

Results of Directional Survey

API number:	30-025-41065		
OGRID:		Operator:	COG OPERATING LLC
		Property:	SALVADOR FEE # 2H

surface	ULSTR:	O	10	T 24S	R 34E
				150 FSL	1980 FEL

BH Loc	ULSTR:	B	10	T 24S	R 34E
15527	MD	10803.2	TVD	369 FNL	1985 FEL
				4911 FSL	

Top Perf/OH	ULSTR:	O	10	T 24S	R 34E
11214	MD	11044.5	TVD	610 FSL	2019 FEL

Bot Perf/OH	ULSTR:	B	10	T 24S	R 34E
15365	MD	10809.1	TVD	531 FNL	1995 FEL
				4749 FSL	

	MD	N/S	E/W	VD
	11182	429.20	-39.00	11036.1
TOP PERFS/OH	11214	460.10	-38.90	11044.50
	11214	460.10	-38.90	11044.50
	15342	4576.40	-16.90	10810.30
BOT PERFS/OH	15365	4599.33	-15.41	10809.08
	15436	4670.10	-10.80	10805.30

NEXT TO LAST	15482	4715.90	-7.70	10804.00
LAST READING	15527	4760.80	-4.80	10803.20
TD	15527	4760.80	-4.80	10803.20

Surface Location	150	FS	1980	FE
Projected BHL	4911	FS	1985	FE
Location of				
Top Perfs/OH	610	FS	2019	FE
Bottom Perfs/OH	4749	FS	1995	FE

SUMMARY of Subsurface Locations

Surface Location	O-10-24S-34E	150	FS	1980	FE	Vert. Depth
Top Perfs/OH	O-10-24S-34E	610	FS	2019	FE	11044.50
Bottom Perfs/OH	B-10-24S-34E	4749	FS	1995	FE	10809.08
Projected TD	B-10-24S-34E	4911	FS	1985	FE	10803.20

NOV 25 2013



A GYRO TECHNOLOGIES INC. COMPANY

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

July 29, 2013

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

HOBBS OCD

OCT 31 2013

RECEIVED

Attn: Kanicia Castillo

Re: **Salvador Fee No 002H**

Please find enclosed a copy of the survey from 0' to 10,320' ran on the above referenced well.

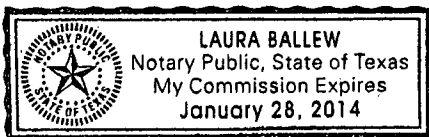
If I can be of any further service, please do not hesitate to call me at 800-606-4976.

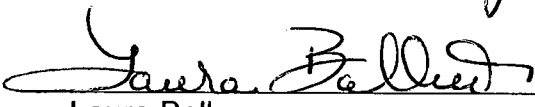
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 29th day of July,
A.D., 2013, by Keith Havelka.





Laura Ballew
Notary Public, State of Texas



Company: CONCHO
Lease/Well: SALVADOR FEE/No 002H

Rig Name: BASIC 46
State/County: NEW MEXICO/LEA
Latitude: 32.22, Longitude: -103.46
GRID North is 0.47 Degrees East of True North
VS-Azi: 0.00 Degrees



Depth Reference : RKB= 22 FT.

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: rate gyro-de_02.ut
Minimum Curvature Method
Report Date/Time: 7/29/2013 / 09:40

Vaughn Energy Services
Midland, Texas
432-563-5444

Surveyor: Danny Spring
Salvador Fee No 002H / API 30-025-41065

HOBBS OCD

OCT 31 2013

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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	0.06	150.31	100.00	-0.04	0.02	-0.04	0.05	150.31	0.06
200.00	0.13	114.85	200.00	-0.14	0.15	-0.14	0.20	131.30	0.09
300.00	0.12	90.46	300.00	-0.18	0.37	-0.18	0.41	116.80	0.05
400.00	0.08	126.23	400.00	-0.23	0.53	-0.23	0.57	113.21	0.07
500.00	0.13	107.03	500.00	-0.30	0.70	-0.30	0.76	113.45	0.06
600.00	0.14	111.19	600.00	-0.38	0.93	-0.38	1.00	112.42	0.01
700.00	0.11	83.96	700.00	-0.42	1.14	-0.42	1.21	110.14	0.07
800.00	0.05	323.24	800.00	-0.37	1.20	-0.37	1.26	107.10	0.14
900.00	0.43	304.89	900.00	-0.12	0.87	-0.12	0.88	97.75	0.38
1000.00	0.35	323.25	1000.00	0.34	0.37	0.34	0.51	47.34	0.15
1100.00	0.30	315.36	1099.99	0.78	0.00	0.78	0.78	0.23	0.07
1200.00	0.24	308.06	1199.99	1.10	-0.35	1.10	1.15	342.36	0.07
1300.00	0.49	334.02	1299.99	1.61	-0.70	1.61	1.76	336.47	0.29
1400.00	0.85	327.25	1399.98	2.62	-1.29	2.62	2.92	333.78	0.37
1500.00	0.91	329.05	1499.97	3.92	-2.10	3.92	4.45	331.85	0.07
1600.00	0.93	329.35	1599.96	5.30	-2.92	5.30	6.06	331.15	0.01
1700.00	0.81	338.70	1699.95	6.66	-3.59	6.66	7.56	331.66	0.18
1800.00	0.88	338.46	1799.94	8.02	-4.13	8.02	9.02	332.78	0.07

