EMPACT

EXTENDED NATURAL GAS ANALYSIS (*DHA)

MAIN PAGE

LEASE #:		NAME/DESCRIP :	**HEMBERGER 6-26-8-60 SALES GAS**
PROJECT NO. :	**201601060**	ANALYSIS NO. :	**01**
COMPANY NAME :	**CARRIZO OIL & GAS, INC**	ANALYSIS DATE:	JANUARY 18, 2016 16:27
OFFICE / BRANCH:	HOUSTON	SAMPLE DATE :	JANUARY 15, 2016 15:30
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	

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

SAMPLE CYCLE:			SAMPLE TYPE:	SPOT	
SAMPLE PRES. :	84	psig	CYLINDER NO. :	1297	
LAB PRES:		psig	SAMPLED BY :	JOHN MOSER	
SAMPLE TEMP. :	64	ºf	SAMPLING COMPANY:	EMPACT	
AMBIENT TEMP.:		ºf	H2S BY STAIN TUBE:	**1.5**	ppm
H2O BY STAIN TUBE:	-	#/mmcf	CO2 BY STAIN TUBE:	-	Mol %
FIELD COMMENTS:	PROBE				
LAB COMMENTS:					

COMPONENT	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
HELIUM	0.01	0.00	---	---
HYDROGEN	0.01	0.00	---	---
OXYGEN/ARGON	0.01	0.01	---	---
NITROGEN	0.9500	1.1500	---	---
CARBON DIOXIDE	2.71	5.16	---	---
METHANE	70.99610	49.28550	---	---
ETHANE	12.5844	16.3745	3.3786	3.3602
PROPANE	8.3336	15.9017	2.3047	2.2922
I-BUTANE	0.7616	1.9155	0.2506	0.2492
N-BUTANE	2.3957	6.0254	0.7578	0.7537
I-PENTANE	0.4101	1.2775	0.1490	0.1481
N-PENTANE	0.4648	1.4512	0.1691	0.1682
HEXANES PLUS	0.3637	1.4487	0.1406	0.1400
TOTALS	100.00000	100.00000	7.1504	7.1116

BTEX COMPONENTS	MOLE%	WT%
BENZENE	0.0131	0.0443
TOLUENE	0.0073	0.0291
ETHYLBENZENE	0.0007	0.0032
XYLENES	0.0019	0.0088
TOTAL BTEX	0.0230	0.0854

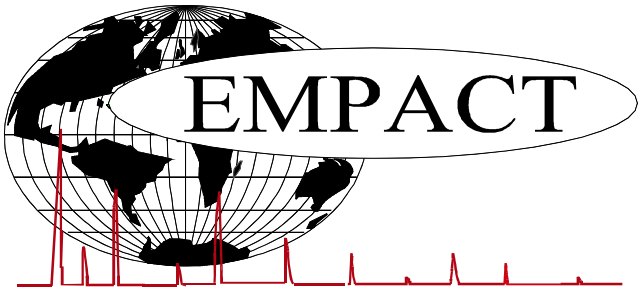
BTU @		14.730	14.650
LOW	NET DRY REAL :	1192.8 **/scf**	1186.3 **/scf**
	NET WET REAL :	1172.1 **/scf**	1165.6 **/scf**
HIGH	GROSS DRY REAL :	1312.7 **/scf**	1305.5 **/scf**
	GROSS WET REAL :	1289.9 **/scf**	1282.7 **/scf**
	NET DRY REAL :	19610.8 **/lb**	19504.3 **/lb**
	GROSS DRY REAL :	21578.0 **/lb**	21460.8 **/lb**

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

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

RELATIVE DENSITY (AIR=1): 0.7971

COMPRESSIBILITY FACTOR : 0.99592

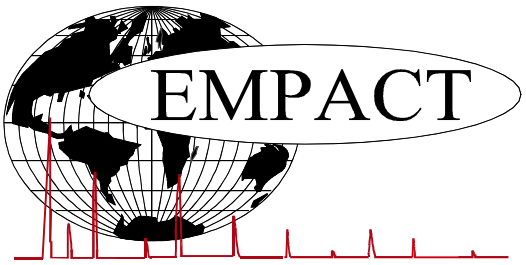


EXTENDED NATURAL GAS ANALYSIS (*DHA)

GLYCALC INFORMATION

PROJECT NO. :	201601060	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	JANUARY 18, 2016 16:27
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 15, 2016 15:30
PRODUCER :		CYLINDER NO. :	1297
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	HEMBERGER 6-26-8-60 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	64
SAMPLE PRES. :	84	AMBIENT TEMP.:	
COMMENTS :	PROBE SPOT		

Componet	Mole %	Wt %
Helium	0.01	0.00
Hydrogen	0.01	0.00
Carbon Dioxide	2.71	5.16
Nitrogen	0.95	1.15
Methane	70.99610	49.28550
Ethane	12.5844	16.3745
Propane	8.3336	15.9017
Isobutane	0.7616	1.9155
n-Butane	2.3957	6.0254
Isopentane	0.3774	1.1783
n-Pentane	0.4648	1.4512
Cyclopentane	0.0327	0.0992
n-Hexane	0.0790	0.2946
Cyclohexane	0.0193	0.0703
Other Hexanes	0.1395	0.5165
Heptanes	0.0568	0.2447
Methycyclohexane	0.0136	0.0578
2,2,4 Trimethylpentane	0.0001	0.0005
Benzene	0.0131	0.0443
Toluene	0.0073	0.0291
Ethylbenzene	0.0007	0.0032
Xylenes	0.0019	0.0088
C8+ Heavies	0.0324	0.1789
Subtotal	99.99000	99.99000
Oxygen/Argon	0.01	0.01
Total	100.00000	100.00000



