



Legacy Reserves Operating

Lea County, NM

Hamon Fed Pad

Hamon Fed Com A #11H

Wellbore #1

Survey: MWD Surveys

Standard Survey Report

08 September, 2017





Integrity Directional Services, LLC

Survey Report



Company: Legacy Reserves Operating
Project: Lea County, NM
Site: Hamon Fed Pad
Well: Hamon Fed Com A #11H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Hamon Fed Com A #11H
TVD Reference: KB=18 @ 3628.00ft
MD Reference: KB=18 @ 3628.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Project Lea County, NM

Map System: US State Plane 1983
Geo Datum: North American Datum 1983
Map Zone: New Mexico Eastern Zone

System Datum: Mean Sea Level

Site Hamon Fed Pad

Site Position:
From: Map
Position Uncertainty: 0.00 ft

Northing: 580,846.2000 usft
Easting: 723,480.4000 usft
Slot Radius: 13-3/16 "

Latitude: 32.595407
Longitude: -103.741904
Grid Convergence: 0.32 °

Well Hamon Fed Com A #11H

Well Position +N/-S 0.00 ft
+E/-W 0.00 ft
Position Uncertainty 0.00 ft

Northing: 575,257.4000 usft
Easting: 724,614.6000 usft
Wellhead Elevation: 0.00 ft

Latitude: 32.580028
Longitude: -103.738323
Ground Level: 3,610.00 ft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	8/11/2017	7.10	60.52	48,391

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	359.22

Survey Program Date 9/8/2017

From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
193.00	14,315.00	MWD Surveys (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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
193.00	0.70	305.52	193.00	0.68	-0.96	0.70	0.36	0.36	0.00
First MWD Survey									
284.00	0.22	302.27	283.99	1.10	-1.56	1.12	0.53	-0.53	-3.57
375.00	0.26	47.47	374.99	1.33	-1.56	1.36	0.42	0.04	115.60
467.00	0.31	95.11	466.99	1.45	-1.15	1.47	0.26	0.05	51.78
558.00	0.31	48.09	557.99	1.60	-0.73	1.61	0.27	0.00	-51.67
649.00	0.31	40.53	648.99	1.95	-0.38	1.95	0.04	0.00	-8.31
741.00	0.18	24.09	740.99	2.27	-0.16	2.27	0.16	-0.14	-17.87
832.00	0.04	44.84	831.99	2.42	-0.08	2.42	0.16	-0.15	22.80
923.00	0.09	154.40	922.99	2.38	-0.03	2.38	0.12	0.05	120.40



