



COG Operating LLC

Eddy County, New Mexico (NAD 27 NME)

Bradley 8 Fee

#1H

OH / Job #1310555

30-015-41162

Survey: Phoenix MWD Survey

Phoenix Final Survey Report

21 May, 2013





Phoenix Technology Services

Phoenix Final Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	KB @ 3390.00usft (JW 4)
Site:	Bradley 8 Fee	MD Reference:	KB @ 3390.00usft (JW 4)
Well:	#1H	North Reference:	Grid
Wellbore:	OH / Job #1310555	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (JW 4)	Database:	GCR DB

Project:	Eddy County, New Mexico (NAD 27 NME)		
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:	Bradley 8 Fee		
Site Position:		Northing:	606,797.50 usft
From:	Map	Easting:	478,847.80 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Grid Convergence:	-0.04 °

Well:	#1H		
Well Position	+N-S	0.00 usft	Latitude: 32° 40' 5.404816 N
	+E-W	0.00 usft	Longitude: 104° 24' 7.453861 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Ground Level:	3,377.00 usft

Wellbore:	OH / Job #1310555		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010_14	05/15/13	7.77
			Dip Angle
			60.41
			Field Strength
			48,599

Design:	Surveys (JW 4)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			359.71

Survey Program	Date 05/21/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name
100.00	2,340.00	VES Gyro (OH / Job #1310555)	VES-ISCWSA-GYRO-3
2,428.00	7,526.00	Phoenix MWD Survey (OH / Job #1310555)	MWD
			Description
			Biaxial Semi-Cont. Gyro
			MWD - Standard

Survey	MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
	2,340.00	0.97	252.67	2,339.82	21.35	-7.12	21.38	0.00
Tie-on to VES Gyro	2,428.00	0.70	257.10	2,427.82	21.00	-8.36	21.05	0.32
First Phoenix MWD Survey	2,459.00	1.60	355.30	2,458.81	21.39	-8.58	21.44	5.92
	2,490.00	7.00	13.20	2,489.71	23.66	-8.18	23.71	17.74
	2,522.00	12.40	13.00	2,521.24	28.91	-6.96	28.95	16.88
	2,553.00	17.60	12.40	2,551.16	36.79	-5.20	36.82	17.43
	2,584.00	21.90	12.10	2,580.31	47.08	-2.97	47.09	13.23
	2,615.00	24.80	9.40	2,608.77	59.15	-0.69	59.15	9.97
	2,646.00	27.90	6.80	2,636.55	72.77	1.23	72.76	10.67



Phoenix Technology Services

Phoenix Final Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, New Mexico (NAD 27-NME)	TVD Reference:	KB @ 3390.00usft (JW 4)
Site:	Bradley 8 Fee	MD Reference:	KB @ 3390.00usft (JW 4)
Well:	#1H	North Reference:	Grid
Wellbore:	OH // Job #1310555	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (JW 4)	Database:	GCR DB

