



NMOCD REC'D
10/12/20

Well Name: LUDWICK LS 20N; CSG
API #: API #300453400500
Source: CASING
Sample Type: GAS
Analysis No: SO200093
Cust No: 15950-11845

Well/Lease Information

Customer Name: BP - SOUTH BHD PROJECT
Well Name: LUDWICK LS 20N; CSG
County/State: SAN JUAN NM
Location:
Lease/PA/CA:
Formation:
Cust. Stn. No.: API #300453400500

Source: CASING
Well Flowing: Y
Pressure: 86 PSIG
Flow Temp: DEG. F
Ambient Temp: 65 DEG. F
Flow Rate: MCF/D
Sample Method: Purge & Fill
Sample Date: 07/30/2020
Sample Time: 7.40 AM
Sampled By: ERIC S.
Sampled by (CO): ABC

Heat Trace: N
Remarks: PRESSURED WITH HELIUM TO 30 LBS.

Analysis

Component::	Mole%:	Unnormalized %:	**GPM:	*BTU:	*SP Gravity:
Nitrogen	19.8090	5.6069	2.1850	0.00	0.1916
CO2	0.3982	0.1127	0.0680	0.00	0.0061
Methane	65.0825	18.4215	11.0600	657.33	0.3605
Ethane	8.0425	2.2764	2.1560	142.33	0.0835
Propane	3.8001	1.0756	1.0490	95.61	0.0579
Iso-Butane	0.7755	0.2195	0.2540	25.22	0.0156
N-Butane	0.8603	0.2435	0.2720	28.07	0.0173
I-Pentane	0.3105	0.0879	0.1140	12.42	0.0077
N-Pentane	0.2353	0.0666	0.0860	9.43	0.0059
Hexane Plus	0.6861	0.1942	0.3070	36.16	0.0227
Total	100.0000	28.3048	17.5510	1006.58	0.7686

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

**@ 14.730 PSIA & 60 DEG. F.

COMPRESSIBILITY FACTOR (1/Z): 1.0027
BTU/CU.FT IDEAL: 1008.9
BTU/CU.FT (DRY) CORRECTED FOR (1/Z): 1011.6
BTU/CU.FT (WET) CORRECTED FOR (1/Z): 994.0
DRY BTU @ 15.025: 1031.9
REAL SPECIFIC GRAVITY: 0.7704

CYLINDER #: 1427
CYLINDER PRESSURE: PSIG
ANALYSIS DATE: 08/05/2020
ANALYSIS TIME: 08:43:27 AM
ANALYSIS RUN BY: SHYANN ELLEDGE

GPM, BTU, and SPG calculations as shown above are based on current GPA constants.

GPA Standard: GPA-2261

GC: Danalyzer Model 500 Last Cal/Verify: 08/06/2020

GC Method: C6+ Gas



BP - SOUTH BHD PROJECT
WELL ANALYSIS COMPARISON

Lease: LUDWICK LS 20N; CSG
Stn. No.: API
Mtr. No.:

CASING

08/06/2020
15950-11845

Smpl Date: 07/30/2020
Test Date: 08/05/2020
Run No: SO200093

Nitrogen: 19.8090
CO2: 0.3982
Methane: 65.0825
Ethane: 8.0425
Propane: 3.8001
I-Butane: 0.7755
N-Butane: 0.8603
I-Pentane: 0.3105
N-Pentane: 0.2353
Hexane+: 0.6861

BTU: 1011.6
GPM: 17.5510
SPG: 0.7704



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Analysis No: SO200093
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Location:
Lease/PA/CA:
Formation:
Cust. Stn. No.: API #300453400500

Source: CASING
Well Flowing: Y
Pressure: 86 PSIG
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Sampled by (CO): ABC

Heat Trace: N
Remarks: PRESSURED WITH HELIUM TO 30 LBS.

