

30-025-42958



HOBBS OCD

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Legacy Reserves Operating

Lea County, NM
Sec 01, T 20 S, R 34 E
Lea Unit 51H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

26 June, 2017





Integrity Directional Services, LLC

Survey Report



Company: Legacy Reserves Operating
 Project: Lea County, NM
 Site: Sec 01, T 20 S, R 34 E
 Well: Lea Unit 51H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Lea Unit 51H
 TVD Reference: KB=25' @ 3705.00ft
 MD Reference: KB=25' @ 3705.00ft
 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	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Sec 01, T 20 S, R 34 E		
Site Position:		Northing:	581,763.7000 usft
From:	Map	Easting:	795,728.6000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32.5966054
		Longitude:	-103.5073039
		Grid Convergence:	0.45 °

Well	Lea Unit 51H, ACTIVE		
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	Easting:
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32.5966054
		Longitude:	-103.5073039
		Ground Level:	3,680.00 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	HDGM	6/1/2017	6.73
			Dip Angle
			60.58
			Field Strength
			48,307

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			Direction
			181.92

Survey Program	Date 6/26/2017		
From	To	Survey (Wellbore)	Tool Name
(ft)	(ft)		
206.00	16,282.00	IDS MWD Surveys (Wellbore #1)	MWD
			Description
			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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
206.00	0.70	56.60	205.99	0.69	1.05	-0.73	0.34	0.34	0.00
First IDS MWD Survey									
389.00	0.70	85.50	388.98	1.40	3.10	-1.50	0.19	0.00	15.79
571.00	0.50	82.20	570.97	1.59	4.99	-1.76	0.11	-0.11	-1.81
752.00	0.70	103.80	751.96	1.43	6.85	-1.66	0.16	0.11	11.93
933.00	0.70	136.70	932.95	0.37	8.68	-0.66	0.22	0.00	18.18
1,114.00	0.50	167.20	1,113.94	-1.21	9.61	0.89	0.20	-0.11	16.85
1,297.00	0.20	165.50	1,296.94	-2.30	9.87	1.96	0.16	-0.16	-0.93
1,482.00	0.80	170.90	1,481.93	-3.88	10.16	3.54	0.32	0.32	2.92
1,672.00	0.90	205.70	1,671.91	-6.54	9.72	6.21	0.27	0.05	18.32



