

Results of Directional Survey

2¹

API number:	30-025-40725		
OGRID:		Operator:	COG OPERATING LLC
		Property:	OUTLAW 22 FEDERAL COM # 1H

surface	ULSTR:	B	22	T	20S	R	33E
				660	FNL	1980	FEL

BH Loc	ULSTR:	O	22	T	20S	R	33E
14930	MD	11196.1	TVD	652	FSL	1926	FEL
				4628	FNL		

Top Perf/OH	ULSTR:	B	22	T	20S	R	33E
11103	MD	11032.5	TVD	821	FNL	1859	FEL

Bot Perf/OH	ULSTR:	O	22	T	20S	R	33E
14866	MD	11195.1	TVD	716	FSL	1924	FEL
				4564	FNL		

	MD	N/S	E/W	VD
	11072	-135.50	122.60	11014.7
TOP PERFS/OH	11103	-160.90	120.70	11032.50
	11103	-160.90	120.70	11032.50
	14770	-3808.30	58.30	11193.60
BOT PERFS/OH	14866	-3904.24	55.60	11195.10
	14930	-3968.20	53.80	11196.10

NEXT TO LAST	14770	-3808.30	58.30	11193.60
LAST READING	14930	-3968.20	53.80	11196.10
TD	14930	-3968.20	53.80	11196.10

Surface Location	660	FN	1980	FE
Projected BHL	4628	FN	1926	FE
Location of				
Top Perfs/OH	821	FN	1859	FE
Bottom Perfs/OH	4564	FN	1924	FE

SUMMARY of Subsurface Locations

Surface Location	B-22-20S-33E	660	FN	1980	FE	Vert. Depth
Top Perfs/OH	B-22-20S-33E	821	FN	1859	FE	11032.50
Bottom Perfs/OH	O-22-20S-33E	4564	FN	1924	FE	11195.10
Projected TD	O-22-20S-33E	4628	FN	1926	FE	11196.10

FEB 25 2013



A GYRO TECHNOLOGIES INC. COMPANY

PO Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

HOBBS OCD

JAN 25 2013

RECEIVED

September 26, 2012

COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanica Castillo

SUR: B-22-20s-33e, 660/N & 1980/E
BHL: O-22-20s-33e, 4628/N & 1926/E
API # 30-025-40725

RE: Outlaw 22 Federal Com No. 001H

Please find enclosed a copy of the survey from 0.00' to 11307.00' ran on the above referenced well.

If I can be of any further service please do not hesitate to call me at 800-606-4976.

Sincerely,

Keith Havelka
Operations



Company: COG Operating LLC (Concho)
Lease/Well: Outlaw 22 Federal Com / No. 1H
Location: S22 T20S R33E
Rig Name: UDI 216
State/County: New Mexico / Lea
Latitude: 32.56, Longitude: -103.65
GRID North is 0.37 Degrees East of True North
VS-Azi: 0.00 Degrees



RKB : 22'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: final survey.ut
Minimum Curvature Method
Report Date/Time: 9/26/2012 / 15:26

Vaughn Energy Services
Gardendale, Texas
817-741-3610

Surveyor: Ray Seago

Outlaw 22 Federal Com No. 001H / API 30-025-40725

HOBBS OCD
JAN 25 2013
RECEIVED

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.15	294.08	100.00	0.05	-0.12	0.05	0.13	294.08	0.15
200.00	0.30	228.17	200.00	-0.07	-0.43	-0.07	0.44	261.13	0.27
300.00	0.27	229.55	300.00	-0.39	-0.80	-0.39	0.89	243.92	0.03
400.00	0.24	230.92	400.00	-0.68	-1.14	-0.68	1.33	239.36	0.03
500.00	0.24	235.33	500.00	-0.93	-1.48	-0.93	1.74	237.87	0.02
600.00	0.23	239.74	600.00	-1.14	-1.82	-1.14	2.15	237.80	0.02
700.00	0.21	196.73	699.99	-1.42	-2.04	-1.42	2.49	235.16	0.16
800.00	0.20	153.72	799.99	-1.75	-2.02	-1.75	2.67	229.07	0.15
900.00	0.46	131.65	899.99	-2.17	-1.64	-2.17	2.72	217.09	0.29
1000.00	0.73	109.57	999.99	-2.66	-0.74	-2.66	2.76	195.58	0.35
1100.00	1.06	124.38	1099.97	-3.39	0.63	-3.39	3.45	169.54	0.40
1200.00	1.40	139.18	1199.95	-4.84	2.19	-4.84	5.31	155.66	0.46
1300.00	1.07	121.39	1299.93	-6.25	3.78	-6.25	7.30	148.82	0.50
1400.00	0.74	103.60	1399.92	-6.88	5.20	-6.88	8.63	142.92	0.43
1500.00	1.20	98.27	1499.90	-7.19	6.86	-7.19	9.94	136.32	0.47
1600.00	1.66	92.94	1599.87	-7.41	9.35	-7.41	11.93	128.41	0.48
1700.00	1.76	96.83	1699.83	-7.67	12.32	-7.67	14.51	121.90	0.15
1800.00	1.85	100.73	1799.78	-8.15	15.43	-8.15	17.45	117.85	0.16

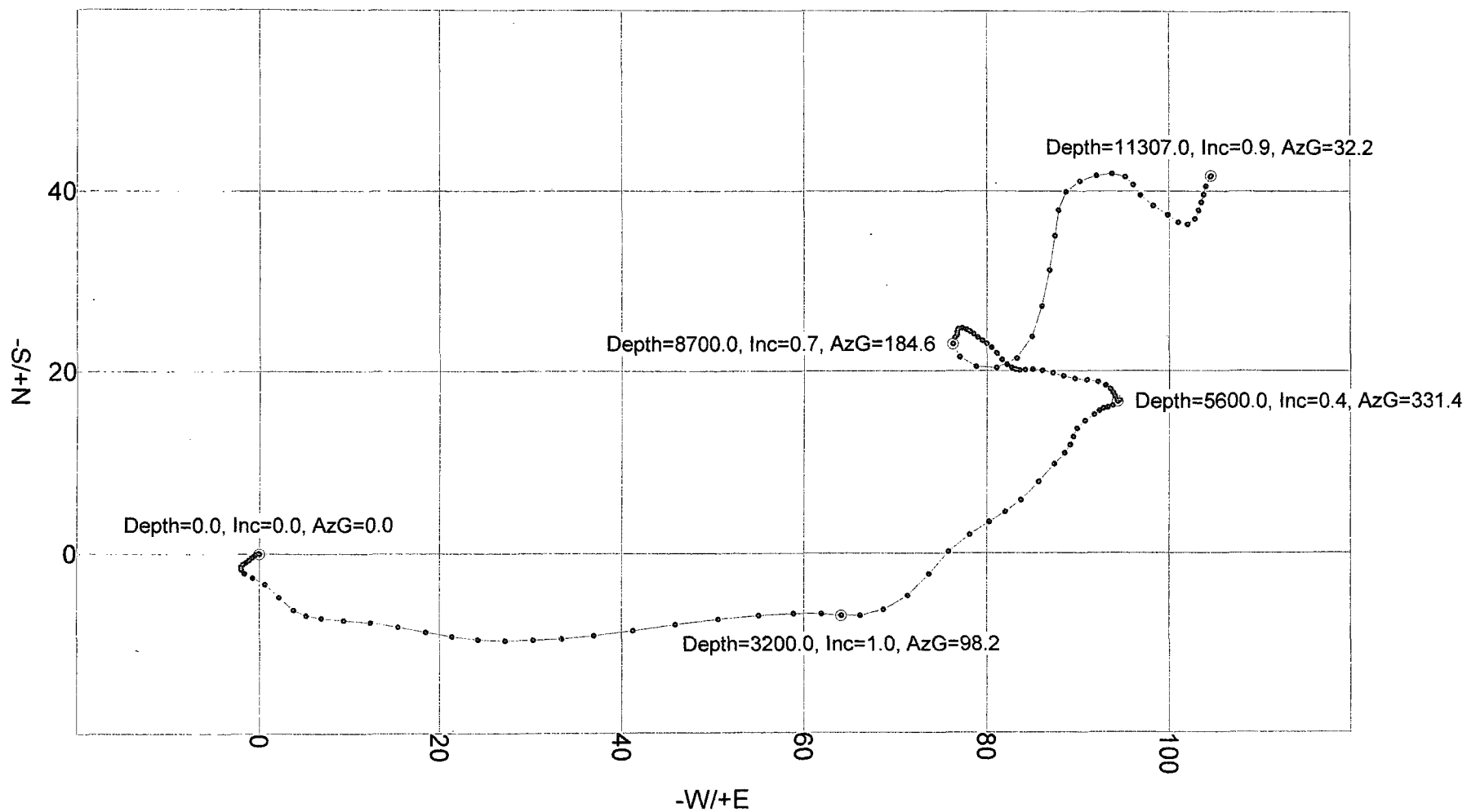
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.74	100.10	1899.73	-8.72	18.51	20.46	115.22	0.12
2000.00	1.62	99.48	1999.68	-9.22	21.39	23.29	113.31	0.12
2100.00	1.68	94.60	2099.64	-9.56	24.24	26.06	111.53	0.15
2200.00	1.74	89.72	2199.60	-9.67	27.22	28.89	109.57	0.16
2300.00	1.78	88.07	2299.55	-9.62	30.29	31.78	107.61	0.06
2400.00	1.82	86.43	2399.50	-9.46	33.43	34.74	105.81	0.07
2500.00	2.25	83.91	2499.44	-9.16	36.96	38.08	103.91	0.44
2600.00	2.68	81.39	2599.35	-8.60	41.23	42.11	101.78	0.44
2700.00	2.71	82.48	2699.24	-7.94	45.88	46.57	99.82	0.06
2800.00	2.75	83.58	2799.12	-7.36	50.61	51.14	98.28	0.06
2900.00	2.38	85.90	2899.02	-6.95	55.06	55.50	97.19	0.38
3000.00	2.01	88.21	2998.95	-6.74	58.88	59.26	96.53	0.38
3100.00	1.50	93.22	3098.90	-6.76	61.93	62.30	96.23	0.53
3200.00	1.00	98.24	3198.88	-6.96	64.11	64.48	96.20	0.51
3300.00	1.35	83.43	3298.86	-6.95	66.14	66.50	96.00	0.46
3400.00	1.69	68.63	3398.82	-6.28	68.68	68.96	95.22	0.52
3500.00	1.85	52.27	3498.77	-4.75	71.33	71.49	93.81	0.53
3600.00	2.02	35.91	3598.72	-2.34	73.64	73.68	91.82	0.57
3700.00	1.81	46.15	3698.66	0.18	75.81	75.81	89.86	0.40
3800.00	1.60	56.39	3798.62	2.05	78.11	78.14	88.50	0.37
3900.00	1.33	57.24	3898.59	3.45	80.26	80.33	87.54	0.27
4000.00	1.06	58.10	3998.56	4.58	82.02	82.15	86.81	0.27
4100.00	1.41	49.71	4098.54	5.86	83.75	83.96	85.99	0.39
4200.00	1.76	41.33	4198.50	7.82	85.71	86.07	84.79	0.42
4300.00	1.22	42.19	4298.47	9.76	87.44	87.99	83.63	0.55
4400.00	0.67	43.05	4398.45	10.97	88.55	89.23	82.94	0.55
4500.00	0.59	27.51	4498.45	11.85	89.19	89.97	82.43	0.19
4600.00	0.51	11.97	4598.44	12.74	89.52	90.42	81.90	0.17
4700.00	0.66	34.01	4698.44	13.66	89.93	90.96	81.37	0.27
4800.00	0.81	56.06	4798.43	14.53	90.84	91.99	80.91	0.32
4900.00	0.55	53.49	4898.42	15.21	91.81	93.06	80.59	0.26
5000.00	0.29	50.92	4998.42	15.66	92.40	93.72	80.38	0.26
5100.00	0.30	67.96	5098.42	15.91	92.84	94.19	80.27	0.09
5200.00	0.30	84.99	5198.42	16.03	93.33	94.70	80.25	0.09
5300.00	0.39	57.27	5298.42	16.24	93.88	95.27	80.19	0.19
5400.00	0.48	29.54	5398.41	16.79	94.37	95.85	79.91	0.23
5500.00	0.44	180.46	5498.41	16.77	94.57	96.05	79.94	0.89
5600.00	0.39	331.37	5598.41	16.69	94.41	95.87	79.97	0.80
5700.00	0.30	331.47	5698.41	17.22	94.12	95.68	79.63	0.09

