



NM OIL CONSERVATION

ARTESIA DISTRICT

OCT 09 2018

RECEIVED

January 17, 2018

Devon Energy Production Company, LP
Well: Onyx PWU 29-28 #12H
County/Parish: Eddy County, NM

30-015-44355

LEAM MWD: (OH) from 233' MD – 16,750' MD
Projection; 16,823' MD

This Borehole Survey taken between 12/28/2017 and 01/13/2018 had been conducted and calculated according to the highest professional standards and complies with all known State and Federal requirements.

Reviewed and Approved:

Date: January 17, 2018



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Survey Certification Form

State of New Mexico

Eddy County

I, Randy W. Rakowitz, certify that; I am employed by LEAM Drilling Services, that I did on the day(s) of 12/28/2017 through 01/13/2018, conduct or supervise the taking of MWD Survey from a depth of 233' MD to 16,823' MD; that the data is true, correct, complete and within the limitations of the tools as set forth by LEAM Drilling Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of Devon Energy Production Company, LP for the Onyx PWU 29-28 #12H in Eddy County, New Mexico; and that I reviewed this report and find that it conforms to the principals and procedures as set forth by LEAM Drilling Services.

A handwritten signature in black ink, appearing to read 'RWR', is written over a horizontal line.

Randy W. Rakowitz
MWD Operations Coordinator

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 MULTI User DB

Project	Eddy 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	Onyx PWU 29-28				
Site Position:		Northing:	596,305.26 usft	Latitude:	32° 38' 20.7014 N
From:	Map	Easting:	611,703.20 usft	Longitude:	104° 6' 17.0602 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	12H					
Well Position	+N/-S	0.00 usft	Northing:	592,268.73 usft	Latitude:	32° 37' 40.7570 N
	+E/-W	0.00 usft	Easting:	611,776.35 usft	Longitude:	104° 6' 16.3063 W
Position Uncertainty	0.00 usft		Wellhead Elevation:	0.00 usft	Ground Level:	3,307.90 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/21/2017	7.40	60.45	48,137

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	96.89	

Survey Program	Date	1/18/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
50.00	150.00	Survey #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
233.00	16,750.00	Survey #2 (OH)	LEAM MWD+HDGM	MWD+HDGM	
16,823.00	16,823.00	Survey #3 (OH)	Project	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
50.00	0.07	36.34	50.00	0.02	0.02	0.02	0.14	0.14	0.00
100.00	0.16	167.69	100.00	-0.02	0.05	0.05	0.43	0.18	262.70
150.00	0.70	158.90	150.00	-0.37	0.18	0.22	1.08	1.08	-17.58
233.00	0.90	177.90	232.99	-1.50	0.38	0.56	0.40	0.24	22.89
325.00	1.10	177.50	324.98	-3.10	0.45	0.82	0.22	0.22	-0.43
423.00	1.10	186.80	422.96	-4.97	0.38	0.97	0.18	0.00	9.49
514.00	0.90	168.60	513.94	-6.54	0.41	1.20	0.41	-0.22	-20.00
606.00	1.00	154.60	605.93	-7.98	0.90	1.85	0.27	0.11	-15.22

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Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
697.00	1.10	141.60	696.92	-9.38	1.79	2.90	0.28	0.11	-14.29
789.00	1.00	128.30	788.90	-10.57	2.96	4.21	0.29	-0.11	-14.46
879.00	1.10	114.40	878.89	-11.41	4.37	5.70	0.30	0.11	-15.44
970.00	1.20	122.70	969.87	-12.29	5.96	7.40	0.21	0.11	9.12
1,061.00	1.00	124.00	1,060.85	-13.25	7.42	8.96	0.22	-0.22	1.43
1,152.00	0.70	105.10	1,151.84	-13.83	8.62	10.22	0.45	-0.33	-20.77
1,243.00	0.60	105.80	1,242.84	-14.11	9.61	11.24	0.11	-0.11	0.77
1,334.00	0.60	109.70	1,333.83	-14.40	10.52	12.17	0.04	0.00	4.29
1,426.00	0.50	159.90	1,425.83	-14.94	11.11	12.82	0.52	-0.11	54.57
1,518.00	1.10	200.60	1,517.82	-16.14	10.94	12.80	0.86	0.65	44.24
1,610.00	2.10	198.90	1,609.78	-18.56	10.08	12.24	1.09	1.09	-1.85
1,702.00	2.90	201.10	1,701.69	-22.33	8.70	11.32	0.88	0.87	2.39
1,797.00	3.30	197.60	1,796.55	-27.18	7.01	10.22	0.47	0.42	-3.68
1,891.00	3.80	197.90	1,890.37	-32.72	5.23	9.12	0.53	0.53	0.32
1,985.00	4.80	199.10	1,984.11	-39.40	2.99	7.69	1.07	1.06	1.28
2,080.00	5.50	197.90	2,078.72	-47.49	0.29	5.98	0.75	0.74	-1.26
2,175.00	6.60	199.10	2,173.19	-56.98	-2.90	3.96	1.17	1.16	1.26
2,269.00	7.50	198.60	2,266.48	-67.90	-6.62	1.57	0.96	0.96	-0.53
2,363.00	8.60	200.70	2,359.55	-80.29	-11.06	-1.35	1.21	1.17	2.23
2,458.00	8.50	201.70	2,453.50	-93.46	-16.17	-4.84	0.19	-0.11	1.05
2,552.00	9.20	203.70	2,546.38	-106.79	-21.76	-8.79	0.81	0.74	2.13
2,646.00	9.20	204.20	2,639.17	-120.53	-27.86	-13.20	0.09	0.00	0.53
2,740.00	9.20	202.20	2,731.96	-134.34	-33.78	-17.42	0.34	0.00	-2.13
2,835.00	9.50	199.00	2,825.70	-148.78	-39.20	-21.07	0.63	0.32	-3.37
2,930.00	9.50	198.80	2,919.40	-163.62	-44.28	-24.33	0.03	0.00	-0.21
3,024.00	9.20	199.70	3,012.15	-178.04	-49.31	-27.60	0.36	-0.32	0.96
3,118.00	9.30	196.50	3,104.93	-192.39	-54.00	-30.53	0.56	0.11	-3.40
3,213.00	9.80	194.80	3,198.61	-207.57	-58.25	-32.93	0.60	0.53	-1.79
3,307.00	9.40	197.10	3,291.29	-222.64	-62.55	-35.39	0.59	-0.43	2.45
3,402.00	9.80	196.80	3,384.96	-237.80	-67.17	-38.16	0.42	0.42	-0.32
3,431.00	9.90	198.00	3,413.53	-242.53	-68.65	-39.06	0.79	0.34	4.14
3,499.00	9.70	198.00	3,480.54	-253.54	-72.23	-41.29	0.29	-0.29	0.00
3,594.00	9.40	199.60	3,574.23	-268.46	-77.30	-44.54	0.42	-0.32	1.68
3,689.00	9.10	201.00	3,667.99	-282.78	-82.60	-48.08	0.39	-0.32	1.47
3,783.00	8.10	201.00	3,760.93	-295.90	-87.64	-51.51	1.06	-1.06	0.00
3,877.00	7.80	200.80	3,854.03	-308.05	-92.27	-54.65	0.32	-0.32	-0.21
3,973.00	8.20	206.40	3,949.10	-320.27	-97.63	-58.51	0.91	0.42	5.83
4,067.00	9.70	208.00	4,041.95	-333.27	-104.33	-63.60	1.62	1.60	1.70
4,162.00	10.00	203.60	4,135.55	-347.89	-111.39	-68.85	0.85	0.32	-4.63
4,256.00	9.90	200.10	4,228.14	-362.96	-117.43	-73.04	0.65	-0.11	-3.72
4,351.00	9.70	194.80	4,321.75	-378.37	-122.29	-76.01	0.97	-0.21	-5.58
4,447.00	9.20	194.50	4,416.45	-393.62	-126.27	-78.14	0.52	-0.52	-0.31
4,542.00	9.00	197.10	4,510.25	-408.07	-130.36	-80.46	0.48	-0.21	2.74

LEAM Drilling Systems LLC

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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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Survey