Survey								
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (%/100usft)	
2,678.00	31.10	7.20	2,664.40	88.40	3.15	88.39	10.02	
2,709.00	33.90	7.80	2,690.54	104.92	5.33	104.89	9.09	
2,740.00	36.00	7.90	2,715.95	122.51	7.76	122.47	6.78	
2,771.00	38.30	8.10	2,740.65	141.04	10.36	140.99	7.43	
2,802.00	40.70	9.20	2,764.57	160.54	13.33	160.47	8.06	
2,834.00	43.20	9.30	2,788.37	181.65	16.77	181.56	7.82	
2,865.00	45.40	8.40	2,810.56	203.04	20.10	202.93	7.38	
2,896.00	47.00	6.90	2,832.01	225.21	23.07	225.09	6.23	
2,927.00	48.30	5.10	2,852.90	248.00	25.46	247.86	6.00	
2,958.00	50.50	3.80	2,873.07	271.46	27.28	271.32	7.78	
2,989.00	53.70	2.50	2,892.11	295.88	28.62	295.73	10.84	
3,021.00	56.60	1.80	2,910.39	322.12	29.60	321.97	9.24	
3,052.00	59.70	1.80	2,926.75	348.44	30.43	348.28	10.00	
3,083.00	62.60	0.20	2,941.71	375.58	30.90	375.42	10.39	
3,114.00	66.30	358.70	2,955.08	403.54	30.63	403.38	12.71	
3,145.00	69.10	357.80	2,966.84	432.21	29.75	432.05	9.42	
3,177.00	72.60	357.40	2,977.34	462.40	28.48	462.25	11.00	
3,208.00	75.60	357.90	2,985.83	492.19	27.26	492.05	9.80	
3,239.00	78.90	358.70	2,992.67	522.41	26.36	522.27	10.94	
3,270.00	82.80	359.30	2,997.60	553.00	25.83	552.86	12.72	
3,301.00	86.90	359.30	3,000.38	583.87	25.45	583.73	13.23	
3,332.00	89.00	359.80	3,001.49	614.85	25.21	614.71	6.96	
3,364.00	88.90	359.80	3,002.07	646.84	25.10	646.71	0.31	
3,457.00	90.80	1.00	3,002.32	739.83	25.75	739.69	2.42	
3,550.00	90.90	1.30	3,000.94	832.80	27.61	832.65	0.34	
3,644.00	91.20	0.30	2,999.22	926.78	28.93	926.62	1.11	
3,738.00	91.60	0.00	2,996.92	1,020.75	29.17	1,020.59	0.53	
3,832.00	90.60	0.30	2,995.11	1,114.73	29.42	1,114.57	1.11	
3,926.00	91.30	0.30	2,993.56	1,208.71	29.91	1,208.55	0.74	
4,020.00	90.60	0.10	2,992.00	1,302.70	30.24	1,302.53	0.77	
4,113.00	90.80	0.00	2,990.86	1,395.69	30.32	1,395.52	0.24	
4,207.00	90.10	359.20	2,990.12	1,489.69	29.66	1,489.52	1.13	
4,301.00	90.50	359.20	2,989.63	1,583.68	28.35	1,583.51	0.43	
4,394.00	91.10	359.40	2,988.33	1,676.66	27.22	1,676.50	0.68	
4,488.00	90.10	359.50	2,987.35	1,770.65	26.31	1,770.49	1.07	
4,582.00	90.30	359.60	2,987.02	1,864.65	25.58	1,864.49	0.24	
4,676.00	90.30	359.50	2,986.53	1,958.64	24.84	1,958.49	0.11	
4,769.00	90.40	359.40	2,985.96	2,051.63	23.94	2,051.49	0.15	
4,863.00	90.60	359.20	2,985.14	2,145.62	22.80	2,145.48	0.30	
4,956.00	90.60	358.60	2,984.16	2,238.60	21.01	2,238.47	0.65	
5,050.00	91.50	358.10	2,982.44	2,332.55	18.30	2,332.42	1.10	
5,143.00	90.90	358.80	2,980.49	2,425.49	15.79	2,425.38	0.99	
5,237.00	89.70	359.60	2,980.00	2,519.48	14.48	2,519.37	1.53	
5,330.00	90.20	359.30	2,980.08	2,612.47	13.58	2,612.37	0.63	



Phoenix Technology Services
Phoenix Final Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #1H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	KB @ 3390.00usft (JW.4)
Site:	Bradley 8 Fee	MD Reference:	KB @ 3390.00usft (JW.4)
Well:	#1H	North Reference:	Grid
Wellbore:	OH / Job #1310555	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (JW 4)	Database:	GCR DB

