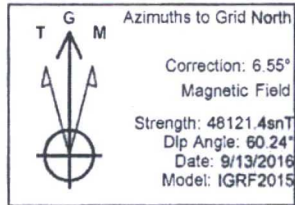


Company Name: BTA Oil Producers, LLC
 Grama 8817 JV-P Federal Com #2H
 Lea County, NM
 Rig: Name: #94
 Created By: Shane Robbins
 Date: 10/17/2016

Grama 8817 JV-P Federal Com #2H
 Lea County, NM
 Q160590 & WT-160390
 Design #1



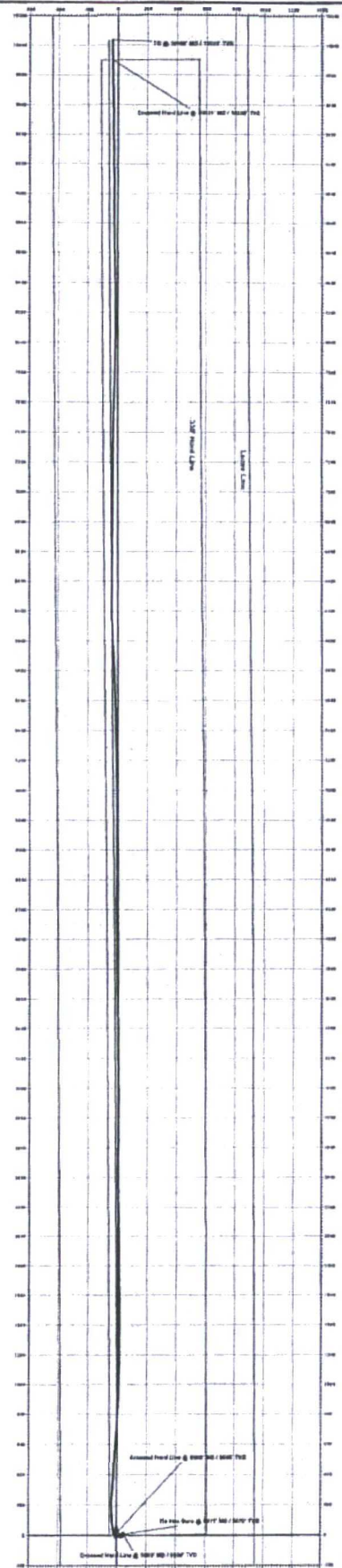
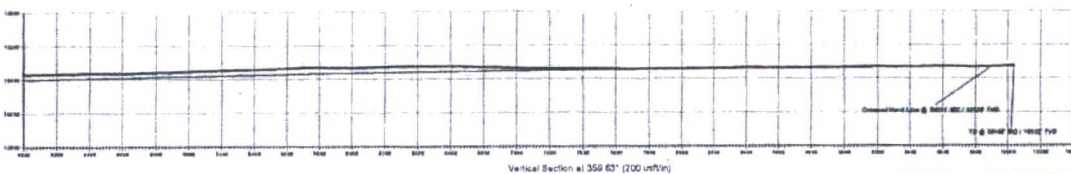
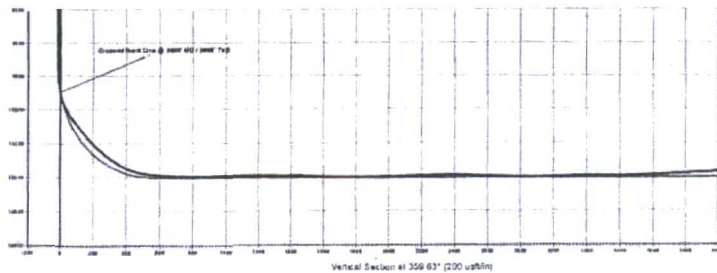
PROJECT DETAILS: Lea County, NM

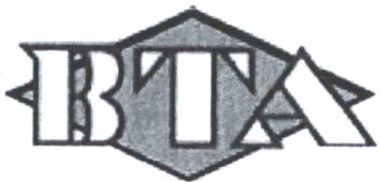
Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NAVD83 GRS83)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

