

Results of Directional Survey

DD

API number:	30-025-39860			
OGRID:		Operator:	COG OPERATING LLC	
		Property:	J C FEDERAL	# 50

surface	ULSTR:	L	22	T	17S	R	32E
				1610	FSL	685	FWL

BH Loc	ULSTR:	L	22	T	17S	R	32E
7135	MD	7120.5	TVD	1671	FSL	971	FWL

Top Perf/OH	ULSTR:	L	22	T	17S	R	32E
5530	MD	5515.6	TVD	1665	FSL	978	FWL

Bot Perf/OH	ULSTR:	L	22	T	17S	R	32E
6870	MD	6855.5	TVD	1669	FSL	972	FWL

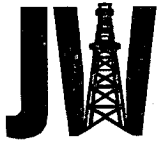
	MD	N/S	E/W	VD
	5448	55.35	291.09	5433.59
TOP PERFS/OH	5530	54.66	292.90	5515.57
	5542	54.56	293.16	5527.57
	6477	57.00	288.62	6462.51
BOT PERFS/OH	6870	59.34	287.11	6855.51
	6524	57.28	288.44	6509.51

NEXT TO LAST	6477	57.00	288.62	6462.51
LAST READING	6524	57.28	288.44	6509.51
TD	7135	60.92	286.10	7120.51

Surface Location	1610	FS	685	FW
Projected BHL	1671	FS	971	FW
Location of				
Top Perfs/OH	1665	FS	978	FW
Bottom Perfs/OH	1669	FS	972	FW

SUMMARY of Subsurface Locations

Surface Location	L-22-17S-32E	1610	FS	685	FW	Vert. Depth
Top Perfs/OH	L-22-17S-32E	1665	FS	978	FW	5515.57
Bottom Perfs/OH	L-22-17S-32E	1669	FS	972	FW	6855.51
Projected TD	L-22-17S-32E	1671	FS	971	FW	7120.51



DRILLING INC. Oil Well Drilling Contractor

Post Office Box 160 Artesia, New Mexico 88211-0160 Office (575) 748-8704 Fax (575) 748-8719

HOBBS OCD

MAY 10 2011

March 21, 2011

RECEIVED

COG Operating, LLC
500 W. Texas, Suite 1300
Midland, Texas 79701

Re: JC Federal #50
Sec. 22, T-17-S, R-32-E
Lea County, New Mexico

Attn: John Coffman

The following is a Deviation Survey on the referenced well in Lea County, New Mexico:

192' - 0.5°
488' - 1°
809' - 1°
1253' - 1°
1716' - 1°

SUR: L-22-17s-32e, 1610/S & 685/W
BHL: L-22-17s-32e, 1671/S & 971/W
API # 30-025-39860

Sincerely,

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 21st day of March, 2011 by Gary W. Chappell.



MY COMMISSION EXPIRES
OFFICIAL SEAL
Cisha Morgan
NOTARY PUBLIC-STATE OF NEW MEXICO

My commission expires: 10/28/2014

NOTARY PUBLIC



HOBBS OCD

MAY 10 2011

RECEIVED

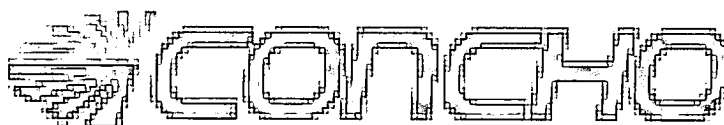
SUR: L-22-17s-32e, 1610/S & 685/W
BHL: L-22-17s-32e, 1671/S & 971/W
API # 30-025-39860

Ryan Energy Directional Drilling Report

Field: Lea Co, NM
Site: J C Federal #50
Well: #50
Wellpath: OH

Prepared For:

