

HOBBS OCD

DEC 15 2016

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Leam Drilling Systems LLC

Survey Report

Company: Devon Energy
 Project: Lea County, NM (NAD-83)
 Site: Thistle Unit
 Well: 94H
 Wellbore: ST
 Design: ST

Local Co-ordinate Reference: Well 94H
 TVD Reference: 3713.3' GL + 25' RKB @ 3738.30usft (Original Well Elev)
 MD Reference: 3713.3' GL + 25' RKB @ 3738.30usft (Original Well Elev)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM 5000.1 Multi_User Db

Project	Lea County, NM (NAD-83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Thistle Unit		
Site Position:		Northing:	468,026.90 usft
From:	Map	Easting:	780,722.56 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 17' 3.494 N
		Longitude:	103° 33' 31.335 W
		Grid Convergence:	0.41 °

Well	94H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	3,738.30 usft
		Latitude:	32° 17' 48.434 N
		Longitude:	103° 34' 4.038 W
		Ground Level:	3,713.30 usft

Wellbore	ST		
Magnetics	Model Name	Sample Date	Declination
	BGGM2015	10/06/15	7.23
			Dip Angle
			60.21
			Field Strength
			48,231

Design	ST		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	11,907.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.00	0.00	0.00
			Direction
			179.56

Survey Program	Date 10/28/15		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
170.00	1,320.00	Survey #1 (OH)	MWD-ISCWSA
1,460.00	11,907.00	Survey #2 (OH)	LEAM MWD+HDGM
11,993.00	17,958.00	Survey #1 (ST)	LEAM MWD+HDGM
18,012.00	18,012.00	Survey #2 (ST)	Project
			Description
			MWD - Standard
			MWD+HDGM
			MWD+HDGM
			Projection

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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
170.00	1.40	5.17	169.98	2.07	0.19	-2.07	0.82	0.82	0.00	
318.00	1.90	9.97	317.92	6.29	0.77	-6.28	0.35	0.34	3.24	
428.00	1.58	5.68	427.87	9.59	1.24	-9.58	0.31	-0.29	-3.90	
510.00	1.41	6.96	509.84	11.72	1.47	-11.71	0.21	-0.21	1.56	
759.00	1.10	46.95	758.79	16.39	3.59	-16.36	0.36	-0.12	16.06	

