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Directional Survey**



30-015-44749

BTA Oil Producers, LLC

Eddy County, New Mexico (NAD 83)

Sec 29, T23, R28-E

Ogden 20509 29-32 Fed Com #1H

**NM OIL CONSERVATION
ARTESIA DISTRICT**

JAN 25 2019

Wellbore #1

RECEIVED

Design: Wellbore #1

QES Survey Report

02 August, 2018





Survey Report



Company: BTA Oil Producers, LLC
Project: Eddy County, New Mexico (NAD 83)
Site: Sec 29, T23, R28-E
Well: Ogden 20509 29-32 Fed Com #1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Ogden 20509 29-32 Fed Com #1H
TVD Reference: WELL @ 3097.0usft (Patterson #594)
MD Reference: WELL @ 3097.0usft (Patterson #594)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Project	Eddy 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	Sec 29, T23, R28-E		
Site Position:		Northing:	466,607.70 usft
From:	Map	Easting:	611,639.60 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 16' 57.266 N
		Longitude:	104° 6' 21.036 W
		Grid Convergence:	0.12 °

Well	Ogden 20509 29-32 Fed Com #1H		
Well Position	+N/-S	0.0 usft	Northing: 466,607.70 usft
	+E/-W	0.0 usft	Easting: 611,639.60 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 16' 57.266 N
		Longitude:	104° 6' 21.036 W
		Ground Level:	3,072.0 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/3/2018	7.09	60.02	47,811.11801530

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	171.10	

Survey Program	Date 8/2/2018				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	327.0	MS Surveys (Wellbore #1)	GYRO-NS	OWSG Gyrocompass Gyro	
442.0	17,994.0	QES MWD Surveys (Wellbore #1)	OWSG (Rev2) MWD	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
100.0	0.53	89.50	100.0	0.0	0.5	0.1	0.53	0.53	0.00
200.0	0.29	75.68	200.0	0.1	1.2	0.1	0.26	-0.24	-13.82
300.0	0.03	283.02	300.0	0.1	1.4	0.1	0.32	-0.26	-152.66
Gyro Tie-In @ 327.0' MD / 327.0' TVD									
327.0	0.17	357.84	327.0	0.2	1.4	0.0	0.61	0.52	277.11
442.0	0.30	322.00	442.0	0.6	1.2	-0.4	0.17	0.11	-31.17
537.0	1.20	42.70	537.0	1.5	1.7	-1.2	1.25	0.95	84.95
632.0	1.90	55.70	632.0	3.1	3.7	-2.5	0.82	0.74	13.68
727.0	1.70	53.50	726.9	4.9	6.1	-3.9	0.22	-0.21	-2.32



