



303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201410002	ANALYSIS NO. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	1117
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 13:20 SNOWBIRD 9-15		
FIELD DATA		SAMPLE TEMP. :	130
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.5PPM (1-7PPM) 13:25		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0047	0.0108		
HELIUM	0.65	0.08	---	---
HYDROGEN	0.03	0.00	---	---
OXYGEN/ARGON	0.36	0.36	---	---
NITROGEN	47.05	40.98	---	---
CARBON DIOXIDE	2.79	3.82	---	---
METHANE	24.51360	12.22800	---	---
ETHANE	4.4904	4.1983	1.1982	1.2047
PROPANE	6.7465	9.2500	1.8542	1.8644
I-BUTANE	1.4845	2.6828	0.4851	0.4877
N-BUTANE	5.3000	9.5782	1.6672	1.6763
I-PENTANE	1.4581	3.2678	0.5291	0.5319
N-PENTANE	2.1401	4.8010	0.7721	0.7763
HEXANES PLUS	2.9821	8.7431	1.2630	1.2695
TOTALS	100.00000	100.00000	7.7689	7.8108

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0035	0.0085	LOW NET DRY REAL :	930.6 /scf	935.7 /scf
TOLUENE	0.0049	0.0140	NET WET REAL :	914.3 /scf	919.4 /scf
ETHYLBENZENE	0.0022	0.0073	HIGH GROSS DRY REAL :	1014.2 /scf	1019.8 /scf
XYLENES	0.0060	0.0197	GROSS WET REAL :	996.5 /scf	1002.0 /scf
TOTAL BTEX	0.0166	0.0495	NET DRY REAL :	11015.5 /lb	11075.7 /lb
			GROSS DRY REAL :	12009.4 /lb	12074.9 /lb

RELATIVE DENSITY (AIR=1): 1.1098
COMPRESSIBILITY FACTOR : 0.99674

(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.



303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201410002	ANALYSIS NO. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 5, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 30, 2014
PRODUCER :		CYLINDER NO. :	1117
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 13:20 SNOWBIRD 9-15		
FIELD DATA		SAMPLE TEMP. :	130
SAMPLE PRES. :	30	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.5PPM (1-7PPM) 13:25		

Componet	Mole %	Wt %
Helium	0.65	0.08
Hydrogen	0.03	0.00
Carbon Dioxide	2.79	3.82
Nitrogen	47.05	40.98
Methane	24.51360	12.22800
Ethane	4.4904	4.1983
Propane	6.7465	9.2500
Isobutane	1.4845	2.6828
n-Butane	5.3000	9.5782
Isopentane	1.4052	3.1524
n-Pentane	2.1401	4.8010
Cyclopentane	0.0529	0.1154
n-Hexane	0.6775	1.8154
Cyclohexane	0.1566	0.4098
Other Hexanes	0.8951	2.3873
Heptanes	0.6316	1.9577
Methycyclohexane	0.1707	0.5211
2,2,4 Trimethylpentane	0.0007	0.0025
Benzene	0.0035	0.0085
Toluene	0.0049	0.0140
Ethylbenzene	0.0022	0.0073
Xylenes	0.0060	0.0197
C8+ Heavies	0.4333	1.5998
Subtotal	99.63530	99.62920
Oxygen/Argon	0.36	0.36
Alcohols	0.0047	0.0108
Total	100.00000	100.00000

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 ITS APPLICATION.



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. : 201410002
 COMPANY NAME : NIGHTHAWK PRODUCTION
 ACCOUNT NO. :
 PRODUCER :
 LEASE NO. :
 NAME/DESCRIP : SALES GAS 13:20
 SNOWBIRD 9-15

ANALYSIS NO. : 06
 ANALYSIS DATE: OCTOBER 5, 2014
 SAMPLE DATE : SEPTEMBER 30, 2014
 CYLINDER NO. : 1117
 SAMPLED BY : JOHN MOSER - EMPACT

FIELD DATA

SAMPLE PRES. : 30
 VAPOR PRES. :
 COMMENTS : SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.5PPM (1-7PPM) 13:25

SAMPLE TEMP. : 130
 AMBIENT TEMP.:
 GRAVITY :

