

Results of Directional Survey

DD

API number:	30-025-40238			
OGRID:		Operator:	COG OPERATING LLC	
		Property:	GC FEDERAL	# 57D

surface	ULSTR:	K	19	T	17S	R	32E
				1690	FSL	1895	FWL

BH Loc	ULSTR:	K	19	T	17S	R	32E
7025	MD	7013.1	TVD	1675	FSL	1656	FWL

Top Perf/OH	ULSTR:	K	19	T	17S	R	32E
5330	MD	5318.1	TVD	1662	FSL	1664	FWL

Bot Perf/OH	ULSTR:	K	19	T	17S	R	32E
6680	MD	6652.6	TVD	2028	FSL	1919	FWL

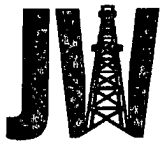
	MD	N/S	E/W	VD
	5238	-27.30	-229.00	5226.1
TOP PERFS/OH	5330	-27.79	-231.45	5318.10
	5332	-27.80	-231.50	5320.10
	7263	340.80	31.50	7235.60
BOT PERFS/OH	6680	337.60	24.45	6652.60
	7354	341.30	32.60	7326.60

NEXT TO LAST	5863	-23.90	-237.00	5851.10
LAST READING	5917	-23.50	-237.10	5905.10
TD	7025	-15.29	-239.15	7013.10

Surface Location	1690	FS	1895	FW
Projected BHL	1675	FS	1656	FW
Location of				
Top Perfs/OH	1662	FS	1664	FW
Bottom Perfs/OH	2028	FS	1919	FW

SUMMARY of Subsurface Locations

Surface Location	K-19-17S-32E	1690	FS	1895	FW	Vert. Depth
Top Perfs/OH	K-19-17S-32E	1662	FS	1664	FW	5318.10
Bottom Perfs/OH	K-19-17S-32E	2028	FS	1919	FW	6652.60
Projected TD	K-19-17S-32E	1675	FS	1656	FW	7013.10



DRILLING INC. Oil Well Drilling Contractor

Post Office Box 160 Artesia, New Mexico 88211-0160 Office (505) 748-8704 Fax (505) 748-8719

HOBBS OCD

March 2, 2012

MAY 14 2012

RECEIVED

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

Re: GC Federal # 57
Sec. 19, 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:

212' - 0.5°	652' - 0.75°	1209' - 0.5°	2079' - 1°
474' - 1°	959' - 0.75°	1646' - 1.25°	

SUR: K-19-17s-32e, 1690/S & 1895/W
BHL: K-19-17s-32e, 1675/S & 1656/W
API # 30-025-40238

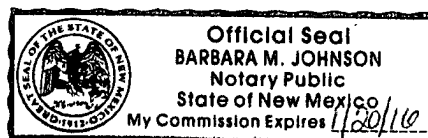
Sincerely,

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 2nd day of March, 2012 by Gary W. Chappell.

NOTARY PUBLIC





HOBBS OCD

MAY 14 2012

RECEIVED

COG OPERATING LLC

Lea County, NM (NAD27 NME)

GC Federal #57

GC Federal #57

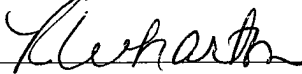
OH - Job #32D0212185

SUR: K-19-17s-32e, 1690/S & 1895/W
BHL: K-19-17s-32e, 1675/S & 1656/W
API # 30-025-40238

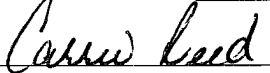
Design: Actual

SDI Standard Survey Report

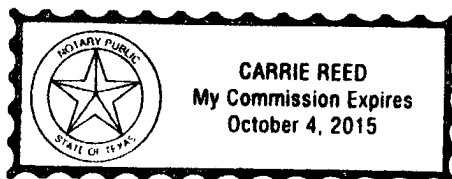
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 15th of March, 2012.



Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well GC Federal #57
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	RF @ 3941 0usft (JW #4)
Site:	GC Federal #57	MD Reference:	RF @ 3941 0usft (JW #4)
Well:	GC Federal #57	North Reference:	Grid
Wellbore:	OH - Job #32D0212185	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Lea County, NM (NAD27 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	GC Federal #57		
Site Position:	Map	Northing:	661,495 70 usft
From:		Easting:	661,448 40 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 49' 2 771 N
		Longitude:	103° 48' 28 118 W
		Grid Convergence:	0 28 °

Well	GC Federal #57		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 2 771 N
		Longitude:	103° 48' 28 118 W
		Ground Level:	3,928 0 usft

Wellbore	OH - Job #32D0212185				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/18/2012	7 66	60 68	48,876

Design	Actual			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth: 0 0
Vertical Section:	Depth From (TVD)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 0	0 0	0 0	262 50

