



30-025-39624

HOBBS OCD

JUN 22 2011

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COG OPERATING LLC

Lea County, NM (NAD27 NME)

BC Federal #52

BC Federal #52

OH

RECEIVED

JUN 14 2011

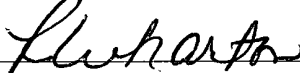
NMOCD ARTESIA

Survey: MWD Survey

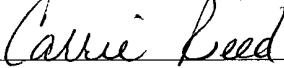
SDI Standard Survey Report

17 May, 2011

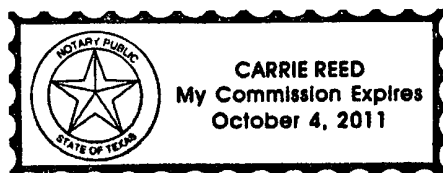
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 17th of May, 2011.



Notary Signature
County of Midland
State of Texas



Scientific Drilling
Directional Drilling Operations



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Well BC Federal #52
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 3968 0usft (United #42)
Site:	BC Federal #52	MD Reference:	KB Elev (20') @ 3968 0usft (United #42)
Well:	BC Federal #52	North Reference:	Grid
Wellbore:	OH	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	BC Federal #52		
Site Position:		Northing:	663,105 90 usft
From:	Map	Easting:	662,613 80 usft
Position Uncertainty:	0 0 usft	Slot Radius:	0"
		Latitude:	32° 49' 18 646 N
		Longitude:	103° 48' 14 368 W
		Grid Convergence:	0 29 °

Well	BC Federal #52		
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' 18 646 N
		Longitude:	103° 48' 14 368 W
		Ground Level:	3,948 0 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF200510	4/9/2011	7 75
			Dip Angle
			(°)
			60 73
			Field Strength
			(nT)
			49,000

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
			(°)
			190 09

Survey Program	Date 5/17/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100 0	2,050 0	Gyro Survey (OH)	UNKNOWN
2,166 0	5,791 0	MWD Survey (OH)	MWD
			Description
			Unknown survey
			MWD - Standard

Survey							
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
2,050 0	0 75	17 46	2,042 3	79 8	-110 0	305 96	135 9
Gyro Tie-in							
2,166 0	0 55	60 89	2,158 3	80 8	-109 3	306 47	136 0
2,229 0	0 69	125 98	2,221 3	80 7	-108 7	306 59	135 4
2,292 0	1 41	150 96	2,284 2	79 8	-108 1	306 46	134 4
2,356 0	2 27	163 96	2,348 2	77 9	-107 3	305 98	132 6
2,419 0	3 08	166 57	2,411 1	75 1	-106 6	305 16	130 4
2,482 0	3 97	170 45	2,474 0	71 3	-105 8	303 96	127 6
2,546 0	4 69	171 11	2,537 8	66 5	-105 1	302 34	124 4
2,609 0	5 32	171 10	2,600 6	61 1	-104 2	300 38	120 8
2,672 0	6 25	171 83	2,663 3	54 8	-103 3	297 96	116 9



