



COG OPERATING LLC

Eddy County, NM (NAN27 NME)

Burch Keely Unit #592

Burch Keely Unit #592

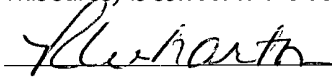
OH - Job #32D0511489

30-015-38500

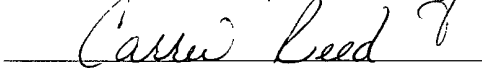
Survey: MWD Survey

SDI Standard Survey Report

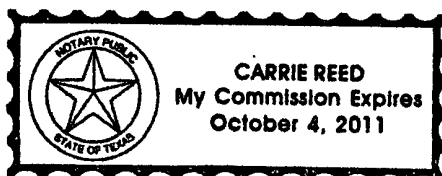
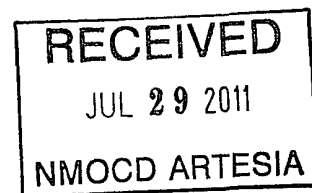
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 22nd of July, 2011.



Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #592
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (13') @ 3607 0usft (Cavaloz #3)
Site:	Burch Keely Unit #592	MD Reference:	KB Elev (13') @ 3607 0usft (Cavaloz #3)
Well:	Burch Keely Unit #592	North Reference:	Grid
Wellbore:	OH - Job #32D0511489	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Eddy County, NM (NAN27 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	Burch Keely Unit #592		
Site Position:		Northing:	664,616 10 usft
From:	Map	Easting:	586,620 80 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 49' 36 476 N
		Longitude:	104° 3' 4 851 W
		Grid Convergence:	0 15 °

Well	Burch Keely Unit #592		
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' 36 476 N
		Longitude:	104° 3' 4 851 W
		Ground Level:	3,594 0 usft

Wellbore	OH - Job #32D0511489		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	5/24/2011	7 86
			Dip Angle
			(°)
			60 66
			Field Strength
			(nT)
			48,931

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
			(°)
			192 65

Survey Program	Date 7/22/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		Description
100 0	842 0	Gyro Survey (OH - Job #32D0511489)	Keeper
963 0	5,031 0	MWD Survey (OH - Job #32D0511489)	MWD
			Standard Wireline Keeper ver 1 0 2
			MWD - Standard

Survey			
Measured Depth	Inclination	Azimuth	True Vertical
(usft)	(°)	(°)	Depth
0 0	0 00	0 00	0 0
100 0	0 62	264 43	100 0
200 0	0 65	228 26	200 0
300 0	0 99	156 10	300 0
400 0	1 53	125 06	400 0
500 0	1 91	115 88	499 9
600 0	2 18	108 15	599 9
700 0	2 46	97 35	699 8
800 0	2 52	93 11	799 7
842 0	2 35	95 42	841 6
			North/South
			(usft)
			0 0
			-0 1
			-0 5
			-1 7
			-3 2
			-4 7
			-6 0
			-6 9
			-7 3
			-7 4
			East/West
			(usft)
			0 0
			-0 5
			-1 5
			-1 6
			-0 1
			2 5
			5 8
			9 7
			14 0
			15 8
			Closure Azimuth
			(°)
			0 00
			264 43
			252 17
			223 64
			182 33
			152 36
			136 23
			125 37
			117 43
			115 13
			Closure Distance
			(usft)
			0 0
			0 5
			1 6
			2 3
			3 2
			5 3
			8 3
			11 9
			15 8
			17 5



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Site:	Burch Keely Unit #592	MD Reference:	KB Elev (13') @ 3607 0usft (Cavaloz #3)
Well:	Burch Keely Unit #592	North Reference:	Grid
Wellbore:	OH - Job #32D0511489	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Eddy County, NM (NAN27 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	Burch Keely Unit #592		
Site Position:		Northing:	664,616 10 usft
From:	Map	Easting:	586,620 80 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 49' 36 476 N
		Longitude:	104° 3' 4 851 W
		Grid Convergence:	0 15 °

Well	Burch Keely Unit #592		
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' 36 476 N
		Longitude:	104° 3' 4 851 W
		Ground Level:	3,594 0 usft

Wellbore	OH - Job #32D0511489		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	5/24/2011	(°)
			7 86
			Dip Angle
			(°)
			60 66
			Field Strength
			(nT)
			48,931

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
			(°)
			192 65

Survey Program	Date 7/22/2011		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100 0	842 0	Gyro Survey (OH - Job #32D0511489)	Keeper
963 0	5,031 0	MWD Survey (OH - Job #32D0511489)	MWD
			Description
			Standard Wireline Keeper ver 1 0 2
			MWD - Standard

