

Results of Directional Survey

API number:	30-025-39877	DD
OGRID:		Operator: COG OPERATING LLC
		Property: MC FEDERAL # 60

surface	ULSTR:	K	21	T	17S	R	32E
				1972	FSL	2444	FWL

BH Loc	ULSTR:	K	21	T	17S	R	32E
7145	MD	7119.0	TVD	2298	FSL	2293	FWL

Top Perf/OH	ULSTR:	K	21	T	17S	R	32E
5430	MD	5405.6	TVD	2294	FSL	2299	FWL

Bot Perf/OH	ULSTR:	K	21	T	17S	R	32E
6700	MD	6674.0	TVD	2298	FSL	2294	FWL

	MD	N/S	E/W	VD
	5360	319.80	-143.10	5339.2
TOP PERFS/OH	5430	322.04	-144.78	5405.63
	5460	323.00	-145.50	5434.10
	5650	325.80	-147.60	5624.00
BOT PERFS/OH	6700	325.80	-149.99	6674.00
	5694	325.80	-147.70	5668.00

NEXT TO LAST	5650	325.80	-147.60	5624.00
LAST READING	5694	325.80	-147.70	5668.00
TD	7145	325.80	-151.00	7119.00

Surface Location	1972	FS	2444	FW
Projected BHL	2298	FS	2293	FW
Location of				
Top Perfs/OH	2294	FS	2299	FW
Bottom Perfs/OH	2298	FS	2294	FW

SUMMARY of Subsurface Locations

Surface Location	K-21-17S-32E	1972	FS	2444	FW	Vert. Depth
Top Perfs/OH	K-21-17S-32E	2294	FS	2299	FW	5405.63
Bottom Perfs/OH	K-21-17S-32E	2298	FS	2294	FW	6674.00
Projected TD	K-21-17S-32E	2298	FS	2293	FW	7119.00

AUG 18 2011

HOBBS OCD

30-025-39877

JUL 26 2011

WELL NAME AND NUMBER MC Federal No. 60 Unit K RECEIVED
 LOCATION Section 21, T17S, R32E, 1972 FSL, 2444 FWL, Lea County
 OPERATOR COG Operating LLC
 DRILLING CONTRACTOR United Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and had conducted deviation test and obtained the following results:

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
1/4° @ 106'		
3/4° @ 200'		
1° @ 290'		
1.5° @ 411'		
1.5° @ 502'		
1 3/4° @ 593'		
1 1/4° @ 686'		
2° @ 1033'		
1° @ 1318'		
1° @ 1856'		
1 1/4° @ 6212'		
1 1/2° @ 6749'		
1 1/4° @ 7100'		

HOBBS OCD

JUL 26 2011

RECEIVED

Drilling Contractor- UNITED DRILLING, INC.By: Luisa Noriega
(Luisa Noriega)Title: Assistant Office ManagerSubscribed and sworn to before me this 23rd day of May, 2011.

Carlue Martin
 Notary Public
Chaves New Mexico
 County State

My Commission Expires: 10/8/12



SUR: K-21-17s-32e, 1972/S & 2444/W
BHL: K-21-17s-32e, 2298/S & 2293/W
API # 30-025-39877

COG OPERATING LLC

Lea County, NM (NAD27 NME)

MC Federal #60

MC Federal #60

OH - Job #32D0511444

HOBBS OCD

JUL 26 2011

RECEIVED

Survey: MWD Survey

SDI Standard Survey Report

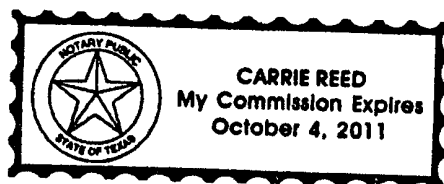
This survey is correct to the best of my knowledge and is supported by actual field data.

Shirley

Notarized this date July of June, 2011.

Carrie Reed

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 MC Federal #60
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 4060 0usft (UDI #42)
Site:	MC Federal #60	MD Reference:	KB Elev (20') @ 4060 0usft (UDI #42)
Well:	MC Federal #60	North Reference:	Grid
Wellbore:	OH - Job #32D0511444	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	MC Federal #60		
Site Position:		Northing:	661,822 80 usft
From:	Map	Easting:	672,581 10 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 49' 5 441 N
		Longitude:	103° 46' 17 648 W
		Grid Convergence:	0 30 °

Well	MC Federal #60		
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' 5 441 N
		Longitude:	103° 46' 17 648 W
		Ground Level:	4,040 0 usft

Wellbore	OH - Job #32D0511444		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	5/14/2011	7 73
			Dip Angle
			60 70
			Field Strength
			48,957

