

NM OIL CONSERVATION
ARTESIA DISTRICT

AUG 22 2018

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Mack Energy

Chaves County

Sec 28-T15S-R29E

White Rock Federal #2H

30-005-64301

Wellbore #1

Survey: Survey #1

Standard Survey Report

01 June, 2018

Survey Report

Company: Mack Energy
Project: Chaves County
Site: Sec 28-T15S-R29E
 White Rock Federal #2H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well White Rock Federal #2H
TVD Reference: KB=17.4 @ 3824.00ft
MD Reference: KB=17.4 @ 3824.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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

Sec 28-T15S-R29E					
Site Position:		Northing:	725,403.57 usft	Latitude:	32.993794
From:	Map	Easting:	631,215.12 usft	Longitude:	-104.040189
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.16 °

White Rock Federal #2H						
Well Position	+N-S	0.00 ft	Northing:	725,409.48 usft	Latitude:	32.993801
	+E-W	0.00 ft	Easting:	632,335.07 usft	Longitude:	-104.036536
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,806.60 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	7/26/2017	7.47	60.73	48,356

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	359.71	

Survey Program	Date 6/1/2018				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
211.00	8,210.00	Survey #1 (Wellbore #1)	MWD	MWD - Standard	

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)	
95.00	0.80	140.00	95.00	-0.51	0.43	-0.51	0.00	0.00	0.00	
211.00	1.10	111.90	210.98	-1.55	1.98	-1.56	0.47	0.26	-24.22	
1st MWD Survey										
271.00	1.10	119.40	270.97	-2.04	3.02	-2.06	0.24	0.00	12.50	
458.00	1.70	103.20	457.92	-3.56	7.28	-3.59	0.38	0.32	-8.66	
647.00	1.60	42.50	646.85	-2.25	11.80	-2.31	0.88	-0.05	-32.12	
836.00	1.40	275.20	835.82	-0.10	11.28	-0.15	1.42	-0.11	-67.35	
1,025.00	1.00	288.10	1,024.78	0.62	7.41	0.59	0.25	-0.21	6.83	
1,215.00	0.90	276.20	1,214.75	1.30	4.35	1.28	0.12	-0.05	-6.26	
1,404.00	0.90	294.40	1,403.73	2.07	1.53	2.07	0.15	0.00	9.63	
1,594.00	0.50	288.50	1,593.72	2.95	-0.62	2.96	0.21	-0.21	-3.11	