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	0.21	331.57	5798.41	17.62	93.90	95.54	79.37	0.09
5900.00	0.34	317.34	5898.41	18.00	93.62	95.33	79.12	0.14
6000.00	0.46	303.11	5998.40	18.43	93.08	94.89	78.80	0.16
6100.00	0.62	287.57	6098.40	18.82	92.23	94.13	78.47	0.22
6200.00	0.79	272.04	6198.39	19.00	91.02	92.98	78.21	0.25
6300.00	0.75	279.51	6298.38	19.14	89.68	91.70	77.95	0.11
6400.00	0.72	286.99	6398.38	19.43	88.43	90.54	77.61	0.10
6500.00	0.70	284.84	6498.37	19.77	87.25	89.46	77.23	0.03
6600.00	0.68	282.68	6598.36	20.06	86.08	88.38	76.88	0.03
6700.00	0.55	271.33	6698.35	20.20	85.02	87.39	76.64	0.18
6800.00	0.41	259.97	6798.35	20.15	84.19	86.57	76.54	0.16
6900.00	0.31	274.90	6898.35	20.11	83.57	85.96	76.47	0.14
7000.00	0.20	289.82	6998.35	20.19	83.14	85.55	76.35	0.12
7100.00	0.31	299.06	7098.35	20.38	82.73	85.21	76.16	0.11
7200.00	0.41	308.29	7198.35	20.73	82.22	84.79	75.85	0.12
7300.00	0.48	316.85	7298.34	21.26	81.65	84.37	75.40	0.09
7400.00	0.54	325.41	7398.34	21.96	81.10	84.01	74.85	0.10
7500.00	0.44	313.76	7498.33	22.61	80.55	83.66	74.32	0.15
7600.00	0.33	302.12	7598.33	23.02	80.04	83.28	73.95	0.13
7700.00	0.35	305.46	7698.33	23.35	79.54	82.90	73.64	0.03
7800.00	0.37	308.81	7798.33	23.73	79.04	82.53	73.29	0.03
7900.00	0.30	306.44	7898.33	24.10	78.57	82.18	72.95	0.07
8000.00	0.23	304.07	7998.33	24.37	78.19	81.90	72.69	0.07
8100.00	0.28	294.42	8098.32	24.58	77.80	81.59	72.46	0.07
8200.00	0.33	284.77	8198.32	24.76	77.30	81.16	72.24	0.07
8300.00	0.27	222.90	8298.32	24.66	76.86	80.71	72.21	0.31
8400.00	0.21	161.03	8398.32	24.31	76.75	80.51	72.43	0.25
8500.00	0.21	201.32	8498.32	23.97	76.75	80.40	72.66	0.14
8600.00	0.21	241.61	8598.32	23.71	76.52	80.11	72.78	0.14
8700.00	0.73	184.56	8698.32	22.99	76.31	79.70	73.23	0.64
8800.00	1.24	137.51	8798.30	21.56	76.99	79.96	74.36	0.92
8900.00	1.29	104.54	8898.28	20.48	78.81	81.43	75.43	0.72
9000.00	1.33	81.58	8998.25	20.37	81.05	83.57	75.89	0.52
9100.00	1.60	51.54	9098.22	21.40	83.29	86.00	75.59	0.80
9200.00	1.86	21.50	9198.18	23.79	84.98	88.24	74.36	0.93
9300.00	2.20	15.01	9298.12	27.15	86.07	90.25	72.49	0.41
9400.00	2.54	8.51	9398.03	31.20	86.90	92.33	70.25	0.43
9500.00	1.94	8.54	9497.95	35.06	87.47	94.24	68.16	0.60
9600.00	1.34	8.57	9597.91	37.90	87.90	95.72	66.68	0.60

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
9700.00	1.24	37.73	9697.89	39.91	88.73	97.29	65.79	0.66
9800.00	1.13	66.89	9797.87	41.15	90.30	99.23	65.50	0.60
9900.00	1.04	77.41	9897.85	41.73	92.09	101.11	65.62	0.22
10000.00	0.95	87.93	9997.84	41.96	93.81	102.76	65.90	0.20
10100.00	0.82	121.04	10097.82	41.62	95.25	103.94	66.40	0.52
10200.00	0.69	154.14	10197.82	40.71	96.12	104.39	67.04	0.45
10300.00	0.93	138.45	10297.81	39.57	96.92	104.69	67.79	0.33
10400.00	1.17	122.76	10397.79	38.41	98.32	105.55	68.66	0.37
10500.00	0.93	125.32	10497.77	37.39	99.84	106.61	69.47	0.25
10600.00	0.68	127.89	10597.76	36.56	100.97	107.38	70.10	0.25
10700.00	0.65	76.96	10697.76	36.32	101.99	108.26	70.40	0.57
10800.00	0.63	26.04	10797.75	36.94	102.79	109.22	70.23	0.55
10900.00	0.57	22.00	10897.75	37.89	103.21	109.95	69.84	0.07
11000.00	0.51	17.97	10997.74	38.77	103.53	110.55	69.47	0.07
11100.00	0.53	15.99	11097.74	39.63	103.80	111.11	69.10	0.03
11200.00	0.55	14.01	11197.73	40.54	104.04	111.66	68.71	0.03
11300.00	0.85	31.03	11297.73	41.63	104.54	112.52	68.29	0.36
11307.00	0.87	32.22	11304.72	41.72	104.59	112.60	68.25	0.39



Vaughn Energy Services
Gardendale, Texas
817-741-3610
Surveyor: Ray Seago
Outlaw 22 Federal Com No. 001H / API 30-025-40725





ROCA Production, INC

Lea County, NM

Outlaw 22 Federal Com

#1H

ST1

SUR: B-22-20s-33e, 660/N & 1980/E
BHL: O-22-20s-33e, 4628/N & 1926/E
API # 30-025-40725

Design: ST1

Survey Report - Geographic

08 October, 2012



Survey Report - Geographic

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

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	Outlaw 22 Federal Com		
Site Position:	Northings:	569,556.36 usft	Latitude: 32° 33' 50.226 N
From: Map	Easting:	711,001.67 usft	Longitude: 103° 38' 54.431 W
Position Uncertainty:	0.0 usft	Slot Radius: 13-3/16 "	Grid Convergence: 0.37 °

Well	#1H		
Well Position	+N/-S	0.0 usft	Northings: 569,556.36 usft
	+E/-W	0.0 usft	Easting: 711,001.67 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
			Ground Level: 3,588.0 usft

Wellbore	ST1		
Magnetics	Model Name	Sample Date	Declination
	IGRF200510	9/29/2012	(°) 7.48
			Dip Angle (°) 60.48
			Field Strength (nT) 48,723

Design	ST1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	10,600.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction (°) 179.62