Survey							
Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
842 0	2 35	95 42	841 6	-7 4	15 8	115 13	17 5
Gyro Tie-in							
963 0	2 27	92 94	962 5	-7 8	20 7	110 60	22 1
1,025 0	2 12	96 32	1,024 5	-8 0	23 0	109 06	24 4
1,088 0	1 66	83 33	1,087 5	-8 0	25 1	107 64	26 3
1,151 0	1 21	65 96	1,150 4	-7 6	26 6	105 95	27 7
1,214 0	0 85	91 59	1,213 4	-7 3	27 7	104 86	28 6
1,276 0	0 91	176 36	1,275 4	-7 9	28 2	105 57	29 3
1,339 0	1 79	210 74	1,338 4	-9 2	27 7	108 36	29 2
1,402 0	2 89	224 12	1,401 4	-11 2	26 1	113 19	28 4
1,465 0	3 94	226 05	1,464 2	-13 8	23 4	120 54	27 2



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Site:	Burch Keely Unit #592	MD Reference:	KB Elev (13') @ 3607 0usft (Cavaloz #3)
Well:	Burch Keely Unit #592	North Reference:	Grid
Wellbore:	OH - Job #32D0511489	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)
1,528 0	4 76	226 37	1,527 1	-17 1	20 0	130 60	26 3
1,591 0	5 60	228 62	1,589 8	-21 0	15 8	143 02	26 2
1,653 0	6 55	231 69	1,651 5	-25 2	10 7	156 88	27 4
1,716 0	7 62	235 96	1,714 0	-29 7	4 5	171 46	30 1
1,779 0	8 43	236 01	1,776 4	-34 6	-2 8	184 67	34 8
1,842 0	9 36	232 88	1,838 6	-40 3	-10 7	194 92	41 7
1,905 0	10 18	233 49	1,900 7	-46 7	-19 3	202 45	50 6
2,000 0	9 15	232 50	1,994 3	-56 3	-32 0	209 64	64 8
2,094 0	9 45	231 88	2,087 1	-65 6	-44 0	213 87	79 0
2,188 0	9 53	231 72	2,179 8	-75 2	-56 2	216 78	93 9
2,283 0	10 23	234 07	2,273 4	-85 0	-69 2	219 15	109 7
2,377 0	10 19	232 31	2,365 9	-95 0	-82 6	220 99	125 9
2,471 0	9 87	236 36	2,458 5	-104 6	-95 9	222 51	141 9
2,565 0	9 96	234 74	2,551 1	-113 7	-109 2	223 84	157 7
2,659 0	9 85	235 61	2,643 7	-123 0	-122 5	224 89	173 5
2,754 0	9 98	234 40	2,737 3	-132 3	-135 9	225 76	189 7
2,848 0	9 97	233 95	2,829 8	-141 9	-149 1	226 42	205 8
2,942 0	10 22	238 45	2,922 4	-151 0	-162 8	227 14	222 0
3,035 0	10 13	238 41	3,013 9	-159 6	-176 8	227 92	238 2
3,130 0	10 08	240 66	3,107 4	-168 1	-191 1	228 67	254 5
3,225 0	10 16	240 65	3,201 0	-176 2	-205 7	229 41	270 9
3,319 0	10 08	239 58	3,293 5	-184 5	-220 0	230 02	287 1
3,413 0	8 81	234 77	3,386 2	-192 8	-233 0	230 39	302 4
3,507 0	8 44	235 71	3,479 2	-200 8	-244 5	230 60	316 4
3,602 0	7 63	237 16	3,573 2	-208 2	-255 6	230 84	329 7
3,695 0	6 27	235 27	3,665 5	-214 4	-265 0	231 02	340 9
3,790 0	5 28	235 54	3,760 1	-219 9	-272 8	231 14	350 4
3,852 0	4 27	240 89	3,821 8	-222 6	-277 2	231 24	355 5
3,947 0	2 60	238 83	3,916 7	-225 4	-282 1	231 38	361 1
4,041 0	1 25	249 47	4,010 6	-226 9	-284 9	231 47	364 2
4,136 0	1 48	262 57	4,105 6	-227 4	-287 1	231 62	366 3
4,143 0	1 39	261 47	4,112 6	-227 4	-287 3	231 63	366 4
4,206 0	0 71	266 71	4,175 6	-227 6	-288 4	231 73	367 4
4,300 0	0 45	263 51	4,269 6	-227 6	-289 4	231 81	368 2
4,397 0	0 48	256 04	4,366 6	-227 8	-290 1	231 87	368 9
4,491 0	0 45	260 29	4,460 6	-227 9	-290 9	231 92	369 6
4,585 0	0 44	255 06	4,554 6	-228 1	-291 6	231 97	370 2
4,679 0	0 38	247 71	4,648 6	-228 3	-292 2	232 00	370 9
4,774 0	0 38	274 64	4,743 6	-228 4	-292 8	232 05	371 4
4,869 0	0 50	274 83	4,838 6	-228 3	-293 6	232 12	371 9
4,982 0	0 50	271 45	4,951 6	-228 3	-294 6	232 22	372 7
Last MWD Survey							
5,031 0	0 50	271 45	5,000 6	-228 3	-295 0	232 26	373 0
Projection to Bit							



