

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #:		NAME/DESCRIP :	JOHN CRAIG 1-2 SALES GAS
PROJECT NO. :	201701044	ANALYSIS NO. :	12
COMPANY NAME :	NIGHTHAWK PRODUCTION CO	ANALYSIS DATE:	JANUARY 19, 2017 16:28
OFFICE / BRANCH:	HIGHLANDS RANCH, CO	SAMPLE DATE :	JANUARY 10, 2017 14:10
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	20 psig	CYLINDER NO. :	1750
LAB PRES:	psig	SAMPLED BY :	GALE MCENDREE
SAMPLE TEMP. :	75 °f	SAMPLING COMPANY:	EMPACT
AMBIENT TEMP.:	°f	H2S BY STAIN TUBE:	3 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>
HELIUM	0.44	0.06	---	---
HYDROGEN	0.00	0.00	---	---
OXYGEN/ARGON	0.12	0.13	---	---
NITROGEN	23.3000	22.4100	---	---
CARBON DIOXIDE	1.32	1.99	---	---
METHANE	38.19000	21.03860	---	---
ETHANE	13.8855	14.3368	3.7300	3.7098
PROPANE	14.6368	22.1622	4.0503	4.0283
I-BUTANE	1.6875	3.3679	0.5549	0.5519
N-BUTANE	3.9899	7.9630	1.2638	1.2570
I-PENTANE	0.8235	2.0369	0.2991	0.2974
N-PENTANE	0.7870	1.9497	0.2870	0.2854
HEXANES PLUS	0.8198	2.5549	0.3256	0.3243
TOTALS	100.00000	100.00000	10.5107	10.4541

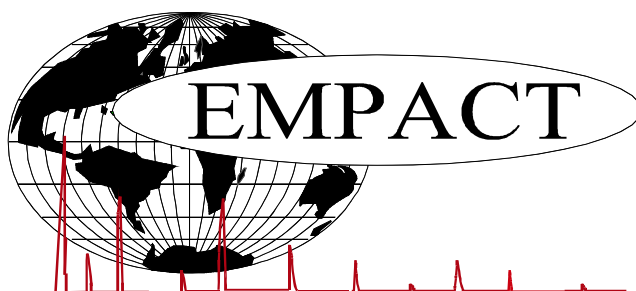
<u>BTEX COMPONENTS</u>	<u>MOLE%</u>	<u>WT%</u>	<u>BTU @</u>	<u>14.730</u>	<u>14.650</u>
BENZENE	0.0324	0.0869	LOW NET DRY REAL :	1186.1 /scf	1179.6 /scf
TOLUENE	0.0170	0.0538	NET WET REAL :	1165.5 /scf	1159.0 /scf
ETHYLBENZENE	0.0014	0.0051	HIGH GROSS DRY REAL :	1297.5 /scf	1290.4 /scf
XYLENES	0.0032	0.0116	GROSS WET REAL :	1274.9 /scf	1267.9 /scf
TOTAL BTEX	0.0540	0.1574	NET DRY REAL :	15471.7 /lb	15387.6 /lb
			GROSS DRY REAL :	16925.9 /lb	16834.0 /lb

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

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

RELATIVE DENSITY (AIR=1): 1.0047
COMPRESSIBILITY FACTOR : 0.99532

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.



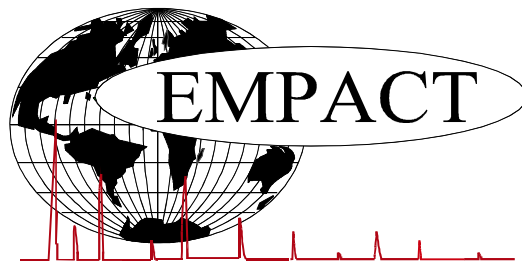
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GLYCALC INFORMATION

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ACCOUNT NO. :		SAMPLE DATE :	JANUARY 10, 2017 14:10
PRODUCER :		CYLINDER NO. :	1750
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	JOHN CRAIG 1-2 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	75
SAMPLE PRES. :	20	AMBIENT TEMP.:	
COMMENTS :	NO PROBE SPOT		

Componet	Mole %	Wt %
Helium	0.44	0.06
Hydrogen	0.00	0.00
Carbon Dioxide	1.32	1.99
Nitrogen	23.30	22.41
Methane	38.19000	21.03860
Ethane	13.8855	14.3368
Propane	14.6368	22.1622
Isobutane	1.6875	3.3679
n-Butane	3.9899	7.9630
Isopentane	0.7771	1.9252
n-Pentane	0.7870	1.9497
Cyclopentane	0.0464	0.1117
n-Hexane	0.1315	0.3891
Cyclohexane	0.0628	0.1815
Other Hexanes	0.3419	1.0048
Heptanes	0.1241	0.4250
Methycyclohexane	0.0452	0.1524
2,2,4 Trimethylpentane	0.0034	0.0133
Benzene	0.0324	0.0869
Toluene	0.0170	0.0538
Ethylbenzene	0.0014	0.0051
Xylenes	0.0032	0.0116
C8+ Heavies	0.0569	0.2314
Subtotal	99.88000	99.87000
Oxygen/Argon	0.12	0.13
Total	100.00000	100.00000

