



Mack Energy

Chaves County

Sec 23 T15S R28E

Klondike State Com #1H

30-005-64295

Wellbore #2

Survey: Survey #1

Standard Survey Report

23 September, 2017





Integrity Directional Services, LLC

Survey Report



Company: Mack Energy
Project: Chaves County
Site: Sec 23 T15S R28E
Well: Klondike State Com #1H
Wellbore: Wellbore #2
Design: Wellbore #2

Local Co-ordinate Reference: Well Klondike State Com #1H
TVD Reference: Well @ 3597.00ft
MD Reference: Well @ 3597.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

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 23 T15S R28E				
Site Position:		Northing:	726,224.2800 usft	Latitude:	32.996178
From:	Map	Easting:	612,464.1300 usft	Longitude:	-104.101341
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.13 °

Well	Klondike State Com #1H				
Well Position	+N/-S	0.00 ft	Northing:	726,224.2800 usft	Latitude: 32.996178
	+E/-W	0.00 ft	Easting:	612,464.1300 usft	Longitude: -104.101341
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level: 3,579.50 ft

Wellbore	Wellbore #2				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	9/8/2017	7.43	60.70	48,325

Design	Wellbore #2				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	2,146.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	179.95	

Survey Program		Date	9/23/2017		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
181.00	2,146.00	Survey #1 (Pilot Hole)	MWD	MWD - Standard	
2,239.00	8,940.00	Survey #1 (Wellbore #2)	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)
2,146.00	0.70	223.50	2,145.84	7.81	10.06	-7.80	0.00	0.00	0.00
2,239.00	0.70	215.40	2,238.83	6.94	9.34	-6.93	0.11	0.00	-8.71
1st MWD Survey									
2,271.00	2.40	187.40	2,270.82	6.11	9.14	-6.10	5.66	5.31	-87.50
2,302.00	6.50	187.60	2,301.72	3.73	8.82	-3.72	13.23	13.23	0.65
2,334.00	11.60	183.80	2,333.31	-1.28	8.37	1.29	16.04	15.94	-11.88
2,365.00	15.90	181.60	2,363.42	-8.64	8.05	8.65	13.97	13.87	-7.10
2,396.00	19.60	180.40	2,392.94	-18.09	7.89	18.09	11.99	11.94	-3.87
2,428.00	21.80	180.30	2,422.87	-29.40	7.82	29.40	6.88	6.88	-0.31
2,459.00	23.10	180.50	2,451.52	-41.23	7.74	41.24	4.20	4.19	0.65



