

HOBBS OCD

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Mack Energy

Lea County, NM

Sec 19-T17S-R32E

Partition 24 Fed AD #1H

Wellbore #1

Survey: Survey #1

Standard Survey Report

11 February, 2019

Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Partition 24 Fed AD #1H
Project:	Lea County, NM	TVD Reference:	KB=18 @ 3953.00usft
Site:	Sec 19-T17S-R32E	MD Reference:	KB=18 @ 3953.00usft
Well:	Partition 24 Fed AD #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Project	Lea County, NM		
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 19-T17S-R32E			
Site Position:		Northing:	664,333.50 usft	Latitude: 32.82520
From:	Map	Easting:	701,242.80 usft	Longitude: -103.81278
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.28 °

Well	Partition 24 Fed AD #1H, MS			
Well Position	+N/-S	0.00 usft	Northing:	664,333.50 usft
	+E/-W	0.00 usft	Easting:	701,242.80 usft
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 3,935.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	HDCM	9/15/2017	(°)	(°)	(nT)
			7.28	60.78	48,394

Design	Wellbore #1			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	274.35

Survey Program	Date 2/11/2019			
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
763.00	10,842.00	Survey #1 (Wellbore #1)	MWD	MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Bulld	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
679.00	0.10	36.00	678.96	1.74	3.53	-3.39	0.00	0.00	0.00
763.00	0.22	320.27	762.96	1.92	3.47	-3.31	0.26	0.14	-90.15
1st MWD Survey									
889.00	0.04	335.21	888.96	2.15	3.30	-3.12	0.14	-0.14	11.86
1,078.00	0.22	289.77	1,077.96	2.33	2.93	-2.74	0.10	0.10	-24.04
1,267.00	0.70	312.70	1,266.85	3.24	1.74	-1.49	0.27	0.25	12.13
1,454.00	1.41	338.20	1,453.92	6.15	0.04	0.42	0.45	0.38	13.64
1,644.00	2.42	356.04	1,643.81	12.32	-1.10	2.03	0.61	0.53	9.39
1,833.00	3.16	3.77	1,832.59	21.50	-1.03	2.66	0.44	0.39	4.09
1,947.00	3.60	3.69	1,946.39	28.21	-0.60	2.74	0.39	0.39	-0.07
2,118.00	1.58	310.51	2,117.23	35.10	-2.04	4.70	1.72	-1.18	-31.10

