

COG OPERATING LLC

Lea County, NM (NAD27 NME)

BC Federal #49

BC Federal #49

OH

RECEIVED

FEB 14 2011

HOBBSUCD

SUR: A-19-17s-32e, 1205/N & 330/E

BHL: H-19-17s-32e, 1658/N & 382/E

API # 30-025-39467

Survey: MWD Survey

SDI Standard Survey Report

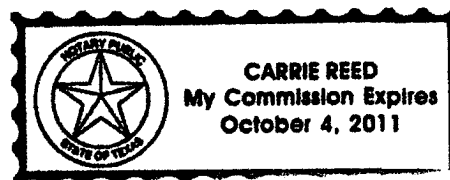
This survey is correct to the best of my knowledge and is supported by actual field data.

Report

Notarized this date 17th of January, 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 BC Federal #49
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB Elev (13') @ 3981.0usft (JW #4)
Site:	BC Federal #49	MD Reference:	KB Elev (13') @ 3981.0usft (JW #4)
Well:	BC Federal #49	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 #49		
Site Position:		Northing:	663,893.70 usft
From:	Map	Easting:	664,521.10 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 49' 26.346 N
		Longitude:	103° 47' 51.971 W
		Grid Convergence:	0.29 °

Well	BC Federal #49		
Well Position	+N/-S	0.0 usft	Northing: 663,893.70 usft
	+E/-W	0.0 usft	Easting: 664,521.10 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 26.346 N
		Longitude:	103° 47' 51.971 W
		Ground Level:	3,968.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	12/7/2010	7.80	60.72	49,001

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	4.74

Survey Program	Date	1/11/2011		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	2,090.0	Gyro Survey (OH)	Keeper	Standard Wireline Keeper ver 1.0.2
2,172.0	7,044.0	MWD Survey (OH)	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	0.27	339.19	100.0	0.2	-0.1	339.19	0.2
200.0	0.27	341.17	200.0	0.7	-0.2	339.85	0.7
300.0	0.54	338.50	300.0	1.3	-0.5	339.62	1.4
400.0	0.60	339.76	400.0	2.3	-0.8	339.43	2.4
500.0	0.68	338.99	500.0	3.3	-1.2	339.41	3.5
600.0	0.90	342.50	600.0	4.6	-1.7	339.85	4.9
700.0	1.04	335.99	700.0	6.2	-2.3	339.64	6.6
800.0	0.95	341.20	799.9	7.8	-2.9	339.39	8.3
900.0	0.85	348.27	899.9	9.3	-3.3	340.21	9.9
1,000.0	0.78	356.87	999.9	10.7	-3.5	341.73	11.3

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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)
1,100.0	0.78	0.37	1,099.9	12.1	-3.6	343.53	12.6
1,200.0	0.86	4.12	1,199.9	13.5	-3.5	345.42	14.0
1,300.0	0.88	21.71	1,299.9	15.0	-3.2	348.03	15.3
1,400.0	1.12	26.32	1,399.9	16.6	-2.5	351.56	16.7
1,500.0	2.06	33.84	1,499.8	18.9	-1.0	356.91	18.9
1,600.0	2.27	37.31	1,599.8	22.0	1.2	3.07	22.0
1,700.0	2.56	35.14	1,699.7	25.4	3.7	8.21	25.7
1,800.0	2.63	42.37	1,799.6	28.9	6.5	12.67	29.6
1,900.0	2.40	44.54	1,899.5	32.1	9.5	16.51	33.5
2,000.0	1.46	46.32	1,999.4	34.5	11.9	19.05	36.5
2,090.0	1.34	44.92	2,089.4	36.0	13.5	20.52	38.4

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Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
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Survey Program	Date	1/11/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
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2,172.0	7,011.0	MWD Survey (OH)	MWD	MWD - Standard	

Survey								
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2,090.0	1.34	44.92	2,089.4	36.0	13.5	20.52	38.4	
2,172.0	1.39	30.07	2,171.4	37.5	14.6	21.31	40.3	
2,203.0	0.90	1.77	2,202.4	38.1	14.8	21.28	40.9	
2,234.0	0.92	319.39	2,233.4	38.5	14.7	20.86	41.3	
2,296.0	2.31	262.66	2,295.3	38.8	13.1	18.71	40.9	
2,327.0	3.00	258.56	2,326.3	38.5	11.7	16.91	40.3	
2,390.0	4.58	243.95	2,389.2	37.1	7.8	11.93	37.9	
2,452.0	5.82	241.04	2,450.9	34.5	2.9	4.74	34.6	
2,515.0	7.06	245.73	2,513.5	31.3	-3.5	353.70	31.5	
2,578.0	8.45	242.91	2,575.9	27.6	-11.1	338.10	29.8	
2,608.0	9.18	239.84	2,605.6	25.4	-15.1	329.24	29.6	

