

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #: NAME/DESCRIP : **SNOWBIRD 9-15 SALES GAS**

PROJECT NO. : **201701044** ANALYSIS NO. : **06**

COMPANY NAME : **NIGHTHAWK PRODUCTION CO** ANALYSIS DATE: JANUARY 19, 2017 07:57

OFFICE / BRANCH: **HIGHLANDS RANCH, CO** SAMPLE DATE : JANUARY 11, 2017 10:20

CUSTOMER REF: TO:

PRODUCER : EFFECTIVE DATE:

FIELD DATA

SAMPLE CYCLE: SAMPLE TYPE: SPOT

SAMPLE PRES. : 25 psig CYLINDER NO. : 0992

LAB PRES: psig SAMPLED BY : GALE MCENDREE

SAMPLE TEMP. : 83 °f SAMPLING COMPANY: EMPACT

AMBIENT TEMP.: °f H2S BY STAIN TUBE: **13** ppm

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

FIELD COMMENTS: NO PROBE

LAB COMMENTS:

COMPONENT	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
ALCOHOLS	0.0011	0.0021		
HELIUM	0.92	0.12	---	---
HYDROGEN	0.03	0.00	---	---
OXYGEN/ARGON	0.39	0.40	---	---
NITROGEN	49.6400	44.6700	---	---
CARBON DIOXIDE	3.89	5.50	---	---
METHANE	24.06880	12.40460	---	---
ETHANE	4.0307	3.8931	1.0805	1.0746
PROPANE	5.9410	8.4150	1.6414	1.6324
I-BUTANE	1.2886	2.4058	0.4232	0.4209
N-BUTANE	4.5474	8.4900	1.4373	1.4295
I-PENTANE	1.2178	2.8195	0.4433	0.4409
N-PENTANE	1.7722	4.1072	0.6423	0.6388
HEXANES PLUS	2.2624	6.7727	0.9564	0.9519
TOTALS	100.00000	100.00000	6.6244	6.5890

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0026	0.0065	LOW NET DRY REAL :	818.1 /scf	813.6 /scf
TOLUENE	0.0036	0.0107	NET WET REAL :	803.9 /scf	799.4 /scf
ETHYLBENZENE	0.0006	0.0021	HIGH GROSS DRY REAL :	892.3 /scf	887.5 /scf
XYLENES	0.0027	0.0092	GROSS WET REAL :	876.8 /scf	872.0 /scf
TOTAL BTEX	0.0095	0.0285	NET DRY REAL :	9998.1 /lb	9943.8 /lb
			GROSS DRY REAL :	10908.3 /lb	10849.1 /lb

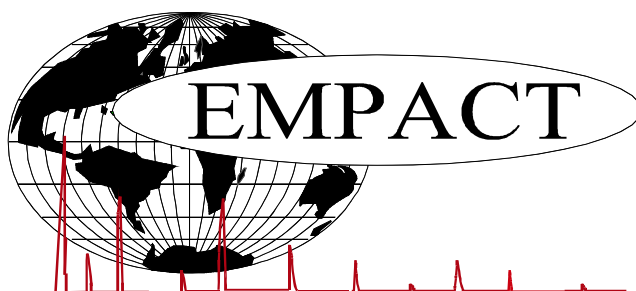
(CALC: GPA STD 2145 & TP-17 @14.696 & 60 F)

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

RELATIVE DENSITY (AIR=1): 1.0737

COMPRESSIBILITY FACTOR : 0.99721

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.



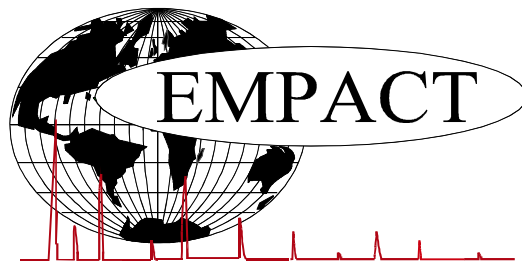
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GLYCALC INFORMATION

PROJECT NO. :	201701044	ANALYSIS NO. :	06
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 19, 2017 07:57
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 11, 2017 10:20
PRODUCER :		CYLINDER NO. :	0992
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	SNOWBIRD 9-15		
	SALES GAS		
FIELD DATA		SAMPLE TEMP. :	83
SAMPLE PRES. :	25	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		
	SPOT		