Survey Report

Company: Mack Energy
 Project: Lea County, NM
 Site: Sec 19-T17S-R32E
 Well: Partition 24 Fed AD #1H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Partition 24 Fed AD #1H
 TVD Reference: KB=18 @ 3953.00usft
 MD Reference: KB=18 @ 3953.00usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,244.00	2.68	219.72	2,243.16	33.96	-5.25	7.81	2.48	0.87	-72.06
2,432.00	1.45	166.81	2,431.05	28.26	-7.51	9.64	1.14	-0.65	-28.14
2,621.00	1.41	171.20	2,619.99	23.64	-6.61	8.39	0.06	-0.02	2.32
2,811.00	1.67	175.42	2,809.93	18.57	-8.03	7.43	0.15	0.14	2.22
3,000.00	1.58	181.40	2,998.85	13.22	-5.88	6.86	0.10	-0.05	3.16
3,190.00	1.67	188.52	3,188.77	7.86	-6.35	6.93	0.12	0.05	3.75
3,379.00	2.02	114.43	3,377.70	3.76	-3.73	4.00	1.19	0.19	-39.20
3,565.00	1.32	323.26	3,563.67	4.12	-2.02	2.33	1.74	-0.38	-81.27
3,754.00	1.49	302.69	3,752.61	7.19	-5.39	5.92	0.28	0.09	-10.88
3,943.00	0.97	173.40	3,941.59	6.93	-7.28	7.78	1.18	-0.28	-68.41
4,133.00	1.36	143.43	4,131.55	3.52	-5.75	6.00	0.37	0.21	-15.77
4,322.00	1.14	131.57	4,320.51	0.47	-3.01	3.03	0.18	-0.12	-6.28
4,510.00	0.48	320.53	4,508.50	-0.18	-2.11	2.09	0.86	-0.35	-90.98
4,605.00	1.80	315.41	4,603.48	1.21	-3.41	3.49	1.39	1.39	-5.39
4,699.00	12.57	310.22	4,696.60	8.89	-12.28	12.92	11.47	11.46	-5.52
4,794.00	22.33	307.50	4,787.12	26.59	-34.55	36.47	10.31	10.27	-2.86
4,889.00	31.38	306.62	4,871.79	52.39	-68.79	72.56	9.54	9.53	-0.93
4,984.00	41.41	306.62	4,948.16	85.97	-113.97	120.17	10.56	10.56	0.00
5,079.00	51.21	306.88	5,013.70	127.03	-168.94	178.09	10.32	10.32	0.27
5,098.00	52.26	306.53	5,024.23	135.00	-179.64	189.36	6.38	6.18	-2.06
5,110.00	52.48	306.18	5,032.78	141.58	-188.57	198.77	2.53	1.57	-2.50
5,128.00	52.88	306.27	5,043.69	150.04	-200.12	210.92	2.26	2.22	0.50
5,142.00	53.23	306.09	5,052.11	156.64	-209.15	220.43	2.70	2.50	-1.29
5,159.00	53.32	306.27	5,062.27	164.69	-220.15	232.01	1.00	0.53	1.06
5,173.00	53.41	306.18	5,070.62	171.32	-229.21	241.55	0.82	0.64	-0.64
5,191.00	53.49	306.18	5,081.34	179.86	-240.88	253.83	0.44	0.44	0.00
5,205.00	53.54	306.00	5,089.67	186.49	-249.98	263.41	1.09	0.36	-1.29
5,223.00	53.80	306.00	5,100.33	195.01	-261.71	275.75	1.44	1.44	0.00
5,237.00	53.89	306.09	5,108.59	201.67	-270.85	285.37	0.83	0.64	0.64
5,254.00	53.85	306.09	5,118.62	208.75	-281.94	297.05	0.24	-0.24	0.00
5,268.00	53.89	306.18	5,126.87	216.42	-291.08	306.66	0.59	0.29	0.64
5,285.00	53.98	306.09	5,136.88	224.53	-302.17	318.34	0.68	0.53	-0.53
5,299.00	53.98	306.00	5,145.11	231.19	-311.33	327.97	0.52	0.00	-0.64
5,317.00	54.02	306.00	5,155.69	239.75	-323.11	340.37	0.22	0.22	0.00
5,331.00	54.07	306.00	5,163.91	246.41	-332.28	350.02	0.36	0.36	0.00
5,349.00	54.15	305.92	5,174.46	254.97	-344.08	362.44	0.57	0.44	-0.44
5,363.00	54.11	306.00	5,182.67	261.63	-353.27	372.10	0.54	-0.29	0.57
5,380.00	54.42	305.82	5,192.60	269.74	-364.44	383.85	1.86	1.82	-0.47
5,394.00	54.59	305.92	5,200.72	276.42	-373.67	393.56	1.21	1.21	0.00
5,412.00	54.73	306.09	5,211.14	285.06	-385.54	406.06	1.09	0.78	0.94
5,426.00	54.68	306.09	5,219.23	291.79	-394.78	415.78	0.38	-0.36	0.00
5,444.00	54.64	305.92	5,229.64	300.42	-406.66	428.28	0.80	-0.22	-0.94
5,458.00	54.68	305.74	5,237.73	307.10	-415.92	438.02	1.09	0.29	-1.29