Survey Program	Date 10/8/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.0	10,600.0	Gyro1 (Pilot)	CB-GYRO-MS
10,661.0	14,770.0	MWD2 (ST1) (ST1)	MWD
14,930.0	14,930.0	PTB (ST1)	MWD
			Description
			Camera based gyro multishot
			MWD - Standard
			MWD - Standard

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	569,556.36	711,001.67	32° 33' 50.226 N	103° 38' 54.431 W
100.0	0.15	294.08	100.0	0.1	-0.1	569,556.42	711,001.55	32° 33' 50.227 N	103° 38' 54.432 W
200.0	0.30	228.17	200.0	-0.1	-0.4	569,556.30	711,001.24	32° 33' 50.225 N	103° 38' 54.436 W
300.0	0.27	229.55	300.0	-0.4	-0.8	569,555.97	711,000.87	32° 33' 50.222 N	103° 38' 54.440 W
400.0	0.24	230.92	400.0	-0.7	-1.2	569,555.68	711,000.52	32° 33' 50.219 N	103° 38' 54.444 W
500.0	0.24	235.33	500.0	-0.9	-1.5	569,555.43	711,000.19	32° 33' 50.217 N	103° 38' 54.448 W
600.0	0.23	239.74	600.0	-1.2	-1.8	569,555.21	710,999.84	32° 33' 50.215 N	103° 38' 54.452 W
700.0	0.21	196.73	700.0	-1.4	-2.1	569,554.94	710,999.62	32° 33' 50.212 N	103° 38' 54.455 W
800.0	0.20	153.72	800.0	-1.8	-2.0	569,554.60	710,999.64	32° 33' 50.209 N	103° 38' 54.455 W
900.0	0.46	131.65	900.0	-2.2	-1.7	569,554.18	711,000.02	32° 33' 50.205 N	103° 38' 54.450 W



Survey Report - Geographic

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,000.0	0.73	109.57	1,000.0	-2.7	-0.8	569,553.70	711,000.92	32° 33' 50.200 N	103° 38' 54.440 W
1,100.0	1.06	124.38	1,100.0	-3.4	0.6	569,552.96	711,002.28	32° 33' 50.192 N	103° 38' 54.424 W
1,200.0	1.40	139.18	1,200.0	-4.8	2.2	569,551.52	711,003.84	32° 33' 50.178 N	103° 38' 54.406 W
1,300.0	1.07	121.39	1,299.9	-6.3	3.8	569,550.11	711,005.44	32° 33' 50.164 N	103° 38' 54.387 W
1,400.0	0.74	103.60	1,399.9	-6.9	5.2	569,549.47	711,006.86	32° 33' 50.157 N	103° 38' 54.371 W
1,500.0	1.20	98.27	1,499.9	-7.2	6.9	569,549.17	711,008.53	32° 33' 50.154 N	103° 38' 54.351 W
1,600.0	1.66	92.94	1,599.9	-7.4	9.3	569,548.94	711,011.01	32° 33' 50.152 N	103° 38' 54.322 W
1,700.0	1.76	96.83	1,699.8	-7.7	12.3	569,548.68	711,013.98	32° 33' 50.149 N	103° 38' 54.288 W
1,800.0	1.85	100.73	1,799.8	-8.2	15.4	569,548.20	711,017.09	32° 33' 50.144 N	103° 38' 54.251 W
1,900.0	1.74	100.10	1,899.7	-8.7	18.5	569,547.63	711,020.17	32° 33' 50.138 N	103° 38' 54.215 W
2,000.0	1.62	99.48	1,999.7	-9.2	21.4	569,547.14	711,023.06	32° 33' 50.133 N	103° 38' 54.182 W
2,100.0	1.68	94.60	2,099.6	-9.6	24.2	569,546.78	711,025.92	32° 33' 50.130 N	103° 38' 54.148 W
2,200.0	1.74	89.72	2,199.6	-9.7	27.2	569,546.67	711,028.90	32° 33' 50.128 N	103° 38' 54.113 W
2,300.0	1.78	88.07	2,299.6	-9.6	30.3	569,546.73	711,031.97	32° 33' 50.129 N	103° 38' 54.078 W
2,400.0	1.82	86.43	2,399.5	-9.5	33.4	569,546.89	711,035.11	32° 33' 50.130 N	103° 38' 54.041 W
2,500.0	2.25	83.91	2,499.4	-9.2	37.0	569,547.19	711,038.64	32° 33' 50.133 N	103° 38' 54.000 W
2,600.0	2.68	81.39	2,599.3	-8.6	41.2	569,547.75	711,042.91	32° 33' 50.138 N	103° 38' 53.950 W
2,700.0	2.71	82.48	2,699.2	-8.0	45.9	569,548.41	711,047.56	32° 33' 50.144 N	103° 38' 53.895 W
2,800.0	2.75	83.58	2,799.1	-7.4	50.6	569,548.99	711,052.29	32° 33' 50.150 N	103° 38' 53.840 W
2,900.0	2.38	85.90	2,899.0	-7.0	55.1	569,549.40	711,056.74	32° 33' 50.154 N	103° 38' 53.788 W
3,000.0	2.01	88.21	2,998.9	-6.8	58.9	569,549.61	711,060.57	32° 33' 50.155 N	103° 38' 53.743 W
3,100.0	1.50	93.22	3,098.9	-6.8	62.0	569,549.59	711,063.63	32° 33' 50.155 N	103° 38' 53.707 W
3,200.0	1.00	98.24	3,198.9	-7.0	64.1	569,549.39	711,065.80	32° 33' 50.153 N	103° 38' 53.682 W
3,300.0	1.35	83.43	3,298.9	-7.0	66.2	569,549.40	711,067.83	32° 33' 50.153 N	103° 38' 53.658 W
3,400.0	1.69	68.63	3,398.8	-6.3	68.7	569,550.07	711,070.37	32° 33' 50.159 N	103° 38' 53.629 W
3,500.0	1.85	52.27	3,498.8	-4.8	71.4	569,551.60	711,073.02	32° 33' 50.174 N	103° 38' 53.598 W
3,600.0	2.02	35.91	3,598.7	-2.4	73.7	569,554.01	711,075.33	32° 33' 50.198 N	103° 38' 53.570 W
3,700.0	1.81	46.15	3,698.7	0.2	75.8	569,556.53	711,077.51	32° 33' 50.223 N	103° 38' 53.545 W
3,800.0	1.60	56.39	3,798.6	2.0	78.1	569,558.40	711,079.81	32° 33' 50.241 N	103° 38' 53.518 W
3,900.0	1.33	57.24	3,898.6	3.4	80.3	569,559.80	711,081.95	32° 33' 50.255 N	103° 38' 53.493 W
4,000.0	1.06	58.10	3,998.6	4.6	82.0	569,560.92	711,083.71	32° 33' 50.266 N	103° 38' 53.472 W
4,100.0	1.41	49.71	4,098.5	5.8	83.8	569,562.20	711,085.43	32° 33' 50.278 N	103° 38' 53.452 W
4,200.0	1.76	41.33	4,198.5	7.8	85.7	569,564.15	711,087.39	32° 33' 50.298 N	103° 38' 53.429 W
4,300.0	1.22	42.19	4,298.5	9.7	87.4	569,566.09	711,089.11	32° 33' 50.317 N	103° 38' 53.408 W
4,400.0	0.67	43.05	4,398.5	10.9	88.6	569,567.31	711,090.23	32° 33' 50.329 N	103° 38' 53.395 W
4,500.0	0.59	27.51	4,498.4	11.8	89.2	569,568.19	711,090.87	32° 33' 50.337 N	103° 38' 53.388 W
4,600.0	0.51	11.97	4,598.4	12.7	89.5	569,569.09	711,091.20	32° 33' 50.346 N	103° 38' 53.384 W
4,700.0	0.66	34.01	4,698.4	13.6	89.9	569,570.00	711,091.61	32° 33' 50.355 N	103° 38' 53.379 W
4,800.0	0.81	56.06	4,798.4	14.5	90.8	569,570.87	711,092.52	32° 33' 50.364 N	103° 38' 53.368 W
4,900.0	0.55	53.49	4,898.4	15.2	91.8	569,571.55	711,093.49	32° 33' 50.370 N	103° 38' 53.357 W
5,000.0	0.29	50.92	4,998.4	15.6	92.4	569,572.00	711,094.07	32° 33' 50.375 N	103° 38' 53.350 W
5,100.0	0.30	67.96	5,098.4	15.9	92.8	569,572.25	711,094.51	32° 33' 50.377 N	103° 38' 53.345 W
5,200.0	0.30	84.99	5,198.4	16.0	93.3	569,572.37	711,095.02	32° 33' 50.379 N	103° 38' 53.339 W
5,300.0	0.39	57.27	5,298.4	16.2	93.9	569,572.58	711,095.56	32° 33' 50.381 N	103° 38' 53.333 W
5,400.0	0.48	29.54	5,398.4	16.8	94.4	569,573.13	711,096.06	32° 33' 50.386 N	103° 38' 53.327 W
5,500.0	0.44	180.46	5,498.4	16.7	94.6	569,573.11	711,096.26	32° 33' 50.386 N	103° 38' 53.324 W
5,600.0	0.39	331.37	5,598.4	16.7	94.4	569,573.03	711,096.09	32° 33' 50.385 N	103° 38' 53.326 W
5,700.0	0.30	331.47	5,698.4	17.2	94.1	569,573.55	711,095.80	32° 33' 50.390 N	103° 38' 53.330 W
5,800.0	0.21	331.57	5,798.4	17.6	93.9	569,573.95	711,095.59	32° 33' 50.394 N	103° 38' 53.332 W
5,900.0	0.34	317.34	5,898.4	18.0	93.6	569,574.32	711,095.30	32° 33' 50.398 N	103° 38' 53.336 W
6,000.0	0.46	303.11	5,998.4	18.4	93.1	569,574.76	711,094.77	32° 33' 50.402 N	103° 38' 53.342 W
6,100.0	0.62	287.57	6,098.4	18.8	92.2	569,575.14	711,093.91	32° 33' 50.406 N	103° 38' 53.352 W
6,200.0	0.79	272.04	6,198.4	19.0	91.0	569,575.33	711,092.71	32° 33' 50.408 N	103° 38' 53.366 W
6,300.0	0.75	279.51	6,298.4	19.1	89.7	569,575.47	711,091.38	32° 33' 50.409 N	103° 38' 53.381 W
6,400.0	0.72	286.99	6,398.4	19.4	88.5	569,575.76	711,090.13	32° 33' 50.412 N	103° 38' 53.396 W



