<u>99.66630</u>	<u>99.62260</u>
Oxygen/Argon	0.33	0.37
Alcohols	0.0037	0.0074
<u>Total</u>	<u>100.00000</u>	<u>100.00000</u>

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. :	04
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	0768
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 11:50 BIG SKY 14-11		
***FIELD DATA***		SAMPLE TEMP. :	100
SAMPLE PRES. :	32	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.75PPM (1-7PPM) 11:55		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @	
				14.650	14.730
Helium	---	0.98	0.14	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.33	0.37	---	---
Nitrogen	---	59.13	57.94	---	---
Carbon Dioxide	---	2.28	3.51	---	---
Methane	P1	23.96700	13.44560	---	---
Ethane	P2	2.7777	2.9212	0.740	0.744
Propane	P3	4.0145	6.1913	1.102	1.108
i-Butane	I4	0.8948	1.8190	0.292	0.293
n-Butane	P4	2.8629	5.8198	0.899	0.904
2,2-Dimethylpropane	I5	0.0055	0.0139	0.002	0.002
Ethanol	X2	0.0018	0.0029	0.000	0.000
i-Pentane	I5	0.6631	1.6733	0.242	0.243
Acetone	X3	0.0008	0.0016	0.000	0.000
n-Pentane	P5	0.9189	2.3188	0.332	0.333
t-Butanol	X4	0.0011	0.0029	0.000	0.000
2,2-Dimethylbutane	I6	0.0045	0.0136	0.002	0.002
Cyclopentane	N5	0.0260	0.0638	0.008	0.008
2,3-Dimethylbutane	I6	0.0186	0.0561	0.008	0.008
2-Methylpentane	I6	0.1676	0.5051	0.069	0.069
3-Methylpentane	I6	0.0840	0.2532	0.034	0.034
UnknownC5s	U5	0.0001	0.0002	0.000	0.000
n-Hexane	P6	0.2441	0.7357	0.100	0.100
2,2-Dimethylpentane	I7	0.0006	0.0021	0.000	0.000
Methylcyclopentane	N6	0.0754	0.2219	0.027	0.027
2,4-Dimethylpentane	I7	0.0041	0.0144	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0002	0.0007	0.000	0.000
Benzene	A6	0.0031	0.0085	0.001	0.001
3,3-Dimethylpentane	I7	0.0004	0.0014	0.000	0.000
Cyclohexane	N6	0.0573	0.1687	0.019	0.019
2-Methylhexane	I7	0.0315	0.1104	0.015	0.015
2,3-Dimethylpentane	I7	0.0051	0.0179	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0091	0.0313	0.004	0.004
3-Methylhexane	I7	0.0356	0.1248	0.016	0.016
1c,3-Dimethylcyclopentane	N7	0.0147	0.0505	0.007	0.007
1t,3-Dimethylcyclopentane	N7	0.0013	0.0045	0.001	0.001

1t,2-Dimethylcyclopentane	N7	0.0238	0.0817	0.011	0.011
2,2,4-Trimethylpentane	I8	0.0004	0.0016	0.000	0.000
n-Heptane	P7	0.0810	0.2839	0.037	0.037
1c,2-Dimethylcyclopentane	N7	0.0023	0.0079	0.001	0.001
Methylcyclohexane	N7	0.0678	0.2328	0.027	0.027
2,2-Dimethylhexane	I8	0.0076	0.0304	0.003	0.003
Ethylcyclopentane	N7	0.0036	0.0123	0.001	0.001
2,5-Dimethylhexane	I8	0.0012	0.0048	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0004	0.0016	0.000	0.000
2,4-Dimethylhexane	I8	0.0019	0.0076	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0052	0.0204	0.002	0.002
3,3-Dimethylhexane	I8	0.0004	0.0016	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0073	0.0286	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0027	0.0087	0.001	0.001
2,3-Dimethylhexane	I8	0.0026	0.0104	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0005	0.0020	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0144	0.0575	0.007	0.007
4-Methylheptane	I8	0.0033	0.0132	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0012	0.0048	0.001	0.001
3,4-Dimethylhexane	I8	0.0005	0.0020	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0003	0.0012	0.000	0.000
3-Methylheptane	I8	0.0059	0.0236	0.003	0.003
1c,2t,3-Trimethylcyclopentane	N8	0.0102	0.0400	0.005	0.005
3-Ethylhexane	I8	0.0027	0.0108	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0036	0.0141	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0010	0.0039	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0010	0.0039	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0008	0.0031	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0023	0.0090	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0039	0.0153	0.002	0.002
UnknownC7s	U7	0.0203	0.0711	0.009	0.009
n-Octane	P8	0.0187	0.0747	0.010	0.010
1c,4-Dimethylcyclohexane	N8	0.0059	0.0231	0.003	0.003
i-Propylcyclopentane	I8	0.0003	0.0012	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0027	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0004	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0005	0.0020	0.000	0.000
2,2-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0046	0.0203	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0028	0.0126	0.001	0.001
2,4-Dimethylheptane	I9	0.0004	0.0018	0.000	0.000
4,4-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
Ethylcyclohexane	N8	0.0023	0.0090	0.001	0.001
n-Propylcyclopentane	N8	0.0015	0.0059	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0018	0.000	0.000
3,3-Dimethylheptane	I9	0.0004	0.0018	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	0.0007	0.0031	0.000	0.000
Ethylbenzene	I8	0.0010	0.0037	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0035	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0052	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0013	0.0048	0.001	0.001