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.65	0.08	---	---
Hydrogen	---	0.03	0.00	---	---
Oxygen/Argon	---	0.36	0.36	---	---
Nitrogen	---	47.05	40.98	---	---
Carbon Dioxide	---	2.79	3.82	---	---
Methane	P1	24.51360	12.22800	---	---
Ethane	P2	4.4904	4.1983	1.198	1.205
Propane	P3	6.7465	9.2500	1.854	1.864
i-Butane	I4	1.4845	2.6828	0.485	0.488
n-Butane	P4	5.2997	9.5777	1.667	1.676
2,2-Dimethylpropane	I5	0.0100	0.0225	0.004	0.004
i-Pentane	I5	1.3952	3.1299	0.509	0.512
i-Propanol	X3	0.0001	0.0002	0.000	0.000
UnknownC4s	U4	0.0003	0.0005	0.000	0.000
n-Pentane	P5	2.1360	4.7918	0.772	0.776
t-Butanol	X4	0.0039	0.0090	0.001	0.001
2,2-Dimethylbutane	I6	0.0103	0.0276	0.004	0.004
Cyclopentane	N5	0.0529	0.1154	0.016	0.016
2,3-Dimethylbutane	I6	0.0443	0.1187	0.018	0.018
2-Methylpentane	I6	0.4372	1.1715	0.181	0.182
i-Butanol	X4	0.0006	0.0014	0.000	0.000
3-Methylpentane	I6	0.2225	0.5962	0.091	0.092
UnknownC5s	U5	0.0041	0.0092	0.001	0.001
n-Hexane	P6	0.6775	1.8154	0.278	0.280
2,2-Dimethylpentane	I7	0.0007	0.0022	0.000	0.000
Methylcyclopentane	N6	0.1797	0.4703	0.063	0.063
2,4-Dimethylpentane	I7	0.0137	0.0427	0.006	0.006
2,2,3-Trimethylbutane	I7	0.0009	0.0028	0.000	0.000
n-Butanol	X4	0.0001	0.0002	0.000	0.000
Benzene	A6	0.0035	0.0085	0.001	0.001
3,3-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Cyclohexane	N6	0.1566	0.4098	0.053	0.053
2-Methylhexane	I7	0.0798	0.2486	0.037	0.037
2,3-Dimethylpentane	I7	0.0216	0.0673	0.010	0.010
1,1-Dimethylcyclopentane	N7	0.0200	0.0611	0.008	0.008
3-Methylhexane	I7	0.1026	0.3197	0.047	0.047
1c,3-Dimethylcyclopentane	N7	0.0354	0.1081	0.016	0.016
1t,3-Dimethylcyclopentane	N7	0.0286	0.0873	0.013	0.013
3-Ethylpentane	I7	0.0039	0.0122	0.002	0.002
1t,2-Dimethylcyclopentane	N7	0.0646	0.1972	0.030	0.030
2,2,4-Trimethylpentane	I8	0.0007	0.0025	0.000	0.000

