

30-05-44362

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## Devon Energy

Eddy County, NM (NAD-83)

Onyx PWU 29-28

61H

OH

Design: OH

## Survey Report - Geographic

21 November, 2017

# LEAM Drilling Systems LLC

## Survey Report - Geographic

Company: Devon Energy	Local Co-ordinate Reference: Well 61H	Well 61H
Project: Eddy County, NM (NAD-83)	TVD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft	
Site: Onyx PWU 29-28	MD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft	
Well: 61H	North Reference: Grid	
Wellbore: OH	Survey Calculation Method: Minimum Curvature	
Design: OH	Database: EDM 5000.1 MULTI User DB	

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

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

<b>Well</b>	61H					
<b>Well Position</b>	<b>+N/-S</b>	0.00 usft	<b>Northing:</b>	594,630.56 usft	<b>Latitude:</b>	32° 38' 4.1292 N
	<b>+E/-W</b>	0.00 usft	<b>Easting:</b>	611,724.93 usft	<b>Longitude:</b>	104° 6' 16.8482 W
<b>Position Uncertainty</b>		0.00 usft	<b>Wellhead Elevation:</b>	0.00 usft	<b>Ground Level:</b>	3,308.70 usft

<b>Wellbore</b>	OH				
<b>Magnetics</b>	<b>Model Name</b>	<b>Sample Date</b>	<b>Declination (°)</b>	<b>Dip Angle (°)</b>	<b>Field Strength (nT)</b>
	HDGM	10/19/2017	7.40	60.50	48,165

<b>Design</b>	OH				
<b>Audit Notes:</b>					
<b>Version:</b>	1.0	<b>Phase:</b>	ACTUAL	<b>Tie On Depth:</b>	0.00
<b>Vertical Section:</b>	<b>Depth From (TVD) (usft)</b>	<b>+N/-S (usft)</b>	<b>+E/-W (usft)</b>	<b>Direction (°)</b>	
	0.00	0.00	0.00	88.15	

<b>Survey Program</b>	<b>Date</b>	11/21/2017			
<b>From (usft)</b>	<b>To (usft)</b>	<b>Survey (Wellbore)</b>	<b>Tool Name</b>	<b>Description</b>	
50.00	1,263.00	Survey #1 - Gyro (OH)	SDI Keeper	Keeper Standard Rate Gyro	
1,354.00	18,994.00	Survey #2 - MWD (OH)	LEAM MWD+HDGM	MWD+HDGM	
19,087.00	19,087.00	Survey #3 (OH)	Project	Projection	

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,011.00	0.60	336.50	2,010.94	9.08	2.45	594,639.64	611,727.38	32° 38' 4.2190 N	104° 6' 16.8193 W
2,107.00	0.70	334.80	2,106.94	10.07	2.00	594,640.63	611,726.93	32° 38' 4.2288 N	104° 6' 16.8246 W
2,202.00	0.60	330.70	2,201.93	11.03	1.51	594,641.59	611,726.44	32° 38' 4.2383 N	104° 6' 16.8303 W
2,298.00	0.60	333.70	2,297.92	11.92	1.04	594,642.48	611,725.97	32° 38' 4.2471 N	104° 6' 16.8358 W
2,393.00	1.10	322.60	2,392.91	13.09	0.26	594,643.65	611,725.20	32° 38' 4.2587 N	104° 6' 16.8448 W
2,489.00	2.10	321.90	2,488.87	15.20	-1.38	594,645.77	611,723.55	32° 38' 4.2797 N	104° 6' 16.8640 W
2,584.00	3.20	325.30	2,583.77	18.75	-3.97	594,649.32	611,720.97	32° 38' 4.3149 N	104° 6' 16.8941 W
2,680.00	4.00	328.60	2,679.58	23.81	-7.24	594,654.38	611,717.70	32° 38' 4.3650 N	104° 6' 16.9322 W
2,776.00	4.90	328.60	2,775.29	30.17	-11.12	594,660.73	611,713.82	32° 38' 4.4280 N	104° 6' 16.9774 W
2,871.00	5.90	326.90	2,869.87	37.72	-15.90	594,668.29	611,709.04	32° 38' 4.5029 N	104° 6' 17.0331 W

**LEAM Drilling Systems LLC**  
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Site: Onyx PWU 29-28  
Well: 61H  
Wellbore: OH  
Design: OH

