



Legacy Reserves Operating

Lea County, NM
Hamon Fed Pad
Hamon Fed Com A #7H

HOBBS OCD
MAY 14 2018
RECEIVED

Wellbore #1

Design: Wellbore #1

Standard Survey Report

22 August, 2017





Integrity Directional Services, LLC

Survey Report



Company: Legacy Reserves Operating
Project: Lea County, NM
Site: Hamon Fed Pad
Well: Hamon Fed Com A #7H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Hamon Fed Com A #7H
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	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Hamon Fed Pad				
Site Position:		Northing:	580,846.2000 usft	Latitude:	32.595407
From:	Map	Easting:	723,480.4000 usft	Longitude:	-103.741904
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "	Grid Convergence:	0.32 °

Well	Hamon Fed Com A #7H					
Well Position	+N/-S	0.00 ft	Northing:	581,428.2000 usfl	Latitude:	32.596955
	+E/-W	0.00 ft	Easting:	726,860.7000 usfl	Longitude:	-103.730918
Position Uncertainty		0.00 ft	Wellhead Elevation:	0.00 ft	Ground Level:	3,610.00 ft

Wellbore	Wellbore #1					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)	
	HDGM	8/3/2017	7.08	60.55	48,402	

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	170.93		

Survey Program	Date 8/22/2017				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
50.00	5,400.00	Phoenix Gyros (Wellbore #1)	NS-GYRO-MS	North sensing gyrocompassing m/s	
5,467.00	14,545.00	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	
50.00	0.38	296.17	50.00	0.07	-0.15	-0.10	0.76	0.76	0.00	
100.00	0.56	137.77	100.00	-0.03	-0.13	0.01	1.85	0.36	-316.80	
200.00	0.49	53.03	200.00	-0.14	0.54	0.22	0.71	-0.07	-84.74	
300.00	0.58	200.06	299.99	-0.36	0.70	0.46	1.03	0.09	147.03	
400.00	0.33	262.98	399.99	-0.87	0.25	0.90	0.52	-0.25	62.92	
500.00	0.64	351.23	499.99	-0.35	-0.13	0.33	0.71	0.31	88.25	
600.00	0.60	190.69	599.99	-0.31	-0.31	0.26	1.22	-0.04	-160.54	
700.00	0.44	251.24	699.98	-0.95	-0.77	0.82	0.54	-0.16	60.55	
800.00	0.78	34.68	799.98	-0.52	-0.74	0.39	1.16	0.34	143.44	