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977.00	0.88	14.87	976.76	19.44	5.55	-19.39	0.27	-0.10	-14.72
1,160.00	0.79	345.16	1,159.74	22.01	5.59	-21.97	0.24	-0.05	-16.23
1,320.00	0.70	9.07	1,319.72	24.05	5.46	-24.00	0.20	-0.06	14.94
1,460.00	0.80	29.40	1,459.71	25.74	6.08	-25.69	0.20	0.07	14.52
1,651.00	0.60	28.50	1,650.70	27.78	7.21	-27.73	0.10	-0.10	-0.47
1,842.00	0.50	38.30	1,841.69	29.31	8.20	-29.25	0.07	-0.05	5.13
2,033.00	0.40	20.00	2,032.68	30.59	8.95	-30.53	0.09	-0.05	-9.58
2,223.00	0.20	1.80	2,222.68	31.55	9.18	-31.48	0.12	-0.11	-9.58
2,414.00	0.30	352.80	2,413.68	32.38	9.13	-32.31	0.06	0.05	-4.71
2,604.00	0.00	16.20	2,603.68	32.87	9.07	-32.80	0.16	-0.16	0.00
2,795.00	0.20	222.90	2,794.68	32.63	8.84	-32.56	0.10	0.10	0.00
2,986.00	0.20	311.50	2,985.68	32.60	8.36	-32.54	0.15	0.00	46.39
3,176.00	0.40	321.10	3,175.67	33.34	7.70	-33.28	0.11	0.11	5.05
3,366.00	0.40	334.90	3,365.67	34.46	7.00	-34.40	0.05	0.00	7.26
3,557.00	0.60	356.70	3,556.66	36.06	6.66	-36.01	0.14	0.10	11.41
3,747.00	0.60	328.20	3,746.65	37.90	6.08	-37.85	0.16	0.00	-15.00
3,938.00	0.50	7.90	3,937.64	39.57	5.67	-39.53	0.20	-0.05	20.79
4,129.00	0.30	207.20	4,128.64	39.95	5.55	-39.91	0.41	-0.10	-84.14
4,320.00	0.90	131.30	4,319.63	38.52	6.45	-38.47	0.46	0.31	-39.74
4,510.00	2.70	116.90	4,509.53	35.51	11.56	-35.42	0.97	0.95	-7.58
4,702.00	1.50	138.00	4,701.40	31.60	17.28	-31.46	0.73	-0.63	10.99
4,893.00	2.70	113.40	4,892.27	27.95	23.08	-27.77	0.77	0.63	-12.88
5,084.00	2.00	120.20	5,083.11	24.49	30.09	-24.26	0.39	-0.37	3.56
5,146.00	1.80	116.40	5,145.08	23.51	31.90	-23.27	0.38	-0.32	-6.13
5,341.00	1.40	119.20	5,340.00	20.99	36.72	-20.70	0.21	-0.21	1.44
5,531.00	1.30	115.00	5,529.95	18.94	40.70	-18.63	0.07	-0.05	-2.21
5,722.00	1.20	111.30	5,720.90	17.30	44.53	-16.96	0.07	-0.05	-1.94
5,912.00	0.90	98.10	5,910.87	16.37	47.86	-16.00	0.20	-0.16	-6.95
6,102.00	1.00	99.70	6,100.85	15.88	50.97	-15.49	0.05	0.05	0.84
6,293.00	1.10	103.70	6,291.81	15.16	54.39	-14.75	0.06	0.05	2.09
6,483.00	1.10	106.50	6,481.78	14.21	57.91	-13.77	0.03	0.00	1.47
6,673.00	1.10	104.80	6,671.74	13.23	61.43	-12.76	0.02	0.00	-0.89
6,865.00	0.90	105.50	6,863.71	12.36	64.66	-11.86	0.10	-0.10	0.36
7,056.00	1.00	108.50	7,054.69	11.43	67.69	-10.91	0.06	0.05	1.57
7,246.00	0.80	207.90	7,244.67	9.73	68.64	-9.20	0.73	-0.11	52.32
7,436.00	0.70	220.40	7,434.66	7.67	67.26	-7.16	0.10	-0.05	6.58
7,627.00	0.80	195.30	7,625.64	5.50	66.16	-4.99	0.18	0.05	-13.14
7,816.00	0.90	198.10	7,814.62	2.81	65.35	-2.31	0.06	0.05	1.48
8,007.00	0.80	192.30	8,005.60	0.09	64.60	0.41	0.07	-0.05	-3.04
8,197.00	1.10	196.20	8,195.57	-2.96	63.81	3.45	0.16	0.16	2.05
8,388.00	0.80	177.20	8,386.55	-6.05	63.36	6.54	0.23	-0.16	-9.95
8,578.00	0.90	186.10	8,576.53	-8.86	63.27	9.35	0.09	0.05	4.68

