

NM OIL CONSERVATION
ARTESIA DISTRICT

NOV 29 2018

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Mack Energy

Chaves County

Sec 32-T15S-R29E

Prince George Federal Com #1H

Lateral

30-005-64310

Survey: Survey #1

Standard Survey Report

14 August, 2018

**Provide Signature Page for
Directional Survey**

Survey Report

Company: Mack Energy
Project: Chaves County
Site: Sec 32-T15S-R29E
Well: Prince George Federal Com #1H
Wellbore: Lateral
Design: Lateral

Local Co-ordinate Reference: Well Prince George Federal Com #1H
TVD Reference: KB=17.5 @ 3799.00ft
MD Reference: KB=17.5 @ 3799.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Project	Chaves County
Map System:	US State Plane 1983
Geo Datum:	North American Datum 1983
Map Zone:	New Mexico Eastern Zone
System Datum:	Mean Sea Level

Site		Sec 32-T15S-R29E			
Site Position:		Northing:	719,626.47 usft	Latitude:	32° 58' 40.57193 N
From:	Map	Easting:	628,324.91 usft	Longitude:	104° 2' 58.79909 W
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.15 °

Well	Prince George Federal Com #1H					
Well Position	+N/-S	0.00 ft	Northing:	719,626.47 usft	Latitude:	32° 58' 40.57193 N
	+E/-W	0.00 ft	Easting:	628,324.91 usft	Longitude:	104° 2' 58.79909 W
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,781.50 ft

Wellbore	Lateral				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/23/2018	7.38	60.67	48,225

Design	Lateral				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	2,433.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	0.51	

Survey Program		Date	8/14/2018	
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
193.00	2,433.00	Survey #1 (Pilot)	MWD	MWD - Standard
2,464.00	8,792.00	Survey #1 (Lateral)	MWD	MWD - Standard

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,433.00	0.66	10.83	2,432.14	3.06	-2.31	3.04	0.00	0.00	0.00
2,464.00	3.21	11.45	2,463.12	4.09	-2.10	4.07	8.23	8.23	2.00
1st MWD Lateral Survey									
2,559.00	13.41	11.71	2,557.00	17.52	0.67	17.52	10.74	10.74	0.27
2,622.00	17.27	3.45	2,617.75	34.01	2.72	34.04	7.03	6.13	-13.11
2,717.00	21.89	2.66	2,707.23	65.80	4.39	65.83	4.87	4.86	-0.83
2,812.00	29.23	2.04	2,792.88	106.72	6.04	106.77	7.73	7.73	-0.65
2,906.00	36.13	0.11	2,871.95	157.43	6.91	157.49	7.42	7.34	-2.05
3,001.00	42.77	359.14	2,945.27	217.76	6.48	217.81	7.02	6.99	-1.02
3,095.00	49.05	0.99	3,010.64	285.24	6.61	285.28	6.83	6.68	1.97