Componet	Mole %	Wt %
Helium	0.92	0.12
Hydrogen	0.03	0.00
Carbon Dioxide	3.89	5.50
Nitrogen	49.64	44.67
Methane	24.06880	12.40460
Ethane	4.0307	3.8931
Propane	5.9410	8.4150
Isobutane	1.2886	2.4058
n-Butane	4.5474	8.4900
Isopentane	1.1736	2.7199
n-Pentane	1.7722	4.1072
Cyclopentane	0.0442	0.0996
n-Hexane	0.5523	1.5288
Cyclohexane	0.1260	0.3406
Other Hexanes	0.7209	1.9859
Heptanes	0.4545	1.4564
Methycyclohexane	0.1318	0.4157
2,2,4 Trimethylpentane	0.0023	0.0084
Benzene	0.0026	0.0065
Toluene	0.0036	0.0107
Ethylbenzene	0.0006	0.0021
Xylenes	0.0027	0.0092
C8+ Heavies	0.2651	1.0084
Subtotal	99.60890	99.59790
Oxygen/Argon	0.39	0.40
Alcohols	0.0011	0.0021
Total	100.00000	100.00000

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EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. : 201701044	ANALYSIS NO. : 06
COMPANY NAME : NIGHTHAWK PRODUCTION CO	ANALYSIS DATE: JANUARY 19, 2017 07:57
ACCOUNT NO. :	SAMPLE DATE : JANUARY 11, 2017 10:20
PRODUCER :	CYLINDER NO. : 0992
LEASE NO. :	SAMPLED BY : GALE MCENDREE
NAME/DESCRIP : SNOWBIRD 9-15	
SALES GAS	
FIELD DATA	
SAMPLE PRES. : 25	SAMPLE TEMP. : 83
COMMENTS : NO PROBE	AMBIENT TEMP.:
SPOT	

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
Helium	---	0.92	0.12	---	---
Hydrogen	---	0.03	0.00	---	---
Oxygen/Argon	---	0.39	0.40	---	---
Nitrogen	---	49.64	44.67	---	---
Carbon Dioxide	---	3.89	5.50	---	---
Methane	P1	24.06880	12.40460	---	---
Ethane	P2	4.0307	3.8931	1.081	1.075
Propane	P3	5.9410	8.4150	1.641	1.632
i-Butane	I4	1.2886	2.4058	0.423	0.421
n-Butane	P4	4.5473	8.4898	1.437	1.430
2,2-Dimethylpropane	I5	0.0088	0.0204	0.003	0.003
i-Pentane	I5	1.1648	2.6995	0.427	0.425
i-Propanol	X3	0.0011	0.0021	0.000	0.000
UnknownC4s	U4	0.0001	0.0002	0.000	0.000
n-Pentane	P5	1.7669	4.0949	0.642	0.639
2,2-Dimethylbutane	I6	0.0073	0.0202	0.003	0.003
Cyclopentane	N5	0.0442	0.0996	0.013	0.013
2,3-Dimethylbutane	I6	0.0248	0.0686	0.010	0.010
2-Methylpentane	I6	0.1734	0.4800	0.072	0.072
3-Methylpentane	I6	0.3565	0.9868	0.146	0.145
UnknownC5s	U5	0.0053	0.0123	0.002	0.002
n-Hexane	P6	0.5523	1.5288	0.228	0.227
2,2-Dimethylpentane	I7	0.0004	0.0013	0.000	0.000
Methylcyclopentane	N6	0.1470	0.3974	0.052	0.052
2,4-Dimethylpentane	I7	0.0088	0.0283	0.004	0.004
2,2,3-Trimethylbutane	I7	0.0006	0.0019	0.000	0.000
Benzene	A6	0.0026	0.0065	0.001	0.001
3,3-Dimethylpentane	I7	0.0005	0.0016	0.000	0.000
Cyclohexane	N6	0.1260	0.3406	0.043	0.043
2-Methylhexane	I7	0.0505	0.1625	0.023	0.023
2,3-Dimethylpentane	I7	0.0148	0.0476	0.007	0.007
1,1-Dimethylcyclopentane	N7	0.0137	0.0432	0.006	0.006
3-Methylhexane	I7	0.0718	0.2311	0.033	0.033
1c,3-Dimethylcyclopentane	N7	0.0241	0.0760	0.011	0.011
1t,3-Dimethylcyclopentane	N7	0.0188	0.0593	0.009	0.009

