



ProDirectional

TAP ROCK

Cosmo K 24S35E3328 No. 133H
Lea County, NM

October 01, 2018

Job No. LNM5178718
API No. 30-025-44915

Survey Completion Report



PRODIRECTIONAL

Survey Certification Letter

October 01, 2018



Operator Name: Tap Rock Operating
Well Name: Cosmo K 24S35E3328 No. 133H
County/Parish: Lea County,
State: NM
Rig Name: H&P 422
Job Number: LNM5178718

This is to certify the surveys performed on the referenced well by Professional Directional Ent., Inc. are true and correct MWD Surveys, data provided as follows:

<u>Surveyor</u>	<u>Surveyed Depths</u>	<u>Projection to Bit</u>	<u>Dates Performed</u>	<u>Type of Survey</u>
ProDirectional	11,671' MD – 18,492' MD	18,582' MD	08/24/18 – 09/04/18	MWD

Sincerely,

Mike Coats

Mike Coats
Regulatory Specialist
Professional Directional

850 Conroe Park West Drive | Conroe, TX 77303 | Phone: 936.441.7266

prodirectional.com

The Standard of Excellence in Directional Supervision



Tap Rock Operating, LLC

Lea County, New Mexico

Cosmo K 24S35E3328

No. 133H

OH

Survey: ProDirectional

Survey Report

01 October, 2018





ProDirectional
Survey Report



Company: Tap Rock Operating, LLC
Project: Lea County, New Mexico (NAD 83)
Site: Cosmo K 24S35E3328
Well: 133H
Wellbore: OH
Design: OH 33-18492' PTB 18530'

Local Co-ordinate Reference: Well 133H
TVD Reference: Well @ 3315.50usft (GL: 3289' + KB:26.5' (H&P 422))
MD Reference: Well @ 3315.50usft (GL: 3289' + KB:26.5' (H&P 422))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Project	Lea County, New Mexico (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	Cosmo K 24S35E3328		
Site Position:		Northing:	428,699.00 usft
From:	Map	Easting:	839,378.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32.174904
		Longitude:	-103.370062
		Grid Convergence:	0.51 °

Well	133H		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32.174904
		Longitude:	-103.370062
		Ground Level:	3,289.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	HDGM	8/20/2018	6.68
			Dip Angle
			(°)
			59.85
			Field Strength
			(nT)
			47,945.40

Design	OH 33-18492' PTB 18530'		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			359.44



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Survey Program Date 10/1/2018

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
33.97	11,508.00	VES Gyro (OH)	VESSI_GYRO_DROP	VESSI Gyroflex GS2 Drop
11,671.00	18,582.00	Pro MWD (OH)	MWD+HDGM	OWSG MWD + HRGM

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	428,699.00	839,378.00
33.97	0.01	88.18	33.97	0.00	0.00	0.00	0.00	88.18	428,699.00	839,378.00
128.40	0.38	91.04	128.40	-0.01	-0.01	0.32	0.32	90.94	428,698.99	839,378.32
222.83	0.69	79.47	222.83	0.08	0.09	1.20	1.20	85.56	428,699.09	839,379.20
317.26	0.65	56.30	317.25	0.47	0.49	2.20	2.26	77.35	428,699.49	839,380.20
411.69	0.51	43.07	411.67	1.07	1.10	2.93	3.13	69.48	428,700.10	839,380.93
506.12	0.67	46.65	506.10	1.75	1.78	3.62	4.04	63.78	428,700.78	839,381.62
600.55	0.51	35.33	600.52	2.46	2.51	4.27	4.95	59.57	428,701.51	839,382.27
694.98	0.59	29.16	694.95	3.23	3.27	4.75	5.77	55.41	428,702.27	839,382.75
789.41	1.69	40.14	789.36	4.70	4.76	5.88	7.57	51.00	428,703.76	839,383.88
883.84	2.19	47.14	883.74	6.97	7.05	8.10	10.74	48.95	428,706.05	839,386.10
978.27	2.45	48.19	978.09	9.52	9.63	10.93	14.56	48.62	428,708.63	839,388.93
1,072.70	2.65	42.46	1,072.42	12.45	12.58	13.91	18.75	47.86	428,711.58	839,391.91
1,167.13	2.32	37.69	1,166.77	15.54	15.71	16.55	22.82	46.50	428,714.71	839,394.55
1,261.56	1.57	29.20	1,261.14	18.17	18.35	18.35	25.95	45.00	428,717.35	839,396.35
1,355.99	1.15	2.14	1,355.54	20.24	20.42	19.01	27.91	42.95	428,719.42	839,397.01
1,450.42	1.90	10.59	1,449.94	22.72	22.91	19.34	29.98	40.17	428,721.91	839,397.34
1,544.85	1.86	12.21	1,544.32	25.75	25.95	19.95	32.73	37.56	428,724.95	839,397.95
1,639.28	2.04	22.56	1,638.70	28.79	29.00	20.92	35.75	35.81	428,728.00	839,398.92
1,733.71	1.92	30.39	1,733.07	31.69	31.91	22.36	38.97	35.02	428,730.91	839,400.36
1,828.14	1.86	48.32	1,827.45	34.06	34.30	24.31	42.04	35.33	428,733.30	839,402.31