Local Co-ordinate Reference: Well 61H  
TVD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft  
MD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft  
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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
2,967.00	6.00	326.90	2,965.35	46.06	-21.33	594,676.62	611,703.60	32° 38' 4.5855 N	104° 6' 17.0965 W
3,062.00	5.80	326.30	3,059.85	54.21	-26.71	594,684.78	611,698.23	32° 38' 4.6663 N	104° 6' 17.1591 W
3,158.00	5.60	325.40	3,155.37	62.11	-32.06	594,692.67	611,692.88	32° 38' 4.7445 N	104° 6' 17.2215 W
3,253.00	6.20	325.10	3,249.87	70.13	-37.62	594,700.69	611,687.31	32° 38' 4.8240 N	104° 6' 17.2864 W
3,349.00	6.10	325.10	3,345.32	78.56	-43.51	594,709.13	611,681.42	32° 38' 4.9076 N	104° 6' 17.3550 W
3,457.00	5.90	325.60	3,452.73	87.85	-49.93	594,718.41	611,675.01	32° 38' 4.9996 N	104° 6' 17.4299 W
3,527.00	5.50	327.70	3,522.38	93.65	-53.75	594,724.22	611,671.18	32° 38' 5.0571 N	104° 6' 17.4744 W
3,623.00	5.90	332.10	3,617.91	101.90	-58.52	594,732.47	611,666.41	32° 38' 5.1389 N	104° 6' 17.5300 W
3,718.00	7.10	331.10	3,712.29	111.36	-63.64	594,741.92	611,661.29	32° 38' 5.2325 N	104° 6' 17.5897 W
3,814.00	7.40	329.80	3,807.53	121.90	-69.62	594,752.46	611,655.31	32° 38' 5.3369 N	104° 6' 17.6593 W
3,909.00	6.90	329.50	3,901.79	132.10	-75.59	594,762.66	611,649.34	32° 38' 5.4380 N	104° 6' 17.7289 W
4,005.00	6.50	332.10	3,997.13	141.87	-81.06	594,772.43	611,643.87	32° 38' 5.5348 N	104° 6' 17.7926 W
4,100.00	6.10	335.50	4,091.56	151.22	-85.67	594,781.78	611,639.26	32° 38' 5.6274 N	104° 6' 17.8463 W
4,196.00	5.80	340.00	4,187.04	160.42	-89.45	594,790.98	611,635.49	32° 38' 5.7185 N	104° 6' 17.8902 W
4,291.00	6.20	339.90	4,281.52	169.74	-92.85	594,800.31	611,632.08	32° 38' 5.8109 N	104° 6' 17.9298 W
4,387.00	7.20	336.70	4,376.86	180.14	-97.01	594,810.70	611,627.92	32° 38' 5.9138 N	104° 6' 17.9782 W
4,483.00	7.30	330.70	4,472.10	190.98	-102.38	594,821.55	611,622.56	32° 38' 6.0213 N	104° 6' 18.0406 W
4,578.00	6.90	324.60	4,566.37	200.90	-108.64	594,831.46	611,616.30	32° 38' 6.1195 N	104° 6' 18.1136 W
4,674.00	6.10	324.20	4,661.75	209.73	-114.96	594,840.30	611,609.97	32° 38' 6.2071 N	104° 6' 18.1873 W
4,769.00	6.10	324.90	4,756.21	217.96	-120.82	594,848.52	611,604.12	32° 38' 6.2886 N	104° 6' 18.2556 W
4,865.00	6.00	324.20	4,851.68	226.20	-126.68	594,856.76	611,598.25	32° 38' 6.3703 N	104° 6' 18.3240 W
4,960.00	5.50	323.30	4,946.20	233.88	-132.31	594,864.44	611,592.62	32° 38' 6.4464 N	104° 6' 18.3896 W
5,056.00	6.20	330.50	5,041.70	242.08	-137.61	594,872.64	611,587.32	32° 38' 6.5276 N	104° 6' 18.4514 W
5,151.00	6.20	334.60	5,136.15	251.18	-142.34	594,881.74	611,582.60	32° 38' 6.6178 N	104° 6' 18.5064 W
5,247.00	6.20	327.20	5,231.59	260.22	-147.37	594,890.78	611,577.56	32° 38' 6.7073 N	104° 6' 18.5651 W
5,342.00	6.20	328.60	5,326.03	268.91	-152.82	594,899.47	611,572.11	32° 38' 6.7934 N	104° 6' 18.6286 W