Design	Actual		
Audit Notes:			
Version:	1 0	Phase:	ACTUAL
		Tie On Depth:	0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0 0	0 0	0 0
			Direction
			(°)
			335 94

Survey Program	Date 7/5/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		Description
100 0	2,070 0	Gyro Survey (OH - Job #32D0511444)	Keeper
2,161 0	5,694 0	MWD Survey (OH - Job #32D0511444)	Keeper
			Standard Wireline Keeper ver 1 0 2
			Standard Wireline Keeper ver 1 0 2

Survey							
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0
100 0	0 28	34 49	100 0	0 2	0 1	34 49	0 2
200 0	0 31	24 29	200 0	0 6	0 4	30 86	0 8
300 0	0 54	345 20	300 0	1 4	0 4	15 66	1 4
400 0	0 75	309 21	400 0	2 2	-0 2	353 61	2 2
500 0	1 01	256 12	500 0	2 4	-1 6	326 38	2 9
600 0	1 13	216 23	600 0	1 4	-3 0	294 91	3 4
700 0	1 30	171 32	699 9	-0 5	-3 5	261 77	3 5
800 0	2 90	155 18	799 9	-3 9	-2 2	209 63	4 5
900 0	2 85	156 35	899 7	-8 5	-0 2	181 14	8 5
1,000 0	2 25	163 10	999 6	-12 6	1 4	173 69	12 7



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SDI Standard Survey Report



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Site:	MC Federal #60	MD Reference:	KB Elev (20') @ 4060 0usft (UDI #42)
Well:	MC Federal #60	North Reference:	Grid
Wellbore:	OH - Job #32D0511444	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	1 84	168 85	1,099 6	-16 1	2 3	171 94	16 3
1,200 0	1 77	176 78	1,199 5	-19 2	2 7	172 07	19 4
1,300 0	1 39	178 24	1,299 5	-22 0	2 8	172 73	22 1
1,400 0	1 19	178 21	1,399 5	-24 2	2 9	173 24	24 4
1,500 0	0 99	169 12	1,499 5	-26 1	3 1	173 30	26 3
1,600 0	0 72	135 88	1,599 4	-27 4	3 7	172 38	27 7
1,700 0	0 88	101 60	1,699 4	-28 0	4 9	170 16	28 4
1,800 0	1 20	84 50	1,799 4	-28 1	6 7	166 67	28 8
1,900 0	2 03	71 57	1,899 4	-27 4	9 4	161 12	29 0
2,000 0	2 13	69 61	1,999 3	-26 2	12 8	153 97	29 2
2,070 0	1 78	69 05	2,069 3	-25 4	15 0	149 34	29 5



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Site:	MC Federal #60	MD Reference:	KB Elev (20') @ 4060 0usft (UDI #42)
Well:	MC Federal #60	North Reference:	Grid
Wellbore:	OH - Job #32D0511444	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	MC Federal #60		
Site Position:		Northing:	661,822 80 usft
From:	Map	Easting:	672,581 10 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 49' 5 441 N
		Longitude:	103° 46' 17 648 W
		Grid Convergence:	0 30 °

Well	MC Federal #60		
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' 5 441 N
		Longitude:	103° 46' 17 648 W
		Ground Level:	4,040 0 usft

Wellbore	OH - Job #32D0511444				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/14/2011	7 73	60 70	48,957

Design	Actual			
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	335 94

Survey Program	Date 7/5/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	2,070 0	Gyro Survey (OH - Job #32D0511444)	Keeper	Standard Wireline Keeper ver 1 0 2
2,161 0	5,694 0	MWD Survey (OH - Job #32D0511444)	Keeper	Standard Wireline Keeper ver 1 0 2

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
2,070 0	1 78	69 05	2,069 3	-25 4	15 0	149 34	29 5
Gyro Tie-in							
2,161 0	2 10	62 81	2,160 2	-24 1	17 8	143 49	30 0
2,256 0	2 81	28 02	2,255 1	-21 2	20 5	136 05	29 5
2,319 0	2 59	16 91	2,318 1	-18 5	21 6	130 58	28 5
2,383 0	2 77	359 55	2,382 0	-15 6	22 0	125 28	27 0
2,446 0	3 24	344 80	2,444 9	-12 3	21 5	119 81	24 8
2,510 0	3 80	337 51	2,508 8	-8 6	20 3	113 09	22 0
2,573 0	4 58	332 74	2,571 6	-4 5	18 3	103 73	18 8
2,636 0	5 65	325 37	2,634 4	0 3	15 4	88 83	15 4
2,699 0	6 04	323 96	2,697 0	5 5	11 7	64 60	12 9