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4,638.00	9.70	199.80	4,604.98	-422.86	-135.31	-83.60	0.86	0.73	2.81
4,733.00	10.50	194.70	4,698.51	-438.76	-140.21	-86.57	1.26	0.84	-5.37
4,828.00	9.80	197.10	4,792.02	-454.86	-144.79	-89.18	0.86	-0.74	2.53
4,922.00	8.50	193.10	4,884.82	-469.28	-148.72	-91.35	1.54	-1.38	-4.26
5,017.00	8.90	189.00	4,978.73	-483.37	-151.46	-92.38	0.78	0.42	-4.32
5,113.00	10.50	186.40	5,073.36	-499.40	-153.59	-92.57	1.73	1.67	-2.71
5,209.00	11.30	185.30	5,167.62	-517.46	-155.44	-92.24	0.86	0.83	-1.15
5,304.00	11.40	191.30	5,260.77	-535.93	-158.14	-92.70	1.25	0.11	6.32
5,400.00	10.60	192.00	5,355.00	-553.87	-161.83	-94.22	0.84	-0.83	0.73
5,495.00	10.60	191.30	5,448.38	-570.99	-165.36	-95.67	0.14	0.00	-0.74
5,591.00	10.60	194.00	5,542.75	-588.22	-169.23	-97.44	0.52	0.00	2.81
5,686.00	9.00	189.20	5,636.36	-604.03	-172.53	-98.82	1.89	-1.68	-5.05
5,782.00	8.80	191.10	5,731.20	-618.65	-175.14	-99.66	0.37	-0.21	1.98
5,877.00	9.20	198.90	5,825.04	-632.96	-179.00	-101.78	1.35	0.42	8.21
5,973.00	11.80	201.70	5,919.42	-649.35	-185.12	-105.88	2.76	2.71	2.92
6,069.00	9.80	198.70	6,013.72	-666.21	-191.37	-110.07	2.16	-2.08	-3.13
6,164.00	8.20	194.80	6,107.54	-680.42	-195.69	-112.65	1.80	-1.68	-4.11
6,211.00	8.40	193.30	6,154.05	-687.00	-197.34	-113.50	0.63	0.43	-3.19
6,260.00	9.10	195.40	6,202.48	-694.22	-199.19	-114.47	1.57	1.43	4.29
6,307.00	8.60	196.10	6,248.92	-701.18	-201.15	-115.58	1.09	-1.06	1.49
6,355.00	6.90	192.60	6,296.48	-707.44	-202.78	-116.44	3.67	-3.54	-7.29
6,403.00	6.40	189.60	6,344.16	-712.89	-203.85	-116.86	1.27	-1.04	-6.25
6,451.00	4.80	183.20	6,391.93	-717.54	-204.41	-116.85	3.57	-3.33	-13.33
6,499.00	5.10	191.10	6,439.75	-721.63	-204.93	-116.88	1.55	0.63	16.46
6,546.00	6.00	197.50	6,486.53	-726.03	-206.07	-117.49	2.32	1.91	13.62
6,594.00	6.90	202.90	6,534.23	-731.08	-207.95	-118.74	2.26	1.88	11.25
6,642.00	7.60	201.90	6,581.84	-736.68	-210.25	-120.36	1.48	1.46	-2.08
6,690.00	7.70	199.10	6,629.41	-742.66	-212.49	-121.86	0.80	0.21	-5.83
6,737.00	8.20	195.40	6,675.96	-748.87	-214.41	-123.03	1.52	1.06	-7.87
6,785.00	9.10	195.20	6,723.42	-755.83	-216.32	-124.08	1.88	1.88	-0.42
6,833.00	10.10	196.80	6,770.74	-763.52	-218.53	-125.35	2.16	2.08	3.33
6,881.00	10.90	200.80	6,817.94	-771.80	-221.36	-127.17	2.25	1.67	8.33
6,928.00	10.50	202.60	6,864.12	-779.90	-224.58	-129.40	1.11	-0.85	3.83
6,976.00	9.20	201.50	6,911.41	-787.51	-227.67	-131.55	2.74	-2.71	-2.29
7,024.00	9.40	196.60	6,958.78	-794.84	-230.19	-133.18	1.70	0.42	-10.21
7,072.00	10.00	194.70	7,006.10	-802.63	-232.37	-134.41	1.42	1.25	-3.96
7,119.00	10.60	195.20	7,052.34	-810.75	-234.54	-135.59	1.29	1.28	1.06
7,167.00	11.30	196.80	7,099.47	-819.51	-237.06	-137.03	1.59	1.46	3.33
7,215.00	11.20	197.80	7,146.54	-828.45	-239.84	-138.72	0.46	-0.21	2.08
7,263.00	9.50	196.40	7,193.76	-836.69	-242.38	-140.26	3.58	-3.54	-2.92
7,310.00	7.60	196.20	7,240.24	-843.39	-244.35	-141.41	4.04	-4.04	-0.43
7,358.00	6.70	197.30	7,287.86	-849.11	-246.06	-142.42	1.90	-1.88	2.29
7,406.00	6.60	199.60	7,335.54	-854.39	-247.82	-143.54	0.59	-0.21	4.79

LEAM Drilling Systems LLC

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7,454.00	7.40	201.30	7,383.18	-859.87	-249.87	-144.91	1.72	1.67	3.54
7,501.00	7.50	201.50	7,429.79	-865.54	-252.09	-146.44	0.22	0.21	0.43
7,549.00	6.50	199.80	7,477.43	-871.01	-254.16	-147.84	2.13	-2.08	-3.54
7,597.00	6.10	197.10	7,525.14	-876.00	-255.83	-148.90	1.04	-0.83	-5.63
7,645.00	5.50	194.30	7,572.89	-880.67	-257.15	-149.65	1.38	-1.25	-5.83
7,693.00	5.40	194.50	7,620.67	-885.09	-258.28	-150.24	0.21	-0.21	0.42
7,741.00	4.30	191.70	7,668.50	-889.04	-259.22	-150.69	2.34	-2.29	-5.83
7,788.00	4.00	184.30	7,715.38	-892.40	-259.70	-150.76	1.30	-0.64	-15.74
7,836.00	3.70	184.30	7,763.27	-895.61	-259.94	-150.62	0.63	-0.63	0.00
7,884.00	3.40	182.40	7,811.18	-898.58	-260.11	-150.44	0.67	-0.63	-3.96
7,932.00	2.50	177.60	7,859.11	-901.04	-260.13	-150.16	1.94	-1.88	-10.00
7,979.00	2.10	176.90	7,906.08	-902.93	-260.04	-149.84	0.85	-0.85	-1.49
8,027.00	1.40	175.90	7,954.05	-904.39	-259.95	-149.58	1.46	-1.46	-2.08
8,075.00	1.60	165.10	8,002.04	-905.62	-259.74	-149.22	0.72	0.42	-22.50
8,171.00	1.50	137.50	8,098.00	-907.85	-258.54	-147.77	0.78	-0.10	-28.75
8,265.00	2.50	118.20	8,191.95	-909.72	-255.90	-144.92	1.27	1.06	-20.53
8,361.00	2.80	121.20	8,287.84	-911.93	-252.05	-140.83	0.34	0.31	3.13
8,467.00	2.70	123.60	8,393.72	-914.65	-247.76	-136.25	0.14	-0.09	2.26
8,575.00	9.80	101.50	8,501.02	-917.89	-236.62	-124.80	6.82	6.57	-20.46
8,623.00	16.80	88.80	8,547.71	-918.56	-225.66	-113.84	15.72	14.58	-26.46
8,670.00	23.70	82.30	8,591.79	-917.15	-209.49	-97.95	15.42	14.68	-13.83
8,718.00	26.50	83.90	8,635.25	-914.72	-189.28	-78.18	6.00	5.83	3.33
8,766.00	28.20	86.90	8,677.89	-912.97	-167.30	-56.57	4.56	3.54	6.25
8,813.00	31.90	86.70	8,718.56	-911.65	-143.81	-33.40	7.88	7.87	-0.43
8,861.00	37.10	89.20	8,758.11	-910.72	-116.65	-6.56	11.23	10.83	5.21
8,909.00	41.50	93.10	8,795.25	-911.38	-86.28	23.68	10.51	9.17	8.13
8,957.00	46.10	94.10	8,829.89	-913.48	-53.13	56.84	9.69	9.58	2.08
9,005.00	51.50	95.90	8,861.49	-916.65	-17.17	92.92	11.60	11.25	3.75
9,052.00	57.40	96.90	8,888.81	-920.92	20.81	131.14	12.67	12.55	2.13
9,100.00	64.00	94.50	8,912.29	-925.05	62.44	172.96	14.42	13.75	-5.00
9,148.00	70.00	91.70	8,931.04	-927.41	106.54	217.02	13.60	12.50	-5.83
9,196.00	74.00	90.20	8,945.87	-928.16	152.17	262.42	8.85	8.33	-3.13
9,243.00	77.60	90.60	8,957.40	-928.48	197.72	307.68	7.70	7.66	0.85
9,291.00	81.70	91.70	8,966.02	-929.43	244.92	354.65	8.83	8.54	2.29
9,338.00	85.87	90.42	8,971.10	-930.29	291.63	401.12	9.28	8.87	-2.72
9,383.00	89.47	90.78	8,972.93	-930.76	336.58	445.81	8.04	8.00	0.80
9,430.00	90.00	89.98	8,973.15	-931.08	383.58	492.50	2.04	1.13	-1.70
9,476.00	90.40	90.16	8,972.99	-931.13	429.58	538.18	0.95	0.87	0.39
9,521.00	90.00	89.98	8,972.83	-931.19	474.58	582.86	0.97	-0.89	-0.40
9,613.00	89.69	88.58	8,973.08	-930.03	566.57	674.05	1.56	-0.34	-1.52
9,705.00	89.17	87.00	8,974.00	-926.48	658.49	764.88	1.81	-0.57	-1.72
9,801.00	88.07	86.21	8,976.31	-920.80	754.29	859.31	1.41	-1.15	-0.82
9,896.00	87.23	87.44	8,980.21	-915.54	849.06	952.76	1.57	-0.88	1.29
9,992.00	87.89	89.37	8,984.29	-912.87	944.93	1,047.62	2.12	0.69	2.01

