



30-025-44296

HOBBS OCD

NOV 27 2018

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BTA Oil Producers, LLC

Lea County, NM (NAD 83)

Sec 27, T25-S, R33-E

Rojo 7811 27 Fed Com #13H

Wellbore #1

Design: Wellbore #1

QES Survey Report

05 July, 2018





Survey Report



Company:	BTA Oil Producers, LLC	Local Co-ordinate Reference:	Well Rojo 7811 27 Fed Com #13H
Project:	Lea County, NM (NAD 83)	TVD Reference:	WELL @ 3369.0usft (Patterson #597)
Site:	Sec 27, T25-S, R33-E	MD Reference:	WELL @ 3369.0usft (Patterson #597)
Well:	Rojo 7811 27 Fed Com #13H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

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

Site	Sec 27, T25-S, R33-E		
Site Position:		Northing:	403,958.90 usft
From:	Map	Easting:	782,026.00 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 6' 29.435 N
		Longitude:	103° 33' 21.547 W
		Grid Convergence:	0.41 °

Well	Rojo 7811 27 Fed Com #13H		
Well Position	+N-S	0.0 usft	Northing: 403,958.90 usft
	+E-W	0.0 usft	Easting: 782,026.00 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 6' 29.435 N
		Longitude:	103° 33' 21.547 W
		Ground Level:	3,344.0 usft

Wellbore	Wellbore #1		
gnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	6/14/2018	6.83
			Dip Angle (°)
			59.95
			Field Strength (nT)
			47,769.63254305

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0

Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.0	0.0	0.0	190.54

Survey Program	Date 6/27/2018		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
130.0	17,360.0	QES MWD Surveys (Wellbore #1)	OWSG (Rev2) MWD
			Description
			OWSG MWD - Standard

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
First MWD Survey @ 130.0' MD / 130.0' TVD									
130.0	0.40	73.40	130.0	0.1	0.4	-0.2	0.31	0.31	0.00
166.0	0.40	86.30	166.0	0.2	0.7	-0.3	0.25	0.00	35.83
257.0	0.60	62.70	257.0	0.4	1.4	-0.7	0.31	0.22	-25.93
345.0	0.30	79.20	345.0	0.7	2.1	-1.0	0.37	-0.34	18.75
433.0	0.40	48.30	433.0	0.9	2.5	-1.4	0.24	0.11	-35.11
521.0	0.30	97.50	521.0	1.1	3.0	-1.6	0.35	-0.11	55.91
609.0	0.30	68.20	609.0	1.1	3.4	-1.7	0.17	0.00	-33.30
698.0	0.30	100.50	698.0	1.2	3.9	-1.9	0.19	0.00	36.29
792.0	0.20	79.10	792.0	1.2	4.3	-1.9	0.14	-0.11	-22.77



