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Directional Survey



PERCUSSION
PETROLEUM
LLC

Percussion Petroleum, LLC

Eddy County, NM

South Boyd

14H

30-015-44881

OH

Survey: Survey #1

Standard Survey Report

14 June, 2018

WELLBENDERS
DIRECTIONAL SERVICES LLC





Company: Percussion Petroleum, LLC
Project: Eddy County, NM
Site: South Boyd
Well: 14H
Wellbore: OH
Rig: Silver Oak 1
Design: Plan #4 / 8:10, June 14 2018



TOTAL CORRECTION
Magnetic North is 7.38° East of Grid North (Magnetic Convergence)
To convert a Magnetic Direction to a Grid Direction, Add 7.38°

WELL DETAILS: 14H

RKB=17' @ 3628.00usft (Silver Oak 1)

	Northings	Eastings	Latitude	Longitude
+N/-S	0.00	0.00	32.623603	-104.468983
+E/-W	0.00	0.00		

SECTION DETAILS

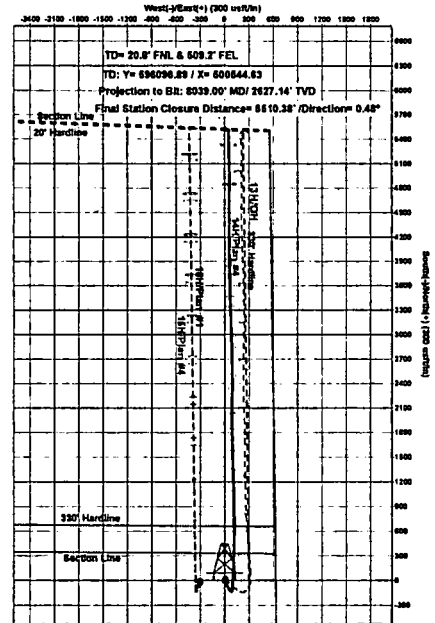
Sec	MD	Inc	Asl	TVD	+N/-S	+E/-W	Dip	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	301.00	0.00	0.00	301.00	0.00	0.00	0.00	0.00
3	600.81	0.00	147.88	600.26	-13.27	0.54	2.00	-13.38
4	2037.29	0.00	147.88	2028.88	-140.32	88.18	0.00	-141.48
5	2890.14	80.17	358.23	2852.00	432.48	114.63	10.00	430.87
6	7889.63	80.17	358.23	2837.24	6431.48	47.18	0.00	6430.33
7	8068.21	80.17	358.23	2837.00	6511.23	46.08	0.00	6509.91

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northings	Eastings	Shape
South Boyd 14H: BHL	2837.00	6511.03	48.08	63607.73	600844.48	Point
South Boyd 14H: LTP	2837.00	6431.44	48.78	636018.14	600844.18	Point
South Boyd 14H: PTP	2862.00	432.48	114.63	631018.18	600813.03	Point

Azimuths to Grid North
True North: 0.07°
Magnetic North: 7.36°
Magnetic Field
Strength: 47977.0nT
Dip Angle: 60.27°
Date: 6/8/2018
Model: IGRF2015

PROJECT DETAILS Eddy County, NM
Coordinate System: US State Plane 1983
Datum: North American Datum 1983
Elevation: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level



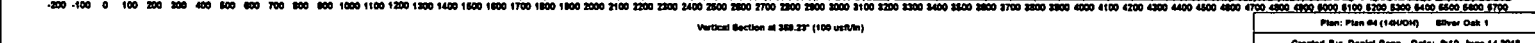
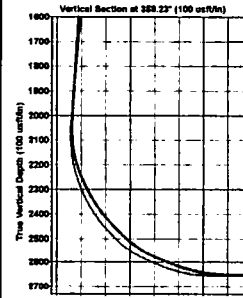
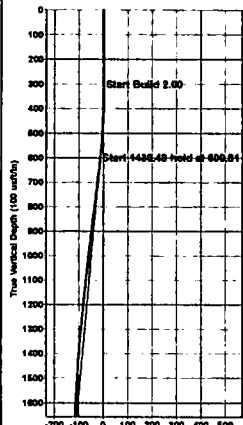
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All # in details, brackets, lines and effort will not be held responsible for any errors or omissions in this document. The user is responsible for the accuracy of the data.