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
10,087.00	88.77	90.95	8,987.06	-913.14	1,039.89	1,141.92	1.90	0.93	1.66
10,183.00	89.52	92.36	8,988.49	-915.91	1,135.84	1,237.51	1.66	0.78	1.47
10,278.00	89.65	90.86	8,989.18	-918.58	1,230.79	1,332.10	1.58	0.14	-1.58
10,374.00	87.41	89.63	8,991.64	-918.99	1,326.75	1,427.42	2.66	-2.33	-1.28
10,469.00	88.24	90.51	8,995.25	-919.11	1,421.68	1,521.68	1.27	0.87	0.93
10,565.00	90.31	89.98	8,996.46	-919.52	1,517.67	1,617.02	2.23	2.16	-0.55
10,660.00	90.31	89.81	8,995.95	-919.34	1,612.67	1,711.31	0.18	0.00	-0.18
10,755.00	93.08	89.28	8,993.14	-918.59	1,707.61	1,805.48	2.97	2.92	-0.56
10,850.00	92.86	88.23	8,988.22	-916.53	1,802.46	1,899.39	1.13	-0.23	-1.11
10,945.00	91.49	88.23	8,984.61	-913.60	1,897.35	1,993.24	1.44	-1.44	0.00
11,041.00	89.78	89.19	8,983.55	-911.44	1,993.31	2,088.25	2.04	-1.78	1.00
11,136.00	88.55	90.07	8,984.93	-910.82	2,088.30	2,182.48	1.59	-1.29	0.93
11,231.00	87.63	90.25	8,988.10	-911.09	2,183.24	2,276.77	0.99	-0.97	0.19
11,326.00	88.59	90.86	8,991.23	-912.01	2,278.18	2,371.14	1.20	1.01	0.64
11,422.00	88.64	90.78	8,993.55	-913.38	2,374.15	2,466.57	0.10	0.05	-0.08
11,517.00	88.68	90.78	8,995.78	-914.67	2,469.11	2,561.01	0.04	0.04	0.00
11,613.00	88.55	91.13	8,998.10	-916.27	2,565.07	2,656.47	0.39	-0.14	0.36
11,708.00	88.64	90.86	9,000.42	-917.92	2,660.03	2,750.93	0.30	0.09	-0.28
11,804.00	87.50	90.51	9,003.66	-919.07	2,755.96	2,846.32	1.24	-1.19	-0.36
11,899.00	87.93	90.69	9,007.45	-920.06	2,850.88	2,940.67	0.49	0.45	0.19
11,995.00	88.59	89.81	9,010.36	-920.48	2,946.84	3,035.98	1.15	0.69	-0.92
12,090.00	88.81	89.19	9,012.52	-919.65	3,041.81	3,130.17	0.69	0.23	-0.65
12,186.00	88.42	89.63	9,014.84	-918.66	3,137.77	3,225.32	0.61	-0.41	0.46
12,281.00	87.89	88.32	9,017.90	-916.97	3,232.71	3,319.36	1.49	-0.56	-1.38
12,377.00	88.42	89.46	9,020.99	-915.11	3,328.64	3,414.38	1.31	0.55	1.19
12,472.00	88.33	89.72	9,023.68	-914.43	3,423.60	3,508.57	0.29	-0.09	0.27
12,568.00	88.68	89.28	9,026.18	-913.59	3,519.56	3,603.74	0.59	0.36	-0.46
12,663.00	88.46	89.63	9,028.56	-912.69	3,614.53	3,697.91	0.44	-0.23	0.37
12,759.00	88.73	89.81	9,030.91	-912.22	3,710.50	3,793.13	0.34	0.28	0.19
12,854.00	89.52	90.07	9,032.36	-912.12	3,805.48	3,887.42	0.88	0.83	0.27
12,950.00	88.99	89.98	9,033.61	-912.16	3,901.48	3,982.73	0.56	-0.55	-0.09
13,045.00	89.03	90.69	9,035.25	-912.72	3,996.46	4,077.09	0.75	0.04	0.75
13,141.00	89.30	90.60	9,036.65	-913.80	4,092.44	4,172.51	0.30	0.28	-0.09
13,236.00	88.99	89.98	9,038.07	-914.28	4,187.43	4,266.87	0.73	-0.33	-0.65
13,332.00	88.99	90.60	9,039.76	-914.76	4,283.41	4,362.22	0.65	0.00	0.65
13,428.00	89.17	90.42	9,041.30	-915.62	4,379.40	4,457.61	0.27	0.19	-0.19
13,496.00	89.43	89.72	9,042.13	-915.70	4,447.39	4,525.12	1.10	0.38	-1.03
13,591.00	90.40	89.55	9,042.27	-915.10	4,542.39	4,619.36	1.04	1.02	-0.18
13,687.00	89.43	89.72	9,042.41	-914.48	4,638.39	4,714.59	1.03	-1.01	0.18
13,782.00	89.78	89.72	9,043.07	-914.02	4,733.38	4,808.85	0.37	0.37	0.00
13,876.00	88.90	89.70	9,044.15	-913.54	4,827.37	4,902.10	0.94	-0.94	-0.02
13,971.00	89.50	89.55	9,045.48	-912.92	4,922.36	4,996.33	0.65	0.63	-0.16
14,066.00	88.99	90.25	9,046.73	-912.76	5,017.35	5,090.62	0.91	-0.54	0.74