EXTENDED NATURAL GAS ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201601060	ANALYSIS NO. :	01
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	JANUARY 18, 2016 16:27
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 15, 2016 15:30
PRODUCER :		CYLINDER NO. :	1297
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	HEMBERGER 6-26-8-60 SALES GAS		
FIELD DATA		SAMPLE TEMP. :	64
SAMPLE PRES. :	84	AMBIENT TEMP.:	
COMMENTS :	PROBE		

COMPONENT	PIANO #	MOLE %	MASS %	GPM @ 14.730	GPM @ 14.650
Helium	---	0.01	0.00	---	---
Hydrogen	---	0.01	0.00	---	---
Oxygen/Argon	---	0.01	0.01	---	---
Nitrogen	---	0.95	1.15	---	---
Carbon Dioxide	---	2.71	5.16	---	---
Methane	P1	70.99610	49.28550	---	---
Ethane	P2	12.5844	16.3745	3.379	3.360
Propane	P3	8.3336	15.9017	2.305	2.292
i-Butane	I4	0.7616	1.9155	0.251	0.249
n-Butane	P4	2.3957	6.0254	0.758	0.754
2,2-Dimethylpropane	I5	0.0016	0.0050	0.001	0.001
i-Pentane	I5	0.3758	1.1733	0.138	0.137
n-Pentane	P5	0.4648	1.4512	0.169	0.168
2,2-Dimethylbutane	I6	0.0009	0.0034	0.000	0.000
Cyclopentane	N5	0.0327	0.0992	0.010	0.010
2,3-Dimethylbutane	I6	0.0054	0.0201	0.002	0.002
2-Methylpentane	I6	0.0607	0.2264	0.025	0.025
3-Methylpentane	I6	0.0297	0.1107	0.012	0.012
n-Hexane	P6	0.0790	0.2946	0.032	0.032
2,2-Dimethylpentane	I7	0.0002	0.0009	0.000	0.000
Methylcyclopentane	N6	0.0427	0.1555	0.015	0.015
2,4-Dimethylpentane	I7	0.0017	0.0074	0.001	0.001
2,2,3-Trimethylbutane	I7	0.0001	0.0004	0.000	0.000
Benzene	A6	0.0131	0.0443	0.004	0.004
3,3-Dimethylpentane	I7	0.0002	0.0009	0.000	0.000
Cyclohexane	N6	0.0193	0.0703	0.007	0.007
2-Methylhexane	I7	0.0068	0.0295	0.003	0.003
2,3-Dimethylpentane	I7	0.0034	0.0148	0.002	0.002
1,1-Dimethylcyclopentane	N7	0.0017	0.0072	0.001	0.001
3-Methylhexane	I7	0.0080	0.0347	0.004	0.004
1c,3-Dimethylcyclopentane	N7	0.0042	0.0178	0.002	0.002
1t,3-Dimethylcyclopentane	N7	0.0037	0.0157	0.002	0.002
3-Ethylpentane	I7	0.0005	0.0022	0.000	0.000
1t,2-Dimethylcyclopentane	N7	0.0077	0.0327	0.004	0.004
2,2,4-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000

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UnknownC6s	U6	0.0001	0.0004	0.000	0.000
n-Heptane	P7	0.0161	0.0698	0.007	0.007
1c,2-Dimethylcyclopentane	N7	0.0006	0.0026	0.000	0.000
Methylcyclohexane	N7	0.0136	0.0578	0.005	0.005
2,2-Dimethylhexane	I8	0.0009	0.0045	0.000	0.000
Ethylcyclopentane	N7	0.0019	0.0081	0.001	0.001
2,5-Dimethylhexane	I8	0.0004	0.0020	0.000	0.000
2,2,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
2,4-Dimethylhexane	I8	0.0005	0.0025	0.000	0.000
1c,2t,4-Trimethylcyclopentane	N8	0.0010	0.0049	0.000	0.000
3,3-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1t,2c,4-Trimethylcyclopentane	N8	0.0012	0.0058	0.001	0.001
2,3,4-Trimethylpentane	I8	0.0003	0.0015	0.000	0.000
2,3,3-Trimethylpentane	I8	0.0001	0.0005	0.000	0.000
Toluene	A7	0.0073	0.0291	0.002	0.002
2,3-Dimethylhexane	I8	0.0005	0.0025	0.000	0.000
2-Methyl-3-ethylpentane	I8	0.0003	0.0015	0.000	0.000
2-Methylheptane	I8	0.0024	0.0119	0.001	0.001
4-Methylheptane	I8	0.0007	0.0035	0.000	0.000
3-Methyl-3-ethylpentane	I8	0.0001	0.0005	0.000	0.000
3,4-Dimethylhexane	I8	0.0001	0.0005	0.000	0.000
1c,2c,4-Trimethylcyclopentane	N8	0.0001	0.0005	0.000	0.000
1c,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
3-Methylheptane	I8	0.0011	0.0055	0.001	0.001
1c,2t,3-Trimethylcyclopentane	N8	0.0016	0.0078	0.001	0.001
3-Ethylhexane	I8	0.0002	0.0010	0.000	0.000
1t,4-Dimethylcyclohexane	N8	0.0006	0.0029	0.000	0.000
1,1-Dimethylcyclohexane	N8	0.0002	0.0010	0.000	0.000
3t-Ethylmethylcyclopentane	N8	0.0004	0.0020	0.000	0.000
2t-Ethylmethylcyclopentane	N8	0.0003	0.0015	0.000	0.000
1,1-Methylethylcyclopentane	N8	0.0010	0.0049	0.001	0.001
2,2,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
1t,2-Dimethylcyclohexane	N8	0.0008	0.0039	0.000	0.000
1c,2c,3-Trimethylcyclopentane	N8	0.0001	0.0005	0.000	0.000
1t,3-Dimethylcyclohexane	N8	0.0001	0.0005	0.000	0.000
n-Octane	P8	0.0032	0.0158	0.002	0.002
1c,4-Dimethylcyclohexane	N8	0.0004	0.0020	0.000	0.000
i-Propylcyclopentane	I8	0.0001	0.0005	0.000	0.000
2,4,4-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
2,3,5-Trimethylhexane	I9	0.0001	0.0006	0.000	0.000
1c,2-Dimethylcyclohexane	N8	0.0003	0.0015	0.000	0.000
1,1,4-Trimethylcyclohexane	N9	0.0011	0.0060	0.001	0.001
2,2,3-Trimethylhexane	I9	0.0004	0.0022	0.000	0.000
2,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
4,4-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
Ethylcyclohexane	N8	0.0006	0.0029	0.000	0.000
n-Propylcyclopentane	N8	0.0002	0.0010	0.000	0.000
2,5-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,3-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
3,5-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
2,6-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
1,1,3-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
Ethylbenzene	I8	0.0007	0.0032	0.000	0.000
1c,2t,4t-Trimethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
2,3-Dimethylheptane	I9	0.0001	0.0006	0.000	0.000
1,3-Dimethylbenzene (m-Xylene)	A8	0.0008	0.0037	0.000	0.000
1,4-Dimethylbenzene (p-Xylene)	A8	0.0005	0.0023	0.000	0.000
3,4-Dimethylheptane	I9	0.0002	0.0011	0.000	0.000
3,4-Dimethylheptane (2)	I9	0.0001	0.0006	0.000	0.000