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2,490.00	25.10	181.20	2,479.82	-53.89	7.55	53.90	6.52	6.45	2.26
2,521.00	26.20	183.70	2,507.76	-67.29	6.97	67.30	4.98	3.55	8.06
2,553.00	27.30	186.00	2,536.34	-81.64	5.75	81.65	4.72	3.44	7.19
2,585.00	29.70	187.00	2,564.46	-96.81	4.01	96.81	7.65	7.50	3.13
2,616.00	32.20	185.40	2,591.04	-112.66	2.30	112.66	8.49	8.06	-5.16
2,647.00	34.10	184.40	2,616.99	-129.55	0.85	129.55	6.38	6.13	-3.23
2,678.00	35.40	183.40	2,642.47	-147.18	-0.34	147.18	4.58	4.19	-3.23
2,710.00	38.60	181.80	2,668.02	-166.41	-1.21	166.41	10.44	10.00	-5.00
2,741.00	42.20	180.40	2,691.62	-186.50	-1.58	186.49	11.98	11.61	-4.52
2,772.00	45.10	181.30	2,714.05	-207.89	-1.91	207.89	9.57	9.35	2.90
2,804.00	47.80	182.50	2,736.10	-231.06	-2.68	231.06	8.86	8.44	3.75
2,836.00	51.00	182.00	2,756.92	-255.34	-3.63	255.34	10.07	10.00	-1.56
2,867.00	54.40	180.90	2,775.70	-279.99	-4.25	279.98	11.32	10.97	-3.55
2,899.00	57.50	180.20	2,793.62	-306.50	-4.50	306.49	9.86	9.69	-2.19
2,930.00	60.30	179.70	2,809.63	-333.04	-4.48	333.03	9.14	9.03	-1.61
2,962.00	63.00	179.70	2,824.82	-361.20	-4.33	361.19	8.44	8.44	0.00
2,993.00	66.10	179.50	2,838.14	-389.18	-4.13	389.18	10.02	10.00	-0.65
3,025.00	69.10	179.00	2,850.34	-418.76	-3.75	418.76	9.49	9.38	-1.56
3,056.00	72.10	178.90	2,860.63	-448.00	-3.21	447.99	9.68	9.68	-0.32
3,088.00	75.40	178.80	2,869.59	-478.71	-2.59	478.70	10.32	10.31	-0.31
3,119.00	78.90	179.00	2,876.48	-508.92	-2.01	508.92	11.31	11.29	0.65
3,150.00	81.50	178.80	2,881.75	-539.46	-1.43	539.46	8.41	8.39	-0.65
3,276.00	90.80	180.90	2,890.21	-665.03	-1.11	665.03	7.57	7.38	1.67
Landing 3276' MD/2890.21 TVD 90.8° Inc. 180.9 Azm -665.03 S -1.11 W N; 725559.2 E: 612463.0									
3,370.00	91.00	181.80	2,888.73	-758.99	-3.32	758.99	0.98	0.21	0.96
3,465.00	90.80	182.70	2,887.24	-853.90	-7.05	853.90	0.97	-0.21	0.95
3,559.00	90.90	180.40	2,885.84	-947.85	-9.60	947.85	2.45	0.11	-2.45
3,653.00	91.40	180.60	2,883.96	-1,041.83	-10.42	1,041.82	0.57	0.53	0.21
3,748.00	90.00	179.90	2,882.80	-1,136.82	-10.83	1,136.81	1.65	-1.47	-0.74
3,843.00	89.30	179.60	2,883.38	-1,231.82	-10.42	1,231.81	0.80	-0.74	-0.32
3,938.00	89.10	180.00	2,884.70	-1,326.81	-10.08	1,326.80	0.47	-0.21	0.42
4,032.00	89.00	180.50	2,886.26	-1,420.79	-10.49	1,420.78	0.54	-0.11	0.53
4,127.00	89.80	179.80	2,887.26	-1,515.79	-10.74	1,515.78	1.12	0.84	-0.74
4,221.00	90.40	178.40	2,887.09	-1,609.77	-9.27	1,609.76	1.62	0.64	-1.49
4,316.00	90.40	178.50	2,886.43	-1,704.73	-6.70	1,704.73	0.11	0.00	0.11
4,411.00	90.50	178.90	2,885.68	-1,799.71	-4.54	1,799.70	0.43	0.11	0.42
4,505.00	90.50	179.70	2,884.86	-1,893.69	-3.39	1,893.69	0.85	0.00	0.85
4,599.00	90.40	180.40	2,884.12	-1,987.69	-3.48	1,987.69	0.75	-0.11	0.74
4,694.00	89.90	178.60	2,883.88	-2,082.68	-2.65	2,082.68	1.97	-0.53	-1.89
4,788.00	90.00	178.70	2,883.96	-2,176.66	-0.43	2,176.66	0.15	0.11	0.11
4,883.00	90.00	178.80	2,883.96	-2,271.63	1.64	2,271.63	0.11	0.00	0.11
4,977.00	90.30	179.40	2,883.71	-2,365.62	3.12	2,365.62	0.71	0.32	0.64
5,071.00	89.50	177.60	2,883.88	-2,459.58	5.58	2,459.59	2.10	-0.85	-1.91