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DHA COMPONENT LIST

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ACCOUNT NO. :		SAMPLE DATE :	JANUARY 10, 2017 14:10
PRODUCER :		CYLINDER NO. :	1750
LEASE NO. :		SAMPLED BY :	GALE MCENDREE
NAME/DESCRIP :	JOHN CRAIG 1-2		
	SALES GAS		
FIELD DATA		SAMPLE TEMP. :	75
SAMPLE PRES. :	20	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		
	SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
Helium	---	0.44	0.06	---	---
Oxygen/Argon	---	0.12	0.13	---	---
Nitrogen	---	23.30	22.41	---	---
Carbon Dioxide	---	1.32	1.99	---	---
Methane	P1	38.19000	21.03860	---	---
Ethane	P2	13.8855	14.3368	3.730	3.710
Propane	P3	14.6368	22.1622	4.050	4.028
i-Butane	I4	1.6875	3.3679	0.555	0.552
n-Butane	P4	3.9899	7.9630	1.264	1.257
2,2-Dimethylpropane	I5	0.0060	0.0149	0.002	0.002
i-Pentane	I5	0.7711	1.9103	0.283	0.281
n-Pentane	P5	0.7869	1.9495	0.287	0.285
2,2-Dimethylbutane	I6	0.0036	0.0106	0.001	0.001
Cyclopentane	N5	0.0464	0.1117	0.014	0.014
2,3-Dimethylbutane	I6	0.0130	0.0385	0.005	0.005
2-Methylpentane	I6	0.1454	0.4303	0.060	0.060
3-Methylpentane	I6	0.0772	0.2284	0.031	0.031
UnknownC5s	U5	0.0001	0.0002	0.000	0.000
n-Hexane	P6	0.1315	0.3891	0.054	0.054
2,2-Dimethylpentane	I7	0.0003	0.0010	0.000	0.000
Methylcyclopentane	N6	0.0997	0.2881	0.035	0.035
2,4-Dimethylpentane	I7	0.0031	0.0107	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0005	0.0017	0.000	0.000
Benzene	A6	0.0324	0.0869	0.009	0.009
3,3-Dimethylpentane	I7	0.0005	0.0017	0.000	0.000
Cyclohexane	N6	0.0628	0.1815	0.021	0.021
2-Methylhexane	I7	0.0107	0.0368	0.005	0.005
2,3-Dimethylpentane	I7	0.0107	0.0368	0.005	0.005
1,1-Dimethylcyclopentane	N7	0.0042	0.0142	0.002	0.002
3-Methylhexane	I7	0.0155	0.0533	0.007	0.007
1c,3-Dimethylcyclopentane	N7	0.0059	0.0199	0.003	0.003
1t,3-Dimethylcyclopentane	N7	0.0071	0.0239	0.003	0.003
3-Ethylpentane	I7	0.0015	0.0052	0.001	0.001
1t,2-Dimethylcyclopentane	N7	0.0136	0.0458	0.006	0.006
2,2,4-Trimethylpentane	I8	0.0034	0.0133	0.002	0.002

