



Job Number: SYMO-160560
 Company: BTA Oil Producers LLC
 Lease/Well: Grama 8817 JV-P Federal Com 2H
 Location: Lee County, NM
 Rig Name: Nomac 94
 RKB: 25.5'
 G.L. or M.S.L.: GL

State/Country: New Mexico/USA
 Declination: Declination See Details Below
 Grid: East To Grid North
 File name: W:\2016\BTA\MO\GRAMA\8817\JV-P\FEDERA-1\2H.SVY
 Date/Time: 03-Oct-16 / 15:48
 Curve Name: Surface - 5071' M.D. (SRG)
 Lat: 32.385229 Long: -103.48183

HOBBS OCD

DEC 30 2016

RECEIVED

MS Energy

WINSERVE SURVEY CALCULATIONS
 Minimum Curvature Method
 Vertical Section Plane 359.63
 Vertical Section Referenced to Wellhead
 Rectangular Coordinates Referenced to Wellhead

Declination To True North: 7.01°
 Grid Convergence Factor: 0.46°
 Total Correction Mag to Grid: 6.55°

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	Direction Deg	Dogleg Severity Deg/100
.00	.00	.00	.00	.00	.00	.00	.00	.00	.00
100.00	.17	85.25	100.00	.01	.15	.01	.15	85.25	.17
200.00	.22	138.33	200.00	-.12	.42	-.12	.44	105.68	.18
300.00	.60	123.19	300.00	-.55	.99	-.56	1.13	119.03	.39
400.00	.77	124.08	399.99	-1.21	1.98	-1.22	2.32	121.42	.17
500.00	.76	109.35	499.98	-1.81	3.17	-1.83	3.65	119.73	.20
600.00	.79	93.00	599.97	-2.06	4.48	-2.09	4.93	114.74	.22
700.00	.78	93.42	699.96	-2.14	5.85	-2.18	6.23	110.11	.01
800.00	1.02	103.51	799.95	-2.39	7.39	-2.44	7.77	107.91	.29
900.00	1.11	94.36	899.93	-2.67	9.22	-2.73	9.60	106.15	.19
1000.00	1.12	97.64	999.91	-2.87	11.16	-2.95	11.52	104.45	.06
1100.00	.80	97.70	1099.90	-3.10	12.82	-3.18	13.19	103.59	.32
1200.00	.49	112.50	1199.89	-3.36	13.91	-3.44	14.31	103.56	.35
1300.00	.39	139.61	1299.89	-3.78	14.52	-3.87	15.01	104.58	.23
1400.00	.24	111.76	1399.89	-4.11	14.94	-4.21	15.49	105.40	.21