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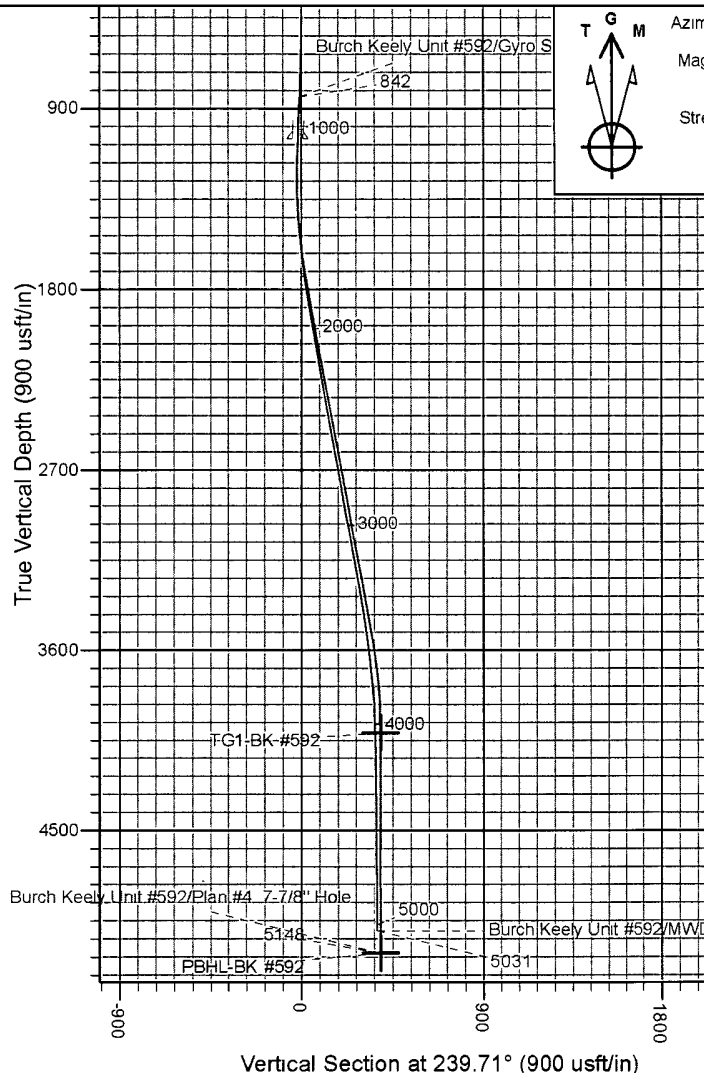


Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #592
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	KB Elev (13') @ 3607 0usft (Cavaloz #3)
Site:	Burch Keely Unit #592	MD Reference:	KB Elev (13') @ 3607 0usft (Cavaloz #3)
Well:	Burch Keely Unit #592	North Reference:	Grid
Wellbore:	OH - Job #32D0511489	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)	
842 0	841 6	-7 4	15 8	Gyro Tie-in
4,982 0	4,951 6	-228 3	-294 6	Last MWD Survey
5,031 0	5,000 6	-228 3	-295 0	Projection to Bit



Project: Eddy County, NM (NAN27 NME)
 Site: Burch Keely Unit #592
 Well: Burch Keely Unit #592
 Wellbore: OH - Job #32D0511489
 Design: Plan #4 7-7/8" Hole