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Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Rojo 7811 27 Fed Com #13H
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North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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)
886.0	0.30	7.00	886.0	1.4	4.5	-2.2	0.32	0.11	-76.70
980.0	0.30	0.80	980.0	1.9	4.5	-2.7	0.03	0.00	-6.60
1,069.0	0.50	9.40	1,069.0	2.6	4.6	-3.3	0.23	0.22	9.66
1,172.0	0.30	9.80	1,172.0	3.3	4.7	-4.1	0.19	-0.19	0.39
1,211.0	0.30	7.30	1,211.0	3.5	4.7	-4.3	0.03	0.00	-6.41
1,361.0	0.40	0.80	1,361.0	4.4	4.8	-5.2	0.07	0.07	-4.33
1,455.0	0.40	9.30	1,455.0	5.0	4.8	-5.8	0.06	0.00	9.04
1,551.0	0.40	6.10	1,551.0	5.7	4.9	-6.5	0.02	0.00	-3.33
1,646.0	0.30	28.10	1,646.0	6.2	5.1	-7.1	0.17	-0.11	23.16
1,741.0	0.40	31.80	1,741.0	6.7	5.4	-7.6	0.11	0.11	3.89
1,836.0	0.40	29.30	1,836.0	7.3	5.7	-8.2	0.02	0.00	-2.63
1,931.0	0.30	20.00	1,931.0	7.8	5.9	-8.8	0.12	-0.11	-9.79
2,026.0	0.30	12.60	2,026.0	8.3	6.1	-9.3	0.04	0.00	-7.79
2,122.0	2.20	296.70	2,121.9	9.4	4.5	-10.1	2.24	1.98	-79.06
2,217.0	5.50	282.60	2,216.7	11.2	-1.6	-10.7	3.59	3.47	-14.84
2,312.0	6.90	275.60	2,311.2	12.8	-11.7	-10.4	1.67	1.47	-7.37
2,407.0	6.30	273.30	2,405.5	13.6	-22.6	-9.2	0.69	-0.63	-2.42
2,502.0	6.00	275.00	2,500.0	14.3	-32.7	-8.1	0.37	-0.32	1.79
2,597.0	5.60	276.10	2,594.5	15.3	-42.3	-7.3	0.44	-0.42	1.16
2,691.0	5.20	276.30	2,688.1	16.2	-51.1	-6.6	0.43	-0.43	0.21
2,785.0	7.20	272.60	2,781.5	17.0	-61.2	-5.5	2.17	2.13	-3.94
2,880.0	7.80	270.00	2,875.7	17.2	-73.6	-3.5	0.73	0.63	-2.74
2,976.0	7.10	271.50	2,970.9	17.4	-86.1	-1.3	0.76	-0.73	1.56
3,071.0	6.60	272.60	3,065.2	17.8	-97.4	0.3	0.54	-0.53	1.16
3,166.0	6.00	274.00	3,159.6	18.4	-107.8	1.6	0.65	-0.63	1.47
3,260.0	5.20	276.80	3,253.2	19.2	-116.9	2.5	0.90	-0.85	2.98
3,355.0	7.40	277.00	3,347.6	20.5	-127.3	3.1	2.32	2.32	0.21
3,448.0	8.00	276.80	3,439.8	22.0	-139.6	3.9	0.65	0.65	-0.22
3,542.0	7.10	279.10	3,533.0	23.7	-151.9	4.5	1.01	-0.96	2.45
3,638.0	6.80	277.90	3,628.3	25.4	-163.4	4.9	0.35	-0.31	-1.25
3,733.0	6.30	276.10	3,722.6	26.7	-174.1	5.6	0.57	-0.53	-1.89
3,828.0	5.80	273.50	3,817.1	27.6	-184.1	6.6	0.60	-0.53	-2.74
3,922.0	5.30	272.80	3,910.7	28.1	-193.2	7.7	0.54	-0.53	-0.74
4,017.0	4.90	272.80	4,005.3	28.5	-201.6	8.9	0.42	-0.42	0.00
4,112.0	4.60	271.70	4,100.0	28.8	-209.5	10.0	0.33	-0.32	-1.16
4,207.0	7.10	281.40	4,194.5	30.1	-219.0	10.5	2.82	2.63	10.21
4,302.0	7.60	280.50	4,288.7	32.4	-231.0	10.4	0.54	0.53	-0.95
4,397.0	6.20	278.70	4,383.0	34.3	-242.2	10.6	1.49	-1.47	-1.89
4,493.0	5.40	281.70	4,478.5	36.0	-251.7	10.7	0.89	-0.83	3.13
4,587.0	6.30	286.80	4,572.0	38.4	-261.0	10.0	1.10	0.96	5.43
4,682.0	7.40	287.40	4,666.3	41.7	-271.8	8.7	1.16	1.16	0.63
4,776.0	6.40	283.70	4,759.6	44.8	-282.7	7.7	1.16	-1.06	-3.94
4,871.0	5.90	283.80	4,854.1	47.2	-292.6	7.1	0.53	-0.53	0.11



