

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #: _____ NAME/DESCRIP : **SNOW KING 13-33 SALES GAS**

PROJECT NO. : **201701044** ANALYSIS NO. : **08**

COMPANY NAME : **NIGHTHAWK PRODUCTION CO** ANALYSIS DATE: **JANUARY 19, 2017 12:04**

OFFICE / BRANCH: **HIGHLANDS RANCH, CO** SAMPLE DATE : **JANUARY 11, 2017 11:20**

CUSTOMER REF: _____ TO: _____

PRODUCER : _____ EFFECTIVE DATE: _____

*****FIELD DATA*****

SAMPLE CYCLE: _____ SAMPLE TYPE: **SPOT**

SAMPLE PRES. : **20** psig CYLINDER NO. : **2001**

LAB PRES: _____ psig SAMPLED BY : **GALE MCENDREE**

SAMPLE TEMP. : **73** °f SAMPLING COMPANY: **EMPACT**

AMBIENT TEMP.: _____ °f H2S BY STAIN TUBE: **7** ppm

H2O BY STAIN TUBE: **-** #/mmcf CO2 BY STAIN TUBE: **-** Mol %

FIELD COMMENTS: **NO PROBE**

LAB COMMENTS: _____

<u>COMPONENT</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.730</u>	<u>GPM @ 14.650</u>
ALCOHOLS	0.0213	0.0250		
HELIUM	0.53	0.07	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.35	0.35	---	---
NITROGEN	45.1400	39.4800	---	---
CARBON DIOXIDE	2.15	2.95	---	---
METHANE	22.84930	11.44650	---	---
ETHANE	4.7585	4.4677	1.2768	1.2699
PROPANE	12.0943	16.6521	3.3434	3.3252
I-BUTANE	2.0286	3.6816	0.6661	0.6624
N-BUTANE	6.1140	11.0958	1.9338	1.9233
I-PENTANE	1.1921	2.6825	0.4346	0.4323
N-PENTANE	1.4041	3.1632	0.5091	0.5063
HEXANES PLUS	1.3678	3.9356	0.5640	0.5612
TOTALS	100.00000	100.00000	8.7278	8.6806

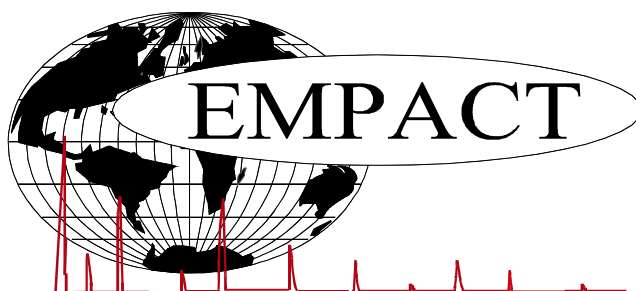
<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>BTU @ 14.730</u>	<u>14.650</u>	
BENZENE	0.0072	0.0176	LOW NET DRY REAL :	974.8 /scf	969.6 /scf
TOLUENE	0.0081	0.0233	NET WET REAL :	957.9 /scf	952.6 /scf
ETHYLBENZENE	0.0001	0.0003	HIGH GROSS DRY REAL :	1062.8 /scf	1057.0 /scf
XYLENES	0.0036	0.0119	GROSS WET REAL :	1044.3 /scf	1038.5 /scf
TOTAL BTEX	0.0190	0.0531	NET DRY REAL :	11571.5 /lb	11508.6 /lb
			GROSS DRY REAL :	12618.1 /lb	12549.5 /lb

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

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

RELATIVE DENSITY (AIR=1): 1.1043
COMPRESSIBILITY FACTOR : 0.99620

The data presented herein has been acquired by means of current analytical techniques and represents the judicious conclusion EMPACT Analytical Systems, Inc. Results of the analysis can be affected by the sampling conditions, therefore, are only warranted through proper lab protocol. EMPACT assumes no responsibility for interpretation or any consequences from application of the reported information and is the sole liability of the user. The reproduction in any media of this reported information may not be made, in portion or as a whole, without the written permission of EMPACT Analytical Systems, Inc.



