

Company: COG Operating LLC (Concho)

Lease/Well: Bradley 8 Fee/No 002H



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=13 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: bradley 8 fee #2h gyro survey.ut

Minimum Curvature Method

Report Date/Time: 4/15/2013 / 09:48

Vaughn Energy Services

Midland, Texas

432-563-5444

Surveyor: Logan Henry

Bradley 8 Fee No 002H / API 30-015-39811



15-39811

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	0.14	158.57	100.00	-0.12	0.05	-0.12	0.12	158.57	0.14
200.00	0.22	122.71	200.00	-0.33	0.25	-0.33	0.42	143.21	0.13
300.00	0.28	117.76	300.00	-0.55	0.62	-0.55	0.83	131.32	0.07
400.00	0.16	104.82	400.00	-0.70	0.98	-0.70	1.20	125.58	0.13
500.00	0.12	118.75	500.00	-0.78	1.20	-0.78	1.44	123.10	0.06
600.00	0.04	124.44	600.00	-0.86	1.32	-0.86	1.58	122.85	0.07
700.00	0.19	145.57	700.00	-1.01	1.45	-1.01	1.77	124.95	0.15
800.00	0.27	161.28	800.00	-1.37	1.62	-1.37	2.12	130.32	0.10
900.00	0.32	156.65	899.99	-1.85	1.81	-1.85	2.59	135.77	0.05
1000.00	0.32	165.26	999.99	-2.38	1.99	-2.38	3.10	140.13	0.05
1100.00	0.34	163.65	1099.99	-2.93	2.14	-2.93	3.63	143.86	0.03
1200.00	0.24	160.07	1199.99	-3.41	2.30	-3.41	4.11	146.08	0.10
1300.00	0.14	153.40	1299.99	-3.72	2.42	-3.72	4.44	146.94	0.11
1400.00	0.06	273.27	1399.99	-3.82	2.43	-3.82	4.53	147.61	0.17
1500.00	0.13	251.24	1499.99	-3.86	2.27	-3.86	4.47	149.54	0.08
1600.00	0.35	215.19	1599.99	-4.14	1.98	-4.14	4.59	154.41	0.26
1700.00	0.50	176.35	1699.99	-4.83	1.84	-4.83	5.16	159.18	0.31
1800.00	0.17	189.37	1799.98	-5.41	1.84	-5.41	5.71	161.22	0.33

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	0.31	191.28	1899.98	-5.82	1.76	-5.82	6.08	163.17	0.14
2000.00	0.35	209.11	1999.98	-6.36	1.56	-6.36	6.54	166.22	0.11
2100.00	0.20	241.03	2099.98	-6.71	1.26	-6.71	6.83	169.39	0.21
2200.00	0.17	299.72	2199.98	-6.72	0.97	-6.72	6.79	171.75	0.18
2300.00	0.33	305.71	2299.98	-6.48	0.61	-6.48	6.50	174.63	0.16
2400.00	0.28	317.79	2399.98	-6.12	0.21	-6.12	6.13	178.06	0.08
2426.00	0.20	320.91	2425.98	-6.04	0.14	-6.04	6.04	178.71	0.30



PHOENIX TECHNOLOGY SERVICES

Survey Calculation Sheet

Company **COG OPERATING**
Well **BRADLEY 8 FEE #2 H**
Field **EDDY COUNTY, NM**
Rig **JW #4**
Phoenix Rep. **Bob Dillon**