Survey Report - Geographic

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,500.0	0.70	284.84	6,498.4	19.7	87.3	569,576.10	711,088.94	32° 33' 50.416 N	103° 38' 53.410 W
6,600.0	0.68	282.68	6,598.4	20.0	86.1	569,576.38	711,087.77	32° 33' 50.419 N	103° 38' 53.423 W
6,700.0	0.55	271.33	6,698.4	20.2	85.0	569,576.53	711,086.71	32° 33' 50.420 N	103° 38' 53.436 W
6,800.0	0.41	259.97	6,798.4	20.1	84.2	569,576.47	711,085.88	32° 33' 50.420 N	103° 38' 53.445 W
6,900.0	0.31	274.90	6,898.3	20.1	83.6	569,576.43	711,085.26	32° 33' 50.419 N	103° 38' 53.453 W
7,000.0	0.20	289.82	6,998.3	20.2	83.1	569,576.52	711,084.82	32° 33' 50.420 N	103° 38' 53.458 W
7,100.0	0.31	299.06	7,098.3	20.3	82.7	569,576.71	711,084.42	32° 33' 50.422 N	103° 38' 53.462 W
7,200.0	0.41	308.29	7,198.3	20.7	82.2	569,577.06	711,083.90	32° 33' 50.426 N	103° 38' 53.468 W
7,300.0	0.48	316.85	7,298.3	21.2	81.7	569,577.59	711,083.34	32° 33' 50.431 N	103° 38' 53.475 W
7,400.0	0.54	325.41	7,398.3	21.9	81.1	569,578.28	711,082.78	32° 33' 50.438 N	103° 38' 53.482 W
7,500.0	0.44	313.76	7,498.3	22.6	80.6	569,578.94	711,082.24	32° 33' 50.444 N	103° 38' 53.488 W
7,600.0	0.33	302.12	7,598.3	23.0	80.0	569,579.35	711,081.72	32° 33' 50.448 N	103° 38' 53.494 W
7,700.0	0.35	305.46	7,698.3	23.3	79.5	569,579.68	711,081.22	32° 33' 50.452 N	103° 38' 53.500 W
7,800.0	0.37	308.81	7,798.3	23.7	79.0	569,580.06	711,080.72	32° 33' 50.456 N	103° 38' 53.505 W
7,900.0	0.30	306.44	7,898.3	24.1	78.6	569,580.42	711,080.26	32° 33' 50.459 N	103° 38' 53.511 W
8,000.0	0.23	304.07	7,998.3	24.3	78.2	569,580.69	711,079.88	32° 33' 50.462 N	103° 38' 53.515 W
8,100.0	0.28	294.42	8,098.3	24.5	77.8	569,580.90	711,079.50	32° 33' 50.464 N	103° 38' 53.520 W
8,200.0	0.33	284.77	8,198.3	24.7	77.3	569,581.08	711,078.99	32° 33' 50.466 N	103° 38' 53.526 W
8,300.0	0.27	222.90	8,298.3	24.6	76.9	569,580.98	711,078.56	32° 33' 50.465 N	103° 38' 53.531 W
8,400.0	0.21	161.03	8,398.3	24.3	76.8	569,580.63	711,078.45	32° 33' 50.461 N	103° 38' 53.532 W
8,500.0	0.21	201.32	8,498.3	23.9	76.8	569,580.29	711,078.45	32° 33' 50.458 N	103° 38' 53.532 W
8,600.0	0.21	241.61	8,598.3	23.7	76.5	569,580.03	711,078.22	32° 33' 50.455 N	103° 38' 53.535 W
8,700.0	0.73	184.56	8,698.3	22.9	76.3	569,579.31	711,078.01	32° 33' 50.448 N	103° 38' 53.537 W
8,800.0	1.24	137.51	8,798.3	21.5	77.0	569,577.88	711,078.69	32° 33' 50.434 N	103° 38' 53.529 W
8,900.0	1.29	104.54	8,898.3	20.4	78.8	569,576.79	711,080.51	32° 33' 50.423 N	103° 38' 53.508 W
9,000.0	1.33	81.58	8,998.3	20.3	81.1	569,576.68	711,082.75	32° 33' 50.422 N	103° 38' 53.482 W
9,100.0	1.60	51.54	9,098.2	21.4	83.3	569,577.72	711,084.99	32° 33' 50.432 N	103° 38' 53.456 W
9,200.0	1.86	21.50	9,198.2	23.7	85.0	569,580.10	711,086.68	32° 33' 50.455 N	103° 38' 53.436 W
9,300.0	2.20	15.01	9,298.1	27.1	86.1	569,583.46	711,087.77	32° 33' 50.489 N	103° 38' 53.423 W
9,400.0	2.54	8.51	9,398.0	31.1	86.9	569,587.51	711,088.59	32° 33' 50.529 N	103° 38' 53.413 W
9,500.0	1.94	8.54	9,498.0	35.0	87.5	569,591.37	711,089.17	32° 33' 50.567 N	103° 38' 53.406 W
9,600.0	1.34	8.57	9,597.9	37.8	87.9	569,594.20	711,089.60	32° 33' 50.595 N	103° 38' 53.401 W
9,700.0	1.24	37.73	9,697.9	39.9	88.8	569,596.22	711,090.43	32° 33' 50.615 N	103° 38' 53.391 W
9,800.0	1.13	66.89	9,797.9	41.1	90.3	569,597.46	711,092.00	32° 33' 50.627 N	103° 38' 53.372 W
9,900.0	1.04	77.41	9,897.8	41.7	92.1	569,598.04	711,093.80	32° 33' 50.633 N	103° 38' 53.351 W
10,000.0	0.95	87.93	9,997.8	41.9	93.8	569,598.27	711,095.51	32° 33' 50.635 N	103° 38' 53.331 W
10,100.0	0.82	121.04	10,097.8	41.6	95.3	569,597.93	711,096.95	32° 33' 50.631 N	103° 38' 53.314 W
10,200.0	0.69	154.14	10,197.8	40.7	96.2	569,597.02	711,097.83	32° 33' 50.622 N	103° 38' 53.304 W
10,300.0	0.93	138.45	10,297.8	39.5	97.0	569,595.87	711,098.63	32° 33' 50.611 N	103° 38' 53.295 W
10,400.0	1.17	122.76	10,397.8	38.3	98.4	569,594.71	711,100.02	32° 33' 50.599 N	103° 38' 53.279 W
10,500.0	0.93	125.32	10,497.8	37.3	99.9	569,593.69	711,101.55	32° 33' 50.589 N	103° 38' 53.261 W
10,600.0	0.68	127.89	10,597.8	36.5	101.0	569,592.86	711,102.68	32° 33' 50.581 N	103° 38' 53.248 W
Tie into OH / KOP @ 10600' MD									
10,661.0	1.80	160.40	10,658.7	35.4	101.6	569,591.73	711,103.28	32° 33' 50.570 N	103° 38' 53.241 W
10,693.0	4.90	147.10	10,690.7	33.7	102.5	569,590.11	711,104.19	32° 33' 50.553 N	103° 38' 53.230 W
10,724.0	9.70	134.50	10,721.4	30.8	105.1	569,587.17	711,106.78	32° 33' 50.524 N	103° 38' 53.200 W
10,756.0	15.30	135.10	10,752.7	25.9	110.0	569,582.28	711,111.68	32° 33' 50.476 N	103° 38' 53.144 W
10,787.0	19.90	141.90	10,782.2	18.9	116.2	569,575.23	711,117.83	32° 33' 50.405 N	103° 38' 53.072 W
10,819.0	22.30	154.20	10,812.1	9.1	122.2	569,565.47	711,123.84	32° 33' 50.308 N	103° 38' 53.003 W
10,850.0	25.40	164.80	10,840.4	-2.6	126.5	569,553.75	711,128.14	32° 33' 50.192 N	103° 38' 52.953 W
10,882.0	28.50	173.20	10,869.0	-16.8	129.2	569,539.54	711,130.85	32° 33' 50.051 N	103° 38' 52.923 W
10,914.0	30.20	179.30	10,896.9	-32.5	130.2	569,523.91	711,131.85	32° 33' 49.897 N	103° 38' 52.912 W
10,945.0	34.00	182.10	10,923.1	-48.9	130.0	569,507.44	711,131.63	32° 33' 49.734 N	103° 38' 52.916 W
10,977.0	37.80	184.70	10,949.0	-67.6	128.8	569,488.72	711,130.50	32° 33' 49.548 N	103° 38' 52.931 W
11,008.0	42.90	185.70	10,972.7	-87.6	127.0	569,468.74	711,128.67	32° 33' 49.351 N	103° 38' 52.954 W