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900.00	0.62	13.14	899.97	0.57	-0.23	-0.60	0.31	-0.16	-21.54
1,000.00	0.57	95.27	999.97	1.05	0.38	-0.98	0.78	-0.05	82.13
1,100.00	0.55	86.08	1,099.96	1.04	1.36	-0.81	0.09	-0.02	-9.19
1,200.00	0.49	90.89	1,199.96	1.07	2.26	-0.70	0.07	-0.06	4.81
1,300.00	0.35	208.61	1,299.96	0.79	2.55	-0.38	0.72	-0.14	117.72
1,400.00	0.43	224.84	1,399.96	0.26	2.13	0.08	0.14	0.08	16.23
1,500.00	0.51	222.88	1,499.95	-0.34	1.57	0.58	0.08	0.08	-1.96
1,600.00	0.34	117.20	1,599.95	-0.80	1.53	1.03	0.69	-0.17	-105.68
1,700.00	0.53	17.94	1,699.95	-0.49	1.93	0.79	0.67	0.19	-99.26
1,800.00	1.79	41.59	1,799.93	1.11	3.11	-0.61	1.32	1.26	23.65
1,900.00	1.96	46.82	1,899.87	3.45	5.40	-2.56	0.24	0.17	5.23
2,000.00	2.57	51.29	1,999.80	6.03	8.39	-4.63	0.63	0.61	4.47
2,100.00	2.57	48.13	2,099.70	8.92	11.81	-6.95	0.14	0.00	-3.16
2,200.00	2.15	49.21	2,199.61	11.65	14.90	-9.15	0.42	-0.42	1.08
2,300.00	2.09	49.06	2,299.54	14.07	17.70	-11.10	0.06	-0.06	-0.15
2,400.00	2.19	49.55	2,399.47	16.50	20.53	-13.06	0.10	0.10	0.49
2,500.00	2.37	58.72	2,499.39	18.81	23.75	-14.84	0.41	0.18	9.17
2,600.00	2.45	59.67	2,599.30	20.97	27.36	-16.39	0.09	0.08	0.95
2,700.00	2.19	58.26	2,699.22	23.05	30.83	-17.90	0.27	-0.26	-1.41
2,800.00	1.97	59.13	2,799.16	24.94	33.93	-19.28	0.22	-0.22	0.87
2,900.00	2.36	72.59	2,899.09	26.44	37.37	-20.22	0.64	0.39	13.46
3,000.00	2.09	63.22	2,999.01	27.87	40.97	-21.07	0.45	-0.27	-9.37
3,100.00	2.01	63.64	3,098.95	29.47	44.17	-22.15	0.08	-0.08	0.42
3,200.00	1.36	76.14	3,198.90	30.54	46.89	-22.77	0.74	-0.65	12.50
3,300.00	1.11	72.35	3,298.88	31.12	48.97	-23.01	0.26	-0.25	-3.79
3,400.00	0.22	72.03	3,398.87	31.47	50.07	-23.18	0.89	-0.89	-0.32
3,500.00	0.37	338.96	3,498.87	31.83	50.14	-23.53	0.44	0.15	-93.07
3,600.00	0.71	354.16	3,598.87	32.75	49.96	-24.46	0.37	0.34	15.20
3,700.00	0.36	118.56	3,698.86	33.21	50.17	-24.89	0.96	-0.35	124.40
3,800.00	0.58	11.31	3,798.86	33.56	50.55	-25.17	0.77	0.22	-107.25
3,900.00	0.55	77.22	3,898.86	34.16	51.11	-25.68	0.62	-0.03	65.91
4,000.00	0.16	92.41	3,998.86	34.26	51.72	-25.68	0.40	-0.39	15.19
4,100.00	0.02	211.63	4,098.86	34.24	51.85	-25.64	0.17	-0.14	119.22
4,200.00	0.88	298.77	4,198.85	34.60	51.17	-26.10	0.88	0.86	87.14
4,300.00	1.08	289.14	4,298.84	35.27	49.61	-27.02	0.26	0.20	-9.63
4,400.00	1.07	308.14	4,398.82	36.16	47.98	-28.15	0.35	-0.01	19.00
4,500.00	1.40	302.32	4,498.80	37.39	46.21	-29.64	0.35	0.33	-5.82
4,600.00	1.69	301.81	4,598.76	38.82	43.93	-31.41	0.29	0.29	-0.51
4,700.00	1.98	300.36	4,698.71	40.47	41.19	-33.47	0.29	0.29	-1.45
4,800.00	1.97	314.52	4,798.65	42.55	38.47	-35.95	0.49	-0.01	14.16
4,900.00	1.93	310.17	4,898.59	44.84	35.96	-38.61	0.15	-0.04	-4.35
5,000.00	1.72	301.23	4,998.54	46.70	33.39	-40.86	0.35	-0.21	-8.94
5,100.00	2.61	312.86	5,098.47	49.03	30.43	-43.62	0.99	0.89	11.63