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Site:	BC Federal #52	MD Reference:	KB Elev (20') @ 3968 0usft (United #42)
Well:	BC Federal #52	North Reference:	Grid
Wellbore:	OH	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)
2,735 0	6 99	171 43	2,725 9	47 6	-102 2	294 98	112 8
2,799 0	7 55	168 44	2,789 3	39 7	-100 8	291 48	108 3
2,862 0	8 11	167 10	2,851 8	31 3	-99 0	287 53	103 8
2,925 0	8 96	165 87	2,914 1	22 2	-96 8	282 91	99 3
3,020 0	9 00	168 58	3,007 9	7 7	-93 5	274 72	93 8
3,115 0	8 09	166 77	3,101 8	-6 1	-90 5	266 16	90 7
3,210 0	8 01	173 04	3,195 9	-19 1	-88 2	257 75	90 2
3,305 0	8 86	173 17	3,289 9	-33 0	-86 5	249 13	92 6
3,400 0	8 31	171 97	3,383 8	-47 0	-84 7	240 95	96 9
3,495 0	8 06	171 95	3,477 8	-60 4	-82 8	233 87	102 5
3,597 0	8 61	171 24	3,578 8	-75 1	-80 6	227 05	110 2
3,692 0	9 70	175 85	3,672 6	-90 1	-79 0	221 24	119 8
3,787 0	9 45	175 48	3,766 2	-105 8	-77 8	216 31	131 3
3,882 0	8 95	174 03	3,860 0	-121 0	-76 4	212 27	143 1
3,976 0	8 55	172 74	3,952 9	-135 2	-74 7	208 94	154 4
4,071 0	8 37	171 86	4,046 9	-149 0	-72 9	206 06	165 9
4,166 0	8 27	170 09	4,140 9	-162 6	-70 7	203 51	177 3
4,261 0	8 37	170 35	4,234 9	-176 1	-68 4	201 22	188 9
4,356 0	8 53	170 09	4,328 9	-189 9	-66 0	199 17	201 0
4,451 0	8 86	176 25	4,422 8	-204 1	-64 3	197 49	214 0
4,546 0	8 63	176 53	4,516 7	-218 5	-63 4	196 18	227 6
4,641 0	8 49	176 32	4,610 6	-232 7	-62 5	195 04	240 9
4,736 0	8 34	176 41	4,704 6	-246 5	-61 6	194 04	254 1
4,831 0	8 33	176 72	4,798 6	-260 3	-60 8	193 15	267 3
4,894 0	7 79	175 97	4,861 0	-269 1	-60 3	192 62	275 8
4,957 0	7 39	176 20	4,923 4	-277 4	-59 7	192 14	283 7
5,020 0	7 05	175 08	4,985 9	-285 3	-59 1	191 70	291 3
5,084 0	6 11	169 70	5,049 5	-292 6	-58 1	191 24	298 3
5,146 0	5 09	166 91	5,111 2	-298 5	-56 9	190 80	303 9
5,209 0	4 48	173 04	5,174 0	-303 6	-56 0	190 45	308 8
5,273 0	3 56	174 38	5,237 8	-308 1	-55 5	190 21	313 1
5,336 0	2 82	168 51	5,300 7	-311 6	-55 0	190 01	316 4
5,399 0	2 24	179 78	5,363 6	-314 3	-54 7	189 87	319 0
5,462 0	1 92	170 18	5,426 6	-316 6	-54 5	189 77	321 2
5,525 0	1 11	166 18	5,489 6	-318 2	-54 2	189 66	322 8
5,589 0	1 14	162 23	5,553 6	-319 4	-53 8	189 57	323 9
5,652 0	0 98	143 57	5,616 6	-320 5	-53 3	189 45	324 9
5,715 0	0 61	131 71	5,679 6	-321 1	-52 8	189 33	325 4
5,747 0	0 48	143 58	5,711 5	-321 3	-52 5	189 29	325 6
Last MWD Survey							
5,791 0	0 48	143 58	5,755 5	-321 6	-52 3	189 24	325 9
Projection to Bit							



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Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (20') @ 3968 0usft (United #42)
Site:	BC Federal #52	MD Reference:	KB Elev (20') @ 3968 0usft (United #42)
Well:	BC Federal #52	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,050 0	2,042 3	79 8	-110 0	Gyro Tie-in
5,747 0	5,711 5	-321 3	-52 5	Last MWD Survey
5,791 0	5,755 5	-321 6	-52 3	Projection to Bit



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Directional Drilling Operations

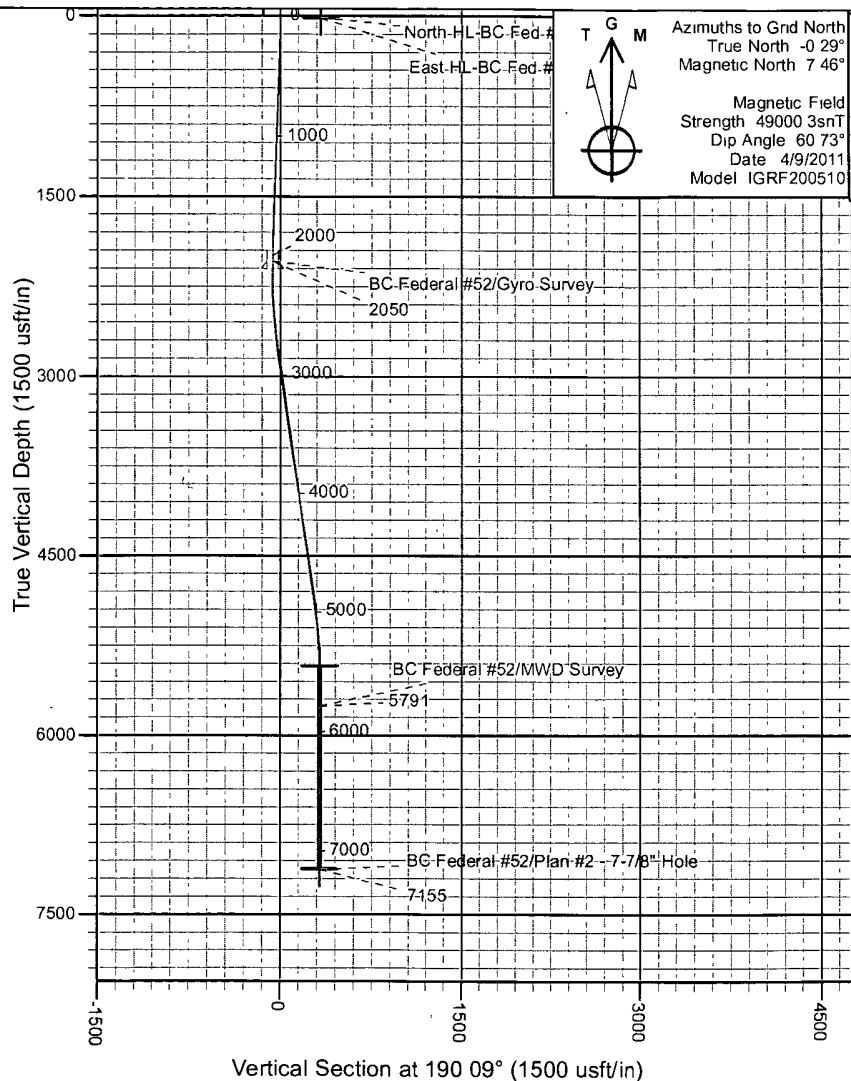
Project: Lea County, NM (NAD27 NME)