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	C L O S U R E		Dogleg Severity Deg/100
							Distance FT	Direction Deg	
1500.00	.17	33.06	1499.89	-4.07	15.21	-4.17	15.75	104.97	.27
1600.00	.33	345.63	1599.89	-3.66	15.22	-3.76	15.66	103.54	.25
1700.00	.34	339.34	1699.89	-3.11	15.05	-3.21	15.36	101.67	.04
1800.00	.05	11.89	1799.89	-2.79	14.95	-2.88	15.21	100.56	.30
1900.00	.07	115.04	1899.89	-2.77	15.01	-2.87	15.27	100.46	.09
2000.00	.28	79.25	1999.88	-2.75	15.31	-2.85	15.55	100.19	.23
2100.00	.51	66.06	2099.88	-2.53	15.96	-2.63	16.15	98.99	.25
2200.00	.64	58.10	2199.88	-2.05	16.84	-2.16	16.96	96.94	.15
2300.00	.53	51.00	2299.87	-1.46	17.67	-1.58	17.73	94.73	.13
2400.00	.94	53.74	2399.86	-.69	18.69	-.81	18.70	92.11	.41
2500.00	1.23	55.00	2499.85	.41	20.23	.28	20.24	88.83	.29
2600.00	1.70	58.02	2599.81	1.81	22.37	1.67	22.44	85.36	.48
2700.00	1.96	54.32	2699.76	3.60	25.02	3.44	25.27	81.82	.29
2800.00	2.45	52.55	2799.69	5.90	28.10	5.71	28.71	78.15	.49
2900.00	3.17	55.30	2899.57	8.77	32.07	8.56	33.25	74.71	.73
3000.00	3.39	58.28	2999.40	11.90	36.86	11.66	38.73	72.11	.28
3100.00	2.23	71.15	3099.28	14.08	41.22	13.81	43.56	71.14	1.31
3200.00	2.28	71.05	3199.20	15.36	44.94	15.06	47.49	71.14	.05
3300.00	1.39	69.83	3299.15	16.42	47.96	16.11	50.69	71.10	.89
3400.00	.69	226.31	3399.14	16.42	48.66	16.11	51.36	71.35	2.04
3500.00	.44	207.78	3499.14	15.67	48.05	15.36	50.54	71.94	.31
3600.00	.45	232.83	3599.14	15.09	47.56	14.78	49.89	72.40	.19
3700.00	.59	246.51	3699.13	14.65	46.77	14.34	49.01	72.61	.19
3800.00	.62	251.85	3799.13	14.27	45.79	13.98	47.96	72.69	.06
3900.00	.81	242.73	3899.12	13.78	44.64	13.49	46.72	72.85	.22
4000.00	.56	240.90	3999.11	13.22	43.59	12.94	45.55	73.13	.25
4100.00	.42	244.12	4099.11	12.82	42.83	12.54	44.71	73.34	.14
4200.00	.55	265.80	4199.10	12.63	42.02	12.35	43.88	73.28	.22
4300.00	.27	226.64	4299.10	12.43	41.37	12.16	43.20	73.28	.38
4400.00	.15	214.40	4399.10	12.16	41.13	11.89	42.89	73.53	.13
4500.00	.27	208.25	4499.10	11.84	40.94	11.58	42.62	73.87	.12
4600.00	.51	196.44	4599.10	11.21	40.70	10.95	42.22	74.60	.25
4700.00	.39	157.06	4699.10	10.47	40.71	10.21	42.04	75.58	.32
4800.00	.55	178.15	4799.09	9.68	40.86	9.41	41.99	76.68	.23
4900.00	.64	147.98	4899.09	8.72	41.17	8.46	42.08	78.04	.32

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	True Vertical Depth	N-S FT	E-W FT	Vertical Section FT	CLOSURE Distance FT	CLOSURE Direction Deg	Dogleg Severity Deg/100
5000.00	.88	165.57	4999.08	7.51	41.66	7.24	42.33	79.79	.33
Last Survey Depth Recorded									
5071.00	.81	156.15	5070.07	6.52	42.00	6.25	42.50	81.18	.22



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



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:
	+E/-W	0.0 usft	Easting:
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



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

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



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:	Gramma 8817 JV-P Federal Com #2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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



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

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



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

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



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

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

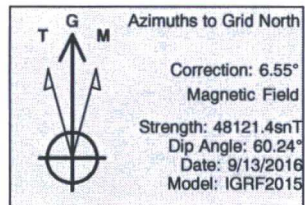
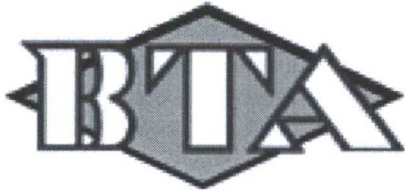
Design Annotations

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: _____

Company Name: BTA Oil Producers, LLC
 Grama 8817 JV-P Federal Com #2H
 Lea County, NM
 Rig: Nomas #81
 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 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

WELL DETAILS: Grama 8817 JV-P Federal Com #2H					
	Ground Level	2479.0			
+N-S	+E-W	Northing	Eastings	Latitude	Longitude
0.0	0.0	904907.50	703905.00	32° 27' 4.555" N	107° 29' 54.389" W

ANNOTATIONS									
MD	Inc	Azi	TVD	+N-S	+E-W	Vsect	Departure	Annotation	
5071.0	0.81	156.15	5070.1	6.5	42.0	6.2	73.1	The Into Gyre @ 5071' MD / 5070' TVD	
5058.6	0.67	197.85	5057.6	0.6	50.2	0.3	84.5	Crossed Hard Line @ 5058' MD / 5058' TVD	
9000.1	12.58	343.42	9007.5	-0.1	-14.1	0.0	188.5	Crossed Hard Line @ 9000' MD / 9000' TVD	
20030.5	91.88	359.35	10329.0	9899.3	-34.7	9899.4	10071.9	Crossed Hard Line @ 20031' MD / 10329' TVD	
20168.0	93.30	359.90	10322.2	10039.5	-37.2	10039.7	10309.2	TD @ 20168' MD / 10322' TVD	