Survey Report - Geographic

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
11,040.0	49.30	185.50	10,994.8	-110.6	124.7	569,445.80	711,126.42	32° 33' 49.124 N	103° 38' 52.982 W
11,072.0	53.70	184.60	11,014.7	-135.5	122.6	569,420.86	711,124.22	32° 33' 48.877 N	103° 38' 53.009 W
11,103.0	56.50	183.80	11,032.5	-160.9	120.7	569,395.51	711,122.37	32° 33' 48.627 N	103° 38' 53.033 W
11,135.0	59.50	181.60	11,049.4	-188.0	119.4	569,368.41	711,121.10	32° 33' 48.359 N	103° 38' 53.050 W
11,166.0	64.70	178.90	11,063.9	-215.3	119.3	569,341.02	711,120.99	32° 33' 48.088 N	103° 38' 53.053 W
11,198.0	69.30	178.60	11,076.4	-244.8	120.0	569,311.58	711,121.64	32° 33' 47.796 N	103° 38' 53.048 W
11,264.0	75.10	181.80	11,096.6	-307.6	119.7	569,248.78	711,121.39	32° 33' 47.175 N	103° 38' 53.055 W
11,296.0	77.60	181.90	11,104.2	-338.7	118.7	569,217.70	711,120.38	32° 33' 46.867 N	103° 38' 53.069 W
11,327.0	80.30	181.80	11,110.1	-369.1	117.7	569,187.29	711,119.40	32° 33' 46.567 N	103° 38' 53.083 W
11,359.0	83.10	181.90	11,114.7	-400.7	116.7	569,155.65	711,118.38	32° 33' 46.253 N	103° 38' 53.097 W
11,390.0	85.90	182.20	11,117.7	-431.5	115.6	569,124.81	711,117.28	32° 33' 45.948 N	103° 38' 53.113 W
11,422.0	88.20	182.30	11,119.3	-463.5	114.3	569,092.88	711,116.02	32° 33' 45.633 N	103° 38' 53.130 W
11,453.0	88.70	182.10	11,120.2	-494.4	113.2	569,061.92	711,114.83	32° 33' 45.326 N	103° 38' 53.146 W
EOC - 11453.0' MD, 11120.2' TVD, 88.70° INC, 182.10° AZI, 495.2' VS									
11,548.0	89.50	182.10	11,121.7	-589.4	109.7	568,966.99	711,111.35	32° 33' 44.387 N	103° 38' 53.194 W
11,643.0	88.40	182.20	11,123.4	-684.3	106.1	568,872.08	711,107.79	32° 33' 43.448 N	103° 38' 53.242 W
11,738.0	89.40	182.30	11,125.2	-779.2	102.4	568,777.17	711,104.06	32° 33' 42.509 N	103° 38' 53.293 W
11,832.0	88.40	182.70	11,127.0	-873.1	98.3	568,683.28	711,099.96	32° 33' 41.580 N	103° 38' 53.348 W
11,927.0	87.60	181.00	11,130.4	-968.0	95.2	568,588.39	711,096.89	32° 33' 40.642 N	103° 38' 53.391 W
12,022.0	87.30	179.10	11,134.6	-1,062.9	95.1	568,493.49	711,096.81	32° 33' 39.703 N	103° 38' 53.399 W
12,117.0	88.00	178.50	11,138.5	-1,157.8	97.1	568,398.59	711,098.80	32° 33' 38.764 N	103° 38' 53.383 W
12,211.0	88.00	177.60	11,141.8	-1,251.7	100.3	568,304.70	711,102.00	32° 33' 37.834 N	103° 38' 53.353 W
12,306.0	88.50	179.40	11,144.7	-1,346.6	102.8	568,209.78	711,104.48	32° 33' 36.895 N	103° 38' 53.331 W
12,401.0	88.60	179.00	11,147.1	-1,441.5	104.1	568,114.82	711,105.81	32° 33' 35.955 N	103° 38' 53.323 W
12,496.0	88.50	178.50	11,149.5	-1,536.5	106.2	568,019.88	711,107.88	32° 33' 35.016 N	103° 38' 53.305 W
12,590.0	88.70	178.50	11,151.8	-1,630.4	108.7	567,925.94	711,110.34	32° 33' 34.086 N	103° 38' 53.284 W
12,685.0	89.10	178.30	11,153.6	-1,725.4	111.3	567,830.99	711,112.99	32° 33' 33.146 N	103° 38' 53.260 W
12,780.0	89.50	178.30	11,154.8	-1,820.3	114.1	567,736.04	711,115.81	32° 33' 32.206 N	103° 38' 53.234 W
12,874.0	90.20	178.10	11,155.0	-1,914.3	117.1	567,642.09	711,118.76	32° 33' 31.277 N	103° 38' 53.207 W
12,969.0	89.40	179.90	11,155.3	-2,009.3	118.7	567,547.11	711,120.42	32° 33' 30.337 N	103° 38' 53.195 W
13,064.0	89.80	179.60	11,156.0	-2,104.3	119.2	567,452.11	711,120.83	32° 33' 29.397 N	103° 38' 53.197 W
13,159.0	88.80	180.50	11,157.2	-2,199.2	119.1	567,357.12	711,120.75	32° 33' 28.457 N	103° 38' 53.205 W
13,253.0	89.10	180.30	11,158.9	-2,293.2	118.4	567,263.14	711,120.10	32° 33' 27.527 N	103° 38' 53.220 W
13,348.0	89.30	181.20	11,160.2	-2,388.2	117.2	567,168.16	711,118.85	32° 33' 26.587 N	103° 38' 53.241 W
13,443.0	90.00	181.00	11,160.8	-2,483.2	115.4	567,073.18	711,117.03	32° 33' 25.647 N	103° 38' 53.270 W
13,538.0	90.00	182.50	11,160.8	-2,578.1	112.5	566,978.22	711,114.13	32° 33' 24.708 N	103° 38' 53.311 W
13,632.0	90.80	182.60	11,160.1	-2,672.0	108.3	566,884.32	711,109.95	32° 33' 23.779 N	103° 38' 53.367 W
13,727.0	89.10	182.60	11,160.2	-2,766.9	104.0	566,789.42	711,105.64	32° 33' 22.840 N	103° 38' 53.424 W
13,822.0	89.80	182.80	11,161.1	-2,861.8	99.5	566,694.53	711,101.16	32° 33' 21.901 N	103° 38' 53.484 W
13,917.0	89.10	182.60	11,162.0	-2,956.7	95.0	566,599.64	711,096.69	32° 33' 20.963 N	103° 38' 53.543 W
14,011.0	86.70	182.80	11,165.5	-3,050.5	90.6	566,505.82	711,092.26	32° 33' 20.035 N	103° 38' 53.602 W
14,106.0	87.20	182.60	11,170.5	-3,145.3	86.1	566,411.06	711,087.79	32° 33' 19.097 N	103° 38' 53.661 W
14,201.0	88.00	182.60	11,174.5	-3,240.1	81.8	566,316.24	711,083.49	32° 33' 18.159 N	103° 38' 53.719 W
14,296.0	86.90	182.80	11,178.7	-3,334.9	77.3	566,221.44	711,079.02	32° 33' 17.222 N	103° 38' 53.778 W
14,391.0	87.40	182.50	11,183.5	-3,429.7	73.0	566,126.66	711,074.63	32° 33' 16.284 N	103° 38' 53.836 W
14,485.0	88.20	182.40	11,187.1	-3,523.5	68.9	566,032.82	711,070.61	32° 33' 15.356 N	103° 38' 53.890 W
14,580.0	88.60	182.50	11,189.7	-3,618.4	64.9	565,937.94	711,066.55	32° 33' 14.417 N	103° 38' 53.945 W
14,675.0	88.80	181.94	11,191.9	-3,713.3	61.2	565,843.04	711,062.88	32° 33' 13.478 N	103° 38' 53.995 W
14,770.0	89.10	181.60	11,193.6	-3,808.3	58.3	565,748.10	711,059.94	32° 33' 12.539 N	103° 38' 54.036 W
14,930.0	89.10	181.60	11,196.1	-3,968.2	53.8	565,588.18	711,055.48	32° 33' 10.957 N	103° 38' 54.101 W

BHL - 14930.0' MD, 11196.1' TVD, 89.10° INC, 181.60° AZI, -3968.2' N, 53.8' E, 3968.5' VS



Survey Report - Geographic

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,600.0	10,597.8	36.5	101.0	Tie into OH / KOP @ 10600' MD
11,453.0	11,120.2	-494.4	113.2	EOC - 11453.0' MD, 11120.2' TVD, 88.70° INC, 182.10° AZI, 495.2' VS
14,930.0	11,196.1	-3,968.2	53.8	BHL - 14930.0' MD, 11196.1' TVD, 89.10° INC, 181.60° AZI, -3968.2' N, 53.8' E,

Checked By: _____ Approved By: _____ Date: _____



ROCA Production, INC

Lea County, NM

Outlaw 22 Federal Com

#1H

ST1

SUR: B-22-20s-33e, 660/N & 1980/E

BHL: O-22-20s-33e, 4628/N & 1926/E

API # 30-025-40725

Design: ST1

Standard Survey Report

08 October, 2012



Survey Report

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

Project: Lea County, NM

Map System: US State Plane 1927 (Exact solution)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site: Outlaw 22 Federal Com

Site Position: Northing: 569,556.36 usft Latitude: 32° 33' 50.226 N
From: Map Easting: 711,001.67 usft Longitude: 103° 38' 54.431 W
Position Uncertainty: 0.0 usft Slot Radius: 13-3/16 " Grid Convergence: 0.37 °

Well: #1H

Well Position: +N/-S 0.0 usft Northing: 569,556.36 usft Latitude: 32° 33' 50.226 N
+E/-W 0.0 usft Easting: 711,001.67 usft Longitude: 103° 38' 54.431 W
Position Uncertainty: 0.0 usft Wellhead Elevation: usft Ground Level: 3,588.0 usft

Wellbore: ST1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	9/29/2012	7.48	60.48	48,723