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1,791.00	0.70	190.10	1,790.90	-8.10	9.19	7.78	0.25	-0.17	-13.11
1,953.00	0.40	199.80	1,952.89	-9.60	8.82	9.30	0.19	-0.19	5.99
2,142.00	0.40	206.20	2,141.88	-10.82	8.31	10.53	0.02	0.00	3.39
2,333.00	0.50	172.60	2,332.88	-12.24	8.12	11.96	0.15	0.05	-17.59
2,427.00	0.30	165.70	2,426.88	-12.89	8.23	12.60	0.22	-0.21	-7.34
2,613.00	0.40	115.80	2,612.87	-13.64	8.94	13.33	0.17	0.05	-26.83
2,802.00	0.70	108.40	2,801.86	-14.29	10.63	13.93	0.16	0.16	-3.92
2,990.00	1.80	86.70	2,989.82	-14.48	14.67	13.98	0.63	0.59	-11.54
3,085.00	2.00	58.00	3,084.77	-13.52	17.56	12.92	1.01	0.21	-30.21
3,179.00	0.60	42.40	3,178.74	-12.29	19.28	11.63	1.52	-1.49	-16.60
3,273.00	0.20	3.40	3,272.74	-11.76	19.63	11.09	0.49	-0.43	-41.49
3,367.00	0.40	47.20	3,366.74	-11.37	19.88	10.70	0.31	0.21	46.60
3,556.00	0.30	8.00	3,555.73	-10.43	20.43	9.74	0.13	-0.05	-20.74
3,745.00	0.30	38.10	3,744.73	-9.56	20.80	8.85	0.08	0.00	15.93
3,937.00	0.10	327.10	3,936.73	-9.02	21.02	8.31	0.15	-0.10	-36.98
4,122.00	0.00	359.00	4,121.73	-8.88	20.93	8.18	0.05	-0.05	0.00
4,217.00	0.30	129.60	4,216.73	-9.04	21.13	8.33	0.32	0.32	0.00
4,311.00	0.40	131.00	4,310.73	-9.41	21.56	8.69	0.11	0.11	1.49
4,406.00	0.20	143.00	4,405.73	-9.76	21.91	9.02	0.22	-0.21	12.63
4,595.00	0.30	50.80	4,594.73	-9.72	22.50	8.95	0.19	0.05	-48.78
4,783.00	0.10	149.60	4,782.73	-9.55	22.96	8.77	0.18	-0.11	52.55
4,878.00	0.10	151.60	4,877.73	-9.69	23.04	8.91	0.00	0.00	2.11
5,067.00	0.20	37.10	5,066.72	-9.57	23.32	8.78	0.14	0.05	-60.58
5,256.00	0.10	33.30	5,255.72	-9.17	23.61	8.37	0.05	-0.05	-2.01
5,445.00	0.20	63.90	5,444.72	-8.89	23.99	8.08	0.07	0.05	16.19
5,537.00	0.30	111.90	5,536.72	-8.91	24.36	8.08	0.24	0.11	52.17
5,661.00	0.40	83.30	5,660.72	-8.98	25.09	8.13	0.16	0.08	-23.06
5,850.00	0.20	101.80	5,849.72	-8.97	26.07	8.09	0.12	-0.11	9.79
6,039.00	0.20	135.60	6,038.72	-9.27	26.63	8.37	0.06	0.00	17.88
6,228.00	0.30	68.70	6,227.72	-9.33	27.32	8.41	0.15	0.05	-35.40
6,416.00	0.40	84.00	6,415.71	-9.08	28.43	8.12	0.07	0.05	8.14
6,605.00	0.40	73.00	6,604.71	-8.82	29.72	7.82	0.04	0.00	-5.82
6,794.00	0.60	291.20	6,793.70	-8.27	29.42	7.28	0.50	0.11	-75.03
6,984.00	0.40	283.50	6,983.70	-7.75	27.85	6.81	0.11	-0.11	-4.05
7,173.00	0.60	252.40	7,172.69	-7.90	26.27	7.01	0.17	0.11	-16.46
7,267.00	0.50	249.10	7,266.69	-8.19	25.41	7.34	0.11	-0.11	-3.51
7,456.00	0.40	225.20	7,455.68	-8.95	24.18	8.14	0.11	-0.05	-12.65
7,645.00	0.60	226.00	7,644.67	-10.10	23.00	9.33	0.11	0.11	0.42
7,833.00	0.70	218.10	7,832.66	-11.69	21.58	10.96	0.07	0.05	-4.20
8,022.00	1.00	217.60	8,021.64	-13.91	19.86	13.23	0.16	0.16	-0.26
8,211.00	1.00	216.80	8,210.61	-16.53	17.87	15.93	0.01	0.00	-0.42
8,399.00	1.30	229.90	8,398.57	-19.22	15.25	18.70	0.21	0.16	6.97
8,494.00	1.50	230.80	8,493.54	-20.70	13.46	20.24	0.21	0.21	0.95