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5,193.00	89.40	179.50	2,885.05	-2,581.53	8.66	2,581.54	1.56	-0.08	1.56
5,287.00	90.00	180.20	2,885.54	-2,675.53	8.91	2,675.54	0.98	0.64	0.74
5,381.00	90.20	180.50	2,885.37	-2,769.53	8.34	2,769.54	0.38	0.21	0.32
5,475.00	89.60	179.10	2,885.54	-2,863.53	8.66	2,863.53	1.62	-0.64	-1.49
5,570.00	89.80	179.60	2,886.04	-2,958.52	9.74	2,958.53	0.57	0.21	0.53
5,665.00	89.70	180.00	2,886.45	-3,053.52	10.07	3,053.52	0.43	-0.11	0.42
5,759.00	89.70	180.40	2,886.94	-3,147.51	9.75	3,147.52	0.43	0.00	0.43
5,853.00	89.60	180.80	2,887.52	-3,241.51	8.76	3,241.51	0.44	-0.11	0.43
5,948.00	89.50	181.30	2,888.26	-3,336.49	7.02	3,336.49	0.54	-0.11	0.53
6,043.00	89.20	180.50	2,889.34	-3,431.47	5.53	3,431.47	0.90	-0.32	-0.84
6,138.00	89.40	180.20	2,890.50	-3,526.46	4.95	3,526.46	0.38	0.21	-0.32
6,233.00	89.30	180.60	2,891.58	-3,621.45	4.29	3,621.45	0.43	-0.11	0.42
6,327.00	89.10	181.00	2,892.89	-3,715.43	2.97	3,715.43	0.48	-0.21	0.43
6,421.00	89.00	181.60	2,894.45	-3,809.40	0.84	3,809.40	0.65	-0.11	0.64
6,516.00	90.10	179.60	2,895.20	-3,904.38	-0.15	3,904.38	2.40	1.16	-2.11
6,610.00	90.40	179.80	2,894.79	-3,998.38	0.34	3,998.38	0.38	0.32	0.21
6,704.00	90.50	180.20	2,894.05	-4,092.38	0.34	4,092.38	0.44	0.11	0.43
6,799.00	90.70	181.00	2,893.05	-4,187.36	-0.66	4,187.36	0.87	0.21	0.84
6,894.00	90.80	179.20	2,891.81	-4,282.35	-0.82	4,282.35	1.90	0.11	-1.89
6,989.00	89.20	178.80	2,891.81	-4,377.33	0.84	4,377.33	1.74	-1.68	-0.42
7,083.00	89.10	178.90	2,893.20	-4,471.31	2.72	4,471.31	0.15	-0.11	0.11
7,178.00	89.30	179.50	2,894.53	-4,566.29	4.05	4,566.29	0.67	0.21	0.63
7,272.00	89.10	179.80	2,895.84	-4,660.28	4.62	4,660.28	0.38	-0.21	0.32
7,367.00	89.50	180.80	2,897.00	-4,755.27	4.12	4,755.27	1.13	0.42	1.05
7,460.00	89.60	181.80	2,897.73	-4,848.24	2.01	4,848.24	1.08	0.11	1.08
7,552.00	87.60	181.30	2,899.98	-4,940.17	-0.47	4,940.17	2.24	-2.17	-0.54
7,645.00	86.90	178.90	2,904.44	-5,033.06	-0.64	5,033.05	2.69	-0.75	-2.58
7,738.00	90.40	178.10	2,906.64	-5,125.98	1.80	5,125.98	3.86	3.76	-0.86
7,830.00	90.80	177.50	2,905.67	-5,217.91	5.33	5,217.91	0.78	0.43	-0.65
7,923.00	90.30	177.00	2,904.78	-5,310.80	9.79	5,310.80	0.76	-0.54	-0.54
8,018.00	90.80	177.90	2,903.87	-5,405.70	14.02	5,405.71	1.08	0.53	0.95
8,111.00	92.50	181.40	2,901.19	-5,498.64	14.59	5,498.65	4.18	1.83	3.76
8,202.00	92.00	181.00	2,897.62	-5,589.55	12.68	5,589.56	0.70	-0.55	-0.44
8,297.00	91.30	180.80	2,894.88	-5,684.50	11.19	5,684.51	0.77	-0.74	-0.21
8,392.00	88.60	180.40	2,894.96	-5,779.48	10.20	5,779.49	2.87	-2.84	-0.42
8,486.00	89.60	180.40	2,896.44	-5,873.47	9.54	5,873.47	1.06	1.06	0.00
8,580.00	90.90	181.10	2,896.03	-5,967.46	8.31	5,967.46	1.57	1.38	0.74
8,608.00	90.61	181.16	2,895.66	-5,995.45	7.76	5,995.45	1.07	-1.05	0.21
Cross Sec Line 8608 MD/2895.66 TVD -5995.45 S 7.76 E N: 720228.8 E: 612471.8									
8,675.00	89.90	181.30	2,895.37	-6,062.43	6.32	6,062.44	1.07	-1.05	0.21
8,770.00	90.30	180.80	2,895.20	-6,157.42	4.58	6,157.42	0.67	0.42	-0.53
8,889.00	89.10	181.10	2,895.82	-6,276.40	2.61	6,276.40	1.04	-1.01	0.25
Last MWD Survey 8889 MD/2895.82 TVD -6275.4 S 2.61 E N: 719947.8 E: 612466.7									
8,907.65	89.10	181.10	2,896.12	-6,295.04	2.25	6,295.04	0.00	0.00	0.00



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PBHL Klondike State Com #1H Plan #4									
8,908.00	89.10	181.10	2,896.12	-6,295.39	2.24	6,295.39	0.00	0.00	0.00
Cross 300' HL 8908 MD/2896.12 TVD -6295.39 S 2.24 E N: 719928.9 E: 612466.3									
8,940.00	89.10	181.10	2,896.62	-6,327.38	1.63	6,327.38	0.00	0.00	0.00
PTB 8940 MD/2896.62 TVD -6327.38 S 1.63 E N: 719896.9 E: 612465.7									

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
2,239.00	2,238.83	6.94	9.34	1st MWD Survey
3,276.00	2,890.21	-665.03	-1.11	Landing 3276' MD/2890.21 TVD 90.8° Inc. 180.9 Azm -665.03 S -1.11 W N; 725
8,608.00	2,895.66	-5,995.45	7.76	Cross Sec Line 8608 MD/2895.66 TVD -5995.45 S 7.76 E N: 720228.8 E: 6124
8,889.00	2,895.82	-6,276.40	2.61	Last MWD Survey 8889 MD/2895.82 TVD -6275.4 S 2.61 E N: 719947.8 E: 612
8,908.00	2,896.12	-6,295.39	2.24	Cross 300' HL 8908 MD/2896.12 TVD -6295.39 S 2.24 E N: 719928.9 E: 61246
8,940.00	2,896.62	-6,327.38	1.63	PTB 8940 MD/2896.62 TVD -6327.38 S 1.63 E N: 719896.9 E: 612465.7

Checked By: _____ Approved By: _____ Date: _____