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

303-637-0150

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

PROJECT NO. :	201411120	ANALYSIS NO. :	03
COMPANY NAME :	NIGHTHAWK PRODUCTION	ANALYSIS DATE:	NOVEMBER 24, 2014
ACCOUNT NO. :		SAMPLE DATE :	NOVEMBER 21, 2014
PRODUCER :		CYLINDER NO. :	0754
LEASE NO. :		SAMPLED BY :	GALE MCENDREE - EMPACT
NAME/DESCRIP :	SALES GAS 13:10 BLACKCOMB 3-14		
FIELD DATA		SAMPLE TEMP. :	36
SAMPLE PRES. :	24	AMBIENT TEMP.:	
VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 0.50 PPM (1-7PPM) 13:15		

COMPONENT	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
HELIUM	0.55	0.08	---	---
HYDROGEN	0.10	0.01	---	---
OXYGEN/ARGON	0.44	0.50	---	---
NITROGEN	53.62	52.93	---	---
CARBON DIOXIDE	1.44	2.23	---	---
METHANE	26.94010	15.22210	---	---
ETHANE	5.2259	5.5368	1.3925	1.4001
PROPANE	5.1332	7.9756	1.4095	1.4172
I-BUTANE	0.8983	1.8397	0.2927	0.2943
N-BUTANE	2.9559	6.0536	0.9280	0.9331
I-PENTANE	0.6918	1.7569	0.2497	0.2511
N-PENTANE	0.9482	2.4105	0.3416	0.3435
HEXANES PLUS	1.0566	3.4548	0.4408	0.4424
TOTALS	100.00000	100.00000	5.0548	5.0817

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0019	0.0052
TOLUENE	0.0020	0.0065
ETHYLBENZENE	0.0009	0.0034
XYLENES	0.0013	0.0049
TOTAL BTEX	0.0061	0.0200

BTU @		14.650	14.730
LOW	NET DRY REAL :	673.3 /scf	677.0 /scf
	NET WET REAL :	661.5 /scf	665.2 /scf
HIGH	GROSS DRY REAL :	737.0 /scf	741.0 /scf
	GROSS WET REAL :	724.1 /scf	728.2 /scf
	NET DRY REAL :	9024.3 /lb	9073.6 /lb
	GROSS DRY REAL :	9878.5 /lb	9932.4 /lb
	RELATIVE DENSITY (AIR=1):		0.9792
	COMPRESSIBILITY FACTOR :		0.99793

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

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

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GLYCALC INFORMATION

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VAPOR PRES. :		GRAVITY :	
COMMENTS :	SPOT; NO PROBE; LENGTH OF H2S STAIN @ 0.50 PPM (1-7PPM) 13:15		

Componet	Mole %	Wt %
Helium	0.55	0.08
Hydrogen	0.10	0.01
Carbon Dioxide	1.44	2.23
Nitrogen	53.62	52.93
Methane	26.94010	15.22210
Ethane	5.2259	5.5368
Propane	5.1332	7.9756
Isobutane	0.8983	1.8397
n-Butane	2.9559	6.0536
Isopentane	0.6666	1.6946
n-Pentane	0.9482	2.4105
Cyclopentane	0.0252	0.0623
n-Hexane	0.2489	0.7558
Cyclohexane	0.0619	0.1836
Other Hexanes	0.3512	1.0612
Heptanes	0.2093	0.7351
Methycyclohexane	0.0604	0.2089
2,2,4 Trimethylpentane	0.0011	0.0044
Benzene	0.0019	0.0052
Toluene	0.0020	0.0065
Ethylbenzene	0.0009	0.0034
Xylenes	0.0013	0.0049
C8+ Heavies	0.1177	0.4858
Subtotal	99.56000	99.50000
Oxygen/Argon	0.44	0.50
Total	100.00000	100.00000

EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

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COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.650	GPM @ 14.730
Helium	---	0.55	0.08	---	---
Hydrogen	---	0.10	0.01	---	---
Oxygen/Argon	---	0.44	0.50	---	---
Nitrogen	---	53.62	52.93	---	---
Carbon Dioxide	---	1.44	2.23	---	---
Methane	P1	26.94010	15.22210	---	---
Ethane	P2	5.2259	5.5368	1.393	1.400
Propane	P3	5.1332	7.9756	1.410	1.417
i-Butane	I4	0.8983	1.8397	0.293	0.294
n-Butane	P4	2.9558	6.0534	0.928	0.933
2,2-Dimethylpropane	I5	0.0059	0.0150	0.002	0.002
i-Pentane	I5	0.6607	1.6796	0.241	0.242
UnknownC4s	U4	0.0001	0.0002	0.000	0.000
n-Pentane	P5	0.9467	2.4067	0.342	0.344
2,2-Dimethylbutane	I6	0.0046	0.0139	0.002	0.002
Cyclopentane	N5	0.0252	0.0623	0.007	0.007
2,3-Dimethylbutane	I6	0.0116	0.0352	0.005	0.005
2-Methylpentane	I6	0.1703	0.5171	0.071	0.071
3-Methylpentane	I6	0.0844	0.2563	0.034	0.034
UnknownC5s	U5	0.0015	0.0038	0.001	0.001
n-Hexane	P6	0.2489	0.7558	0.102	0.102
2,2-Dimethylpentane	I7	0.0003	0.0011	0.000	0.000
Methylcyclopentane	N6	0.0727	0.2156	0.026	0.026
2,4-Dimethylpentane	I7	0.0050	0.0176	0.002	0.002
2,2,3-Trimethylbutane	I7	0.0004	0.0014	0.000	0.000
Benzene	A6	0.0019	0.0052	0.001	0.001
3,3-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Cyclohexane	N6	0.0619	0.1836	0.021	0.021
2-Methylhexane	I7	0.0243	0.0858	0.011	0.011
2,3-Dimethylpentane	I7	0.0080	0.0283	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0091	0.0315	0.004	0.004
3-Methylhexane	I7	0.0317	0.1119	0.015	0.015
1c,3-Dimethylcyclopentane	N7	0.0115	0.0398	0.005	0.005
1t,3-Dimethylcyclopentane	N7	0.0066	0.0228	0.003	0.003
3-Ethylpentane	I7	0.0052	0.0184	0.002	0.002
1t,2-Dimethylcyclopentane	N7	0.0213	0.0737	0.010	0.010