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SDI Standard Survey Report



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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 4060 0usft (UDI #42)
Site:	MC Federal #60	MD Reference:	KB Elev (20') @ 4060 0usft (UDI #42)
Well:	MC Federal #60	North Reference:	Grid
Wellbore:	OH - Job #32D0511444	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)
2,763 0	6 47	324 92	2,760 7	11 2	7 6	34 21	13 6
2,826 0	7 14	326 22	2,823 2	17 4	3 4	11 11	17 7
2,890 0	7 88	326 71	2,886 7	24 4	-1 2	357 16	24 4
2,985 0	8 38	329 50	2,980 7	35 8	-8 3	346 94	36 7
3,080 0	7 48	324 60	3,074 8	46 8	-15 4	341 78	49 2
3,175 0	8 45	331 30	3,168 9	57 9	-22 3	338 92	62 1
3,270 0	8 89	335 80	3,262 8	70 7	-28 7	337 93	76 3
3,365 0	8 37	333 50	3,356 7	83 6	-34 8	337 42	90 6
3,460 0	8 67	337 30	3,450 7	96 4	-40 6	337 15	104 6
3,555 0	8 35	335 80	3,544 6	109 3	-46 2	337 08	118 7
3,650 0	8 47	337 40	3,638 6	122 1	-51 7	337 03	132 6
3,751 0	8 16	336 49	3,738 6	135 5	-57 5	337 02	147 2
3,847 0	8 07	337 09	3,833 6	148 0	-62 8	337 00	160 7
3,942 0	7 79	336 84	3,927 7	160 0	-67 9	337 00	173 8
4,037 0	8 07	334 14	4,021 8	171 9	-73 4	336 89	186 9
4,132 0	8 34	334 21	4,115 8	184 2	-79 3	336 71	200 5
4,226 0	8 35	333 75	4,208 8	196 4	-85 3	336 54	214 1
4,322 0	8 45	333 98	4,303 8	209 0	-91 4	336 37	228 1
4,416 0	8 63	334 40	4,396 7	221 6	-97 5	336 25	242 1
4,511 0	7 90	334 70	4,490 7	233 9	-103 4	336 16	255 7
4,606 0	7 65	334 30	4,584 9	245 5	-108 9	336 08	268 6
4,701 0	7 47	334 20	4,679 0	256 8	-114 3	336 00	281 1
4,796 0	7 45	333 00	4,773 2	267 8	-119 8	335 89	293 4
4,891 0	7 52	334 60	4,867 4	278 9	-125 3	335 81	305 8
4,986 0	7 59	335 20	4,961 6	290 2	-130 6	335 77	318 2
5,081 0	5 46	342 77	5,056 0	300 2	-134 6	335 86	329 0
5,176 0	4 76	339 60	5,150 6	308 2	-137 3	336 00	337 4
5,270 0	4 07	332 90	5,244 3	314 9	-140 1	336 01	344 7
5,365 0	2 89	322 90	5,339 2	319 8	-143 1	335 89	350 4
5,460 0	1 93	323 30	5,434 1	323 0	-145 5	335 74	354 2
5,555 0	1 11	327 30	5,529 0	325 0	-147 0	335 67	356 7
5,650 0	0 11	274 00	5,624 0	325 8	-147 6	335 63	357 7
Last MWD Survey							
5,694 0	0 11	274 00	5,668 0	325 8	-147 7	335 62	357 7
Projection to Bit							

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,070 0	2,069 3	-25 4	15 0	Gyro Tie-in
5,650 0	5,624 0	325 8	-147 6	Last MWD Survey
5,694 0	5,668 0	325 8	-147 7	Projection to Bit



Project: Lea County, NM (NAD27 NME)
 Site: MC Federal #60
 Well: MC Federal #60
 Wellbore: OH - Job #32D0511444
 Design: Plan #2 - 7-7/8" Hole