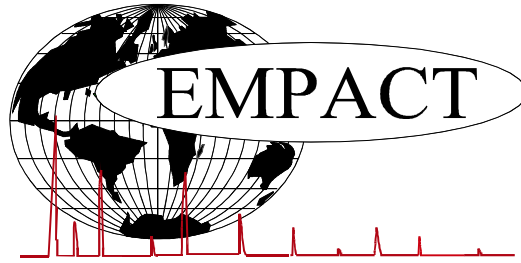
EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201701044	ANALYSIS NO. :	08
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 19, 2017 12:04
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 11:20
PRODUCER :		CYLINDER NO. :	2001
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SNOW KING 13-33 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	73
SAMPLE PRES. :	20	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

<u>Componet</u>	<u>Mole %</u>	<u>Wt %</u>
Helium	0.53	0.07
Hydrogen	0.00	0.00
Carbon Dioxide	2.15	2.95
Nitrogen	45.14	39.48
Methane	22.84930	11.44650
Ethane	4.7585	4.4677
Propane	12.0943	16.6521
Isobutane	2.0286	3.6816
n-Butane	6.1140	11.0958
Isopentane	1.1424	2.5736
n-Pentane	1.4041	3.1632
Cyclopentane	0.0497	0.1089
n-Hexane	0.3006	0.8088
Cyclohexane	0.0986	0.2591
Other Hexanes	0.4974	1.3312
Heptanes	0.2340	0.7283
Methycyclohexane	0.0849	0.2603
2,2,4 Trimethylpentane	0.0010	0.0036
Benzene	0.0072	0.0176
Toluene	0.0081	0.0233
Ethylbenzene	0.0001	0.0003
Xylenes	0.0036	0.0119
C8+ Heavies	0.1323	0.4912
<u>Subtotal</u>	<u>99.62870</u>	<u>99.62500</u>
Oxygen/Argon	0.35	0.35
<u>Alcohols</u>	<u>0.0213</u>	<u>0.0250</u>
Total	100.00000	100.00000

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201701044	ANALYSIS NO. :	08
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 19, 2017 12:04
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 11:20
PRODUCER :		CYLINDER NO. :	2001
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SNOW KING 13-33		
	SALES GAS		
FIELD DATA		SAMPLE TEMP. :	73
SAMPLE PRES. :	20	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		
	SPOT		

<u>COMPONENT</u>	<u>PIANO #</u>	<u>MOLE %</u>	<u>MASS %</u>	<u>GPM @ 14.730</u>	<u>GPM @ 14.650</u>
Helium	---	0.53	0.07	---	---
Oxygen/Argon	---	0.35	0.35	---	---
Nitrogen	---	45.14	39.48	---	---
Carbon Dioxide	---	2.15	2.95	---	---
Methane	P1	22.84930	11.44650	---	---
Ethane	P2	4.7585	4.4677	1.277	1.270
Propane	P3	12.0943	16.6521	3.343	3.325
i-Butane	I4	2.0286	3.6816	0.666	0.662
Methanol	X1	0.0168	0.0168	0.002	0.002
n-Butane	P4	6.1132	11.0944	1.934	1.923
2,2-Dimethylpropane	I5	0.0098	0.0221	0.004	0.004
i-Pentane	I5	1.1326	2.5515	0.416	0.413
Acetone	X3	0.0045	0.0082	0.002	0.002
UnknownC4s	U4	0.0008	0.0014	0.000	0.000
n-Pentane	P5	1.3997	3.1533	0.509	0.506
2,2-Dimethylbutane	I6	0.0070	0.0188	0.003	0.003
Cyclopentane	N5	0.0497	0.1089	0.015	0.015
2,3-Dimethylbutane	I6	0.0210	0.0565	0.009	0.009
2-Methylpentane	I6	0.1167	0.3140	0.048	0.048
3-Methylpentane	I6	0.2328	0.6264	0.096	0.095
UnknownC5s	U5	0.0044	0.0099	0.002	0.002
n-Hexane	P6	0.3006	0.8088	0.124	0.123
2,2-Dimethylpentane	I7	0.0001	0.0003	0.000	0.000
Methylcyclopentane	N6	0.1135	0.2983	0.040	0.040
2,4-Dimethylpentane	I7	0.0054	0.0169	0.003	0.003
2,2,3-Trimethylbutane	I7	0.0005	0.0016	0.000	0.000
Benzene	A6	0.0072	0.0176	0.002	0.002
3,3-Dimethylpentane	I7	0.0003	0.0009	0.000	0.000
Cyclohexane	N6	0.0986	0.2591	0.033	0.033
2-Methylhexane	I7	0.0226	0.0707	0.010	0.010
2,3-Dimethylpentane	I7	0.0091	0.0285	0.004	0.004
1,1-Dimethylcyclopentane	N7	0.0101	0.0310	0.004	0.004
3-Methylhexane	I7	0.0347	0.1086	0.016	0.016
1c,3-Dimethylcyclopentane	N7	0.0153	0.0469	0.007	0.007
1t,3-Dimethylcyclopentane	N7	0.0124	0.0380	0.006	0.006