Correction 7.82
Target TVD **3062.8**
Target Az. **357.58**
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	2426	0.20	320.91	0	2425.98	-6.03	6.04 S	0.14 E	0.00		
12-Apr	1	2489	0.3	317.4	63	2488.98	-5.83	5.83 S	0.04 W	0.16	0.16	1
	2	2552	2.5	352.4	63	2551.96	-4.33	4.35 S	0.33 W	3.59	3.49	
13-Apr	3	2583	7.4	351.2	31	2582.83	-1.67	1.71 S	0.73 W	15.81	15.81	
	4	2615	12.5	352.1	32	2614.34	3.83	3.77 N	1.52 W	15.94	15.94	
	5	2646	16.7	351.6	31	2644.33	11.60	11.50 N	2.63 W	13.55	13.55	
	6	2677	19.5	349.7	31	2673.80	21.16	21.00 N	4.21 W	9.23	9.03	
	7	2708	22.4	347.3	31	2702.74	32.10	31.85 N	6.43 W	9.75	9.35	
	8	2740	25.3	347.3	32	2732.01	44.83	44.47 N	9.28 W	9.06	9.06	
	9	2771	28.0	348.2	31	2759.71	58.52	58.06 N	12.22 W	8.81	8.71	
	10	2802	30.9	349.0	31	2786.70	73.58	73.00 N	15.23 W	9.44	9.35	
	11	2833	34.1	350.0	31	2812.85	90.07	89.38 N	18.26 W	10.47	10.32	
	12	2864	36.6	349.5	31	2838.13	107.83	107.02 N	21.45 W	8.12	8.06	
	13	2895	38.9	348.0	31	2862.64	126.58	125.63 N	25.16 W	7.99	7.42	
	14	2927	41.4	346.6	32	2887.10	146.88	145.76 N	29.70 W	8.31	7.81	
	15	2958	44.3	346.8	31	2909.82	167.58	166.27 N	34.55 W	9.37	9.35	
	16	2989	47.0	347.0	31	2931.49	189.37	187.86 N	39.57 W	8.72	8.71	
	17	3020	49.7	347.6	31	2952.09	212.16	210.46 N	44.66 W	8.83	8.71	
	18	3051	52.5	347.3	31	2971.56	235.90	234.00 N	49.90 W	9.06	9.03	
	19	3082	55.0	347.5	31	2989.88	260.51	258.40 N	55.35 W	8.08	8.06	
	20	3114	57.5	348.6	32	3007.66	286.74	284.43 N	60.86 W	8.32	7.81	
	21	3145	60.0	349.9	31	3023.74	312.97	310.46 N	65.80 W	8.83	8.06	
	22	3176	63.0	350.2	31	3038.53	339.97	337.29 N	70.50 W	9.71	9.68	
	23	3207	65.7	350.1	31	3051.95	367.68	364.83 N	75.28 W	8.71	8.71	
	24	3238	68.6	349.6	31	3063.99	395.98	392.94 N	80.32 W	9.47	9.35	
	25	3269	72.0	349.3	31	3074.44	424.87	421.63 N	85.66 W	11.01	10.97	
	26	3300	75.3	349.0	31	3083.16	454.29	450.84 N	91.26 W	10.69	10.65	
	27	3332	78.6	348.9	32	3090.39	485.11	481.43 N	97.23 W	10.32	10.31	
	28	3363	81.8	348.8	31	3095.66	515.30	511.40 N	103.14 W	10.33	10.32	
14-Apr	29	3394	85.4	349.1	31	3099.12	545.75	541.63 N	109.04 W	11.65	11.61	
	30	3425	88.8	349.5	31	3100.69	576.38	572.05 N	114.79 W	11.04	10.97	
	31	3519	89.1	350.5	94	3102.41	669.54	664.60 N	131.10 W	1.11	0.32	
	32	3612	90.6	352.1	93	3102.65	761.98	756.53 N	145.17 W	2.36	1.61	
	33	3706	91.2	353.2	94	3101.17	855.62	849.74 N	157.19 W	1.33	0.64	2
	34	3799	90.9	356.6	93	3099.47	948.49	942.34 N	165.46 W	3.67	-0.32	
	35	3893	91.7	358.1	94	3097.34	1042.46	1036.21 N	169.80 W	1.81	0.85	
15-Apr	36	3986	90.7	0.6	93	3095.39	1135.39	1129.18 N	170.86 W	2.89	-1.08	
	37	4080	90.7	359.9	94	3094.24	1229.28	1223.17 N	170.45 W	0.74	0.00	
	38	4173	90.3	1.8	93	3093.43	1322.12	1316.15 N	169.07 W	2.09	-0.43	
	39	4267	90.2	1.8	94	3093.02	1415.86	1410.11 N	166.11 W	0.11	-0.11	
	40	4361	89.7	1.8	94	3093.10	1509.61	1504.06 N	163.16 W	0.53	-0.53	
	41	4454	90.7	0.3	93	3092.78	1602.43	1597.04 N	161.46 W	1.94	1.08	
	42	4548	90.0	0.8	94	3092.20	1696.30	1691.03 N	160.56 W	0.92	-0.74	
	43	4641	90.7	359.3	93	3091.63	1789.21	1784.03 N	160.47 W	1.78	0.75	