Survey Report

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Site: Sec 19-T17S-R32E
Well: Partition 24 Fed AD #1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Partition 24 Fed AD #1H
TVD Reference: KB=18 @ 3953.00usft
MD Reference: KB=18 @ 3953.00usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,476.00	54.59	305.83	5,248.15	315.69	-427.82	450.54	0.65	-0.50	0.50
5,490.00	54.59	305.65	5,256.26	322.35	-437.08	460.28	1.05	0.00	-1.29
5,507.00	54.42	305.74	5,266.14	330.43	-448.33	472.10	1.09	-1.00	0.53
5,521.00	54.33	305.56	5,274.29	337.06	-457.57	481.83	1.23	-0.64	-1.29
5,539.00	54.15	305.65	5,284.81	345.56	-469.45	494.31	1.08	-1.00	0.50
5,553.00	54.11	305.48	5,293.01	352.16	-478.68	504.02	1.02	-0.29	-1.21
5,570.00	54.11	305.39	5,302.98	360.15	-489.90	515.81	0.43	0.00	-0.53
5,584.00	54.51	304.69	5,311.15	366.68	-499.21	525.59	4.97	2.86	-5.00
5,603.00	55.69	303.10	5,322.02	375.36	-512.14	539.15	9.26	6.21	-8.37
5,616.00	56.84	302.05	5,329.24	381.18	-521.25	548.67	11.11	8.85	-8.08
5,648.00	60.26	298.71	5,345.93	394.97	-544.80	573.20	13.91	10.69	-10.44
5,743.00	70.86	290.54	5,385.24	430.68	-623.33	654.21	13.62	11.16	-8.60
5,838.00	78.90	282.19	5,410.04	456.35	-711.20	743.78	11.98	8.46	-8.79
5,927.00	84.48	274.54	5,422.92	469.11	-798.23	831.53	10.56	6.27	-8.60
5,986.93	88.43	270.80	5,426.62	471.89	-857.96	891.30	9.07	6.60	-6.24
FTP Partition 24 Fed AD #1H Plan #3									
5,987.29	88.46	270.78	5,426.63	471.89	-858.32	891.65	9.07	6.61	-6.22
FTP/Cross 330' FEL 6987.29 MD/5426.63 TVD 471.89 N -858.32 W N: 664805.3 E: 700384.4									
5,987.41	88.46	270.78	5,426.63	471.89	-858.44	891.77	0.00	0.00	0.00
FTP Partition 24 Fed AD #1H Plan #5									
5,989.00	88.57	270.67	5,426.67	471.91	-860.03	893.36	9.74	7.09	-6.68
6,053.00	90.64	269.44	5,427.12	471.98	-924.03	957.17	3.76	3.23	-1.92
6,147.00	89.19	268.65	5,427.26	470.41	-1,018.01	1,050.77	1.76	-1.54	-0.84
6,243.00	89.49	267.95	5,428.36	467.56	-1,113.96	1,146.22	0.79	0.31	-0.73
6,338.00	89.58	269.71	5,429.13	465.62	-1,208.93	1,240.78	1.85	0.09	1.85
6,433.00	89.58	269.53	5,429.83	464.99	-1,303.93	1,335.45	0.19	0.00	-0.19
6,528.00	90.29	269.44	5,429.94	464.14	-1,398.92	1,430.11	0.75	0.75	-0.09
6,622.00	90.90	269.62	5,428.96	463.37	-1,492.92	1,523.77	0.68	0.65	0.19
6,716.00	91.56	268.12	5,426.94	461.51	-1,586.87	1,617.31	1.74	0.70	-1.60
6,811.00	91.80	268.39	5,424.32	458.62	-1,681.79	1,711.74	0.29	0.04	0.28
6,906.00	91.25	267.77	5,421.96	455.44	-1,776.71	1,808.14	0.75	-0.37	-0.65
7,001.00	90.11	268.12	5,420.83	452.03	-1,871.64	1,900.54	1.26	-1.20	0.37
7,095.00	90.20	269.79	5,420.58	450.32	-1,965.62	1,994.12	1.78	0.10	1.78
7,190.00	92.22	269.79	5,418.57	449.97	-2,060.59	2,088.79	2.13	2.13	0.00
7,285.00	91.52	270.41	5,415.47	450.14	-2,155.54	2,183.48	0.98	-0.74	0.65
7,380.00	89.10	268.65	5,414.96	449.36	-2,250.53	2,278.13	3.15	-2.55	-1.85
7,475.00	89.80	270.50	5,415.87	448.65	-2,345.51	2,372.79	2.08	0.74	1.85
7,568.00	91.69	270.06	5,414.66	449.11	-2,438.50	2,465.55	2.09	2.03	-0.47
7,664.00	91.56	270.32	5,411.94	449.43	-2,534.46	2,561.26	0.30	-0.14	0.27
7,759.00	90.51	269.79	5,410.22	449.52	-2,629.44	2,655.97	1.24	-1.11	-0.56
7,853.00	89.93	270.14	5,409.86	449.46	-2,723.44	2,749.69	0.72	-0.62	0.37
7,948.00	89.23	270.32	5,410.56	449.84	-2,818.44	2,844.45	0.76	-0.74	0.19
8,043.00	89.54	269.97	5,411.58	450.08	-2,913.43	2,939.18	0.49	0.33	-0.37
8,137.00	89.89	269.09	5,412.05	449.31	-3,007.43	3,032.85	1.01	0.37	-0.94