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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,940.0	5.50	283.80	4,922.8	48.8	-299.3	6.7	0.58	-0.58	0.00
5,037.0	4.90	286.60	5,019.4	51.1	-307.7	6.0	0.67	-0.62	2.89
5,132.0	4.80	285.10	5,114.0	53.3	-315.5	5.3	0.17	-0.11	-1.58
5,227.0	4.80	283.50	5,208.7	55.3	-323.2	4.8	0.14	0.00	-1.68
5,323.0	4.70	283.70	5,304.4	57.1	-330.9	4.4	0.11	-0.10	0.21
5,418.0	4.60	282.40	5,399.0	58.9	-338.4	4.0	0.15	-0.11	-1.37
5,513.0	4.50	282.60	5,493.7	60.5	-345.8	3.8	0.11	-0.11	0.21
5,607.0	4.40	281.20	5,587.5	62.0	-352.9	3.6	0.16	-0.11	-1.49
5,702.0	4.10	283.50	5,682.2	63.5	-359.8	3.4	0.36	-0.32	2.42
5,797.0	5.80	280.80	5,776.8	65.2	-367.8	3.2	1.81	1.79	-2.84
5,892.0	6.40	280.00	5,871.3	67.0	-377.7	3.2	0.64	0.63	-0.84
5,985.0	6.10	278.00	5,963.8	68.6	-387.7	3.5	0.40	-0.32	-2.15
6,081.0	5.50	277.90	6,059.3	70.0	-397.3	3.9	0.63	-0.63	-0.10
6,176.0	5.40	276.10	6,153.8	71.1	-406.3	4.5	0.21	-0.11	-1.89
6,271.0	6.30	282.10	6,248.3	72.6	-415.8	4.7	1.14	0.95	6.32
6,366.0	6.80	282.80	6,342.7	75.0	-426.4	4.3	0.53	0.53	0.74
6,460.0	6.60	282.40	6,436.1	77.4	-437.1	3.9	0.22	-0.21	-0.43
6,555.0	6.70	282.30	6,530.4	79.7	-447.8	3.6	0.11	0.11	-0.11
6,650.0	6.60	281.00	6,624.8	81.9	-458.6	3.3	0.19	-0.11	-1.37
6,745.0	6.40	281.20	6,719.2	84.0	-469.2	3.2	0.21	-0.21	0.21
6,840.0	6.20	280.00	6,813.6	85.9	-479.4	3.2	0.25	-0.21	-1.26
6,935.0	6.10	280.50	6,908.1	87.7	-489.4	3.3	0.12	-0.11	0.53
7,031.0	6.00	279.10	7,003.5	89.5	-499.4	3.4	0.19	-0.10	-1.46
7,126.0	5.60	278.40	7,098.0	90.9	-508.9	3.7	0.43	-0.42	-0.74
7,221.0	5.40	277.30	7,192.6	92.2	-517.9	4.1	0.24	-0.21	-1.16
7,316.0	5.30	277.10	7,287.2	93.3	-526.7	4.6	0.11	-0.11	-0.21
7,411.0	5.20	275.80	7,381.8	94.2	-535.3	5.3	0.16	-0.11	-1.37
7,506.0	5.00	283.70	7,476.4	95.7	-543.6	5.4	0.77	-0.21	8.32
7,601.0	5.50	295.40	7,571.0	98.6	-551.8	4.0	1.24	0.53	12.32
7,696.0	5.60	294.70	7,665.6	102.5	-560.1	1.7	0.13	0.11	-0.74
7,790.0	4.90	294.00	7,759.2	106.0	-567.9	-0.4	0.75	-0.74	-0.74
7,886.0	4.50	293.00	7,854.9	109.2	-575.1	-2.1	0.43	-0.42	-1.04
7,981.0	4.50	294.00	7,949.6	112.1	-582.0	-3.8	0.08	0.00	1.05
8,074.0	5.40	279.40	8,042.2	114.3	-589.6	-4.6	1.66	0.97	-15.70
8,169.0	5.60	277.50	8,136.8	115.7	-598.6	-4.2	0.28	0.21	-2.00
8,263.0	5.20	276.80	8,230.4	116.8	-607.4	-3.7	0.43	-0.43	-0.74
8,357.0	4.90	275.60	8,324.0	117.7	-615.6	-3.1	0.34	-0.32	-1.28
8,453.0	4.80	276.50	8,419.7	118.5	-623.7	-2.4	0.13	-0.10	0.94
8,548.0	5.70	279.10	8,514.3	119.7	-632.3	-2.0	0.98	0.95	2.74
8,641.0	6.20	280.70	8,606.8	121.4	-641.8	-1.9	0.57	0.54	1.72
8,736.0	5.80	279.80	8,701.2	123.2	-651.6	-1.9	0.43	-0.42	-0.95
8,832.0	5.50	279.80	8,796.8	124.8	-660.9	-1.8	0.31	-0.31	0.00
8,926.0	5.20	279.10	8,890.4	126.2	-669.5	-1.6	0.33	-0.32	-0.74