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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)
806.0	1.90	59.90	805.9	6.2	8.2	-4.9	0.36	0.25	8.10
901.0	4.00	47.90	900.7	9.2	12.0	-7.3	2.29	2.21	-12.63
996.0	6.50	50.00	995.3	14.9	18.6	-11.8	2.64	2.63	2.21
1,090.0	8.40	52.70	1,088.5	22.5	28.1	-17.9	2.05	2.02	2.87
1,185.0	8.40	51.40	1,182.5	31.0	39.1	-24.6	0.20	0.00	-1.37
1,281.0	9.10	62.50	1,277.4	38.9	51.3	-30.5	1.90	0.73	11.56
1,376.0	9.10	71.50	1,371.2	44.8	65.1	-34.1	1.50	0.00	9.47
1,470.0	8.90	74.10	1,464.1	49.1	79.1	-36.3	0.48	-0.21	2.77
1,565.0	8.80	72.00	1,557.9	53.4	93.1	-38.3	0.36	-0.11	-2.21
1,660.0	8.40	73.10	1,651.9	57.6	106.7	-40.4	0.46	-0.42	1.16
1,755.0	7.50	71.80	1,745.9	61.6	119.2	-42.4	0.97	-0.95	-1.37
1,850.0	8.20	79.60	1,840.1	64.7	131.7	-43.6	1.34	0.74	8.21
1,945.0	8.40	85.90	1,934.1	66.5	145.3	-43.2	0.98	0.21	6.63
2,040.0	9.00	87.80	2,028.0	67.2	159.7	-41.7	0.70	0.63	2.00
Crossed LL @ 2130.8' MD / 2117.7' TVD									
2,130.8	8.42	86.35	2,117.7	67.9	173.4	-40.3	0.68	-0.64	-1.59
2,134.0	8.40	86.30	2,120.9	68.0	173.9	-40.2	0.68	-0.64	-1.70
2,230.0	8.10	91.50	2,215.9	68.2	187.6	-38.4	0.84	-0.31	5.42
2,325.0	8.20	94.90	2,309.9	67.5	201.1	-35.6	0.52	0.11	3.58
2,469.0	7.00	94.90	2,452.7	65.9	220.0	-31.0	0.83	-0.83	0.00
2,588.0	7.00	93.80	2,570.8	64.8	234.5	-27.7	0.11	0.00	-0.92
2,683.0	7.70	85.50	2,665.0	64.9	246.6	-25.9	1.34	0.74	-8.74
2,778.0	8.40	83.10	2,759.1	66.2	259.9	-25.2	0.82	0.74	-2.53
2,873.0	8.70	82.40	2,853.0	68.0	273.9	-24.8	0.33	0.32	-0.74
2,968.0	9.00	82.00	2,946.9	70.0	288.3	-24.5	0.32	0.32	-0.42
3,063.0	9.40	83.60	3,040.7	71.9	303.4	-24.1	0.50	0.42	1.68
3,158.0	8.40	82.00	3,134.5	73.7	318.0	-23.6	1.08	-1.05	-1.68
3,252.0	8.40	78.90	3,227.5	76.0	331.5	-23.8	0.48	0.00	-3.30
3,347.0	8.40	80.40	3,321.5	78.5	345.2	-24.1	0.23	0.00	1.58
3,442.0	7.90	82.70	3,415.5	80.5	358.5	-24.0	0.63	-0.53	2.42
3,537.0	8.20	83.60	3,509.6	82.0	371.7	-23.6	0.34	0.32	0.95
3,632.0	8.30	83.60	3,603.6	83.6	385.3	-23.0	0.11	0.11	0.00
3,727.0	8.40	83.40	3,697.6	85.1	399.0	-22.4	0.11	0.11	-0.21
3,821.0	8.40	85.70	3,790.6	86.4	412.6	-21.6	0.36	0.00	2.45
3,916.0	8.70	86.60	3,884.5	87.4	426.7	-20.3	0.35	0.32	0.95
4,011.0	7.40	80.10	3,978.6	88.9	439.9	-19.7	1.67	-1.37	-6.84
4,106.0	7.40	81.50	4,072.8	90.8	452.0	-19.8	0.19	0.00	1.47
4,201.0	7.40	81.80	4,167.0	92.6	464.1	-19.7	0.04	0.00	0.32
4,296.0	7.80	84.00	4,261.2	94.1	476.6	-19.3	0.52	0.42	2.32
4,391.0	7.80	75.90	4,355.3	96.4	489.2	-19.5	1.16	0.00	-8.53
4,486.0	8.20	77.10	4,449.4	99.5	502.1	-20.6	0.46	0.42	1.26
4,581.0	7.90	76.90	4,543.4	102.5	515.1	-21.5	0.32	-0.32	-0.21
4,675.0	7.70	79.40	4,636.6	105.1	527.5	-22.2	0.42	-0.21	2.66



