

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 18 2018

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Mack Energy

Chaves County

Sec 28-T15S-R29E

White Rock Federal #1H Correct

Lateral

30-005-64300

Survey: Survey #1

Standard Survey Report

27 November, 2017

Survey Report

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

Local Co-ordinate Reference: Well White Rock Federal #1H Correct
TVD Reference: KB=21 @ 3811.50ft
MD Reference: KB=21 @ 3811.50ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

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

Site		Sec 28-T15S-R29E			
Site Position:		Northing:	725,403.5700 usft	Latitude:	32.993794
From:	Map	Easting:	631,215.1200 usft	Longitude:	-104.040189
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.16 °

Well	White Rock Federal #1H Correct					
Well Position	+N/-S	0.00 ft	Northing:	725,403.5700 usft	Latitude:	32.993794
	+E/-W	0.00 ft	Easting:	631,215.1200 usft	Longitude:	-104.040189
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,790.50 ft

Wellbore	Lateral				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	11/14/2017	7.43	60.72	48,320

Design	Lateral				
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	357.48	

Survey Program		Date	11/27/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
310.00	2,734.00	Survey #1 (Pilot Hole)	MWD	MWD - Standard	
2,741.00	8,255.00	Survey #1 (Lateral)	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)
2,734.00	0.50	346.60	2,733.66	-4.63	11.33	-5.12	0.00	0.00	0.00
2,741.00	0.70	359.00	2,740.66	-4.55	11.32	-5.05	3.39	2.86	177.14
1st MWD Survey									
2,776.00	1.30	354.10	2,775.65	-3.95	11.27	-4.44	1.73	1.71	-14.00
2,807.00	3.20	352.20	2,806.63	-2.74	11.12	-3.22	6.13	6.13	-6.13
2,835.00	5.80	352.30	2,834.54	-0.56	10.82	-1.04	9.29	9.29	0.36
2,869.00	10.20	358.10	2,868.20	4.15	10.49	3.69	13.14	12.94	17.06
2,929.00	18.40	2.70	2,926.29	18.95	10.76	18.46	13.79	13.67	7.67
2,976.00	25.20	1.40	2,969.91	36.38	11.36	35.85	14.50	14.47	-2.77
3,024.00	31.30	0.40	3,012.17	59.08	11.70	58.51	12.75	12.71	-2.08

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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)
3,071.00	36.90	359.90	3,051.07	85.42	11.76	84.83	11.93	11.91	-1.06
3,119.00	42.70	359.00	3,087.93	116.13	11.45	115.52	12.14	12.08	-1.88
3,166.00	47.70	359.30	3,121.04	149.47	10.96	148.84	10.65	10.64	0.64
3,213.00	53.00	359.40	3,151.02	185.64	10.55	185.00	11.28	11.28	0.21
3,307.00	64.50	358.00	3,199.71	265.84	8.67	265.21	12.30	12.23	-1.49
3,354.00	70.30	355.80	3,217.76	309.15	6.30	308.57	13.07	12.34	-4.68
3,402.00	76.00	354.10	3,231.67	354.89	2.25	354.45	12.35	11.88	-3.54
3,449.00	82.20	355.10	3,240.55	400.81	-2.08	400.52	13.36	13.19	2.13
3,496.00	87.10	355.80	3,244.94	447.45	-5.79	447.27	10.53	10.43	1.49
3,518.40	88.00	356.46	3,245.89	469.77	-7.30	469.64	4.97	4.00	2.95
Cross 330° 3518.4 MD/3245.89 TVD 469.77 N -7.3 W N: 725873.3 E: 631207.8									
3,591.00	90.90	358.60	3,246.59	542.29	-10.43	542.23	4.97	4.00	2.95
3,684.00	90.60	359.50	3,245.38	635.27	-11.97	635.18	1.02	-0.32	0.97
3,778.00	90.70	359.30	3,244.31	729.26	-12.96	729.12	0.24	0.11	-0.21
3,873.00	91.30	358.10	3,242.65	824.22	-15.11	824.09	1.41	0.63	-1.26
3,967.00	91.40	359.10	3,240.44	918.16	-17.41	918.04	1.07	0.11	1.06
4,061.00	90.70	357.30	3,238.71	1,012.09	-20.36	1,012.01	2.05	-0.74	-1.91
4,156.00	90.60	355.40	3,237.64	1,106.89	-26.41	1,106.98	2.00	-0.11	-2.00
4,250.00	90.20	354.90	3,236.98	1,200.55	-34.36	1,200.90	0.68	-0.43	-0.53
4,344.00	89.70	355.20	3,237.06	1,294.20	-42.47	1,294.82	0.62	-0.53	0.32
4,439.00	89.00	355.80	3,238.14	1,388.90	-49.92	1,389.75	0.97	-0.74	0.63
4,533.00	89.80	356.30	3,239.12	1,482.67	-56.39	1,483.72	1.00	0.85	0.53
4,627.00	89.50	356.50	3,239.70	1,576.48	-62.30	1,577.70	0.38	-0.32	0.21
4,721.00	90.50	357.60	3,239.70	1,670.36	-67.13	1,671.69	1.58	1.06	1.17
4,816.00	92.10	358.60	3,237.54	1,765.28	-70.28	1,766.66	1.99	1.68	1.05
4,910.00	91.50	358.80	3,234.59	1,859.21	-72.41	1,860.59	0.67	-0.64	0.21
5,005.00	90.50	358.70	3,232.93	1,954.17	-74.49	1,955.55	1.06	-1.05	-0.11
5,100.00	90.50	357.90	3,232.10	2,049.12	-77.30	2,050.54	0.84	0.00	-0.84
5,194.00	89.90	358.00	3,231.78	2,143.06	-80.67	2,144.53	0.65	-0.64	0.11
5,289.00	90.40	357.30	3,231.53	2,237.98	-84.56	2,239.53	0.91	0.53	-0.74
5,383.00	90.20	356.60	3,231.03	2,331.84	-89.56	2,333.53	0.77	-0.21	-0.74
5,476.00	90.90	356.60	3,230.14	2,424.67	-95.08	2,426.51	0.75	0.75	0.00
5,571.00	90.50	357.00	3,228.98	2,519.52	-100.38	2,521.50	0.60	-0.42	0.42
5,664.00	90.90	357.40	3,227.85	2,612.40	-104.92	2,614.49	0.61	0.43	0.43
5,757.00	90.20	357.30	3,226.95	2,705.30	-109.22	2,707.48	0.76	-0.75	-0.11
5,851.00	89.60	357.30	3,227.12	2,799.19	-113.65	2,801.48	0.64	-0.64	0.00
5,945.00	90.00	356.90	3,227.44	2,893.07	-118.41	2,895.48	0.60	0.43	-0.43
6,039.00	90.70	356.20	3,226.87	2,986.90	-124.06	2,989.46	1.05	0.74	-0.74
6,132.00	91.40	355.90	3,225.17	3,079.66	-130.47	3,082.42	0.82	0.75	-0.32
6,226.00	91.10	356.10	3,223.12	3,173.41	-137.02	3,176.36	0.38	-0.32	0.21
6,347.00	90.60	356.60	3,221.32	3,294.15	-144.73	3,297.33	0.58	-0.41	0.41
6,441.00	90.80	357.30	3,220.17	3,388.01	-149.73	3,391.32	0.77	0.21	0.74
6,534.00	90.50	357.50	3,219.12	3,480.91	-153.95	3,484.31	0.39	-0.32	0.22