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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)
8,769.00	1.20	189.50	8,767.49	-12.33	62.78	12.81	0.16	0.16	1.78
8,960.00	0.70	216.20	8,958.47	-15.24	61.76	15.71	0.34	-0.26	13.98
9,151.00	0.80	218.00	9,149.45	-17.23	60.25	17.70	0.05	0.05	0.94
9,342.00	0.80	234.70	9,340.43	-19.05	58.34	19.50	0.12	0.00	8.74
9,533.00	0.40	302.50	9,531.43	-19.47	56.69	19.90	0.39	-0.21	35.50
9,723.00	0.60	178.20	9,721.42	-20.10	56.16	20.54	0.47	0.11	-65.42
9,914.00	1.10	199.50	9,912.40	-22.83	55.58	23.26	0.31	0.26	11.15
10,044.00	1.20	200.20	10,042.37	-25.29	54.69	25.71	0.08	0.08	0.54
10,150.00	4.00	190.00	10,148.25	-29.97	53.67	30.38	2.67	2.64	-9.62
10,200.00	9.50	168.90	10,197.90	-35.74	54.16	36.16	11.89	11.00	-42.20
10,245.00	15.30	166.10	10,241.83	-45.16	56.30	45.59	12.95	12.89	-6.22
10,296.00	20.70	167.50	10,290.31	-60.50	59.87	60.96	10.62	10.59	2.75
10,341.00	23.50	170.90	10,332.01	-77.13	63.01	77.61	6.84	6.22	7.56
10,359.00	25.10	171.70	10,348.41	-84.45	64.13	84.94	9.07	8.89	4.44
10,391.00	27.10	172.80	10,377.15	-98.40	66.03	98.90	6.43	6.25	3.44
10,422.00	29.60	171.20	10,404.43	-112.97	68.08	113.49	8.43	8.06	-5.16
10,454.00	34.00	171.90	10,431.62	-129.65	70.55	130.19	13.80	13.75	2.19
10,486.00	38.80	173.10	10,457.36	-148.47	73.02	149.03	15.16	15.00	3.75
10,518.00	43.60	174.90	10,481.44	-169.43	75.21	170.00	15.45	15.00	5.63
10,550.00	47.40	176.30	10,503.86	-192.18	76.95	192.76	12.28	11.88	4.38
10,582.00	52.20	177.40	10,524.51	-216.58	78.28	217.17	15.23	15.00	3.44
10,614.00	57.60	178.20	10,542.90	-242.73	79.28	243.33	17.00	16.88	2.50
10,646.00	62.50	178.90	10,558.88	-270.44	79.98	271.04	15.43	15.31	2.19
10,677.00	66.50	180.30	10,572.22	-298.41	80.17	299.02	13.53	12.90	4.52
10,709.00	71.30	181.20	10,583.74	-328.25	79.77	328.86	15.23	15.00	2.81
10,741.00	76.10	181.40	10,592.71	-358.95	79.08	359.55	15.01	15.00	0.63
10,764.00	78.50	181.00	10,597.77	-381.38	78.61	381.97	10.57	10.43	-1.74
10,795.00	83.80	181.00	10,602.54	-412.00	78.07	412.58	17.10	17.10	0.00
10,827.00	87.80	181.00	10,604.88	-443.90	77.51	444.48	12.50	12.50	0.00
10,859.00	90.00	181.20	10,605.50	-475.88	76.90	476.46	6.90	6.88	0.63
10,955.00	91.00	182.30	10,604.66	-571.83	73.97	572.38	1.55	1.04	1.15
11,050.00	91.80	182.80	10,602.34	-666.71	69.74	667.23	0.99	0.84	0.53
11,145.00	91.20	182.30	10,599.85	-761.58	65.52	762.06	0.82	-0.63	-0.53
11,240.00	90.50	181.00	10,598.44	-856.53	62.78	856.99	1.55	-0.74	-1.37
11,336.00	90.40	182.30	10,597.69	-952.48	60.02	952.92	1.36	-0.10	1.35
11,431.00	90.90	181.90	10,596.61	-1,047.41	56.54	1,047.82	0.67	0.53	-0.42
11,526.00	88.60	179.80	10,597.02	-1,142.39	55.13	1,142.78	3.28	-2.42	-2.21
11,621.00	87.80	179.50	10,600.01	-1,237.34	55.71	1,237.73	0.90	-0.84	-0.32
11,716.00	88.00	178.40	10,603.49	-1,332.26	57.45	1,332.66	1.18	0.21	-1.16
11,811.00	88.10	177.90	10,606.72	-1,427.16	60.51	1,427.58	0.54	0.11	-0.53
11,907.00	88.30	178.10	10,609.74	-1,523.05	63.86	1,523.50	0.29	0.21	0.21
11,993.00	88.40	179.10	10,612.21	-1,608.99	65.96	1,609.45	1.17	0.12	1.16