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4,769.0	7.50	79.20	4,729.7	107.4	539.8	-22.6	0.21	-0.21	-0.21
4,864.0	7.10	82.70	4,824.0	109.3	551.7	-22.6	0.63	-0.42	3.68
4,959.0	6.80	82.90	4,918.3	110.7	563.1	-22.3	0.32	-0.32	0.21
5,053.0	6.50	81.70	5,011.6	112.2	573.9	-22.1	0.35	-0.32	-1.28
5,148.0	6.50	85.70	5,106.0	113.4	584.5	-21.6	0.48	0.00	4.21
5,243.0	7.50	77.80	5,200.3	115.1	596.0	-21.5	1.46	1.05	-8.32
5,337.0	7.50	76.20	5,293.5	117.8	607.9	-22.4	0.22	0.00	-1.70
5,432.0	7.60	79.20	5,387.7	120.5	620.1	-23.1	0.43	0.11	3.16
5,527.0	7.50	79.00	5,481.9	122.9	632.4	-23.5	0.11	-0.11	-0.21
5,622.0	7.50	81.20	5,576.1	125.0	644.6	-23.8	0.30	0.00	2.32
5,717.0	7.20	84.00	5,670.3	126.6	656.6	-23.5	0.49	-0.32	2.95
5,812.0	7.50	76.60	5,764.5	128.6	668.6	-23.6	1.04	0.32	-7.79
5,907.0	7.70	78.50	5,858.7	131.3	680.8	-24.4	0.34	0.21	2.00
6,002.0	7.60	77.50	5,952.8	134.0	693.2	-25.1	0.18	-0.11	-1.05
6,097.0	6.90	78.90	6,047.1	136.4	704.9	-25.7	0.76	-0.74	1.47
6,191.0	6.10	76.80	6,140.5	138.6	715.4	-26.3	0.89	-0.85	-2.23
6,286.0	7.80	74.30	6,234.8	141.5	726.5	-27.4	1.82	1.79	-2.63
6,381.0	7.70	73.40	6,328.9	145.1	738.8	-29.1	0.17	-0.11	-0.95
6,475.0	7.00	73.60	6,422.1	148.5	750.3	-30.7	0.75	-0.74	0.21
6,570.0	7.90	75.90	6,516.3	151.7	762.2	-32.0	1.00	0.95	2.42
6,665.0	8.40	77.30	6,610.4	154.9	775.3	-33.0	0.57	0.53	1.47
6,760.0	8.00	80.60	6,704.4	157.5	788.6	-33.6	0.65	-0.42	3.47
6,855.0	7.80	84.30	6,798.5	159.2	801.5	-33.3	0.58	-0.21	3.89
6,950.0	8.60	86.10	6,892.5	160.3	815.0	-32.3	0.88	0.84	1.89
7,044.0	8.50	86.60	6,985.5	161.2	829.0	-31.0	0.13	-0.11	0.53
7,139.0	8.40	92.40	7,079.4	161.3	842.9	-29.0	0.90	-0.11	6.11
7,234.0	7.70	86.10	7,173.5	161.5	856.2	-27.1	1.18	-0.74	-6.63
7,329.0	7.00	88.20	7,267.7	162.1	868.3	-25.8	0.79	-0.74	2.21
7,424.0	7.50	74.70	7,362.0	163.9	880.1	-25.8	1.86	0.53	-14.21
7,518.0	7.90	72.00	7,455.1	167.5	892.2	-27.5	0.57	0.43	-2.87
7,613.0	7.60	73.10	7,549.3	171.4	904.4	-29.4	0.35	-0.32	1.16
7,708.0	7.10	68.10	7,643.5	175.4	915.8	-31.6	0.85	-0.53	-5.26
7,802.0	7.50	69.60	7,736.7	179.7	927.0	-34.1	0.47	0.43	1.60
7,897.0	7.80	75.70	7,830.9	183.4	939.0	-35.9	0.91	0.32	6.42
7,992.0	7.10	77.50	7,925.1	186.3	951.0	-36.9	0.78	-0.74	1.89
8,087.0	6.70	79.90	8,019.4	188.5	962.2	-37.4	0.52	-0.42	2.53
8,181.0	5.60	81.70	8,112.8	190.2	972.1	-37.5	1.19	-1.17	1.91
8,276.0	6.70	71.70	8,207.3	192.6	982.0	-38.3	1.61	1.16	-10.53
8,371.0	5.90	74.80	8,301.7	195.6	992.0	-39.8	0.91	-0.84	3.26
8,465.0	5.40	77.30	8,395.3	197.8	1,000.9	-40.6	0.59	-0.53	2.66
8,560.0	5.20	76.90	8,489.9	199.8	1,009.5	-41.2	0.21	-0.21	-0.42
8,655.0	5.00	76.90	8,584.5	201.7	1,017.7	-41.8	0.21	-0.21	0.00
8,750.0	5.00	74.10	8,679.1	203.8	1,025.7	-42.6	0.26	0.00	-2.95
8,845.0	5.70	81.00	8,773.7	205.6	1,034.4	-43.1	1.00	0.74	7.26