WELL DATA		Grama 8817 JV-P Federal Com #2H	
Well ID	Well Name	Well Type	Well Status
8817-0	8817-0	Oil	Active

ANNOTATIONS

MD	Loc	Alt	TVD	+N/-S	+E/-W	V-Sect	Departure	Annotation
5071.0	0.81	158.15	5071.1	6.3	42.8	6.2	73.1	See Note: 5071 MD / 5070 TVD
1958.8	0.87	197.85	1957.5	0.0	50.2	0.3	84.5	Crossed Hand Line @ 5059 MD / 5058 TVD
8500.1	12.08	347.42	8871.5	-0.1	-14.1	0.0	164.5	Crossed Hand Line @ 8807 MD / 8808 TVD
20030.5	91.88	359.25	18328.6	9899.3	-34.7	8899.4	10071.9	Crossed Hand Line @ 20031 MD / 18329 TVD
20164.0	93.10	358.80	18322.7	10036.6	-37.2	10036.7	12206.2	Top @ 30168 MD / 18322 TVD





BTA Oil Producers, LLC

Lea County, NM

Sec 16, T22-S, R34-E

Grama 8817 JV-P Federal Com #2H

Wellbore #1

Design: Wellbore #1

QES Survey Report

17 October, 2016





Survey Report

QES

Company:	BTA Oil Producers, LLC	Local Co-ordinate Reference:	Well Grama 8817 JV-P Federal Com #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3501.0usft (Nomac #94)
Site:	Sec 16, T22-S, R34-E	MD Reference:	WELL @ 3501.0usft (Nomac #94)
Well:	Grama 8817 JV-P Federal Com #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM5002

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec 16, T22-S, R34-E		
Site Position:		Northing:	504,907.50 usft
From:	Map	Easting:	762,856.00 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 23' 6.826 N
		Longitude:	103° 28' 54.589 W
		Grid Convergence:	0.46 °

Well	Grama 8817 JV-P Federal Com #2H		
Well Position	+N/-S	0.0 usft	Northing: 504,907.50 usft
	+E/-W	0.0 usft	Easting: 762,856.00 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 23' 6.826 N
		Longitude:	103° 28' 54.589 W
		Ground Level:	3,476.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	9/13/2016	7.01
			Dip Angle (°)
			60.24
			Field Strength (nT)
			48,121

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)
	0.0	0.0	0.0
			Direction (°)
			359.63

Survey Program	Date 10/17/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	5,071.0	Gyro (Wellbore #1)	Good_gyro
5,261.0	20,168.0	MWD Surveys (Wellbore #1)	MWD default
			Description
			Good Gyro
			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	0.17	85.25	100.0	0.0	0.1	0.0	0.17	0.17	0.00	
200.0	0.22	138.33	200.0	-0.1	0.4	-0.1	0.18	0.05	53.08	
300.0	0.60	123.19	300.0	-0.5	1.0	-0.6	0.39	0.38	-15.14	
400.0	0.77	124.08	400.0	-1.2	2.0	-1.2	0.17	0.17	0.89	
500.0	0.76	109.35	500.0	-1.8	3.2	-1.8	0.20	-0.01	-14.73	
600.0	0.79	93.00	600.0	-2.1	4.5	-2.1	0.22	0.03	-16.35	
700.0	0.78	93.42	700.0	-2.1	5.8	-2.2	0.01	-0.01	0.42	
800.0	1.02	103.51	799.9	-2.4	7.4	-2.4	0.29	0.24	10.09	
900.0	1.11	94.36	899.9	-2.7	9.2	-2.7	0.19	0.09	-9.15	



Survey Report

QES

Company: BTA Oil Producers, LLC
 Project: Lea County, NM
 Site: Sec 16, T22-S, R34-E
 Well: Grama 8817 JV-P Federal Com #2H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Grama 8817 JV-P Federal Com #2H
 TVD Reference: WELL @ 3501.0usft (Nomac #94)
 MD Reference: WELL @ 3501.0usft (Nomac #94)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM5002