ProDirectional
Survey Report



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1,922.57	2.00	50.65	1,921.83	36.10	36.36	26.73	45.13	36.32	428,735.36	839,404.73
2,017.00	2.29	55.55	2,016.19	38.18	38.47	29.56	48.52	37.53	428,737.47	839,407.56
2,111.43	2.03	60.29	2,110.55	40.05	40.37	32.57	51.87	38.89	428,739.37	839,410.57
2,205.86	1.98	66.82	2,204.92	41.49	41.84	35.52	54.88	40.33	428,740.84	839,413.52
2,300.29	1.14	84.15	2,299.32	42.20	42.58	37.95	57.04	41.71	428,741.58	839,415.95
2,394.72	1.00	85.88	2,393.73	42.34	42.73	39.71	58.33	42.90	428,741.73	839,417.71
2,489.15	0.98	92.20	2,488.15	42.35	42.76	41.34	59.47	44.03	428,741.76	839,419.34
2,583.58	1.15	101.43	2,582.56	42.12	42.54	43.07	60.54	45.36	428,741.54	839,421.07
2,678.01	1.35	148.03	2,676.97	40.97	41.41	44.59	60.85	47.12	428,740.41	839,422.59
2,772.44	1.44	155.67	2,771.37	38.94	39.39	45.67	60.31	49.22	428,738.39	839,423.67
2,866.87	1.59	158.13	2,865.77	36.63	37.09	46.65	59.59	51.51	428,736.09	839,424.65
2,961.30	1.49	153.02	2,960.17	34.31	34.78	47.69	59.02	53.90	428,733.78	839,425.69
3,055.73	1.54	177.23	3,054.56	31.94	32.42	48.31	58.18	56.14	428,731.42	839,426.31
3,150.16	2.74	211.00	3,148.93	28.75	29.21	47.21	55.52	58.25	428,728.21	839,425.21
3,244.59	3.40	228.70	3,243.23	25.00	25.43	43.94	50.77	59.94	428,724.43	839,421.94
3,339.02	4.20	227.14	3,337.45	20.85	21.23	39.30	44.67	61.62	428,720.23	839,417.30
3,433.45	5.07	230.78	3,431.57	15.91	16.24	33.54	37.26	64.16	428,715.24	839,411.54
3,527.88	5.08	232.74	3,525.63	10.81	11.07	26.98	29.16	67.68	428,710.07	839,404.98
3,622.31	4.92	235.79	3,619.70	6.07	6.26	20.30	21.24	72.85	428,705.26	839,398.30
3,716.74	4.50	228.52	3,713.81	1.39	1.53	14.17	14.26	83.83	428,700.53	839,392.17
3,811.17	4.01	226.63	3,807.98	-3.28	-3.19	9.00	9.55	109.50	428,695.81	839,387.00
3,905.60	3.81	210.39	3,902.19	-8.21	-8.16	5.01	9.58	148.45	428,690.84	839,383.01
4,000.03	5.20	198.60	3,996.33	-14.94	-14.92	2.06	15.07	172.14	428,684.08	839,380.06
4,094.46	5.97	200.92	4,090.31	-23.56	-23.57	-1.06	23.59	182.57	428,675.43	839,376.94
4,188.89	7.24	215.40	4,184.12	-32.94	-33.00	-6.26	33.59	190.74	428,666.00	839,371.74
4,283.32	7.52	217.69	4,277.77	-42.61	-42.75	-13.48	44.82	197.51	428,656.25	839,364.52
4,377.75	7.90	230.58	4,371.35	-51.54	-51.76	-22.28	56.35	203.29	428,647.24	839,355.72