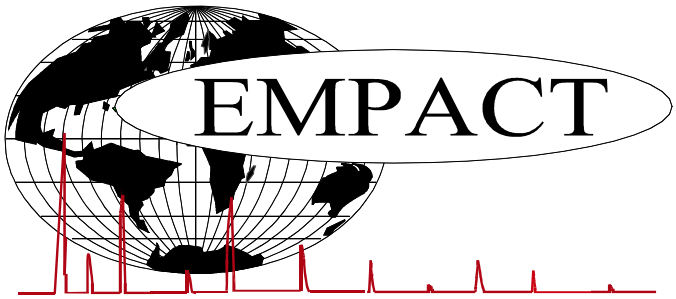
4-Methyloctane	I9	0.0002	0.0011	0.000	0.000
2-Methyloctane	I9	0.0002	0.0011	0.000	0.000
3-Ethylheptane	I9	0.0001	0.0006	0.000	0.000
3-Methyloctane	I9	0.0003	0.0016	0.000	0.000
3,3-Diethylpentane	I9	0.0001	0.0006	0.000	0.000
1,2-Dimethylbenzene (o-Xylene)	A8	0.0006	0.0028	0.000	0.000
i-Butylcyclopentane	N9	0.0002	0.0011	0.000	0.000
n-Nonane	P9	0.0007	0.0039	0.000	0.000
1,1-Methylethylcyclohexane	N9	0.0002	0.0011	0.000	0.000
i-Propylbenzene	A9	0.0001	0.0005	0.000	0.000
i-Propylcyclohexane	N9	0.0001	0.0006	0.000	0.000
2,2-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,4-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
2,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
n-Butylcyclopentane	N9	0.0002	0.0011	0.000	0.000
n-Propylbenzene	A9	0.0002	0.0010	0.000	0.000
3,6-Dimethyloctane	I10	0.0001	0.0006	0.000	0.000
3-Methyl-5-ethylheptane	I10	0.0002	0.0012	0.000	0.000
1,3-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,3,5-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
1,2-Methylethylbenzene	A9	0.0001	0.0005	0.000	0.000
2-Methylnonane	I10	0.0002	0.0012	0.000	0.000
3-Methylnonane	I10	0.0001	0.0006	0.000	0.000
t-Butylbenzene	A10	0.0001	0.0006	0.000	0.000
i-Butylcyclohexane	N10	0.0001	0.0006	0.000	0.000
UnknownC9s	U9	0.0008	0.0045	0.000	0.000
n-Decane	P10	0.0002	0.0012	0.000	0.000
1,2,3-Trimethylbenzene	A9	0.0001	0.0005	0.000	0.000
Sec-Butylcyclohexane	A10	0.0001	0.0006	0.000	0.000
1,3-Diethylbenzene	A10	0.0001	0.0006	0.000	0.000
1,4-Diethylbenzene	A10	0.0001	0.0006	0.000	0.000
UnknownC10s	U10	0.0007	0.0043	0.000	0.000
n-Undecane	P11	0.0001	0.0007	0.000	0.000
n-Dodecane	P12	0.0001	0.0007	0.000	0.000
2-Methylnaphthalene	A11	0.0001	0.0006	0.000	0.000
UnknownC12s	U12	0.0001	0.0007	0.000	0.000
n-Tridecane	P13	0.0002	0.0016	0.000	0.000
UnknownC13s	U13	0.0001	0.0008	0.000	0.000
n-Tetradecane	P14	0.0002	0.0017	0.000	0.000
UnknownC14s	U14	0.0003	0.0026	0.000	0.000
n-Pentadecane	P15	0.0002	0.0018	0.000	0.000
UnknownC15s	U15	0.0006	0.0055	0.001	0.001
n-Hexadecane	P16	0.0002	0.0020	0.000	0.000
UnknownC16s	U16	0.0004	0.0039	0.000	0.000
n-Heptadecane	P17	0.0001	0.0010	0.000	0.000
UnknownC17s	U17	0.0002	0.0021	0.000	0.000
UnknownC18s	U18	0.0001	0.0011	0.000	0.000
TOTAL		100.00000	100.00000	7.1504	7.1116

BTEX COMPONENTS	**MOLE%**	**WT%**
BENZENE	0.0131	0.0443
TOLUENE	0.0073	0.0291
ETHYLBENZENE	0.0007	0.0032
XYLENES	0.0019	0.0088
TOTAL BTEX	0.0230	0.0854

