EMPACT ANALYTICAL SYSTEMS INC.
365 S. MAIN ST.
BRIGHTON, CO
80601

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201410050	ANALYSIS NO. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2014
PRODUCER :		CYLINDER NO. :	0690
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 13:25 JOHN CRAIG 2-2		
FIELD DATA		SAMPLE TEMP. :	68
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.0 PPM (1-7PPM) 13:30		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
ALCOHOLS	0.0002	0.0005		
HELIUM	0.25	0.03	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.03	0.03	---	---
NITROGEN	13.74	13.26	---	---
CARBON DIOXIDE	0.64	0.97	---	---
METHANE	45.10180	24.93290	---	---
ETHANE	15.5552	16.1180	4.1588	4.1816
PROPANE	14.8974	22.6371	4.1037	4.1261
I-BUTANE	1.8647	3.7348	0.6104	0.6138
N-BUTANE	4.6243	9.2620	1.4575	1.4654
I-PENTANE	1.0922	2.7100	0.3930	0.3951
N-PENTANE	0.9867	2.4531	0.3578	0.3598
HEXANES PLUS	1.2075	3.8616	0.4876	0.4902
TOTALS	100.00000	100.00000	11.5688	11.6320

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0680	0.1831
TOLUENE	0.0372	0.1181
ETHYLBENZENE	0.0079	0.0289
XYLENES	0.0063	0.0230
TOTAL BTEX	0.1194	0.3531

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1337.0 /scf	1344.3 /scf
	NET WET REAL :	1313.6 /scf	1320.9 /scf
HIGH	GROSS DRY REAL :	1463.0 /scf	1471.0 /scf
	GROSS WET REAL :	1437.4 /scf	1445.4 /scf
	NET DRY REAL :	17510.9 /lb	17606.5 /lb
	GROSS DRY REAL :	19158.3 /lb	19262.9 /lb

RELATIVE DENSITY (AIR=1):	1.0010
COMPRESSIBILITY FACTOR :	0.99451

(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 RESPONSIBLITY OF THE USER. EMPACT ANALYTICAL SYSTEMS, ASSUMES NO RESPONSIBLITY FOR ACCURACY OF THE REPORTED INFORMATION NOR ANY CONSEQUENCES OF IT'S APPLICATION.

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201410050	ANALYSIS NO. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2014
PRODUCER :		CYLINDER NO. :	0690
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 13:25 JOHN CRAIG 2-2		
FIELD DATA		SAMPLE TEMP. :	68
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.0 PPM (1-7PPM) 13:30		

Componet	Mole %	Wt %
Helium	0.25	0.03
Hydrogen	0.01	0.00
Carbon Dioxide	0.64	0.97
Nitrogen	13.74	13.26
Methane	45.10180	24.93290
Ethane	15.5552	16.1180
Propane	14.8974	22.6371
Isobutane	1.8647	3.7348
n-Butane	4.6243	9.2620
Isopentane	1.0128	2.5181
n-Pentane	0.9867	2.4531
Cyclopentane	0.0794	0.1919
n-Hexane	0.1737	0.5158
Cyclohexane	0.0562	0.1630
Other Hexanes	0.4650	1.3723
Heptanes	0.2043	0.6996
Methycyclohexane	0.0397	0.1343
2,2,4 Trimethylpentane	0.0003	0.0012
Benzene	0.0680	0.1831
Toluene	0.0372	0.1181
Ethylbenzene	0.0079	0.0289
Xylenes	0.0063	0.0230
C8+ Heavies	0.1489	0.6223
Subtotal	99.96980	99.96950
Oxygen/Argon	0.03	0.03
Alcohols	0.0002	0.0005
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 IT'S APPLICATION.