3,4-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0022	0.000	0.000
4-Ethylheptane	I9	0.0003	0.0013	0.000	0.000
4-Methyloctane	I9	0.0013	0.0058	0.001	0.001
2-Methyloctane	I9	0.0015	0.0067	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
3-Ethylheptane	I9	0.0007	0.0031	0.000	0.000
3-Methyloctane	I9	0.0026	0.0116	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0002	0.0009	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
3,3-Diethylpentane	I9	0.0002	0.0009	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0007	0.0026	0.000	0.000
i-Butylcyclopentane	N9	0.0009	0.0040	0.000	0.000
UnknownC8s	U8	0.0009	0.0036	0.000	0.000
n-Nonane	P9	0.0043	0.0193	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0032	0.0141	0.002	0.002
i-Propylbenzene	A9	0.0007	0.0029	0.000	0.000
i-Propylcyclohexane	N9	0.0003	0.0013	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,4-Dimethyloctane	I10	0.0002	0.0010	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0010	0.0044	0.001	0.001
3,3-Dimethyloctane	I10	0.0002	0.0010	0.000	0.000
n-Propylbenzene	A9	0.0009	0.0038	0.000	0.000
3,6-Dimethyloctane	I10	0.0004	0.0020	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0004	0.0020	0.000	0.000
1,3-Methylthylbenzene	A9	0.0005	0.0021	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0008	0.000	0.000
1,3,5-Trimethylbenzenc	A9	0.0005	0.0021	0.000	0.000
2,3-Dimethyloctane	I10	0.0002	0.0010	0.000	0.000
5-Methylnonane	I10	0.0009	0.0045	0.001	0.001
1,2-Methylethylbenzene	A9	0.0008	0.0034	0.000	0.000
2-Methylnonane	I10	0.0001	0.0005	0.000	0.000
3-Ethylloctane	I10	0.0002	0.0010	0.000	0.000
3-Methylnonane	I10	0.0005	0.0025	0.000	0.000
t-Butylbenzene	A10	0.0007	0.0033	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0010	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0005	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	0.0055	0.0247	0.003	0.003
n-Decane	P10	0.0030	0.0149	0.002	0.002
1,2,3-Trimethylbenzene	A9	0.0003	0.0013	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0002	0.0009	0.000	0.000
Sec-Butylcyclohexane	A10	0.0008	0.0039	0.000	0.000
1,2-Methyl-i-propylbenzenc	A10	0.0004	0.0019	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0006	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	0.0004	0.0019	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
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Diethylbenzenc	A10	0.0002	0.0009	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0005	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
1,2-Dimethyl-4-ethylbenzenc	A10	0.0002	0.0009	0.000	0.000
1,3-Dimethyl-2-ethylbenzene	A10	0.0001	0.0004	0.000	0.000

1,2-Dimethyl-3-ethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,2-Ethyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0002	0.0010	0.000	0.000
UnknownC10s	U10	0.0047	0.0234	0.003	0.003
n-Undecane	P11	0.0014	0.0077	0.001	0.001
1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0002	0.0009	0.000	0.000
1,2-Methyl-n-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0002	0.0010	0.000	0.000
1,2-Ethyl-n-propylbenzene	A11	0.0002	0.0010	0.000	0.000
2-Methylindan	A11	0.0001	0.0004	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,3-Di-i-propylbenzene	A11	0.0001	0.0006	0.000	0.000
sec-Pentylbenzene	A11	0.0001	0.0005	0.000	0.000
n-Pentylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Di-n-propylbenzene	A11	0.0001	0.0006	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0006	0.000	0.000
Naphthalene	A10	0.0001	0.0004	0.000	0.000
1,4-Ethyl-t-butylbenzene	A11	0.0001	0.0006	0.000	0.000
UnknownC11s	U11	0.0017	0.0093	0.001	0.001
n-Dodecane	P12	0.0005	0.0030	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0002	0.0011	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	0.0001	0.0005	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0009	0.0049	0.001	0.001
n-Tridecane	P13	0.0002	0.0013	0.000	0.000
UnknownC13s	U13	0.0006	0.0039	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
<b>TOTAL</b>		<b>100.00000</b>	<b>100.00000</b>	<b>4.0847</b>	<b>4.1062</b>

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0031	0.0085	LOW NET DRY REAL :	581.2 /scf	584.4 /scf
TOLUENE	0.0027	0.0087	NET WET REAL :	571.0 /scf	574.2 /scf
ETHYLBENZENE	0.0010	0.0037	HIGH GROSS DRY REAL :	635.9 /scf	639.4 /scf
XYLENES	0.0034	0.0126	GROSS WET REAL :	624.8 /scf	628.3 /scf
<b>TOTAL BTEX</b>	<b>0.0102</b>	<b>0.0335</b>	NET DRY REAL :	7738.2 /lb	7780.5 /lb
			GROSS DRY REAL :	8465.8 /lb	8512.0 /lb

RELATIVE DENSITY (AIR=1): 0.9852  
 COMPRESSIBILITY FACTOR : 0.99826

(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.

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