		14.730	14.650
	BTU @		
LOW	NET DRY REAL :	1192.8 **/scf**	1186.3 **/scf**
	NET WET REAL :	1172.1 **/scf**	1165.6 **/scf**
HIGH	GROSS DRY REAL :	1312.7 **/scf**	1305.5 **/scf**
	GROSS WET REAL :	1289.9 **/scf**	1282.7 **/scf**
	NET DRY REAL :	19610.8 **/lb**	19504.3 **/lb**
	GROSS DRY REAL :	21578.0 **/lb**	21460.8 **/lb**
	RELATIVE DENSITY (AIR=1):		0.7971
	COMPRESSIBILITY FACTOR :		0.99592

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

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



EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)
MAIN PAGE

LEASE #: NAME/DESCRIP : HEMBERGER 6-26-8-60
SEPARATOR OIL

PROJECT NO. :	201601060	ANALYSIS NO. :	02
COMPANY NAME :	**CARRIZO OIL & GAS, INC**	ANALYSIS DATE:	JANUARY 18, 2016 14:53
OFFICE / BRANCH:	HOUSTON	SAMPLE DATE :	JANUARY 15, 2016 15:25
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :	**24**	CYLINDER NO. :	6018
LAB PRES:		SAMPLED BY :	JOHN MOSER
SAMPLE TEMP. :	142	SAMPLING COMPANY:	**EMPACT**
AMBIENT TEMP.:			
FIELD COMMENTS:	NO PROBE		
LAB COMMENTS:			

COMPONENT	MOLE %	MASS %	VOL %
NITROGEN (AIR)	0.0250	0.0060	0.0055
CARBON DIOXIDE	0.0200	0.0075	0.0069
METHANE	0.0200	0.0027	0.0067
ETHANE	0.2570	0.0661	0.1387
PROPANE	1.6440	0.6197	0.9139
I-BUTANE	0.4900	0.2434	0.3233
N-BUTANE	2.5560	1.2699	1.6259
I-PENTANE	1.1084	0.6836	0.8187
N-PENTANE	1.8700	1.1533	1.3663
HEXANES PLUS	92.0096	95.9478	94.7941
TOTALS	100.0000	100.0000	100.0000

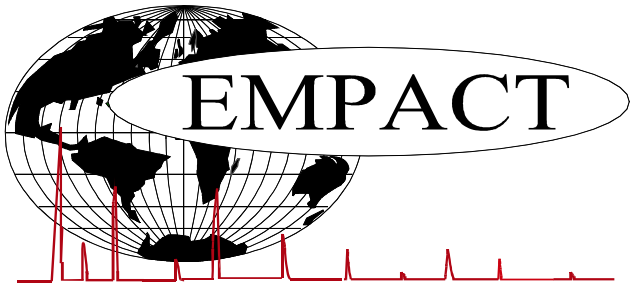
BTEX COMPONENTS	**MOLE%**	**MASS%**
BENZENE	1.1451	0.7646
TOLUENE	2.6483	2.0859
ETHYLBENZENE	0.5313	0.4822
XYLENE	2.5324	2.2983
TOTAL BTEX	6.8571	5.6310

(CALC: GPA STD 2145-94 & TP-17 @14.696 & 60 F)**

	TOTAL SAMPLE	**C6+ FRACTION**	
Specific Gravity (H2O=1) =	0.7481	0.7566	60/60
API Gravity =	57.65	55.52	60/60
Molecular Weight =	116.98	122.678	
Absolute Density =	6.24	6.31	LBS/GAL
Heating Value Liq. Idl Gas=	126367	128079	BTU/GAL
Vapor/Liquid =	20.30	19.66	CUFT/GAL
Vapor Pressure =	9.70	1.43	PSIA @100 F

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

***Calculated values may error depending on amount of unknown components in DHA, physical testing may be required.**



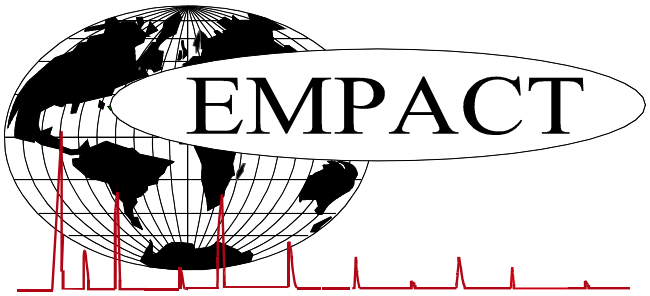
EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

E & P TANK / GLYCALC INFORMATION

PROJECT NO. :	201601060	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	JANUARY 18, 2016 14:53
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 15, 2016 15:25
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	HEMBERGER 6-26-8-60 SEPARATOR OIL		EMPACT
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	24	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		

COMPONENT	SPOT Mole %		Wt %		LV %	
CARBON DIOXIDE	0.0200		0.0075		0.0069	
NITROGEN (AIR)	0.0250		0.0060		0.0055	
METHANE	0.0200		0.0027		0.0067	
ETHANE	0.2570		0.0661		0.1387	
PROPANE	1.6440		0.6197		0.9139	
I-BUTANE	0.4900		0.2434		0.3233	
N-BUTANE	2.5560		1.2699		1.6259	
I-PENTANE	1.1084		0.6836		0.8187	
N-PENTANE	1.8700		1.1533		1.3663	
CYCLOPENTANE (N-C5)	1.2055		0.7227		0.7108	
UNKNOWN C1-C5	0.0000		0.0000		0.0000	
N-HEXANE	5.6089		4.1314		4.6535	
CYCLOHEXANE (OTHER C6)	2.2894		1.6470		1.5718	
OTHER HEXANES	8.4194		6.1406		6.5638	
OTHER HEPTANES	11.2487		9.5715		10.0661	
METHYLCYCLOHEXANE (OTHER C7)	3.8161		3.2030		3.0914	
2,2,4 TRIMETHYLPENTANE	0.6453		0.5416		0.5375	
BENZENE	1.1451		0.7646		0.6475	
TOLUENE	2.6483		2.0859		1.7840	
ETHYLBENZENE	0.5313		0.4822		0.4123	
XYLENES	2.5324		2.2983		1.9676	
OTHER OCTANES	10.8231		10.5779		10.7745	
OCTANES PLUS	----	55.6282	----	67.6811	----	65.7052
NONANES	11.4248		12.3835		12.2233	
DECANES PLUS	29.6713		41.3976		39.7900	
TOTAL	100.0000		100.0000		100.0000	