LEAM Drilling Systems LLC

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
14,160.00	89.34	90.60	9,048.10	-913.45	5,111.34	5,184.01	0.53	0.37	0.37
14,255.00	88.80	90.40	9,049.64	-914.28	5,206.32	5,278.41	0.61	-0.57	-0.21
14,349.00	89.40	90.60	9,051.12	-915.10	5,300.31	5,371.81	0.67	0.64	0.21
14,443.00	88.90	90.60	9,052.51	-916.09	5,394.29	5,465.23	0.53	-0.53	0.00
14,538.00	89.70	90.60	9,053.67	-917.08	5,489.28	5,559.65	0.84	0.84	0.00
14,633.00	88.99	90.42	9,054.76	-917.93	5,584.27	5,654.06	0.77	-0.75	-0.19
14,727.00	89.25	90.25	9,056.20	-918.48	5,678.26	5,747.43	0.33	0.28	-0.18
14,822.00	89.43	90.25	9,057.30	-918.89	5,773.25	5,841.79	0.19	0.19	0.00
14,917.00	89.87	90.07	9,057.88	-919.16	5,868.25	5,936.13	0.50	0.46	-0.19
15,013.00	89.16	90.07	9,058.69	-919.27	5,964.24	6,031.45	0.74	-0.74	0.00
15,108.00	88.90	90.10	9,060.30	-919.41	6,059.23	6,125.77	0.28	-0.27	0.03
15,203.00	89.43	90.42	9,061.68	-919.85	6,154.22	6,220.12	0.65	0.56	0.34
15,298.00	88.20	90.25	9,063.65	-920.40	6,249.19	6,314.48	1.31	-1.29	-0.18
15,394.00	88.29	90.25	9,066.59	-920.82	6,345.15	6,409.79	0.09	0.09	0.00
15,489.00	88.72	90.25	9,069.07	-921.23	6,440.11	6,504.12	0.45	0.45	0.00
15,585.00	89.30	90.40	9,070.72	-921.78	6,536.10	6,599.47	0.62	0.60	0.16
15,680.00	88.11	90.60	9,072.87	-922.61	6,631.07	6,693.86	1.27	-1.25	0.21
15,776.00	88.29	90.78	9,075.89	-923.76	6,727.01	6,789.25	0.27	0.19	0.19
15,871.00	88.64	91.30	9,078.43	-925.49	6,821.96	6,883.72	0.66	0.37	0.55
15,967.00	89.16	90.25	9,080.27	-926.78	6,917.93	6,979.16	1.22	0.54	-1.09
16,062.00	89.34	89.37	9,081.52	-926.47	7,012.92	7,073.42	0.95	0.19	-0.93
16,158.00	89.96	89.72	9,082.10	-925.71	7,108.92	7,168.63	0.74	0.65	0.36
16,253.00	89.34	89.55	9,082.69	-925.10	7,203.91	7,262.87	0.68	-0.65	-0.18
16,349.00	89.08	89.37	9,084.01	-924.20	7,299.90	7,358.05	0.33	-0.27	-0.19
16,444.00	88.20	89.02	9,086.26	-922.86	7,394.86	7,452.17	1.00	-0.93	-0.37
16,540.00	88.29	88.84	9,089.20	-921.07	7,490.80	7,547.20	0.21	0.09	-0.19
16,635.00	88.81	88.84	9,091.61	-919.15	7,585.75	7,641.23	0.55	0.55	0.00
16,750.00	89.43	89.19	9,093.37	-917.17	7,700.72	7,755.14	0.62	0.54	0.30
16,823.00	89.43	89.19	9,094.10	-916.14	7,773.71	7,827.47	0.00	0.00	0.00
Projection									

Devon Energy

Eddy County, NM (NAD-83)

Onyx PWU 29-28

12H

OH

Design: OH

Standard Survey Report

05 February, 2018

LEAM Drilling Services

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Multi User Db

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

Site	Onyx PWU 29-28				
Site Position:		Northing:	596,305.26 usft	Latitude:	32° 38' 20.7014 N
From:	Map	Easting:	611,703.20 usft	Longitude:	104° 6' 17.0602 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.12 °

Well	12H					
Well Position	+N/-S	0.00 usft	Northing:	592,268.73 usft	Latitude:	32° 37' 40.7570 N
	+E/-W	0.00 usft	Easting:	611,776.35 usft	Longitude:	104° 6' 16.3063 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,307.90 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	12/21/2017	7.40	60.45	48,137

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.00	0.00	0.00	96.89	

Survey Program	Date 1/18/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
50.00	150.00	Survey #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
233.00	16,750.00	Survey #2 (OH)	LEAM MWD+HDGM	MWD+HDGM	
16,823.00	16,823.00	Survey #3 (OH)	Project	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
SHL (Onyx 12H) - SHL (12H)									
50.00	0.07	36.34	50.00	0.02	0.02	0.02	0.14	0.14	0.00
100.00	0.16	167.69	100.00	-0.02	0.05	0.05	0.43	0.18	262.70
150.00	0.70	158.90	150.00	-0.37	0.18	0.22	1.08	1.08	-17.58
233.00	0.90	177.90	232.99	-1.50	0.38	0.56	0.40	0.24	22.89
325.00	1.10	177.50	324.98	-3.10	0.45	0.82	0.22	0.22	-0.43
423.00	1.10	186.80	422.96	-4.97	0.38	0.97	0.18	0.00	9.49
514.00	0.90	168.60	513.94	-6.54	0.41	1.20	0.41	-0.22	-20.00

LEAM Drilling Services

Survey Report

Company: Devon Energy
 Project: Eddy County, NM (NAD-83)
 Site: Onyx PWU 29-28
 Well: 12H
 Wellbore: OH
 Design: OH

Local Co-ordinate Reference: Well 12H
 TVD Reference: 3307.9' GE + 23.5' KB @ 3331.40usft
 MD Reference: 3307.9' GE + 23.5' KB @ 3331.40usft
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 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)
606.00	1.00	154.60	605.93	-7.98	0.90	1.85	0.27	0.11	-15.22
697.00	1.10	141.60	696.92	-9.38	1.79	2.90	0.28	0.11	-14.29
789.00	1.00	128.30	788.90	-10.57	2.96	4.21	0.29	-0.11	-14.46
879.00	1.10	114.40	878.89	-11.41	4.37	5.70	0.30	0.11	-15.44
970.00	1.20	122.70	969.87	-12.29	5.96	7.40	0.21	0.11	9.12
1,061.00	1.00	124.00	1,060.85	-13.25	7.42	8.96	0.22	-0.22	1.43
1,152.00	0.70	105.10	1,151.84	-13.83	8.62	10.22	0.45	-0.33	-20.77
1,243.00	0.60	105.80	1,242.84	-14.11	9.61	11.24	0.11	-0.11	0.77
1,334.00	0.60	109.70	1,333.83	-14.40	10.52	12.17	0.04	0.00	4.29
1,426.00	0.50	159.90	1,425.83	-14.94	11.11	12.82	0.52	-0.11	54.57
1,518.00	1.10	200.60	1,517.82	-16.14	10.94	12.80	0.86	0.65	44.24
1,610.00	2.10	198.90	1,609.78	-18.56	10.08	12.24	1.09	1.09	-1.85
1,702.00	2.90	201.10	1,701.69	-22.33	8.70	11.32	0.88	0.87	2.39
1,797.00	3.30	197.60	1,796.55	-27.18	7.01	10.22	0.47	0.42	-3.68
1,891.00	3.80	197.90	1,890.37	-32.72	5.23	9.12	0.53	0.53	0.32
1,985.00	4.80	199.10	1,984.11	-39.40	2.99	7.69	1.07	1.06	1.28
2,080.00	5.50	197.90	2,078.72	-47.49	0.29	5.98	0.75	0.74	-1.26
2,175.00	6.60	199.10	2,173.19	-56.98	-2.90	3.96	1.17	1.16	1.26
2,269.00	7.50	198.60	2,266.48	-67.90	-6.62	1.57	0.96	0.96	-0.53
2,363.00	8.60	200.70	2,359.55	-80.29	-11.06	-1.35	1.21	1.17	2.23
2,458.00	8.50	201.70	2,453.50	-93.46	-16.17	-4.84	0.19	-0.11	1.05
2,552.00	9.20	203.70	2,546.38	-106.79	-21.76	-8.79	0.81	0.74	2.13
2,646.00	9.20	204.20	2,639.17	-120.53	-27.86	-13.20	0.09	0.00	0.53
2,740.00	9.20	202.20	2,731.96	-134.34	-33.78	-17.42	0.34	0.00	-2.13
2,835.00	9.50	199.00	2,825.70	-148.78	-39.20	-21.07	0.63	0.32	-3.37
2,930.00	9.50	198.80	2,919.40	-163.62	-44.28	-24.33	0.03	0.00	-0.21
3,024.00	9.20	199.70	3,012.15	-178.04	-49.31	-27.60	0.36	-0.32	0.96
3,118.00	9.30	196.50	3,104.93	-192.39	-54.00	-30.53	0.56	0.11	-3.40
3,213.00	9.80	194.80	3,198.61	-207.57	-58.25	-32.93	0.60	0.53	-1.79
3,307.00	9.40	197.10	3,291.29	-222.64	-62.55	-35.39	0.59	-0.43	2.45
3,402.00	9.80	196.80	3,384.96	-237.80	-67.17	-38.16	0.42	0.42	-0.32
3,431.00	9.90	198.00	3,413.53	-242.53	-68.65	-39.06	0.79	0.34	4.14
3,499.00	9.70	198.00	3,480.54	-253.54	-72.23	-41.29	0.29	-0.29	0.00
3,594.00	9.40	199.60	3,574.23	-268.46	-77.30	-44.54	0.42	-0.32	1.68
3,689.00	9.10	201.00	3,667.99	-282.78	-82.60	-48.08	0.39	-0.32	1.47
3,783.00	8.10	201.00	3,760.93	-295.90	-87.64	-51.51	1.06	-1.06	0.00
3,877.00	7.80	200.80	3,854.03	-308.05	-92.27	-54.65	0.32	-0.32	-0.21
3,973.00	8.20	206.40	3,949.10	-320.27	-97.63	-58.51	0.91	0.42	5.83
4,067.00	9.70	208.00	4,041.95	-333.27	-104.33	-63.60	1.62	1.60	1.70
4,162.00	10.00	203.60	4,135.55	-347.89	-111.39	-68.85	0.85	0.32	-4.63
4,256.00	9.90	200.10	4,228.14	-362.96	-117.43	-73.04	0.65	-0.11	-3.72
4,351.00	9.70	194.80	4,321.75	-378.37	-122.29	-76.01	0.97	-0.21	-5.58
4,447.00	9.20	194.50	4,416.45	-393.62	-126.27	-78.14	0.52	-0.52	-0.31