COG Operating LLC



Ryan Energy Technology

19510 Oil Center Blvd
Houston, TX 77073
Ph: 281-443-1414
Fx: 281-443-1676

www.ryanenergy.com



Ryan Energy Technologies Survey Report



Company: COG Operating LLC	Date: 3/17/2011	Time: 11:23:38	Page: 1
Field: Lea Co, NM	Co-ordinate(N/E) Reference:	Site: J C Federal #50, Grid North	
Site: J C Federal #50	Vertical (TVD) Reference:	SITE 4030.0	
Well: #50	Section (VS) Reference:	Well (0.00N,0.00E,80.18Azi)	
Wellpath: OH	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Field: Lea Co, NM New Mexico U.S.A.	Map System: US State Plane Coordinate System 1927	Map Zone: New Mexico, Eastern Zone
Geo Datum: NAD27 (Clarke 1866)	Coordinate System: Site Centre	
Sys Datum: Mean Sea Level	Geomagnetic Model: IGRF2010	

Site: J C Federal #50 22-17S-32E Lea Co, NM	Site Position:	Northings: 661470.80 ft	Latitude: 32 49 1.771 N
From: Map	Easting: 676105.90 ft	Longitude: 103 45 36.368 W	
Position Uncertainty: 0.00 ft		North Reference: Grid	
Ground Level: 4030.00 ft		Grid Convergence: 0.31 deg	

Well: #50	Slot Name:
Well Position: +N/-S 0.00 ft	Latitude: 32 49 1.771 N
+E/-W 0.00 ft	Longitude: 103 45 36.368 W
Position Uncertainty: 0.00 ft	

Wellpath: OH	Drilled From: Surface
Current Datum: SITE	Tie-on Depth: 0.00 ft
Magnetic Data: 3/4/2011	Above System Datum: Mean Sea Level
Field Strength: 49007 nT	Declination: 7.75 deg
Vertical Section: Depth From (TVD)	Mag Dip Angle: 60.71 deg
ft	+N/-S
	+E/-W
	Direction
	deg
0.00	0.00
	0.00
	80.18

Survey Program for Definitive Wellpath			Version: 0	Tool Name
Date: 3/17/2011	Validated: No	Toolcode		
Actual From	To	Survey		
ft	ft			
100.00	2049.00	Survey #1 (100.00-2049.00)	Gyro	Gyro
2132.00	6477.00	Survey #2 (2132.00-6477.00)	Ryan MWD	Ryan MWD
6524.00	6524.00	Survey #3 (6524.00-6524.00)	Projection	Projection

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	TIE LINE
100.00	0.64	324.29	100.00	0.45	-0.33	-0.24	0.64	0.64	0.00	Gyro
200.00	0.63	313.09	199.99	1.28	-1.05	-0.82	0.12	-0.01	-11.20	Gyro
300.00	0.71	318.58	299.98	2.12	-1.86	-1.48	0.10	0.08	5.49	Gyro
400.00	0.85	299.97	399.98	2.96	-2.92	-2.37	0.29	0.14	-18.61	Gyro
500.00	0.97	278.95	499.96	3.46	-4.40	-3.74	0.35	0.12	-21.02	Gyro
600.00	0.88	274.79	599.95	3.66	-6.00	-5.29	0.11	-0.09	-4.16	Gyro
700.00	0.65	263.97	699.94	3.66	-7.33	-6.60	0.27	-0.23	-10.82	Gyro
800.00	0.77	251.12	799.93	3.38	-8.53	-7.82	0.20	0.12	-12.85	Gyro
900.00	0.54	249.12	899.93	3.00	-9.60	-8.95	0.23	-0.23	-2.00	Gyro
1000.00	0.68	247.07	999.92	2.60	-10.59	-9.99	0.14	0.14	-2.05	Gyro
1100.00	0.62	248.39	1099.92	2.17	-11.64	-11.10	0.06	-0.06	1.32	Gyro
1200.00	0.68	245.20	1199.91	1.72	-12.68	-12.20	0.07	0.06	-3.19	Gyro
1300.00	0.42	218.97	1299.90	1.19	-13.45	-13.05	0.36	-0.26	-26.23	Gyro
1400.00	0.42	260.10	1399.90	0.84	-14.04	-13.69	0.30	0.00	41.13	Gyro
1500.00	0.16	109.64	1499.90	0.73	-14.27	-13.94	0.56	-0.26	-150.46	Gyro
1600.00	0.66	49.32	1599.90	1.06	-13.70	-13.32	0.60	0.50	-60.32	Gyro
1700.00	1.01	59.46	1699.89	1.88	-12.51	-12.00	0.38	0.35	10.14	Gyro
1800.00	1.24	60.24	1799.87	2.87	-10.81	-10.16	0.23	0.23	0.78	Gyro
1900.00	1.49	58.67	1899.84	4.08	-8.76	-7.93	0.25	0.25	-1.57	Gyro
2000.00	1.89	53.14	1999.80	5.74	-6.33	-5.26	0.43	0.40	-5.53	Gyro