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8,940.0	5.00	79.60	8,868.3	207.1	1,043.1	-43.3	0.75	-0.74	-1.47
9,035.0	4.00	82.60	8,963.0	208.3	1,050.5	-43.3	1.08	-1.05	3.16
9,130.0	3.40	79.90	9,057.8	209.2	1,056.5	-43.3	0.66	-0.63	-2.84
9,224.0	3.00	88.20	9,151.7	209.8	1,061.7	-43.0	0.65	-0.43	8.83
9,319.0	2.70	89.40	9,246.5	209.9	1,066.4	-42.4	0.32	-0.32	1.26
9,414.0	2.50	92.90	9,341.4	209.8	1,070.8	-41.6	0.27	-0.21	3.68
9,509.0	2.20	92.40	9,436.4	209.6	1,074.6	-40.9	0.32	-0.32	-0.53
9,604.0	1.90	99.60	9,531.3	209.3	1,078.0	-40.0	0.42	-0.32	7.58
9,698.0	1.90	106.60	9,625.2	208.6	1,081.0	-38.8	0.25	0.00	7.45
9,825.0	1.70	142.50	9,752.2	206.5	1,084.2	-36.3	0.89	-0.16	28.27
9,907.0	5.40	161.10	9,834.0	201.9	1,086.2	-31.4	4.67	4.51	22.68
10,001.0	18.30	174.50	9,925.8	182.9	1,089.1	-12.2	13.94	13.72	14.26
10,096.0	32.30	176.60	10,011.5	142.5	1,092.0	28.1	14.76	14.74	2.21
10,191.0	40.30	179.40	10,088.0	86.4	1,093.8	83.9	8.60	8.42	2.95
10,286.0	47.20	180.30	10,156.6	20.7	1,094.0	148.8	7.29	7.26	0.95
10,381.0	54.70	178.40	10,216.4	-53.0	1,094.9	221.7	8.05	7.89	-2.00
Crossed PA @ 10386.2' MD / 10219.4' TVD									
10,386.2	55.03	178.49	10,219.4	-57.2	1,095.0	226.0	6.49	6.34	1.66
10,444.0	58.70	179.40	10,251.0	-105.6	1,095.9	273.9	6.49	6.35	1.58
10,511.0	65.30	180.50	10,282.4	-164.7	1,095.9	332.3	9.96	9.85	1.64
10,605.0	73.30	180.50	10,315.6	-252.6	1,095.2	419.0	8.51	8.51	0.00
10,699.0	82.40	179.80	10,335.4	-344.4	1,094.9	509.6	9.71	9.68	-0.74
10,793.0	84.90	178.40	10,345.8	-437.8	1,096.4	602.1	3.04	2.66	-1.49
10,887.0	84.40	178.00	10,354.6	-531.3	1,099.3	695.0	0.68	-0.53	-0.43
10,981.0	84.60	178.20	10,363.6	-624.9	1,102.4	787.9	0.30	0.21	0.21
11,075.0	87.80	178.50	10,369.8	-718.6	1,105.1	880.9	3.42	3.40	0.32
11,169.0	86.10	177.80	10,374.8	-812.4	1,108.2	974.1	1.96	-1.81	-0.74
11,263.0	82.60	176.90	10,384.0	-905.8	1,112.5	1,067.0	3.84	-3.72	-0.96
11,357.0	85.40	177.10	10,393.9	-999.2	1,117.4	1,160.0	2.99	2.98	0.21
11,452.0	91.70	179.80	10,396.3	-1,094.1	1,119.9	1,254.2	7.21	6.63	2.84
11,546.0	91.90	179.80	10,393.3	-1,188.0	1,120.3	1,347.0	0.21	0.21	0.00
11,640.0	86.20	179.40	10,394.9	-1,282.0	1,120.9	1,439.9	6.08	-6.06	-0.43
11,734.0	86.20	179.80	10,401.1	-1,375.8	1,121.6	1,532.7	0.42	0.00	0.43
11,828.0	85.60	178.90	10,407.8	-1,469.5	1,122.6	1,625.5	1.15	-0.64	-0.96
11,922.0	90.80	179.90	10,410.8	-1,563.4	1,123.6	1,718.4	5.63	5.53	1.06
12,016.0	93.30	179.80	10,407.4	-1,657.4	1,123.9	1,811.3	2.66	2.66	-0.11
12,110.0	93.00	180.50	10,402.3	-1,751.2	1,123.6	1,904.0	0.81	-0.32	0.74
12,204.0	90.00	179.10	10,399.8	-1,845.2	1,124.0	1,996.8	3.52	-3.19	-1.49
12,298.0	90.00	179.90	10,399.8	-1,939.2	1,124.8	2,089.8	0.85	0.00	0.85
12,392.0	89.50	180.50	10,400.2	-2,033.2	1,124.4	2,182.6	0.83	-0.53	0.64
12,486.0	90.00	180.30	10,400.6	-2,127.2	1,123.8	2,275.4	0.57	0.53	-0.21
12,580.0	90.60	180.60	10,400.1	-2,221.2	1,123.1	2,368.2	0.71	0.64	0.32
12,674.0	88.60	178.90	10,400.8	-2,315.1	1,123.5	2,461.1	2.79	-2.13	-1.81