Survey Program	Date 3/15/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	2,050 0	Gyro (OH - Job #32D0212185)	Keeper	Standard Wireline Keeper ver 1 0 2
2,179 0	5,917 0	MWD (OH - Job #32D0212185)	MWD	MWD - Standard

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0
100 0	0 12	23 13	100 0	0 1	0 0	23 13	0 1
200 0	0 29	322 94	200 0	0 4	-0 1	349 91	0 4
300 0	0 45	335 74	300 0	1 0	-0 4	338 08	1 0
400 0	0 35	324 95	400 0	1 6	-0 7	335 23	1 7
500 0	0 15	234 13	500 0	1 7	-1 0	330 00	2 0
600 0	0 18	224 13	600 0	1 5	-1 2	321 78	2 0
700 0	0 39	215 70	700 0	1 2	-1 5	307 18	1 9
800 0	0 24	204 81	800 0	0 7	-1 8	290 87	1 9
900 0	0 14	149 60	900 0	0 4	-1 8	282 14	1 9
1,000 0	0 61	149 39	1,000 0	-0 2	-1 5	263 63	1 5



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Site:	GC Federal #57	MD Reference:	RF @ 3941 0usft (JW #4)
Well:	GC Federal #57	North Reference:	Grid
Wellbore:	OH - Job #32D0212185	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,100 0	0 51	162 58	1,100 0	-1 1	-1 1	226 34	1 5	
1,200 0	0 37	154 75	1,200 0	-1 8	-0 8	205 16	2 0	
1,300 0	0 39	183 66	1,300 0	-2 4	-0 7	196 58	2 5	
1,400 0	0 42	146 47	1,400 0	-3 0	-0 5	189 94	3 1	
1,500 0	0 54	116 75	1,500 0	-3 6	0 1	178 56	3 6	
1,600 0	0 90	84 60	1,600 0	-3 7	1 3	160 75	3 9	
1,700 0	1 70	64 26	1,699 9	-3 0	3 4	131 17	4 5	
1,800 0	1 85	63 40	1,799 9	-1 6	6 2	104 62	6 4	
1,900 0	1 74	62 59	1,899 8	-0 2	9 0	91 23	9 0	
2,000 0	1 61	69 30	1,999 8	1 0	11 6	85 08	11 7	
2,050 0	1 56	75 33	2,049 8	1 4	13 0	83 74	13 0	
Gyro Tie-in								
2,179 0	1 41	62 10	2,178 7	2 6	16 1	80 77	16 3	
2,273 0	0 44	308 50	2,272 7	3 4	16 8	78 64	17 1	
2,335 0	0 67	347 54	2,334 7	3 9	16 5	76 80	17 0	
2,398 0	0 95	313 10	2,397 7	4 6	16 1	74 05	16 7	
2,460 0	1 80	294 98	2,459 7	5 4	14 8	70 12	15 8	
2,522 0	2 31	278 14	2,521 7	5 9	12 7	64 91	14 0	
2,617 0	3 49	253 15	2,616 5	5 4	8 0	56 20	9 7	
2,680 0	3 84	258 41	2,679 4	4 4	4 1	43 21	6 0	
2,743 0	4 28	266 98	2,742 3	3 9	-0 3	355 80	3 9	
2,804 0	4 95	267 91	2,803 1	3 6	-5 2	305 03	6 3	
2,898 0	5 66	273 01	2,896 7	3 7	-13 9	285 06	14 4	
2,992 0	5 26	272 60	2,990 2	4 2	-22 8	280 36	23 2	
3,085 0	5 24	271 66	3,082 8	4 5	-31 3	278 15	31 6	
3,178 0	6 07	263 53	3,175 4	4 1	-40 4	275 73	40 6	
3,271 0	5 43	258 05	3,267 9	2 6	-49 6	272 99	49 7	
3,364 0	5 15	257 11	3,360 5	0 7	-58 0	270 74	58 0	
3,458 0	6 46	260 53	3,454 0	-1 1	-67 3	269 09	67 3	
3,551 0	6 47	260 23	3,546 4	-2 8	-77 7	267 92	77 7	
3,645 0	6 51	259 05	3,639 8	-4 7	-88 1	266 93	88 2	
3,738 0	6 12	261 40	3,732 3	-6 5	-98 2	266 23	98 4	
3,832 0	6 16	258 87	3,825 7	-8 2	-108 1	265 67	108 4	
3,926 0	6 16	256 88	3,919 2	-10 3	-117 9	265 00	118 4	
4,020 0	5 50	261 22	4,012 7	-12 1	-127 3	264 55	127 9	
4,113 0	5 14	260 44	4,105 3	-13 5	-135 8	264 32	136 5	
4,207 0	5 51	260 43	4,198 9	-15 0	-144 4	264 08	145 2	
4,301 0	5 14	260 20	4,292 5	-16 4	-153 0	263 87	153 9	
4,394 0	5 24	259 93	4,385 1	-17 9	-161 3	263 67	162 3	
4,487 0	4 92	257 98	4,477 8	-19 5	-169 4	263 45	170 5	
4,580 0	5 79	264 94	4,570 3	-20 7	-178 0	263 37	179 2	
4,673 0	5 89	262 74	4,662 9	-21 7	-187 4	263 39	188 6	
4,768 0	5 60	262 22	4,757 4	-23 0	-196 8	263 35	198 1	
4,861 0	5 50	261 31	4,850 0	-24 2	-205 7	263 28	207 1	
4,924 0	5 04	259 29	4,912 7	-25 2	-211 4	263 20	212 9	