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)
5,423.00	90.90	358.90	2,979.19	2,705.46	12.12	2,705.36	0.87
5,517.00	89.80	359.10	2,978.62	2,799.44	10.48	2,799.35	1.19
5,611.00	90.20	358.30	2,978.62	2,893.41	8.35	2,893.33	0.95
5,704.00	90.20	359.00	2,978.29	2,986.39	6.16	2,986.32	0.75
5,797.00	90.90	358.80	2,977.40	3,079.36	4.37	3,079.30	0.78
5,891.00	89.80	359.50	2,976.83	3,173.35	2.98	3,173.29	1.39
5,984.00	90.30	359.20	2,976.74	3,266.34	1.93	3,266.29	0.63
6,077.00	90.60	358.80	2,976.01	3,359.33	0.30	3,359.28	0.54
6,170.00	91.40	358.40	2,974.39	3,452.28	-1.97	3,452.25	0.96
6,264.00	90.90	359.10	2,972.50	3,546.24	-4.02	3,546.22	0.92
6,357.00	90.20	0.00	2,971.61	3,639.23	-4.75	3,639.21	1.23
6,451.00	91.10	0.00	2,970.54	3,733.23	-4.75	3,733.20	0.96
6,544.00	89.80	0.60	2,969.81	3,826.22	-4.26	3,826.19	1.54
6,637.00	90.50	0.90	2,969.57	3,919.21	-3.05	3,919.18	0.82
6,731.00	91.20	0.30	2,968.18	4,013.19	-2.06	4,013.15	0.98
6,824.00	90.80	359.50	2,966.55	4,106.18	-2.22	4,106.14	0.96
6,918.00	90.10	358.80	2,965.82	4,200.16	-3.62	4,200.13	1.05
7,012.00	90.70	358.40	2,965.16	4,294.13	-5.91	4,294.11	0.77
7,105.00	91.80	357.80	2,963.13	4,387.06	-9.00	4,387.05	1.35
7,199.00	90.90	358.20	2,960.92	4,480.97	-12.28	4,480.98	1.05
7,292.00	89.40	358.60	2,960.67	4,573.93	-14.87	4,573.95	1.67
7,385.00	90.10	358.20	2,961.08	4,666.90	-17.47	4,666.92	0.87
7,448.00	90.60	357.90	2,960.69	4,729.86	-19.61	4,729.90	0.93
Last Phoenix MWD Survey							
7,526.00	90.60	357.90	2,959.88	4,807.80	-22.47	4,807.85	0.00
Projection to TD							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		N/S (usft)	E/W (usft)	
2,340.00	2,339.82	21.35	-7.12	Tie-on to VES GYRO
2,428.00	2,427.82	21.00	-8.36	First Phoenix MWD Survey
7,448.00	2,960.69	4,729.86	-19.61	Last Phoenix MWD Survey
7,526.00	2,959.88	4,807.80	-22.47	Projection to TD

Checked By: _____ Approved By: _____ Date: _____



PHOENIX TECHNOLOGY SERVICES

Survey Calculation Sheet

Company **COG OPERATING, LLC**
Well **BRADLEY 8 FEE #1 H**
Field **EDDY COUNTY, NM**
Rig **JW #4**
Phoenix Rep. **BOB DILLON**

Correction 7.81
Target TVD **3000**
Target Az. **359.71**
Tgt. Coord.