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2,2,4-Trimethylpentane	I8	0.0011	0.0044	0.001	0.001
UnknownC6s	U6	0.0076	0.0231	0.003	0.003
n-Heptane	P7	0.0760	0.2683	0.035	0.035
1c,2-Dimethylcyclopentane	N7	0.0020	0.0069	0.001	0.001
Methylcyclohexane	N7	0.0604	0.2089	0.024	0.024
2,2-Dimethylhexane	I8	0.0068	0.0274	0.003	0.003
Ethylcyclopentane	N7	0.0034	0.0118	0.001	0.001
2,5-Dimethylhexane	I8	0.0013	0.0052	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0007	0.0028	0.000	0.000
2,4-Dimethylhexane	I8	0.0016	0.0064	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0042	0.0166	0.002	0.002
3,3-Dimethylhexane	I8	0.0002	0.0008	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0061	0.0241	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0001	0.0004	0.000	0.000
Toluene	A7	0.0020	0.0065	0.001	0.001
2,3-Dimethylhexane	I8	0.0012	0.0048	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0009	0.0036	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0002	0.0008	0.000	0.000
2-Methylheptane	I8	0.0118	0.0475	0.006	0.006
4-Methylheptane	I8	0.0019	0.0076	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0022	0.0088	0.001	0.001
3,4-Dimethylhexane	I8	0.0006	0.0024	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0004	0.0016	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0002	0.0008	0.000	0.000
3-Methylheptane	I8	0.0021	0.0085	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0109	0.0431	0.006	0.006
3-Ethylhexane	I8	0.0022	0.0088	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0031	0.0123	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0007	0.0028	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0008	0.0032	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0007	0.0028	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0017	0.0067	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0030	0.0119	0.002	0.002
UnknownC7s	U7	0.0044	0.0155	0.002	0.002
n-Octane	P8	0.0091	0.0366	0.005	0.005
1c,4-Dimethylcyclohexane	N8	0.0104	0.0411	0.005	0.005
i-Propylcyclopentane	I8	0.0001	0.0004	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0005	0.0020	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0034	0.0151	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0010	0.0045	0.001	0.001
2,4-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
4,4-Dimethylheptane	I9	0.0009	0.0040	0.000	0.000
Ethylcyclohexane	N8	0.0017	0.0067	0.001	0.001
n-Propylcyclopentane	N8	0.0009	0.0036	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0003	0.0013	0.000	0.000
2,5-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0013	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0009	0.0034	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0003	0.0013	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0006	0.0023	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0002	0.0007	0.000	0.000

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3,4-Dimethylheptane (2)	I9	0.0004	0.0018	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0009	0.0040	0.001	0.001
2-Methyloctane	I9	0.0008	0.0036	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0002	0.0009	0.000	0.000
3-Ethylheptane	I9	0.0004	0.0018	0.000	0.000
3-Methyloctane	I9	0.0014	0.0063	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0002	0.0009	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0005	0.0019	0.000	0.000
i-Butylcyclopentane	N9	0.0005	0.0022	0.000	0.000
UnknownC8s	U8	0.0013	0.0052	0.001	0.001
n-Nonane	P9	0.0026	0.0117	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0012	0.0053	0.001	0.001
i-Propylbenzene	A9	0.0004	0.0017	0.000	0.000
i-Propylcyclohexane	N9	0.0002	0.0009	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0004	0.0018	0.000	0.000
3,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0008	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0005	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0005	0.000	0.000
5-Methylnonane	I10	0.0002	0.0010	0.000	0.000
1,2-Methylethylbenzene	A9	0.0002	0.0008	0.000	0.000
3-Methylnonane	I10	0.0002	0.0010	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0005	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0005	0.000	0.000
UnknownC9s	U9	0.0051	0.0230	0.003	0.003
n-Decane	P10	0.0006	0.0030	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0010	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0018	0.0090	0.001	0.001
n-Undecane	P11	0.0002	0.0011	0.000	0.000
1,3-Methyl-n-butylbenzene	A11	0.0001	0.0005	0.000	0.000
UnknownC11s	U11	0.0002	0.0011	0.000	0.000
UnknownC13s	U13	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	5.0558	5.0827

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0019	0.0052
TOLUENE	0.0020	0.0065
ETHYLBENZENE	0.0009	0.0034
XYLENES	0.0013	0.0049
TOTAL BTEX	0.0061	0.0200

	BTU @	14.650	14.730
LOW	NET DRY REAL :	673.3 /scf	677.0 /scf
	NET WET REAL :	661.5 /scf	665.2 /scf
HIGH	GROSS DRY REAL :	737.0 /scf	741.0 /scf
	GROSS WET REAL :	724.1 /scf	728.2 /scf
	NET DRY REAL :	9024.3 /lb	9073.6 /lb
	GROSS DRY REAL :	9878.5 /lb	9932.4 /lb
	RELATIVE DENSITY (AIR=1):		0.9792
	COMPRESSIBILITY FACTOR :		0.99793

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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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