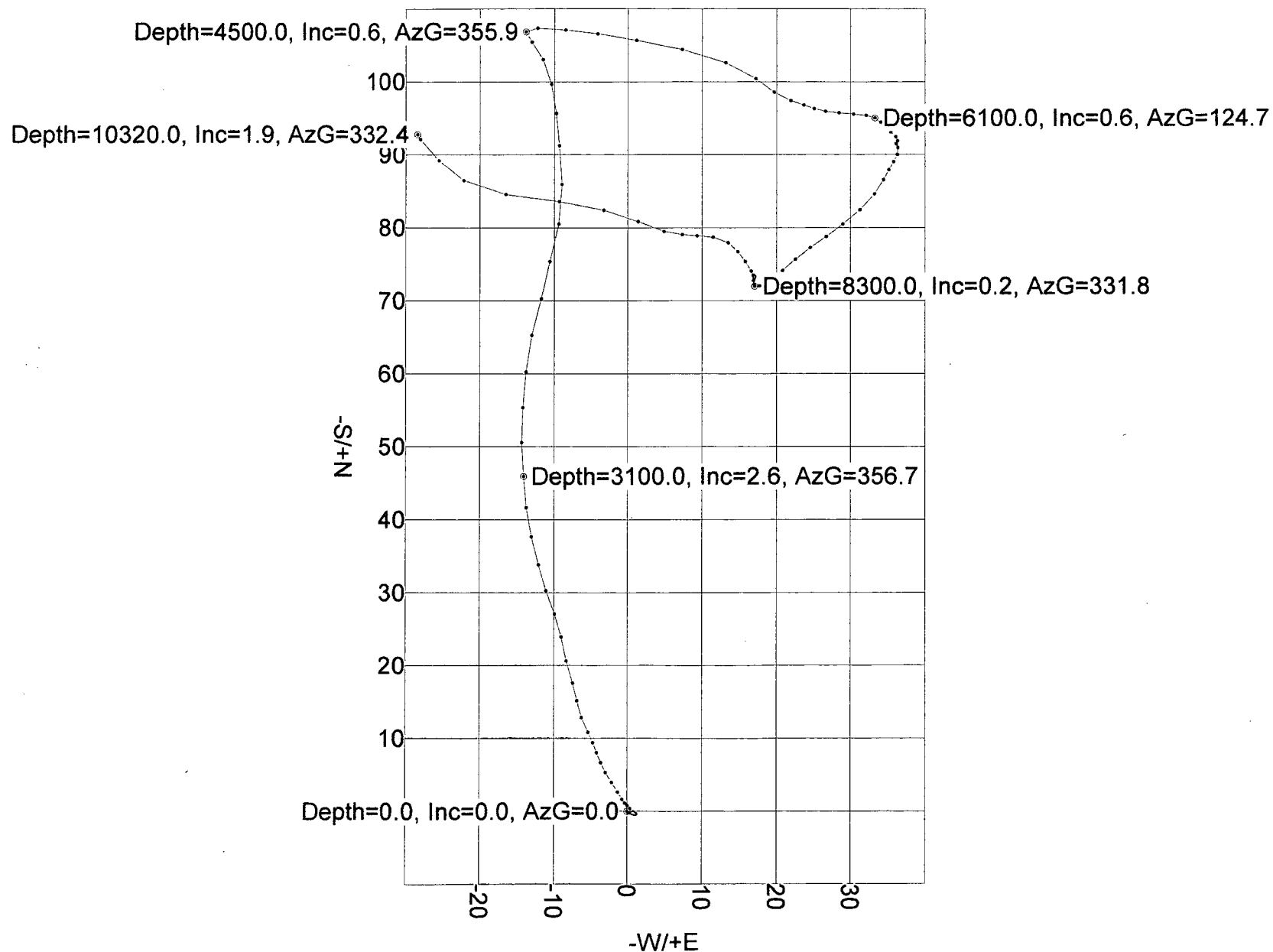
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.80	339.36	1899.93	9.39	-4.65	9.39	10.48	333.63	0.07
2000.00	1.04	332.16	1999.91	10.85	-5.32	10.85	12.08	333.85	0.27
2100.00	1.48	338.78	2099.89	12.86	-6.22	12.86	14.28	334.19	0.46
2200.00	1.28	352.54	2199.86	15.18	-6.83	15.18	16.64	335.76	0.39
2300.00	1.57	340.79	2299.83	17.58	-7.43	17.58	19.08	337.09	0.41
2400.00	2.08	346.84	2399.78	20.64	-8.29	20.64	22.24	338.11	0.55
2500.00	1.81	349.65	2499.72	23.96	-8.99	23.96	25.59	339.44	0.29
2600.00	1.96	337.97	2599.67	27.10	-9.91	27.10	28.85	339.90	0.41
2700.00	1.94	342.53	2699.61	30.29	-11.06	30.29	32.25	339.94	0.16
2800.00	2.28	345.79	2799.54	33.84	-12.06	33.84	35.92	340.39	0.37
2900.00	2.26	346.58	2899.46	37.69	-13.01	37.69	39.87	340.96	0.04
3000.00	2.39	352.93	2999.38	41.68	-13.72	41.68	43.88	341.78	0.29
3100.00	2.55	356.70	3099.29	45.97	-14.11	45.97	48.09	342.94	0.23
3200.00	2.77	357.23	3199.18	50.60	-14.35	50.60	52.60	344.17	0.22
3300.00	2.73	6.47	3299.06	55.38	-14.20	55.38	57.17	345.62	0.44
3400.00	2.91	3.46	3398.94	60.28	-13.78	60.28	61.83	347.12	0.24
3500.00	2.95	14.48	3498.81	65.30	-12.98	65.30	66.58	348.76	0.56
3600.00	2.95	13.59	3598.68	70.30	-11.73	70.30	71.27	350.53	0.05
3700.00	3.03	11.61	3698.54	75.40	-10.59	75.40	76.14	352.00	0.13
3800.00	3.04	14.53	3798.40	80.55	-9.40	80.55	81.10	353.35	0.15
3900.00	3.26	355.83	3898.26	85.95	-8.94	85.95	86.41	354.06	1.05
4000.00	2.80	356.11	3998.12	91.22	-9.31	91.22	91.70	354.17	0.46
4100.00	2.34	353.03	4098.02	95.68	-9.73	95.68	96.17	354.20	0.48
4200.00	2.27	347.90	4197.93	99.64	-10.39	99.64	100.18	354.05	0.22
4300.00	1.87	333.57	4297.87	103.04	-11.53	103.04	103.69	353.62	0.65
4400.00	1.37	321.16	4397.83	105.44	-13.01	105.44	106.23	352.97	0.61
4500.00	0.56	355.89	4497.82	106.86	-13.79	106.86	107.74	352.65	0.96
4600.00	1.82	90.68	4597.80	107.33	-12.24	107.33	108.03	353.49	1.95
4700.00	2.51	95.93	4697.73	107.08	-8.48	107.08	107.42	355.47	0.72
4800.00	2.57	97.39	4797.63	106.57	-4.07	106.57	106.65	357.81	0.09
4900.00	3.53	101.06	4897.48	105.69	1.17	105.69	105.70	0.63	0.98
5000.00	3.66	102.27	4997.29	104.42	7.31	104.42	104.68	4.01	0.15
5100.00	3.41	112.26	5097.10	102.62	13.19	102.62	103.46	7.32	0.66
5200.00	1.90	129.68	5196.99	100.43	17.22	100.43	101.90	9.73	1.70
5300.00	1.64	124.25	5296.94	98.57	19.68	98.57	100.51	11.29	0.31
5400.00	1.27	109.13	5396.91	97.40	21.90	97.40	99.83	12.67	0.53
5500.00	0.85	109.03	5496.89	96.80	23.64	96.80	99.64	13.72	0.42
5600.00	0.85	109.62	5596.88	96.31	25.04	96.31	99.51	14.57	0.01
5700.00	0.96	97.90	5696.87	95.94	26.57	95.94	99.55	15.48	0.21