	44	4735	89.8	359.7	94	3091.22	1883.16	1878.02 N	161.29 W	1.05	-0.96	
	45	4828	90.9	358.8	93	3090.66	1976.11	1971.01 N	162.51 W	1.53	-1.18	
16-Apr	46	4923	90.5	358.8	95	3089.50	2071.08	2065.98 N	164.50 W	0.42	-0.42	
	47	5016	90.0	358.9	93	3089.09	2164.06	2158.96 N	166.37 W	0.55	-0.54	
	48	5110	90.8	358.5	94	3088.43	2258.04	2252.93 N	168.50 W	0.95	0.85	3
	49	5203	91.7	357.5	93	3086.40	2351.01	2345.85 N	171.74 W	1.45	0.97	
17-Apr	50	5296	91.8	358.1	93	3083.56	2443.97	2438.74 N	175.31 W	0.65	0.11	
	51	5390	91.5	358.9	94	3080.86	2537.92	2532.67 N	177.77 W	0.91	-0.32	
	52	5483	91.8	359.9	93	3078.18	2630.83	2625.62 N	178.75 W	1.12	0.32	4
18-Apr	53	5577	91.4	359.2	94	3075.56	2724.74	2719.58 N	179.48 W	0.86	-0.43	5
	54	5671	91.1	359.6	94	3073.50	2818.67	2813.56 N	180.47 W	0.53	-0.32	
19-Apr	55	5764	90.1	0.1	93	3072.53	2911.59	2906.55 N	180.71 W	1.20	-1.08	6
	56	5858	92.0	359.4	94	3070.81	3005.50	3000.53 N	181.12 W	2.15	2.02	
	57	5951	91.8	359.0	93	3067.72	3098.41	3093.47 N	182.42 W	0.48	-0.22	
	58	6045	91.9	358.4	94	3064.69	3192.34	3187.39 N	184.55 W	0.65	0.11	
	59	6139	91.3	359.1	94	3062.07	3286.29	3281.33 N	186.60 W	0.98	-0.64	
20-Apr	60	6232	91.9	0.2	93	3059.47	3379.19	3374.29 N	187.17 W	1.35	0.65	
	61	6326	91.5	0.2	94	3056.68	3473.05	3468.25 N	186.84 W	0.43	-0.43	
	62	6420	91.0	0.3	94	3054.63	3566.92	3562.23 N	186.43 W	0.54	-0.53	
	63	6513	92.0	0.5	93	3052.19	3659.78	3655.19 N	185.78 W	1.10	1.08	
	64	6606	91.4	359.9	93	3049.44	3752.64	3748.15 N	185.46 W	0.91	-0.65	
	65	6701	91.7	359.6	95	3046.87	3847.53	3843.11 N	185.87 W	0.45	0.32	
21-Apr	66	6794	91.2	359.0	93	3044.51	3940.46	3936.08 N	187.01 W	0.84	-0.54	
	67	6887	92.2	358.3	93	3041.75	4033.40	4029.01 N	189.20 W	1.31	1.08	
	68	6995	92.4	357.4	108	3037.42	4141.31	4136.84 N	193.25 W	0.85	0.19	
	69	7089	91.7	358.5	94	3034.06	4235.25	4230.72 N	196.61 W	1.39	-0.74	
22-Apr	70	7182	91.5	358.0	93	3031.46	4328.21	4323.64 N	199.44 W	0.58	-0.22	
	71	7276	92.3	358.9	94	3028.34	4422.14	4417.55 N	201.99 W	1.28	0.85	
	72	7369	92.1	359.8	93	3024.77	4515.03	4510.48 N	203.04 W	0.99	-0.22	
	73	7463	92.6	359.6	94	3020.92	4608.88	4604.40 N	203.53 W	0.57	0.53	
	74	7557	92.3	359.2	94	3016.90	4702.75	4698.31 N	204.52 W	0.53	-0.32	
	75	7588	92.8	358.9	31	3015.52	4733.71	4729.27 N	205.03 W	1.88	1.61	
	PTB	7673	92.8	358.9	85	3011.37	4818.59	4814.15 N	206.66 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</			