Design: ST1

Audit Notes:

Version: 1.0 Phase: ACTUAL Tie On Depth: 10,600.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	179.62

Survey Program: Date 10/8/2012

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,600.0	Gyro1 (Pilot)	CB-GYRO-MS	Camera based gyro multishot
10,661.0	14,770.0	MWD2 (ST1) (ST1)	MWD	MWD - Standard
14,930.0	14,930.0	PTB (ST1)	MWD	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	0.15	294.08	100.0	0.1	-0.1	-0.1	0.15	0.15	0.00
200.0	0.30	228.17	200.0	-0.1	-0.4	0.1	0.28	0.15	-65.91
300.0	0.27	229.55	300.0	-0.4	-0.8	0.4	0.03	-0.03	1.38
400.0	0.24	230.92	400.0	-0.7	-1.2	0.7	0.03	-0.03	1.37
500.0	0.24	235.33	500.0	-0.9	-1.5	0.9	0.02	0.00	4.41
600.0	0.23	239.74	600.0	-1.2	-1.8	1.1	0.02	-0.01	4.41
700.0	0.21	196.73	700.0	-1.4	-2.1	1.4	0.16	-0.02	-43.01
800.0	0.20	153.72	800.0	-1.8	-2.0	1.7	0.15	-0.01	-43.01



Survey Report

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

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)
900.0	0.46	131.65	900.0	-2.2	-1.7	2.2	0.28	0.26	-22.07
1,000.0	0.73	109.57	1,000.0	-2.7	-0.8	2.7	0.35	0.27	-22.08
1,100.0	1.06	124.38	1,100.0	-3.4	0.6	3.4	0.40	0.33	14.81
1,200.0	1.40	139.18	1,200.0	-4.8	2.2	4.9	0.46	0.34	14.80
1,300.0	1.07	121.39	1,299.9	-6.3	3.8	6.3	0.50	-0.33	-17.79
1,400.0	0.74	103.60	1,399.9	-6.9	5.2	6.9	0.43	-0.33	-17.79
1,500.0	1.20	98.27	1,499.9	-7.2	6.9	7.2	0.47	0.46	-5.33
1,600.0	1.66	92.94	1,599.9	-7.4	9.3	7.5	0.48	0.46	-5.33
1,700.0	1.76	96.83	1,699.8	-7.7	12.3	7.8	0.15	0.10	3.89
1,800.0	1.85	100.73	1,799.8	-8.2	15.4	8.3	0.15	0.09	3.90
1,900.0	1.74	100.10	1,899.7	-8.7	18.5	8.9	0.11	-0.11	-0.63
2,000.0	1.62	99.48	1,999.7	-9.2	21.4	9.4	0.12	-0.12	-0.62
2,100.0	1.68	94.60	2,099.6	-9.6	24.2	9.7	0.15	0.06	-4.88
2,200.0	1.74	89.72	2,199.6	-9.7	27.2	9.9	0.16	0.06	-4.88
2,300.0	1.78	88.07	2,299.6	-9.6	30.3	9.8	0.06	0.04	-1.65
2,400.0	1.82	86.43	2,399.5	-9.5	33.4	9.7	0.07	0.04	-1.64
2,500.0	2.25	83.91	2,499.4	-9.2	37.0	9.4	0.44	0.43	-2.52
2,600.0	2.68	81.39	2,599.3	-8.6	41.2	8.9	0.44	0.43	-2.52
2,700.0	2.71	82.48	2,699.2	-8.0	45.9	8.3	0.06	0.03	1.09
2,800.0	2.75	83.58	2,799.1	-7.4	50.6	7.7	0.07	0.04	1.10
2,900.0	2.38	85.90	2,899.0	-7.0	55.1	7.3	0.38	-0.37	2.32
3,000.0	2.01	88.21	2,998.9	-6.8	58.9	7.1	0.38	-0.37	2.31
3,100.0	1.50	93.22	3,098.9	-6.8	62.0	7.2	0.53	-0.51	5.01
3,200.0	1.00	98.24	3,198.9	-7.0	64.1	7.4	0.51	-0.50	5.02
3,300.0	1.35	83.43	3,298.9	-7.0	66.2	7.4	0.46	0.35	-14.81
3,400.0	1.69	68.63	3,398.8	-6.3	68.7	6.7	0.52	0.34	-14.80
3,500.0	1.85	52.27	3,498.8	-4.8	71.4	5.2	0.53	0.16	-16.36
3,600.0	2.02	35.91	3,598.7	-2.4	73.7	2.8	0.58	0.17	-16.36
3,700.0	1.81	46.15	3,698.7	0.2	75.8	0.3	0.40	-0.21	10.24
3,800.0	1.60	56.39	3,798.6	2.0	78.1	-1.5	0.37	-0.21	10.24
3,900.0	1.33	57.24	3,898.6	3.4	80.3	-2.9	0.27	-0.27	0.85
4,000.0	1.06	58.10	3,998.6	4.6	82.0	-4.0	0.27	-0.27	0.86
4,100.0	1.41	49.71	4,098.5	5.8	83.8	-5.3	0.39	0.35	-8.39
4,200.0	1.76	41.33	4,198.5	7.8	85.7	-7.2	0.42	0.35	-8.38
4,300.0	1.22	42.19	4,298.5	9.7	87.4	-9.2	0.54	-0.54	0.86
4,400.0	0.67	43.05	4,398.5	10.9	88.6	-10.4	0.55	-0.55	0.86
4,500.0	0.59	27.51	4,498.4	11.8	89.2	-11.2	0.19	-0.08	-15.54
4,600.0	0.51	11.97	4,598.4	12.7	89.5	-12.1	0.17	-0.08	-15.54
4,700.0	0.66	34.01	4,698.4	13.6	89.9	-13.0	0.27	0.15	22.04
4,800.0	0.81	56.06	4,798.4	14.5	90.8	-13.9	0.32	0.15	22.05
4,900.0	0.55	53.49	4,898.4	15.2	91.8	-14.6	0.26	-0.26	-2.57
5,000.0	0.29	50.92	4,998.4	15.6	92.4	-15.0	0.26	-0.26	-2.57
5,100.0	0.30	67.96	5,098.4	15.9	92.8	-15.3	0.09	0.01	17.04



Survey Report

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

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)
5,200.0	0.30	84.99	5,198.4	16.0	93.3	-15.4	0.09	0.00	17.03
5,300.0	0.39	57.27	5,298.4	16.2	93.9	-15.6	0.19	0.09	-27.72
5,400.0	0.48	29.54	5,398.4	16.8	94.4	-16.1	0.23	0.09	-27.73
5,500.0	0.44	180.46	5,498.4	16.7	94.6	-16.1	0.89	-0.04	150.92
5,600.0	0.39	331.37	5,598.4	16.7	94.4	-16.0	0.80	-0.05	150.91
5,700.0	0.30	331.47	5,698.4	17.2	94.1	-16.6	0.09	-0.09	0.10
5,800.0	0.21	331.57	5,798.4	17.6	93.9	-17.0	0.09	-0.09	0.10
5,900.0	0.34	317.34	5,898.4	18.0	93.6	-17.3	0.15	0.13	-14.23
6,000.0	0.46	303.11	5,998.4	18.4	93.1	-17.8	0.15	0.12	-14.23
6,100.0	0.62	287.57	6,098.4	18.8	92.2	-18.2	0.22	0.16	-15.54
6,200.0	0.79	272.04	6,198.4	19.0	91.0	-18.4	0.25	0.17	-15.53
6,300.0	0.75	279.51	6,298.4	19.1	89.7	-18.5	0.11	-0.04	7.47
6,400.0	0.72	286.99	6,398.4	19.4	88.5	-18.8	0.10	-0.03	7.48
6,500.0	0.70	284.84	6,498.4	19.7	87.3	-19.2	0.03	-0.02	-2.15
6,600.0	0.68	282.68	6,598.4	20.0	86.1	-19.4	0.03	-0.02	-2.16
6,700.0	0.55	271.33	6,698.4	20.2	85.0	-19.6	0.18	-0.13	-11.35
6,800.0	0.41	259.97	6,798.4	20.1	84.2	-19.6	0.17	-0.14	-11.36
6,900.0	0.31	274.90	6,898.3	20.1	83.6	-19.5	0.14	-0.10	14.93
7,000.0	0.20	289.82	6,998.3	20.2	83.1	-19.6	0.13	-0.11	14.92
7,100.0	0.31	299.06	7,098.3	20.3	82.7	-19.8	0.12	0.11	9.24
7,200.0	0.41	308.29	7,198.3	20.7	82.2	-20.2	0.12	0.10	9.23
7,300.0	0.48	316.85	7,298.3	21.2	81.7	-20.7	0.10	0.07	8.56
7,400.0	0.54	325.41	7,398.3	21.9	81.1	-21.4	0.10	0.06	8.56
7,500.0	0.44	313.76	7,498.3	22.6	80.6	-22.0	0.14	-0.10	-11.65
7,600.0	0.33	302.12	7,598.3	23.0	80.0	-22.5	0.13	-0.11	-11.64
7,700.0	0.35	305.46	7,698.3	23.3	79.5	-22.8	0.03	0.02	3.34
7,800.0	0.37	308.81	7,798.3	23.7	79.0	-23.2	0.03	0.02	3.35
7,900.0	0.30	306.44	7,898.3	24.1	78.6	-23.5	0.07	-0.07	-2.37
8,000.0	0.23	304.07	7,998.3	24.3	78.2	-23.8	0.07	-0.07	-2.37
8,100.0	0.28	294.42	8,098.3	24.5	77.8	-24.0	0.07	0.05	-9.65
8,200.0	0.33	284.77	8,198.3	24.7	77.3	-24.2	0.07	0.05	-9.65
8,300.0	0.27	222.90	8,298.3	24.6	76.9	-24.1	0.31	-0.06	-61.87
8,400.0	0.21	161.03	8,398.3	24.3	76.8	-23.8	0.25	-0.06	-61.87
8,500.0	0.21	201.32	8,498.3	23.9	76.8	-23.4	0.14	0.00	40.29
8,600.0	0.21	241.61	8,598.3	23.7	76.5	-23.2	0.14	0.00	40.29
8,700.0	0.73	184.56	8,698.3	22.9	76.3	-22.4	0.64	0.52	-57.05
8,800.0	1.24	137.51	8,798.3	21.5	77.0	-21.0	0.91	0.51	-47.05
8,900.0	1.29	104.54	8,898.3	20.4	78.8	-19.9	0.72	0.05	-32.97
9,000.0	1.33	81.58	8,998.3	20.3	81.1	-19.8	0.52	0.04	-22.96
9,100.0	1.60	51.54	9,098.2	21.4	83.3	-20.8	0.80	0.27	-30.04
9,200.0	1.86	21.50	9,198.2	23.7	85.0	-23.2	0.93	0.26	-30.04
9,300.0	2.20	15.01	9,298.1	27.1	86.1	-26.5	0.41	0.34	-6.49
9,400.0	2.54	8.51	9,398.0	31.1	86.9	-30.6	0.43	0.34	-6.50