LEAM Drilling Services

Survey Report

Company: Devon Energy
Project: Eddy County, NM (NAD-83)
Site: Onyx PWU 29-28
Well: 12H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 12H
TVD Reference: 3307.9' GE + 23.5' KB @ 3331.40usft
MD Reference: 3307.9' GE + 23.5' KB @ 3331.40usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
4,542.00	9.00	197.10	4,510.25	-408.07	-130.36	-80.46	0.48	-0.21	2.74
4,638.00	9.70	199.80	4,604.98	-422.86	-135.31	-83.60	0.86	0.73	2.81
4,733.00	10.50	194.70	4,698.51	-438.76	-140.21	-86.57	1.26	0.84	-5.37
4,828.00	9.80	197.10	4,792.02	-454.86	-144.79	-89.18	0.86	-0.74	2.53
4,922.00	8.50	193.10	4,884.82	-469.28	-148.72	-91.35	1.54	-1.38	-4.26
5,017.00	8.90	189.00	4,978.73	-483.37	-151.46	-92.38	0.78	0.42	-4.32
5,113.00	10.50	186.40	5,073.36	-499.40	-153.59	-92.57	1.73	1.67	-2.71
5,209.00	11.30	185.30	5,167.62	-517.46	-155.44	-92.24	0.86	0.83	-1.15
5,304.00	11.40	191.30	5,260.77	-535.93	-158.14	-92.70	1.25	0.11	6.32
5,400.00	10.60	192.00	5,355.00	-553.87	-161.83	-94.22	0.84	-0.83	0.73
5,495.00	10.60	191.30	5,448.38	-570.99	-165.36	-95.67	0.14	0.00	-0.74
5,591.00	10.60	194.00	5,542.75	-588.22	-169.23	-97.44	0.52	0.00	2.81
5,686.00	9.00	189.20	5,636.36	-604.03	-172.53	-98.82	1.89	-1.68	-5.05
5,782.00	8.80	191.10	5,731.20	-618.65	-175.14	-99.66	0.37	-0.21	1.98
5,877.00	9.20	198.90	5,825.04	-632.96	-179.00	-101.78	1.35	0.42	8.21
5,973.00	11.80	201.70	5,919.42	-649.35	-185.12	-105.88	2.76	2.71	2.92
6,069.00	9.80	198.70	6,013.72	-666.21	-191.37	-110.07	2.16	-2.08	-3.13
6,164.00	8.20	194.80	6,107.54	-680.42	-195.69	-112.65	1.80	-1.68	-4.11
6,211.00	8.40	193.30	6,154.05	-687.00	-197.34	-113.50	0.63	0.43	-3.19
6,260.00	9.10	195.40	6,202.48	-694.22	-199.19	-114.47	1.57	1.43	4.29
6,307.00	8.60	196.10	6,248.92	-701.18	-201.15	-115.58	1.09	-1.06	1.49
6,355.00	6.90	192.60	6,296.48	-707.44	-202.78	-116.44	3.67	-3.54	-7.29
6,403.00	6.40	189.60	6,344.16	-712.89	-203.85	-116.86	1.27	-1.04	-6.25
6,451.00	4.80	183.20	6,391.93	-717.54	-204.41	-116.85	3.57	-3.33	-13.33
6,499.00	5.10	191.10	6,439.75	-721.63	-204.93	-116.88	1.55	0.63	16.46
6,546.00	6.00	197.50	6,486.53	-726.03	-206.07	-117.49	2.32	1.91	13.62
6,594.00	6.90	202.90	6,534.23	-731.08	-207.95	-118.74	2.26	1.88	11.25
6,642.00	7.60	201.90	6,581.84	-736.68	-210.25	-120.36	1.48	1.46	-2.08
6,690.00	7.70	199.10	6,629.41	-742.66	-212.49	-121.86	0.80	0.21	-5.83
6,737.00	8.20	195.40	6,675.96	-748.87	-214.41	-123.03	1.52	1.06	-7.87
6,785.00	9.10	195.20	6,723.42	-755.83	-216.32	-124.08	1.88	1.88	-0.42
6,833.00	10.10	196.80	6,770.74	-763.52	-218.53	-125.35	2.16	2.08	3.33
6,881.00	10.90	200.80	6,817.94	-771.80	-221.36	-127.17	2.25	1.67	8.33
6,928.00	10.50	202.60	6,864.12	-779.90	-224.58	-129.40	1.11	-0.85	3.83
6,976.00	9.20	201.50	6,911.41	-787.51	-227.67	-131.55	2.74	-2.71	-2.29
7,024.00	9.40	196.60	6,958.78	-794.84	-230.19	-133.18	1.70	0.42	-10.21
7,072.00	10.00	194.70	7,006.10	-802.63	-232.37	-134.41	1.42	1.25	-3.96
7,119.00	10.60	195.20	7,052.34	-810.75	-234.54	-135.59	1.29	1.28	1.06
7,167.00	11.30	196.80	7,099.47	-819.51	-237.06	-137.03	1.59	1.46	3.33
7,215.00	11.20	197.80	7,146.54	-828.45	-239.84	-138.72	0.46	-0.21	2.08
7,263.00	9.50	196.40	7,193.76	-836.69	-242.38	-140.26	3.58	-3.54	-2.92
7,310.00	7.60	196.20	7,240.24	-843.39	-244.35	-141.41	4.04	-4.04	-0.43
7,358.00	6.70	197.30	7,287.86	-849.11	-246.06	-142.42	1.90	-1.88	2.29
7,406.00	6.60	199.60	7,335.54	-854.39	-247.82	-143.54	0.59	-0.21	4.79