Projection to Btl: 6039.00' MD/ 2827.14' TVD
TD: Y= 696096.89 / X= 600844.63
TD= 20.8' FNL & 609.3' FEL

Final Station Closure Distance= 8510.38' / Direction= 0.48°

Plan: Plan #4 (16440H) Silver Oak 1

Created By: Daniel Benn Date: 8:10, June 14 2018





Wellbenders Survey Report



Company: Percussion Petroleum, LLC
Project: Eddy County, NM
Site: South Boyd
Well: 14H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 14H
TVD Reference: RKB=17' @ 3525.00usft (Silver Oak 1)
MD Reference: RKB=17' @ 3525.00usft (Silver Oak 1)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WBDS_SQL_2

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

Site	South Boyd				
Site Position:		Northing:	596,083.74 usft	Latitude:	32.638611
From:	Lat/Long	Easting:	500,025.61 usft	Longitude:	-104.467541
Position Uncertainty:	0.00 usft	Slot Radius:	13.200 in	Grid Convergence:	-0.07 °

Well	14H				
Well Position	+N/-S	0.00 usft	Northing:	590,586.70 usfi	Latitude: 32.623503
	+E/-W	0.00 usft	Easting:	500,498.40 usfi	Longitude: -104.465983
Position Uncertainty	0.00 usft		Wellhead Elevation:	usfi	Ground Level: 3,508.00 usfi

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	6/8/2018	7.29	60.27	47,977.04844912

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	359.23	

Survey Program		Date	6/14/2018	
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
163.00	8,039.00	Survey #1 (OH)	MWD+IGRF	OWSG MWD + IGRF or WMM

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
163.00	0.62	11.24	163.00	0.86	0.17	0.86	0.38	0.38	0.00
225.00	0.66	351.37	224.99	1.55	0.18	1.54	0.36	0.06	-32.05
316.00	0.92	141.05	315.99	1.50	0.56	1.49	1.68	0.29	164.48
408.00	1.23	154.94	407.97	0.03	1.45	0.01	0.44	0.34	15.10
500.00	3.56	156.61	499.89	-3.49	3.00	-3.53	2.53	2.53	1.82
592.00	6.51	156.08	591.52	-10.88	6.25	-10.96	3.21	3.21	-0.58
684.00	7.56	152.57	682.83	-21.02	11.15	-21.17	1.23	1.14	-3.82
776.00	7.60	152.92	774.02	-31.81	16.71	-32.03	0.07	0.04	0.38
867.00	7.60	152.39	864.22	-42.50	22.24	-42.79	0.08	0.00	-0.58



Wellbenders Survey Report



Company: Percussion Petroleum, LLC
Project: Eddy County, NM
Site: South Boyd
Well: 14H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well 14H
TVD Reference: RKB=17' @ 3525.00usft (Silver Oak 1)
MD Reference: RKB=17' @ 3525.00usft (Silver Oak 1)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: WBDS_SQL_2