3-Ethylpentane	I7	0.0029	0.0091	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0268	0.0822	0.012	0.012
2,2,4-Trimethylpentane	I8	0.0010	0.0036	0.001	0.001
UnknownC6s	U6	0.0064	0.0172	0.003	0.003
n-Heptane	P7	0.0782	0.2447	0.036	0.036
1c,2-Dimethylcyclopentane	N7	0.0019	0.0058	0.001	0.001
Methylcyclohexane	N7	0.0849	0.2603	0.034	0.034
2,2-Dimethylhexane	I8	0.0066	0.0235	0.003	0.003
1,1,3-Trimethylcyclopentane	N7	0.0012	0.0042	0.001	0.001
Ethylcyclopentane	N7	0.0030	0.0092	0.001	0.001
2,5-Dimethylhexane	I8	0.0012	0.0043	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0003	0.0011	0.000	0.000
2,4-Dimethylhexane	I8	0.0021	0.0075	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0051	0.0179	0.002	0.002
3,3-Dimethylhexane	I8	0.0005	0.0018	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0061	0.0214	0.003	0.003
2,3,4-Trimethylpentane	I8	0.0001	0.0003	0.000	0.000
Toluene	A7	0.0081	0.0233	0.003	0.003
2,3-Dimethylhexane	I8	0.0016	0.0057	0.001	0.001
2-Methyl-3-ethylpentane	I8	0.0008	0.0028	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0003	0.000	0.000
2-Methylheptane	I8	0.0120	0.0428	0.006	0.006
4-Methylheptane	I8	0.0025	0.0089	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0010	0.0036	0.000	0.000
3,4-Dimethylhexane	I8	0.0005	0.0018	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0005	0.0018	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0003	0.000	0.000
3-Methylheptane	I8	0.0037	0.0132	0.002	0.002
1c,2t,3-Trimethylcyclopentane	N8	0.0103	0.0361	0.005	0.005
3-Ethylhexane	I8	0.0026	0.0093	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0036	0.0126	0.002	0.002
1,1-Dimethylcyclohexane	N8	0.0008	0.0028	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0007	0.0025	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0006	0.0021	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0014	0.0049	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0034	0.0119	0.002	0.002
1c,2c,3-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
UnknownC7s	U7	0.0095	0.0297	0.004	0.004
n-Octane	P8	0.0187	0.0667	0.010	0.010
1c,4-Dimethylcyclohexane	N8	0.0010	0.0035	0.001	0.001
i-Propylcyclopentane	I8	0.0001	0.0003	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0004	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0003	0.0012	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0006	0.0021	0.000	0.000
2,2-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0033	0.0130	0.002	0.002
2,2,3-Trimethylhexane	I9	0.0015	0.0060	0.001	0.001
2,4-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
4,4-Dimethylheptane	I9	0.0006	0.0024	0.000	0.000
Ethylcyclohexane	N8	0.0013	0.0046	0.001	0.001
n-Propylcyclopentane	N8	0.0008	0.0028	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0003	0.0012	0.000	0.000
2,5-Dimethylheptane	I9	0.0004	0.0016	0.000	0.000
3,3-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
3,5-Dimethylheptane	I9	0.0002	0.0008	0.000	0.000