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)
1,000.0	1.12	97.64	999.9	-2.9	11.2	-2.9	0.06	0.01	3.28
1,100.0	0.80	97.70	1,099.9	-3.1	12.8	-3.2	0.32	-0.32	0.06
1,200.0	0.49	112.50	1,199.9	-3.4	13.9	-3.4	0.35	-0.31	14.80
1,300.0	0.39	139.61	1,299.9	-3.8	14.5	-3.9	0.23	-0.10	27.11
1,400.0	0.24	111.76	1,399.9	-4.1	14.9	-4.2	0.21	-0.15	-27.85
1,500.0	0.17	33.06	1,499.9	-4.1	15.2	-4.2	0.27	-0.07	-78.70
1,600.0	0.33	345.63	1,599.9	-3.7	15.2	-3.8	0.25	0.16	-47.43
1,700.0	0.34	339.34	1,699.9	-3.1	15.0	-3.2	0.04	0.01	-6.29
1,800.0	0.05	11.89	1,799.9	-2.8	14.9	-2.9	0.30	-0.29	32.55
1,900.0	0.07	115.04	1,899.9	-2.8	15.0	-2.9	0.09	0.02	103.15
2,000.0	0.28	79.25	1,999.9	-2.8	15.3	-2.9	0.23	0.21	-35.79
2,100.0	0.51	66.06	2,099.9	-2.5	16.0	-2.6	0.25	0.23	-13.19
2,200.0	0.64	58.10	2,199.9	-2.0	16.8	-2.2	0.15	0.13	-7.96
2,300.0	0.53	51.00	2,299.9	-1.5	17.7	-1.6	0.13	-0.11	-7.10
2,400.0	0.94	53.74	2,399.9	-0.7	18.7	-0.8	0.41	0.41	2.74
2,500.0	1.23	55.00	2,499.8	0.4	20.2	0.3	0.29	0.29	1.26
2,600.0	1.70	58.02	2,599.8	1.8	22.4	1.7	0.48	0.47	3.02
2,700.0	1.96	54.32	2,699.8	3.6	25.0	3.4	0.29	0.26	-3.70
2,800.0	2.45	52.55	2,799.7	5.9	28.1	5.7	0.49	0.49	-1.77
2,900.0	3.17	55.30	2,899.6	8.8	32.1	8.6	0.73	0.72	2.75
3,000.0	3.39	58.28	2,999.4	11.9	36.9	11.7	0.28	0.22	2.98
3,100.0	2.23	71.15	3,099.3	14.1	41.2	13.8	1.31	-1.16	12.87
3,200.0	2.28	71.05	3,199.2	15.4	44.9	15.1	0.05	0.05	-0.10
3,300.0	1.39	69.83	3,299.2	16.4	48.0	16.1	0.89	-0.89	-1.22
3,400.0	0.69	226.31	3,399.1	16.4	48.7	16.1	2.04	-0.70	156.48
3,500.0	0.44	207.78	3,499.1	15.7	48.0	15.4	0.31	-0.25	-18.53
3,600.0	0.45	232.83	3,599.1	15.1	47.6	14.8	0.19	0.01	25.05
3,700.0	0.59	246.51	3,699.1	14.6	46.8	14.3	0.19	0.14	13.68
3,800.0	0.62	251.85	3,799.1	14.3	45.8	14.0	0.06	0.03	5.34
3,900.0	0.81	242.73	3,899.1	13.8	44.6	13.5	0.22	0.19	-9.12
4,000.0	0.56	240.90	3,999.1	13.2	43.6	12.9	0.25	-0.25	-1.83
4,100.0	0.42	244.12	4,099.1	12.8	42.8	12.5	0.14	-0.14	3.22
4,200.0	0.55	265.80	4,199.1	12.6	42.0	12.4	0.22	0.13	21.68
4,300.0	0.27	226.64	4,299.1	12.4	41.4	12.2	0.38	-0.28	-39.16
4,400.0	0.15	214.40	4,399.1	12.2	41.1	11.9	0.13	-0.12	-12.24
4,500.0	0.27	208.25	4,499.1	11.8	40.9	11.6	0.12	0.12	-6.15
4,600.0	0.51	196.44	4,599.1	11.2	40.7	10.9	0.25	0.24	-11.81
4,700.0	0.39	157.06	4,699.1	10.5	40.7	10.2	0.32	-0.12	-39.38
4,800.0	0.55	178.15	4,799.1	9.7	40.9	9.4	0.23	0.16	21.09
4,900.0	0.64	147.98	4,899.1	8.7	41.2	8.5	0.32	0.09	-30.17
5,000.0	0.88	165.57	4,999.1	7.5	41.7	7.2	0.33	0.24	17.59
Tie Into Gyro @ 5071' MD / 5070' TVD									
5,071.0	0.81	156.15	5,070.1	6.5	42.0	6.2	0.22	-0.10	-13.27