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Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,127.00	51.87	1.52	3,031.01	309.91	7.16	309.96	8.90	8.81	1.66
3,144.00	52.84	1.43	3,041.39	323.36	7.50	323.42	5.72	5.71	-0.53
3,159.00	53.14	1.61	3,050.42	335.34	7.82	335.39	2.22	2.00	1.20
3,173.00	53.14	1.61	3,058.82	346.53	8.13	346.59	0.00	0.00	0.00
3,190.00	53.14	1.52	3,069.02	360.13	8.51	360.19	0.42	0.00	-0.53
3,210.00	53.23	1.34	3,081.00	376.14	8.91	376.20	0.85	0.45	-0.90
3,221.00	53.23	1.25	3,087.59	384.95	9.11	385.01	0.66	0.00	-0.82
3,237.00	53.10	1.08	3,097.18	397.75	9.37	397.82	1.18	-0.81	-1.06
3,253.00	53.23	1.17	3,106.77	410.55	9.62	410.62	0.93	0.81	0.56
3,271.00	53.19	0.99	3,117.55	424.96	9.89	425.04	0.83	-0.22	-1.00
3,284.00	53.23	0.73	3,125.34	435.37	10.04	435.45	1.63	0.31	-2.00
3,299.00	53.27	0.64	3,134.31	447.39	10.19	447.46	0.55	0.27	-0.60
3,316.00	53.58	0.55	3,144.44	461.04	10.33	461.12	1.87	1.82	-0.53
3,332.00	54.55	0.46	3,153.83	474.00	10.44	474.07	6.08	6.06	-0.56
3,347.00	56.18	0.55	3,162.36	486.34	10.55	486.41	10.88	10.87	0.60
3,379.00	59.43	0.99	3,179.40	513.41	10.92	513.49	10.22	10.16	1.38
3,474.00	66.07	2.92	3,222.88	597.77	13.84	597.86	7.22	6.99	2.03
3,568.00	76.53	0.20	3,252.98	686.64	16.20	686.75	11.46	11.13	-2.89
3,641.84	84.05	1.92	3,265.43	759.35	17.55	759.48	10.43	10.18	2.33
FTP Cross 100' FSL 3641.84 MD/3265.43 TVD 759.35 N 17.65 E N: 720385.8 E: 628342.4									
3,663.00	86.20	2.40	3,267.23	780.42	18.35	780.55	10.43	10.18	2.27
3,757.00	91.74	1.87	3,268.92	874.30	21.85	874.46	5.92	5.89	-0.56
3,852.00	94.20	359.58	3,264.00	969.15	23.05	969.32	3.54	2.59	-2.41
3,946.00	90.51	359.41	3,260.14	1,063.05	22.22	1,063.21	3.93	-3.93	-0.18
4,041.00	91.47	359.94	3,258.49	1,158.04	21.68	1,158.18	1.15	1.01	0.56
4,135.00	89.63	359.32	3,257.59	1,252.03	21.08	1,252.16	2.07	-1.96	-0.66
4,230.00	90.15	359.58	3,257.77	1,347.02	20.16	1,347.15	0.61	0.55	0.27
4,325.00	91.30	359.50	3,256.57	1,442.01	19.40	1,442.12	1.21	1.21	-0.08
4,419.00	90.20	0.02	3,255.34	1,536.00	19.01	1,536.11	1.29	-1.17	0.55
4,513.00	89.41	0.29	3,255.66	1,630.00	19.26	1,630.10	0.89	-0.84	0.29
4,607.00	89.67	0.11	3,256.42	1,723.99	19.59	1,724.10	0.34	0.28	-0.19
4,701.00	91.34	0.37	3,255.59	1,817.98	19.98	1,818.09	1.80	1.78	0.28
4,795.00	91.12	0.73	3,253.57	1,911.96	20.89	1,912.07	0.45	-0.23	0.38
4,890.00	90.46	0.64	3,252.26	2,006.94	22.02	2,007.06	0.70	-0.69	-0.09
4,985.00	89.80	0.90	3,252.04	2,101.93	23.30	2,102.06	0.75	-0.69	0.27
5,079.00	90.73	1.08	3,251.61	2,195.92	24.92	2,196.05	1.01	0.99	0.19
5,174.00	90.11	0.64	3,250.91	2,290.90	26.35	2,291.05	0.80	-0.65	-0.46
5,268.00	89.98	359.50	3,250.84	2,384.90	26.46	2,385.04	1.22	-0.14	-1.21
5,362.00	90.90	359.41	3,250.12	2,478.89	25.57	2,479.02	0.98	0.98	-0.10
5,456.00	90.33	358.88	3,249.11	2,572.88	24.17	2,572.99	0.83	-0.61	-0.56
5,579.00	90.29	359.94	3,248.44	2,695.87	22.90	2,695.96	0.86	-0.03	0.86
5,674.00	90.86	0.64	3,247.49	2,790.86	23.38	2,790.96	0.95	0.60	0.74
5,768.00	90.24	0.55	3,246.59	2,884.85	24.36	2,884.95	0.67	-0.66	-0.10