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4,472.18	8.92	240.63	4,464.77	-59.14	-59.47	-33.67	68.34	209.52	428,639.53	839,344.33
4,566.61	9.26	250.68	4,558.02	-65.11	-65.57	-47.22	80.81	215.76	428,633.43	839,330.78
4,661.04	8.44	260.91	4,651.33	-68.58	-69.18	-61.23	92.39	221.51	428,629.82	839,316.77
4,755.47	7.91	263.08	4,744.80	-70.33	-71.06	-74.53	102.97	226.36	428,627.94	839,303.47
4,849.90	4.29	250.38	4,838.68	-72.20	-73.03	-84.31	111.54	229.10	428,625.97	839,293.69
4,944.33	4.06	240.06	4,932.87	-74.99	-75.88	-90.53	118.13	230.03	428,623.12	839,287.47
5,038.76	5.86	236.60	5,026.94	-79.25	-80.21	-97.45	126.21	230.55	428,618.79	839,280.55
5,133.19	6.02	236.34	5,120.86	-84.57	-85.60	-105.60	135.94	230.97	428,613.40	839,272.40
5,227.62	6.60	228.76	5,214.72	-90.81	-91.93	-113.80	146.29	231.07	428,607.07	839,264.20
5,322.05	7.24	221.53	5,308.46	-98.76	-99.96	-121.83	157.59	230.63	428,599.04	839,256.17
5,416.48	7.26	220.72	5,402.14	-107.66	-108.93	-129.67	169.35	229.97	428,590.07	839,248.33
5,510.91	7.40	221.67	5,495.80	-116.65	-118.00	-137.60	181.27	229.39	428,581.00	839,240.40
5,605.34	7.51	221.12	5,589.43	-125.76	-127.19	-145.70	193.41	228.88	428,571.81	839,232.30
5,699.77	7.60	220.58	5,683.04	-135.07	-136.58	-153.82	205.71	228.40	428,562.42	839,224.18
5,794.20	7.62	219.09	5,776.64	-144.60	-146.18	-161.83	218.08	227.91	428,552.82	839,216.17
5,888.63	7.66	218.04	5,870.23	-154.33	-156.00	-169.66	230.48	227.40	428,543.00	839,208.34
5,983.06	7.73	217.66	5,963.81	-164.24	-165.98	-177.42	242.96	226.91	428,533.02	839,200.58
6,077.49	7.69	216.35	6,057.39	-174.28	-176.10	-185.04	255.44	226.42	428,522.90	839,192.96
6,171.92	7.04	215.98	6,151.04	-183.98	-185.87	-192.19	267.36	225.96	428,513.13	839,185.81
6,266.35	6.37	220.63	6,244.82	-192.58	-194.53	-199.00	278.28	225.65	428,504.47	839,179.00
6,360.78	6.25	219.34	6,338.68	-200.46	-202.48	-205.67	288.61	225.45	428,496.52	839,172.33
6,455.21	6.28	217.77	6,432.54	-208.46	-210.54	-212.09	298.85	225.21	428,488.46	839,165.91
6,549.64	6.30	217.27	6,526.41	-216.60	-218.74	-218.39	309.10	224.95	428,480.26	839,159.61
6,644.07	6.23	216.01	6,620.27	-224.81	-227.01	-224.54	319.30	224.69	428,471.99	839,153.46
6,738.50	6.37	214.93	6,714.13	-233.19	-235.45	-230.55	329.53	224.40	428,463.55	839,147.45
6,832.93	6.27	212.06	6,807.99	-241.80	-244.12	-236.29	339.74	224.07	428,454.88	839,141.71
6,927.36	6.01	215.55	6,901.88	-250.13	-252.51	-241.90	349.68	223.77	428,446.49	839,136.10