Survey Report



Company: BTA Oil Producers, LLC
Project: Eddy County, New Mexico (NAD 83)
Site: Sec 29, T23, R28-E
Well: Ogden 20509 29-32 Fed Com #1H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Ogden 20509 29-32 Fed Com #1H
TVD Reference: WELL @ 3097.0usft (Patterson #594)
MD Reference: WELL @ 3097.0usft (Patterson #594)
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)
12,768.0	88.40	178.40	10,403.2	-2,409.1	1,125.7	2,554.2	0.57	-0.21	-0.53
12,863.0	87.70	178.00	10,406.5	-2,504.0	1,128.7	2,648.4	0.85	-0.74	-0.42
12,956.0	87.10	177.10	10,410.7	-2,596.8	1,132.6	2,740.8	1.16	-0.65	-0.97
13,050.0	87.30	177.10	10,415.3	-2,690.6	1,137.4	2,834.1	0.21	0.21	0.00
13,144.0	87.10	178.20	10,419.9	-2,784.4	1,141.2	2,927.4	1.19	-0.21	1.17
13,239.0	86.10	178.00	10,425.5	-2,879.2	1,144.4	3,021.5	1.07	-1.05	-0.21
13,333.0	86.30	178.20	10,431.7	-2,972.9	1,147.5	3,114.6	0.30	0.21	0.21
13,426.0	87.60	179.40	10,436.7	-3,065.7	1,149.4	3,206.7	1.90	1.40	1.29
13,520.0	88.20	180.50	10,440.1	-3,159.7	1,149.5	3,299.5	1.33	0.64	1.17
13,614.0	89.10	181.50	10,442.3	-3,253.6	1,147.9	3,392.0	1.43	0.96	1.06
13,708.0	88.20	181.20	10,444.6	-3,347.6	1,145.7	3,484.5	1.01	-0.96	-0.32
13,802.0	88.10	181.50	10,447.6	-3,441.5	1,143.4	3,577.0	0.34	-0.11	0.32
13,897.0	87.40	181.30	10,451.3	-3,536.4	1,141.1	3,670.4	0.77	-0.74	-0.21
13,991.0	87.70	181.70	10,455.3	-3,630.3	1,138.7	3,762.7	0.53	0.32	0.43
14,085.0	87.60	182.60	10,459.2	-3,724.1	1,135.1	3,854.9	0.96	-0.11	0.96
14,180.0	87.30	182.80	10,463.4	-3,818.9	1,130.7	3,947.9	0.38	-0.32	0.21
14,273.0	87.10	182.90	10,468.0	-3,911.7	1,126.1	4,038.8	0.24	-0.22	0.11
14,368.0	88.80	181.20	10,471.4	-4,006.6	1,122.7	4,132.0	2.53	1.79	-1.79
14,461.0	88.60	181.20	10,473.5	-4,099.5	1,120.7	4,223.6	0.22	-0.22	0.00
14,555.0	89.30	182.90	10,475.2	-4,193.5	1,117.3	4,315.8	1.96	0.74	1.81
14,650.0	93.60	183.30	10,472.8	-4,288.3	1,112.2	4,408.7	4.55	4.53	0.42
14,743.0	91.40	176.60	10,468.7	-4,381.1	1,112.3	4,500.5	7.58	-2.37	-7.20
14,837.0	92.20	177.30	10,465.8	-4,474.9	1,117.3	4,593.9	1.13	0.85	0.74
14,931.0	89.30	175.50	10,464.5	-4,568.7	1,123.2	4,687.5	3.63	-3.09	-1.91
15,026.0	88.80	175.50	10,466.1	-4,663.4	1,130.7	4,782.2	0.53	-0.53	0.00
15,120.0	88.60	175.50	10,468.3	-4,757.1	1,138.0	4,875.9	0.21	-0.21	0.00
15,215.0	89.70	176.40	10,469.7	-4,851.9	1,144.7	4,970.5	1.50	1.16	0.95
15,309.0	89.50	176.60	10,470.3	-4,945.7	1,150.5	5,064.1	0.30	-0.21	0.21
15,403.0	89.30	176.10	10,471.3	-5,039.5	1,156.5	5,157.7	0.57	-0.21	-0.53
15,497.0	89.00	175.70	10,472.7	-5,133.2	1,163.2	5,251.4	0.53	-0.32	-0.43
15,591.0	88.20	178.50	10,475.0	-5,227.1	1,167.9	5,344.8	3.10	-0.85	2.98
15,686.0	88.60	179.90	10,477.6	-5,322.0	1,169.3	5,438.8	1.53	0.42	1.47
15,779.0	88.40	179.40	10,480.1	-5,415.0	1,169.8	5,530.8	0.58	-0.22	-0.54
15,873.0	87.90	179.80	10,483.1	-5,508.9	1,170.5	5,623.7	0.68	-0.53	0.43
15,967.0	88.00	179.90	10,486.5	-5,602.9	1,170.7	5,716.5	0.15	0.11	0.11
16,061.0	88.40	180.50	10,489.4	-5,696.8	1,170.4	5,809.3	0.77	0.43	0.64
16,155.0	88.00	180.60	10,492.4	-5,790.8	1,169.5	5,902.0	0.44	-0.43	0.11
16,249.0	87.80	181.50	10,495.8	-5,884.7	1,167.8	5,994.5	0.98	-0.21	0.96
16,344.0	89.70	180.60	10,497.9	-5,979.7	1,166.0	6,088.1	2.21	2.00	-0.95
16,437.0	89.50	180.50	10,498.6	-6,072.7	1,165.1	6,179.8	0.24	-0.22	-0.11
16,532.0	88.90	180.30	10,499.9	-6,167.6	1,164.5	6,273.5	0.67	-0.63	-0.21
16,625.0	92.20	180.80	10,499.0	-6,260.6	1,163.6	6,365.3	3.59	3.55	0.54
16,719.0	92.00	181.20	10,495.5	-6,354.5	1,161.9	6,457.8	0.48	-0.21	0.43