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5,200.00	2.79	298.17	5,198.36	51.73	26.62	-46.89	0.71	0.18	-14.69
5,300.00	3.43	297.55	5,298.21	54.26	21.82	-50.14	0.64	0.64	-0.62
5,400.00	3.69	296.08	5,398.02	57.06	16.28	-53.78	0.28	0.26	-1.47
5,467.00	3.30	292.14	5,464.89	58.73	12.56	-56.02	0.68	-0.58	-5.88
First MWD Survey @ 5467' MD									
5,562.00	3.47	326.42	5,559.74	62.16	8.43	-60.05	2.11	0.18	36.08
5,656.00	4.40	1.93	5,653.53	68.14	6.98	-66.18	2.72	0.99	37.78
5,751.00	5.14	29.96	5,748.21	75.47	9.23	-73.07	2.54	0.78	29.51
5,845.00	5.19	52.38	5,841.84	81.71	14.70	-78.37	2.13	0.05	23.85
5,939.00	5.71	72.94	5,935.42	85.68	22.54	-81.05	2.14	0.55	21.87
6,034.00	6.59	92.54	6,029.89	86.82	32.50	-80.61	2.38	0.93	20.63
6,128.00	7.91	99.84	6,123.14	85.48	44.27	-77.43	1.71	1.40	7.77
6,223.00	9.93	105.99	6,216.98	82.10	58.58	-71.84	2.35	2.13	6.47
6,317.00	11.78	108.98	6,309.30	76.75	75.45	-63.90	2.06	1.97	3.18
6,411.00	14.20	113.46	6,400.89	69.04	95.10	-53.19	2.79	2.57	4.77
6,506.00	14.51	113.72	6,492.92	59.61	116.69	-40.48	0.33	0.33	0.27
6,600.00	15.47	115.57	6,583.72	49.46	138.78	-26.97	1.14	1.02	1.97
6,695.00	15.74	116.97	6,675.22	38.15	161.69	-12.19	0.49	0.28	1.47
6,789.00	15.52	116.97	6,765.75	26.66	184.26	2.71	0.23	-0.23	0.00
6,884.00	15.43	118.21	6,857.30	14.93	206.73	17.84	0.36	-0.09	1.31
6,978.00	15.21	118.91	6,947.96	3.05	228.54	33.00	0.31	-0.23	0.74
7,072.00	14.68	119.88	7,038.78	-8.84	249.66	48.08	0.62	-0.56	1.03
7,167.00	15.43	117.68	7,130.52	-20.71	271.29	63.21	0.99	0.79	-2.32
7,261.00	14.86	116.62	7,221.26	-31.92	293.14	77.72	0.67	-0.61	-1.13
7,355.00	15.78	117.77	7,311.91	-43.28	315.23	92.42	1.03	0.98	1.22
7,450.00	17.19	117.77	7,403.01	-55.83	339.08	108.58	1.48	1.48	0.00
7,544.00	17.19	117.59	7,492.81	-68.74	363.68	125.20	0.06	0.00	-0.19
7,638.00	16.26	118.21	7,582.83	-81.39	387.59	141.46	1.01	-0.99	0.66
7,733.00	17.14	118.73	7,673.82	-94.41	411.59	158.10	0.94	0.93	0.55
7,828.00	16.31	118.21	7,764.80	-107.45	435.62	174.76	0.89	-0.87	-0.55
7,922.00	16.44	116.45	7,854.99	-119.61	459.16	190.48	0.55	0.14	-1.87
8,016.00	16.92	115.30	7,945.04	-131.38	483.43	205.93	0.62	0.51	-1.22
8,111.00	17.49	119.44	8,035.79	-144.30	508.37	222.62	1.42	0.60	4.36
8,205.00	15.87	119.79	8,125.83	-157.63	531.82	239.48	1.73	-1.72	0.37
8,300.00	15.60	119.35	8,217.27	-170.35	554.23	255.57	0.31	-0.28	-0.46
8,394.00	14.51	119.61	8,308.04	-182.36	575.48	270.78	1.16	-1.16	0.28
8,489.00	13.89	118.73	8,400.14	-193.72	595.83	285.21	0.69	-0.65	-0.93
8,583.00	13.89	117.85	8,491.39	-204.42	615.70	298.90	0.22	0.00	-0.94
8,677.00	12.75	117.85	8,582.86	-214.53	634.85	311.91	1.21	-1.21	0.00
8,771.00	12.84	119.70	8,674.53	-224.56	653.09	324.68	0.45	0.10	1.97
8,866.00	11.30	120.93	8,767.42	-234.57	670.25	337.27	1.64	-1.62	1.29
8,939.00	10.46	120.75	8,839.11	-241.63	682.08	346.11	1.15	-1.15	-0.25
9,008.00	9.76	122.34	8,907.04	-247.97	692.40	353.99	1.09	-1.01	2.30