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7,021.79	5.95	213.57	6,995.79	-258.18	-260.61	-247.48	359.39	223.52	428,438.39	839,130.52
7,116.22	5.78	213.17	7,089.73	-266.18	-268.67	-252.79	368.90	223.26	428,430.33	839,125.21
7,210.65	5.64	209.52	7,183.69	-274.15	-276.69	-257.68	378.09	222.96	428,422.31	839,120.32
7,305.08	4.12	203.44	7,277.78	-281.27	-283.84	-261.31	385.81	222.63	428,415.16	839,116.69
7,399.51	3.57	212.45	7,371.99	-286.83	-289.43	-264.24	391.91	222.39	428,409.57	839,113.76
7,493.94	2.65	220.12	7,466.28	-290.95	-293.58	-267.22	396.98	222.31	428,405.42	839,110.78
7,588.37	1.96	249.65	7,560.64	-293.16	-295.81	-270.14	400.60	222.40	428,403.19	839,107.86
7,682.80	1.59	265.83	7,655.03	-293.79	-296.47	-272.96	402.99	222.64	428,402.53	839,105.04
7,777.23	0.80	281.47	7,749.43	-293.73	-296.43	-274.92	404.29	222.84	428,402.57	839,103.08
7,871.66	0.59	288.24	7,843.86	-293.44	-296.15	-276.02	404.84	222.99	428,402.85	839,101.98
7,966.09	0.31	200.33	7,938.29	-293.52	-296.24	-276.58	405.28	223.03	428,402.76	839,101.42
8,060.52	0.22	110.34	8,032.71	-293.82	-296.54	-276.49	405.44	223.00	428,402.46	839,101.51
8,154.95	0.49	82.77	8,127.14	-293.84	-296.55	-275.92	405.06	222.94	428,402.45	839,102.08
8,249.38	0.64	74.13	8,221.57	-293.65	-296.36	-275.02	404.30	222.86	428,402.64	839,102.98
8,343.81	0.71	66.92	8,315.99	-293.29	-295.98	-273.97	403.32	222.79	428,403.02	839,104.03
8,438.24	0.84	58.68	8,410.41	-292.71	-295.39	-272.84	402.12	222.73	428,403.61	839,105.16
8,532.67	0.92	50.60	8,504.83	-291.88	-294.55	-271.66	400.70	222.69	428,404.45	839,106.34
8,627.10	1.15	48.46	8,599.25	-290.79	-293.44	-270.37	399.01	222.66	428,405.56	839,107.63
8,721.53	1.02	50.01	8,693.66	-289.63	-292.27	-269.02	397.23	222.63	428,406.73	839,108.98
8,815.96	0.90	51.27	8,788.08	-288.64	-291.27	-267.79	395.67	222.60	428,407.73	839,110.21
8,910.39	0.88	66.56	8,882.49	-287.90	-290.52	-266.55	394.27	222.54	428,408.48	839,111.45
9,004.82	1.06	71.06	8,976.91	-287.34	-289.95	-265.06	392.84	222.43	428,409.05	839,112.94
9,099.25	0.84	84.61	9,071.33	-287.01	-289.60	-263.54	391.56	222.30	428,409.40	839,114.46
9,193.68	0.63	108.73	9,165.75	-287.12	-289.70	-262.36	390.84	222.17	428,409.30	839,115.64
9,288.11	0.70	118.39	9,260.17	-287.57	-290.14	-261.36	390.50	222.01	428,408.86	839,116.64
9,382.54	0.95	181.84	9,354.60	-288.63	-291.20	-260.88	390.96	221.86	428,407.80	839,117.12
9,476.97	1.30	234.95	9,449.01	-290.02	-292.59	-261.78	392.61	221.82	428,406.41	839,116.22