QDT
CLT

Date	No.	DEPTH	INC.	AZM	C.L.	T.V.D.	V.S.	N/S	E/W	DLS	B/D.	BHA
Tie - In	0	2340	0.97	252.67	0	2339.82	21.36	21.35 N	7.12 W	0.00		
15-May	1	2428	0.7	257.1	88	2427.81	21.05	21.01 N	8.36 W	0.32	0.31	1
	2	2459	1.6	355.3	31	2458.81	21.44	21.40 N	8.58 W	5.92	2.90	
	3	2490	7.0	13.1	31	2489.71	23.71	23.67 N	8.18 W	17.74	17.42	
	4	2522	12.4	13.0	32	2521.24	28.96	28.92 N	16.97 W	16.88	16.88	
	5	2553	17.8	12.4	31	2551.16	36.82	36.80 N	5.20 W	17.43	17.42	
	6	2584	21.9	12.1	31	2580.31	47.10	47.08 N	2.97 W	13.23	13.23	
	7	2615	24.8	9.4	31	2608.77	59.18	59.15 N	0.70 W	9.97	9.35	
	8	2646	27.9	6.8	31	2636.55	72.77	72.77 N	1.22 E	10.67	10.00	
	9	2678	31.1	7.2	32	2664.39	88.39	88.41 N	3.15 E	10.02	10.00	
	10	2709	33.9	7.8	31	2690.54	104.89	104.92 N	5.32 E	9.09	9.03	
	11	2740	36.0	7.9	31	2715.94	122.47	122.51 N	7.75 E	6.78	6.77	
	12	2771	38.3	8.1	31	2740.65	141.00	141.05 N	10.36 E	7.43	7.42	
16-May	13	2802	40.7	9.2	31	2764.57	160.47	160.54 N	13.33 E	8.06	7.74	
	14	2834	43.2	9.3	32	2788.37	181.57	181.65 N	16.76 E	7.82	7.81	
	15	2865	45.4	8.4	31	2810.55	202.94	203.04 N	20.09 E	7.38	7.10	
	16	2896	47.0	6.9	31	2832.01	225.10	225.22 N	23.08 E	6.23	5.16	
	17	2927	48.3	5.1	31	2852.89	247.87	248.00 N	25.46 E	6.00	4.19	
	18	2958	50.5	3.8	31	2873.07	271.32	271.47 N	27.28 E	7.78	7.10	
	19	2989	53.7	2.5	31	2892.11	295.74	295.89 N	28.61 E	10.84	10.32	
	20	3021	56.6	1.8	32	2910.39	321.97	322.13 N	29.60 E	9.24	9.06	
	21	3052	59.7	1.8	31	2926.75	348.28	348.44 N	30.42 E	10.00	10.00	
	22	3083	62.6	0.2	31	2941.70	375.43	375.59 N	30.89 E	10.39	9.35	
	23	3114	66.3	358.7	31	2955.07	403.39	403.55 N	30.62 E	12.71	11.94	
	24	3145	69.1	357.8	31	2966.83	432.08	432.21 N	29.74 E	9.42	9.03	
	25	3177	72.6	357.4	32	2977.33	462.28	462.41 N	28.47 E	11.00	10.94	
	26	3208	75.6	357.9	31	2985.82	492.05	492.20 N	27.25 E	9.80	9.68	
	27	3239	78.9	358.7	31	2992.66	522.27	522.41 N	26.36 E	10.94	10.65	
	28	3270	82.8	359.3	31	2997.59	552.87	553.01 N	25.82 E	12.72	12.58	
	29	3301	86.9	359.3	31	3000.37	583.74	583.88 N	25.45 E	13.23	13.23	
	30	3332	89.0	359.8	31	3001.48	614.72	614.85 N	25.20 E	6.96	6.77	
	31	3364	88.9	359.8	32	3002.07	646.71	646.85 N	25.09 E	0.31	0.31	
17-May	32	3457	90.8	1.0	93	3002.31	739.70	739.84 N	25.74 E	2.42	2.04	2
	33	3550	90.9	1.3	93	3000.93	832.66	832.81 N	27.61 E	0.34	0.11	
	34	3644	91.2	0.3	94	2999.21	926.62	926.78 N	28.92 E	1.11	0.32	
	35	3738	91.6	360.0	94	2996.91	1020.59	1020.75 N	29.17 E	0.53	0.43	
	36	3832	90.6	0.3	94	2995.11	1114.57	1114.74 N	29.41 E	1.11	1.06	
	37	3926	91.3	0.3	94	2993.55	1208.55	1208.72 N	29.90 E	0.74	0.74	
	38	4020	90.6	0.1	94	2991.99	1302.54	1302.71 N	30.23 E	0.77	0.74	
	39	4113	90.8	360.0	93	2990.86	1395.53	1395.70 N	30.31 E	0.24	0.22	
	40	4207	90.1	359.2	94	2990.12	1489.52	1489.69 N	29.66 E	1.13	0.74	
	41	4301	90.5	359.2	94	2989.63	1583.52	1583.68 N	28.34 E	0.43	0.43	
	42	4394	91.1	359.4	93	2988.33	1676.51	1676.67 N	27.21 E	0.68	0.65	
18-May	43	4488	90.1	359.5	94	2987.34	1770.50	1770.66 N	26.31 E	1.07	1.06	