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
959.00	7.56	154.15	955.42	-53.33	27.70	-53.70	0.26	-0.04	1.91
1,050.00	7.52	153.09	1,045.63	-64.03	33.00	-64.47	0.16	-0.04	-1.16
1,142.00	6.42	153.97	1,136.95	-74.02	37.98	-74.53	1.20	-1.20	0.96
1,203.00	6.51	154.32	1,197.57	-80.20	40.98	-80.75	0.16	0.15	0.57
1,298.00	6.51	154.50	1,291.95	-89.92	45.63	-90.52	0.02	0.00	0.19
1,360.00	5.19	145.62	1,353.63	-95.40	48.73	-96.05	2.58	-2.13	-14.32
1,455.00	4.70	137.27	1,448.28	-101.81	53.79	-102.52	0.92	-0.52	-8.79
1,549.00	4.79	137.36	1,541.95	-107.53	59.07	-108.31	0.10	0.10	0.10
1,643.00	4.66	137.36	1,635.64	-113.22	64.31	-114.08	0.14	-0.14	0.00
1,738.00	4.92	135.87	1,730.30	-118.98	69.76	-119.91	0.30	0.27	-1.57
1,832.00	4.70	136.92	1,823.97	-124.69	75.20	-125.69	0.25	-0.23	1.12
1,926.00	4.84	136.22	1,917.65	-130.37	80.57	-131.44	0.16	0.15	-0.74
2,020.00	4.53	138.15	2,011.33	-135.99	85.79	-137.14	0.37	-0.33	2.05
2,067.00	1.67	90.69	2,058.26	-137.39	87.72	-138.55	7.69	-6.09	-100.98
2,113.00	5.05	12.20	2,104.19	-135.41	88.82	-136.60	10.85	7.35	-170.63
2,160.00	10.90	5.79	2,150.72	-128.97	89.70	-130.16	12.57	12.45	-13.64
2,206.00	16.88	4.29	2,195.36	-117.97	90.64	-119.18	13.02	13.00	-3.26
2,253.00	22.15	5.88	2,239.64	-102.34	92.06	-103.57	11.27	11.21	3.38
2,299.00	25.63	6.49	2,281.69	-83.82	94.07	-85.08	7.58	7.57	1.33
2,346.00	30.02	6.32	2,323.25	-62.03	96.52	-63.32	9.34	9.34	-0.36
2,393.00	34.37	4.82	2,363.01	-37.11	98.93	-38.43	9.41	9.26	-3.19
2,440.00	38.68	3.50	2,400.77	-9.22	100.94	-10.57	9.32	9.17	-2.81
2,488.00	43.03	4.29	2,437.07	22.10	103.08	20.72	9.13	9.06	1.65
2,535.00	46.24	4.56	2,470.51	55.02	105.63	53.60	6.84	6.83	0.57
2,582.00	49.54	3.68	2,502.02	89.79	108.13	88.33	7.16	7.02	-1.87
2,629.00	54.64	2.10	2,530.89	126.81	109.98	125.33	11.17	10.85	-3.36
2,676.00	59.16	0.43	2,556.55	166.17	110.83	164.66	10.07	9.62	-3.55
2,723.00	63.69	0.43	2,579.03	207.43	111.14	205.92	9.64	9.64	0.00
2,769.00	67.60	0.78	2,598.00	249.32	111.59	247.80	8.53	8.50	0.76
2,816.00	71.30	1.92	2,614.49	293.31	112.63	291.77	8.19	7.87	2.43
2,862.00	75.34	2.18	2,627.69	337.34	114.21	335.77	8.80	8.78	0.57
2,909.00	78.55	1.92	2,638.31	383.09	115.84	381.50	6.85	6.83	-0.55
2,958.00	83.69	1.48	2,645.87	431.47	117.28	429.85	10.53	10.49	-0.90
3,005.00	88.53	1.04	2,649.06	478.33	118.31	476.70	10.34	10.30	-0.94
3,051.00	89.89	1.75	2,649.69	524.31	119.43	522.66	3.34	2.96	1.54
3,145.00	89.76	359.99	2,649.98	618.30	120.86	616.62	1.88	-0.14	-1.87
3,241.00	90.15	0.43	2,650.05	714.30	121.21	712.60	0.61	0.41	0.46
3,336.00	89.85	358.14	2,650.05	809.28	120.02	807.60	2.43	-0.32	-2.41
3,430.00	90.59	358.23	2,649.69	903.23	117.05	901.58	0.79	0.79	0.10
3,524.00	90.73	358.49	2,648.61	997.19	114.36	995.56	0.31	0.15	0.28
3,619.00	91.34	358.67	2,646.89	1,092.14	112.00	1,090.54	0.67	0.64	0.19
3,714.00	89.41	357.70	2,646.27	1,187.09	108.99	1,185.52	2.27	-2.03	-1.02
3,806.00	89.85	357.79	2,646.87	1,279.01	105.37	1,277.48	0.49	0.48	0.10
3,898.00	90.15	358.23	2,646.87	1,370.96	102.18	1,369.46	0.58	0.33	0.48