3-Ethylpentane	I7	0.0052	0.0167	0.002	0.002
1t,2-Dimethylcyclopentane	N7	0.0432	0.1363	0.020	0.020
2,2,4-Trimethylpentane	I8	0.0023	0.0084	0.001	0.001
UnknownC6s	U6	0.0119	0.0329	0.005	0.005
n-Heptane	P7	0.1758	0.5658	0.081	0.081
1c,2-Dimethylcyclopentane	N7	0.0038	0.0120	0.002	0.002
Methylcyclohexane	N7	0.1318	0.4157	0.053	0.053
2,2-Dimethylhexane	I8	0.0101	0.0371	0.005	0.005
1,1,3-Trimethylcyclopentane	N7	0.0022	0.0079	0.001	0.001
Ethylcyclopentane	N7	0.0065	0.0205	0.003	0.003
2,5-Dimethylhexane	I8	0.0022	0.0081	0.001	0.001
2,2,3-Trimethylpentane	I8	0.0006	0.0022	0.000	0.000
2,4-Dimethylhexane	I8	0.0044	0.0162	0.002	0.002
1c,2t,4-Trimethylcyclopentane	N8	0.0086	0.0310	0.004	0.004
3,3-Dimethylhexane	I8	0.0007	0.0026	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0121	0.0436	0.006	0.006
2,3,4-Trimethylpentane	I8	0.0003	0.0011	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0003	0.000	0.000
Toluene	A7	0.0036	0.0107	0.001	0.001
2,3-Dimethylhexane	I8	0.0036	0.0132	0.002	0.002
2-Methyl-3-ethylpentane	I8	0.0015	0.0055	0.001	0.001
1,1,2-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
2-Methylheptane	I8	0.0272	0.0998	0.014	0.014
4-Methylheptane	I8	0.0070	0.0257	0.004	0.004
3-Methyl-3-ethylpentane	I8	0.0013	0.0047	0.001	0.001
3,4-Dimethylhexane	I8	0.0011	0.0040	0.001	0.001
1c,2c,4-Trimethylcyclopentane	N8	0.0007	0.0025	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0004	0.0014	0.000	0.000
3-Methylheptane	I8	0.0087	0.0319	0.004	0.004
1c,2t,3-Trimethylcyclopentane	N8	0.0213	0.0768	0.011	0.011
3-Ethylhexane	I8	0.0035	0.0128	0.002	0.002
1t,4-Dimethylcyclohexane	N8	0.0060	0.0216	0.003	0.003
1,1-Dimethylcyclohexane	N8	0.0012	0.0043	0.001	0.001
2,2,5-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0017	0.0061	0.001	0.001
2t-Ethylmethylcyclopentane	N8	0.0015	0.0054	0.001	0.001
1,1-Methylethylcyclopentane	N8	0.0035	0.0126	0.002	0.002
2,2,4-Trimethylhexane	I9	0.0003	0.0012	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0059	0.0213	0.003	0.003
1c,2c,3-Trimethylcyclopentane	N8	0.0002	0.0007	0.000	0.000
UnknownC7s	U7	0.0138	0.0444	0.006	0.006
n-Octane	P8	0.0432	0.1585	0.022	0.022
1c,4-Dimethylcyclohexane	N8	0.0023	0.0083	0.001	0.001
i-Propylcyclopentane	I8	0.0002	0.0007	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0006	0.0025	0.000	0.000
2,2,3,4-Tetramethylpentane	I9	0.0007	0.0029	0.000	0.000
2,3,4-Trimethylhexane	I9	0.0002	0.0008	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0011	0.0039	0.001	0.001
2,2-Dimethylheptane	I9	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0072	0.0292	0.004	0.004
2,2,3-Trimethylhexane	I9	0.0031	0.0128	0.002	0.002
2,4-Dimethylheptane	I9	0.0006	0.0025	0.000	0.000
4,4-Dimethylheptane	I9	0.0014	0.0058	0.001	0.001
Ethylcyclohexane	N8	0.0027	0.0097	0.001	0.001
n-Propylcyclopentane	N8	0.0014	0.0050	0.001	0.001
1c,3c,5-Trimethylcyclohexane	N9	0.0005	0.0020	0.000	0.000
2,5-Dimethylheptane	I9	0.0008	0.0033	0.000	0.000
3,3-Dimethylheptane	I9	0.0006	0.0025	0.000	0.000