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)
16,813.0	91.80	181.30	10,492.4	-6,448.5	1,159.9	6,550.3	0.24	-0.21	0.11
16,908.0	91.20	179.10	10,489.9	-6,543.4	1,159.6	6,644.0	2.40	-0.63	-2.32
17,002.0	93.20	179.40	10,486.3	-6,637.3	1,160.8	6,737.0	2.15	2.13	0.32
17,096.0	91.60	178.70	10,482.4	-6,731.2	1,162.4	6,830.0	1.86	-1.70	-0.74
17,190.0	88.80	177.60	10,482.1	-6,825.2	1,165.4	6,923.3	3.20	-2.98	-1.17
17,284.0	87.30	176.40	10,485.3	-6,919.0	1,170.3	7,016.7	2.04	-1.60	-1.28
17,378.0	89.30	178.00	10,488.1	-7,012.8	1,174.9	7,110.2	2.72	2.13	1.70
17,472.0	90.50	178.50	10,488.2	-7,106.8	1,177.8	7,203.4	1.38	1.28	0.53
17,566.0	90.40	179.10	10,487.5	-7,200.8	1,179.7	7,296.6	0.65	-0.11	0.64
17,660.0	90.50	179.80	10,486.7	-7,294.8	1,180.6	7,389.6	0.75	0.11	0.74
Crossed PA @ 17700.4' MD / 10486.6' TVD									
17,700.4	89.90	179.20	10,486.6	-7,335.2	1,181.0	7,429.6	2.11	-1.49	-1.49
17,754.0	89.10	178.40	10,487.1	-7,388.7	1,182.1	7,482.7	2.11	-1.49	-1.49
17,848.0	89.50	179.40	10,488.2	-7,482.7	1,183.9	7,575.8	1.15	0.43	1.06
17,933.0	88.30	179.10	10,489.8	-7,567.7	1,185.0	7,659.9	1.46	-1.41	-0.35
TD @ 17994' MD / 10492' TVD									
17,994.0	88.30	179.10	10,491.7	-7,628.7	1,186.0	7,720.3	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
327.0	327.0	0.2	1.4	Gyro Tie-in @ 327.0' MD / 327.0' TVD
2,130.8	2,117.7	67.9	173.4	Crossed LL @ 2130.8' MD / 2117.7' TVD
10,386.2	10,219.4	-57.2	1,095.0	Crossed PA @ 10386.2' MD / 10219.4' TVD
17,700.4	10,486.6	-7,335.2	1,181.0	Crossed PA @ 17700.4' MD / 10486.6' TVD
17,994.0	10,491.7	-7,628.7	1,186.0	TD @ 17994' MD / 10492' TVD

Checked By: _____ Approved By: _____ Date: _____