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Well:	GC Federal #57	North Reference:	Grid
Wellbore:	OH - Job #32D0212185	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
4,987 0	4 14	259 66	4,975 5	-26 1	-216 4	263 11	217 9
5,049 0	3 17	265 60	5,037 4	-26 7	-220 3	263 10	221 9
5,143 0	2 80	266 31	5,131 2	-27 0	-225 2	263 16	226 8
5,238 0	1 81	265 08	5,226 1	-27 3	-229 0	263 20	230 6
5,332 0	1 33	247 67	5,320 1	-27 8	-231 5	263 14	233 1
5,426 0	0 77	291 66	5,414 1	-28 0	-233 0	263 14	234 7
5,520 0	0 87	309 59	5,508 1	-27 3	-234 2	263 34	235 8
5,614 0	0 84	316 06	5,602 1	-26 4	-235 2	263 60	236 7
5,677 0	1 07	312 87	5,665 1	-25 7	-236 0	263 80	237 4
5,769 0	0 50	338 94	5,757 1	-24 7	-236 7	264 05	238 0
5,832 0	0 60	341 18	5,820 1	-24 1	-236 9	264 19	238 2
5,863 0	0 44	343 74	5,851 1	-23 9	-237 0	264 25	238 2
Last MWD Survey							
5,917 0	0 44	343 74	5,905 1	-23 5	-237 1	264 35	238 3
Pojection to Bit							

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,050 0	2,049 8	1 4	13 0	Gyro Tie-in
5,863 0	5,851 1	-23 9	-237 0	Last MWD Survey
5,917 0	5,905 1	-23 5	-237 1	Pojection to Bit



GC Federal #57
Lea County, NM (NAD27 NME)
Northing (Y) 661495.70
Easting (X) 661448.40
Plan #3 vs Actual - 7-7/8" Hole



Approximate to Grid North
True North -0.28°
Magnetic North 7.31°
Magnetic Field Strength 488.70 Gauss
Dip Angle 60.88°
Date 02/18/2012
Model IGRF2010

To convert a Magnetic Direction to a Grid Direction Add 7.31°
To convert a True Direction to a Grid Direction Subtract 0.28°

WELL DETAILS GC Federal #57

	Ground Level	3928.00			
+N/S	+E/W	Northing	Easting	Latitude	Longitude
0.00	0.00	661495.70	661448.40	32° 49' 2.771" N	103° 48' 28.118" W

SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Dlog	TFace	VSec	Target
1	2050.00	1.56	75.33	2049.78	1.42	12.86	0.00	0.00	-13.03	
2	2200.00	1.56	75.33	2199.72	2.46	16.91	0.00	0.00	-17.08	
3	2545.85	5.37	262.32	2545.18	1.49	5.42	2.00	-174.58	5.57	
4	3003.54	5.37	262.32	4969.59	-29.22	-222.36	0.00	0.00	224.27	
5	5271.84	0.00	0.00	5269.00	-30.90	-234.80	2.00	180.00	236.82	T1-GC #57
6	7011.84	0.00	0.00	7000.00	-30.90	-234.80	0.00	0.00	236.82	PBH-GC #57

DESIGN TARGET DETAILS

Name	TVD	+N/S	+E/W	Northing	Easting	Latitude	Longitude	Shape
T1-GC #57	5269.00	-30.90	-234.80	661464.80	661213.60	32° 49' 2.477" N	103° 48' 30.871" W	Point
PBH-GC #57	7000.00	-30.90	-234.80	661464.80	661213.60	32° 49' 2.477" N	103° 48' 30.871" W	Circle (Radius: 10.00)

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
5269.00	5271.84	Top of Paddock	0.00	

CASING DETAILS

TVD	MD	Name	Size
2100.00	2100.24	8-5/8" Casing	8-5/8"

PROJECT DETAILS Lea County NM (NAD27 NME)

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