5,438.00	6.00	327.20	5,421.49	277.55	-158.24	594,908.11	611,566.69	32° 38' 6.8791 N	104° 6' 18.6918 W
5,534.00	6.00	329.30	5,516.96	286.08	-163.52	594,916.65	611,561.41	32° 38' 6.9636 N	104° 6' 18.7533 W
5,629.00	6.00	329.70	5,611.44	294.64	-168.56	594,925.20	611,556.37	32° 38' 7.0484 N	104° 6' 18.8120 W
5,725.00	5.70	331.60	5,706.94	303.16	-173.36	594,933.73	611,551.58	32° 38' 7.1329 N	104° 6' 18.8679 W
5,820.00	6.20	328.60	5,801.43	311.69	-178.28	594,942.26	611,546.66	32° 38' 7.2174 N	104° 6' 18.9252 W
5,916.00	5.80	327.60	5,896.90	320.21	-183.58	594,950.78	611,541.36	32° 38' 7.3018 N	104° 6' 18.9870 W
6,011.00	6.10	328.30	5,991.39	328.56	-188.80	594,959.12	611,536.13	32° 38' 7.3845 N	104° 6' 19.0479 W
6,107.00	5.70	328.40	6,086.88	336.96	-193.98	594,967.52	611,530.96	32° 38' 7.4677 N	104° 6' 19.1082 W
6,203.00	5.50	324.00	6,182.43	344.74	-199.18	594,975.31	611,525.75	32° 38' 7.5448 N	104° 6' 19.1688 W
6,298.00	4.70	321.00	6,277.05	351.45	-204.31	594,982.02	611,520.63	32° 38' 7.6113 N	104° 6' 19.2286 W
6,394.00	4.10	320.20	6,372.76	357.14	-208.98	594,987.71	611,515.96	32° 38' 7.6678 N	104° 6' 19.2831 W
6,489.00	3.80	320.70	6,467.54	362.19	-213.15	594,992.75	611,511.79	32° 38' 7.7178 N	104° 6' 19.3317 W
6,585.00	3.50	324.00	6,563.34	367.02	-216.88	594,997.59	611,508.05	32° 38' 7.7657 N	104° 6' 19.3753 W
6,680.00	2.40	324.90	6,658.22	371.00	-219.73	595,001.56	611,505.20	32° 38' 7.8051 N	104° 6' 19.4085 W
6,776.00	1.00	330.20	6,754.17	373.37	-221.30	595,003.93	611,503.63	32° 38' 7.8286 N	104° 6' 19.4268 W
6,872.00	1.40	325.80	6,850.15	375.06	-222.38	595,005.63	611,502.55	32° 38' 7.8454 N	104° 6' 19.4394 W
6,967.00	0.40	278.50	6,945.14	376.07	-223.36	595,006.64	611,501.57	32° 38' 7.8554 N	104° 6' 19.4508 W
7,063.00	0.50	243.90	7,041.14	375.94	-224.07	595,006.50	611,500.87	32° 38' 7.8541 N	104° 6' 19.4591 W
7,158.00	0.80	237.20	7,136.13	375.40	-225.00	595,005.96	611,499.94	32° 38' 7.8487 N	104° 6' 19.4700 W
7,254.00	0.60	229.30	7,232.12	374.71	-225.94	595,005.27	611,498.99	32° 38' 7.8419 N	104° 6' 19.4810 W
7,349.00	0.80	233.20	7,327.12	373.98	-226.85	595,004.55	611,498.08	32° 38' 7.8348 N	104° 6' 19.4917 W
7,444.00	1.10	246.00	7,422.10	373.22	-228.21	595,003.78	611,496.72	32° 38' 7.8272 N	104° 6' 19.5077 W
7,540.00	0.80	244.10	7,518.09	372.55	-229.66	595,003.11	611,495.28	32° 38' 7.8206 N	104° 6' 19.5246 W
7,635.00	1.80	243.50	7,613.06	371.59	-231.59	595,002.16	611,493.34	32° 38' 7.8112 N	104° 6' 19.5472 W
7,731.00	1.80	223.80	7,709.02	369.83	-233.98	595,000.40	611,490.95	32° 38' 7.7938 N	104° 6' 19.5752 W
7,826.00	1.10	198.50	7,803.99	367.89	-235.30	594,998.45	611,489.63	32° 38' 7.7747 N	104° 6' 19.5907 W
7,922.00	0.90	156.90	7,899.97	366.32	-235.30	594,996.89	611,489.63	32° 38' 7.7591 N	104° 6' 19.5907 W
8,017.00	1.10	189.90	7,994.96	364.74	-235.17	594,995.30	611,489.77	32° 38' 7.7435 N	104° 6' 19.5892 W
8,113.00	1.30	195.90	8,090.94	362.78	-235.62	594,993.35	611,489.31	32° 38' 7.7241 N	104° 6' 19.5946 W