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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
9,571.40	1.76	239.01	9,543.41	-291.36	-293.96	-263.90	395.04	221.92	428,405.04	839,114.10
9,665.83	2.05	242.97	9,637.78	-292.85	-295.47	-266.65	398.00	222.07	428,403.53	839,111.35
9,760.26	2.48	240.54	9,732.14	-294.59	-297.24	-269.93	401.52	222.24	428,401.76	839,108.07
9,854.69	3.18	236.06	9,826.45	-297.02	-299.71	-273.88	406.00	222.42	428,399.29	839,104.12
9,949.12	3.78	238.22	9,920.71	-300.07	-302.81	-278.70	411.55	222.63	428,396.19	839,099.30
10,043.55	3.58	245.53	10,014.95	-302.88	-305.67	-284.03	417.26	222.90	428,393.33	839,093.97
10,137.98	3.01	242.26	10,109.22	-305.21	-308.05	-288.91	422.33	223.16	428,390.95	839,089.09
10,232.41	1.80	240.93	10,203.56	-307.05	-309.92	-292.40	426.09	223.33	428,389.08	839,085.60
10,326.84	0.83	288.72	10,297.97	-307.53	-310.42	-294.35	427.79	223.48	428,388.58	839,083.65
10,421.27	0.73	313.48	10,392.39	-306.89	-309.79	-295.43	428.07	223.64	428,389.21	839,082.57
10,515.70	0.69	303.95	10,486.82	-306.15	-309.06	-296.34	428.17	223.80	428,389.94	839,081.66
10,610.13	0.63	277.91	10,581.24	-305.75	-308.67	-297.32	428.58	223.93	428,390.33	839,080.68
10,704.56	0.81	271.59	10,675.66	-305.65	-308.58	-298.51	429.33	224.05	428,390.42	839,079.49
10,798.99	0.99	279.70	10,770.08	-305.48	-308.42	-299.98	430.24	224.20	428,390.58	839,078.02
10,893.42	1.23	282.24	10,864.49	-305.11	-308.07	-301.77	431.25	224.41	428,390.93	839,076.23
10,987.85	1.45	290.45	10,958.90	-304.45	-307.44	-303.88	432.28	224.67	428,391.56	839,074.12
11,082.28	1.45	299.49	11,053.30	-303.43	-306.43	-306.04	433.08	224.96	428,392.57	839,071.96
11,176.71	1.15	301.78	11,147.70	-302.32	-305.35	-307.89	433.62	225.24	428,393.65	839,070.11
11,271.14	0.93	313.38	11,242.12	-301.28	-304.32	-309.25	433.87	225.46	428,394.68	839,068.75
11,365.57	0.78	299.07	11,336.54	-300.43	-303.48	-310.37	434.08	225.64	428,395.52	839,067.63
11,460.00	0.85	282.84	11,430.96	-299.95	-303.01	-311.61	434.65	225.80	428,395.99	839,066.39
11,508.00	0.83	272.88	11,478.95	-299.85	-302.92	-312.31	435.08	225.87	428,396.08	839,065.69
11,671.00	1.80	248.90	11,641.91	-300.68	-303.78	-315.87	438.24	226.12	428,395.22	839,062.13
First Pro MWD Survey, 11671.00' MD, 11641.91' TVD										
11,718.00	6.60	345.10	11,688.80	-298.32	-301.43	-317.26	437.62	226.47	428,397.57	839,060.74
11,765.00	12.20	350.10	11,735.15	-290.79	-293.92	-318.81	433.62	227.33	428,405.08	839,059.19
11,812.00	16.70	352.80	11,780.65	-279.18	-282.32	-320.51	427.12	228.62	428,416.68	839,057.49



ProDirectional
Survey Report



Company: Tap Rock Operating, LLC
Project: Lea County, New Mexico (NAD 83)
Site: Cosmo K 24S35E3328
Well: 133H
Wellbore: OH
Design: OH 33-18492' PTB 18530'