API Gravity =	**57.65**	60/60
Vapor Pressure =	**9.70**	PSIA & 100 F
Average Molecular Weight of Decanes plus =	**163.22**	
Average Specific Gravity of Decanes plus =	**0.7810**	

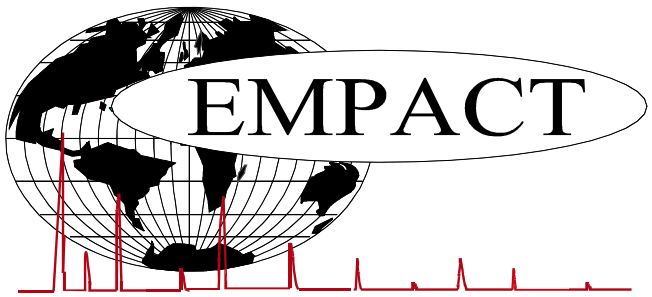


EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

BY CARBON NUMBER

PROJECT NO. :	201601060	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	JANUARY 18, 2016 14:53
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 15, 2016 15:25
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	HEMBERGER 6-26-8-60		EMPACT
	SEPARATOR OIL		
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	24	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		
	SPOT		

COMPONENT / CARBON NUMBER		MOLE%	MASS %	VOLUME %
NITROGEN		0.0250	0.0060	0.0055
CARBON DIOXIDE		0.0200	0.0075	0.0069
	C1	0.0200	0.0027	0.0067
	C2	0.2570	0.0661	0.1387
	C3	1.6440	0.6197	0.9139
	C4	3.0460	1.5133	1.9492
	C5	4.1839	2.5596	2.8958
	C6	17.4628	12.6836	13.4366
	C7	17.7131	14.8604	14.9415
	C8	14.5321	13.9000	13.6919
	C9	11.4248	12.3835	12.2233
	C10	10.5250	12.3738	11.9047
	C11	6.4830	8.2532	7.7780
	C12	3.3423	4.5578	4.3818
	C13	2.6954	4.1289	4.0104
	C14	2.2817	3.8695	3.7904
	C15	2.3792	4.3202	4.1833
	C16	1.3658	2.6437	2.5433
	C17	0.4493	0.9236	0.8858
	C18	0.1369	0.2978	0.2847
	C19	0.0127	0.0291	0.0276
	C20	0.0000	0.0000	0.0000
	C21	0.0000	0.0000	0.0000
	C22	0.0000	0.0000	0.0000
	C23	0.0000	0.0000	0.0000
	C24	0.0000	0.0000	0.0000
	C25	0.0000	0.0000	0.0000
	C26	0.0000	0.0000	0.0000
	C27	0.0000	0.0000	0.0000
	C28	0.0000	0.0000	0.0000
	C29	0.0000	0.0000	0.0000
	C30+	0.0000	0.0000	0.0000
	Total	100.0000	100.0000	100.0000



EXTENDED NATURAL GAS LIQUID ANALYSIS (*DHA)

DHA COMPONENT LIST

PROJECT NO. :	201601060	ANALYSIS NO. :	02
COMPANY NAME :	CARRIZO OIL & GAS, INC	ANALYSIS DATE:	JANUARY 18, 2016 14:53
ACCOUNT NO. :		SAMPLE DATE :	JANUARY 15, 2016 15:25
PRODUCER :		CYLINDER NO. :	6018
LEASE NO. :		SAMPLED BY :	JOHN MOSER
NAME/DESCRIP :	HEMBERGER 6-26-8-60		EMPACT
	SEPARATOR OIL		
FIELD DATA		SAMPLE TEMP. :	142
SAMPLE PRES. :	24	AMBIENT TEMP.:	
COMMENTS :	NO PROBE		
	SPOT		