LEAM Drilling Services

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
7,454.00	7.40	201.30	7,383.18	-859.87	-249.87	-144.91	1.72	1.67	3.54
7,501.00	7.50	201.50	7,429.79	-865.54	-252.09	-146.44	0.22	0.21	0.43
7,549.00	6.50	199.80	7,477.43	-871.01	-254.16	-147.84	2.13	-2.08	-3.54
7,597.00	6.10	197.10	7,525.14	-876.00	-255.83	-148.90	1.04	-0.83	-5.63
7,645.00	5.50	194.30	7,572.89	-880.67	-257.15	-149.65	1.38	-1.25	-5.83
7,693.00	5.40	194.50	7,620.67	-885.09	-258.28	-150.24	0.21	-0.21	0.42
7,741.00	4.30	191.70	7,668.50	-889.04	-259.22	-150.69	2.34	-2.29	-5.83
7,788.00	4.00	184.30	7,715.38	-892.40	-259.70	-150.76	1.30	-0.64	-15.74
7,836.00	3.70	184.30	7,763.27	-895.61	-259.94	-150.62	0.63	-0.63	0.00
7,884.00	3.40	182.40	7,811.18	-898.58	-260.11	-150.44	0.67	-0.63	-3.96
7,932.00	2.50	177.60	7,859.11	-901.04	-260.13	-150.16	1.94	-1.88	-10.00
7,979.00	2.10	176.90	7,906.08	-902.93	-260.04	-149.84	0.85	-0.85	-1.49
8,027.00	1.40	175.90	7,954.05	-904.39	-259.95	-149.58	1.46	-1.46	-2.08
8,075.00	1.60	165.10	8,002.04	-905.62	-259.74	-149.22	0.72	0.42	-22.50
8,171.00	1.50	137.50	8,098.00	-907.85	-258.54	-147.77	0.78	-0.10	-28.75
8,265.00	2.50	118.20	8,191.95	-909.72	-255.90	-144.92	1.27	1.06	-20.53
8,361.00	2.80	121.20	8,287.84	-911.93	-252.05	-140.83	0.34	0.31	3.13
8,467.00	2.70	123.60	8,393.72	-914.65	-247.76	-136.25	0.14	-0.09	2.26
8,575.00	9.80	101.50	8,501.02	-917.89	-236.62	-124.80	6.82	6.57	-20.46
8,623.00	16.80	88.80	8,547.71	-918.56	-225.66	-113.84	15.72	14.58	-26.46
8,670.00	23.70	82.30	8,591.79	-917.15	-209.49	-97.95	15.42	14.68	-13.83
8,718.00	26.50	83.90	8,635.25	-914.72	-189.28	-78.18	6.00	5.83	3.33
8,766.00	28.20	86.90	8,677.89	-912.97	-167.30	-56.57	4.56	3.54	6.25
8,813.00	31.90	86.70	8,718.56	-911.65	-143.81	-33.40	7.88	7.87	-0.43
8,861.00	37.10	89.20	8,758.11	-910.72	-116.65	-6.56	11.23	10.83	5.21
8,909.00	41.50	93.10	8,795.25	-911.38	-86.28	23.68	10.51	9.17	8.13
8,957.00	46.10	94.10	8,829.89	-913.48	-53.13	56.84	9.69	9.58	2.08
9,005.00	51.50	95.90	8,861.49	-916.65	-17.17	92.92	11.60	11.25	3.75
9,052.00	57.40	96.90	8,888.81	-920.92	20.81	131.14	12.67	12.55	2.13
9,100.00	64.00	94.50	8,912.29	-925.05	62.44	172.96	14.42	13.75	-5.00
9,148.00	70.00	91.70	8,931.04	-927.41	106.54	217.02	13.60	12.50	-5.83
9,196.00	74.00	90.20	8,945.87	-928.16	152.17	262.42	8.85	8.33	-3.13
9,243.00	77.60	90.60	8,957.40	-928.48	197.72	307.68	7.70	7.66	0.85
9,291.00	81.70	91.70	8,966.02	-929.43	244.92	354.65	8.83	8.54	2.29
9,338.00	85.87	90.42	8,971.10	-930.29	291.63	401.12	9.28	8.87	-2.72
9,383.00	89.47	90.78	8,972.93	-930.76	336.58	445.81	8.04	8.00	0.80
9,430.00	90.00	89.98	8,973.15	-931.08	383.58	492.50	2.04	1.13	-1.70
9,476.00	90.40	90.16	8,972.99	-931.13	429.58	538.18	0.95	0.87	0.39
9,521.00	90.00	89.98	8,972.83	-931.19	474.58	582.86	0.97	-0.89	-0.40
9,613.00	89.69	88.58	8,973.08	-930.03	566.57	674.05	1.56	-0.34	-1.52
9,705.00	89.17	87.00	8,974.00	-926.48	658.49	764.88	1.81	-0.57	-1.72
9,801.00	88.07	86.21	8,976.31	-920.80	754.29	859.31	1.41	-1.15	-0.82
9,896.00	87.23	87.44	8,980.21	-915.54	849.06	952.76	1.57	-0.88	1.29

LEAM Drilling Services

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
9,992.00	87.89	89.37	8,984.29	-912.87	944.93	1,047.62	2.12	0.69	2.01
10,087.00	88.77	90.95	8,987.06	-913.14	1,039.89	1,141.92	1.90	0.93	1.66
10,183.00	89.52	92.36	8,988.49	-915.91	1,135.84	1,237.51	1.66	0.78	1.47
10,278.00	89.65	90.86	8,989.18	-918.58	1,230.79	1,332.10	1.58	0.14	-1.58
10,374.00	87.41	89.63	8,991.64	-918.99	1,326.75	1,427.42	2.66	-2.33	-1.28
10,469.00	88.24	90.51	8,995.25	-919.11	1,421.68	1,521.68	1.27	0.87	0.93
10,565.00	90.31	89.98	8,996.46	-919.52	1,517.67	1,617.02	2.23	2.16	-0.55
10,660.00	90.31	89.81	8,995.95	-919.34	1,612.67	1,711.31	0.18	0.00	-0.18
10,755.00	93.08	89.28	8,993.14	-918.59	1,707.61	1,805.48	2.97	2.92	-0.56
10,850.00	92.86	88.23	8,988.22	-916.53	1,802.46	1,899.39	1.13	-0.23	-1.11
10,945.00	91.49	88.23	8,984.61	-913.60	1,897.35	1,993.24	1.44	-1.44	0.00
11,041.00	89.78	89.19	8,983.55	-911.44	1,993.31	2,088.25	2.04	-1.78	1.00
11,136.00	88.55	90.07	8,984.93	-910.82	2,088.30	2,182.48	1.59	-1.29	0.93
11,231.00	87.63	90.25	8,988.10	-911.09	2,183.24	2,276.77	0.99	-0.97	0.19
11,326.00	88.59	90.86	8,991.23	-912.01	2,278.18	2,371.14	1.20	1.01	0.64
11,422.00	88.64	90.78	8,993.55	-913.38	2,374.15	2,466.57	0.10	0.05	-0.08
11,517.00	88.68	90.78	8,995.78	-914.67	2,469.11	2,561.01	0.04	0.04	0.00
11,613.00	88.55	91.13	8,998.10	-916.27	2,565.07	2,656.47	0.39	-0.14	0.36
11,708.00	88.64	90.86	9,000.42	-917.92	2,660.03	2,750.93	0.30	0.09	-0.28
11,804.00	87.50	90.51	9,003.66	-919.07	2,755.96	2,846.32	1.24	-1.19	-0.36
11,899.00	87.93	90.69	9,007.45	-920.06	2,850.88	2,940.67	0.49	0.45	0.19
11,995.00	88.59	89.81	9,010.36	-920.48	2,946.84	3,035.98	1.15	0.69	-0.92
12,090.00	88.81	89.19	9,012.52	-919.65	3,041.81	3,130.17	0.69	0.23	-0.65
12,186.00	88.42	89.63	9,014.84	-918.66	3,137.77	3,225.32	0.61	-0.41	0.46
12,281.00	87.89	88.32	9,017.90	-916.97	3,232.71	3,319.36	1.49	-0.56	-1.38
12,377.00	88.42	89.46	9,020.99	-915.11	3,328.64	3,414.38	1.31	0.55	1.19
12,472.00	88.33	89.72	9,023.68	-914.43	3,423.60	3,508.57	0.29	-0.09	0.27
12,568.00	88.68	89.28	9,026.18	-913.59	3,519.56	3,603.74	0.59	0.36	-0.46
12,663.00	88.46	89.63	9,028.56	-912.69	3,614.53	3,697.91	0.44	-0.23	0.37
12,759.00	88.73	89.81	9,030.91	-912.22	3,710.50	3,793.13	0.34	0.28	0.19
12,854.00	89.52	90.07	9,032.36	-912.12	3,805.48	3,887.42	0.88	0.83	0.27
12,950.00	88.99	89.98	9,033.61	-912.16	3,901.48	3,982.73	0.56	-0.55	-0.09
13,045.00	89.03	90.69	9,035.25	-912.72	3,996.46	4,077.09	0.75	0.04	0.75
13,141.00	89.30	90.60	9,036.65	-913.80	4,092.44	4,172.51	0.30	0.28	-0.09
13,236.00	88.99	89.98	9,038.07	-914.28	4,187.43	4,266.87	0.73	-0.33	-0.65
13,332.00	88.99	90.60	9,039.76	-914.76	4,283.41	4,362.22	0.65	0.00	0.65
13,428.00	89.17	90.42	9,041.30	-915.62	4,379.40	4,457.61	0.27	0.19	-0.19
13,496.00	89.43	89.72	9,042.13	-915.70	4,447.39	4,525.12	1.10	0.38	-1.03
13,591.00	90.40	89.55	9,042.27	-915.10	4,542.39	4,619.36	1.04	1.02	-0.18
13,687.00	89.43	89.72	9,042.41	-914.48	4,638.39	4,714.59	1.03	-1.01	0.18
13,782.00	89.78	89.72	9,043.07	-914.02	4,733.38	4,808.85	0.37	0.37	0.00
13,876.00	88.90	89.70	9,044.15	-913.54	4,827.37	4,902.10	0.94	-0.94	-0.02
13,971.00	89.50	89.55	9,045.48	-912.92	4,922.36	4,996.33	0.65	0.63	-0.16