UnknownC6s	U6	0.0011	0.0030	0.000	0.000
n-Heptane	P7	0.2387	0.7437	0.110	0.111
1c,2-Dimethylcyclopentane	N7	0.0052	0.0159	0.002	0.002
Methylcyclohexane	N7	0.1707	0.5211	0.068	0.068
2,2-Dimethylhexane	I8	0.0194	0.0689	0.009	0.009
Ethylcyclopentane	N7	0.0098	0.0299	0.004	0.004
2,5-Dimethylhexane	I8	0.0009	0.0032	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0037	0.0132	0.002	0.002
2,4-Dimethylhexane	I8	0.0073	0.0259	0.004	0.004
1c,2t,4-Trimethylcyclopentane	N8	0.0135	0.0471	0.006	0.006
3,3-Dimethylhexane	I8	0.0015	0.0053	0.001	0.001
1t,2c,4-Trimethylcyclopentane	N8	0.0188	0.0656	0.009	0.009
2,3,4-Trimethylpentane	I8	0.0005	0.0018	0.000	0.000
Toluene	A7	0.0049	0.0140	0.002	0.002
2,3-Dimethylhexane	I8	0.0066	0.0234	0.003	0.003
2-Methyl-3-ethylpentane	I8	0.0023	0.0082	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0003	0.0011	0.000	0.000
2-Methylheptane	I8	0.0425	0.1510	0.022	0.022
4-Methylheptane	I8	0.0123	0.0437	0.006	0.006
3-Methyl-3-ethylpentane	I8	0.0020	0.0071	0.001	0.001
3,4-Dimethylhexane	I8	0.0014	0.0050	0.001	0.001
1c,2c,4-Trimethylcyclopentane	N8	0.0004	0.0014	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0006	0.0021	0.000	0.000
3-Methylheptane	I8	0.0140	0.0497	0.007	0.007
1c,2t,3-Trimethylcyclopentane	N8	0.0352	0.1228	0.018	0.018
3-Ethylhexane	I8	0.0039	0.0138	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0093	0.0325	0.005	0.005
1,1-Dimethylcyclohexane	N8	0.0026	0.0091	0.001	0.001
3t-Ethylmethylcyclopentane	N8	0.0029	0.0101	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0021	0.0073	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0062	0.0216	0.003	0.003
2,2,4-Trimethylhexane	I9	0.0006	0.0024	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0099	0.0345	0.005	0.005
1t,3-Dimethylcyclohexane	N8	0.0001	0.0003	0.000	0.000
UnknownC7s	U7	0.0060	0.0187	0.003	0.003
n-Octane	P8	0.0487	0.1730	0.025	0.025
1c,4-Dimethylcyclohexane	N8	0.0216	0.0754	0.011	0.011
i-Propylcyclopentane	I8	0.0008	0.0028	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0005	0.0020	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0024	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0010	0.0040	0.001	0.001
2,3,4-Trimethylhexane	I9	0.0005	0.0020	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0025	0.0087	0.001	0.001
2,2-Dimethylheptane	I9	0.0004	0.0016	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0121	0.0475	0.006	0.006
2,2,3-Trimethylhexane	I9	0.0068	0.0271	0.003	0.003
2,4-Dimethylheptane	I9	0.0002	0.0008	0.000	0.000
4,4-Dimethylheptane	I9	0.0014	0.0056	0.001	0.001
Ethylcyclohexane	N8	0.0052	0.0182	0.002	0.002
n-Propylcyclopentane	N8	0.0035	0.0122	0.002	0.002
1c,3c,5-Trimethylcyclohexane	N9	0.0006	0.0024	0.000	0.000
2,5-Dimethylheptane	I9	0.0012	0.0048	0.001	0.001
3,3-Dimethylheptane	I9	0.0011	0.0044	0.001	0.001
3,5-Dimethylheptane	I9	0.0006	0.0024	0.000	0.000
2,6-Dimethylheptane	I9	0.0009	0.0036	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0017	0.0067	0.001	0.001
Ethylbenzene	I8	0.0022	0.0073	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0018	0.0071	0.001	0.001
2,3-Dimethylheptane	I9	0.0004	0.0016	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0025	0.0082	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0021	0.0069	0.001	0.001
3,4-Dimethylheptane	I9	0.0006	0.0024	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0011	0.0044	0.001	0.001
4-Ethylheptane	I9	0.0006	0.0024	0.000	0.000