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9,021.0	4.70	279.40	8,985.0	127.5	-677.6	-1.4	0.53	-0.53	0.32
9,116.0	4.20	277.30	9,079.7	128.6	-684.9	-1.2	0.55	-0.53	-2.21
9,212.0	3.90	277.30	9,175.5	129.5	-691.6	-0.8	0.31	-0.31	0.00
9,306.0	4.00	284.50	9,269.3	130.7	-698.0	-0.8	0.54	0.11	7.66
9,400.0	5.90	285.80	9,362.9	132.8	-705.8	-1.5	2.02	2.02	1.38
9,495.0	6.20	282.10	9,457.4	135.2	-715.5	-2.1	0.52	0.32	-3.89
9,589.0	7.10	280.80	9,550.7	137.4	-726.2	-2.2	0.97	0.96	-1.38
9,684.0	9.10	283.70	9,644.8	140.3	-739.3	-2.7	2.15	2.11	3.05
9,811.0	9.40	280.30	9,770.1	144.5	-759.2	-3.2	0.49	0.24	-2.68
9,906.0	8.60	278.00	9,864.0	146.9	-773.9	-2.8	0.92	-0.84	-2.42
10,001.0	7.50	275.60	9,958.0	148.5	-787.1	-2.0	1.21	-1.16	-2.53
10,097.0	7.40	279.40	10,053.2	150.1	-799.4	-1.3	0.52	-0.10	3.96
10,192.0	7.60	280.70	10,147.4	152.3	-811.6	-1.2	0.28	0.21	1.37
10,287.0	7.60	278.90	10,241.6	154.4	-824.0	-1.1	0.25	0.00	-1.89
10,382.0	9.10	282.10	10,335.6	156.9	-837.6	-1.1	1.65	1.58	3.37
10,477.0	8.50	278.00	10,429.4	159.5	-851.9	-1.0	0.91	-0.63	-4.32
10,571.0	7.10	275.80	10,522.6	161.0	-864.5	-0.2	1.52	-1.49	-2.34
10,666.0	6.20	274.00	10,616.9	162.0	-875.5	0.9	0.97	-0.95	-1.89
10,761.0	6.20	278.40	10,711.4	163.1	-885.7	1.7	0.50	0.00	4.63
10,855.0	7.90	281.50	10,804.7	165.1	-897.0	1.7	1.85	1.81	3.30
10,950.0	7.70	278.40	10,898.8	167.4	-909.7	1.9	0.49	-0.21	-3.26
11,045.0	7.10	275.20	10,993.0	168.8	-921.9	2.6	0.77	-0.63	-3.37
11,140.0	7.00	281.40	11,087.3	170.5	-933.4	3.1	0.81	-0.11	6.53
11,235.0	6.70	286.10	11,181.6	173.2	-944.4	2.5	0.67	-0.32	4.95
11,330.0	4.50	286.50	11,276.1	175.8	-953.3	1.6	2.32	-2.32	0.42
11,425.0	3.50	296.50	11,370.9	178.1	-959.5	0.4	1.28	-1.05	10.53
11,520.0	3.30	314.40	11,465.7	181.3	-964.0	-1.9	1.13	-0.21	18.84
11,615.0	2.50	320.00	11,560.6	184.8	-967.3	-4.8	0.89	-0.84	5.89
11,710.0	2.10	305.60	11,655.5	187.4	-970.0	-6.8	0.74	-0.42	-15.16
11,760.0	1.90	303.20	11,705.5	188.4	-971.5	-7.5	0.43	-0.40	-4.80
11,898.0	8.80	210.00	11,843.0	180.5	-978.7	1.5	6.60	5.00	-67.54
11,993.0	19.30	203.70	11,935.0	159.8	-988.7	23.7	11.15	11.05	-6.63
12,089.0	30.80	201.00	12,021.8	122.2	-1,003.9	63.5	12.04	11.98	-2.81
12,184.0	39.60	193.80	12,099.4	70.0	-1,019.9	117.8	10.23	9.26	-7.58
12,279.0	50.10	181.90	12,166.8	3.8	-1,028.3	184.3	14.11	11.05	-12.53
12,374.0	57.30	175.40	12,223.0	-72.6	-1,026.3	259.1	9.37	7.58	-6.84
12,390.0	57.30	174.70	12,231.7	-86.0	-1,025.2	272.1	3.68	0.00	-4.38
HL Crossed @ 12428.9' MD / 12252.5' TVD									
12,428.9	58.03	173.96	12,252.5	-118.7	-1,021.9	303.6	2.48	1.88	-1.91
12,496.0	59.30	172.70	12,287.4	-175.6	-1,015.3	358.4	2.48	1.89	-1.87
12,590.0	66.80	170.60	12,329.9	-258.5	-1,003.1	437.6	8.22	7.98	-2.23
12,685.0	73.30	172.00	12,362.3	-346.7	-989.6	521.8	6.98	6.84	1.47
12,779.0	82.70	178.00	12,381.9	-438.1	-981.7	610.3	11.78	10.00	6.38
12,873.0	88.20	177.70	12,389.3	-531.7	-978.2	701.7	5.86	5.85	-0.32