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
5800.00	1.18	95.93	5796.85	95.72	28.42	95.72	99.85	16.54	0.22
5900.00	1.09	95.16	5896.83	95.53	30.40	95.53	100.25	17.65	0.09
6000.00	0.88	95.45	5996.82	95.37	32.10	95.37	100.63	18.60	0.21
6100.00	0.59	124.71	6096.81	95.01	33.29	95.01	100.67	19.31	0.47
6200.00	0.52	130.33	6196.80	94.42	34.05	94.42	100.38	19.83	0.08
6300.00	0.58	137.17	6296.80	93.76	34.74	93.76	99.99	20.33	0.09
6400.00	0.54	132.02	6396.79	93.07	35.44	93.07	99.59	20.85	0.07
6500.00	0.49	136.17	6496.79	92.45	36.08	92.45	99.24	21.32	0.06
6600.00	0.34	191.14	6596.79	91.85	36.32	91.85	98.77	21.57	0.40
6700.00	0.14	241.90	6696.79	91.50	36.15	91.50	98.38	21.56	0.28
6800.00	0.14	89.04	6796.79	91.44	36.16	91.44	98.33	21.57	0.27
6900.00	0.59	168.02	6896.79	90.94	36.38	90.94	97.95	21.80	0.58
7000.00	0.56	202.40	6996.78	89.98	36.30	89.98	97.03	21.97	0.34
7100.00	0.71	210.44	7096.77	89.00	35.80	89.00	95.93	21.91	0.17
7200.00	0.73	210.20	7196.77	87.92	35.17	87.92	94.69	21.80	0.02
7300.00	1.04	206.40	7296.75	86.56	34.44	86.56	93.16	21.70	0.32
7400.00	1.62	215.94	7396.73	84.60	33.21	84.60	90.89	21.43	0.62
7500.00	1.74	228.58	7496.69	82.46	31.25	82.46	88.18	20.75	0.39
7600.00	1.72	230.41	7596.64	80.50	28.96	80.50	85.55	19.78	0.06
7700.00	1.53	236.78	7696.60	78.81	26.69	78.81	83.21	18.71	0.26
7800.00	1.49	232.44	7796.57	77.29	24.54	77.29	81.09	17.61	0.12
7900.00	1.45	230.87	7896.53	75.70	22.53	75.70	78.98	16.57	0.06
8000.00	1.22	225.76	7996.51	74.16	20.79	74.16	77.02	15.66	0.26
8100.00	1.21	236.27	8096.48	72.83	19.15	72.83	75.31	14.73	0.22
8200.00	0.68	250.09	8196.47	72.05	17.72	72.05	74.19	13.81	0.57
8300.00	0.21	331.77	8296.47	72.01	17.07	72.01	74.01	13.34	0.68
8400.00	0.11	11.94	8396.47	72.26	17.00	72.26	74.24	13.24	0.15
8500.00	0.49	342.68	8496.46	72.76	16.90	72.76	74.70	13.07	0.40
8600.00	0.28	97.53	8596.46	73.13	17.01	73.13	75.09	13.10	0.66
8700.00	0.31	320.22	8696.46	73.31	17.08	73.31	75.27	13.12	0.55
8800.00	0.04	242.04	8796.46	73.50	16.88	73.50	75.41	12.93	0.30
8900.00	0.73	339.40	8896.46	74.08	16.62	74.08	75.92	12.64	0.74
9000.00	1.06	320.91	8996.45	75.40	15.81	75.40	77.04	11.84	0.43
9100.00	0.84	326.01	9096.43	76.73	14.82	76.73	78.15	10.93	0.23
9200.00	1.24	306.00	9196.42	77.97	13.53	77.97	79.14	9.84	0.53
9300.00	1.35	274.79	9296.39	78.70	11.49	78.70	79.54	8.30	0.70
9400.00	1.17	275.61	9396.37	78.90	9.30	78.90	79.45	6.72	0.18
9500.00	1.11	274.10	9496.35	79.07	7.33	79.07	79.41	5.30	0.07
9600.00	1.76	284.09	9596.32	79.51	4.88	79.51	79.66	3.51	0.70