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Design: Lateral

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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)
6,626.00	90.20	358.20	3,218.56	3,572.84	-157.40	3,576.30	0.83	-0.33	0.76
6,720.00	92.20	357.80	3,216.59	3,666.76	-160.68	3,670.28	2.17	2.13	-0.43
6,813.00	93.80	357.60	3,211.72	3,759.55	-164.40	3,763.14	1.73	1.72	-0.22
6,907.00	93.20	357.30	3,205.98	3,853.28	-168.58	3,856.97	0.71	-0.64	-0.32
7,002.00	92.10	357.40	3,201.59	3,948.08	-172.97	3,951.86	1.16	-1.16	0.11
7,096.00	93.40	357.50	3,197.08	4,041.87	-177.14	4,045.75	1.39	1.38	0.11
7,191.00	91.20	357.20	3,193.27	4,136.69	-181.53	4,140.67	2.34	-2.32	-0.32
7,284.00	91.50	357.00	3,191.08	4,229.55	-186.24	4,233.64	0.39	0.32	-0.22
7,379.00	92.00	356.90	3,188.17	4,324.37	-191.29	4,328.60	0.54	0.53	-0.11
7,473.00	90.80	356.30	3,185.88	4,418.17	-196.86	4,422.55	1.43	-1.28	-0.64
7,567.00	91.30	356.90	3,184.16	4,511.99	-202.44	4,516.53	0.83	0.53	0.64
7,660.00	90.60	356.50	3,182.61	4,604.82	-207.79	4,609.50	0.87	-0.75	-0.43
7,754.00	90.70	357.30	3,181.55	4,698.68	-212.87	4,703.49	0.86	0.11	0.85
7,847.00	90.80	357.30	3,180.33	4,791.57	-217.25	4,796.48	0.11	0.11	0.00
7,941.00	91.20	357.30	3,178.69	4,885.45	-221.68	4,890.47	0.43	0.43	0.00
8,034.00	91.00	357.30	3,176.90	4,978.33	-226.06	4,983.45	0.22	-0.22	0.00
8,127.00	91.20	357.50	3,175.12	5,071.21	-230.28	5,076.43	0.30	0.22	0.22
8,196.00	91.65	357.68	3,173.40	5,140.13	-233.18	5,145.41	0.71	0.66	0.26
Cross 270' 8196 MD/3173.4 TVD 5140.13 N -233.18 W N: 730543.6 E: 630981.9									
8,203.00	91.70	357.70	3,173.20	5,147.12	-233.46	5,152.41	0.71	0.66	0.26
Last MWD Survey 8203 MD/3173.2 TVD 5147.12 N -233.46 W N: 730550.6 E: 630981.6									
8,255.00	91.70	357.70	3,171.65	5,199.06	-235.54	5,204.39	0.00	0.00	0.00
PTB 8255 MD/3171.65 TVD 5199.06 N -235.54 W N: 730602.6 E: 630979.5									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,741.00	2,740.66	-4.55	11.32	1st MWD Survey
3,518.40	3,245.89	469.77	-7.30	Cross 330' 3518.4 MD/3245.89 TVD 469.77 N -7.3 W N: 725873.3 E: 631207.8
8,196.00	3,173.40	5,140.13	-233.18	Cross 270' 8196 MD/3173.4 TVD 5140.13 N -233.18 W N: 730543.6 E: 630981.9
8,203.00	3,173.20	5,147.12	-233.46	Last MWD Survey 8203 MD/3173.2 TVD 5147.12 N -233.46 W N: 730550.6 E: 630981.6
8,255.00	3,171.65	5,199.06	-235.54	PTB 8255 MD/3171.65 TVD 5199.06 N -235.54 W N: 730602.6 E: 630979.5

Checked By: _____ Approved By: _____ Date: _____