Analysis

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CO2	0.3982	0.1127	0.0680	0.00	0.0061
Methane	65.0825	18.4215	11.0600	657.33	0.3605
Ethane	8.0425	2.2764	2.1560	142.33	0.0835
Propane	3.8001	1.0756	1.0490	95.61	0.0579
Iso-Butane	0.7755	0.2195	0.2540	25.22	0.0156
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Hexane Plus	0.6861	0.1942	0.3070	36.16	0.0227
Total	100.0000	28.3048	17.5510	1006.58	0.7686

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

**@ 14.730 PSIA & 60 DEG. F.

COMPRESSIBILITY FACTOR (1/Z):	1.0027	CYLINDER #:	1427
BTU/CU.FT IDEAL:	1008.9	CYLINDER PRESSURE:	PSIG
BTU/CU.FT (DRY) CORRECTED FOR (1/Z):	1011.6	ANALYSIS DATE:	08/05/2020
BTU/CU.FT (WET) CORRECTED FOR (1/Z):	994.0	ANALYSIS TIME:	08:43:27 AM
DRY BTU @ 15.025:	1031.9	ANALYSIS RUN BY:	SHYANN ELLEDGE
REAL SPECIFIC GRAVITY:	0.7704		

GPM, BTU, and SPG calculations as shown above are based on current GPA constants.

GPA Standard: GPA-2261

GC: Danalyzer Model 500 Last Cal/Verify: 08/06/2020

GC Method: C6+ Gas



BP - SOUTH BHD PROJECT
WELL ANALYSIS COMPARISON

Lease: LUDWICK LS 20N; CSG
Stn. No.: API
Mtr. No.:

CASING

08/06/2020
15950-11845

Smpl Date: 07/30/2020
Test Date: 08/05/2020
Run No: SO200093

Nitrogen: 19.8090
CO2: 0.3982
Methane: 65.0825
Ethane: 8.0425
Propane: 3.8001
I-Butane: 0.7755
N-Butane: 0.8603
I-Pentane: 0.3105
N-Pentane: 0.2353
Hexane+: 0.6861

BTU: 1011.6
GPM: 17.5510
SPG: 0.7704



NMOCD REC'D
10/12/20

Well Name: LUDWICK LS 20N; INTER
API #: API #300453400500
Source: INTERMEDIATE CASING
Sample Type: GAS
Analysis No: SO200094
Cust No: 15950-11850

Well/Lease Information

Customer Name:	BP - SOUTH BHD PROJECT	Source:	INTERMEDIATE CASING
Well Name:	LUDWICK LS 20N; INTER	Well Flowing:	Y
County/State:	SAN JUAN NM	Pressure:	51 PSIG
Location:		Flow Temp:	DEG. F
Lease/PA/CA:		Ambient Temp:	65 DEG. F
Formation:		Flow Rate:	MCF/D
Cust. Stn. No.:	API #300453400500	Sample Method:	Purge & Fill
		Sample Date:	07/30/2020
		Sample Time:	8.50 AM
		Sampled By:	ERIC S.
		Sampled by (CO):	ABC
Heat Trace:	N		
Remarks:	PRESSURED WITH HELIUM TO 30 LBS.		

Analysis

Component::	Mole%:	Unnormalized %:	**GPM:	*BTU:	*SP Gravity:
Nitrogen	0.7500	0.2422	0.0830	0.00	0.0073
CO2	0.0000	0.0000	0.0000	0.00	0.0000
Methane	83.3213	26.9088	14.1740	841.55	0.4615
Ethane	6.0764	1.9624	1.6310	107.53	0.0631
Propane	4.7608	1.5375	1.3160	119.79	0.0725
Iso-Butane	1.4751	0.4764	0.4840	47.97	0.0296
N-Butane	1.4374	0.4642	0.4550	46.89	0.0288
I-Pentane	0.6066	0.1959	0.2230	24.27	0.0151
N-Pentane	0.3744	0.1209	0.1360	15.01	0.0093
Hexane Plus	1.1980	0.3869	0.5360	63.15	0.0396
Total	100.0000	32.2952	19.0380	1266.15	0.7269

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

**@ 14.730 PSIA & 60 DEG. F.

COMPRESSIBILITY FACTOR (1/Z):	1.0037
BTU/CU.FT IDEAL:	1269.1
BTU/CU.FT (DRY) CORRECTED FOR (1/Z):	1273.8
BTU/CU.FT (WET) CORRECTED FOR (1/Z):	1251.6
DRY BTU @ 15.025:	1299.3
REAL SPECIFIC GRAVITY:	0.7293

CYLINDER #:	2005
CYLINDER PRESSURE:	1 PSIG
ANALYSIS DATE:	08/04/2020
ANALYSIS TIME:	04:34:06 PM
ANALYSIS RUN BY:	SHYANN ELLEDGE

GPM, BTU, and SPG calculations as shown above are based on current GPA constants.