2,6-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
Ethylbenzene	I8	0.0001	0.0003	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0009	0.0036	0.001	0.001
2,3-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0020	0.0066	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0006	0.0020	0.000	0.000
3,4-Dimethylheptane	I9	0.0004	0.0016	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0005	0.0020	0.000	0.000
4-Ethylheptane	I9	0.0002	0.0008	0.000	0.000
4-Methyloctane	I9	0.0009	0.0036	0.001	0.001
2-Methyloctane	I9	0.0009	0.0036	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0004	0.0016	0.000	0.000
3-Ethylheptane	I9	0.0003	0.0012	0.000	0.000
3-Methyloctane	I9	0.0010	0.0040	0.001	0.001
1c,2t,4c-Trimethylcyclohexane	I9	0.0008	0.0032	0.000	0.000
1,1,2-Trimethylcyclohexane	N9	0.0001	0.0004	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0004	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0010	0.0033	0.000	0.000
i-Butylcyclopentane	N9	0.0007	0.0028	0.000	0.000
UnknownC8s	U8	0.0007	0.0025	0.000	0.000
n-Nonane	P9	0.0040	0.0160	0.002	0.002
1,1-Methylethylcyclohexane	N9	0.0009	0.0036	0.001	0.001
i-Propylbenzene	A9	0.0005	0.0019	0.000	0.000
i-Propylcyclohexane	N9	0.0003	0.0012	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
2,5-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
n-Butylcyclopentane	N9	0.0006	0.0024	0.000	0.000
3,3-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
n-Propylbenzene	A9	0.0006	0.0023	0.000	0.000
3,6-Dimethyloctane	I10	0.0003	0.0013	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0003	0.0013	0.000	0.000
1,3-Methylethylbenzene	A9	0.0004	0.0015	0.000	0.000
1,4-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0003	0.0011	0.000	0.000
2,3-Dimethyloctane	I10	0.0001	0.0004	0.000	0.000
5-Methylnonane	I10	0.0004	0.0018	0.000	0.000
1,2-Methylethylbenzene	A9	0.0003	0.0011	0.000	0.000
2-Methylnonane	I10	0.0001	0.0004	0.000	0.000
3-Ethylheptane	I10	0.0001	0.0004	0.000	0.000
3-Methylnonane	I10	0.0003	0.0013	0.000	0.000
1,2,4-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
t-Butylbenzene	A10	0.0005	0.0021	0.000	0.000
i-Butylcyclohexane	N10	0.0002	0.0009	0.000	0.000
1t-Methyl-2-n-propylcyclohexane	I10	0.0001	0.0004	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	0.0061	0.0244	0.003	0.003
n-Decane	P10	0.0013	0.0058	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	0.0001	0.0004	0.000	0.000
1,2-Methyl-i-propylbenzene	A10	0.0003	0.0013	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-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
n-Butylbenzene	A10	0.0001	0.0004	0.000	0.000

1,2-Diethylbenzene	A10	0.0001	0.0004	0.000	0.000
t-Decahydronaphthalene	A9	0.0001	0.0005	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
1,3-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
UnknownC10s	U10	0.0025	0.0111	0.002	0.002
n-Undecane	P11	0.0004	0.0020	0.000	0.000
1,2,3,5-Tetramethylbenzene	A11	0.0001	0.0004	0.000	0.000
1,2-Ethyl-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
UnknownC11s	U11	0.0009	0.0044	0.001	0.001
n-Dodecane	P12	0.0002	0.0011	0.000	0.000
1,3,5-Triethylbenzene	A12	0.0001	0.0005	0.000	0.000
UnknownC12s	U12	0.0002	0.0010	0.000	0.000
TOTAL		100.00000	100.00000	8.7338	8.6866

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0072	0.0176	LOW NET DRY REAL :	974.8 /scf	969.6 /scf
TOLUENE	0.0081	0.0233	NET WET REAL :	957.9 /scf	952.6 /scf
ETHYLBENZENE	0.0001	0.0003	HIGH GROSS DRY REAL :	1062.8 /scf	1057.0 /scf
XYLENES	0.0036	0.0119	GROSS WET REAL :	1044.3 /scf	1038.5 /scf
TOTAL BTEX	0.0190	0.0531	NET DRY REAL :	11571.5 /lb	11508.6 /lb
			GROSS DRY REAL :	12618.1 /lb	12549.5 /lb

RELATIVE DENSITY (AIR=1): 1.1043
 COMPRESSIBILITY FACTOR : 0.99620

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

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

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