Local Co-ordinate Reference: Well 133H
TVD Reference: Well @ 3315.50usft (GL: 3289' + KB:26.5' (H&P 422))
MD Reference: Well @ 3315.50usft (GL: 3289' + KB:26.5' (H&P 422))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
11,860.00	18.50	3.60	11,826.42	-264.73	-267.88	-320.90	418.01	230.15	428,431.12	839,057.10
11,908.00	24.60	8.30	11,871.04	-247.24	-250.37	-318.97	405.50	231.87	428,448.63	839,059.03
11,954.00	30.10	6.20	11,911.89	-226.31	-229.42	-316.34	390.77	234.05	428,469.58	839,061.66
12,001.00	32.80	1.70	11,951.98	-201.88	-204.97	-314.69	375.56	236.92	428,494.03	839,063.31
12,048.00	35.90	358.50	11,990.79	-175.37	-178.46	-314.68	361.76	240.44	428,520.54	839,063.32
12,095.00	41.10	354.90	12,027.56	-146.17	-149.27	-316.41	349.85	244.74	428,549.73	839,061.59
12,143.00	47.00	356.30	12,062.04	-112.89	-116.01	-318.95	339.39	250.01	428,582.99	839,059.05
12,190.00	52.20	358.00	12,092.50	-77.14	-80.28	-320.71	330.60	255.95	428,618.72	839,057.29
12,238.00	55.60	358.00	12,120.77	-38.37	-41.52	-322.06	324.73	262.65	428,657.48	839,055.94
12,285.00	57.30	357.90	12,146.75	0.78	-2.38	-323.46	323.47	269.58	428,696.62	839,054.54
12,332.00	61.40	359.40	12,170.70	41.20	38.03	-324.40	326.62	276.69	428,737.03	839,053.60
12,379.00	66.70	359.50	12,191.26	83.45	80.28	-324.81	334.58	283.88	428,779.28	839,053.19
12,427.00	71.00	359.20	12,208.58	128.20	125.03	-325.32	348.52	291.02	428,824.03	839,052.68
12,474.00	73.80	358.90	12,222.79	173.00	169.82	-326.06	367.63	297.51	428,868.82	839,051.94
12,521.00	75.90	358.10	12,235.07	218.36	215.17	-327.25	391.65	303.33	428,914.17	839,050.75
12,568.00	79.00	358.70	12,245.28	264.22	261.02	-328.53	419.60	308.47	428,960.02	839,049.47
12,616.00	82.90	0.90	12,252.83	311.61	308.41	-328.69	450.73	313.18	429,007.41	839,049.31
12,710.00	90.10	1.40	12,258.57	405.33	402.16	-326.81	518.20	320.90	429,101.16	839,051.19
12,804.00	91.60	0.10	12,257.17	499.29	496.13	-325.58	593.42	326.73	429,195.13	839,052.42
12,899.00	92.80	359.30	12,253.53	594.22	591.06	-326.07	675.04	331.12	429,290.06	839,051.93
12,994.00	94.30	357.00	12,247.64	689.00	685.82	-329.13	760.71	334.36	429,384.82	839,048.87
13,088.00	94.60	357.60	12,240.35	782.65	779.43	-333.55	847.80	336.83	429,478.43	839,044.45
13,183.00	93.10	358.30	12,233.97	877.40	874.15	-336.94	936.84	338.92	429,573.15	839,041.06
13,277.00	91.70	359.00	12,230.04	971.31	968.04	-339.15	1,025.73	340.69	429,667.04	839,038.85
13,371.00	92.30	359.30	12,226.75	1,065.25	1,061.97	-340.54	1,115.24	342.22	429,760.97	839,037.46
13,465.00	89.50	359.40	12,225.28	1,159.23	1,155.94	-341.61	1,205.36	343.54	429,854.94	839,036.39
13,560.00	89.00	359.80	12,226.52	1,254.22	1,250.93	-342.27	1,296.91	344.70	429,949.93	839,035.73



ProDirectional Survey Report



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Site: Cosmo K 24S35E3328
Well: 133H
Wellbore: OH
Design: OH 33-18492' PTB 18530'

Local Co-ordinate Reference: Well 133H
TVD Reference: Well @ 3315.50usft (GL: 3289' + KB:26.5' (H&P 422))
MD Reference: Well @ 3315.50usft (GL: 3289' + KB:26.5' (H&P 422))
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WellPlanner1

Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
13,653.00	88.30	2.00	12,228.71	1,347.16	1,343.89	-340.81	1,386.43	345.77	430,042.89	839,037.19
13,748.00	88.30	4.30	12,231.53	1,441.91	1,438.70	-335.59	1,477.32	346.87	430,137.70	839,042.41
13,840.00	85.70	6.00	12,236.35	1,533.32	1,530.19	-327.35	1,564.81	347.92	430,229.19	839,050.65
13,936.00	86.90	5.50	12,242.54	1,628.53	1,625.51	-317.75	1,656.27	348.94	430,324.51	839,060.25
14,031.00	87.30	6.30	12,247.35	1,722.81	1,719.88	-308.00	1,747.24	349.85	430,418.88	839,070.00
14,125.00	87.70	7.40	12,251.45	1,815.93	1,813.12	-296.80	1,837.25	350.70	430,512.12	839,081.20
14,220.00	88.30	6.10	12,254.76	1,910.10	1,907.40	-285.64	1,928.67	351.48	430,606.40	839,092.36
14,314.00	89.70	5.80	12,256.40	2,003.48	2,000.88	-275.90	2,019.81	352.15	430,699.88	839,102.10
14,408.00	89.20	4.20	12,257.31	2,097.03	2,094.51	-267.71	2,111.55	352.72	430,793.51	839,110.29
14,502.00	86.80	2.70	12,260.59	2,190.73	2,188.28	-262.05	2,203.91	353.17	430,887.28	839,115.95
14,597.00	92.10	3.60	12,261.50	2,285.49	2,283.09	-256.83	2,297.49	353.58	430,982.09	839,121.17
14,618.00	92.10	4.00	12,260.73	2,306.42	2,304.03	-255.44	2,318.15	353.67	431,003.03	839,122.56
14,712.00	90.80	3.20	12,258.35	2,400.14	2,397.81	-249.54	2,410.76	354.06	431,096.81	839,128.46
14,807.00	84.50	2.00	12,262.24	2,494.87	2,492.59	-245.24	2,504.62	354.38	431,191.59	839,132.76
14,901.00	80.90	1.10	12,274.19	2,588.02	2,585.77	-242.71	2,597.14	354.64	431,284.77	839,135.29
14,996.00	82.10	358.20	12,288.23	2,681.97	2,679.72	-243.29	2,690.74	354.81	431,378.72	839,134.71
15,089.00	81.60	356.40	12,301.42	2,773.96	2,771.67	-247.63	2,782.71	354.89	431,470.67	839,130.37
15,184.00	82.40	352.70	12,314.64	2,867.67	2,865.30	-256.56	2,876.77	354.88	431,564.30	839,121.44
15,278.00	85.10	350.40	12,324.88	2,960.22	2,957.72	-270.30	2,970.04	354.78	431,656.72	839,107.70
15,373.00	93.20	349.80	12,326.28	3,053.87	3,051.21	-286.61	3,064.64	354.63	431,750.21	839,091.39
15,467.00	94.50	351.00	12,319.97	3,146.49	3,143.68	-302.25	3,158.18	354.51	431,842.68	839,075.75
15,561.00	92.90	356.10	12,313.90	3,239.76	3,236.86	-312.78	3,251.94	354.48	431,935.86	839,065.22
15,655.00	95.70	358.30	12,306.85	3,333.41	3,330.47	-317.37	3,345.55	354.56	432,029.47	839,060.63
15,750.00	93.80	1.90	12,298.99	3,428.06	3,425.12	-317.20	3,439.78	354.71	432,124.12	839,060.80
15,844.00	93.30	2.10	12,293.17	3,521.78	3,518.88	-313.92	3,532.86	354.90	432,217.88	839,064.08
15,938.00	92.00	0.00	12,288.82	3,615.64	3,612.76	-312.20	3,626.22	355.06	432,311.76	839,065.80
16,032.00	92.00	358.50	12,285.54	3,709.58	3,706.69	-313.43	3,719.92	355.17	432,405.69	839,064.57