Survey Report

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

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)
9,500.0	1.94	8.54	9,498.0	35.0	87.5	-34.4	0.60	-0.60	0.03
9,600.0	1.34	8.57	9,597.9	37.8	87.9	-37.3	0.60	-0.60	0.03
9,700.0	1.24	37.73	9,697.9	39.9	88.8	-39.3	0.66	-0.10	29.16
9,800.0	1.13	66.89	9,797.9	41.1	90.3	-40.5	0.61	-0.11	29.16
9,900.0	1.04	77.41	9,897.8	41.7	92.1	-41.1	0.22	-0.09	10.52
10,000.0	0.95	87.93	9,997.8	41.9	93.8	-41.3	0.20	-0.09	10.52
10,100.0	0.82	121.04	10,097.8	41.6	95.3	-40.9	0.52	-0.13	33.11
10,200.0	0.69	154.14	10,197.8	40.7	96.2	-40.0	0.45	-0.13	33.10
10,300.0	0.93	138.45	10,297.8	39.5	97.0	-38.9	0.32	0.24	-15.69
10,400.0	1.17	122.76	10,397.8	38.3	98.4	-37.7	0.37	0.24	-15.69
10,500.0	0.93	125.32	10,497.8	37.3	99.9	-36.7	0.24	-0.24	2.56
10,600.0	0.68	127.89	10,597.8	36.5	101.0	-35.8	0.25	-0.25	2.57
Tie into OH / KOP @ 10600' MD									
10,661.0	1.80	160.40	10,658.7	35.4	101.6	-34.7	2.10	1.84	53.30
10,693.0	4.90	147.10	10,690.7	33.7	102.5	-33.1	9.92	9.69	-41.56
10,724.0	9.70	134.50	10,721.4	30.8	105.1	-30.1	16.23	15.48	-40.65
10,756.0	15.30	135.10	10,752.7	25.9	110.0	-25.2	17.50	17.50	1.88
10,787.0	19.90	141.90	10,782.2	18.9	116.2	-18.1	16.23	14.84	21.94
10,819.0	22.30	154.20	10,812.1	9.1	122.2	-8.3	15.70	7.50	38.44
10,850.0	25.40	164.80	10,840.4	-2.6	126.5	3.5	17.03	10.00	34.19
10,882.0	28.50	173.20	10,869.0	-16.8	129.2	17.7	15.32	9.69	26.25
10,914.0	30.20	179.30	10,896.9	-32.5	130.2	33.3	10.74	5.31	19.06
10,945.0	34.00	182.10	10,923.1	-48.9	130.0	49.8	13.16	12.26	9.03
10,977.0	37.80	184.70	10,949.0	-67.6	128.8	68.5	12.79	11.88	8.13
11,008.0	42.90	185.70	10,972.7	-87.6	127.0	88.5	16.58	16.45	3.23
11,040.0	49.30	185.50	10,994.8	-110.6	124.7	111.4	20.01	20.00	-0.63
11,072.0	53.70	184.60	11,014.7	-135.5	122.6	136.3	13.92	13.75	-2.81
11,103.0	56.50	183.80	11,032.5	-160.9	120.7	161.7	9.28	9.03	-2.58
11,135.0	59.50	181.60	11,049.4	-188.0	119.4	188.7	11.04	9.38	-6.88
11,166.0	64.70	178.90	11,063.9	-215.3	119.3	216.1	18.45	16.77	-8.71
11,198.0	69.30	178.60	11,076.4	-244.8	120.0	245.6	14.40	14.38	-0.94
11,264.0	75.10	181.80	11,096.6	-307.6	119.7	308.4	9.93	8.79	4.85
11,296.0	77.60	181.90	11,104.2	-338.7	118.7	339.4	7.82	7.81	0.31
11,327.0	80.30	181.80	11,110.1	-369.1	117.7	369.8	8.72	8.71	-0.32
11,359.0	83.10	181.90	11,114.7	-400.7	116.7	401.5	8.76	8.75	0.31
11,390.0	85.90	182.20	11,117.7	-431.5	115.6	432.3	9.08	9.03	0.97
11,422.0	88.20	182.30	11,119.3	-463.5	114.3	464.2	7.19	7.19	0.31
11,453.0	88.70	182.10	11,120.2	-494.4	113.2	495.2	1.74	1.61	-0.65
EOC - 11453.0' MD, 11120.2' TVD, 88.70° INC, 182.10° AZI, 495.2' VS									
11,548.0	89.50	182.10	11,121.7	-589.4	109.7	590.1	0.84	0.84	0.00
11,643.0	88.40	182.20	11,123.4	-684.3	106.1	685.0	1.16	-1.16	0.11
11,738.0	89.40	182.30	11,125.2	-779.2	102.4	779.9	1.06	1.05	0.11
11,832.0	88.40	182.70	11,127.0	-873.1	98.3	873.7	1.15	-1.06	0.43
11,927.0	87.60	181.00	11,130.4	-968.0	95.2	968.6	1.98	-0.84	-1.79



Survey Report

Company: ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: ST1
Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: Houston R5000 Database

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)
12,022.0	87.30	179.10	11,134.6	-1,062.9	95.1	1,063.5	2.02	-0.32	-2.00
12,117.0	88.00	178.50	11,138.5	-1,157.8	97.1	1,158.4	0.97	0.74	-0.63
12,211.0	88.00	177.60	11,141.8	-1,251.7	100.3	1,252.3	0.96	0.00	-0.96
12,306.0	88.50	179.40	11,144.7	-1,346.6	102.8	1,347.2	1.97	0.53	1.89
12,401.0	88.60	179.00	11,147.1	-1,441.5	104.1	1,442.2	0.43	0.11	-0.42
12,496.0	88.50	178.50	11,149.5	-1,536.5	106.2	1,537.2	0.54	-0.11	-0.53
12,590.0	88.70	178.50	11,151.8	-1,630.4	108.7	1,631.1	0.21	0.21	0.00
12,685.0	89.10	178.30	11,153.6	-1,725.4	111.3	1,726.1	0.47	0.42	-0.21
12,780.0	89.50	178.30	11,154.8	-1,820.3	114.1	1,821.0	0.42	0.42	0.00
12,874.0	90.20	178.10	11,155.0	-1,914.3	117.1	1,915.0	0.77	0.74	-0.21
12,969.0	89.40	179.90	11,155.3	-2,009.3	118.7	2,010.0	2.07	-0.84	1.89
13,064.0	89.80	179.60	11,156.0	-2,104.3	119.2	2,105.0	0.53	0.42	-0.32
13,159.0	88.80	180.50	11,157.2	-2,199.2	119.1	2,200.0	1.42	-1.05	0.95
13,253.0	89.10	180.30	11,158.9	-2,293.2	118.4	2,294.0	0.38	0.32	-0.21
13,348.0	89.30	181.20	11,160.2	-2,388.2	117.2	2,388.9	0.97	0.21	0.95
13,443.0	90.00	181.00	11,160.8	-2,483.2	115.4	2,483.9	0.77	0.74	-0.21
13,538.0	90.00	182.50	11,160.8	-2,578.1	112.5	2,578.8	1.58	0.00	1.58
13,632.0	90.80	182.60	11,160.1	-2,672.0	108.3	2,672.7	0.86	0.85	0.11
13,727.0	89.10	182.60	11,160.2	-2,766.9	104.0	2,767.6	1.79	-1.79	0.00
13,822.0	89.80	182.80	11,161.1	-2,861.8	99.5	2,862.4	0.77	0.74	0.21
13,917.0	89.10	182.60	11,162.0	-2,956.7	95.0	2,957.3	0.77	-0.74	-0.21
14,011.0	86.70	182.80	11,165.5	-3,050.5	90.6	3,051.1	2.56	-2.55	0.21
14,106.0	87.20	182.60	11,170.5	-3,145.3	86.1	3,145.8	0.57	0.53	-0.21
14,201.0	88.00	182.60	11,174.5	-3,240.1	81.8	3,240.6	0.84	0.84	0.00
14,296.0	86.90	182.80	11,178.7	-3,334.9	77.3	3,335.4	1.18	-1.16	0.21
14,391.0	87.40	182.50	11,183.5	-3,429.7	73.0	3,430.1	0.61	0.53	-0.32
14,485.0	88.20	182.40	11,187.1	-3,523.5	68.9	3,523.9	0.86	0.85	-0.11
14,580.0	88.60	182.50	11,189.7	-3,618.4	64.9	3,618.8	0.43	0.42	0.11
14,675.0	88.80	181.94	11,191.9	-3,713.3	61.2	3,713.7	0.63	0.21	-0.59
14,770.0	89.10	181.60	11,193.6	-3,808.3	58.3	3,808.6	0.48	0.32	-0.36
14,930.0	89.10	181.60	11,196.1	-3,968.2	53.8	3,968.5	0.00	0.00	0.00