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1,015.00	0.62	211.64	1,014.98	1.89	-0.26	1.89	0.63	0.58	62.22
1,105.00	0.40	210.60	1,104.98	1.21	-0.67	1.21	0.24	-0.24	-1.16
1,196.00	0.79	232.48	1,195.98	0.55	-1.33	0.57	0.49	0.43	24.04
1,288.00	0.92	230.20	1,287.97	-0.31	-2.40	-0.28	0.15	0.14	-2.48
1,379.00	0.88	210.33	1,378.96	-1.38	-3.32	-1.33	0.34	-0.04	-21.84
1,473.00	0.53	204.01	1,472.95	-2.40	-3.86	-2.35	0.38	-0.37	-6.72
1,491.00	0.70	212.09	1,490.95	-2.57	-3.95	-2.52	1.06	0.94	44.89
1,663.00	0.26	149.16	1,662.94	-3.79	-4.31	-3.74	0.36	-0.26	-36.59
1,758.00	0.31	124.99	1,757.94	-4.13	-3.99	-4.07	0.14	0.05	-25.44
1,852.00	0.31	141.78	1,851.94	-4.47	-3.62	-4.42	0.10	0.00	17.86
1,946.00	0.13	151.54	1,945.94	-4.77	-3.41	-4.72	0.19	-0.19	10.38
2,039.00	0.09	22.34	2,038.94	-4.79	-3.34	-4.75	0.21	-0.04	-138.93
2,134.00	0.09	36.66	2,133.94	-4.66	-3.26	-4.62	0.02	0.00	15.07
2,229.00	0.22	117.08	2,228.94	-4.69	-3.06	-4.64	0.24	0.14	84.65
2,324.00	0.18	106.71	2,323.94	-4.81	-2.75	-4.77	0.06	-0.04	-10.92
2,418.00	0.13	29.72	2,417.94	-4.76	-2.56	-4.73	0.21	-0.05	-81.90
2,512.00	0.22	82.89	2,511.94	-4.65	-2.32	-4.61	0.19	0.10	56.56
2,606.00	0.35	89.66	2,605.94	-4.62	-1.86	-4.60	0.14	0.14	7.20
2,701.00	0.48	71.12	2,700.93	-4.49	-1.19	-4.48	0.20	0.14	-19.52
2,796.00	0.66	76.04	2,795.93	-4.23	-0.28	-4.23	0.20	0.19	5.18
2,890.00	0.66	74.54	2,889.92	-3.96	0.76	-3.97	0.02	0.00	-1.60
2,986.00	0.26	68.22	2,985.92	-3.73	1.50	-3.75	0.42	-0.42	-6.58
3,081.00	0.48	79.90	3,080.92	-3.58	2.09	-3.61	0.24	0.23	12.29
3,176.00	0.57	58.90	3,175.91	-3.26	2.89	-3.30	0.22	0.09	-22.11
3,271.00	0.26	128.86	3,270.91	-3.16	3.46	-3.20	0.57	-0.33	73.64
3,366.00	0.18	130.00	3,365.91	-3.39	3.74	-3.44	0.08	-0.08	1.20
3,460.00	0.35	136.68	3,459.91	-3.69	4.05	-3.75	0.18	0.18	7.11
3,555.00	0.44	165.51	3,554.91	-4.25	4.34	-4.31	0.23	0.09	30.35
3,650.00	0.35	128.33	3,649.90	-4.79	4.66	-4.85	0.28	-0.09	-39.14
3,745.00	0.53	126.17	3,744.90	-5.23	5.24	-5.30	0.19	0.19	-2.27
3,839.00	0.62	180.89	3,838.90	-5.99	5.59	-6.07	0.57	0.10	58.21
3,934.00	0.44	160.47	3,933.89	-6.85	5.70	-6.93	0.27	-0.19	-21.49
4,029.00	0.13	250.15	4,028.89	-7.23	5.72	-7.31	0.48	-0.33	94.40
4,124.00	0.18	180.63	4,123.89	-7.42	5.62	-7.49	0.19	0.05	-73.18
4,218.00	0.26	199.96	4,217.89	-7.76	5.54	-7.84	0.11	0.09	20.56
4,314.00	0.04	238.72	4,313.89	-7.99	5.44	-8.06	0.24	-0.23	40.38
4,408.00	0.26	220.09	4,407.89	-8.17	5.28	-8.24	0.24	0.23	-19.82
4,503.00	0.09	332.85	4,502.89	-8.27	5.10	-8.33	0.32	-0.18	118.69
4,598.00	0.26	325.12	4,597.89	-8.02	4.94	-8.09	0.18	0.18	-8.14
4,692.00	0.31	346.13	4,691.89	-7.60	4.76	-7.66	0.12	0.05	22.35
4,787.00	0.62	314.57	4,786.89	-6.99	4.33	-7.05	0.41	0.33	-33.22
4,881.00	0.18	348.76	4,880.88	-6.49	3.94	-6.54	0.51	-0.47	36.37
4,974.00	0.26	14.43	4,973.88	-6.14	3.97	-6.19	0.13	0.09	27.60