COMPONENT	PIANO #	MOLE %	MASS %	VOL %
Nitrogen	NHC	0.0250	0.0060	0.0055
Carbon Dioxide	NHC	0.0200	0.0075	0.0069
Methane	P1	0.0200	0.0027	0.0067
Ethane	P2	0.2570	0.0661	0.1387
Propane	P3	1.6440	0.6197	0.9139
i-Butane	I4	0.4900	0.2434	0.3233
n-Butane	P4	2.5560	1.2699	1.6259
2,2-Dimethylpropane	I5	0.0114	0.0070	0.0088
i-Pentane	I5	1.0970	0.6766	0.8099
n-Pentane	P5	1.8700	1.1533	1.3663
2,2-Dimethylbutane	I6	0.0288	0.0212	0.0242
Cyclopentane	N5	1.2055	0.7227	0.7108
2,3-Dimethylbutane	I6	0.2441	0.1798	0.2016
2-Methylpentane	I6	1.6637	1.2256	1.3932
3-Methylpentane	I6	2.9044	2.1396	2.3916
n-Hexane	P6	5.6089	4.1314	4.6535
Methylcyclopentane	N6	3.5772	2.5735	2.5522
2,4-Dimethylpentane	I7	0.1819	0.1558	0.1722
2,2,3-Trimethylbutane	I7	0.0227	0.0194	0.0209
Benzene	A6	1.1451	0.7646	0.6475
3,3-Dimethylpentane	I7	0.0193	0.0165	0.0177
Cyclohexane	N6	2.2894	1.6470	1.5718
2-Methylhexane	I7	0.7854	0.6727	0.7371
2,3-Dimethylpentane	I7	0.7634	0.6539	0.6961
1,1-Dimethylcyclopentane	N7	0.3886	0.3262	0.3212
3-Methylhexane	I7	1.1898	1.0191	1.0999
1c,3-Dimethylcyclopentane	N7	0.6965	0.5846	0.5832
1t,3-Dimethylcyclopentane	N7	0.6453	0.5416	0.5375
3-Ethylpentane	I7	0.0370	0.0317	0.0337
1t,2-Dimethylcyclopentane	N7	1.4474	1.2149	1.2014
2,2,4-Trimethylpentane	I8	0.0691	0.0675	0.0722
UnknownC6s	U6	0.0012	0.0009	0.0010
n-Heptane	P7	4.1403	3.5463	3.8528
1c,2-Dimethylcyclopentane	N7	0.1220	0.1024	0.0985
Methylcyclohexane	N7	3.8161	3.2030	3.0914
2,2-Dimethylhexane	I8	0.3000	0.2929	0.3128
1,1,3-Trimethylcyclopentane	N7	0.0208	0.0200	0.0199
Ethylcyclopentane	N7	0.5105	0.4285	0.4155
2,5-Dimethylhexane	I8	0.1166	0.1139	0.1220
2,2,3-Trimethylpentane	I8	0.0661	0.0645	0.0670
2,4-Dimethylhexane	I8	0.1418	0.1385	0.1476
1c,2t,4-Trimethylcyclopentane	N8	0.3263	0.3130	0.3047

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3,3-Dimethylhexane	I8	0.0355	0.0347	0.0363
2,3,4-Trimethylpentane	I8	0.0795	0.0776	0.0801
2,3,3-Trimethylpentane	I8	0.0104	0.0102	0.0104
Toluene	A7	2.6483	2.0859	1.7840
2,3-Dimethylhexane	I8	0.1440	0.1406	0.1468
2-Methyl-3-ethylpentane	I8	0.1457	0.1423	0.1470
1,1,2-Trimethylcyclopentane	N8	0.0340	0.0326	0.0314
2-Methylheptane	I8	1.2993	1.2687	1.3483
4-Methylheptane	I8	0.3288	0.3211	0.3330
3-Methyl-3-ethylpentane	I8	0.1644	0.1605	0.1641
3,4-Dimethylhexane	I8	0.0487	0.0476	0.0491
1c,2c,4-Trimethylcyclopentane	N8	0.0232	0.0223	0.0215
1c,3-Dimethylcyclohexane	N8	0.0201	0.0193	0.0187
3-Methylheptane	I8	0.4891	0.4776	0.5032
1c,2t,3-Trimethylcyclopentane	N8	1.0644	1.0210	0.9851
3-Ethylhexane	I8	0.1850	0.1806	0.1883
1t,4-Dimethylcyclohexane	N8	0.3735	0.3583	0.3493
1,1-Dimethylcyclohexane	N8	0.1049	0.1006	0.0958
2,2,5-Trimethylhexane	I9	0.0131	0.0144	0.0150
3c-Ethylmethylcyclopentane	N8	0.0032	0.0031	0.0030
3t-Ethylmethylcyclopentane	N8	0.1838	0.1763	0.1709
2t-Ethylmethylcyclopentane	N8	0.1537	0.1474	0.1425
1,1-Methylethylcyclopentane	N8	0.5191	0.4979	0.4740
2,2,4-Trimethylhexane	I9	0.0446	0.0489	0.0508
1t,2-Dimethylcyclohexane	N8	0.4991	0.4787	0.4588
1c,2c,3-Trimethylcyclopentane	N8	0.0511	0.0490	0.0467
1t,3-Dimethylcyclohexane	N8	0.0127	0.0122	0.0116
UnknownC7s	U7	0.2778	0.2379	0.2585
n-Octane	P8	3.1161	3.0428	3.2183
1c,4-Dimethylcyclohexane	N8	0.1743	0.1672	0.1588
i-Propylcyclopentane	I8	0.0234	0.0224	0.0215
2,4,4-Trimethylhexane	I9	0.0026	0.0028	0.0029
2,2,3,4-Tetramethylpentane	I9	0.0161	0.0177	0.0183
2,3,4-Trimethylhexane	I9	0.0162	0.0178	0.0183
1c,2-Dimethylcyclohexane	N8	0.2324	0.2229	0.2082
2,3,5-Trimethylhexane	I9	0.0736	0.0807	0.0831
2,2-Dimethylheptane	I9	0.0177	0.0194	0.0203
1,1,4-Trimethylcyclohexane	N9	0.9490	1.0241	0.9865
2,2,3-Trimethylhexane	I9	0.4126	0.4524	0.4611
2,4-Dimethylheptane	I9	0.0600	0.0658	0.0684
4,4-Dimethylheptane	I9	0.0395	0.0433	0.0450
Ethylcyclohexane	N8	0.5275	0.5060	0.4776
n-Propylcyclopentane	N8	0.2563	0.2458	0.2353
1c,3c,5-Trimethylcyclohexane	N9	0.0379	0.0409	0.0394
2,5-Dimethylheptane	I9	0.0784	0.0860	0.0892
3,3-Dimethylheptane	I9	0.0710	0.0778	0.0807
3,5-Dimethylheptane	I9	0.0536	0.0588	0.0610
2,6-Dimethylheptane	I9	0.0546	0.0599	0.0628
1,1,3-Trimethylcyclohexane	N9	0.1330	0.1435	0.1382
Ethylbenzene	A8	0.5313	0.4822	0.4123
1c,2t,4t-Trimethylcyclohexane	N9	0.0437	0.0472	0.0446
2,3-Dimethylheptane	I9	0.4365	0.4786	0.4901
1,3-Dimethylbenzene (m-Xylene)	A8	1.1755	1.0668	0.9175
1,4-Dimethylbenzene (p-Xylene)	A8	0.5830	0.5291	0.4565
3,4-Dimethylheptane	I9	0.0261	0.0286	0.0291
3,4-Dimethylheptane (2)	I9	0.1270	0.1392	0.1415
4-Ethylheptane	I9	0.0369	0.0405	0.0421
4-Methyloctane	I9	0.3253	0.3567	0.3680
2-Methyloctane	I9	0.3398	0.3726	0.3882
1c,2t,4c-Trimethylcyclohexane	I9	0.2919	0.3200	0.3278
3-Ethylheptane	I9	0.1361	0.1492	0.1526
3-Methyloctane	I9	0.2256	0.2473	0.2551
3,3-Diethylpentane	I9	0.0341	0.0374	0.0369
1c,2t,3-Trimethylcyclohexane	N9	0.0886	0.0956	0.0903
1,1,2-Trimethylcyclohexane	N9	0.0538	0.0581	0.0549
1,2-Dimethylbenzene (o-Xylene)	A8	0.7739	0.7024	0.5936
i-Butylcyclopentane	N9	0.3149	0.3398	0.3236
UnknownC8s	U8	0.1453	0.1419	0.1501
n-Nonane	P9	2.2865	2.5069	2.5968
1,1-Methylethylcyclohexane	N9	0.3271	0.3586	0.3726
i-Propylbenzene	A9	0.4099	0.4211	0.3626
i-Propylcyclohexane	N9	0.0965	0.1041	0.0965
2,2-Dimethyloctane	I10	0.0780	0.0949	0.0954