Ryan Energy Technologies

Survey Report



Company: COG Operating LLC
Field: Lea Co, NM
Site: J C Federal #50
Well: #50
Wellpath: OH

Date: 3/17/2011 Time: 11:23:38 Page: 2
Co-ordinate(NE) Reference: Site: J C Federal #50, Grid North
Vertical (TVD) Reference: SITE 4030.0
Section (VS) Reference: Well (0.00N,0.00E,80.18Azi)
Survey Calculation Method: Minimum Curvature Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	+N/-S ft	+E/-W ft	VS ft	DLS deg/100ft	Build deg/100ft	Turn deg/100ft	Tool/Comment
2049.00	1.68	52.39	2048.77	6.67	-5.11	-3.90	0.43	-0.43	-1.53	Gyro
2132.00	2.00	50.40	2131.73	8.33	-3.03	-1.57	0.39	0.39	-2.40	Ryan MWD
2194.00	3.80	57.30	2193.65	10.13	-0.47	1.26	2.95	2.90	11.13	Ryan MWD
2257.00	5.60	67.40	2256.43	12.44	4.12	6.19	3.13	2.86	16.03	Ryan MWD
2351.00	5.40	78.80	2350.00	15.06	12.70	15.08	1.18	-0.21	12.13	Ryan MWD
2445.00	4.80	77.20	2443.63	16.79	20.87	23.43	0.66	-0.64	-1.70	Ryan MWD
2538.00	5.50	91.50	2536.26	17.54	29.12	31.69	1.57	0.75	15.38	Ryan MWD
2632.00	5.30	87.20	2629.84	17.63	37.96	40.41	0.48	-0.21	-4.57	Ryan MWD
2726.00	6.00	76.50	2723.39	18.99	47.08	49.62	1.34	0.74	-11.38	Ryan MWD
2826.00	6.20	59.80	2822.83	22.93	56.82	59.90	1.78	0.20	-16.70	Ryan MWD
2920.00	5.80	77.40	2916.32	26.52	65.85	69.41	1.99	-0.43	18.72	Ryan MWD
3014.00	5.00	75.50	3009.90	28.58	74.45	78.23	0.87	-0.85	-2.02	Ryan MWD
3108.00	4.60	84.00	3103.58	30.00	82.16	86.08	0.87	-0.43	9.04	Ryan MWD
3201.00	4.30	82.70	3196.30	30.83	89.33	93.28	0.34	-0.32	-1.40	Ryan MWD
3294.00	4.00	78.30	3289.05	31.93	95.97	100.01	0.47	-0.32	-4.73	Ryan MWD
3388.00	5.40	82.10	3382.73	33.21	103.56	107.70	1.52	1.49	4.04	Ryan MWD
3481.00	5.30	81.40	3475.33	34.45	112.14	116.37	0.13	-0.11	-0.75	Ryan MWD
3576.00	5.50	84.30	3569.91	35.56	121.01	125.30	0.36	0.21	3.05	Ryan MWD
3670.00	5.20	84.40	3663.50	36.42	129.73	134.04	0.32	-0.32	0.11	Ryan MWD
3762.00	7.30	75.10	3754.95	38.33	139.53	144.02	2.53	2.28	-10.11	Ryan MWD
3856.00	6.90	77.20	3848.23	41.12	150.81	155.61	0.51	-0.43	2.23	Ryan MWD