3,5-Dimethylheptane	I9	0.0004	0.0016	0.000	0.000
2,6-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
Ethylbenzene	I8	0.0006	0.0021	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0014	0.0057	0.001	0.001
2,3-Dimethylheptane	I9	0.0003	0.0012	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0048	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0017	0.000	0.000
3,4-Dimethylheptane	I9	0.0009	0.0037	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0008	0.0033	0.000	0.000
4-Ethylheptane	I9	0.0005	0.0021	0.000	0.000
4-Methyloctane	I9	0.0021	0.0086	0.001	0.001
2-Methyloctane	I9	0.0018	0.0074	0.001	0.001
1c,2t,3-Trimethylcyclohexane	N9	0.0007	0.0028	0.000	0.000
3-Ethylheptane	I9	0.0007	0.0029	0.000	0.000
3-Methyloctane	I9	0.0030	0.0124	0.002	0.002
1c,2t,4c-Trimethylcyclohexane	I9	0.0011	0.0045	0.001	0.001
1,1,2-Trimethylcyclohexane	N9	0.0002	0.0008	0.000	0.000
3,3-Diethylpentane	I9	0.0003	0.0012	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0008	0.0027	0.000	0.000
i-Butylcyclopentane	N9	0.0013	0.0053	0.001	0.001
UnknownC8s	U8	0.0010	0.0037	0.001	0.001
n-Nonane	P9	0.0095	0.0391	0.005	0.005
1,1-Methylethylcyclohexane	N9	0.0017	0.0069	0.001	0.001
i-Propylbenzene	A9	0.0009	0.0035	0.000	0.000
i-Propylcyclohexane	N9	0.0004	0.0016	0.000	0.000
2,2-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
2,4-Dimethyloctane	I10	0.0003	0.0014	0.000	0.000
2,5-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
n-Butylcyclopentane	N9	0.0012	0.0048	0.001	0.001
3,3-Dimethyloctane	I10	0.0003	0.0014	0.000	0.000
n-Propylbenzene	A9	0.0014	0.0054	0.001	0.001
3,6-Dimethyloctane	I10	0.0005	0.0023	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0005	0.0023	0.000	0.000
1,3-Methylethylbenzene	A9	0.0005	0.0019	0.000	0.000
1,4-Methylethylbenzene	A9	0.0002	0.0008	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0004	0.0015	0.000	0.000
2,3-Dimethyloctane	I10	0.0002	0.0009	0.000	0.000
5-Methylnonane	I10	0.0008	0.0037	0.000	0.000
1,2-Methylethylbenzene	A9	0.0006	0.0023	0.000	0.000
2-Methylnonane	I10	0.0001	0.0004	0.000	0.000
3-Ethylheptane	I10	0.0002	0.0009	0.000	0.000
3-Methylnonane	I10	0.0005	0.0023	0.000	0.000
t-Butylbenzene	A10	0.0006	0.0026	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	0.0108	0.0445	0.006	0.006
n-Decane	P10	0.0025	0.0114	0.002	0.002
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	0.0006	0.0026	0.000	0.000
1,3-Diethylbenzene	A10	0.0002	0.0009	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
1,4-Methyl-n-propylbenzene	A10	0.0001	0.0004	0.000	0.000
n-Butylbenzene	A10	0.0002	0.0009	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	0.0002	0.0009	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	0.0046	0.0210	0.003	0.003
n-Undecane	P11	0.0007	0.0035	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
UnknownC11s	U11	0.0012	0.0060	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
n-Tridecane	P13	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	6.6264	6.5910

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0026	0.0065	LOW NET DRY REAL :	818.1 /scf	813.6 /scf
TOLUENE	0.0036	0.0107	NET WET REAL :	803.9 /scf	799.4 /scf
ETHYLBENZENE	0.0006	0.0021	HIGH GROSS DRY REAL :	892.3 /scf	887.5 /scf
XYLENES	0.0027	0.0092	GROSS WET REAL :	876.8 /scf	872.0 /scf
TOTAL BTEX	0.0095	0.0285	NET DRY REAL :	9998.1 /lb	9943.8 /lb
			GROSS DRY REAL :	10908.3 /lb	10849.1 /lb

RELATIVE DENSITY (AIR=1): 1.0737
COMPRESSIBILITY FACTOR : 0.99721

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

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

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