2,4-Dimethyloctane	I10	0.0544	0.0662	0.0666
2,6-Dimethyloctane	I10	0.0349	0.0425	0.0442
2,5-Dimethyloctane	I10	0.0183	0.0223	0.0224
n-Butylcyclopentane	N9	0.3194	0.3830	0.3565
3,3-Dimethyloctane	I10	0.1506	0.1832	0.1843
n-Propylbenzene	A9	0.2012	0.2067	0.1780
3,6-Dimethyloctane	I10	0.2525	0.3071	0.3088
3-Methyl-5-ethylheptane	I10	0.3995	0.4380	0.4487
1,3-Methylethylbenzene	A9	0.4672	0.4800	0.4099
1,4-Methylethylbenzene	A9	0.1220	0.1254	0.1071
1,3,5-Trimethylbenzene	A9	0.2123	0.2181	0.1875
2,3-Dimethyloctane	I10	0.0850	0.1034	0.1040
5-Methylnonane	I10	0.1981	0.2409	0.2445
1,2-Methylethylbenzene	A9	0.4635	0.4762	0.4045
2-Methylnonane	I10	0.0841	0.1023	0.1047
3-Ethyloctane	I10	0.0530	0.0645	0.0649
3-Methylnonane	I10	0.2120	0.2578	0.2614
1,2,4-Trimethylbenzene	A9	0.0192	0.0197	0.0167
t-Butylbenzene	A10	0.6773	0.7771	0.6674
i-Butylcyclohexane	N10	0.2358	0.2827	0.2590
1t-Methyl-2-n-propylcyclohexane	I10	0.0558	0.0612	0.0627
i-Butylbenzene	A10	0.0443	0.0508	0.0443
sec-Butylbenzene	A10	0.0689	0.0791	0.0683
UnknownC9s	U9	1.7271	1.8936	1.9615
n-Decane	P10	1.8012	2.1907	2.2311
1,2,3-Trimethylbenzene	A9	0.2191	0.2251	0.1873
1,3-Methyl-i-propylbenzene	A10	0.1171	0.1203	0.1022
1,4-Methyl-i-propylbenzene	A10	0.0981	0.1008	0.0856
Sec-Butylcyclohexane	N10	0.0578	0.0693	0.0634
1,2-Methyl-i-propylbenzene	A10	0.4309	0.4944	0.4196
3-Ethylnonane	I10	0.0164	0.0199	0.0204
1,3-Diethylbenzene	A10	0.1495	0.1715	0.1477
1,3-Methyl-n-propylbenzene	A10	0.1471	0.1688	0.1459
1,4-Diethylbenzene	A10	0.0365	0.0419	0.0362
1,4-Methyl-n-propylbenzene	A10	0.0562	0.0645	0.0559
n-Butylbenzene	A10	0.3202	0.3674	0.3172
1,3-Dimethyl-5-ethylbenzene	A10	0.0783	0.0898	0.0772
1,2-Diethylbenzene	A10	0.1473	0.1690	0.1430
1,2-Methyl-n-propylbenzene	A10	0.0162	0.0186	0.0158
1,4-Dimethyl-2-ethylbenzene	A10	0.1323	0.1518	0.1287
1,3-Dimethyl-4-ethylbenzene	A10	0.0042	0.0048	0.0041
1,2-Dimethyl-4-ethylbenzene	A10	0.1628	0.1868	0.1589
1,3-Dimethyl-2-ethylbenzene	A10	0.0478	0.0548	0.0458
1t,2c,4-Trimethylcyclopentane	A10	0.4010	0.3846	0.3825
1,2-Dimethyl-3-ethylbenzene	A10	0.1658	0.1902	0.1586
1,2-Ethyl-i-propylbenzene	A10	0.0977	0.1121	0.0951
1,4-Methyl-t-butylbenzene	A11	0.1449	0.1663	0.1411
UnknownC10s	U10	2.9049	3.5331	3.5983
n-Undecane	P11	1.4020	1.8733	1.8814
1,4-Ethyl-i-propylbenzene	A11	0.0530	0.0608	0.0516
1,2,4,5-Tetramethylbenzene	A11	0.1396	0.1602	0.1345
1,2-Methyl-n-butylbenzene	A11	0.1638	0.1879	0.1595
1,2,3,5-Tetramethylbenzene	A11	0.1804	0.2070	0.1730
1,2-Methyl-t-butylbenzene	A11	0.2021	0.2319	0.1968
5-Methylindan	A11	0.0551	0.0802	0.0797
4-Methylindan	A11	0.0176	0.0256	0.0254
1,2-Ethyl-n-propylbenzene	A11	0.1663	0.1908	0.1619
2-Methylindan	A11	0.0932	0.1357	0.1348
1,3-Methyl-n-butylbenzene	A11	0.0383	0.0439	0.0373
1,3-Di-i-propylbenzene	A11	0.1483	0.1702	0.1444
sec-Pentylbenzene	A11	0.1166	0.1338	0.1136
n-Pentylbenzene	A11	0.1136	0.1440	0.1248
1t-M-2-(4MP)cyclopentane	P12	0.0720	0.1048	0.1041
1,2-Di-n-propylbenzene	A11	0.1638	0.1879	0.1595
1,4-Di-i-propylbenzene	A11	0.1775	0.2037	0.1729
Tetrahydronaphthalene	A10	0.2215	0.2541	0.2157
t-Decahydronaphthalene	A10	0.1668	0.1914	0.1624
Naphthalene	A10	0.0449	0.0492	0.0418
1-t-Butyl-3,5-dimethylbenzene	A12	0.1261	0.1447	0.1228
1,4-Ethyl-t-butylbenzene	A11	0.1415	0.1623	0.1377
UnknownC11s	U11	2.3471	3.1361	3.1497
n-Dodecane	P12	1.1114	1.6183	1.6074
1,3-Di-n-propylbenzene	A12	0.1512	0.1735	0.1473