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8,588.00	0.90	359.90	8,587.53	-20.74	12.51	20.31	2.32	-0.64	137.34
8,777.00	0.60	322.90	8,776.52	-18.47	11.91	18.06	0.29	-0.16	-19.58
8,965.00	1.20	278.90	8,964.50	-17.38	9.37	17.05	0.46	0.32	-23.40
9,147.00	2.10	251.70	9,146.42	-18.13	4.32	17.97	0.64	0.49	-14.95
9,241.00	1.70	251.90	9,240.37	-19.10	1.36	19.05	0.43	-0.43	0.21
9,336.00	1.50	243.90	9,335.33	-20.09	-1.09	20.11	0.32	-0.21	-8.42
9,525.00	2.30	223.20	9,524.23	-23.94	-5.91	24.13	0.55	0.42	-10.95
9,619.00	2.20	228.10	9,618.16	-26.52	-8.55	26.79	0.23	-0.11	5.21
9,713.00	1.90	236.20	9,712.10	-28.59	-11.18	28.95	0.44	-0.32	8.62
9,807.00	2.00	233.30	9,806.04	-30.44	-13.79	30.89	0.15	0.11	-3.09
9,901.00	1.50	232.30	9,900.00	-32.17	-16.08	32.69	0.53	-0.53	-1.06
9,996.00	1.50	224.90	9,994.97	-33.81	-17.94	34.40	0.20	0.00	-7.79
10,184.00	2.40	232.20	10,182.86	-37.97	-22.79	38.71	0.50	0.48	3.88
10,278.00	2.40	236.50	10,276.77	-40.26	-25.99	41.11	0.19	0.00	4.57
10,372.00	2.20	232.60	10,370.70	-42.44	-29.06	43.40	0.27	-0.21	-4.15
10,419.00	2.40	215.90	10,417.66	-43.79	-30.36	44.78	1.48	0.43	-35.53
10,466.00	6.30	194.70	10,464.52	-47.08	-31.59	48.12	8.84	8.30	-45.11
10,513.00	12.00	188.20	10,510.90	-54.42	-32.94	55.49	12.31	12.13	-13.83
10,560.00	18.00	185.90	10,556.28	-66.49	-34.39	67.61	12.83	12.77	-4.89
10,607.00	22.30	182.60	10,600.39	-82.63	-35.54	83.78	9.46	9.15	-7.02
10,655.00	25.40	180.60	10,644.29	-102.03	-36.06	103.18	6.67	6.46	-4.17
10,701.00	28.90	181.50	10,685.22	-123.01	-36.45	124.16	7.66	7.61	1.96
10,749.00	33.30	181.20	10,726.31	-147.79	-37.03	148.95	9.17	9.17	-0.63
10,796.00	37.70	181.30	10,764.56	-175.07	-37.63	176.23	9.36	9.36	0.21
10,843.00	41.60	179.80	10,800.74	-205.05	-37.90	206.21	8.54	8.30	-3.19
10,890.00	45.80	179.30	10,834.72	-237.51	-37.64	238.64	8.97	8.94	-1.06
10,937.00	50.60	180.30	10,866.03	-272.54	-37.53	273.65	10.33	10.21	2.13
10,984.00	55.60	181.10	10,894.24	-310.11	-38.00	311.21	10.72	10.64	1.70
11,031.00	59.80	181.40	10,919.35	-349.82	-38.87	350.93	8.95	8.94	0.64
11,078.00	62.30	180.60	10,942.10	-390.94	-39.58	392.04	5.52	5.32	-1.70
11,125.00	64.80	181.20	10,963.04	-433.01	-40.24	434.11	5.44	5.32	1.28
11,172.00	68.60	182.20	10,981.62	-476.15	-41.53	477.27	8.32	8.09	2.13
11,219.00	74.90	183.00	10,996.33	-520.71	-43.56	521.88	13.50	13.40	1.70
11,266.00	78.60	182.80	11,007.10	-566.40	-45.87	567.62	7.88	7.87	-0.43
11,314.00	82.20	182.80	11,015.11	-613.66	-48.18	614.93	7.50	7.50	0.00
11,369.00	85.60	182.20	11,020.95	-668.29	-50.57	669.61	6.28	6.18	-1.09
11,417.00	86.60	181.40	11,024.22	-716.15	-52.07	717.50	2.67	2.08	-1.67
11,464.00	87.10	181.50	11,026.80	-763.07	-53.26	764.42	1.08	1.06	0.21
11,511.00	90.20	181.20	11,027.91	-810.03	-54.37	811.40	6.63	6.60	-0.64
11,558.00	90.50	181.00	11,027.62	-857.02	-55.27	858.40	0.77	0.64	-0.43
11,605.00	90.10	181.00	11,027.37	-904.02	-56.09	905.39	0.85	-0.85	0.00
11,661.71	90.04	180.94	11,027.30	-960.72	-57.05	962.09	0.15	-0.11	-0.11