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
9700.00	2.54	296.08	9696.25	80.86	1.40	80.86	80.87	0.99	0.90
9800.00	3.10	282.17	9796.13	82.41	-3.24	82.41	82.47	357.75	0.88
9900.00	3.99	279.90	9895.93	83.58	-9.32	83.58	84.09	353.64	0.90
10000.00	4.29	275.83	9995.67	84.56	-16.47	84.56	86.15	348.97	0.42
10100.00	2.89	307.59	10095.48	86.47	-22.20	86.47	89.28	345.60	2.38
10200.00	2.05	310.43	10195.39	89.17	-25.55	89.17	92.76	344.01	0.85
10300.00	2.41	327.80	10295.31	92.11	-28.03	92.11	96.28	343.07	0.76
10320.00	1.95	332.36	10315.30	92.77	-28.42	92.77	97.02	342.97	2.48



Vaughn Energy Services
Midland, Texas
432-563-5444
Surveyor: Danny Spring
Salvador Fee No 002H / API 30-025-41065



VES Survey Date: 07/22/2013



COG Operating LLC

Lea County, NM

Salvador Fee

#2H

OH

HOBBS OCD

OCT 31 2013

RECEIVED

Survey: MWD #1

Survey Report - Geographic

05 August, 2013



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3536.0usft (Original Well Elev)
Site:	Salvador Fee	MD Reference:	WELL @ 3536.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

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	Salvador Fee				
Site Position:		Northing:	446,719.90 usft	Latitude:	32° 13' 30.358 N
From:	Map	Easting:	771,549.40 usft	Longitude:	103° 27' 18.775 W
Position Uncertainty:	0.0 usft	Slot Radius:	6-1/8 "	Grid Convergence:	0.47 °

Well	#2H					
Well Position	+N/-S	0.0 usft	Northing:	446,719.90 usft	Latitude:	32° 13' 30.358 N
	+E/-W	0.0 usft	Easting:	771,549.40 usft	Longitude:	103° 27' 18.775 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,514.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/10/2013	7.28	60.16	48,422

Design	OH				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)	
	0.0	0.0	0.0	359.52	

Survey Program	Date 8/5/2013			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	10,320.0	GYRO (OH)	MWD	MWD - Standard
10,488.0	15,527.0	MWD #1 (OH)	MWD	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,320.0	1.95	332.36	10,315.3	92.7	-28.4	446,812.61	771,521.00	32° 13' 31.278 N	103° 27' 19.097 W
10,488.0	2.30	315.30	10,483.2	97.6	-32.1	446,817.54	771,517.30	32° 13' 31.327 N	103° 27' 19.140 W
10,551.0	2.50	314.30	10,546.1	99.5	-34.0	446,819.40	771,515.43	32° 13' 31.346 N	103° 27' 19.161 W
10,583.0	2.90	324.00	10,578.1	100.6	-34.9	446,820.54	771,514.45	32° 13' 31.357 N	103° 27' 19.173 W
10,614.0	3.60	353.50	10,609.0	102.2	-35.5	446,822.14	771,513.88	32° 13' 31.373 N	103° 27' 19.179 W
10,646.0	7.70	15.50	10,640.9	105.3	-35.1	446,825.21	771,514.34	32° 13' 31.403 N	103° 27' 19.174 W
10,677.0	11.80	14.00	10,671.4	110.4	-33.7	446,830.29	771,515.66	32° 13' 31.453 N	103° 27' 19.158 W
10,709.0	16.00	8.70	10,702.5	117.9	-32.3	446,837.82	771,517.12	32° 13' 31.528 N	103° 27' 19.140 W
10,740.0	20.00	2.00	10,732.0	127.5	-31.4	446,847.35	771,517.95	32° 13' 31.622 N	103° 27' 19.129 W
10,772.0	24.50	359.30	10,761.6	139.6	-31.3	446,859.46	771,518.06	32° 13' 31.742 N	103° 27' 19.127 W
10,803.0	28.90	358.20	10,789.3	153.5	-31.6	446,873.38	771,517.75	32° 13' 31.880 N	103° 27' 19.129 W