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1,3,5-Triethylbenzene	A12	0.3552	0.3649	0.3137
1,2,4-Triethylbenzene	A12	0.0514	0.0528	0.0448
1,4-Methyl-n-pentylbenzene	A12	0.1312	0.1505	0.1277
n-Hexylbenzene	A12	0.1217	0.1688	0.1464
1,2,3,4,5-Pentamethylbenzene	A13	0.2776	0.3185	0.2703
2-Methylnaphthalene	A11	0.3454	0.4199	0.3564
1-Methylnaphthalene	A11	0.2729	0.3317	0.2420
UnknownC12s	U12	1.2221	1.7795	1.7676
n-Tridecane	P13	0.9700	1.5287	1.5005
UnknownC13s	U13	1.4478	2.2817	2.2396
n-Tetradecane	P14	0.8373	1.4200	1.3910
UnknownC14s	U14	1.4444	2.4495	2.3994
n-Pentadecane	P15	0.7214	1.3099	1.2684
UnknownC15s	U15	1.6578	3.0103	2.9149
n-Hexadecane	P16	0.3857	0.7466	0.7182
UnknownC16s	U16	0.9801	1.8971	1.8251
n-Heptadecane	P17	0.0514	0.1057	0.1014
UnknownC17s	U17	0.3979	0.8179	0.7844
n-Octadecane	P18	0.0018	0.0039	0.0037
UnknownC18s	U18	0.1351	0.2939	0.2810
UnknownC19s	U19	0.0127	0.0291	0.0276
TOTAL		100.0000	100.0000	100.0000

EMPACT

CRUDE OIL ASSAY

LEASE #:		NAME/DESCRIP :	**HEMBERGER 6-26-8-60 PRODUCTION TANK**
PROJECT NO. :	**201601060**	ANALYSIS NO. :	**03**
COMPANY NAME :	**CARRIZO OIL & GAS, INC**	ANALYSIS DATE:	JANUARY 18, 2016
OFFICE / BRANCH:	HOUSTON	SAMPLE DATE :	JANUARY 15, 2016 15:50
CUSTOMER REF:		TO:	
PRODUCER :		EFFECTIVE DATE:	
FIELD DATA			
SAMPLE CYCLE:		SAMPLE TYPE:	SPOT
SAMPLE PRES. :		CYLINDER NO. :	1L GLASS JAR
LAB PRES:		SAMPLED BY :	JOHN MOSER
SAMPLE TEMP. :	46	SAMPLING COMPANY:	EMPACT
AMBIENT TEMP.:			
FIELD COMMENTS:			
LAB COMMENTS:			

SPECIFICATION		TEST METHOD	DETECTION LIMIT	UNITS	RESULTS
API GRAVITY				API 60/60	38.1
RVP @100 DEG F		D323		PSIG	10.6
TOTAL SULFUR		D2622		Wt %	N/A
VISUAL APPEARANCE					N/A
BS&W		D96			
Crude Oil				Vol %	N/A
Water				Vol %	N/A
Emulsion				Vol %	N/A
Sediment				Vol %	N/A
VISCOSITY		D445			
Average Centipoise	45° F			° F cP	N/A
Average Centipoise	65° F			° F cP	N/A
Average Centipoise	85° F			° F cP	N/A
Kinetic Viscosity	45° F			cSt (mm2/s)	N/A
Kinetic Viscosity	65° F			cSt (mm2/s)	N/A
Kinetic Viscosity	85° F			cSt (mm2/s)	N/A
FLASH POINT		D93	<40	° F	N/A
POUR POINT		D3227	<-110	° F	N/A
CLOUD POINT		D2500		° F	N/A
DISTILLATION:		D86			
Initial Point				° F	N/A
50%				° F	N/A
90%				° F	N/A
Final Boiling Point 100%				° F	N/A
PARAFFINS		Distillation		Wt %	N/A
ASPHALTENES		D6560 M	<0.02	Wt %	N/A
TOTAL CHLORIDE		D86/XFR	<0.001	Wt %	N/A
ORGANIC CHLORIDE		D4929	<0.0001	Vol %	N/A

BDL: BELOW DETECTION LIMIT

N/A: NO TEST PREFORMED FOR THIS PARAMETER