Survey Report

QES

Company: BTA Oil Producers, LLC
 Project: Lea County, NM
 Site: Sec 16, T22-S, R34-E
 Well: Grama 8817 JV-P Federal Com #2H
 Wellbore: Wellbore #1
 Design: Wellbore #1

Local Co-ordinate Reference: Well Grama 8817 JV-P Federal Com #2H
 TVD Reference: WELL @ 3501.0usft (Nomac #94)
 MD Reference: WELL @ 3501.0usft (Nomac #94)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Database: EDM5002

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)
5,261.0	0.90	122.00	5,260.1	4.5	43.8	4.2	0.27	0.05	-17.97
5,451.0	0.80	124.70	5,450.0	3.0	46.2	2.7	0.06	-0.05	1.42
5,641.0	0.50	95.00	5,640.0	2.1	48.1	1.8	0.23	-0.16	-15.63
5,831.0	0.60	116.90	5,830.0	1.6	49.8	1.3	0.12	0.05	11.53
Crossed Hard Line @ 5959' MD / 5958' TVD									
5,958.6	0.67	197.85	5,957.6	0.6	50.2	0.3	0.65	0.06	63.44
6,021.0	1.00	214.70	6,020.0	-0.2	49.7	-0.5	0.65	0.52	27.00
6,211.0	0.80	205.20	6,210.0	-2.8	48.2	-3.1	0.13	-0.11	-5.00
6,401.0	0.90	212.70	6,400.0	-5.2	46.9	-5.5	0.08	0.05	3.95
6,591.0	0.70	223.10	6,589.9	-7.3	45.3	-7.6	0.13	-0.11	5.47
6,781.0	0.70	225.80	6,779.9	-9.0	43.6	-9.3	0.02	0.00	1.42
6,971.0	0.70	227.30	6,969.9	-10.6	41.9	-10.9	0.01	0.00	0.79
7,161.0	1.00	235.60	7,159.9	-12.3	39.7	-12.6	0.17	0.16	4.37
7,351.0	1.40	257.20	7,349.8	-13.8	36.1	-14.0	0.31	0.21	11.37
7,541.0	1.30	262.80	7,539.8	-14.5	31.7	-14.7	0.09	-0.05	2.95
7,731.0	1.00	283.80	7,729.8	-14.4	27.9	-14.6	0.27	-0.16	11.05
7,915.0	1.10	288.00	7,913.7	-13.5	24.7	-13.6	0.07	0.05	2.28
8,104.0	1.10	292.70	8,102.7	-12.2	21.3	-12.4	0.05	0.00	2.49
8,294.0	1.10	288.10	8,292.7	-11.0	17.9	-11.1	0.05	0.00	-2.42
8,484.0	1.30	300.30	8,482.6	-9.3	14.3	-9.4	0.17	0.11	6.42
8,674.0	0.60	281.60	8,672.6	-8.0	11.5	-8.1	0.40	-0.37	-9.84
8,865.0	0.50	296.80	8,863.6	-7.4	9.7	-7.5	0.09	-0.05	7.96
9,055.0	0.50	195.70	9,053.6	-7.9	8.8	-7.9	0.41	0.00	-53.21
9,245.0	1.40	241.80	9,243.5	-9.8	6.5	-9.8	0.59	0.47	24.26
9,435.0	2.60	253.50	9,433.4	-12.1	0.3	-12.1	0.66	0.63	6.16
9,625.0	1.20	272.30	9,623.3	-13.2	-5.8	-13.2	0.80	-0.74	9.89
9,720.0	1.50	275.70	9,718.3	-13.1	-8.0	-13.0	0.33	0.32	3.58
9,822.0	3.30	334.70	9,820.2	-10.3	-10.6	-10.2	2.78	1.76	57.84
Crossed Hard Line @ 9900' MD / 9898' TVD									
9,900.1	12.58	342.42	9,897.5	-0.1	-14.1	0.0	11.94	11.89	9.88
9,917.0	14.60	342.80	9,913.9	3.7	-15.3	3.8	11.94	11.93	2.26
10,012.0	27.60	350.40	10,002.4	37.0	-22.6	37.1	13.96	13.68	8.00
10,107.0	37.10	353.40	10,082.5	87.2	-29.6	87.4	10.14	10.00	3.16
10,202.0	43.30	358.10	10,155.1	148.3	-33.9	148.6	7.26	6.53	4.95
10,297.0	47.80	1.60	10,221.6	216.1	-34.0	216.3	5.42	4.74	3.68
10,392.0	52.80	5.80	10,282.3	289.0	-29.2	289.2	6.26	5.26	4.42
10,487.0	61.80	2.50	10,333.6	368.6	-23.6	368.8	9.91	9.47	-3.47
10,582.0	76.10	0.90	10,367.6	457.0	-21.0	457.2	15.13	15.05	-1.68
10,677.0	84.30	4.30	10,383.7	550.5	-16.7	550.6	9.32	8.63	3.58
10,772.0	86.90	5.10	10,391.0	644.8	-9.0	644.9	2.86	2.74	0.84
10,896.0	89.50	2.70	10,394.9	768.5	-0.5	768.5	2.85	2.10	-1.94
10,991.0	90.60	2.50	10,394.8	863.4	3.8	863.3	1.18	1.16	-0.21
11,086.0	90.40	2.30	10,394.0	958.3	7.8	958.2	0.30	-0.21	-0.21
11,181.0	90.00	1.60	10,393.7	1,053.2	11.0	1,053.1	0.85	-0.42	-0.74