GPA Standard: GPA-2261

GC: Danalyzer Model 500

Last Cal/Verify: 08/06/2020

GC Method: C6+ Gas



BP - SOUTH BHD PROJECT
WELL ANALYSIS COMPARISON

Lease: LUDWICK LS 20N; INTER
Stn. No.: API
Mtr. No.:

INTERMEDIATE CASING

08/06/2020
15950-11850

Smpl Date: 07/30/2020
Test Date: 08/04/2020
Run No: SO200094

Nitrogen: 0.7500
CO2: 0.0000
Methane: 83.3213
Ethane: 6.0764
Propane: 4.7608
I-Butane: 1.4751
N-Butane: 1.4374
I-Pentane: 0.6066
N-Pentane: 0.3744
Hexane+: 1.1980

BTU: 1273.8
GPM: 19.0380
SPG: 0.7293



NMOCD REC'D
10/12/20

Well Name: LUDWICK LS 20N; TBG
API #: API #300453400500
Source: TUBING
Sample Type: GAS
Analysis No: SO200095
Cust No: 15950-11855

Well/Lease Information

Customer Name: BP - SOUTH BHD PROJECT
Well Name: LUDWICK LS 20N; TBG
County/State: SAN JUAN NM
Location:
Lease/PA/CA:
Formation:
Cust. Stn. No.: API #300453400500

Source: TUBING
Well Flowing: Y
Pressure: 83 PSIG
Flow Temp: DEG. F
Ambient Temp: 65 DEG. F
Flow Rate: MCF/D
Sample Method: Purge & Fill
Sample Date: 07/30/2020
Sample Time: 7.45 AM
Sampled By: ERIC S.
Sampled by (CO): ABC

Heat Trace: N
Remarks:

Analysis

Component::	Mole%:	Unnormalized %:	**GPM:	*BTU:	*SP Gravity:
Nitrogen	0.5930	0.5821	0.0650	0.00	0.0057
CO2	1.0916	1.0715	0.1870	0.00	0.0166
Methane	82.0167	80.5063	13.9480	828.37	0.4543
Ethane	9.0818	8.9146	2.4360	160.72	0.0943
Propane	4.0670	3.9921	1.1240	102.33	0.0619
Iso-Butane	0.7199	0.7066	0.2360	23.41	0.0144
N-Butane	1.0930	1.0729	0.3460	35.66	0.0219
I-Pentane	0.3696	0.3628	0.1360	14.79	0.0092
N-Pentane	0.2916	0.2862	0.1060	11.69	0.0073
Hexane Plus	0.6758	0.6634	0.3020	35.62	0.0224
Total	100.0000	98.1585	18.8860	1212.59	0.7080

* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

**@ 14.730 PSIA & 60 DEG. F.

COMPRESSIBILITY FACTOR (1/Z): 1.0034
BTU/CU.FT IDEAL: 1215.4
BTU/CU.FT (DRY) CORRECTED FOR (1/Z): 1219.5
BTU/CU.FT (WET) CORRECTED FOR (1/Z): 1198.3
DRY BTU @ 15.025: 1243.9
REAL SPECIFIC GRAVITY: 0.7102

CYLINDER #: 1102
CYLINDER PRESSURE: 82 PSIG
ANALYSIS DATE: 08/04/2020
ANALYSIS TIME: 04:34:09 PM
ANALYSIS RUN BY: PATRICIA KING

GPM, BTU, and SPG calculations as shown above are based on current GPA constants.

GPA Standard: GPA-2261

GC: Danalyzer Model 500

Last Cal/Verify: 08/06/2020

GC Method: C6+ Gas



BP - SOUTH BHD PROJECT
WELL ANALYSIS COMPARISON

Lease: LUDWICK LS 20N; TBG
Stn. No.: API
Mtr. No.:

TUBING

08/06/2020
15950-11855

Smpl Date: 07/30/2020
Test Date: 08/04/2020
Run No: SO200095

Nitrogen: 0.5930
CO2: 1.0916
Methane: 82.0167
Ethane: 9.0818
Propane: 4.0670
I-Butane: 0.7199
N-Butane: 1.0930
I-Pentane: 0.3696
N-Pentane: 0.2916
Hexane+: 0.6758

BTU: 1219.5
GPM: 18.8860
SPG: 0.7102