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5,067.00	0.31	8.71	5,066.88	-5.69	4.06	-5.74	0.06	0.05	-6.15
5,162.00	0.35	24.09	5,161.88	-5.17	4.22	-5.23	0.10	0.04	16.19
5,256.00	0.22	342.43	5,255.88	-4.73	4.28	-4.79	0.25	-0.14	-44.32
5,349.00	0.35	14.34	5,348.88	-4.29	4.29	-4.35	0.22	0.14	34.31
5,479.00	0.79	14.87	5,478.87	-3.04	4.62	-3.10	0.34	0.34	0.41
5,574.00	1.05	342.26	5,573.86	-1.58	4.53	-1.64	0.60	0.27	-34.33
5,669.00	1.54	338.22	5,668.83	0.44	3.79	0.39	0.52	0.52	-4.25
5,764.00	1.63	341.03	5,763.80	2.90	2.87	2.86	0.13	0.09	2.96
5,858.00	1.67	341.03	5,857.76	5.46	1.99	5.43	0.04	0.04	0.00
5,951.00	1.63	338.57	5,950.72	7.97	1.07	7.96	0.09	-0.04	-2.65
6,046.00	1.58	338.65	6,045.68	10.45	0.10	10.45	0.05	-0.05	0.08
6,141.00	1.58	340.85	6,140.65	12.91	-0.81	12.92	0.06	0.00	2.32
6,235.00	1.58	342.08	6,234.61	15.37	-1.63	15.39	0.04	0.00	1.31
6,329.00	1.58	345.33	6,328.58	17.85	-2.36	17.88	0.10	0.00	3.46
6,424.00	1.45	344.10	6,423.54	20.28	-3.02	20.31	0.14	-0.14	-1.29
6,519.00	1.54	342.17	6,518.51	22.65	-3.74	22.70	0.11	0.09	-2.03
6,614.00	1.58	344.98	6,613.48	25.13	-4.47	25.19	0.09	0.04	2.96
6,709.00	1.36	343.58	6,708.44	27.47	-5.13	27.54	0.23	-0.23	-1.47
6,804.00	1.19	346.57	6,803.42	29.51	-5.67	29.59	0.19	-0.18	3.15
6,898.00	1.27	341.20	6,897.40	31.45	-6.24	31.53	0.15	0.09	-5.71
6,993.00	1.14	346.57	6,992.38	33.37	-6.80	33.46	0.18	-0.14	5.65
7,088.00	1.05	325.38	7,087.36	35.00	-7.51	35.10	0.43	-0.09	-22.31
7,183.00	1.80	323.54	7,182.33	36.92	-8.89	37.04	0.79	0.79	-1.94
7,278.00	1.80	323.63	7,277.28	39.32	-10.66	39.46	0.00	0.00	0.09
7,373.00	1.67	322.75	7,372.24	41.62	-12.39	41.79	0.14	-0.14	-0.93
7,468.00	1.63	322.83	7,467.20	43.80	-14.04	43.99	0.04	-0.04	0.08
7,562.00	1.49	319.23	7,561.17	45.79	-15.65	46.00	0.18	-0.15	-3.83
7,657.00	1.45	315.72	7,656.13	47.59	-17.29	47.82	0.10	-0.04	-3.69
7,752.00	1.27	313.61	7,751.11	49.17	-18.89	49.43	0.20	-0.19	-2.22
7,846.00	1.49	320.73	7,845.08	50.84	-20.42	51.11	0.30	0.23	7.57
7,939.00	1.36	321.43	7,938.05	52.64	-21.87	52.93	0.14	-0.14	0.75
8,033.00	1.41	328.11	8,032.02	54.49	-23.18	54.80	0.18	0.05	7.11
8,128.00	1.45	328.28	8,126.99	56.51	-24.43	56.84	0.04	0.04	0.18
8,223.00	1.27	325.12	8,221.97	58.39	-25.66	58.74	0.21	-0.19	-3.33
8,317.00	1.27	328.99	8,315.95	60.14	-26.80	60.50	0.09	0.00	4.12
8,412.00	1.19	318.35	8,410.92	61.78	-27.99	62.16	0.25	-0.08	-11.20
8,506.00	0.75	321.25	8,504.91	62.99	-29.03	63.38	0.47	-0.47	3.09
8,601.00	1.05	328.37	8,599.90	64.21	-29.87	64.62	0.34	0.32	7.49
8,696.00	1.32	325.74	8,694.88	65.86	-30.95	66.28	0.29	0.28	-2.77
8,729.00	1.32	326.00	8,727.87	66.49	-31.37	66.91	0.02	0.00	0.79
8,758.00	1.19	315.89	8,756.86	66.98	-31.77	67.41	0.88	-0.45	-34.86
8,790.00	3.74	334.61	8,788.83	68.16	-32.45	68.60	8.25	7.97	58.50
8,821.00	8.92	347.88	8,819.63	71.43	-33.39	71.88	17.25	16.71	42.81