Site: BC Federal #52

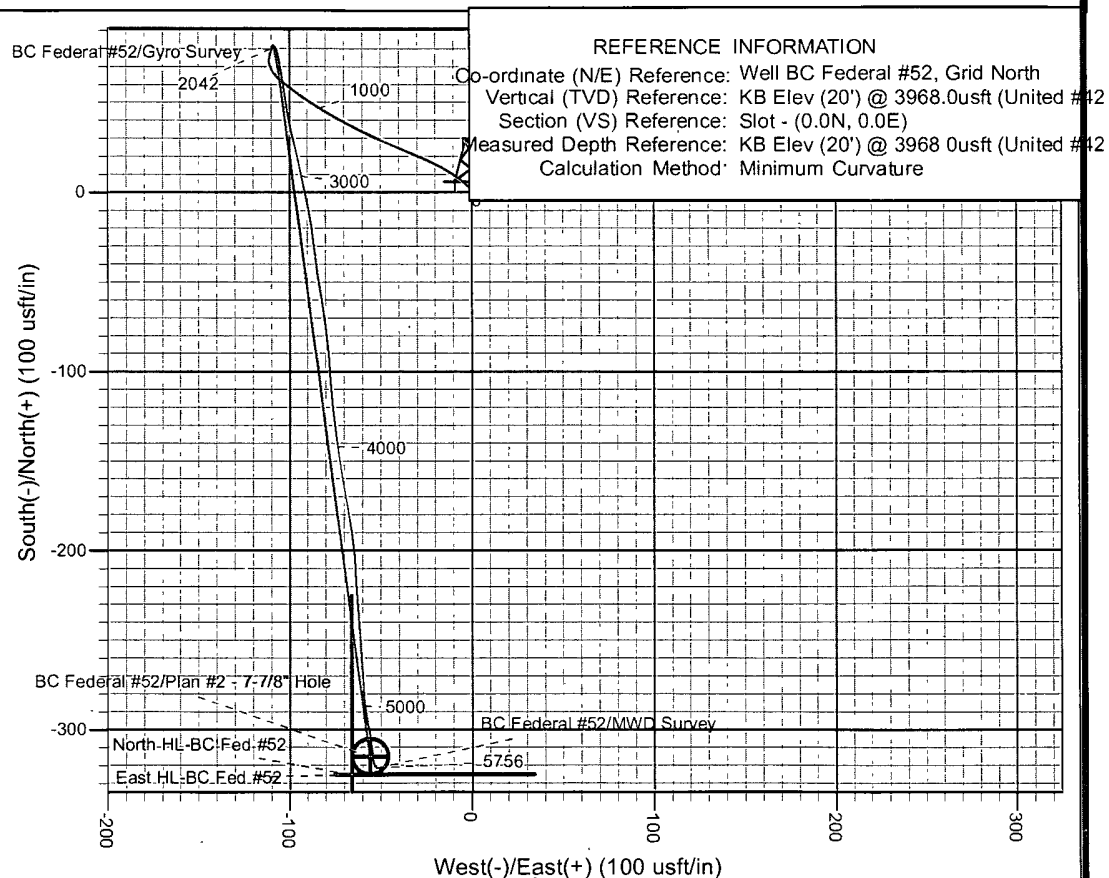
Well: BC Federal #52

Wellbore: OH

Design: Plan #2 - 7-7/8" Hole



Azimuths to Grid North		WELL DETAILS: BC Federal #52			
True North -0 29°		KB Elev (20') @ 3968.0usft (United #42)			
Magnetic North 7 46°		Ground Level: 3948 0			
Magnetic Field		Easting			
Strength 49000 3snT		Latitude			
Dip Angle 60 73°		Longitude			
Date 4/9/2011		Slo			
Model IGRF200510					
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	663105.90	662613.80	32° 49' 18.646 N	103° 48' 14.368 W



REFERENCE INFORMATION
Co-ordinate (N/E) Reference: Well BC Federal #52, Grid North
Vertical (TVD) Reference: KB Elev (20') @ 3968.0usft (United #42)
Section (VS) Reference: Slot - (0.0N, 0.0E)
Measured Depth Reference: KB Elev (20') @ 3968 0usft (United #42)
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: BC Federal #52
Site Centre Latitude: 32° 49' 18.646 N
Longitude: 103° 48' 14.368 W
Positional Uncertainty: 0.0
Convergence: 0.29
Local North: Grid