# LEAM Drilling Systems LLC

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Project: Eddy County, NM (NAD-83)	TVD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft
Site: Onyx PWU 29-28	MD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft
Well: 61H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,208.00	1.30	201.30	8,185.91	360.74	-236.31	594,991.31	611,488.63	32° 38' 7.7040 N	104° 6' 19.6026 W
8,304.00	1.00	194.00	8,281.90	358.92	-236.91	594,989.48	611,488.03	32° 38' 7.6859 N	104° 6' 19.6097 W
8,368.00	0.80	201.00	8,345.89	357.96	-237.20	594,988.52	611,487.73	32° 38' 7.6764 N	104° 6' 19.6132 W
8,457.00	2.32	105.98	8,434.86	356.88	-235.69	594,987.44	611,489.24	32° 38' 7.6657 N	104° 6' 19.5955 W
8,505.00	7.30	95.23	8,482.68	356.33	-231.72	594,986.90	611,493.21	32° 38' 7.6602 N	104° 6' 19.5491 W
8,553.00	11.40	89.70	8,530.03	356.08	-223.94	594,986.65	611,501.00	32° 38' 7.6576 N	104° 6' 19.4581 W
8,601.00	15.21	89.87	8,576.73	356.12	-212.89	594,986.68	611,512.04	32° 38' 7.6577 N	104° 6' 19.3289 W
8,648.00	18.60	89.94	8,621.70	356.14	-199.23	594,986.71	611,525.71	32° 38' 7.6576 N	104° 6' 19.1691 W
8,696.00	22.26	91.25	8,666.67	355.95	-182.48	594,986.52	611,542.46	32° 38' 7.6554 N	104° 6' 18.9732 W
8,744.00	25.15	88.65	8,710.62	355.99	-163.19	594,986.56	611,561.75	32° 38' 7.6554 N	104° 6' 18.7476 W
8,807.00	30.19	85.96	8,766.40	357.43	-133.98	594,987.99	611,590.95	32° 38' 7.6690 N	104° 6' 18.4060 W
8,837.00	31.35	84.98	8,792.17	358.64	-118.68	594,989.20	611,606.25	32° 38' 7.6806 N	104° 6' 18.2271 W
8,869.00	33.03	83.98	8,819.25	360.28	-101.71	594,990.85	611,623.22	32° 38' 7.6965 N	104° 6' 18.0286 W
8,901.00	36.86	83.70	8,845.48	362.25	-83.50	594,992.82	611,641.44	32° 38' 7.7156 N	104° 6' 17.8155 W
8,933.00	40.16	84.45	8,870.51	364.30	-63.68	594,994.87	611,661.25	32° 38' 7.7355 N	104° 6' 17.5837 W
8,961.00	43.70	84.80	8,891.34	366.05	-45.05	594,996.62	611,679.88	32° 38' 7.7524 N	104° 6' 17.3659 W
8,993.00	47.80	84.30	8,913.67	368.24	-22.24	594,998.80	611,702.69	32° 38' 7.7735 N	104° 6' 17.0990 W
9,025.00	54.20	83.90	8,933.79	370.79	2.48	595,001.36	611,727.42	32° 38' 7.7983 N	104° 6' 16.8098 W
9,056.00	60.80	83.90	8,950.44	373.57	28.46	595,004.13	611,753.40	32° 38' 7.8253 N	104° 6' 16.5059 W
9,079.66	65.83	84.88	8,961.06	375.63	49.50	595,006.20	611,774.43	32° 38' 7.8452 N	104° 6' 16.2599 W
<b>West HardLine Crossing - 9079.66'</b>									
9,088.00	67.60	85.20	8,964.36	376.30	57.13	595,006.86	611,782.06	32° 38' 7.8516 N	104° 6' 16.1706 W
9,120.00	74.20	85.90	8,974.83	378.64	87.26	595,009.20	611,812.19	32° 38' 7.8741 N	104° 6' 15.8182 W
9,131.00	76.90	85.50	8,977.57	379.44	97.88	595,010.00	611,822.81	32° 38' 7.8818 N	104° 6' 15.6940 W
9,146.00	79.50	84.43	8,980.64	380.73	112.50	595,011.29	611,837.44	32° 38' 7.8943 N	104° 6' 15.5229 W
9,178.00	86.13	83.22	8,984.64	384.14	144.05	595,014.70	611,868.98	32° 38' 7.9274 N	104° 6' 15.1539 W