3949.00	6.90	77.00	3940.55	43.61	161.70	166.77	0.03	0.00	-0.22	Ryan MWD
4042.00	6.50	77.30	4032.92	46.03	172.27	177.60	0.43	-0.43	0.32	Ryan MWD
4136.00	6.50	77.30	4126.31	48.37	182.66	188.23	0.00	0.00	0.00	Ryan MWD
4229.00	5.50	85.50	4218.81	49.87	192.23	197.92	1.41	-1.08	8.82	Ryan MWD
4323.00	5.40	85.60	4312.38	50.57	201.14	206.81	0.11	-0.11	0.11	Ryan MWD
4417.00	5.50	82.20	4405.96	51.52	210.01	215.72	0.36	0.11	-3.62	Ryan MWD
4511.00	5.40	85.10	4499.53	52.51	218.88	224.63	0.31	-0.11	3.09	Ryan MWD
4605.00	4.90	83.60	4593.15	53.33	227.28	233.04	0.55	-0.53	-1.60	Ryan MWD
4699.00	4.70	81.90	4686.82	54.32	235.08	240.90	0.26	-0.21	-1.81	Ryan MWD
4793.00	5.10	85.00	4780.48	55.23	243.05	248.91	0.51	0.43	3.30	Ryan MWD
4886.00	4.90	84.20	4873.12	55.99	251.12	256.99	0.23	-0.22	-0.86	Ryan MWD
4979.00	4.90	87.20	4965.78	56.58	259.04	264.90	0.28	0.00	3.23	Ryan MWD
5072.00	5.00	85.40	5058.44	57.10	267.05	272.87	0.20	0.11	-1.94	Ryan MWD
5166.00	4.80	87.20	5152.09	57.62	275.06	280.86	0.27	-0.21	1.91	Ryan MWD
5260.00	3.70	98.90	5245.84	57.35	281.98	287.63	1.48	-1.17	12.45	Ryan MWD
5354.00	3.00	101.90	5339.67	56.37	287.39	292.79	0.77	-0.74	3.19	Ryan MWD
5448.00	1.70	111.80	5433.59	55.35	291.09	296.26	1.44	-1.38	10.53	Ryan MWD
5542.00	1.00	108.80	5527.57	54.56	293.16	298.17	0.75	-0.74	-3.19	Ryan MWD
5634.00	1.00	98.50	5619.55	54.19	294.71	299.64	0.20	0.00	-11.20	Ryan MWD
5728.00	0.70	302.90	5713.55	54.38	295.04	299.99	1.77	-0.32	-165.53	Ryan MWD
5821.00	0.60	285.80	5806.54	54.82	294.10	299.14	0.23	-0.11	-18.39	Ryan MWD
5916.00	0.60	278.70	5901.54	55.03	293.13	298.22	0.08	0.00	-7.47	Ryan MWD
6010.00	0.70	293.20	5995.53	55.33	292.11	297.27	0.20	0.11	15.43	Ryan MWD
6104.00	0.70	296.80	6089.52	55.81	291.07	296.33	0.05	0.00	3.83	Ryan MWD
6197.00	0.40	284.50	6182.52	56.15	290.25	295.58	0.34	-0.32	-13.23	Ryan MWD
6291.00	0.40	283.50	6276.52	56.31	289.61	294.98	0.01	0.00	-1.06	Ryan MWD
6477.00	0.40	326.30	6462.51	57.00	288.62	294.12	0.16	0.00	23.01	Ryan MWD
6524.00	0.40	326.30	6509.51	57.28	288.44	293.98	0.00	0.00	0.00	PROJECTED to TD