	44	4582	90.3	359.6	94	2987.01	1864.50	1864.65 N	25.57 E	0.24	0.21
	45	4676	90.3	359.5	94	2986.52	1958.50	1958.65 N	24.83 E	0.11	0.00
	46	4769	90.4	359.4	93	2985.95	2051.49	2051.64 N	23.94 E	0.15	0.11
	47	4863	90.6	359.2	94	2985.13	2145.49	2145.63 N	22.79 E	0.30	0.21
	48	4956	90.6	358.6	93	2984.16	2238.47	2238.61 N	21.00 E	0.65	0.00
	49	5050	91.5	358.1	94	2982.44	2332.43	2332.55 N	18.30 E	1.10	0.96
	50	5143	90.9	358.8	93	2980.49	2425.39	2425.50 N	15.78 E	0.99	0.65
	51	5237	89.7	359.6	94	2980.00	2519.38	2519.48 N	14.47 E	1.53	1.28
	52	5330	90.2	359.3	93	2980.08	2612.38	2612.48 N	13.58 E	0.63	0.54
19-May	53	5423	90.9	358.9	93	2979.19	2705.37	2705.46 N	12.12 E	0.87	0.75
	54	5517	89.8	359.1	94	2978.61	2799.36	2799.44 N	10.48 E	1.19	1.17
	55	5611	90.2	358.3	94	2978.61	2893.34	2893.42 N	8.34 E	0.95	0.43
	56	5704	90.2	359.0	93	2978.29	2986.32	2986.39 N	6.15 E	0.75	0.00
	57	5797	90.9	358.8	93	2977.39	3079.31	3079.37 N	4.37 E	0.78	0.75
	58	5891	89.8	359.5	94	2976.82	3173.30	3173.36 N	2.97 E	1.39	1.17
	59	5984	90.3	359.2	93	2976.74	3266.30	3266.35 N	1.92 E	0.63	0.54
	60	6077	90.6	358.8	93	2976.01	3359.29	3359.33 N	0.30 E	0.54	0.32
	61	6170	91.4	358.4	93	2974.39	3452.26	3452.29 N	1.98 W	0.96	0.86
20-May	62	6264	90.9	359.1	94	2972.50	3546.22	3546.25 N	4.03 W	0.92	0.53
	63	6357	90.2	360.0	93	2971.61	3639.22	3639.24 N	4.76 W	1.23	0.75
	64	6451	91.1	360.0	94	2970.54	3733.21	3733.23 N	4.76 W	0.96	0.96
	65	6544	89.8	0.6	93	2969.81	3826.20	3826.23 N	4.27 W	1.54	1.40
	66	6637	90.5	0.9	93	2969.57	3919.18	3919.22 N	3.05 W	0.82	0.75
	67	6731	91.2	0.3	94	2968.17	4013.16	4013.20 N	2.07 W	0.98	0.74
	68	6824	90.8	359.5	93	2966.55	4106.14	4106.18 N	2.23 W	0.96	0.43
	69	6918	90.1	358.8	94	2965.81	4200.13	4200.17 N	3.62 W	1.05	0.74
	70	7012	90.7	358.4	94	2965.15	4294.11	4294.14 N	5.92 W	0.77	0.64
	71	7105	91.8	357.8	93	2963.13	4387.05	4387.06 N	9.00 W	1.35	1.18
21-May	72	7199	90.9	358.2	94	2960.91	4480.98	4480.98 N	12.28 W	1.05	0.96
	73	7292	89.4	358.6	93	2960.67	4573.96	4573.94 N	14.88 W	1.67	1.61
	74	7385	90.1	358.2	93	2961.07	4666.93	4666.90 N	17.48 W	0.87	0.75
	75	7448	90.6	357.9	63	2960.69	4729.90	4729.86 N	19.62 W	0.93	0.79
	PTB	7526	90.6	357.9	78	2959.87	4807.86	4807.81 N	22.48 W	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.00	0.00	0.00 N	0.00 E	0.00	0.00
					0	0.					