COG Operating LLC

Eddy County, New Mexico (NAD 27 NME)

Bradley 8 Fee

#2H

Wellbore #1 / Job #1310409

Survey: Phoenix MWD Surveys

Standard Survey Report

23 April, 2013





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	KB @ 3387.00usft (JW 4)
Site:	Bradley 8 Fee	MD Reference:	KB @ 3387.00usft (JW 4)
Well:	#2H	North Reference:	Grid
Wellbore:	Wellbore #1 / Job #1310409	Survey Calculation Method:	Minimum Curvature
Design:	JW #4 Surveys	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:	From:	Map	
From:	Map		
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
Northings:	606,797.50 usft	Latitude:	32° 40' 5.404816 N
Easting:	478,847.80 usft	Longitude:	104° 24' 7.453861 W
Grid Convergence:			-0.04 °

Well:	#2H					
Well Position	+N/-S	0.00 usft	Northing:	606,804.80 usft	Latitude:	32° 40' 5.468944 N
	+E/-W	0.00 usft	Easting:	477,618.00 usft	Longitude:	104° 24' 21.841007 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,374.00 usft

Wellbore: Wellbore #1 / Job #1310409					
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010_14	04/10/13	7.78	60.41	48,609

Design: JW #4 Surveys				
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	357.58

Survey Program		Date 04/23/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	2,426.00	VES Gyro (Wellbore #1 / Job #1310409)	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro
2,489.00	7,673.00	Phoenix MWD Surveys (Wellbore #1 / Job	MWD	MWD - Standard

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn	
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate	
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)	
2,426.00	0.20	320.91	2,425.98	-6.05	0.14	-6.05	0.00	0.00	0.00	
Tie-on to VES Gyro										
2,489.00	0.30	317.40	2,488.98	-5.84	-0.04	-5.83	0.16	0.16	-5.57	
Phoenix First MWD Survey										
2,552.00	2.50	352.40	2,551.95	-4.36	-0.33	-4.34	3.59	3.49	55.56	
2,583.00	7.40	351.20	2,582.83	-1.71	-0.73	-1.68	15.81	15.81	-3.87	
2,615.00	12.50	352.10	2,614.34	3.76	-1.52	3.82	15.94	15.94	2.81	
2,646.00	16.70	351.60	2,644.33	11.49	-2.63	11.59	13.55	13.55	-1.61	
2,677.00	19.50	349.70	2,673.79	20.99	-4.21	21.15	9.23	9.03	-6.13	



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	KB @ 3387.00usft (JW 4)
Site:	Bradley 8 Fee	MD Reference:	KB @ 3387.00usft (JW 4)
Well:	#2H	North Reference:	Grid
Wellbore:	Wellbore #1 / Job #1310409	Survey Calculation Method:	Minimum Curvature
Design:	JW #4 Surveys	Database:	GCR.DB