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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)
1,782.00	0.70	304.80	1,781.71	3.87	-2.34	3.88	0.14	0.11	8.67
1,972.00	0.40	292.10	1,971.70	4.78	-3.91	4.80	0.17	-0.16	-6.68
2,161.00	0.40	261.00	2,160.69	4.93	-5.17	4.95	0.11	0.00	-16.46
2,350.00	0.60	277.90	2,349.69	4.96	-6.80	4.99	0.13	0.11	8.94
2,539.00	0.40	315.50	2,538.68	5.57	-8.25	5.61	0.20	-0.11	19.89
2,673.00	2.00	5.10	2,672.65	8.23	-8.37	8.27	1.32	1.19	37.02
2,702.00	4.20	14.30	2,701.60	9.76	-8.06	9.80	7.75	7.59	31.72
2,734.00	6.70	13.60	2,733.46	12.71	-7.33	12.75	7.82	7.81	-2.19
2,765.00	9.30	5.10	2,764.15	16.97	-6.68	17.00	9.19	8.39	-27.42
2,797.00	11.20	355.40	2,795.64	22.64	-6.70	22.67	8.00	5.94	-30.31
2,851.00	15.60	359.40	2,848.16	35.13	-7.20	35.17	8.32	8.15	7.41
2,882.00	19.30	1.00	2,877.73	44.43	-7.15	44.46	12.03	11.94	5.16
2,977.00	29.40	1.30	2,964.17	83.54	-6.35	83.57	10.63	10.63	0.32
3,008.00	31.90	359.80	2,990.83	99.34	-6.20	99.37	8.43	8.06	-4.84
3,039.00	35.00	359.30	3,016.70	116.42	-6.34	116.45	10.04	10.00	-1.61
3,071.00	38.50	0.20	3,042.33	135.57	-6.42	135.60	11.07	10.94	2.81
3,078.00	39.02	0.43	3,047.79	139.95	-6.39	139.98	7.70	7.41	3.35
Cross 140' FSL 3078 MD/3047.79 TVD 139.95 N -6.39 W N: 725549.4 E: 632328.6									
3,102.00	40.80	1.20	3,066.20	155.34	-6.17	155.37	7.70	7.42	3.19
3,141.00	44.10	1.00	3,094.97	181.66	-5.67	181.68	8.47	8.46	-0.51
3,161.00	44.70	0.80	3,109.26	195.65	-5.45	195.67	3.08	3.00	-1.00
3,175.00	44.80	0.70	3,119.21	205.50	-5.32	205.53	0.87	0.71	-0.71
3,197.00	45.00	0.40	3,134.79	221.03	-5.17	221.06	1.32	0.91	-1.36
3,216.00	45.80	0.20	3,148.13	234.56	-5.10	234.58	4.28	4.21	-1.05
3,221.00	46.20	0.30	3,151.60	238.16	-5.08	238.18	8.13	8.00	2.00
3,260.00	49.50	0.60	3,177.77	267.07	-4.85	267.09	8.48	8.46	0.77
3,291.00	53.60	358.70	3,197.05	291.34	-5.01	291.36	14.07	13.23	-6.13
3,322.00	58.30	357.80	3,214.40	317.00	-5.80	317.03	15.35	15.16	-2.90
3,354.00	63.30	357.00	3,230.00	344.90	-7.08	344.93	15.78	15.63	-2.50
3,385.00	68.40	357.30	3,242.68	373.14	-8.48	373.18	16.48	16.45	0.97
3,417.00	73.50	358.00	3,253.12	403.35	-9.72	403.40	16.07	15.94	2.19
3,448.00	78.40	359.60	3,260.65	433.41	-10.34	433.45	16.58	15.81	5.16
3,480.00	83.60	0.60	3,265.65	465.00	-10.28	465.05	16.54	16.25	3.13
3,512.00	88.70	1.00	3,267.80	496.92	-9.84	496.96	15.99	15.94	1.25
3,543.00	90.30	1.10	3,268.07	527.91	-9.27	527.95	5.17	5.16	0.32
3,574.00	90.70	1.10	3,267.80	558.90	-8.68	558.94	1.29	1.29	0.00
3,668.00	91.60	1.40	3,265.91	652.86	-6.63	652.89	1.01	0.96	0.32
3,693.00	91.80	1.70	3,265.17	677.84	-5.95	677.86	1.44	0.80	1.20
3,789.00	92.20	0.80	3,261.82	773.76	-3.86	773.77	1.03	0.42	-0.94
3,883.00	92.10	0.60	3,258.30	867.68	-2.71	867.69	0.24	-0.11	-0.21
3,977.00	90.50	0.10	3,256.16	961.65	-2.14	961.65	1.78	-1.70	-0.53
4,072.00	92.10	0.40	3,254.01	1,056.63	-1.72	1,056.62	1.71	1.68	0.32
4,166.00	91.00	358.70	3,251.47	1,150.58	-2.46	1,150.58	2.15	-1.17	-1.81