30-015-41162

Company: COG Operating LLC (Concho)

Lease/Well: Bradley 8 Fee/No 001H



Rig Name: JW 4

State/County: New Mexico/Eddy

Latitude: 32.67, Longitude: -104.41

GRID North is 0.04 Degrees West of True North

VS-Azi: 0.00 Degrees



Depth Reference : RKB=13FT

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: survey.ut

Minimum Curvature Method

Report Date/Time: 5/20/2013 / 14:50

Vaughn Energy Services

432-563-5444

Gardendale, Texas

Surveyor: Kyle Willis

Bradley 8 Fee No 001H / API 30-015-41162

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	0.25	26.34	100.00	0.20	0.10	0.20	0.22	26.34	0.25
200.00	0.42	36.08	200.00	0.70	0.41	0.70	0.81	30.76	0.18
300.00	0.28	20.19	300.00	1.23	0.72	1.23	1.42	30.31	0.17
400.00	0.36	23.70	399.99	1.74	0.93	1.74	1.98	28.01	0.08
500.00	0.53	18.32	499.99	2.47	1.20	2.47	2.74	25.90	0.17
600.00	0.78	2.82	599.98	3.58	1.38	3.58	3.84	21.02	0.31
700.00	0.80	336.35	699.98	4.90	1.13	4.90	5.03	12.96	0.36
800.00	0.80	351.95	799.97	6.23	0.75	6.23	6.28	6.85	0.22
900.00	0.95	347.18	899.95	7.73	0.47	7.73	7.75	3.46	0.17
1000.00	0.87	330.21	999.94	9.20	-0.09	9.20	9.20	359.42	0.28
1100.00	0.88	357.66	1099.93	10.62	-0.50	10.62	10.63	357.31	0.41
1200.00	0.69	336.65	1199.92	11.93	-0.77	11.93	11.96	356.32	0.34
1300.00	0.99	353.22	1299.91	13.34	-1.11	13.34	13.38	355.26	0.38
1400.00	0.92	354.28	1399.90	14.99	-1.29	14.99	15.05	355.09	0.07
1500.00	0.68	354.41	1499.89	16.38	-1.43	16.38	16.44	355.03	0.24
1600.00	1.08	346.55	1599.88	17.88	-1.70	17.88	17.96	354.56	0.42
1700.00	0.74	3.17	1699.86	19.44	-1.88	19.44	19.53	354.46	0.43
1800.00	0.32	343.70	1799.86	20.35	-1.93	20.35	20.44	354.59	0.45

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
1900.00	0.46	331.26	1899.86	20.97	-2.20	20.97	21.09	354.01	0.17
2000.00	0.49	280.81	1999.85	21.41	-2.82	21.41	21.59	352.51	0.41
2100.00	0.72	279.83	2099.85	21.59	-3.86	21.59	21.94	349.86	0.23
2200.00	0.80	264.48	2199.84	21.63	-5.18	21.63	22.25	346.53	0.22
2300.00	0.77	261.25	2299.83	21.46	-6.55	21.46	22.44	343.04	0.05
2340.00	0.97	252.67	2339.82	21.32	-7.14	21.32	22.48	341.49	0.59