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Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,862.00	90.99	0.55	3,245.58	2,978.84	25.26	2,978.95	0.80	0.80	0.00
5,957.00	90.02	0.90	3,244.74	3,073.83	26.46	3,073.94	1.09	-1.02	0.37
6,051.00	91.08	0.90	3,243.84	3,167.81	27.94	3,167.93	1.13	1.13	0.00
6,146.00	89.45	1.17	3,243.40	3,262.79	29.65	3,262.92	1.74	-1.72	0.28
6,241.00	90.55	1.17	3,243.40	3,357.77	31.59	3,357.92	1.16	1.16	0.00
6,336.00	90.77	359.85	3,242.31	3,452.76	32.44	3,452.91	1.41	0.23	-1.39
6,430.00	91.43	359.67	3,240.50	3,546.74	32.04	3,546.88	0.73	0.70	-0.19
6,526.00	91.08	0.11	3,238.40	3,642.71	31.86	3,642.85	0.59	-0.36	0.46
6,620.00	89.19	0.37	3,238.18	3,736.71	32.25	3,736.85	2.03	-2.01	0.28
6,715.00	89.93	0.02	3,238.91	3,831.70	32.58	3,831.84	0.86	0.78	-0.37
6,810.00	90.99	0.37	3,238.14	3,926.70	32.90	3,926.84	1.18	1.12	0.37
6,905.00	90.37	0.55	3,237.02	4,021.69	33.66	4,021.83	0.68	-0.65	0.19
6,999.00	91.12	0.73	3,235.79	4,115.67	34.71	4,115.82	0.82	0.80	0.19
7,094.00	90.07	359.85	3,234.81	4,210.67	35.19	4,210.81	1.44	-1.11	-0.93
7,189.00	90.51	359.85	3,234.33	4,305.66	34.95	4,305.80	0.46	0.46	0.00
7,283.00	91.38	0.37	3,232.78	4,399.65	35.13	4,399.79	1.08	0.93	0.55
7,377.00	90.37	0.02	3,231.34	4,493.64	35.45	4,493.77	1.14	-1.07	-0.37
7,472.00	88.88	0.02	3,231.96	4,588.63	35.48	4,588.77	1.57	-1.57	0.00
7,566.00	89.36	0.29	3,233.41	4,682.62	35.73	4,682.75	0.59	0.51	0.29
7,660.00	90.07	0.11	3,233.87	4,776.62	36.06	4,776.75	0.78	0.76	-0.19
7,755.00	90.55	1.52	3,233.36	4,871.60	37.41	4,871.74	1.57	0.51	1.48
7,849.00	91.12	2.13	3,231.99	4,965.55	40.41	4,965.71	0.89	0.61	0.65
7,943.00	91.30	0.99	3,230.00	5,059.49	42.96	5,059.67	1.23	0.19	-1.21
8,037.00	90.46	1.43	3,228.56	5,153.45	44.95	5,153.65	1.01	-0.89	0.47
8,132.00	90.81	1.52	3,227.51	5,248.42	47.39	5,248.63	0.38	0.37	0.09
8,226.00	90.07	1.34	3,226.79	5,342.38	49.74	5,342.62	0.81	-0.79	-0.19
8,321.00	90.33	0.81	3,226.45	5,437.37	51.52	5,437.61	0.62	0.27	-0.56
8,416.00	91.16	0.99	3,225.22	5,532.35	53.01	5,532.60	0.89	0.87	0.19
8,510.00	91.16	0.64	3,223.32	5,626.32	54.35	5,626.58	0.37	0.00	-0.37
8,605.00	91.21	0.46	3,221.35	5,721.29	55.26	5,721.56	0.20	0.05	-0.19
8,699.00	91.34	0.02	3,219.26	5,815.27	55.66	5,815.53	0.49	0.14	-0.47
8,741.00	91.65	0.11	3,218.16	5,857.25	55.70	5,857.52	0.77	0.74	0.21
Last Lateral MWD Survey 8741 MD/3218.16 TVD 5857.25 N 55.7 E N: 725483.7 E: 628380.6									
8,753.59	91.65	0.11	3,217.80	5,869.84	55.73	5,870.10	0.00	0.00	0.00
LTP 8753.59 MD/3217.8 TVD 5869.84 N 55.73 E N: 725496.3 E: 628380.6									
8,792.00	91.65	0.11	3,216.70	5,908.23	55.80	5,908.50	0.00	0.00	0.00
PTB 8792 MD/3216.7 TVD 5908.23 N 55.8 E N: 725534.6 E: 628380.7									

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Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,464.00	2,463.12	4.09	-2.10	1st MWD Lateral Survey
3,641.84	3,265.43	759.35	17.55	FTP Cross 100' FSL 3641.84 MD/3265.43 TVD 759.35 N 17.55 E N: 720385.8
8,741.00	3,218.16	5,857.25	55.70	Last Lateral MWD Survey 8741 MD/3218.16 TVD 5857.25 N 55.7 E N: 725483.
8,753.59	3,217.80	5,869.84	55.73	LTP 8753.59 MD/3217.8 TVD 5869.84 N 55.73 E N: 725496.3 E: 628380.6
8,792.00	3,216.70	5,908.23	55.80	PTB 8792 MD/3216.7 TVD 5908.23 N 55.8 E N: 725534.6 E: 628380.7

Checked By: _____ Approved By: _____ Date: _____