Wellplanning
Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3536.0usft (Original Well Elev)
Site:	Salvador Fee	MD Reference:	WELL @ 3536.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,835.0	32.10	357.10	10,816.8	169.7	-32.3	446,889.61	771,517.08	32° 13' 32.040 N	103° 27' 19.136 W
10,866.0	35.60	356.80	10,842.6	186.9	-33.2	446,906.85	771,516.16	32° 13' 32.211 N	103° 27' 19.145 W
10,898.0	38.30	357.30	10,868.2	206.2	-34.2	446,926.06	771,515.17	32° 13' 32.401 N	103° 27' 19.154 W
10,930.0	40.70	357.70	10,892.8	226.5	-35.1	446,946.39	771,514.28	32° 13' 32.602 N	103° 27' 19.163 W
10,961.0	42.90	357.90	10,915.9	247.1	-35.9	446,967.03	771,513.49	32° 13' 32.807 N	103° 27' 19.170 W
10,993.0	45.50	358.70	10,938.9	269.4	-36.6	446,989.33	771,512.83	32° 13' 33.028 N	103° 27' 19.175 W
11,025.0	49.00	359.30	10,960.6	292.9	-37.0	447,012.82	771,512.43	32° 13' 33.260 N	103° 27' 19.178 W
11,057.0	53.90	359.10	10,980.5	317.9	-37.3	447,037.84	771,512.08	32° 13' 33.508 N	103° 27' 19.180 W
11,089.0	58.50	358.90	10,998.3	344.5	-37.8	447,064.42	771,511.61	32° 13' 33.771 N	103° 27' 19.183 W
11,120.0	63.70	358.90	11,013.3	371.6	-38.3	447,091.54	771,511.09	32° 13' 34.039 N	103° 27' 19.186 W
11,151.0	68.40	359.10	11,025.9	400.0	-38.8	447,119.86	771,510.60	32° 13' 34.319 N	103° 27' 19.189 W
11,182.0	73.00	0.00	11,036.1	429.2	-39.0	447,149.11	771,510.37	32° 13' 34.609 N	103° 27' 19.189 W
11,214.0	76.70	0.60	11,044.5	460.1	-38.9	447,179.99	771,510.53	32° 13' 34.914 N	103° 27' 19.184 W
11,243.0	79.70	0.80	11,050.4	488.5	-38.5	447,208.38	771,510.88	32° 13' 35.195 N	103° 27' 19.177 W
11,274.0	81.80	0.20	11,055.4	519.1	-38.3	447,238.97	771,511.15	32° 13' 35.498 N	103° 27' 19.171 W
11,305.0	83.90	359.80	11,059.3	549.8	-38.3	447,269.73	771,511.15	32° 13' 35.802 N	103° 27' 19.168 W
11,336.0	85.70	359.50	11,062.1	580.7	-38.4	447,300.60	771,510.96	32° 13' 36.108 N	103° 27' 19.168 W
11,368.0	88.20	358.80	11,063.8	612.6	-38.9	447,332.55	771,510.48	32° 13' 36.424 N	103° 27' 19.170 W
11,399.0	90.60	358.00	11,064.1	643.6	-39.8	447,363.53	771,509.62	32° 13' 36.731 N	103° 27' 19.177 W
EOC- 11399.0 MD, 90.60° INC, 358.00° AZI									
11,431.0	93.20	357.80	11,063.0	675.6	-41.0	447,395.49	771,508.45	32° 13' 37.047 N	103° 27' 19.188 W
11,462.0	94.40	357.90	11,061.0	706.5	-42.1	447,426.40	771,507.29	32° 13' 37.353 N	103° 27' 19.198 W
11,526.0	94.80	358.20	11,055.9	770.3	-44.3	447,490.15	771,505.11	32° 13' 37.984 N	103° 27' 19.218 W
11,589.0	95.40	358.40	11,050.3	833.0	-46.1	447,552.88	771,503.25	32° 13' 38.605 N	103° 27' 19.233 W
11,652.0	97.50	358.30	11,043.2	895.5	-47.9	447,615.45	771,501.45	32° 13' 39.224 N	103° 27' 19.248 W
11,715.0	96.20	359.20	11,035.7	958.1	-49.3	447,677.98	771,500.09	32° 13' 39.843 N	103° 27' 19.258 W
11,779.0	92.80	0.00	11,030.6	1,021.9	-49.8	447,741.77	771,499.64	32° 13' 40.474 N	103° 27' 19.257 W