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8,852.00	14.24	352.19	8,849.99	77.56	-34.41	78.03	17.38	17.16	13.90
8,883.00	18.37	353.68	8,879.74	86.20	-35.47	86.68	13.39	13.32	4.81
8,915.00	20.79	353.86	8,909.88	96.86	-36.63	97.35	7.56	7.56	0.56
8,947.00	23.34	354.91	8,939.54	108.82	-37.80	109.33	8.06	7.97	3.28
8,979.00	25.80	355.09	8,968.64	122.07	-38.96	122.60	7.69	7.69	0.56
9,010.00	27.52	354.21	8,996.34	135.92	-40.26	136.46	5.69	5.55	-2.84
9,041.00	27.52	353.42	9,023.83	150.16	-41.80	150.72	1.18	0.00	-2.55
9,073.00	27.52	353.86	9,052.21	164.86	-43.44	165.44	0.64	0.00	1.38
9,104.00	30.15	355.62	9,079.37	179.74	-44.80	180.34	8.91	8.48	5.68
9,136.00	32.26	357.29	9,106.74	196.29	-45.82	196.90	7.13	6.59	5.22
9,168.00	34.64	358.78	9,133.44	213.91	-46.41	214.53	7.87	7.44	4.66
9,232.00	37.19	4.14	9,185.28	251.41	-45.41	252.01	6.32	3.98	8.38
9,264.00	39.65	5.37	9,210.35	271.22	-43.75	271.80	8.05	7.69	3.84
9,296.00	43.82	5.02	9,234.22	292.43	-41.83	292.98	13.05	13.03	-1.09
9,327.00	47.56	3.62	9,255.87	314.55	-40.16	315.07	12.49	12.06	-4.52
9,359.00	50.90	2.65	9,276.77	338.74	-38.84	339.24	10.69	10.44	-3.03
9,390.00	54.24	2.65	9,295.61	363.33	-37.71	363.81	10.77	10.77	0.00
9,422.00	57.98	3.18	9,313.45	389.85	-36.35	390.31	11.77	11.69	1.66
9,453.00	61.05	3.88	9,329.17	416.51	-34.70	416.95	10.09	9.90	2.26
9,485.00	65.41	3.79	9,343.58	445.01	-32.79	445.42	13.63	13.63	-0.28
9,517.00	68.44	3.53	9,356.12	474.39	-30.92	474.77	9.50	9.47	-0.81
9,549.00	71.38	3.44	9,367.11	504.38	-29.09	504.73	9.19	9.19	-0.28
9,580.00	74.24	3.35	9,376.27	533.94	-27.34	534.27	9.23	9.23	-0.29
9,631.00	78.29	3.26	9,388.38	583.39	-24.48	583.67	7.94	7.94	-0.18
9,663.00	79.65	2.47	9,394.50	614.76	-22.91	615.02	4.89	4.25	-2.47
9,693.00	83.30	1.95	9,398.95	644.40	-21.77	644.64	12.29	12.17	-1.73
9,697.56	83.52	1.98	9,399.47	648.93	-21.61	649.17	4.77	4.73	0.55
H Fed Com A #11H FTP									
9,698.48	83.56	1.98	9,399.57	649.84	-21.58	650.08	4.77	4.73	0.55
Hardline Crossing Point 9698.48'MD/650.07'VS									
9,757.00	86.33	2.30	9,404.73	708.09	-19.41	708.29	4.77	4.73	0.55
9,852.00	88.75	1.95	9,408.81	802.93	-15.89	803.07	2.57	2.55	-0.37
9,946.00	91.30	2.12	9,408.77	896.86	-12.55	896.95	2.72	2.71	0.18
10,041.00	90.73	359.84	9,407.08	991.83	-10.92	991.88	2.47	-0.60	-2.40
10,135.00	91.52	0.36	9,405.24	1,085.81	-10.76	1,085.85	1.01	0.84	0.55
10,230.00	91.74	359.31	9,402.54	1,180.77	-11.03	1,180.81	1.13	0.23	-1.11
10,324.00	91.34	0.01	9,400.01	1,274.73	-11.59	1,274.77	0.86	-0.43	0.74
10,418.00	91.03	358.61	9,398.07	1,368.70	-12.72	1,368.75	1.53	-0.33	-1.49
10,513.00	90.64	358.61	9,396.68	1,463.66	-15.03	1,463.73	0.41	-0.41	0.00
10,607.00	90.20	358.96	9,395.99	1,557.64	-17.02	1,557.73	0.60	-0.47	0.37
10,702.00	91.03	359.31	9,394.97	1,652.62	-18.45	1,652.72	0.95	0.87	0.37
10,796.00	93.01	359.40	9,391.66	1,746.55	-19.51	1,746.66	2.11	2.11	0.10
10,890.00	90.51	356.76	9,388.77	1,840.44	-22.66	1,840.58	3.87	-2.66	-2.81
10,985.00	90.77	357.46	9,387.71	1,935.31	-27.45	1,935.51	0.79	0.27	0.74



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MD Reference: KB=18 @ 3628.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