LEAM Drilling Services

Survey Report

Company:	Devon Energy	Local Co-ordinate Reference:	Well 12H
Project:	Eddy County, NM (NAD-83)	TVD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Site:	Onyx PWU 29-28	MD Reference:	3307.9' GE + 23.5' KB @ 3331.40usft
Well:	12H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	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)
14,066.00	88.99	90.25	9,046.73	-912.76	5,017.35	5,090.62	0.91	-0.54	0.74
14,160.00	89.34	90.60	9,048.10	-913.45	5,111.34	5,184.01	0.53	0.37	0.37
14,255.00	88.80	90.40	9,049.64	-914.28	5,206.32	5,278.41	0.61	-0.57	-0.21
14,349.00	89.40	90.60	9,051.12	-915.10	5,300.31	5,371.81	0.67	0.64	0.21
14,443.00	88.90	90.60	9,052.51	-916.09	5,394.29	5,465.23	0.53	-0.53	0.00
14,538.00	89.70	90.60	9,053.67	-917.08	5,489.28	5,559.65	0.84	0.84	0.00
14,633.00	88.99	90.42	9,054.76	-917.93	5,584.27	5,654.06	0.77	-0.75	-0.19
14,727.00	89.25	90.25	9,056.20	-918.48	5,678.26	5,747.43	0.33	0.28	-0.18
14,822.00	89.43	90.25	9,057.30	-918.89	5,773.25	5,841.79	0.19	0.19	0.00
14,917.00	89.87	90.07	9,057.88	-919.16	5,868.25	5,936.13	0.50	0.46	-0.19
15,013.00	89.16	90.07	9,058.69	-919.27	5,964.24	6,031.45	0.74	-0.74	0.00
15,108.00	88.90	90.10	9,060.30	-919.41	6,059.23	6,125.77	0.28	-0.27	0.03
15,203.00	89.43	90.42	9,061.68	-919.85	6,154.22	6,220.12	0.65	0.56	0.34
15,298.00	88.20	90.25	9,063.65	-920.40	6,249.19	6,314.48	1.31	-1.29	-0.18
15,394.00	88.29	90.25	9,066.59	-920.82	6,345.15	6,409.79	0.09	0.09	0.00
15,489.00	88.72	90.25	9,069.07	-921.23	6,440.11	6,504.12	0.45	0.45	0.00
15,585.00	89.30	90.40	9,070.72	-921.78	6,536.10	6,599.47	0.62	0.60	0.16
15,680.00	88.11	90.60	9,072.87	-922.61	6,631.07	6,693.86	1.27	-1.25	0.21
15,776.00	88.29	90.78	9,075.89	-923.76	6,727.01	6,789.25	0.27	0.19	0.19
15,871.00	88.64	91.30	9,078.43	-925.49	6,821.96	6,883.72	0.66	0.37	0.55
15,967.00	89.16	90.25	9,080.27	-926.78	6,917.93	6,979.16	1.22	0.54	-1.09
16,062.00	89.34	89.37	9,081.52	-926.47	7,012.92	7,073.42	0.95	0.19	-0.93
16,158.00	89.96	89.72	9,082.10	-925.71	7,108.92	7,168.63	0.74	0.65	0.36
16,253.00	89.34	89.55	9,082.69	-925.10	7,203.91	7,262.87	0.68	-0.65	-0.18
16,349.00	89.08	89.37	9,084.01	-924.20	7,299.90	7,358.05	0.33	-0.27	-0.19
16,444.00	88.20	89.02	9,086.26	-922.86	7,394.86	7,452.17	1.00	-0.93	-0.37
16,540.00	88.29	88.84	9,089.20	-921.07	7,490.80	7,547.20	0.21	0.09	-0.19
16,635.00	88.81	88.84	9,091.61	-919.15	7,585.75	7,641.23	0.55	0.55	0.00
16,641.45	88.84	88.86	9,091.74	-919.02	7,592.19	7,647.61	0.62	0.54	0.30
PBHL (Onyx 12H)									
16,641.89	88.85	88.86	9,091.75	-919.01	7,592.64	7,648.05	0.62	0.54	0.30
PBHL (12H)									
16,750.00	89.43	89.19	9,093.37	-917.17	7,700.72	7,755.14	0.62	0.54	0.30
16,823.00	89.43	89.19	9,094.10	-916.14	7,773.71	7,827.47	0.00	0.00	0.00
Projection - BHL (Onyx 12H)									

LEAM Drilling Services

Survey Report

Company: Devon Energy
Project: Eddy County, NM (NAD-83)
Site: Onyx PWU 29-28
Well: 12H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 12H
TVD Reference: 3307.9' GE + 23.5' KB @ 3331.40usft
MD Reference: 3307.9' GE + 23.5' KB @ 3331.40usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Multi User Db

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
SHL (Onyx 12H) - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	592,268.73	611,776.35	32° 37' 40.7570 N	104° 6' 16.3063 W
BHL (Onyx 12H) - actual wellpath hits target center - Point	0.00	0.00	9,094.10	-916.14	7,773.71	591,352.59	619,550.06	32° 37' 31.5168 N	104° 4' 45.4289 W

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
16,823.00	9,094.10	-916.14	7,773.71	Projection

Checked By: _____ Approved By: _____ Date: _____

Devon Energy

Project: Eddy County, NM (NAD-83)
 Site: Onyx PWU 29-28
 Well: 12H
 Wellbore: OH
 Design: OH

3307.9' GE + 23.5' KB @ 3331.40usft
 Ground Level: 3307.90

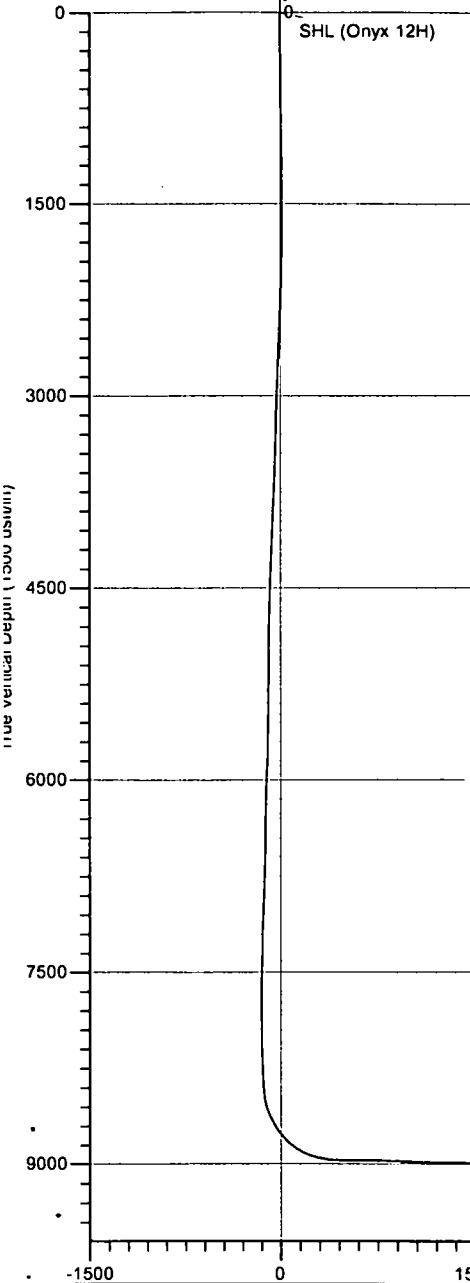


Azimuths to Grid North
 True North: -0.12°
 Magnetic North: 7.28°

Magnetic Field
 Strength: 48137.4snT
 Dip Angle: 60.45°
 Date: 12/21/2017
 Model: HDGM