11,842.0	93.00	0.00	11,027.5	1,084.8	-49.8	447,804.69	771,499.64	32° 13' 41.097 N	103° 27' 19.251 W
11,937.0	94.30	358.40	11,021.4	1,179.6	-51.1	447,899.48	771,498.32	32° 13' 42.035 N	103° 27' 19.258 W
12,031.0	92.40	359.50	11,015.9	1,273.4	-52.8	447,993.30	771,496.60	32° 13' 42.963 N	103° 27' 19.269 W
12,126.0	92.50	359.40	11,011.9	1,368.3	-53.7	448,088.21	771,495.69	32° 13' 43.903 N	103° 27' 19.270 W
12,220.0	93.30	359.50	11,007.1	1,462.2	-54.6	448,182.09	771,494.79	32° 13' 44.832 N	103° 27' 19.272 W
12,315.0	94.80	358.40	11,000.4	1,556.9	-56.3	448,276.83	771,493.05	32° 13' 45.769 N	103° 27' 19.283 W
12,410.0	93.70	359.60	10,993.4	1,651.6	-58.0	448,371.55	771,491.40	32° 13' 46.707 N	103° 27' 19.293 W
12,504.0	94.20	359.40	10,986.9	1,745.4	-58.8	448,465.32	771,490.58	32° 13' 47.635 N	103° 27' 19.294 W
12,599.0	93.80	359.50	10,980.3	1,840.2	-59.7	448,560.09	771,489.67	32° 13' 48.572 N	103° 27' 19.296 W
12,693.0	92.80	359.50	10,974.8	1,934.0	-60.5	448,653.93	771,488.85	32° 13' 49.501 N	103° 27' 19.296 W
12,787.0	93.50	359.30	10,969.7	2,027.9	-61.5	448,747.78	771,487.87	32° 13' 50.430 N	103° 27' 19.299 W
12,882.0	94.90	357.00	10,962.7	2,122.6	-64.6	448,842.46	771,484.81	32° 13' 51.367 N	103° 27' 19.325 W
12,977.0	94.20	358.80	10,955.2	2,217.2	-68.1	448,937.10	771,481.35	32° 13' 52.304 N	103° 27' 19.357 W
13,072.0	94.90	1.40	10,947.6	2,311.9	-67.9	449,031.79	771,481.51	32° 13' 53.241 N	103° 27' 19.346 W
13,166.0	92.30	2.00	10,941.7	2,405.7	-65.1	449,125.55	771,484.29	32° 13' 54.168 N	103° 27' 19.304 W
13,261.0	93.30	1.90	10,937.1	2,500.5	-61.9	449,220.38	771,487.52	32° 13' 55.106 N	103° 27' 19.258 W
13,356.0	92.30	1.00	10,932.5	2,595.3	-59.5	449,315.24	771,489.92	32° 13' 56.045 N	103° 27' 19.221 W
13,450.0	92.60	0.00	10,928.4	2,689.2	-58.7	449,409.15	771,490.74	32° 13' 56.974 N	103° 27' 19.202 W
13,545.0	93.50	358.90	10,923.4	2,784.1	-59.6	449,504.01	771,489.83	32° 13' 57.913 N	103° 27' 19.204 W
13,639.0	93.70	0.20	10,917.5	2,877.9	-60.3	449,597.82	771,489.10	32° 13' 58.841 N	103° 27' 19.204 W
13,734.0	94.90	359.50	10,910.4	2,972.6	-60.5	449,692.55	771,488.85	32° 13' 59.778 N	103° 27' 19.197 W
13,828.0	94.40	0.80	10,902.7	3,066.3	-60.3	449,786.23	771,489.09	32° 14' 0.705 N	103° 27' 19.186 W
13,923.0	95.80	0.00	10,894.3	3,161.0	-59.6	449,880.85	771,489.75	32° 14' 1.642 N	103° 27' 19.169 W
14,017.0	93.80	0.10	10,886.4	3,254.6	-59.6	449,974.52	771,489.84	32° 14' 2.568 N	103° 27' 19.159 W
14,112.0	93.70	0.80	10,880.2	3,349.4	-58.8	450,069.31	771,490.58	32° 14' 3.506 N	103° 27' 19.141 W
14,206.0	92.70	2.20	10,875.0	3,443.2	-56.4	450,163.13	771,493.04	32° 14' 4.434 N	103° 27' 19.104 W
14,301.0	93.10	1.30	10,870.2	3,538.1	-53.5	450,257.96	771,495.94	32° 14' 5.373 N	103° 27' 19.061 W
14,395.0	96.40	0.90	10,862.4	3,631.7	-51.7	450,351.61	771,497.73	32° 14' 6.299 N	103° 27' 19.031 W