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)
2,708.00	22.40	347.30	2,702.74	31.85	-6.43	32.09	9.75	9.35	-7.74
2,740.00	25.30	347.30	2,732.01	44.47	-9.27	44.82	9.06	9.06	0.00
2,771.00	28.00	348.20	2,759.71	58.06	-12.22	58.52	8.81	8.71	2.90
2,802.00	30.90	349.00	2,786.70	73.00	-15.23	73.57	9.44	9.35	2.58
2,833.00	34.10	350.00	2,812.84	89.37	-18.26	90.06	10.47	10.32	3.23
2,864.00	36.60	349.50	2,838.13	107.02	-21.45	107.83	8.12	8.06	-1.61
2,895.00	38.90	348.00	2,862.64	125.63	-25.16	126.58	7.99	7.42	-4.84
2,927.00	41.40	346.60	2,887.09	145.75	-29.70	146.88	8.31	7.81	-4.38
2,958.00	44.30	346.80	2,909.82	166.27	-34.55	167.58	9.37	9.35	0.65
2,989.00	47.00	347.00	2,931.49	187.86	-39.57	189.36	8.72	8.71	0.65
3,020.00	49.70	347.60	2,952.09	210.45	-44.66	212.15	8.83	8.71	1.94
3,051.00	52.50	347.30	2,971.55	234.00	-49.90	235.90	9.06	9.03	-0.97
3,082.00	55.00	347.50	2,989.88	258.40	-55.36	260.50	8.08	8.06	0.65
3,114.00	57.50	348.60	3,007.66	284.42	-60.86	286.74	8.32	7.81	3.44
3,145.00	60.00	349.90	3,023.74	310.46	-65.80	312.96	8.83	8.06	4.19
3,176.00	63.00	350.20	3,038.53	337.29	-70.51	339.97	9.71	9.68	0.97
3,207.00	65.70	350.10	3,051.95	364.82	-75.29	367.67	8.71	8.71	-0.32
3,238.00	68.60	349.60	3,063.99	392.94	-80.32	395.98	9.47	9.35	-1.61
3,269.00	72.00	349.30	3,074.43	421.62	-85.66	424.87	11.01	10.97	-0.97
3,300.00	75.30	349.00	3,083.16	450.83	-91.26	454.29	10.69	10.65	-0.97
3,332.00	78.60	348.90	3,090.38	481.43	-97.24	485.10	10.32	10.31	-0.31
3,363.00	81.80	348.80	3,095.66	511.39	-103.14	515.29	10.33	10.32	-0.32
3,394.00	85.40	349.10	3,099.11	541.62	-109.05	545.75	11.65	11.61	0.97
3,425.00	88.80	349.50	3,100.68	572.04	-114.79	576.38	11.04	10.97	1.29
3,519.00	89.10	350.50	3,102.41	664.60	-131.11	669.54	1.11	0.32	1.06
3,612.00	90.60	352.10	3,102.65	756.52	-145.18	761.98	2.36	1.61	1.72
3,706.00	91.20	353.20	3,101.17	849.73	-157.20	855.61	1.33	0.64	1.17
3,799.00	90.90	356.60	3,099.47	942.34	-165.47	948.48	3.67	-0.32	3.66
3,893.00	91.70	358.10	3,097.33	1,036.21	-169.81	1,042.46	1.81	0.85	1.60
3,986.00	90.70	0.60	3,095.39	1,129.17	-170.87	1,135.38	2.89	-1.08	2.69
4,080.00	90.70	359.90	3,094.24	1,223.17	-170.46	1,229.27	0.74	0.00	-0.74
4,173.00	90.30	1.80	3,093.43	1,316.15	-169.08	1,322.11	2.09	-0.43	2.04
4,267.00	90.20	1.80	3,093.02	1,410.10	-166.13	1,415.86	0.11	-0.11	0.00
4,361.00	89.70	1.80	3,093.10	1,504.05	-163.17	1,509.60	0.53	-0.53	0.00
4,454.00	90.70	0.30	3,092.77	1,597.03	-161.47	1,602.43	1.94	1.08	-1.61
4,548.00	90.00	0.80	3,092.20	1,691.03	-160.57	1,696.30	0.92	-0.74	0.53
4,641.00	90.70	359.30	3,091.63	1,784.02	-160.49	1,789.21	1.78	0.75	-1.61
4,735.00	89.80	359.70	3,091.22	1,878.02	-161.31	1,883.15	1.05	-0.96	0.43
4,828.00	90.90	358.80	3,090.65	1,971.00	-162.52	1,976.11	1.53	1.18	-0.97
4,923.00	90.50	358.80	3,089.49	2,065.98	-164.51	2,071.08	0.42	-0.42	0.00
5,016.00	90.00	358.90	3,089.09	2,158.96	-166.38	2,164.06	0.55	-0.54	0.11
5,110.00	90.80	358.50	3,088.43	2,252.93	-168.51	2,258.03	0.95	0.85	-0.43
5,203.00	91.70	357.50	3,086.40	2,345.85	-171.76	2,351.01	1.45	0.97	-1.08