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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)
12,089.00	84.90	178.90	10,617.82	-1,704.79	67.64	1,705.26	3.65	-3.65	-0.21
12,184.00	89.30	179.30	10,622.63	-1,799.64	69.12	1,800.11	4.65	4.63	0.42
12,280.00	89.40	179.30	10,623.72	-1,895.62	70.30	1,896.11	0.10	0.10	0.00
12,375.00	88.60	177.90	10,625.37	-1,990.58	72.62	1,991.08	1.70	-0.84	-1.47
12,471.00	89.20	178.10	10,627.22	-2,086.50	75.97	2,087.02	0.66	0.63	0.21
12,566.00	88.50	178.10	10,629.12	-2,181.43	79.12	2,181.97	0.74	-0.74	0.00
12,661.00	87.70	177.40	10,632.27	-2,276.30	82.84	2,276.87	1.12	-0.84	-0.74
12,757.00	89.30	177.70	10,634.79	-2,372.18	86.95	2,372.78	1.70	1.67	0.31
12,852.00	89.80	178.10	10,635.53	-2,467.11	90.43	2,467.73	0.67	0.53	0.42
12,946.00	88.80	177.50	10,636.68	-2,561.03	94.04	2,561.68	1.24	-1.06	-0.64
13,042.00	86.80	177.40	10,640.37	-2,656.86	98.30	2,657.54	2.09	-2.08	-0.10
13,136.00	89.70	177.20	10,643.24	-2,750.70	102.73	2,751.41	3.09	3.09	-0.21
13,232.00	91.10	177.20	10,642.57	-2,846.59	107.42	2,847.33	1.46	1.46	0.00
13,327.00	91.50	177.70	10,640.41	-2,941.47	111.64	2,942.24	0.67	0.42	0.53
13,422.00	92.20	178.80	10,637.34	-3,036.37	114.54	3,037.16	1.37	0.74	1.16
13,517.00	92.50	178.60	10,633.45	-3,131.27	116.70	3,132.07	0.38	0.32	-0.21
13,613.00	93.50	179.50	10,628.42	-3,227.12	118.29	3,227.93	1.40	1.04	0.94
13,708.00	92.30	179.80	10,623.62	-3,321.99	118.87	3,322.81	1.30	-1.26	0.32
13,804.00	91.80	179.10	10,620.18	-3,417.93	119.79	3,418.75	0.90	-0.52	-0.73
13,899.00	90.40	176.80	10,618.36	-3,512.84	123.18	3,513.68	2.83	-1.47	-2.42
13,995.00	88.60	176.70	10,619.20	-3,608.68	128.63	3,609.56	1.88	-1.88	-0.10
14,090.00	88.90	177.20	10,621.27	-3,703.52	133.68	3,704.44	0.61	0.32	0.53
14,185.00	87.90	177.50	10,623.92	-3,798.38	138.07	3,799.33	1.10	-1.05	0.32
14,280.00	88.90	177.20	10,626.58	-3,893.24	142.46	3,894.22	1.10	1.05	-0.32
14,376.00	89.50	178.20	10,627.92	-3,989.15	146.31	3,990.16	1.21	0.63	1.04
14,471.00	91.30	180.00	10,627.25	-4,084.13	147.81	4,085.15	2.68	1.89	1.89
14,566.00	92.30	179.60	10,624.27	-4,179.08	148.14	4,180.10	1.13	1.05	-0.42
14,661.00	90.90	179.10	10,621.62	-4,274.04	149.21	4,275.06	1.56	-1.47	-0.53
14,755.00	90.50	179.30	10,620.47	-4,368.02	150.53	4,369.05	0.48	-0.43	0.21
14,850.00	89.10	180.30	10,620.80	-4,463.01	150.86	4,464.04	1.81	-1.47	1.05
14,945.00	90.10	180.20	10,621.46	-4,558.01	150.44	4,559.03	1.06	1.05	-0.11
15,041.00	90.70	180.50	10,620.79	-4,654.01	149.86	4,655.02	0.70	0.63	0.31
15,135.00	88.70	178.90	10,621.28	-4,748.00	150.35	4,749.01	2.72	-2.13	-1.70
15,231.00	88.20	178.20	10,623.88	-4,843.93	152.78	4,844.96	0.90	-0.52	-0.73
15,327.00	90.10	178.20	10,625.30	-4,939.87	155.79	4,940.92	1.98	1.98	0.00
15,422.00	89.70	177.40	10,625.47	-5,034.79	159.44	5,035.87	0.94	-0.42	-0.84
15,517.00	91.00	178.20	10,624.89	-5,129.72	163.09	5,130.82	1.61	1.37	0.84
15,613.00	90.80	179.10	10,623.38	-5,225.68	165.35	5,226.80	0.96	-0.21	0.94
15,708.00	91.00	179.50	10,621.89	-5,320.66	166.51	5,321.78	0.47	0.21	0.42
15,803.00	90.90	178.80	10,620.32	-5,415.64	167.92	5,416.77	0.74	-0.11	-0.74
15,898.00	89.20	177.00	10,620.23	-5,510.57	171.40	5,511.72	2.61	-1.79	-1.89
15,994.00	90.10	178.20	10,620.82	-5,606.48	175.42	5,607.66	1.56	0.94	1.25