BHL - 14930.0' MD, 11196.1' TVD, 89.10° INC, 181.60° AZI, -3968.2' N, 53.8' E, 3968.5' VS

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
10,600.0	10,597.8	36.5	101.0	Tie into OH / KOP @ 10600' MD
11,453.0	11,120.2	-494.4	113.2	EOC - 11453.0' MD, 11120.2' TVD, 88.70° INC, 182.10° AZI, 495.2' VS
14,930.0	11,196.1	-3,968.2	53.8	BHL - 14930.0' MD, 11196.1' TVD, 89.10° INC, 181.60° AZI, -3968.2' N, 53.8' E,

Checked By: _____

Approved By: _____

Date: _____



Anticollision Report

Company: ROCA Production, INC
Project: Lea County, NM
Reference Site: Outlaw 22 Federal Com
Site Error: 0.0 usft
Reference Well: #1H
Well Error: 0.0 usft
Reference Wellbore: ST1
Reference Design: ST1

Local Co-ordinate Reference: Site Outlaw 22 Federal Com
TVD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
MD Reference: WELL @ 3608.5usft (Union #216 - 20.5' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Houston R5000 Database
Offset TVD Reference: Offset Datum

Reference ST1

Filter type: NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method: Stations
Depth Range: Unlimited
Results Limited by: Maximum separation factor of 20.00
Warning Levels Evaluated at: 2.00 Sigma
Error Model: ISCWSA
Scan Method: Closest Approach 3D
Error Surface: Elliptical Conic
Casing Method: Not applied

Survey Program Date 10/8/2012

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,600.0	Gyro1 (Pilot)	CB-GYRO-MS	Camera based gyro multishot
10,661.0	14,770.0	MWD2 (ST1) (ST1)	MWD	MWD - Standard
14,915.0	14,915.0	PTB (ST1)	MWD	MWD - Standard

Summary

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Outlaw 22 Federal Com						
#1H - OH - OH	10,500.0	10,500.0	0.0	0.0	0.000	Level 1, CC, SF
#1H - OH - OH	10,667.9	10,667.9	1.0	-0.8	0.575	Level 1, ES

Offset Design Outlaw 22 Federal Com - #1H - OH - OH

Survey Program: 100-CB-GYRO-MS, 10664-MWD

Reference	Offset	Semi Major Axis	Distance	Minimum Separation	Separation Factor	Warning						
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)		
10,500.0	10,497.8	10,500.0	10,497.8	0.0	0.0	0.00	37.3	99.9	0.0	0.0	0.00	0.000 Level 1, CC, SF
10,560.8	10,558.6	10,560.8	10,558.6	0.5	0.3	48.36	36.5	100.6	0.3	-0.5	0.80	0.316 Level 1
10,600.0	10,597.8	10,600.0	10,597.7	0.9	0.4	47.15	35.8	101.1	0.7	-0.6	1.32	0.519 Level 1
10,661.0	10,658.7	10,661.0	10,658.7	1.2	0.7	17.13	34.3	101.7	1.1	-0.8	1.80	0.583 Level 1
10,667.9	10,665.7	10,667.9	10,665.6	1.2	0.7	24.57	34.1	101.7	1.0	-0.8	1.79	0.575 Level 1, ES
10,693.0	10,690.7	10,692.9	10,690.5	1.2	0.7	42.00	32.3	102.3	1.5	-0.2	1.70	0.871 Level 1
10,724.0	10,721.4	10,723.7	10,721.1	1.2	0.7	78.28	28.2	103.4	3.1	1.4	1.76	1.769
10,756.0	10,752.7	10,755.3	10,752.2	1.2	0.7	105.30	22.9	104.3	6.5	4.5	2.06	3.165
10,787.0	10,782.2	10,785.4	10,781.8	1.2	0.7	118.95	17.4	104.4	11.9	9.7	2.19	5.432
10,819.0	10,812.1	10,816.2	10,812.0	1.2	0.7	121.75	11.7	103.8	18.6	16.5	2.12	8.762
10,850.0	10,840.4	10,845.9	10,841.0	1.2	0.7	120.87	5.1	102.5	25.2	23.2	2.03	12.421
10,882.0	10,869.0	10,877.3	10,870.9	1.2	0.7	118.90	-4.1	100.2	31.8	29.8	1.94	16.358
10,914.0	10,896.9	10,910.1	10,901.1	1.2	0.7	116.59	-16.4	97.3	36.8	35.0	1.86	19.783

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

ROCA Production, INC
Project: Lea County, NM
Site: Outlaw 22 Federal Com
Well: #1H
Wellbore: OH
Plan: Plan #2 (#1H/OH)

ROCA Production, INC



Azimuths to Grid North
True North: -0.37°
Magnetic North: 7.13°

Magnetic Field
Strength: 48738.0snT
Dip Angle: 60.49°
Date: 8/3/2012
Model: IGRF200510

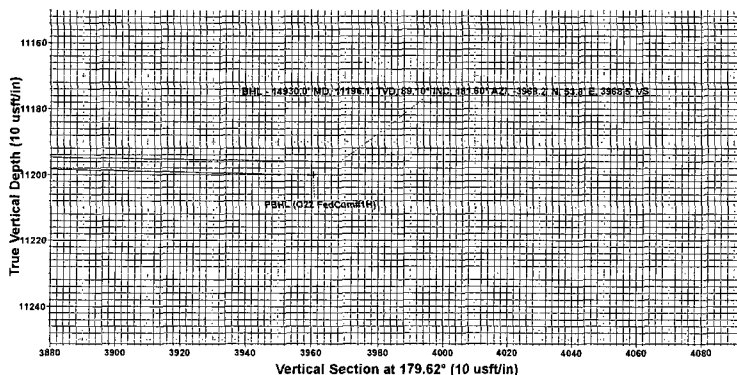
WELL DETAILS: #1H

Ground Elevation: 3588.0
RKB Elevation: WELL @ 3608.5usft (Union #216 - 20.5' KB)
Rig Name: Union #216 - 20.5' KB

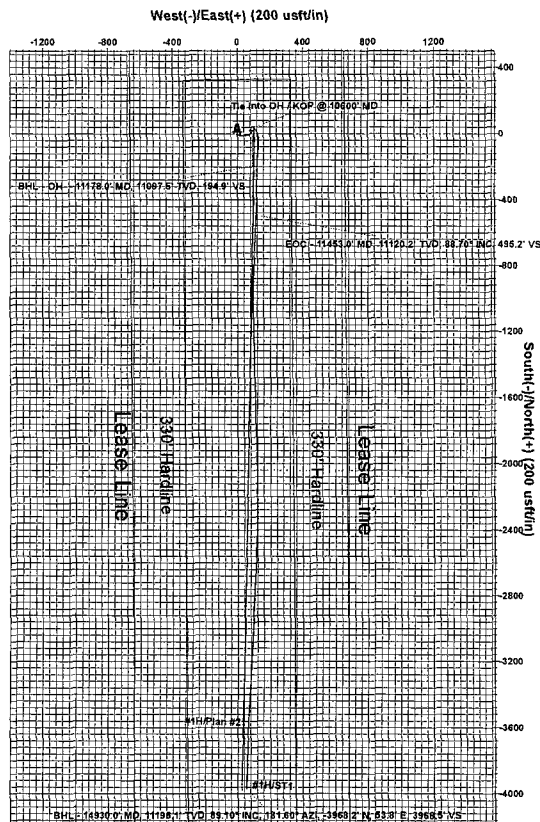
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	569556.36	711001.68	32° 33' 50.226 N	103° 38' 54.431 W

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	Target
10646.0	0.60	105.22	10643.8	36.3	101.5	0.00	0.00	-35.6	
11384.2	88.70	181.15	11120.0	-430.5	96.8	12.00	75.95	431.1	
14915.8	88.70	181.15	11200.1	-3960.5	26.0	0.00	0.00	3960.6	PBHL (O22 FedCom#1H)



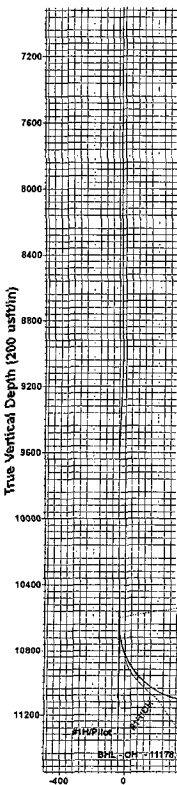
Vertical Section at 179.62° (10 usft/in)



WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (O22 FedCom#1H)	11200.0	-3960.5	26.1	565595.87	711027.78	Point

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
Local North: Grid



Tie into OH / KOP @ 10600' MD

EOC - 11453.0' MD, 11120.2' TVD, 88.70' INC, 182.10' AZI, 495.2' VS

BHL - 14930.0' MD, 11196.1' TVD, 89.10' INC, 181.80' AZI, 3968.2' N, 53.8' E, 3968.6' VS

PBHL (O22 FedCom#1H)

Vertical Section at 179.62° (200 usft/in)



Crescent Directional Drilling
7715 West Industrial Ave. Midland, Tx 79706
Phone: 432-618-1135

Plan: Plan #2 (#1H/OH)
Created By: Math Higgins Date: 10/09, October 08 2012