9,210.00	87.77	82.78	8,986.34	388.03	175.77	595,018.60	611,900.70	32° 38' 7.9652 N	104° 6' 14.7829 W
9,240.00	90.03	84.24	8,986.92	391.42	205.57	595,021.99	611,930.50	32° 38' 7.9981 N	104° 6' 14.4343 W
9,273.00	90.51	87.88	8,986.76	393.69	238.48	595,024.26	611,963.41	32° 38' 8.0199 N	104° 6' 14.0493 W
9,305.00	90.84	89.91	8,986.39	394.31	270.47	595,024.87	611,995.41	32° 38' 8.0253 N	104° 6' 13.6752 W
9,337.00	91.24	91.82	8,985.80	393.83	302.46	595,024.39	612,027.39	32° 38' 8.0198 N	104° 6' 13.3011 W
9,433.00	91.71	91.96	8,983.33	390.66	398.38	595,021.22	612,123.31	32° 38' 7.9865 N	104° 6' 12.1795 W
9,528.00	91.78	92.05	8,980.44	387.34	493.27	595,017.90	612,218.21	32° 38' 7.9516 N	104° 6' 11.0698 W
9,624.00	91.61	91.95	8,977.60	383.99	589.17	595,014.55	612,314.11	32° 38' 7.9164 N	104° 6' 9.9483 W
9,718.00	90.28	91.08	8,976.05	381.51	683.13	595,012.07	612,408.06	32° 38' 7.8898 N	104° 6' 8.8497 W
9,814.00	88.98	90.56	8,976.67	380.13	779.11	595,010.69	612,504.04	32° 38' 7.8741 N	104° 6' 7.7272 W
9,909.00	88.23	90.34	8,978.98	379.39	874.08	595,009.95	612,599.01	32° 38' 7.8647 N	104° 6' 6.6166 W
10,004.00	88.77	90.17	8,981.47	378.96	969.05	595,009.53	612,693.98	32° 38' 7.8584 N	104° 6' 5.5060 W
10,099.00	91.33	91.27	8,981.39	377.77	1,064.03	595,008.33	612,788.96	32° 38' 7.8446 N	104° 6' 4.3952 W
10,195.00	92.11	91.42	8,978.51	375.52	1,159.96	595,006.08	612,884.89	32° 38' 7.8202 N	104° 6' 3.2734 W
10,291.00	91.79	90.75	8,975.24	373.70	1,255.88	595,004.26	612,980.82	32° 38' 7.8002 N	104° 6' 2.1517 W
10,386.00	91.89	90.46	8,972.19	372.70	1,350.83	595,003.26	613,075.76	32° 38' 7.7882 N	104° 6' 1.0413 W
10,477.00	91.47	90.41	8,969.52	372.01	1,441.79	595,002.57	613,166.72	32° 38' 7.7794 N	104° 5' 59.9776 W
10,567.00	90.66	90.35	8,967.85	371.41	1,531.77	595,001.97	613,256.70	32° 38' 7.7715 N	104° 5' 58.9253 W
10,660.00	90.58	90.09	8,966.84	371.05	1,624.76	595,001.62	613,349.70	32° 38' 7.7659 N	104° 5' 57.8378 W
10,752.00	90.16	90.53	8,966.25	370.56	1,716.76	595,001.12	613,441.69	32° 38' 7.7590 N	104° 5' 56.7620 W
10,842.00	90.16	91.18	8,966.00	369.21	1,806.75	594,999.78	613,531.68	32° 38' 7.7438 N	104° 5' 55.7096 W
10,933.00	90.09	91.55	8,965.80	367.04	1,897.72	594,997.61	613,622.66	32° 38' 7.7203 N	104° 5' 54.6458 W
11,023.00	89.69	90.12	8,965.97	365.73	1,987.71	594,996.30	613,712.64	32° 38' 7.7054 N	104° 5' 53.5934 W
11,115.00	89.44	89.46	8,966.67	366.07	2,079.71	594,996.63	613,804.64	32° 38' 7.7067 N	104° 5' 52.5176 W
11,206.00	88.97	89.87	8,967.93	366.60	2,170.70	594,997.17	613,895.63	32° 38' 7.7100 N	104° 5' 51.4535 W
11,299.00	89.24	89.97	8,969.38	366.73	2,263.68	594,997.30	613,988.62	32° 38' 7.7092 N	104° 5' 50.3660 W
11,389.00	89.29	90.11	8,970.54	366.67	2,353.68	594,997.23	614,078.61	32° 38' 7.7066 N	104° 5' 49.3136 W
11,480.00	89.30	90.29	8,971.66	366.35	2,444.67	594,996.91	614,169.60	32° 38' 7.7015 N	104° 5' 48.2494 W
11,572.00	89.08	90.20	8,972.96	365.96	2,536.66	594,996.52	614,261.59	32° 38' 7.6955 N	104° 5' 47.1737 W