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)
11,080.00	91.52	356.94	9,385.81	2,030.18	-32.09	2,030.43	0.96	0.79	-0.55
11,174.00	90.90	357.02	9,383.83	2,124.03	-37.04	2,124.34	0.67	-0.66	0.09
11,268.00	91.60	357.55	9,381.78	2,217.90	-41.49	2,218.26	0.93	0.74	0.56
11,363.00	90.90	357.46	9,379.70	2,312.79	-45.63	2,313.19	0.74	-0.74	-0.09
11,457.00	89.71	357.90	9,379.20	2,406.71	-49.43	2,407.16	1.35	-1.27	0.47
11,552.00	90.42	359.57	9,379.10	2,501.68	-51.53	2,502.15	1.91	0.75	1.76
11,647.00	91.21	0.80	9,377.75	2,596.67	-51.22	2,597.12	1.54	0.83	1.29
11,741.00	91.69	0.72	9,375.37	2,690.63	-49.98	2,691.06	0.52	0.51	-0.09
11,836.00	91.43	0.45	9,372.78	2,785.59	-49.01	2,786.00	0.39	-0.27	-0.28
11,931.00	90.95	0.19	9,370.81	2,880.56	-48.48	2,880.96	0.57	-0.51	-0.27
12,026.00	92.00	358.25	9,368.36	2,975.52	-49.77	2,975.92	2.32	1.11	-2.04
12,120.00	91.56	358.25	9,365.44	3,069.43	-52.64	3,069.86	0.47	-0.47	0.00
12,215.00	92.04	357.99	9,362.46	3,164.33	-55.75	3,164.80	0.57	0.51	-0.27
12,309.00	91.69	357.82	9,359.40	3,258.22	-59.19	3,258.72	0.41	-0.37	-0.18
12,404.00	90.64	357.46	9,357.47	3,353.12	-63.10	3,353.67	1.17	-1.11	-0.38
12,498.00	90.02	1.51	9,356.93	3,447.09	-63.94	3,447.64	4.36	-0.66	4.31
12,592.00	89.41	359.66	9,357.39	3,541.08	-62.98	3,541.61	2.07	-0.65	-1.97
12,687.00	88.97	359.22	9,358.74	3,636.07	-63.91	3,636.60	0.65	-0.46	-0.46
12,782.00	87.74	359.40	9,361.46	3,731.02	-65.06	3,731.56	1.31	-1.29	0.19
12,876.00	88.62	359.40	9,364.45	3,824.96	-66.04	3,825.51	0.94	0.94	0.00
12,971.00	89.80	0.28	9,365.76	3,919.95	-66.30	3,920.49	1.55	1.24	0.93
13,065.00	89.32	359.57	9,366.48	4,013.95	-66.43	4,014.48	0.91	-0.51	-0.76
13,160.00	89.49	359.84	9,367.47	4,108.94	-66.92	4,109.47	0.34	0.18	0.28
13,254.00	89.85	359.92	9,368.01	4,202.94	-67.11	4,203.46	0.39	0.38	0.09
13,348.00	90.15	359.57	9,368.01	4,296.94	-67.53	4,297.46	0.49	0.32	-0.37
13,443.00	90.55	359.22	9,367.43	4,391.93	-68.54	4,392.46	0.56	0.42	-0.37
13,538.00	88.75	358.96	9,368.01	4,486.91	-70.04	4,487.45	1.91	-1.89	-0.27
13,633.00	88.75	359.40	9,370.08	4,581.88	-71.40	4,582.43	0.46	0.00	0.46
13,726.00	86.95	359.92	9,373.57	4,674.81	-71.95	4,675.36	2.01	-1.94	0.56
13,822.00	87.21	0.36	9,378.46	4,770.68	-71.72	4,771.22	0.53	0.27	0.46
13,916.00	87.38	0.36	9,382.90	4,864.58	-71.13	4,865.10	0.18	0.18	0.00
14,011.00	87.69	0.80	9,386.98	4,959.48	-70.17	4,959.98	0.57	0.33	0.46
14,105.00	86.90	0.89	9,391.42	5,053.37	-68.79	5,053.84	0.85	-0.84	0.10
14,200.00	86.86	0.10	9,396.59	5,148.22	-67.97	5,148.67	0.83	-0.04	-0.83
14,258.00	86.24	358.87	9,400.08	5,206.11	-68.49	5,206.56	2.37	-1.07	-2.12
Final MWD Survey									
14,315.00	86.24	358.87	9,403.82	5,262.98	-69.61	5,263.44	0.00	0.00	0.00
Projection to TD - PBHL Hamon Fed Com A #11H									



Integrity Directional Services, LLC

Survey Report



Company: Legacy Reserves Operating
Project: Lea County, NM
Site: Hamon Fed Pad
Well: Hamon Fed Com A #11H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Hamon Fed Com A #11H
TVD Reference: KB=18 @ 3628.00ft
MD Reference: KB=18 @ 3628.00ft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Survey Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
193.00	193.00	0.68	-0.96	First MWD Survey
9,698.48	9,399.57	649.84	-21.58	Hardline Crossing Point 9698.48'MD/650.07'VS
14,258.00	9,400.08	5,206.11	-68.49	Final MWD Survey
14,315.00	9,403.82	5,262.98	-69.61	Projection to TD

Checked By: _____ Approved By: _____ Date: _____