Survey Report

QES

Company: BTA Oil Producers, LLC
Project: Lea County, NM
Site: Sec 16, T22-S, R34-E
Well: Grama 8817 JV-P Federal Com #2H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Grama 8817 JV-P Federal Com #2H
TVD Reference: WELL @ 3501.0usft (Nomac #94)
MD Reference: WELL @ 3501.0usft (Nomac #94)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM5002

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)
11,276.0	91.20	0.90	10,392.7	1,148.2	13.1	1,148.1	1.46	1.26	-0.74
11,371.0	89.80	0.40	10,391.9	1,243.2	14.1	1,243.1	1.56	-1.47	-0.53
11,466.0	88.70	0.10	10,393.1	1,338.2	14.6	1,338.1	1.20	-1.16	-0.32
11,561.0	90.00	359.70	10,394.2	1,433.2	14.4	1,433.1	1.43	1.37	-0.42
11,656.0	87.80	359.50	10,396.0	1,528.1	13.7	1,528.0	2.33	-2.32	-0.21
11,751.0	88.60	359.50	10,399.0	1,623.1	12.9	1,623.0	0.84	0.84	0.00
11,846.0	89.20	359.50	10,400.8	1,718.1	12.1	1,718.0	0.63	0.63	0.00
11,941.0	90.00	359.30	10,401.5	1,813.1	11.1	1,813.0	0.87	0.84	-0.21
12,036.0	90.80	359.20	10,400.8	1,908.1	9.8	1,908.0	0.85	0.84	-0.11
12,131.0	91.50	358.80	10,398.9	2,003.0	8.2	2,002.9	0.85	0.74	-0.42
12,225.0	91.20	359.00	10,396.7	2,097.0	6.4	2,096.9	0.38	-0.32	0.21
12,320.0	92.00	358.80	10,394.0	2,191.9	4.5	2,191.8	0.87	0.84	-0.21
12,415.0	91.30	359.20	10,391.3	2,286.9	2.9	2,286.8	0.85	-0.74	0.42
12,510.0	89.60	359.20	10,390.6	2,381.9	1.6	2,381.8	1.79	-1.79	0.00
12,605.0	88.70	359.70	10,392.0	2,476.8	0.6	2,476.8	1.08	-0.95	0.53
12,700.0	87.80	0.80	10,394.9	2,571.8	1.1	2,571.7	1.50	-0.95	1.16
12,795.0	88.40	0.60	10,398.0	2,666.7	2.2	2,666.7	0.67	0.63	-0.21
12,890.0	88.90	0.40	10,400.3	2,761.7	3.0	2,761.6	0.57	0.53	-0.21
12,985.0	89.80	0.20	10,401.3	2,856.7	3.5	2,856.6	0.97	0.95	-0.21
13,080.0	90.60	0.10	10,401.0	2,951.7	3.8	2,951.6	0.85	0.84	-0.11
13,175.0	91.40	359.50	10,399.3	3,046.7	3.5	3,046.6	1.05	0.84	-0.63
13,270.0	92.10	359.30	10,396.4	3,141.6	2.5	3,141.5	0.77	0.74	-0.21
13,365.0	90.00	359.50	10,394.7	3,236.6	1.5	3,236.5	2.22	-2.21	0.21
13,460.0	90.50	359.90	10,394.3	3,331.6	1.0	3,331.5	0.67	0.53	0.42
13,555.0	91.10	359.50	10,393.0	3,426.6	0.5	3,426.5	0.76	0.63	-0.42
13,650.0	91.60	359.30	10,390.7	3,521.6	-0.5	3,521.5	0.57	0.53	-0.21
13,745.0	92.30	359.00	10,387.5	3,616.5	-1.9	3,616.4	0.80	0.74	-0.32
13,839.0	92.70	359.00	10,383.4	3,710.4	-3.6	3,710.3	0.43	0.43	0.00
13,934.0	93.70	358.60	10,378.1	3,805.2	-5.5	3,805.2	1.13	1.05	-0.42
14,029.0	92.50	359.50	10,373.0	3,900.1	-7.1	3,900.0	1.58	-1.26	0.95
14,124.0	91.40	359.50	10,369.7	3,995.0	-7.9	3,995.0	1.16	-1.16	0.00
14,219.0	90.30	359.90	10,368.3	4,090.0	-8.4	4,090.0	1.23	-1.16	0.42
14,313.0	91.00	359.70	10,367.2	4,184.0	-8.8	4,183.9	0.77	0.74	-0.21
14,408.0	90.20	0.40	10,366.3	4,279.0	-8.7	4,278.9	1.12	-0.84	0.74
14,503.0	91.10	0.40	10,365.2	4,374.0	-8.0	4,373.9	0.95	0.95	0.00
14,598.0	91.60	0.20	10,362.9	4,468.9	-7.5	4,468.9	0.57	0.53	-0.21
14,693.0	89.40	0.10	10,362.1	4,563.9	-7.3	4,563.9	2.32	-2.32	-0.11
14,788.0	90.10	359.90	10,362.5	4,658.9	-7.3	4,658.9	0.77	0.74	-0.21
14,883.0	90.80	0.10	10,361.8	4,753.9	-7.3	4,753.9	0.77	0.74	0.21
14,978.0	91.40	0.10	10,360.0	4,848.9	-7.1	4,848.8	0.63	0.63	0.00
15,073.0	91.90	0.10	10,357.2	4,943.9	-7.0	4,943.8	0.53	0.53	0.00
15,168.0	92.20	359.70	10,353.8	5,038.8	-7.1	5,038.7	0.53	0.32	-0.42
15,263.0	92.50	359.30	10,349.9	5,133.7	-7.9	5,133.7	0.53	0.32	-0.42



