



303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201409145	ANALYSIS NO. :	10
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	SEPTEMBER 29, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 23, 2014
PRODUCER :	ARIKAREE CREEK	CYLINDER NO. :	0146
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 14:30 TAOS 1-10		
FIELD DATA		SAMPLE TEMP. :	104
SAMPLE PRES. :	28	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.75 PPM (1-7PPM) 14:35		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0022	0.0048	---	---
HELIUM	0.40	0.05	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.38	0.41	---	---
NITROGEN	48.98	46.02	---	---
CARBON DIOXIDE	2.58	3.81	---	---
METHANE	28.38390	15.27180	---	---
ETHANE	3.4729	3.5023	0.9256	0.9306
PROPANE	6.0364	8.9272	1.6582	1.6673
I-BUTANE	1.4269	2.7815	0.4658	0.4683
N-BUTANE	4.3341	8.4486	1.3623	1.3698
I-PENTANE	1.0664	2.5780	0.3858	0.3880
N-PENTANE	1.3864	3.3548	0.5008	0.5035
HEXANES PLUS	1.5508	4.8410	0.6408	0.6437
TOTALS	100.00000	100.00000	5.9393	5.9712

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.650	14.730
BENZENE	0.0041	0.0107	LOW NET DRY REAL :	790.0 /scf	794.3 /scf
TOLUENE	0.0033	0.0102	NET WET REAL :	776.2 /scf	780.5 /scf
ETHYLBENZENE	0.0011	0.0039	HIGH GROSS DRY REAL :	863.3 /scf	868.0 /scf
XYLENES	0.0029	0.0103	GROSS WET REAL :	848.2 /scf	852.9 /scf
TOTAL BTEX	0.0114	0.0351	NET DRY REAL :	10078.2 /lb	10133.3 /lb
			GROSS DRY REAL :	11014.4 /lb	11074.5 /lb