Survey Report



Company: BTA Oil Producers, LLC
Project: Lea County, NM (NAD 83)
Site: Sec 27, T25-S, R33-E
Well: Rojo 7811 27 Fed Com #13H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Rojo 7811 27 Fed Com #13H
TVD Reference: WELL @ 3369.0usft (Patterson #597)
MD Reference: WELL @ 3369.0usft (Patterson #597)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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)	
12,968.0	91.60	178.90	12,389.5	-626.7	-975.3	794.5	3.80	3.58	1.26	
13,062.0	91.10	177.00	12,387.3	-720.6	-972.0	886.2	2.09	-0.53	-2.02	
13,156.0	91.50	177.00	12,385.2	-814.4	-967.1	977.6	0.43	0.43	0.00	
13,250.0	90.90	175.90	12,383.2	-908.2	-961.2	1,068.7	1.33	-0.64	-1.17	
13,344.0	90.60	179.90	12,382.0	-1,002.1	-957.8	1,160.4	4.27	-0.32	4.26	
13,437.0	90.90	179.40	12,380.7	-1,095.1	-957.2	1,251.7	0.63	0.32	-0.54	
13,532.0	91.50	179.60	12,378.7	-1,190.1	-956.4	1,345.0	0.67	0.63	0.21	
13,626.0	91.10	179.10	12,376.6	-1,284.1	-955.3	1,437.2	0.68	-0.43	-0.53	
13,720.0	91.60	179.10	12,374.4	-1,378.0	-953.9	1,529.3	0.53	0.53	0.00	
13,814.0	91.50	178.90	12,371.9	-1,472.0	-952.2	1,621.3	0.24	-0.11	-0.21	
13,909.0	88.90	180.50	12,371.5	-1,567.0	-951.7	1,714.6	3.21	-2.74	1.68	
14,002.0	88.80	180.50	12,373.4	-1,660.0	-952.5	1,806.2	0.11	-0.11	0.00	
14,097.0	87.30	179.60	12,376.6	-1,754.9	-952.6	1,899.5	1.84	-1.58	-0.95	
14,191.0	89.40	179.10	12,379.3	-1,848.8	-951.5	1,991.7	2.30	2.23	-0.53	
14,285.0	90.00	178.20	12,379.8	-1,942.8	-949.3	2,083.7	1.15	0.64	-0.96	
14,379.0	91.50	178.50	12,378.6	-2,036.8	-946.6	2,175.6	1.63	1.60	0.32	
14,473.0	89.20	176.60	12,378.0	-2,130.7	-942.6	2,267.1	3.17	-2.45	-2.02	
14,567.0	89.60	178.50	12,379.0	-2,224.6	-938.6	2,358.7	2.07	0.43	2.02	
14,661.0	89.00	178.70	12,380.2	-2,318.5	-936.3	2,450.7	0.67	-0.64	0.21	
14,754.0	89.40	177.80	12,381.4	-2,411.5	-933.5	2,541.5	1.06	0.43	-0.97	
14,849.0	88.70	176.40	12,383.0	-2,506.3	-928.6	2,633.9	1.65	-0.74	-1.47	
14,943.0	91.50	181.40	12,382.9	-2,600.3	-926.8	2,726.0	6.10	2.98	5.32	
15,037.0	90.20	181.40	12,381.5	-2,694.2	-929.1	2,818.7	1.38	-1.38	0.00	
15,131.0	91.80	181.40	12,379.8	-2,788.2	-931.4	2,911.5	1.70	1.70	0.00	
15,225.0	92.10	181.00	12,376.6	-2,882.1	-933.4	3,004.2	0.53	0.32	-0.43	
15,319.0	92.50	180.80	12,372.9	-2,976.0	-934.9	3,096.8	0.48	0.43	-0.21	
15,413.0	89.70	181.00	12,371.0	-3,070.0	-936.4	3,189.5	2.99	-2.98	0.21	
15,508.0	89.90	180.60	12,371.4	-3,165.0	-937.7	3,283.1	0.47	0.21	-0.42	
15,602.0	89.00	179.90	12,372.3	-3,259.0	-938.1	3,375.6	1.21	-0.96	-0.74	
15,695.0	89.60	179.40	12,373.4	-3,352.0	-937.5	3,466.9	0.84	0.65	-0.54	
15,789.0	90.80	175.90	12,373.1	-3,445.9	-933.7	3,558.5	3.94	1.28	-3.72	
15,884.0	90.90	179.20	12,371.7	-3,540.8	-929.6	3,651.1	3.47	0.11	3.47	
15,978.0	91.80	179.10	12,369.5	-3,634.7	-928.2	3,743.2	0.96	0.96	-0.11	
16,072.0	92.20	178.00	12,366.2	-3,728.6	-925.8	3,835.1	1.24	0.43	-1.17	
16,166.0	92.60	177.70	12,362.2	-3,822.5	-922.3	3,926.7	0.53	0.43	-0.32	
16,260.0	90.40	179.90	12,359.8	-3,916.4	-920.3	4,018.7	3.31	-2.34	2.34	
16,354.0	91.20	179.80	12,358.5	-4,010.4	-920.1	4,111.1	0.86	0.85	-0.11	
16,448.0	88.40	180.30	12,358.8	-4,104.4	-920.2	4,203.5	3.03	-2.98	0.53	
16,542.0	87.80	179.40	12,361.9	-4,198.4	-919.9	4,295.8	1.15	-0.64	-0.96	
16,635.0	88.60	179.40	12,364.8	-4,291.3	-919.0	4,387.0	0.86	0.86	0.00	
16,729.0	89.10	179.80	12,366.7	-4,385.3	-918.3	4,479.3	0.68	0.53	0.43	
16,824.0	89.40	179.60	12,368.0	-4,480.3	-917.8	4,572.6	0.38	0.32	-0.21	
16,919.0	89.80	179.20	12,368.6	-4,575.3	-916.8	4,665.8	0.60	0.42	-0.42	