Survey Report

QES

Company: BTA Oil Producers, LLC
Project: Lea County, NM
Site: Sec 16, T22-S, R34-E
Well: Grama 8817 JV-P Federal Com #2H
Wellbore: Wellbore #1
Design: Wellbore #1

Local Co-ordinate Reference: Well Grama 8817 JV-P Federal Com #2H
TVD Reference: WELL @ 3501.0usft (Nomac #94)
MD Reference: WELL @ 3501.0usft (Nomac #94)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM5002

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)
15,358.0	90.50	359.30	10,347.4	5,228.7	-9.1	5,228.6	2.11	-2.11	0.00
15,453.0	91.00	359.00	10,346.2	5,323.6	-10.5	5,323.6	0.61	0.53	-0.32
15,547.0	92.00	358.80	10,343.7	5,417.6	-12.3	5,417.6	1.08	1.06	-0.21
15,642.0	92.70	358.60	10,339.8	5,512.5	-14.5	5,512.5	0.77	0.74	-0.21
15,737.0	92.40	358.50	10,335.6	5,607.4	-16.9	5,607.4	0.33	-0.32	-0.11
15,831.0	91.70	357.60	10,332.2	5,701.3	-20.1	5,701.3	1.21	-0.74	-0.96
15,928.0	88.60	357.60	10,332.0	5,798.2	-24.1	5,798.2	3.20	-3.20	0.00
16,023.0	89.20	357.40	10,333.8	5,893.0	-28.3	5,893.1	0.67	0.63	-0.21
16,118.0	90.50	357.40	10,334.1	5,987.9	-32.6	5,988.0	1.37	1.37	0.00
16,213.0	91.90	357.80	10,332.1	6,082.8	-36.6	6,082.9	1.53	1.47	0.42
16,308.0	91.50	359.90	10,329.3	6,177.8	-38.5	6,177.9	2.25	-0.42	2.21
16,402.0	90.20	0.60	10,327.9	6,271.8	-38.1	6,271.9	1.57	-1.38	0.74
16,497.0	91.60	359.70	10,326.4	6,366.7	-37.8	6,366.9	1.75	1.47	-0.95
16,592.0	90.20	0.40	10,324.9	6,461.7	-37.7	6,461.8	1.65	-1.47	0.74
16,687.0	89.30	0.60	10,325.3	6,556.7	-36.9	6,556.8	0.97	-0.95	0.21
16,782.0	89.70	0.60	10,326.1	6,651.7	-35.9	6,651.8	0.42	0.42	0.00
16,877.0	87.70	0.40	10,328.3	6,746.7	-35.1	6,746.8	2.12	-2.11	-0.21
16,972.0	89.00	0.80	10,331.0	6,841.6	-34.1	6,841.7	1.43	1.37	0.42