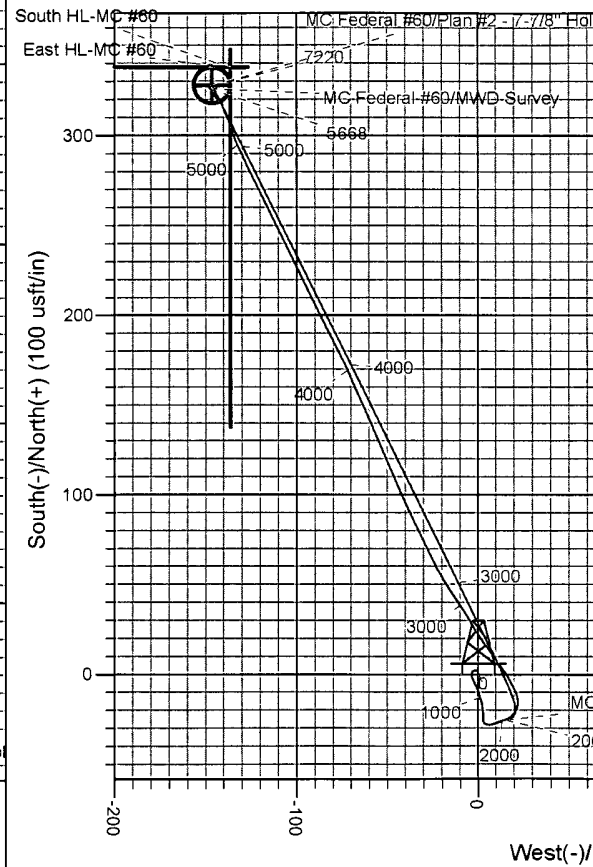
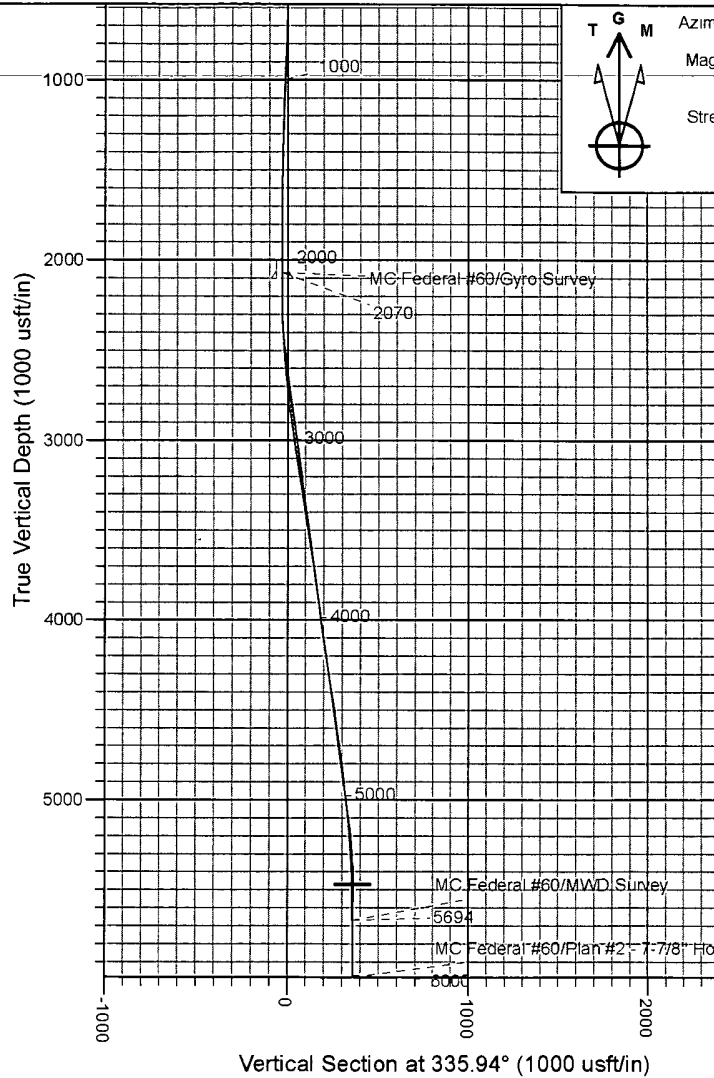


Azimuths to Grid North
 True North -0 30°
 Magnetic North 7 43°
 Magnetic Field
 Strength 48956 8snT
 Dip Angle 60 70°
 Date 5/14/2011
 Model IGRF2010

WELL DETAILS: MC Federal #60
 KB Elev (20') @ 4060.0usft (UDI #42)
 Ground Level: 4040.0
 Easting 672581 10
 Latitude 32° 49' 5.441 N
 Longitude 103° 46' 17.648 W

+N/-S +E/-W Northing
 0.0 0.0 661822.80

Slot



REFERENCE INFORMATION
 Co-ordinate (N/E) Reference Well MC Federal #60, Grid North
 Vertical (TVD) Reference KB Elev (20') @ 4060.0usft (UDI #42)
 Section (VS) Reference Slot - (0 ON, 0 OE)
 Measured Depth Reference KB Elev (20') @ 4060.0usft (UDI
 Calculation Method: Minimum Curvature

COMPANY DETAILS: COG OPERATING LLC
 223032
 Calculation Method: Minimum Curvature
 Error System: ISCWSA
 Scan Method: Closest Approach 3D
 Error Surface: Elliptical Conic
 Warning Method: Error Ratio

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

SITE DETAILS: MC Federal #60
 Site Centre Latitude: 32° 49' 5.441 N
 Longitude: 103° 46' 17.648 W
 Positional Uncertainty: 0.0
 Convergence: 0.30
 Local North: Grid