Wellplanning

Survey Report - Geographic

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Lea County, NM	TVD Reference:	WELL @ 3536.0usft (Original Well Elev)
Site:	Salvador Fee	MD Reference:	WELL @ 3536.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
14,490.0	94.90	1.80	10,853.0	3,726.2	-49.4	450,446.12	771,499.96	32° 14' 7.234 N	103° 27' 18.996 W
14,584.0	93.50	2.60	10,846.1	3,819.9	-45.8	450,539.79	771,503.56	32° 14' 8.161 N	103° 27' 18.946 W
14,679.0	91.00	2.70	10,842.4	3,914.7	-41.4	450,634.61	771,507.95	32° 14' 9.099 N	103° 27' 18.885 W
14,773.0	92.90	2.50	10,839.2	4,008.6	-37.2	450,728.45	771,512.21	32° 14' 10.027 N	103° 27' 18.827 W
14,868.0	93.10	1.20	10,834.2	4,103.4	-34.1	450,823.27	771,515.27	32° 14' 10.965 N	103° 27' 18.782 W
14,963.0	92.40	1.40	10,829.7	4,198.2	-32.0	450,918.14	771,517.43	32° 14' 11.903 N	103° 27' 18.748 W
15,058.0	92.40	1.70	10,825.7	4,293.1	-29.4	451,013.02	771,520.00	32° 14' 12.842 N	103° 27' 18.709 W
15,152.0	93.50	2.00	10,820.9	4,386.9	-26.4	451,106.84	771,523.03	32° 14' 13.770 N	103° 27' 18.665 W
15,247.0	92.60	2.90	10,815.8	4,481.7	-22.3	451,201.62	771,527.08	32° 14' 14.708 N	103° 27' 18.609 W
15,342.0	94.10	3.70	10,810.3	4,576.4	-16.9	451,296.30	771,532.54	32° 14' 15.644 N	103° 27' 18.536 W
15,436.0	92.00	3.70	10,805.3	4,670.1	-10.8	451,389.96	771,538.60	32° 14' 16.571 N	103° 27' 18.457 W
15,482.0	91.10	4.00	10,804.0	4,715.9	-7.7	451,435.84	771,541.68	32° 14' 17.024 N	103° 27' 18.416 W
15,527.0	91.10	4.00	10,803.2	4,760.8	-4.6	451,480.73	771,544.82	32° 14' 17.468 N	103° 27' 18.376 W

BHL - 15527.0 'MD, 91.10° INC, 4.00° AZI

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
11,399.0	11,064.1	643.6	-39.8	EOC- 11399.0 'MD, 90.60° INC, 358.00° AZI
15,527.0	10,803.2	4,760.8	-4.6	BHL - 15527.0 'MD, 91.10° INC, 4.00° AZI

Checked By: _____ Approved By: _____ Date: _____



COG Operating LLC
Project: Lea County, NM
Site: Salvador Fee
Well: #2H
Wellbore: OH
Plan: Plan #2 Rev.1 (#2H/OH)

Section Details

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	
1	10320.0	1.95	332.36	10315.3	92.7	-28.4	0.00	0.00	92.9	
2	10626.0	1.95	332.36	10621.1	101.9	-33.2	0.00	0.00	102.2	
3	11374.4	94.12	0.01	11070.0	599.2	-40.8	12.34	27.60	599.5	
4	13946.9	94.12	0.01	10885.2	3165.0	-40.3	0.00	0.00	3165.2	TGT1(Salv#2H)
5	14013.4	92.79	0.00	10881.2	3231.4	-40.3	2.00	-179.77	3231.6	
6	15578.4	92.79	0.00	10805.0	4794.5	-40.2	0.00	0.00	4794.7	PBHL(Salv#2H)