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9,055.00	14.59	137.28	8,952.98	-254.45	699.79	361.56	12.19	10.28	31.79
9,102.00	19.74	144.22	8,997.88	-265.25	708.45	373.59	11.77	10.96	14.77
9,150.00	24.26	146.07	9,042.37	-280.01	718.70	389.78	9.53	9.42	3.85
9,197.00	27.87	149.58	9,084.59	-297.50	729.66	408.78	8.35	7.68	7.47
9,244.00	32.62	153.36	9,125.18	-318.32	740.91	431.11	10.88	10.11	8.04
9,291.00	37.10	157.49	9,163.74	-342.75	752.02	456.99	10.77	9.53	8.79
9,338.00	42.46	160.30	9,199.85	-370.80	762.81	486.39	12.03	11.40	5.98
9,385.00	47.12	162.06	9,233.20	-402.14	773.46	519.02	10.26	9.91	3.74
9,433.00	51.34	162.59	9,264.54	-436.77	784.49	554.95	8.83	8.79	1.10
9,480.00	55.60	164.35	9,292.51	-472.97	795.22	592.39	9.55	9.06	3.74
9,527.00	60.04	167.16	9,317.54	-511.52	804.98	631.99	10.72	9.45	5.98
9,574.00	63.91	169.53	9,339.62	-552.14	813.35	673.43	9.36	8.23	5.04
9,621.00	66.15	171.03	9,359.46	-594.13	820.53	716.03	5.58	4.77	3.19
9,668.00	66.64	171.55	9,378.28	-636.70	827.05	759.09	1.45	1.04	1.11
9,716.00	67.82	172.26	9,396.86	-680.52	833.29	803.34	2.81	2.46	1.48
9,763.00	71.52	173.58	9,413.18	-724.25	838.71	847.38	8.30	7.87	2.81
9,810.00	73.93	175.95	9,427.14	-768.94	842.80	892.15	7.03	5.13	5.04
9,857.00	74.68	176.56	9,439.86	-814.09	845.75	937.21	2.03	1.60	1.30
9,904.00	78.33	179.55	9,450.82	-859.75	847.29	982.54	9.93	7.77	6.36
9,918.05	79.39	180.03	9,453.54	-873.53	847.35	996.16	8.28	7.57	3.41
330' Hardline Crossing @ 9918.05'MD									
9,951.00	81.89	181.14	9,458.90	-906.04	847.01	1,028.21	8.28	7.58	3.37
9,999.00	85.58	182.01	9,464.13	-953.73	845.70	1,075.09	7.90	7.69	1.81
10,018.00	86.86	182.10	9,465.39	-972.67	845.02	1,093.70	6.75	6.74	0.47
10,112.00	89.27	182.45	9,468.56	-1,066.54	841.29	1,185.80	2.59	2.56	0.37
10,207.00	88.66	182.54	9,470.28	-1,161.43	837.16	1,278.86	0.65	-0.64	0.09
10,301.00	88.22	182.19	9,472.83	-1,255.32	833.28	1,370.96	0.60	-0.47	-0.37
10,395.00	89.98	180.96	9,474.31	-1,349.26	830.70	1,463.32	2.28	1.87	-1.31
10,490.00	90.55	180.87	9,473.87	-1,444.25	829.18	1,556.88	0.61	0.60	-0.09
10,584.00	90.99	178.32	9,472.61	-1,538.23	829.84	1,649.79	2.75	0.47	-2.71
10,678.00	90.90	178.15	9,471.06	-1,632.17	832.74	1,743.02	0.20	-0.10	-0.18
10,773.00	90.68	178.41	9,469.75	-1,727.12	835.59	1,837.23	0.36	-0.23	0.27
10,867.00	90.24	178.76	9,468.99	-1,821.09	837.91	1,930.39	0.60	-0.47	0.37
10,962.00	89.89	178.76	9,468.89	-1,916.07	839.97	2,024.50	0.37	-0.37	0.00
11,057.00	89.01	179.20	9,469.80	-2,011.05	841.66	2,118.56	1.04	-0.93	0.46
11,151.00	88.84	179.73	9,471.56	-2,105.03	842.53	2,211.51	0.59	-0.18	0.56
11,246.00	88.97	180.26	9,473.38	-2,200.01	842.54	2,305.30	0.57	0.14	0.56
11,340.00	88.48	180.08	9,475.47	-2,293.98	842.26	2,398.06	0.56	-0.52	-0.19
11,435.00	87.82	178.06	9,478.53	-2,388.92	843.80	2,492.05	2.24	-0.69	-2.13
11,530.00	87.56	178.06	9,482.36	-2,483.79	847.02	2,586.24	0.27	-0.27	0.00
11,625.00	87.87	179.38	9,486.15	-2,578.68	849.14	2,680.28	1.43	0.33	1.39
11,719.00	87.60	179.47	9,489.87	-2,672.61	850.08	2,773.18	0.30	-0.29	0.10
11,813.00	87.60	179.64	9,493.80	-2,766.52	850.81	2,866.04	0.18	0.00	0.18
11,907.00	87.34	179.90	9,497.95	-2,860.43	851.19	2,958.83	0.39	-0.28	0.28



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 Project: Lea County, NM
 Site: Hamon Fed Pad
 Well: Hamon Fed Com A #7H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Hamon Fed Com A #7H
 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