Survey Report

Company: Mack Energy
Project: Lea County, NM
Site: Sec 19-T17S-R32E
Well: Partition 24 Fed AD #1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:

Well Partition 24 Fed AD #1H
KB=18 @ 3953.00usft
KB=18 @ 3953.00usft
Grid
Minimum Curvature
EDM 5000.1

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
8,232.00	88.97	267.51	5,412.99	446.49	-3,102.38	3,127.31	1.92	-0.97	-1.66
8,327.00	89.14	268.91	5,414.56	443.53	-3,197.32	3,221.75	1.48	0.18	1.47
8,421.00	89.85	269.62	5,415.39	442.32	-3,291.30	3,315.38	1.07	0.76	0.76
8,516.00	90.15	271.29	5,415.39	443.07	-3,386.30	3,410.15	1.79	0.32	1.76
8,611.00	92.22	270.95	5,413.42	444.93	-3,481.25	3,504.98	2.21	2.18	-0.36
8,704.00	91.69	269.79	5,410.25	445.53	-3,574.19	3,597.70	1.37	-0.57	-1.25
8,798.00	91.30	268.83	5,407.80	444.40	-3,668.15	3,691.30	1.10	-0.41	-1.02
8,893.00	90.90	268.39	5,405.97	442.10	-3,763.11	3,785.80	0.63	-0.42	-0.46
8,988.00	90.46	268.04	5,404.85	439.14	-3,858.06	3,880.25	0.59	-0.46	-0.37
9,084.00	90.37	269.27	5,404.15	436.88	-3,954.02	3,975.77	1.28	-0.09	1.28
9,179.00	90.59	270.14	5,403.35	436.39	-4,049.02	4,070.46	0.94	0.23	0.92
9,273.00	91.56	270.32	5,401.59	436.77	-4,143.00	4,164.20	1.05	1.03	0.19
9,368.00	90.07	271.11	5,400.24	437.96	-4,237.98	4,258.99	1.78	-1.57	0.83
9,463.00	91.08	270.58	5,399.29	439.36	-4,332.96	4,353.81	1.20	1.06	-0.56
9,557.00	90.73	269.88	5,397.80	439.73	-4,426.95	4,447.55	0.83	-0.37	-0.74
9,652.00	91.60	269.44	5,395.87	439.17	-4,521.93	4,542.21	1.03	0.92	-0.46
9,745.00	90.33	269.27	5,394.30	438.12	-4,614.91	4,634.85	1.38	-1.37	-0.18
9,840.00	91.56	269.09	5,392.74	436.77	-4,709.88	4,729.44	1.31	1.29	-0.19
9,935.00	89.98	268.21	5,391.46	434.53	-4,804.84	4,823.96	1.90	-1.66	-0.93
10,030.00	91.38	268.04	5,390.33	431.42	-4,899.78	4,918.39	1.48	1.47	-0.18
10,125.00	90.37	268.65	5,388.88	428.68	-4,994.73	5,012.86	1.24	-1.06	0.64
10,220.00	89.45	269.88	5,389.03	427.46	-5,089.72	5,107.48	1.62	-0.97	1.29
10,315.00	90.02	271.29	5,389.47	428.43	-5,184.71	5,202.27	1.60	0.60	1.48
10,410.00	91.87	271.02	5,387.90	430.34	-5,279.68	5,297.11	1.97	1.95	-0.28