Survey Report



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Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single 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)
17,013.0	90.00	179.60	12,368.8	-4,669.3	-915.8	4,758.0	0.48	0.21	0.43
HL Crossed @ 17081.5' MD / 12368.9' TVD									
17,081.5	89.78	179.31	12,368.9	-4,737.8	-915.2	4,825.2	0.53	-0.32	-0.43
17,107.0	89.70	179.20	12,369.0	-4,763.3	-914.8	4,850.2	0.53	-0.32	-0.43
17,201.0	89.80	179.80	12,369.5	-4,857.2	-914.0	4,942.5	0.65	0.11	0.64
17,302.0	89.60	179.40	12,370.0	-4,958.2	-913.3	5,041.7	0.44	-0.20	-0.40
TD @ 17360.0' MD / 12370.4' TVD									
17,360.0	89.60	179.40	12,370.4	-5,016.2	-912.7	5,098.6	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
130.0	130.0	0.1	0.4	First MWD Survey @ 130.0' MD / 130.0' TVD
12,428.9	12,252.5	-118.7	-1,021.9	HL Crossed @ 12428.9' MD / 12252.5' TVD
17,081.5	12,368.9	-4,737.8	-915.2	HL Crossed @ 17081.5' MD / 12368.9' TVD
17,360.0	12,370.4	-5,016.2	-912.7	TD @ 17360.0' MD / 12370.4' TVD

Checked By: _____ Approved By: _____ Date: _____