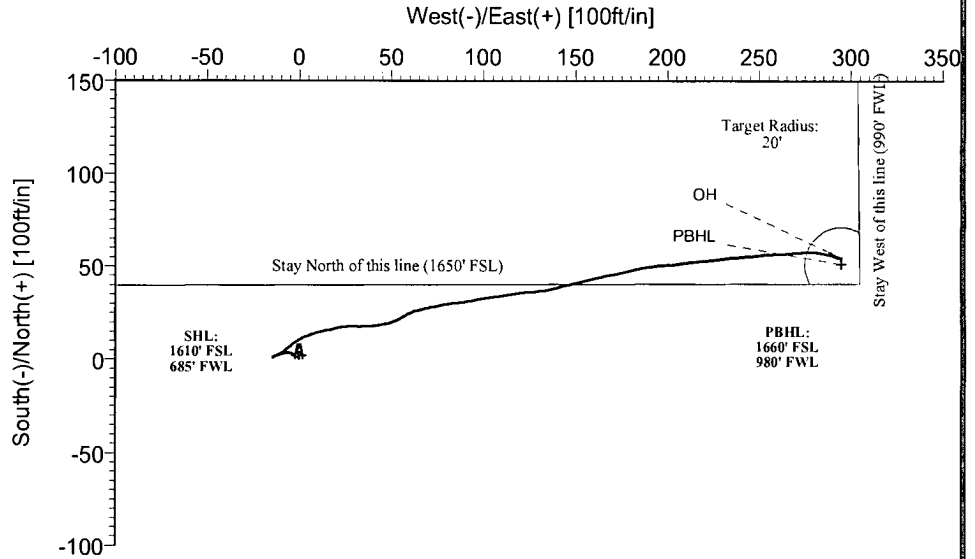
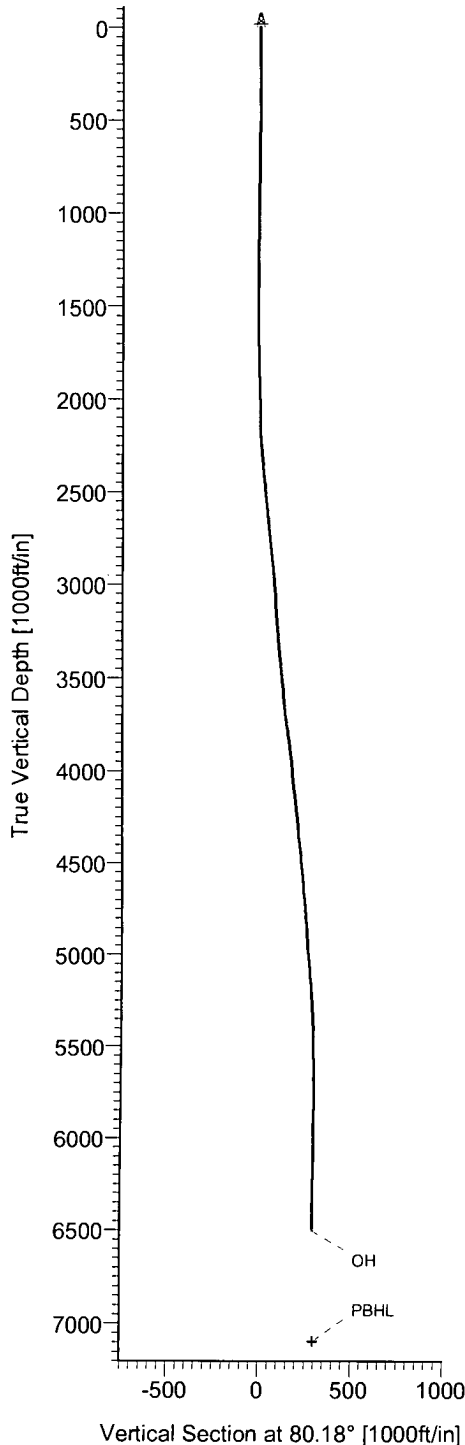


COG Operating LLC

Field: Lea Co, NM
Site: J C Federal #50
Well: #50
Wellpath: OH



Azimuths to Grid North
True North: -0.31°
Magnetic North: 7.44°
Magnetic Field
Strength: 49007nT
Dip Angle: 60.71°
Date: 3/4/2011
Model: IGRF2010



TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL	7100.00	51.00	294.60	661521.80	676400.50	32°49'02.260N	103°45'32.912W

FIELD DETAILS
Lea Co, NM
New Mexico
U.S.A.
Geodetic System: US State Plane Coordinate System 1927
Ellipsoid: NAD27 (Clarke 1866)
Zone: New Mexico, Eastern Zone
Magnetic Model: IGRF2010
System Datum: Mean Sea Level
Local North: Grid North

WELLPATH DETAILS			
Rig:	JW #4	SITE	OH
Ref. Datum:	4030.00ft		
V. Section Angle	Origin +N/-S	Origin +E/-W	Starting From TVD
80.18°	0.00	0.00	0.00

SITE DETAILS
J C Federal #50
22-17S-32E
Lea Co, NM
Site Centre Northing: 661470.80
Easting: 676105.90
Ground Level: 4030.00
Positional Uncertainty: 0.00
Convergence: 0.31