North 330 Crossing point 11661.71'MD / 962.09' VS



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11,699.00	90.00	180.90	11,027.29	-998.00	-57.65	999.38	0.15	-0.11	-0.11
11,794.00	90.00	180.90	11,027.29	-1,092.99	-59.14	1,094.36	0.00	0.00	0.00
11,888.00	89.80	181.00	11,027.46	-1,186.98	-60.70	1,188.35	0.24	-0.21	0.11
11,982.00	89.70	181.10	11,027.87	-1,280.96	-62.42	1,282.34	0.15	-0.11	0.11
12,077.00	89.70	180.50	11,028.36	-1,375.95	-63.75	1,377.32	0.63	0.00	-0.63
12,171.00	89.80	180.20	11,028.77	-1,469.95	-64.32	1,471.28	0.34	0.11	-0.32
12,266.00	89.60	180.10	11,029.27	-1,564.95	-64.57	1,566.23	0.24	-0.21	-0.11
12,360.00	89.80	180.00	11,029.76	-1,658.94	-64.65	1,660.18	0.24	0.21	-0.11
12,454.00	89.80	179.70	11,030.09	-1,752.94	-64.41	1,754.12	0.32	0.00	-0.32
12,549.00	90.00	179.70	11,030.26	-1,847.94	-63.91	1,849.05	0.21	0.21	0.00
12,643.00	90.10	179.80	11,030.17	-1,941.94	-63.50	1,942.98	0.15	0.11	0.11
12,737.00	90.10	180.60	11,030.01	-2,035.94	-63.83	2,036.94	0.85	0.00	0.85
12,832.00	90.00	181.00	11,029.93	-2,130.93	-65.15	2,131.92	0.43	-0.11	0.42
12,926.00	90.40	181.40	11,029.60	-2,224.91	-67.12	2,225.91	0.60	0.43	0.43
13,020.00	90.40	181.60	11,028.94	-2,318.87	-69.58	2,319.90	0.21	0.00	0.21
13,114.00	90.80	181.60	11,027.96	-2,412.83	-72.21	2,413.90	0.43	0.43	0.00
13,209.00	90.50	182.00	11,026.88	-2,507.78	-75.19	2,508.89	0.53	-0.32	0.42
13,303.00	92.60	181.90	11,024.34	-2,601.68	-78.39	2,602.85	2.24	2.23	-0.11
13,397.00	93.10	182.20	11,019.67	-2,695.51	-81.75	2,696.73	0.62	0.53	0.32
13,491.00	91.80	182.80	11,015.65	-2,789.33	-85.84	2,790.64	1.52	-1.38	0.64
13,585.00	92.20	182.40	11,012.37	-2,883.18	-90.10	2,884.58	0.60	0.43	-0.43
13,679.00	92.20	182.50	11,008.76	-2,977.02	-94.12	2,978.50	0.11	0.00	0.11
13,774.00	92.70	182.90	11,004.70	-3,071.83	-98.59	3,073.41	0.67	0.53	0.42
13,868.00	91.40	182.30	11,001.33	-3,165.67	-102.85	3,167.34	1.52	-1.38	-0.64
13,962.00	91.30	182.30	10,999.12	-3,259.57	-106.62	3,261.31	0.11	-0.11	0.00
14,056.00	90.20	181.90	10,997.89	-3,353.49	-110.07	3,355.30	1.25	-1.17	-0.43
14,151.00	90.60	182.20	10,997.23	-3,448.43	-113.46	3,450.30	0.53	0.42	0.32
14,248.00	89.20	181.70	10,997.40	-3,545.37	-116.76	3,547.29	1.53	-1.44	-0.52
14,342.00	89.80	182.10	10,998.22	-3,639.32	-119.88	3,641.29	0.77	0.64	0.43
14,436.00	88.00	181.80	11,000.02	-3,733.24	-123.08	3,735.27	1.94	-1.91	-0.32
14,531.00	87.90	181.60	11,003.42	-3,828.14	-125.90	3,830.21	0.24	-0.11	-0.21
14,625.00	89.00	181.40	11,005.96	-3,922.07	-128.36	3,924.17	1.19	1.17	-0.21
14,719.00	88.60	180.90	11,007.93	-4,016.03	-130.24	4,018.14	0.68	-0.43	-0.53
14,813.00	90.20	181.50	11,008.91	-4,110.00	-132.21	4,112.12	1.82	1.70	0.64
14,907.00	90.60	181.00	11,008.26	-4,203.98	-134.26	4,206.11	0.68	0.43	-0.53
15,001.00	90.90	181.20	11,007.03	-4,297.95	-136.07	4,300.09	0.38	0.32	0.21
15,096.00	91.20	181.30	11,005.29	-4,392.91	-138.14	4,395.07	0.33	0.32	0.11
15,190.00	91.00	181.00	11,003.48	-4,486.87	-140.02	4,489.05	0.38	-0.21	-0.32
15,284.00	91.20	180.90	11,001.68	-4,580.84	-141.58	4,583.02	0.24	0.21	-0.11
15,378.00	91.60	180.90	10,999.38	-4,674.80	-143.06	4,676.97	0.43	0.43	0.00
15,472.00	90.50	180.50	10,997.66	-4,768.78	-144.21	4,770.93	1.25	-1.17	-0.43
15,566.00	90.70	180.00	10,996.67	-4,862.77	-144.62	4,864.89	0.57	0.21	-0.53
15,661.00	90.10	180.80	10,996.01	-4,957.77	-145.28	4,959.85	1.05	-0.63	0.84
15,755.00	90.50	180.40	10,995.52	-5,051.76	-146.26	5,053.82	0.60	0.43	-0.43