UnknownC6s	U6	0.0030	0.0089	0.001	0.001
n-Heptane	P7	0.0361	0.1242	0.017	0.017
1c,2-Dimethylcyclopentane	N7	0.0009	0.0030	0.000	0.000
Methylcyclohexane	N7	0.0452	0.1524	0.018	0.018
2,2-Dimethylhexane	I8	0.0019	0.0075	0.001	0.001
1,1,3-Trimethylcyclopentane	N7	0.0010	0.0039	0.000	0.000
Ethylcyclopentane	N7	0.0026	0.0088	0.001	0.001
2,5-Dimethylhexane	I8	0.0004	0.0016	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0002	0.0008	0.000	0.000
2,4-Dimethylhexane	I8	0.0011	0.0043	0.001	0.001
1c,2t,4-Trimethylcyclopentane	N8	0.0021	0.0081	0.001	0.001
3,3-Dimethylhexane	I8	0.0003	0.0012	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0018	0.0069	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0009	0.0035	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0002	0.0008	0.000	0.000
Toluene	A7	0.0170	0.0538	0.006	0.006
2,3-Dimethylhexane	I8	0.0007	0.0028	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0003	0.0012	0.000	0.000
1,1,2-Trimethylcyclopentane	N8	0.0001	0.0004	0.000	0.000
2-Methylheptane	I8	0.0055	0.0216	0.003	0.003
4-Methylheptane	I8	0.0015	0.0059	0.001	0.001
3-Methyl-3-ethylpentane	I8	0.0006	0.0024	0.000	0.000
3,4-Dimethylhexane	I8	0.0002	0.0008	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0002	0.0008	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
3-Methylheptane	I8	0.0001	0.0004	0.000	0.000
1c,2t,3-Trimethylcyclopentane	N8	0.0045	0.0173	0.002	0.002
3-Ethylhexane	I8	0.0023	0.0090	0.001	0.001
1t,4-Dimethylcyclohexane	N8	0.0014	0.0054	0.001	0.001
1,1-Dimethylcyclohexane	N8	0.0004	0.0016	0.000	0.000
2,2,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0005	0.0019	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0003	0.0012	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0011	0.0042	0.001	0.001
1t,2-Dimethylcyclohexane	N8	0.0012	0.0046	0.001	0.001
1c,2c,3-Trimethylcyclopentane	N8	0.0004	0.0016	0.000	0.000
UnknownC7s	U7	0.0099	0.0341	0.005	0.005
n-Octane	P8	0.0079	0.0310	0.004	0.004
1c,4-Dimethylcyclohexane	N8	0.0007	0.0027	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0002	0.0009	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0005	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0001	0.0004	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0022	0.0096	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0006	0.0026	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylcyclohexane	N8	0.0012	0.0046	0.001	0.001
n-Propylcyclopentane	N8	0.0002	0.0008	0.000	0.000
1c,3c,5-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0005	0.000	0.000
Ethylbenzene	I8	0.0014	0.0051	0.001	0.001
1c,2t,4t-Trimethylcyclohexane	N9	0.0003	0.0013	0.000	0.000
2,3-Dimethylheptane	I9	0.0005	0.0022	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0014	0.0051	0.001	0.001
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0018	0.000	0.000
3,4-Dimethylheptane	I9	0.0002	0.0009	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0003	0.0013	0.000	0.000
4-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
4-Methyloctane	I9	0.0004	0.0018	0.000	0.000

2-Methyloctane	I9	0.0004	0.0018	0.000	0.000
1c,2t,3-Trimethylcyclohexane	N9	0.0001	0.0005	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0005	0.000	0.000
3-Methyloctane	I9	0.0004	0.0018	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0005	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0013	0.0047	0.000	0.000
i-Butylcyclopentane	N9	0.0004	0.0017	0.000	0.000
UnknownC8s	U8	0.0014	0.0055	0.001	0.001
n-Nonane	P9	0.0017	0.0075	0.001	0.001
1,1-Methylethylcyclohexane	N9	0.0004	0.0017	0.000	0.000
i-Propylbenzene	A9	0.0003	0.0012	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0005	0.000	0.000
n-Butylcyclopentane	N9	0.0003	0.0013	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	0.0002	0.0010	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0001	0.0005	0.000	0.000
1,3-Methylethylbenzene	A9	0.0003	0.0012	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0004	0.000	0.000
5-Methylnonane	I10	0.0002	0.0010	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0004	0.000	0.000
3-Methylnonane	I10	0.0001	0.0005	0.000	0.000
t-Butylbenzene	A10	0.0003	0.0014	0.000	0.000
UnknownC9s	U9	0.0017	0.0075	0.001	0.001
n-Decane	P10	0.0005	0.0024	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0002	0.0008	0.000	0.000
Sec-Butylcyclohexane	A10	0.0002	0.0010	0.000	0.000
3-Ethylnonane	I10	0.0001	0.0006	0.000	0.000
1,3-Methyl-n-propylbenzene	A10	0.0001	0.0005	0.000	0.000
UnknownC10s	U10	0.0006	0.0029	0.000	0.000
n-Undecane	P11	0.0002	0.0011	0.000	0.000
n-Dodecane	P12	0.0001	0.0006	0.000	0.000
TOTAL		100.00000	100.00000	10.5107	10.4541

BTEX COMPONENTS	MOLE%	WT%	BTU @	14.730	14.650
BENZENE	0.0324	0.0869	LOW NET DRY REAL :	1186.1 /scf	1179.6 /scf
TOLUENE	0.0170	0.0538	NET WET REAL :	1165.5 /scf	1159.0 /scf
ETHYLBENZENE	0.0014	0.0051	HIGH GROSS DRY REAL :	1297.5 /scf	1290.4 /scf
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COMPRESSIBILITY FACTOR : 0.99532

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

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