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201410050	ANALYSIS NO. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	OCTOBER 10, 2014
ACCOUNT NO. :		SAMPLE DATE :	OCTOBER 7, 2014
PRODUCER :		CYLINDER NO. :	0690
LEASE NO. :		SAMPLED BY :	JOHN MOSER - EMPACT
NAME/DESCRIP :	SALES GAS 13:25 JOHN CRAIG 2-2		
FIELD DATA		SAMPLE TEMP. :	68
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 1.0 PPM (1-7PPM) 13:30		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.25	0.03	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.03	0.03	---	---
Nitrogen	---	13.74	13.26	---	---
Carbon Dioxide	---	0.64	0.97	---	---
Methane	P1	45.10180	24.93290	---	---
Ethane	P2	15.5552	16.1180	4.159	4.182
Propane	P3	14.8974	22.6371	4.104	4.126
i-Butane	I4	1.8647	3.7348	0.610	0.614
n-Butane	P4	4.6243	9.2620	1.458	1.465
2,2-Dimethylpropane	I5	0.0062	0.0154	0.002	0.002
i-Pentane	I5	1.0066	2.5027	0.368	0.370
n-Pentane	P5	0.9866	2.4529	0.358	0.360
t-Butanol	X4	0.0002	0.0005	0.000	0.000
2,2-Dimethylbutane	I6	0.0030	0.0089	0.001	0.001
Cyclopentane	N5	0.0794	0.1919	0.023	0.023
2,3-Dimethylbutane	I6	0.0165	0.0490	0.007	0.007
2-Methylpentane	I6	0.2038	0.6052	0.084	0.085
3-Methylpentane	I6	0.1189	0.3531	0.048	0.048
UnknownC5s	U5	0.0001	0.0002	0.000	0.000
n-Hexane	P6	0.1737	0.5158	0.071	0.072
2,2-Dimethylpentane	I7	0.0014	0.0048	0.001	0.001
Methylcyclopentane	N6	0.1228	0.3561	0.043	0.043
2,4-Dimethylpentane	I7	0.0034	0.0118	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0002	0.0007	0.000	0.000
Benzene	A6	0.0680	0.1831	0.019	0.019
3,3-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Cyclohexane	N6	0.0562	0.1630	0.019	0.019
2-Methylhexane	I7	0.0187	0.0646	0.009	0.009
2,3-Dimethylpentane	I7	0.0126	0.0435	0.006	0.006
1,1-Dimethylcyclopentane	N7	0.0062	0.0210	0.003	0.003
3-Methylhexane	I7	0.0364	0.1257	0.017	0.017
1c,3-Dimethylcyclopentane	N7	0.0163	0.0551	0.008	0.008
1t,3-Dimethylcyclopentane	N7	0.0124	0.0420	0.006	0.006
3-Ethylpentane	I7	0.0017	0.0059	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0376	0.1272	0.017	0.017
2,2,4-Trimethylpentane	I8	0.0003	0.0012	0.000	0.000
n-Heptane	P7	0.0458	0.1581	0.021	0.021
1c,2-Dimethylcyclopentane	N7	0.0028	0.0095	0.001	0.001
Methylcyclohexane	N7	0.0397	0.1343	0.016	0.016
2,2-Dimethylhexane	I8	0.0031	0.0122	0.001	0.001

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Ethylcyclopentane	N7	0.0086	0.0291	0.003	0.003
2,5-Dimethylhexane	I8	0.0009	0.0036	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0006	0.0024	0.000	0.000
2,4-Dimethylhexane	I8	0.0019	0.0075	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0042	0.0162	0.002	0.002
3,3-Dimethylhexane	I8	0.0003	0.0012	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0071	0.0275	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0002	0.0008	0.000	0.000
Toluene	A7	0.0372	0.1181	0.012	0.012
2,3-Dimethylhexane	I8	0.0018	0.0071	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0012	0.0047	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0139	0.0547	0.007	0.007
4-Methylheptane	I8	0.0032	0.0126	0.002	0.002
3-Methyl-3-ethylpentane	I8	0.0006	0.0024	0.000	0.000
3,4-Dimethylhexane	I8	0.0009	0.0036	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0003	0.0012	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0008	0.000	0.000
3-Methylheptane	I8	0.0033	0.0130	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0069	0.0267	0.004	0.004
3-Ethylhexane	I8	0.0023	0.0091	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0019	0.0073	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0010	0.0039	0.000	0.000
3c-Ethylmethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0019	0.0073	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0015	0.0058	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0052	0.0201	0.003	0.003
2,2,4-Trimethylhexane	I9	0.0003	0.0013	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0032	0.0124	0.002	0.002
UnknownC7s	U7	0.0001	0.0003	0.000	0.000
n-Octane	P8	0.0082	0.0323	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0058	0.0224	0.003	0.003
i-Propylcyclopentane	I8	0.0003	0.0012	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0007	0.0027	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0047	0.0204	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0035	0.0155	0.002	0.002
2,4-Dimethylheptane	I9	0.0004	0.0018	0.000	0.000
4,4-Dimethylheptane	I9	0.0004	0.0018	0.000	0.000
Ethylcyclohexane	N8	0.0044	0.0170	0.002	0.002
n-Propylcyclopentane	N8	0.0010	0.0039	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
2,5-Dimethylheptane	I9	0.0005	0.0022	0.000	0.000
3,3-Dimethylheptane	I9	0.0005	0.0022	0.000	0.000
3,5-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
2,6-Dimethylheptane	I9	0.0004	0.0018	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0079	0.0289	0.003	0.003
1c,2t,4t-Trimethylcyclohexane	N9	0.0013	0.0057	0.001	0.001
2,3-Dimethylheptane	I9	0.0006	0.0027	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0028	0.0102	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0010	0.0037	0.000	0.000
3,4-Dimethylheptane	I9	0.0005	0.0022	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0022	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0009	0.000	0.000
4-Methyloctane	I9	0.0010	0.0044	0.001	0.001
2-Methyloctane	I9	0.0013	0.0058	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0005	0.0022	0.000	0.000
3-Ethylheptane	I9	0.0004	0.0018	0.000	0.000
3-Methyloctane	I9	0.0026	0.0115	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0001	0.0005	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000