10,504.00	90.51	270.06	5,385.95	431.23	-5,373.65	5,390.88	1.77	-1.45	-1.02
10,600.00	90.07	270.41	5,385.47	431.62	-5,469.64	5,486.63	0.59	-0.46	0.36
10,616.06	90.22	270.41	5,385.42	431.74	-5,485.71	5,502.65	0.93	0.93	0.00
LTP Partition 24 Fed AD#1H Plan #6									
10,656.00	90.59	270.41	5,385.14	432.02	-5,525.64	5,542.49	0.93	0.93	0.00
Cross 290' FWL 10656 MD/5385.14 TVD 432.02 N -5525.64 W N: 664766.6 E: 695717.1									
10,657.87	90.81	270.41	5,385.12	432.04	-5,527.51	5,544.36	0.93	0.93	0.00
PBHL Partition 24 Fed AD #1H									
10,658.99	90.62	270.41	5,385.11	432.04	-5,528.63	5,545.47	0.93	0.93	0.00
PBHL Partition 24 Fed AD #1H Plan #3									
10,695.00	90.95	270.41	5,384.62	432.30	-5,564.64	5,581.40	0.93	0.93	0.00
10,794.00	91.91	270.41	5,382.15	433.01	-5,663.60	5,680.13	0.97	0.97	0.00
Last MWD Survey 10794 MD/5382.15 TVD 433.01 N -5663.60 W N: 664766.6 E: 695579.2									
10,841.77	91.91	270.41	5,380.56	433.35	-5,711.35	5,727.76	0.00	0.00	0.00
PBHL Partition 24 Fed AD #1H Plan #6									
10,842.00	91.91	270.41	5,380.55	433.35	-5,711.58	5,727.99	0.00	0.00	0.00
PTB 10842 MD/5380.55 TVD 433.35 N -5711.58 W N: 664766.8 E: 695531.2									

Survey Report

Company:	Mack Energy	Local Co-ordinate Reference:	Well Partition 24 Fed AD #1H
Project:	Lea County, NM	TVD Reference:	KB=18 @ 3953.00usft
Site:	Sec 19-T17S-R32E	MD Reference:	KB=18 @ 3953.00usft
Well:	Partition 24 Fed AD #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1

Survey Annotations:				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
763.00	762.96	1.92	3.47	1st MWD Survey
5,987.29	5,426.63	471.89	-858.32	FTP/Cross 330' FEL 5987.29 MD/5426.63 TVD 471.89 N -858.32 W N: 664805.
10,656.00	5,385.14	432.02	-5,525.64	Cross 290' FWL 10656 MD/5385.14 TVD 432.02 N -5525.64 W N: 664765.5 E:
10,794.00	5,382.15	433.01	-5,663.60	Last MWD Survey 10794 MD/5382.15 TVD 433.01 N -5663.60 W N: 664766.5 E:
10,842.00	5,380.55	433.35	-5,711.58	PTB 10842 MD/5380.55 TVD 433.35 N -5711.58 W N: 664766.8 E: 695531.2

Checked By: _____	Approved By: _____	Date: _____
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