# LEAM Drilling Systems LLC

## Survey Report - Geographic

**Company:** Devon Energy  
**Project:** Eddy County, NM (NAD-83)  
**Site:** Onyx PWU 29-28  
**Well:** 61H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well 61H  
**TVD Reference:** 3308.7' GE + 23.5' RKB @ 3332.20usft  
**MD Reference:** 3308.7' GE + 23.5' RKB @ 3332.20usft  
**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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,664.00	88.75	90.20	8,974.70	365.64	2,628.64	594,996.20	614,353.58	32° 38' 7.6903 N	104° 5' 46.0980 W
11,760.00	88.01	89.78	8,977.41	365.65	2,724.60	594,996.22	614,449.54	32° 38' 7.6884 N	104° 5' 44.9757 W
11,855.00	89.02	89.19	8,979.88	366.51	2,819.57	594,997.07	614,544.50	32° 38' 7.6947 N	104° 5' 43.8652 W
11,951.00	90.26	89.37	8,980.48	367.71	2,915.55	594,998.28	614,640.49	32° 38' 7.7045 N	104° 5' 42.7426 W
12,046.00	91.02	89.44	8,979.42	368.70	3,010.54	594,999.26	614,735.48	32° 38' 7.7122 N	104° 5' 41.6317 W
12,142.00	91.27	89.40	8,977.50	369.67	3,106.52	595,000.24	614,831.45	32° 38' 7.7197 N	104° 5' 40.5093 W
12,237.00	91.52	89.50	8,975.19	370.58	3,201.49	595,001.15	614,926.42	32° 38' 7.7266 N	104° 5' 39.3987 W
12,333.00	90.01	89.65	8,973.91	371.30	3,297.47	595,001.86	615,022.41	32° 38' 7.7315 N	104° 5' 38.2761 W
12,429.00	90.18	89.83	8,973.75	371.73	3,393.47	595,002.29	615,118.40	32° 38' 7.7336 N	104° 5' 37.1534 W
12,524.00	89.68	89.97	8,973.86	371.90	3,488.47	595,002.46	615,213.40	32° 38' 7.7332 N	104° 5' 36.0424 W
12,620.00	89.59	90.15	8,974.47	371.80	3,584.47	595,002.36	615,309.40	32° 38' 7.7300 N	104° 5' 34.9198 W
12,715.00	89.83	90.10	8,974.96	371.59	3,679.47	595,002.15	615,404.40	32° 38' 7.7258 N	104° 5' 33.8088 W
12,811.00	90.16	90.06	8,974.96	371.46	3,775.47	595,002.02	615,500.40	32° 38' 7.7224 N	104° 5' 32.6861 W
12,906.00	88.85	89.85	8,975.78	371.53	3,870.46	595,002.09	615,595.39	32° 38' 7.7210 N	104° 5' 31.5752 W
13,002.00	89.19	89.82	8,977.43	371.81	3,966.45	595,002.37	615,691.38	32° 38' 7.7215 N	104° 5' 30.4527 W
13,098.00	90.73	90.06	8,977.49	371.91	4,062.44	595,002.47	615,787.38	32° 38' 7.7204 N	104° 5' 29.3300 W
13,193.00	89.49	90.47	8,977.31	371.47	4,157.44	595,002.03	615,882.37	32° 38' 7.7139 N	104° 5' 28.2191 W
13,289.00	89.92	90.42	8,977.81	370.72	4,253.44	595,001.28	615,978.37	32° 38' 7.7043 N	104° 5' 27.0965 W
13,384.00	90.16	90.20	8,977.74	370.21	4,348.43	595,000.77	616,073.37	32° 38' 7.6971 N	104° 5' 25.9855 W
13,480.00	88.26	90.95	8,979.06	369.24	4,444.41	594,999.81	616,169.35	32° 38' 7.6854 N	104° 5' 24.8631 W
13,575.00	88.12	90.76	8,982.06	367.83	4,539.36	594,998.39	616,264.29	32° 38' 7.6692 N	104° 5' 23.7528 W
13,671.00	88.26	90.39	8,985.10	366.86	4,635.30	594,997.43	616,360.24	32° 38' 7.6575 N	104° 5' 22.6308 W
13,766.00	88.45	90.17	8,987.82	366.40	4,730.26	594,996.96	616,455.20	32° 38' 7.6508 N	104° 5' 21.5203 W
13,862.00	88.91	90.27	8,990.03	366.03	4,826.24	594,996.60	616,551.17	32° 38' 7.6450 N	104° 5' 20.3979 W
13,957.00	89.34	90.13	8,991.48	365.70	4,921.23	594,996.26	616,646.16	32° 38' 7.6395 N	104° 5' 19.2871 W