RELATIVE DENSITY (AIR=1): 1.0279
 COMPRESSIBILITY FACTOR : 0.99735

(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. :	201409145	ANALYSIS NO. :	10
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	SEPTEMBER 29, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 23, 2014
PRODUCER :	ARIKAREE CREEK	CYLINDER NO. :	0146
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 14:30 TAOS 1-10		
FIELD DATA		SAMPLE TEMP. :	104
SAMPLE PRES. :	28	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.75 PPM (1-7PPM) 14:35		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.40	0.05
Hydrogen	0.00	0.00
Carbon Dioxide	2.58	3.81
Nitrogen	48.98	46.02
Methane	28.38390	15.27180
Ethane	3.4729	3.5023
Propane	6.0364	8.9272
Isobutane	1.4269	2.7815
n-Butane	4.3341	8.4486
Isopentane	1.0297	2.4917
n-Pentane	1.3864	3.3548
Cyclopentane	0.0367	0.0863
n-Hexane	0.3588	1.0370
Cyclohexane	0.0901	0.2543
Other Hexanes	0.5225	1.5030
Heptanes	0.3006	1.0040
Methycyclohexane	0.0854	0.2812
2,2,4 Trimethylpentane	0.0004	0.0015
Benzene	0.0041	0.0107
Toluene	0.0033	0.0102
Ethylbenzene	0.0011	0.0039
Xylenes	0.0029	0.0103
C8+ Heavies	0.1816	0.7249
<u>Subtotal</u>	<u>99.61780</u>	<u>99.58520</u>
Oxygen/Argon	0.38	0.41
Alcohols	0.0022	0.0048
<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. :	201409145	ANALYSIS NO. :	10
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	SEPTEMBER 29, 2014
ACCOUNT NO. :		SAMPLE DATE :	SEPTEMBER 23, 2014
PRODUCER :	ARIKAREE CREEK	CYLINDER NO. :	0146
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 14:30		
	TAOS 1-10		
FIELD DATA		SAMPLE TEMP. :	104
SAMPLE PRES. :	28	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.75 PPM (1-7PPM) 14:35		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @	
				14.650	14.730
Helium	---	0.40	0.05	---	---
Hydrogen	---	0.00	0.00	---	---
Oxygen/Argon	---	0.38	0.41	---	---
Nitrogen	---	48.98	46.02	---	---
Carbon Dioxide	---	2.58	3.81	---	---
Methane	P1	28.38390	15.27180	---	---
Ethane	P2	3.4729	3.5023	0.926	0.931
Propane	P3	6.0364	8.9272	1.658	1.667
i-Butane	I4	1.4269	2.7815	0.466	0.468
n-Butane	P4	4.3341	8.4486	1.362	1.370
2,2-Dimethylpropane	I5	0.0087	0.0211	0.003	0.003
i-Pentane	I5	1.0210	2.4706	0.372	0.374
Acetone	X3	0.0011	0.0021	0.000	0.000
n-Pentane	P5	1.3857	3.3531	0.501	0.504
t-Butanol	X4	0.0011	0.0027	0.000	0.000
2,2-Dimethylbutane	I6	0.0069	0.0200	0.003	0.003
Cyclopentane	N5	0.0367	0.0863	0.011	0.011
2,3-Dimethylbutane	I6	0.0285	0.0824	0.012	0.012
2-Methylpentane	I6	0.2516	0.7272	0.104	0.105
3-Methylpentane	I6	0.1276	0.3688	0.052	0.052
UnknownC5s	U5	0.0007	0.0017	0.000	0.000
n-Hexane	P6	0.3588	1.0370	0.147	0.148
2,2-Dimethylpentane	I7	0.0004	0.0013	0.000	0.000
Methylcyclopentane	N6	0.1079	0.3046	0.038	0.038
2,4-Dimethylpentane	I7	0.0071	0.0238	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0006	0.0020	0.000	0.000
Benzene	A6	0.0041	0.0107	0.001	0.001
3,3-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Cyclohexane	N6	0.0901	0.2543	0.031	0.031
2-Methylhexane	I7	0.0366	0.1230	0.017	0.017
2,3-Dimethylpentane	I7	0.0108	0.0363	0.005	0.005
1,1-Dimethylcyclopentane	N7	0.0121	0.0398	0.005	0.005
3-Methylhexane	I7	0.0469	0.1576	0.021	0.021
1c,3-Dimethylcyclopentane	N7	0.0188	0.0619	0.009	0.009
1t,3-Dimethylcyclopentane	N7	0.0159	0.0523	0.007	0.007
3-Ethylpentane	I7	0.0018	0.0060	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0330	0.1087	0.015	0.015
2,2,4-Trimethylpentane	I8	0.0004	0.0015	0.000	0.000
n-Heptane	P7	0.1067	0.3586	0.049	0.049
1c,2-Dimethylcyclopentane	N7	0.0025	0.0082	0.001	0.001
Methylcyclohexane	N7	0.0854	0.2812	0.034	0.034

2,2-Dimethylhexane	I8	0.0100	0.0383	0.005	0.005
Ethylcyclopentane	N7	0.0042	0.0138	0.002	0.002
2,5-Dimethylhexane	I8	0.0009	0.0034	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0010	0.0038	0.001	0.001
2,4-Dimethylhexane	I8	0.0031	0.0119	0.002	0.002
1c,2t,4-Trimethylcyclopentane	N8	0.0065	0.0244	0.003	0.003
3,3-Dimethylhexane	I8	0.0007	0.0027	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0097	0.0365	0.004	0.004
2,3,4-Trimethylpentane	I8	0.0002	0.0008	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0033	0.0102	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	0.0173	0.0663	0.009	0.009
4-Methylheptane	I8	0.0043	0.0165	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0010	0.0038	0.000	0.000
3,4-Dimethylhexane	I8	0.0008	0.0030	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0004	0.0015	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0007	0.000	0.000
3-Methylheptane	I8	0.0052	0.0199	0.003	0.003
1c,2t,3-Trimethylcyclopentane	N8	0.0133	0.0500	0.007	0.007
3-Ethylhexane	I8	0.0034	0.0130	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0042	0.0158	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0012	0.0045	0.001	0.001
3t-Ethylmethylcyclopentane	N8	0.0012	0.0045	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0009	0.0034	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0027	0.0102	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0003	0.0013	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0044	0.0166	0.002	0.002
UnknownC7s	U7	0.0031	0.0104	0.001	0.001
n-Octane	P8	0.0167	0.0640	0.009	0.009
1c,4-Dimethylcyclohexane	N8	0.0104	0.0391	0.005	0.005
i-Propylcyclopentane	I8	0.0003	0.0011	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0004	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0003	0.0013	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0003	0.0013	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	0.0002	0.0009	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0049	0.0208	0.003	0.003
2,2,3-Trimethylhexane	I9	0.0026	0.0112	0.001	0.001
2,4-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
4,4-Dimethylheptane	I9	0.0007	0.0030	0.000	0.000
Ethylcyclohexane	N8	0.0020	0.0075	0.001	0.001
n-Propylcyclopentane	N8	0.0013	0.0049	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0017	0.000	0.000
3,3-Dimethylheptane	I9	0.0005	0.0021	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	0.0006	0.0025	0.000	0.000
Ethylbenzene	I8	0.0011	0.0039	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0008	0.0034	0.000	0.000
2,3-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0050	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0007	0.0025	0.000	0.000
3,4-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0004	0.0017	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0004	0.000	0.000
4-Methyloctane	I9	0.0013	0.0056	0.001	0.001
2-Methyloctane	I9	0.0016	0.0069	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0003	0.0013	0.000	0.000
3-Ethylheptane	I9	0.0005	0.0021	0.000	0.000