4-Methyloctane	I9	0.0036	0.0144	0.002	0.002
2-Methyloctane	I9	0.0043	0.0172	0.002	0.002
1c,2t,3-Trimethylcyclohexane	N9	0.0008	0.0031	0.000	0.000
3-Ethylheptane	I9	0.0012	0.0048	0.001	0.001
3-Methyloctane	I9	0.0057	0.0227	0.003	0.003
1c,2t,4c-Trimethylcyclohexane	I9	0.0014	0.0055	0.001	0.001
1,1,2-Trimethylcyclohexane	N9	0.0003	0.0012	0.000	0.000
3,3-Diethylpentane	I9	0.0006	0.0024	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0014	0.0046	0.001	0.001
i-Butylcyclopentane	N9	0.0019	0.0075	0.001	0.001
UnknownC8s	U8	0.0016	0.0057	0.001	0.001
n-Nonane	P9	0.0134	0.0535	0.008	0.008
1,1-Methylethylcyclohexane	N9	0.0048	0.0188	0.003	0.003
i-Propylbenzene	A9	0.0007	0.0026	0.000	0.000
i-Propylcyclohexane	N9	0.0007	0.0027	0.000	0.000
2,2-Dimethyloctane	I10	0.0003	0.0013	0.000	0.000
2,4-Dimethyloctane	I10	0.0004	0.0018	0.000	0.000
2,6-Dimethyloctane	I10	0.0003	0.0013	0.000	0.000
n-Butylcyclopentane	N9	0.0020	0.0078	0.001	0.001
3,3-Dimethyloctane	I10	0.0003	0.0013	0.000	0.000
n-Propylbenzene	A9	0.0023	0.0086	0.001	0.001
3,6-Dimethyloctane	I10	0.0006	0.0026	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0008	0.0035	0.000	0.000
1,3-Methylethylbenzene	A9	0.0008	0.0030	0.000	0.000
1,4-Methylethylbenzene	A9	0.0006	0.0022	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0008	0.0030	0.000	0.000
2,3-Dimethyloctane	I10	0.0005	0.0022	0.000	0.000
5-Methylnonane	I10	0.0016	0.0071	0.001	0.001
1,2-Methylethylbenzene	A9	0.0004	0.0015	0.000	0.000
2-Methylnonane	I10	0.0009	0.0040	0.001	0.001
3-Ethylheptane	I10	0.0004	0.0018	0.000	0.000
3-Methylnonane	I10	0.0011	0.0049	0.001	0.001
1,2,4-Trimethylbenzene	A9	0.0002	0.0008	0.000	0.000
t-Butylbenzene	A10	0.0007	0.0029	0.000	0.000
i-Butylcyclohexane	N10	0.0006	0.0026	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0002	0.0009	0.000	0.000
i-Butylbenzene	A10	0.0002	0.0008	0.000	0.000
sec-Butylbenzene	A10	0.0002	0.0008	0.000	0.000
UnknownC9s	U9	0.0136	0.0542	0.008	0.008
n-Decane	P10	0.0045	0.0199	0.003	0.003
1,2,3-Trimethylbenzene	A9	0.0003	0.0011	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0002	0.0008	0.000	0.000
1,4-Methyl-i-propylbenzene	A10	0.0001	0.0004	0.000	0.000
Sec-Butylcyclohexane	A10	0.0011	0.0048	0.001	0.001
1,2-Methyl-i-propylbenzene	A10	0.0004	0.0017	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0005	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0008	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0002	0.0008	0.000	0.000
1,4-Diethylbenzene	A10	0.0003	0.0012	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0003	0.0012	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-Diethylbenzene	A10	0.0002	0.0008	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0005	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0002	0.0008	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0003	0.0012	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0003	0.0012	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
1,2-Ethyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0003	0.0014	0.000	0.000
UnknownC10s	U10	0.0097	0.0429	0.006	0.006
n-Undecane	P11	0.0013	0.0063	0.001	0.001

1,4-Ethyl-i-propylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0004	0.000	0.000
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
2-Methylindan	A11	0.0001	0.0004	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	0.0005	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0005	0.000	0.000
Tetrahydronaphthalene	A10	0.0001	0.0004	0.000	0.000
Naphthalene	A10	0.0001	0.0004	0.000	0.000
UnknownC11s	U11	0.0020	0.0097	0.001	0.001
n-Dodecane	P12	0.0003	0.0016	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0007	0.0034	0.000	0.000
n-Tridecane	P13	0.0001	0.0006	0.000	0.000
n-Tetradecane	P14	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	7.7709	7.8128

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0035	0.0085	LOW NET DRY REAL :	930.6 /scf	935.7 /scf
TOLUENE	0.0049	0.0140	NET WET REAL :	914.3 /scf	919.4 /scf
ETHYLBENZENE	0.0022	0.0073	HIGH GROSS DRY REAL :	1014.2 /scf	1019.8 /scf
XYLENES	0.0060	0.0197	GROSS WET REAL :	996.5 /scf	1002.0 /scf
TOTAL BTEX	0.0166	0.0495	NET DRY REAL :	11015.5 /lb	11075.7 /lb
			GROSS DRY REAL :	12009.4 /lb	12074.9 /lb

(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.

RELATIVE DENSITY (AIR=1):

1.1098

COMPRESSIBILITY FACTOR :

0.99674