14,042.78	89.81	89.80	8,992.12	365.75	5,007.00	594,996.32	616,731.94	32° 38' 7.6381 N	104° 5' 18.2839 W
<b>SL Crossing - 14042.78'</b>									
14,053.00	89.87	89.76	8,992.15	365.79	5,017.22	594,996.36	616,742.16	32° 38' 7.6382 N	104° 5' 18.1644 W
14,148.00	90.21	89.73	8,992.08	366.22	5,112.22	594,996.78	616,837.15	32° 38' 7.6402 N	104° 5' 17.0534 W
14,244.00	90.76	89.47	8,991.27	366.89	5,208.21	594,997.45	616,933.15	32° 38' 7.6447 N	104° 5' 15.9308 W
14,339.00	91.05	89.36	8,989.77	367.86	5,303.20	594,998.42	617,028.13	32° 38' 7.6521 N	104° 5' 14.8200 W
14,435.00	91.61	89.08	8,987.54	369.16	5,399.16	594,999.73	617,124.10	32° 38' 7.6628 N	104° 5' 13.6977 W
14,530.00	90.52	89.15	8,985.77	370.63	5,494.13	595,001.19	617,219.07	32° 38' 7.6752 N	104° 5' 12.5870 W
14,626.00	89.98	89.17	8,985.35	372.04	5,590.12	595,002.60	617,315.06	32° 38' 7.6869 N	104° 5' 11.4644 W
14,722.00	89.44	89.72	8,985.84	372.97	5,686.12	595,003.53	617,411.05	32° 38' 7.6939 N	104° 5' 10.3418 W
14,817.00	89.62	90.34	8,986.62	372.92	5,781.11	595,003.48	617,506.05	32° 38' 7.6912 N	104° 5' 9.2308 W
14,912.00	89.59	90.14	8,987.27	372.52	5,876.11	595,003.08	617,601.04	32° 38' 7.6851 N	104° 5' 8.1199 W
15,008.00	90.03	90.42	8,987.59	372.05	5,972.11	595,002.61	617,697.04	32° 38' 7.6782 N	104° 5' 6.9973 W
15,104.00	90.51	90.68	8,987.14	371.13	6,068.10	595,001.69	617,793.03	32° 38' 7.6669 N	104° 5' 5.8747 W
15,199.00	89.19	90.88	8,987.39	369.83	6,163.09	595,000.40	617,888.02	32° 38' 7.6519 N	104° 5' 4.7638 W
15,295.00	89.34	91.19	8,988.62	368.10	6,259.07	594,998.66	617,984.00	32° 38' 7.6325 N	104° 5' 3.6415 W
15,390.00	89.51	90.69	8,989.57	366.54	6,354.05	594,997.11	618,078.98	32° 38' 7.6149 N	104° 5' 2.5307 W
15,486.00	88.11	90.97	8,991.57	365.15	6,450.01	594,995.72	618,174.95	32° 38' 7.5989 N	104° 5' 1.4085 W
15,581.00	88.31	90.92	8,994.54	363.59	6,544.96	594,994.15	618,269.89	32° 38' 7.5812 N	104° 5' 0.2982 W
15,677.00	88.59	90.92	8,997.13	362.05	6,640.91	594,992.61	618,365.84	32° 38' 7.5637 N	104° 4' 59.1762 W
15,773.00	88.98	91.18	8,999.17	360.29	6,736.87	594,990.85	618,461.80	32° 38' 7.5441 N	104° 4' 58.0540 W
15,868.00	89.26	90.10	9,000.63	359.23	6,831.85	594,989.79	618,556.78	32° 38' 7.5313 N	104° 4' 56.9432 W
15,964.00	89.54	89.19	9,001.63	359.82	6,927.84	594,990.38	618,652.78	32° 38' 7.5350 N	104° 4' 55.8206 W
16,060.00	89.30	89.40	9,002.60	361.00	7,023.83	594,991.56	618,748.76	32° 38' 7.5444 N	104° 4' 54.6981 W
16,155.00	91.23	89.70	9,002.16	361.75	7,118.82	594,992.31	618,843.76	32° 38' 7.5496 N	104° 4' 53.5871 W
16,251.00	91.20	90.00	9,000.13	362.00	7,214.80	594,992.56	618,939.73	32° 38' 7.5498 N	104° 4' 52.4647 W
16,346.00	91.09	90.92	8,998.23	361.24	7,309.78	594,991.80	619,034.71	32° 38' 7.5400 N	104° 4' 51.3540 W
16,442.00	89.01	91.94	8,998.15	358.84	7,405.74	594,989.40	619,130.67	32° 38' 7.5141 N	104° 4' 50.2318 W
16,537.00	87.13	91.33	9,001.35	356.13	7,500.64	594,986.69	619,225.58	32° 38' 7.4850 N	104° 4' 49.1221 W
16,631.00	87.38	90.68	9,005.85	354.48	7,594.52	594,985.05	619,319.45	32° 38' 7.4665 N	104° 4' 48.0242 W