3-Methyloctane	I9	0.0022	0.0095	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0004	0.0017	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	0.0008	0.0028	0.000	0.000
i-Butylcyclopentane	N9	0.0008	0.0034	0.000	0.000
UnknownC8s	U8	0.0007	0.0027	0.000	0.000
n-Nonane	P9	0.0052	0.0224	0.003	0.003
1,1-Methylethylcyclohexane	N9	0.0018	0.0076	0.001	0.001
i-Propylbenzene	A9	0.0004	0.0016	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	0.0009	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0008	0.0034	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
n-Propylbenzene	A9	0.0010	0.0040	0.000	0.000
3,6-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0004	0.0019	0.000	0.000
1,3-Methylethylbenzene	A9	0.0003	0.0012	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0012	0.000	0.000
2,3-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
5-Methylnonane	I10	0.0006	0.0028	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-Ethylloctane	I10	0.0001	0.0005	0.000	0.000
3-Methylnonane	I10	0.0004	0.0019	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0022	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0009	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	0.0063	0.0271	0.004	0.004
n-Decane	P10	0.0019	0.0091	0.001	0.001
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	0.0005	0.0023	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-n-propylbenzene	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	0.0001	0.0004	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0004	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
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0040	0.0191	0.002	0.002
n-Undecane	P11	0.0006	0.0031	0.000	0.000
UnknownC11s	U11	0.0007	0.0037	0.000	0.000
n-Dodecane	P12	0.0002	0.0011	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0001	0.0005	0.000	0.000
n-Tridecane	P13	0.0002	0.0012	0.000	0.000
n-Tetradecane	P14	0.0003	0.0020	0.000	0.000
UnknownC14s	U14	0.0001	0.0007	0.000	0.000
n-Pentadecane	P15	0.0004	0.0028	0.000	0.000
UnknownC15s	U15	0.0001	0.0007	0.000	0.000
n-Hexadecane	P16	0.0003	0.0023	0.000	0.000
UnknownC17s	U17	0.0002	0.0016	0.000	0.000
TOTAL		100.00000	100.00000	5.9393	5.9712

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0041	0.0107
TOLUENE	0.0033	0.0102
ETHYLBENZENE	0.0011	0.0039
XYLENES	0.0029	0.0103
TOTAL BTEX	0.0114	0.0351

	14.650	14.730
LOW NET DRY REAL :	790.0 /scf	794.3 /scf
NET WET REAL :	776.2 /scf	780.5 /scf
HIGH GROSS DRY REAL :	863.3 /scf	868.0 /scf
GROSS WET REAL :	848.2 /scf	852.9 /scf
NET DRY REAL :	10078.2 /lb	10133.3 /lb
GROSS DRY REAL :	11014.4 /lb	11074.5 /lb

RELATIVE DENSITY (AIR=1): 1.0279
 COMPRESSIBILITY FACTOR : 0.99735

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

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

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