WELL DETAILS: #2H

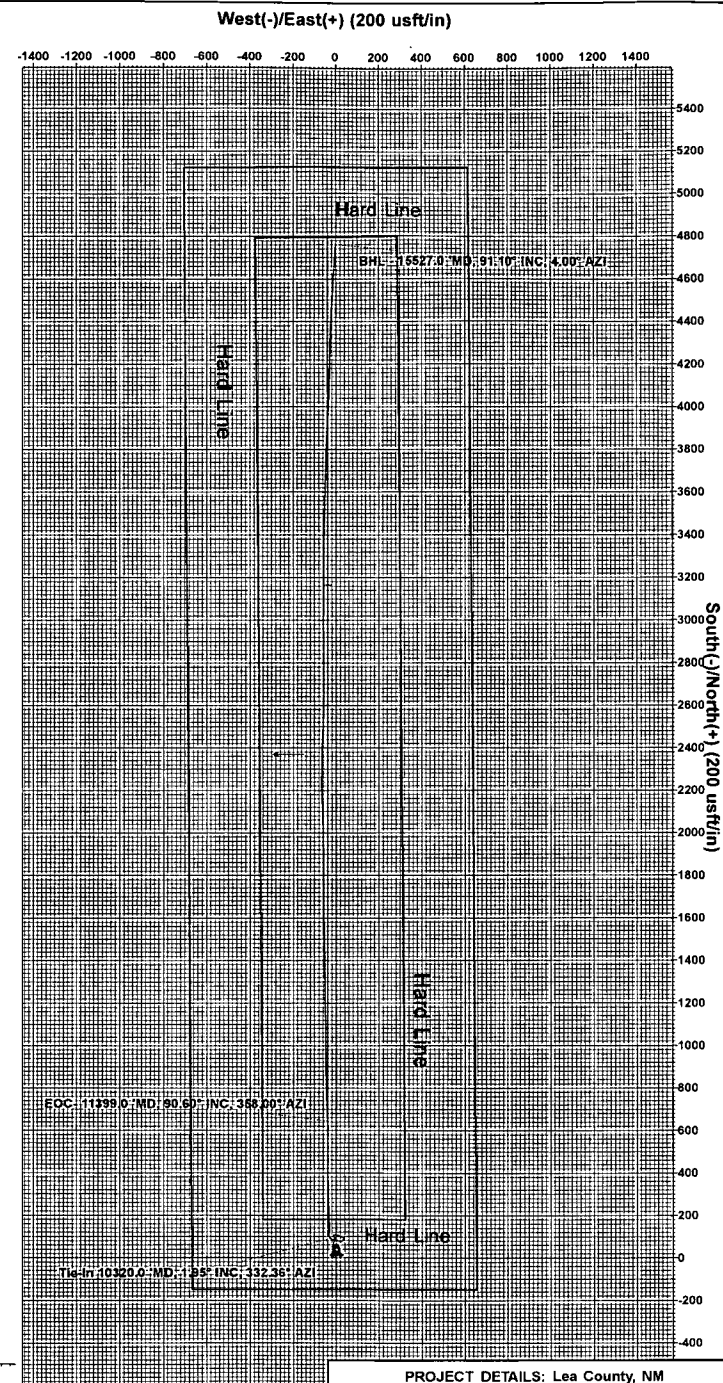
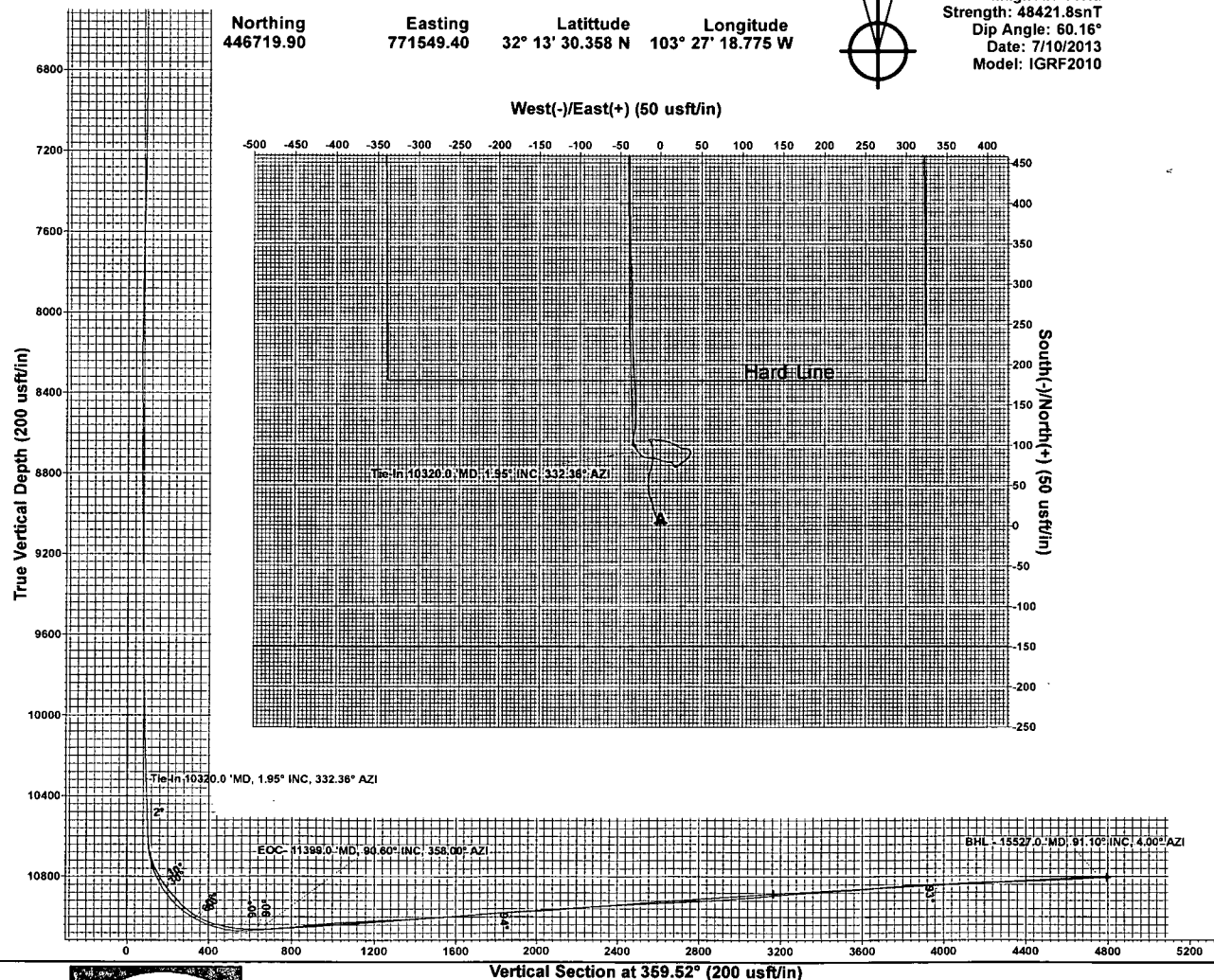
Ground Elevation:: 3514.0
RKB Elevation: WELL @ 3536.0usft (Original Well Elev)
Rig Name: Original Well Elev

Northing 446719.90 Easting 771549.40 Latitude 32° 13' 30.358 N Longitude 103° 27' 18.775 W



Azimuths to Grid North
True North: -0.47°
Magnetic North: 6.81°

Magnetic Field
Strength: 48421.8snT
Dip Angle: 60.16°
Date: 7/10/2013
Model: IGRF2010



Plan: Plan #2 Rev.1 (#2H/OH)
Created By: Well Planner Date: 6:15, August 05 2013

Terra Directional Services
322 Spring Hill Drive, Suite A100, Spring, Texas 77386
432.425.7532

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