Phoenix Technology Services

Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	KB @ 3387.00usft (JW 4)
Site:	Bradley 8 Fee	MD Reference:	KB @ 3387.00usft (JW 4)
Well:	#2H	North Reference:	Grid
Wellbore:	Wellbore #1 / Job #1310409	Survey Calculation Method:	Minimum Curvature
Design:	JW #4 Surveys	Database:	GCR-DB

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)
5,296.00	91.80	358.10	3,083.56	2,438.74	-175.33	2,443.96	0.65	0.11	0.65
5,390.00	91.50	358.90	3,080.86	2,532.66	-177.78	2,537.91	0.91	-0.32	0.85
5,483.00	91.80	359.90	3,078.18	2,625.62	-178.76	2,630.82	1.12	0.32	1.08
5,577.00	91.40	359.20	3,075.55	2,719.58	-179.50	2,724.73	0.86	-0.43	-0.74
5,671.00	91.10	359.60	3,073.50	2,813.55	-180.48	2,818.66	0.53	-0.32	0.43
5,764.00	90.10	0.10	3,072.53	2,906.54	-180.72	2,911.58	1.20	-1.08	0.54
5,858.00	92.00	359.40	3,070.81	3,000.52	-181.13	3,005.49	2.15	2.02	-0.74
5,951.00	91.80	359.00	3,067.72	3,093.46	-182.43	3,098.41	0.48	-0.22	-0.43
6,045.00	91.90	358.40	3,064.69	3,187.39	-184.56	3,192.34	0.65	0.11	-0.64
6,139.00	91.30	359.10	3,062.06	3,281.33	-186.61	3,286.28	0.98	-0.64	0.74
6,232.00	91.90	0.20	3,059.47	3,374.29	-187.18	3,379.18	1.35	0.65	1.18
6,326.00	91.50	0.20	3,056.68	3,468.25	-186.85	3,473.04	0.43	-0.43	0.00
6,420.00	91.00	0.30	3,054.63	3,562.22	-186.44	3,566.92	0.54	-0.53	0.11
6,513.00	92.00	0.50	3,052.19	3,655.19	-185.79	3,659.77	1.10	1.08	0.22
6,606.00	91.40	359.90	3,049.43	3,748.14	-185.47	3,752.63	0.91	-0.65	-0.65
6,701.00	91.70	359.60	3,046.86	3,843.11	-185.88	3,847.53	0.45	0.32	-0.32
6,794.00	91.20	359.00	3,044.51	3,936.07	-187.02	3,940.46	0.84	-0.54	-0.65
6,887.00	92.20	358.30	3,041.75	4,029.00	-189.21	4,033.40	1.31	1.08	-0.75
6,995.00	92.40	357.40	3,037.42	4,136.84	-193.26	4,141.31	0.85	0.19	-0.83
7,089.00	91.70	358.50	3,034.05	4,230.72	-196.62	4,235.24	1.39	-0.74	1.17
7,182.00	91.50	358.00	3,031.46	4,323.64	-199.46	4,328.20	0.58	-0.22	-0.54
7,276.00	92.30	358.90	3,028.34	4,417.55	-202.00	4,422.14	1.28	0.85	0.96
7,369.00	92.10	359.80	3,024.77	4,510.47	-203.05	4,515.02	0.99	-0.22	0.97
7,463.00	92.60	359.60	3,020.92	4,604.39	-203.54	4,608.88	0.57	0.53	-0.21
7,557.00	92.30	359.20	3,016.90	4,698.30	-204.53	4,702.75	0.53	-0.32	-0.43
7,588.00	92.80	358.90	3,015.52	4,729.27	-205.04	4,733.71	1.88	1.61	-0.97
Phoenix Last MWD Survey									
7,673.00	92.80	358.90	3,011.37	4,814.15	-206.67	4,818.58	0.00	0.00	0.00
Projection to TD									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,426.00	2,425.98	-6.05	0.14	Tie-on to VES Gyro
2,489.00	2,488.98	-5.84	-0.04	Phoenix First MWD Survey
7,588.00	3,015.52	4,729.27	-205.04	Phoenix Last MWD Survey
7,673.00	3,011.37	4,814.15	-206.67	Projection to TD

Checked By: _____ Approved By: _____ Date: _____