# LEAM Drilling Systems LLC

## Survey Report - Geographic

Company: Devon Energy	Local Co-ordinate Reference: Well 61H	Well 61H
Project: Eddy County, NM (NAD-83)	TVD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft	
Site: Onyx PWU 29-28	MD Reference: 3308.7' GE + 23.5' RKB @ 3332.20usft	
Well: 61H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
16,726.00	87.73	88.62	9,009.90	355.06	7,689.43	594,985.63	619,414.36	32° 38' 7.4700 N	104° 4' 46.9143 W
16,820.00	88.82	89.32	9,012.73	356.75	7,783.37	594,987.32	619,508.30	32° 38' 7.4845 N	104° 4' 45.8157 W
16,915.00	87.60	89.87	9,015.70	357.42	7,878.32	594,987.99	619,603.25	32° 38' 7.4889 N	104° 4' 44.7053 W
17,010.00	88.91	91.42	9,018.59	356.36	7,973.26	594,986.92	619,698.19	32° 38' 7.4761 N	104° 4' 43.5950 W
17,104.00	88.73	91.87	9,020.53	353.66	8,067.20	594,984.22	619,792.14	32° 38' 7.4472 N	104° 4' 42.4964 W
17,199.00	89.07	92.52	9,022.35	350.02	8,162.11	594,980.58	619,887.05	32° 38' 7.4089 N	104° 4' 41.3866 W
17,293.00	87.61	92.05	9,025.07	346.27	8,256.00	594,976.84	619,980.93	32° 38' 7.3696 N	104° 4' 40.2888 W
17,389.00	87.20	91.09	9,029.42	343.65	8,351.86	594,974.21	620,076.80	32° 38' 7.3413 N	104° 4' 39.1677 W
17,483.00	87.11	89.75	9,034.09	342.96	8,445.74	594,973.52	620,170.67	32° 38' 7.3323 N	104° 4' 38.0699 W
17,577.00	87.82	90.69	9,038.24	342.60	8,539.65	594,973.16	620,264.58	32° 38' 7.3265 N	104° 4' 36.9717 W
17,672.00	89.06	89.36	9,040.83	342.56	8,634.61	594,973.12	620,359.54	32° 38' 7.3238 N	104° 4' 35.8612 W
17,766.00	90.02	90.15	9,041.58	342.96	8,728.60	594,973.52	620,453.54	32° 38' 7.3255 N	104° 4' 34.7619 W
17,861.00	90.54	91.70	9,041.12	341.42	8,823.59	594,971.99	620,548.52	32° 38' 7.3081 N	104° 4' 33.6512 W
17,955.00	91.33	92.75	9,039.59	337.78	8,917.50	594,968.34	620,642.43	32° 38' 7.2697 N	104° 4' 32.5530 W
18,049.00	90.87	93.39	9,037.78	332.74	9,011.35	594,963.31	620,736.28	32° 38' 7.2176 N	104° 4' 31.4556 W
18,144.00	89.29	93.00	9,037.65	327.45	9,106.20	594,958.01	620,831.13	32° 38' 7.1630 N	104° 4' 30.3466 W
18,238.00	88.96	92.20	9,039.08	323.18	9,200.09	594,953.75	620,925.02	32° 38' 7.1185 N	104° 4' 29.2487 W
18,332.00	89.83	91.65	9,040.08	320.03	9,294.03	594,950.59	621,018.96	32° 38' 7.0850 N	104° 4' 28.1502 W
18,427.00	90.17	91.05	9,040.08	317.79	9,389.00	594,948.35	621,113.93	32° 38' 7.0606 N	104° 4' 27.0396 W
18,522.00	89.32	89.72	9,040.50	317.15	9,483.99	594,947.71	621,208.93	32° 38' 7.0520 N	104° 4' 25.9287 W
18,617.00	88.30	88.79	9,042.47	318.38	9,578.96	594,948.95	621,303.90	32° 38' 7.0619 N	104° 4' 24.8180 W
18,712.00	86.99	89.13	9,046.38	320.11	9,673.87	594,950.67	621,398.80	32° 38' 7.0766 N	104° 4' 23.7081 W
18,806.00	86.45	89.36	9,051.75	321.34	9,767.70	594,951.91	621,492.64	32° 38' 7.0866 N	104° 4' 22.6107 W
18,900.00	87.99	88.71	9,056.31	322.93	9,861.58	594,953.49	621,586.51	32° 38' 7.1000 N	104° 4' 21.5128 W
18,993.09	89.27	88.44	9,058.54	325.24	9,954.61	594,955.80	621,679.54	32° 38' 7.1206 N	104° 4' 20.4248 W
<b>PBHL (Onyx 61H)</b>									
18,994.00	89.28	88.44	9,058.55	325.26	9,955.52	594,955.83	621,680.45	32° 38' 7.1208 N	104° 4' 20.4142 W
18,994.98	89.28	88.44	9,058.57	325.29	9,956.50	594,955.85	621,681.43	32° 38' 7.1211 N	104° 4' 20.4027 W
<b>East Hardline Crossing - 18994.98'</b>									
19,087.00	89.28	88.44	9,059.72	327.79	10,048.48	594,958.36	621,773.41	32° 38' 7.1436 N	104° 4' 19.3270 W
<b>Projection - BHL (Onyx PWU 29-28 61H)</b>									

### Design Targets

Target Name:	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
SHL (Onyx PWU 29-28)	0.00	0.00	0.00	0.00	0.00	594,630.56	611,724.93	32° 38' 4.1292 N	104° 6' 16.8482 W
- actual wellpath misses target center by 2010.96usft at 2011.00usft MD (2010.94 TVD, 9.08 N, 2.45 E)									
- Point									
BHL (Onyx PWU 29-28)	0.00	0.00	9,059.72	327.79	10,048.48	594,958.35	621,773.41	32° 38' 7.1436 N	104° 4' 19.3269 W
- actual wellpath misses target center by 0.01usft at 19087.00usft MD (9059.72 TVD, 327.79 N, 10048.48 E)									
- Point									

# LEAM Drilling Systems LLC

## Survey Report - Geographic

**Company:** Devon Energy  
**Project:** Eddy County, NM (NAD-83)  
**Site:** Onyx PWU 29-28  
**Well:** 61H  
**Wellbore:** OH  
**Design:** OH

**Local Co-ordinate Reference:** Well 61H  
**TVD Reference:** 3308.7' GE + 23.5' RKB @ 3332.20usft  
**MD Reference:** 3308.7' GE + 23.5' RKB @ 3332.20usft  
**North Reference:** Grid  
**Survey Calculation Method:** Minimum Curvature  
**Database:** EDM 5000.1 MULTI User DB

### Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,079.66	8,961.06	375.63	49.50	West HardLine Crossing - 9079.66'
14,042.78	8,992.12	365.75	5,007.00	SL Crossing - 14042.78'
18,994.98	9,058.57	325.29	9,956.50	East Hardline Crossing - 18994.98'
19,087.00	9,059.72	327.79	10,048.48	Projection