17,067.0	88.10	0.20	10,333.4	6,936.6	-33.2	6,936.7	1.14	-0.95	-0.63
17,162.0	87.90	0.60	10,336.7	7,031.5	-32.6	7,031.6	0.47	-0.21	0.42
17,256.0	89.30	0.40	10,339.0	7,125.5	-31.8	7,125.6	1.50	1.49	-0.21
17,351.0	90.60	359.90	10,339.1	7,220.5	-31.5	7,220.6	1.47	1.37	-0.53
17,446.0	90.00	0.40	10,338.6	7,315.5	-31.3	7,315.6	0.82	-0.63	0.53
17,541.0	90.80	1.10	10,337.9	7,410.5	-30.0	7,410.5	1.12	0.84	0.74
17,636.0	89.50	1.50	10,337.7	7,505.5	-27.9	7,505.5	1.43	-1.37	0.42
17,730.0	87.90	1.80	10,339.8	7,599.4	-25.2	7,599.4	1.73	-1.70	0.32
17,825.0	89.30	1.30	10,342.2	7,694.3	-22.6	7,694.3	1.56	1.47	-0.53
17,920.0	91.30	1.60	10,341.7	7,789.3	-20.2	7,789.3	2.13	2.11	0.32
18,015.0	89.80	1.30	10,340.7	7,884.3	-17.8	7,884.2	1.61	-1.58	-0.32
18,110.0	91.20	1.60	10,339.9	7,979.2	-15.4	7,979.2	1.51	1.47	0.32
18,205.0	90.40	0.10	10,338.6	8,074.2	-14.0	8,074.1	1.79	-0.84	-1.58
18,300.0	90.30	359.30	10,338.0	8,169.2	-14.5	8,169.1	0.85	-0.11	-0.84
18,394.0	91.70	359.20	10,336.4	8,263.2	-15.7	8,263.1	1.49	1.49	-0.11
18,489.0	90.20	359.20	10,334.8	8,358.1	-17.0	8,358.1	1.58	-1.58	0.00
18,584.0	89.40	359.00	10,335.1	8,453.1	-18.5	8,453.1	0.87	-0.84	-0.21
18,678.0	89.60	359.00	10,335.9	8,547.1	-20.2	8,547.1	0.21	0.21	0.00
18,773.0	91.50	359.20	10,335.0	8,642.1	-21.7	8,642.1	2.01	2.00	0.21
18,868.0	89.40	359.90	10,334.3	8,737.1	-22.4	8,737.0	2.33	-2.21	0.74
18,963.0	89.50	359.30	10,335.2	8,832.1	-23.1	8,832.0	0.64	0.11	-0.63
19,058.0	91.00	359.20	10,334.8	8,927.1	-24.3	8,927.0	1.58	1.58	-0.11
19,153.0	92.40	359.20	10,332.0	9,022.0	-25.6	9,022.0	1.47	1.47	0.00
19,248.0	90.20	359.30	10,329.8	9,117.0	-26.9	9,117.0	2.32	-2.32	0.11
19,342.0	89.60	359.90	10,330.0	9,211.0	-27.5	9,211.0	0.90	-0.64	0.64