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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
16,126.00	90.10	355.50	12,283.82	3,803.46	3,800.53	-318.35	3,813.84	355.21	432,499.53	839,059.65
16,221.00	95.90	358.50	12,278.84	3,898.19	3,895.22	-323.32	3,908.62	355.26	432,594.22	839,054.68
16,315.00	90.00	357.00	12,274.01	3,991.98	3,988.98	-327.01	4,002.36	355.31	432,687.98	839,050.99
16,409.00	95.20	357.80	12,269.75	4,085.80	4,082.75	-331.27	4,096.17	355.36	432,781.75	839,046.73
16,503.00	96.40	358.50	12,260.25	4,179.29	4,176.22	-334.29	4,189.58	355.42	432,875.22	839,043.71
16,597.00	89.80	0.20	12,255.17	4,273.09	4,270.02	-335.35	4,283.17	355.51	432,969.02	839,042.65
16,691.00	85.60	2.70	12,258.94	4,366.93	4,363.89	-332.97	4,376.57	355.64	433,062.89	839,045.03
16,786.00	83.30	1.10	12,268.13	4,461.39	4,458.38	-329.84	4,470.56	355.77	433,157.38	839,048.16
16,887.00	89.50	355.70	12,274.47	4,562.09	4,559.05	-332.66	4,571.18	355.83	433,258.05	839,045.34
16,981.00	90.60	351.60	12,274.39	4,655.59	4,652.46	-343.06	4,665.09	355.78	433,351.46	839,034.94
17,073.00	98.60	354.00	12,267.01	4,746.59	4,743.35	-354.55	4,756.59	355.73	433,442.35	839,023.45
17,170.00	95.80	356.40	12,254.86	4,842.55	4,839.24	-362.60	4,852.80	355.71	433,538.24	839,015.40
17,265.00	95.10	357.70	12,245.83	4,937.03	4,933.68	-367.46	4,947.34	355.74	433,632.68	839,010.54
17,359.00	91.70	359.30	12,240.26	5,030.84	5,027.46	-369.92	5,041.06	355.79	433,726.46	839,008.08
17,453.00	91.40	359.00	12,237.72	5,124.80	5,121.42	-371.31	5,134.86	355.85	433,820.42	839,006.69
17,548.00	88.50	358.50	12,237.80	5,219.79	5,216.39	-373.38	5,229.73	355.91	433,915.39	839,004.62
17,642.00	90.00	359.50	12,239.03	5,313.77	5,310.36	-375.02	5,323.59	355.96	434,009.36	839,002.98
17,736.00	88.80	0.80	12,240.01	5,407.76	5,404.35	-374.78	5,417.33	356.03	434,103.35	839,003.22
17,831.00	86.80	358.90	12,243.66	5,502.67	5,499.27	-375.03	5,512.04	356.10	434,198.27	839,002.97
17,925.00	91.80	1.40	12,244.81	5,596.62	5,593.23	-374.78	5,605.77	356.17	434,292.23	839,003.22
18,019.00	90.20	2.20	12,243.17	5,690.52	5,687.16	-371.83	5,699.30	356.26	434,386.16	839,006.17
18,114.00	88.30	1.80	12,244.41	5,785.42	5,782.09	-368.51	5,793.82	356.35	434,481.09	839,009.49
18,208.00	89.10	1.60	12,246.54	5,879.32	5,876.03	-365.72	5,887.40	356.44	434,575.03	839,012.28
18,303.00	89.60	0.20	12,247.62	5,974.28	5,971.00	-364.23	5,982.10	356.51	434,670.00	839,013.77
18,398.00	85.20	357.10	12,251.93	6,069.14	6,065.85	-366.46	6,076.91	356.54	434,764.85	839,011.54
18,492.00	84.30	356.40	12,260.53	6,162.64	6,159.30	-371.77	6,170.51	356.55	434,858.30	839,006.23
Final Survey, 18492.00' MD, 12260.53' TVD										



ProDirectional
Survey Report



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Survey

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	V. Sec (usft)	N/S (usft)	E/W (usft)	Closure Distance (usft)	Closure Azimuth (°)	Northing (usft)	Easting (usft)
18,582.00	84.30	356.40	12,269.47	6,252.07	6,248.68	-377.39	6,260.06	356.54	434,947.68	839,000.61

Projected TD, 18582.00' MD, 12269.47' TVD

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
11,671.00	11,641.91	-303.78	-315.87	First Pro MWD Survey, 11671.00' MD, 11641.91' TVD
18,492.00	12,260.53	6,159.30	-371.77	Final Survey, 18492.00' MD, 12260.53' TVD
18,582.00	12,269.47	6,248.68	-377.39	Projected TD, 18582.00' MD, 12269.47' TVD