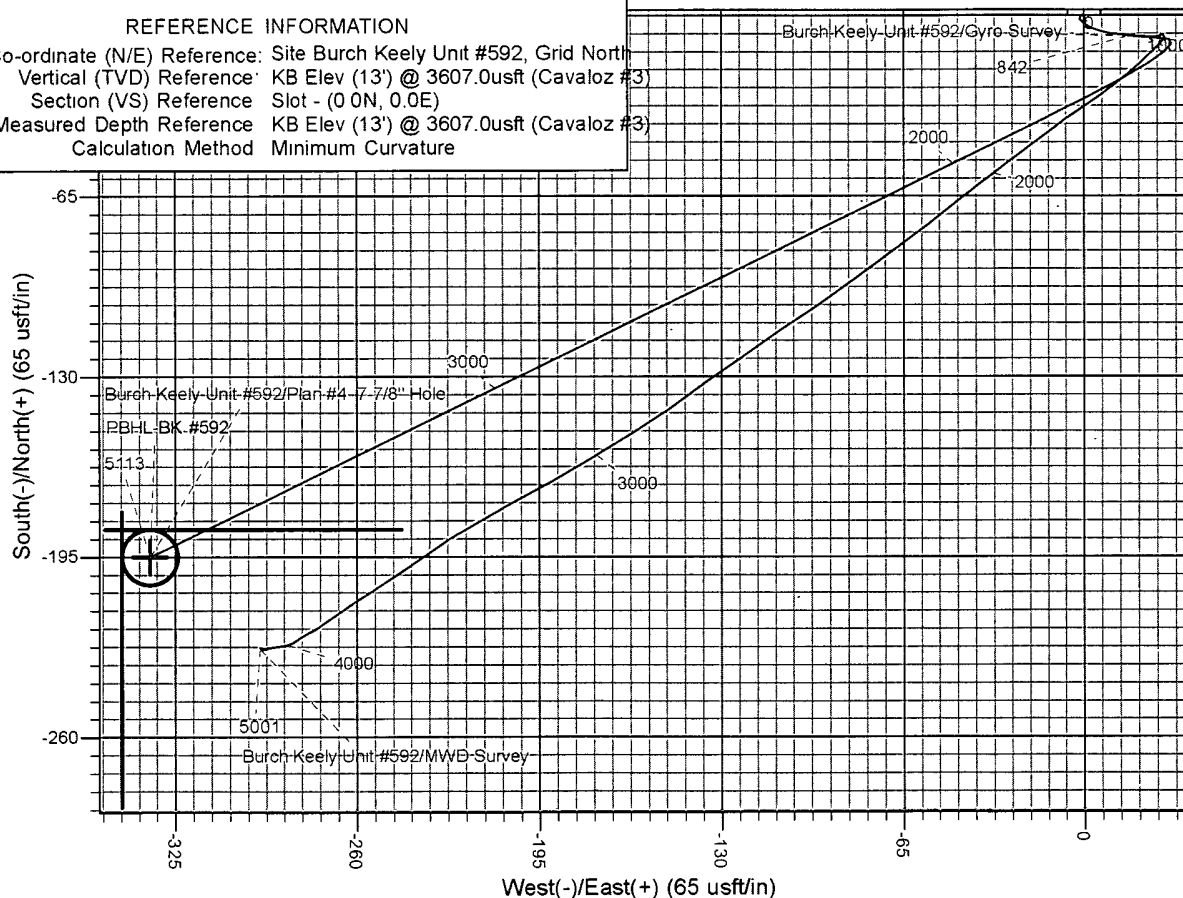


Azimuths to Grid North
 True North -0 15°
 Magnetic North 7 71°
 Magnetic Field
 Strength 48930 8snT
 Dip Angle 60 66°
 Date 5/24/2011

WELL DETAILS: Burch Keely Unit #592
 KB Elev (13') @ 3607.0usft (Cavaloz #3)
 Ground Level 3594.0

	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slo
	0.0	0.0	664616.10	586620.80	32° 49' 36.476 N	104° 3' 4.851 W	

REFERENCE INFORMATION
 Co-ordinate (N/E) Reference: Site Burch Keely Unit #592, Grid North
 Vertical (TVD) Reference: KB Elev (13') @ 3607.0usft (Cavaloz #3)
 Section (VS) Reference: Slot - (0.0N, 0.0E)
 Measured Depth Reference: KB Elev (13') @ 3607.0usft (Cavaloz #3)
 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: Eddy County, NM (NAN27 NME)
 Geodetic System: NAD 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: Burch Keely Unit #592
 Site Centre Latitude: 32° 49' 36.476 N
 Longitude: 104° 3' 4.851 W
 Positional Uncertainty: 0.0
 Convergence: 0.15
 Local North: Grid