PROJECT DETAILS: Eddy County, NM (NAD-83)

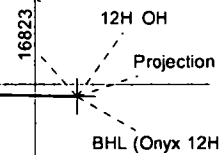
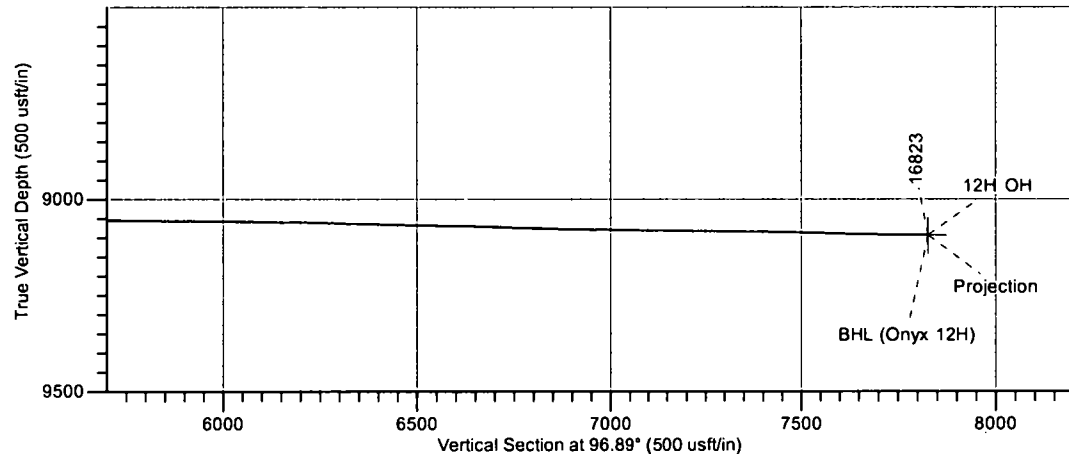
Geodetic System: US State Plane 1983
 Datum: North American Datum 1983
 Ellipsoid: GRS 1980
 Zone: New Mexico Eastern Zone



ACTUAL LINE CALLS
 SHL: 1235' FSL, 322' FWL of Sec 29
 BHL: 332' FSL, 2462' FEL of Sec 28

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Latitude	Longitude
BHL (Onyx 12H)	9094.10	-916.14	7773.71	32° 37' 31.5167 N	104° 4' 45.4289 W
SHL (Onyx 12H)	0.00	0.00	0.00	32° 37' 40.7570 N	104° 6' 16.3063 W



LEAM DRILLING SYSTEMS LLC
 2010 East Davis, Conroe, Texas 77301
 Phone: 936/756-7577, Fax: 936/756-7595

Design: OH (12H/OH)
 Onyx PWU 29-28
 Created By: Dustin Ault
 Date: 15:52, February 05 2018
 Approved: _____
 Date: _____

Devon Energy

Project: Eddy County, NM (NAD-83)

Site: Onyx PWU 29-28

Well: 12H

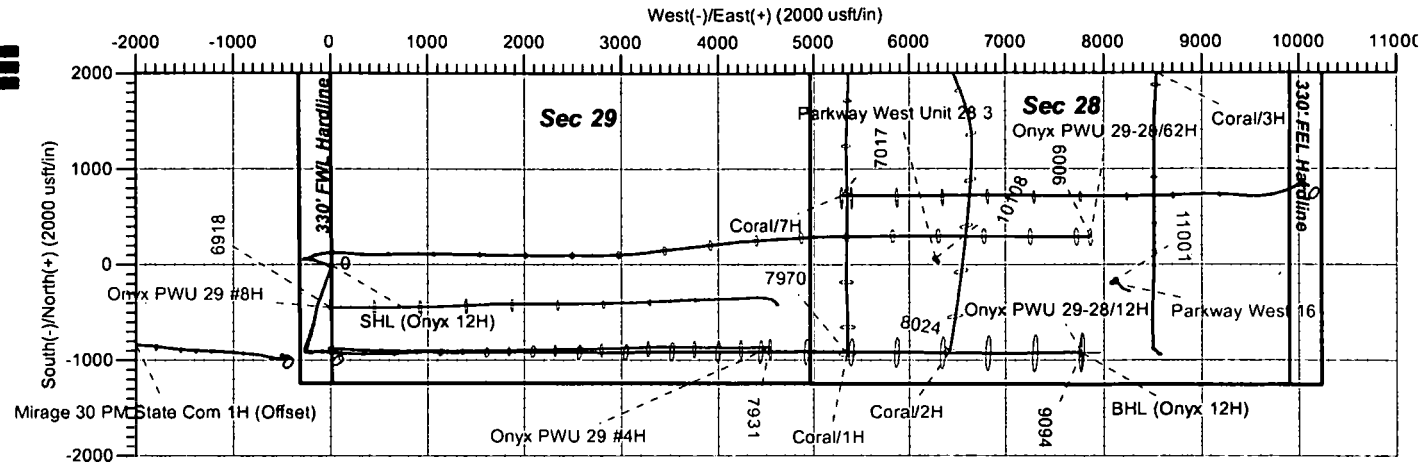
Wellbore: OH

Design: OH



Azimuths to Grid North
True North: -0.12°
Magnetic North: 7.28°

Magnetic Field
Strength: 48137.4snT
Dip Angle: 60.45°
Date: 12/21/2017
Model: HDGM



DESIGN TARGET DETAILS

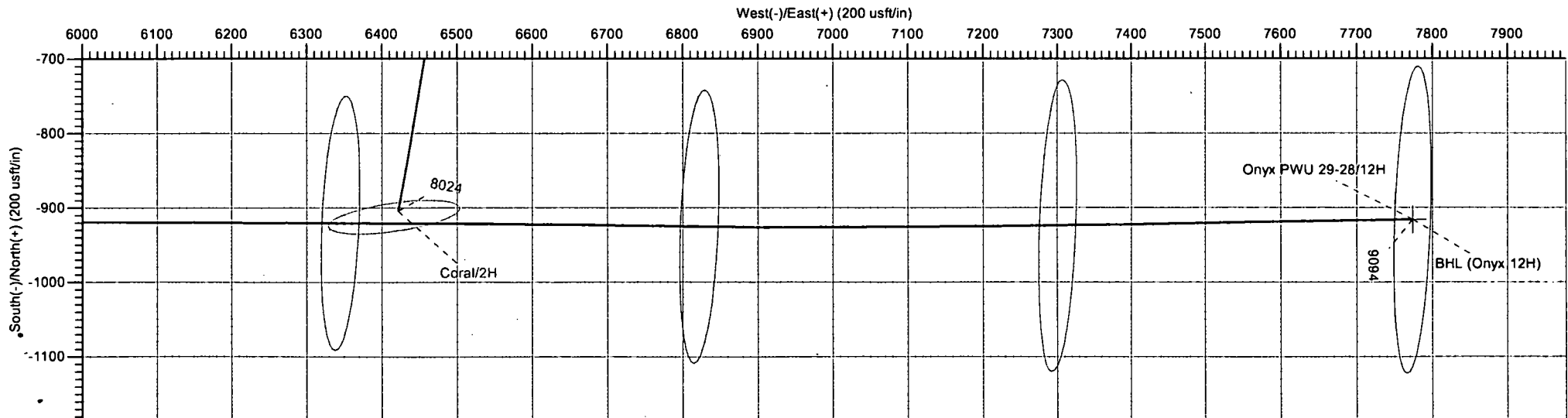
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
SHL (Onyx 12H)	0.00	0.00	0.00	592268.73	611776.35	32° 37' 40.7570 N	104° 6' 16.3063 W
BHL (Onyx 12H)	9094.10	-916.14	7773.71	591352.59	619550.06	32° 37' 31.5167 N	104° 4' 45.4289 W

PROJECT DETAILS: Eddy County, NM (NAD-83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone

ACTUAL LINE CALLS

SHL: 1235' FSL, 322' FWL of Sec 29

BHL: 332' FSL, 2462' FEL of Sec 28



LEAM DRILLING SYSTEMS LLC
2010 East Davis, Conroe, Texas 77301
Phone: 936/756-7577, Fax 936/756-7595

Design: OH (12H/OH)
Onyx PWU 29-28
Created By: Dustin Ault
Date: 15:49, February 05 2018
Approved: _____
Date: _____