Leam Drilling Systems LLC

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Company:	Devon Energy	Local Co-ordinate Reference:	Well 94H
Project:	Lea County, NM (NAD-83)	TVD Reference:	3713.3' GL + 25' RKB @ 3738.30usft (Original Well Elev)
Site:	Thistle Unit	MD Reference:	3713.3' GL + 25' RKB @ 3738.30usft (Original Well Elev)
Well:	94H	North Reference:	Grid
Wellbore:	ST	Survey Calculation Method:	Minimum Curvature
Design:	ST	Database:	EDM 5000.1 Multi_User Db

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)
16,089.00	91.00	178.10	10,619.91	-5,701.42	178.48	5,702.63	0.95	0.95	-0.11
16,185.00	87.20	176.50	10,621.41	-5,797.28	183.00	5,798.52	4.29	-3.96	-1.67
16,280.00	87.80	177.90	10,625.56	-5,892.08	187.64	5,893.34	1.60	0.63	1.47
16,376.00	89.30	176.80	10,627.99	-5,987.94	192.08	5,989.24	1.94	1.56	-1.15
16,471.00	89.90	177.50	10,628.65	-6,082.82	196.80	6,084.15	0.97	0.63	0.74
16,566.00	91.00	177.50	10,627.90	-6,177.72	200.95	6,179.08	1.16	1.16	0.00
16,662.00	89.90	177.50	10,627.15	-6,273.63	205.13	6,275.02	1.15	-1.15	0.00
16,756.00	89.20	177.20	10,627.89	-6,367.52	209.48	6,368.94	0.81	-0.74	-0.32
16,851.00	89.00	176.70	10,629.38	-6,462.38	214.53	6,463.83	0.57	-0.21	-0.53
16,947.00	89.70	177.20	10,630.47	-6,558.23	219.64	6,559.73	0.90	0.73	0.52
17,042.00	91.30	178.90	10,629.64	-6,653.17	222.87	6,654.68	2.46	1.68	1.79
17,138.00	91.60	179.30	10,627.21	-6,749.13	224.38	6,750.65	0.52	0.31	0.42
17,232.00	92.60	179.30	10,623.77	-6,843.05	225.53	6,844.59	1.06	1.06	0.00
17,327.00	90.70	179.50	10,621.03	-6,938.01	226.52	6,939.54	2.01	-2.00	0.21
17,422.00	89.20	179.50	10,621.12	-7,033.00	227.35	7,034.54	1.58	-1.58	0.00
17,518.00	88.40	179.30	10,623.13	-7,128.97	228.36	7,130.52	0.86	-0.83	-0.21
17,613.00	87.00	180.20	10,626.94	-7,223.89	228.77	7,225.44	1.75	-1.47	0.95
17,708.00	88.50	180.50	10,630.67	-7,318.81	228.19	7,320.35	1.61	1.58	0.32
17,803.00	89.00	180.00	10,632.74	-7,413.79	227.78	7,415.32	0.74	0.53	-0.53
17,897.00	88.70	179.30	10,634.63	-7,507.77	228.35	7,509.30	0.81	-0.32	-0.74
17,958.00	88.10	178.90	10,636.33	-7,568.74	229.31	7,570.27	1.18	-0.98	-0.66
18,012.00	88.10	178.90	10,638.12	-7,622.70	230.34	7,624.24	0.00	0.00	0.00
Projection									