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)
12,002.00	89.58	179.64	9,500.51	-2,955.39	851.57	3,052.66	2.37	2.36	-0.27
12,096.00	89.67	179.20	9,501.12	-3,049.38	852.52	3,145.63	0.48	0.10	-0.47
12,190.00	89.58	179.64	9,501.74	-3,143.37	853.47	3,238.60	0.48	-0.10	0.47
12,284.00	89.45	179.73	9,502.53	-3,237.37	853.99	3,331.50	0.17	-0.14	0.10
12,378.00	89.05	179.47	9,503.76	-3,331.36	854.64	3,424.42	0.51	-0.43	-0.28
12,473.00	87.43	175.60	9,506.68	-3,426.20	858.73	3,518.72	4.41	-1.71	-4.07
12,567.00	88.84	176.65	9,509.74	-3,519.94	865.08	3,612.28	1.87	1.50	1.12
12,661.00	87.91	178.41	9,512.41	-3,613.81	869.12	3,705.62	2.12	-0.99	1.87
12,755.00	88.88	181.93	9,515.04	-3,707.75	868.85	3,798.35	3.88	1.03	3.74
12,849.00	88.57	181.22	9,517.13	-3,801.69	866.26	3,890.71	0.82	-0.33	-0.76
12,944.00	87.96	180.87	9,520.01	-3,896.63	864.53	3,984.19	0.74	-0.64	-0.37
13,038.00	89.32	183.33	9,522.24	-3,990.53	861.09	4,076.37	2.99	1.45	2.62
13,132.00	89.41	183.16	9,523.28	-4,084.38	855.77	4,168.20	0.20	0.10	-0.18
13,226.00	89.45	183.24	9,524.22	-4,178.23	850.52	4,260.05	0.10	0.04	0.09
13,321.00	89.10	182.63	9,525.42	-4,273.09	845.66	4,352.97	0.74	-0.37	-0.64
13,415.00	89.10	183.07	9,526.89	-4,366.97	840.98	4,444.93	0.47	0.00	0.47
13,509.00	90.95	181.93	9,526.85	-4,460.87	836.88	4,537.02	2.31	1.97	-1.21
13,604.00	91.60	182.10	9,524.74	-4,555.79	833.54	4,630.22	0.71	0.68	0.18
13,698.00	92.09	180.87	9,521.71	-4,649.70	831.11	4,722.58	1.41	0.52	-1.31
13,792.00	91.38	178.23	9,518.87	-4,743.65	831.85	4,815.47	2.91	-0.76	-2.81
13,886.00	92.04	177.80	9,516.06	-4,837.55	835.10	4,908.71	0.84	0.70	-0.46
13,980.00	90.77	179.03	9,513.76	-4,931.48	837.70	5,001.88	1.88	-1.35	1.31
14,075.00	90.02	178.06	9,513.10	-5,026.45	840.11	5,096.03	1.29	-0.79	-1.02
14,169.00	89.98	178.59	9,513.10	-5,120.41	842.86	5,189.25	0.57	-0.04	0.56
14,263.00	89.23	178.41	9,513.75	-5,214.37	845.32	5,282.43	0.82	-0.80	-0.19
14,357.00	89.19	178.06	9,515.05	-5,308.32	848.21	5,375.66	0.37	-0.04	-0.37
14,451.00	89.27	178.06	9,516.31	-5,402.26	851.40	5,468.92	0.09	0.09	0.00
14,486.00	89.27	178.15	9,516.75	-5,437.23	852.55	5,503.65	0.26	0.00	0.26
Final MWD Survey @ 14486'MD									
14,542.79	89.27	178.15	9,517.48	-5,493.99	854.39	5,559.98	0.00	0.00	0.00
330' Hardline Crossing @ 14542.79'MD									
14,545.00	89.27	178.15	9,517.51	-5,496.20	854.46	5,562.18	0.00	0.00	0.00
Projection to TD @ 14545'MD									

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									
Hamon Fed Com A7H	0.00	0.00	9,537.72	-5,493.80	876.80	575,934.4110	727,737.4982	32.581841	-103.728172
- actual wellpath misses target center by 30.20ft at 14542.79ft MD (9517.48 TVD, -5493.99 N, 854.39 E)									
- Point									



Integrity Directional Services, LLC

Survey Report



Company: Legacy Reserves Operating
Project: Lea County, NM
Site: Hamon Fed Pad
Well: Hamon Fed Com A #7H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Hamon Fed Com A #7H
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

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
5,467.00	5,464.89	58.73	12.56	First MWD Survey @ 5467'MD
9,918.05	9,453.54	-873.53	847.35	330' Hardline Crossing @ 9918.05'MD
14,486.00	9,516.75	-5,437.23	852.55	Final MWD Survey @ 14486'MD
14,542.79	9,517.48	-5,493.99	854.39	330' Hardline Crossing @ 14542.79'MD
14,545.00	9,517.51	-5,496.20	854.46	Projection to TD @ 14545'MD

Checked By: _____ Approved By: _____ Date: _____