Integrity Directional Services, LLC

Survey Report



Company: Legacy Reserves Operating
Project: Lea County, NM
Site: Sec 01, T 20 S, R 34 E
Well: Lea Unit 51H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Lea Unit 51H
TVD Reference: KB=25' @ 3705.00ft
MD Reference: KB=25' @ 3705.00ft
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)
15,849.00	90.90	180.60	10,994.37	-5,145.75	-147.08	5,147.79	0.48	0.43	0.21
15,943.00	91.30	180.60	10,992.57	-5,239.73	-148.07	5,241.74	0.43	0.43	0.00
16,037.00	91.50	180.80	10,990.27	-5,333.69	-149.22	5,335.70	0.30	0.21	0.21
16,131.00	92.20	181.10	10,987.23	-5,427.63	-150.77	5,429.63	0.81	0.74	0.32
16,226.00	92.50	180.70	10,983.34	-5,522.54	-152.26	5,524.54	0.53	0.32	-0.42
16,235.00	92.70	181.00	10,982.93	-5,531.53	-152.40	5,533.53	4.00	2.22	3.33
Final IDS MWD Survey									
16,282.00	92.70	181.00	10,980.72	-5,578.47	-153.22	5,580.47	0.00	0.00	0.00
Projection To TD									

Design Targets

Target Name

- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- Shape									
Interp @ 11027.30 (L)	0.00	0.00	11,027.30	-960.72	-57.05	580,802.9819	795,671.5519	32.5939661	-103.5075133
- actual wellpath hits target center									
- Point									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
206.00	205.99	0.69	1.05	First IDS MWD Survey
11,661.71	11,027.30	-960.72	-57.05	North 330 Crossing point 11661.71'MD / 962.09' VS
16,235.00	10,982.93	-5,531.53	-152.40	Final IDS MWD Survey
16,282.00	10,980.72	-5,578.47	-153.22	Projection To TD

Checked By: _____

Approved By: _____

Date: _____