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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)
4,260.00	89.00	358.20	3,251.47	1,244.54	-5.00	1,244.55	2.19	-2.13	-0.53
4,356.00	89.10	359.20	3,253.06	1,340.51	-7.18	1,340.52	1.05	0.10	1.04
4,451.00	89.30	358.90	3,254.38	1,435.48	-8.75	1,435.51	0.38	0.21	-0.32
4,545.00	89.60	358.30	3,255.29	1,529.45	-11.05	1,529.49	0.71	0.32	-0.64
4,641.00	90.10	358.20	3,255.54	1,625.40	-13.98	1,625.45	0.53	0.52	-0.10
4,735.00	90.80	359.30	3,254.80	1,719.38	-16.03	1,719.44	1.39	0.74	1.17
4,829.00	91.10	1.00	3,253.24	1,813.36	-15.79	1,813.42	1.84	0.32	1.81
4,924.00	91.40	1.70	3,251.17	1,908.31	-13.55	1,908.36	0.80	0.32	0.74
5,018.00	90.90	1.40	3,249.28	2,002.26	-11.01	2,002.29	0.62	-0.53	-0.32
5,113.00	91.50	0.50	3,247.29	2,097.22	-9.43	2,097.24	1.14	0.63	-0.95
5,209.00	91.30	0.30	3,244.95	2,193.19	-8.76	2,193.21	0.29	-0.21	-0.21
5,303.00	92.70	0.70	3,241.67	2,287.13	-7.94	2,287.14	1.55	1.49	0.43
5,397.00	92.40	10.10	3,237.47	2,380.51	0.89	2,380.48	10.00	-0.32	10.00
5,490.00	88.50	14.70	3,236.74	2,471.30	20.85	2,471.16	6.48	-4.19	4.95
5,583.00	89.00	5.30	3,238.78	2,562.76	36.97	2,562.54	10.12	0.54	-10.11
5,677.00	89.50	0.30	3,240.01	2,656.61	41.56	2,656.37	5.35	0.53	-5.32
5,772.00	89.10	357.70	3,241.17	2,751.58	39.91	2,751.34	2.77	-0.42	-2.74
5,866.00	88.70	357.50	3,242.97	2,845.48	35.97	2,845.26	0.48	-0.43	-0.21
5,960.00	90.50	356.20	3,243.63	2,939.33	30.81	2,939.14	2.36	1.91	-1.38
6,055.00	90.40	356.00	3,242.88	3,034.11	24.34	3,033.94	0.24	-0.11	-0.21
6,149.00	89.80	355.90	3,242.72	3,127.87	17.71	3,127.74	0.65	-0.64	-0.11
6,243.00	89.90	357.40	3,242.97	3,221.71	12.21	3,221.60	1.60	0.11	1.60
6,338.00	89.00	357.20	3,243.88	3,316.60	7.74	3,316.52	0.97	-0.95	-0.21
6,433.00	90.70	358.00	3,244.13	3,411.51	3.76	3,411.45	1.98	1.79	0.84
6,527.00	90.60	358.30	3,243.06	3,505.45	0.73	3,505.41	0.34	-0.11	0.32
6,621.00	90.00	358.80	3,242.57	3,599.42	-1.65	3,599.38	0.83	-0.64	0.53
6,716.00	92.10	357.80	3,240.83	3,694.36	-4.47	3,694.33	2.45	2.21	-1.05
6,802.00	91.10	357.90	3,238.43	3,780.26	-7.70	3,780.25	1.17	-1.16	0.12
6,897.00	92.00	358.40	3,235.86	3,875.18	-10.76	3,875.18	1.08	0.95	0.53
6,992.00	90.10	359.40	3,234.11	3,970.14	-12.58	3,970.15	2.26	-2.00	1.05
7,086.00	91.30	359.40	3,232.97	4,064.12	-13.57	4,064.14	1.28	1.28	0.00
7,181.00	91.40	358.80	3,230.73	4,159.09	-15.06	4,159.11	0.64	0.11	-0.63
7,275.00	90.10	359.10	3,229.50	4,253.06	-16.78	4,253.09	1.42	-1.38	0.32
7,369.00	89.80	359.20	3,229.58	4,347.05	-18.18	4,347.09	0.34	-0.32	0.11
7,464.00	90.60	359.30	3,229.25	4,442.04	-19.42	4,442.08	0.85	0.84	0.11
7,558.00	90.30	359.90	3,228.51	4,536.03	-20.08	4,536.08	0.71	-0.32	0.64
7,653.00	91.70	0.10	3,226.85	4,631.02	-20.08	4,631.06	1.49	1.47	0.21
7,748.00	90.50	0.50	3,225.03	4,726.00	-19.58	4,726.03	1.33	-1.26	0.42
7,842.00	90.10	1.60	3,224.54	4,819.98	-17.86	4,820.01	1.25	-0.43	1.17
7,936.00	90.40	1.70	3,224.13	4,913.94	-15.15	4,913.95	0.34	0.32	0.11
8,031.00	90.10	0.00	3,223.71	5,008.92	-13.74	5,008.93	1.82	-0.32	-1.79
8,126.00	91.50	358.30	3,222.39	5,103.90	-15.15	5,103.91	2.32	1.47	-1.79
8,165.00	92.10	358.40	3,221.16	5,142.86	-16.27	5,142.88	1.56	1.54	0.26

Last MWd Survey 8165 MD/3221.16 TVD 5142.86 N -16.27 W N: 730552.3 E: 632318.8

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Project: Chaves County
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Wellbore: Wellbore #1
Design: Wellbore #1

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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)
8,178.00	92.10	358.40	3,220.68	5,155.85	-16.64	5,155.87	0.00	0.00	0.00
Cross 250' FNL 8178 MD/3220.68 TVD 5155.85 N -16.64 W N: 730565.3 E: 632318.4									
8,210.00	92.10	358.40	3,219.51	5,187.81	-17.53	5,187.84	0.00	0.00	0.00
PTB 8210 MD/3219.51 TVD 5187.81 N -17.53 W N: 730597.2 E: 632317.5									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
211.00	210.98	-1.55	1.98	1st MWD Survey
3,078.00	3,047.79	139.95	-6.39	Cross 140' FSL 3078 MD/3047.79 TVD 139.95 N -6.39 W N: 725549.4 E: 632318.4
8,165.00	3,221.16	5,142.86	-16.27	Last MWD Survey 8165 MD/3221.16 TVD 5142.86 N -16.27 W N: 730552.3 E: 632318.4
8,178.00	3,220.68	5,155.85	-16.64	Cross 250' FNL 8178 MD/3220.68 TVD 5155.85 N -16.64 W N: 730565.3 E: 632318.4
8,210.00	3,219.51	5,187.81	-17.53	PTB 8210 MD/3219.51 TVD 5187.81 N -17.53 W N: 730597.2 E: 632317.5

Checked By: _____ Approved By: _____ Date: _____