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3,3-Diethylpentane	I9	0.0003	0.0013	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0025	0.0091	0.001	0.001
i-Butylcyclopentane	N9	0.0006	0.0026	0.000	0.000
UnknownC8s	U8	0.0004	0.0016	0.000	0.000
n-Nonane	P9	0.0032	0.0141	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0017	0.0074	0.001	0.001
i-Propylbenzene	A9	0.0015	0.0062	0.001	0.001
i-Propylcyclohexane	N9	0.0003	0.0013	0.000	0.000
2,2-Dimethyloctane	I10	0.0002	0.0010	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0008	0.0035	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Propylbenzene	A9	0.0016	0.0066	0.001	0.001
3,6-Dimethyloctane	I10	0.0012	0.0059	0.001	0.001
3-Methyl-5-ethylheptane	I10	0.0002	0.0010	0.000	0.000
1,3-Methylethylbenzene	A9	0.0009	0.0037	0.001	0.001
1,4-Methylethylbenzene	A9	0.0006	0.0025	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0004	0.0017	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0007	0.0035	0.000	0.000
1,2-Methylethylbenzene	A9	0.0007	0.0029	0.000	0.000
2-Methylnonane	I10	0.0005	0.0025	0.000	0.000
3-Ethyloctane	I10	0.0002	0.0010	0.000	0.000
3-Methylnonane	I10	0.0005	0.0025	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0013	0.0060	0.001	0.001
i-Butylcyclohexane	N10	0.0004	0.0019	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0005	0.000	0.000
i-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
sec-Butylbenzene	A10	0.0002	0.0009	0.000	0.000
UnknownC9s	U9	0.0067	0.0296	0.004	0.004
n-Decane	P10	0.0016	0.0079	0.001	0.001
1,2,3-Trimethylbenzene	A9	0.0006	0.0025	0.000	0.000
1,3-Methyl-i-propylbenzene	A10	0.0002	0.0009	0.000	0.000
Sec-Butylcyclohexane	A10	0.0007	0.0034	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Diethylbenzene	A10	0.0003	0.0014	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0004	0.0019	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Dimethyl-5-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Diethylbenzene	A10	0.0001	0.0005	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0005	0.000	0.000
1,2-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Dimethyl-2-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,3-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-4-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,2-Dimethyl-3-ethylbenzene	A10	0.0001	0.0005	0.000	0.000
1,4-Methyl-t-butylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0051	0.0250	0.003	0.003
n-Undecane	P11	0.0003	0.0016	0.000	0.000
1,2,4,5-Tetramethylbenzene	A11	0.0001	0.0005	0.000	0.000
1,2-Methyl-t-butylbenzene	A11	0.0001	0.0005	0.000	0.000
1,4-Di-i-propylbenzene	A11	0.0001	0.0006	0.000	0.000
Tetrahydronaphthalene	A10	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0017	0.0092	0.001	0.001
n-Dodecane	P12	0.0001	0.0006	0.000	0.000
1,2,4-Triethylbenzene	A12	0.0001	0.0006	0.000	0.000
UnknownC12s	U12	0.0005	0.0027	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
n-Heptadecane	P17	0.0001	0.0008	0.000	0.000

n-Octadecane	P18	0.0001	0.0009	0.000	0.000
UnknownC19s	U19	0.0001	0.0009	0.000	0.000
TOTAL		100.00000	100.00000	11.5688	11.6320

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0680	0.1831
TOLUENE	0.0372	0.1181
ETHYLBENZENE	0.0079	0.0289
XYLENES	0.0063	0.0230
TOTAL BTEX	0.1194	0.3531

	BTU @	14.650	14.730
LOW	NET DRY REAL :	1337.0 /scf	1344.3 /scf
	NET WET REAL :	1313.6 /scf	1320.9 /scf
HIGH	GROSS DRY REAL :	1463.0 /scf	1471.0 /scf
	GROSS WET REAL :	1437.4 /scf	1445.4 /scf
	NET DRY REAL :	17510.9 /lb	17606.5 /lb
	GROSS DRY REAL :	19158.3 /lb	19262.9 /lb

RELATIVE DENSITY (AIR=1):	1.0010
COMPRESSIBILITY FACTOR :	0.99451

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

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

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