Survey Report

QES

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Design: Wellbore #1

Local Co-ordinate Reference: Well Grama 8817 JV-P Federal Com #2H
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MD Reference: WELL @ 3501.0usft (Nomac #94)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM5002

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)
19,437.0	89.30	359.20	10,330.9	9,306.0	-28.3	9,305.9	0.80	-0.32	-0.74
19,532.0	90.30	359.50	10,331.2	9,400.9	-29.4	9,400.9	1.10	1.05	0.32
19,627.0	91.90	359.50	10,329.4	9,495.9	-30.2	9,495.9	1.68	1.68	0.00
19,722.0	90.00	359.70	10,327.8	9,590.9	-30.8	9,590.9	2.01	-2.00	0.21
19,817.0	88.50	359.00	10,329.1	9,685.9	-31.9	9,685.9	1.74	-1.58	-0.74
19,912.0	89.60	359.20	10,330.6	9,780.9	-33.4	9,780.9	1.18	1.16	0.21
20,007.0	91.50	359.50	10,329.7	9,875.8	-34.5	9,875.9	2.02	2.00	0.32
Crossed Hard Line @ 20031' MD / 10329' TVD									
20,030.5	91.88	359.35	10,329.0	9,899.3	-34.7	9,899.4	1.76	1.64	-0.64
20,117.0	93.30	358.80	10,325.1	9,985.7	-36.1	9,985.8	1.76	1.64	-0.64
TD @ 20168' MD / 10322' TVD									
20,168.0	93.30	358.80	10,322.2	10,036.6	-37.2	10,036.7	0.00	0.00	0.00

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,071.0	5,070.1	6.5	42.0	Tie into Gyro @ 5071' MD / 5070' TVD
5,958.6	5,957.6	0.6	50.2	Crossed Hard Line @ 5959' MD / 5958' TVD
9,900.1	9,897.5	-0.1	-14.1	Crossed Hard Line @ 9900' MD / 9898' TVD
20,030.5	10,329.0	9,899.3	-34.7	Crossed Hard Line @ 20031' MD / 10329' TVD
20,168.0	10,322.2	10,036.6	-37.2	TD @ 20168' MD / 10322' TVD

Checked By: _____ Approved By: _____ Date: _____