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Database: WBDS_SQL_2

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Buid Rate (°/100ft)	Turn Rate (°/100ft)
3,989.00	90.55	358.76	2,646.31	1,461.93	99.79	1,460.45	0.73	0.44	0.58
4,107.00	91.30	359.11	2,644.40	1,579.89	97.60	1,578.43	0.70	0.64	0.30
4,199.00	88.70	358.23	2,644.40	1,671.86	95.46	1,670.42	2.98	-2.83	-0.96
4,291.00	88.88	358.76	2,646.35	1,763.80	93.04	1,762.39	0.61	0.20	0.58
4,383.00	89.23	359.20	2,647.86	1,855.77	91.41	1,854.38	0.61	0.38	0.48
4,475.00	89.76	359.46	2,648.68	1,947.76	90.33	1,946.37	0.64	0.58	0.28
4,566.00	90.02	359.81	2,648.85	2,038.76	89.75	2,037.37	0.48	0.29	0.38
4,658.00	90.73	0.69	2,648.25	2,130.76	90.15	2,129.35	1.23	0.77	0.96
4,749.00	90.59	0.87	2,647.20	2,221.74	91.39	2,220.31	0.25	-0.15	0.20
4,840.00	90.81	1.48	2,646.09	2,312.72	93.26	2,311.26	0.71	0.24	0.67
4,935.00	89.36	359.02	2,645.95	2,407.71	93.67	2,406.23	3.01	-1.53	-2.59
5,029.00	90.07	359.20	2,646.41	2,501.69	92.21	2,500.23	0.78	0.76	0.19
5,123.00	90.81	0.16	2,645.69	2,595.69	91.69	2,594.22	1.29	0.79	1.02
5,217.00	89.63	359.90	2,645.33	2,689.68	91.74	2,688.21	1.29	-1.26	-0.28
5,310.00	90.81	0.08	2,644.97	2,782.68	91.72	2,781.20	1.28	1.27	0.19
5,405.00	89.14	357.70	2,645.02	2,877.65	89.88	2,876.19	3.06	-1.76	-2.51
5,500.00	89.45	357.26	2,646.19	2,972.56	85.70	2,971.13	0.57	0.33	-0.46
5,594.00	90.90	358.05	2,645.90	3,066.47	81.86	3,065.10	1.76	1.54	0.84
5,688.00	91.56	358.32	2,643.88	3,160.40	78.88	3,159.06	0.76	0.70	0.29
5,781.00	89.01	357.35	2,643.42	3,253.33	75.37	3,252.02	2.93	-2.74	-1.04
5,900.00	89.80	357.26	2,644.65	3,372.19	69.77	3,370.95	0.67	0.66	-0.08
5,992.00	90.29	357.88	2,644.58	3,464.10	65.87	3,462.91	0.86	0.53	0.67
6,083.00	91.30	358.05	2,643.32	3,555.04	62.64	3,553.87	1.13	1.11	0.19
6,175.00	89.14	358.84	2,642.97	3,647.00	60.14	3,645.86	2.50	-2.35	0.86
6,267.00	89.85	359.02	2,643.78	3,738.98	58.43	3,737.85	0.80	0.77	0.20
6,359.00	90.33	359.72	2,643.63	3,830.97	57.42	3,829.85	0.92	0.52	0.76
6,451.00	91.12	359.64	2,642.47	3,922.96	56.90	3,921.84	0.86	0.86	-0.09
6,543.00	92.04	359.90	2,639.93	4,014.92	56.53	4,013.80	1.04	1.00	0.28
6,634.00	89.49	359.90	2,638.72	4,105.91	56.37	4,104.78	2.80	-2.80	0.00
6,726.00	90.20	359.90	2,638.96	4,197.91	56.21	4,196.77	0.77	0.77	0.00
6,817.00	90.95	0.78	2,638.05	4,288.90	56.75	4,287.75	1.27	0.82	0.97
6,909.00	88.35	359.64	2,638.61	4,380.89	57.09	4,379.72	3.09	-2.83	-1.24
7,003.00	88.40	359.55	2,641.28	4,474.85	56.43	4,473.68	0.11	0.05	-0.10
7,098.00	88.84	0.08	2,643.57	4,569.82	56.12	4,568.65	0.72	0.46	0.56
7,191.00	89.49	0.43	2,644.92	4,662.81	56.53	4,661.63	0.79	0.70	0.38
7,285.00	89.67	0.51	2,645.61	4,756.80	57.30	4,755.60	0.21	0.19	0.09
7,379.00	90.07	1.39	2,645.82	4,850.79	58.86	4,849.56	1.03	0.43	0.94
7,475.00	89.89	358.49	2,645.86	4,946.78	58.76	4,945.54	3.03	-0.19	-3.02
7,570.00	90.55	358.05	2,645.49	5,041.73	55.89	5,040.53	0.83	0.69	-0.46
7,664.00	91.21	358.41	2,644.05	5,135.68	52.99	5,134.50	0.80	0.70	0.38
7,756.00	91.82	358.67	2,641.62	5,227.61	50.65	5,226.46	0.72	0.66	0.28
7,850.00	92.62	358.93	2,637.98	5,321.52	48.68	5,320.39	0.89	0.85	0.28
7,943.00	93.36	359.46	2,633.13	5,414.38	47.38	5,413.26	0.98	0.80	0.57



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Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,983.00	93.63	359.28	2,630.69	5,454.31	46.94	5,453.18	0.81	0.67	-0.45
8,039.00	93.63	359.28	2,627.14	5,510.19	46.23	5,509.07	0.00	0.00	0.00

TD= 20.8' FNL & 509.2' FEL - TD: Y= 596096.89 / X= 500544.63 - Projection to Bit: 8039.00' MD/ 2627.14' TVD - Final Stati

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,039.00	2,627.14	5,510.19	46.23	TD= 20.8' FNL & 509.2' FEL
8,039.00	2,627.14	5,510.19	46.23	TD: Y= 596096.89 / X= 500544.63
8,039.00	2,627.14	5,510.19	46.23	Projection to Bit: 8039.00' MD/ 2627.14' TVD
8,039.00	2,627.14	5,510.19	46.23	Final Station Closure Distance= 5510.38' /Direction= 0.48°

Checked By: _____ Approved By: _____ Date: _____