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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)
2,672.0	10.52	232.01	2,668.6	19.3	-24.2	308.59	30.9
2,795.0	11.31	198.44	2,789.5	0.9	-36.8	271.41	36.9
2,858.0	10.66	189.88	2,851.4	-10.7	-39.8	254.96	41.2
2,889.0	10.45	185.70	2,881.9	-16.3	-40.6	248.09	43.7
2,920.0	10.14	185.09	2,912.4	-21.8	-41.1	242.02	46.5
2,983.0	9.41	186.79	2,974.4	-32.5	-42.2	232.42	53.2
3,045.0	9.73	184.06	3,035.6	-42.7	-43.2	225.29	60.7
3,107.0	9.89	182.97	3,096.7	-53.3	-43.8	219.43	69.0
3,201.0	9.63	183.25	3,189.3	-69.2	-44.7	212.85	82.4
3,263.0	8.91	181.11	3,250.5	-79.2	-45.1	209.65	91.1
3,325.0	8.68	179.71	3,311.8	-88.6	-45.1	206.98	99.5
3,388.0	8.32	180.25	3,374.1	-98.0	-45.1	204.73	107.8
3,482.0	8.87	178.86	3,467.0	-112.0	-45.0	201.89	120.7
3,575.0	8.68	179.56	3,558.9	-126.2	-44.8	199.55	133.9
3,668.0	8.73	180.08	3,650.9	-140.3	-44.8	197.70	147.2
3,762.0	7.83	175.43	3,743.9	-153.8	-44.3	196.06	160.0
3,856.0	7.84	176.76	3,837.0	-166.6	-43.4	194.60	172.1
3,949.0	7.75	175.56	3,929.2	-179.1	-42.6	193.36	184.1
4,044.0	7.44	175.40	4,023.3	-191.7	-41.6	192.24	196.1
4,137.0	7.36	176.58	4,115.5	-203.6	-40.7	191.31	207.6
4,231.0	7.32	174.04	4,208.8	-215.6	-39.7	190.45	219.2
4,325.0	7.20	173.79	4,302.0	-227.4	-38.5	189.61	230.6
4,419.0	6.94	174.22	4,395.3	-238.9	-37.3	188.87	241.8
4,513.0	7.07	181.41	4,488.6	-250.3	-36.8	188.37	253.0
4,606.0	7.29	179.09	4,580.9	-261.9	-36.9	188.02	264.5
4,700.0	7.22	178.25	4,674.1	-273.8	-36.6	187.62	276.3
4,793.0	7.00	182.23	4,766.4	-285.3	-36.7	187.32	287.7
4,887.0	7.07	185.39	4,859.7	-296.8	-37.4	187.19	299.2
4,980.0	7.16	187.63	4,952.0	-308.2	-36.7	187.16	310.7
5,073.0	6.79	188.49	5,044.3	-319.4	-40.3	187.19	322.0
5,169.0	6.40	181.65	5,139.7	-330.4	-41.3	187.13	333.0
5,262.0	6.32	179.99	5,232.1	-340.7	-41.5	186.94	343.2
5,356.0	6.03	179.82	5,325.5	-350.8	-41.4	186.74	353.2
5,450.0	4.98	179.95	5,419.1	-359.8	-41.4	186.57	362.2
5,543.0	5.40	181.57	5,511.7	-368.2	-41.5	186.44	370.6
5,636.0	4.89	181.80	5,604.4	-376.6	-41.8	186.33	378.9
5,730.0	4.26	183.54	5,698.1	-384.1	-42.1	186.26	386.4
5,822.0	3.92	191.65	5,789.8	-390.5	-43.0	186.28	392.9
5,916.0	3.11	181.08	5,883.6	-396.2	-43.7	186.29	398.6
6,010.0	3.12	184.63	5,977.5	-401.3	-43.9	186.24	403.7
6,104.0	2.77	186.44	6,071.4	-406.1	-44.4	186.24	408.6
6,197.0	3.30	183.40	6,164.2	-411.1	-44.8	186.22	413.5
6,290.0	3.26	181.51	6,257.1	-416.4	-45.0	186.17	418.8
6,383.0	3.12	181.54	6,350.0	-421.5	-45.2	186.11	424.0

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Site:	BC Federal #49	MD Reference:	KB Elev (13') @ 3981.0usft (JW #4)
Well:	BC Federal #49	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)
6,477.0	3.10	185.25	6,443.8	-426.6	-45.5	186.08	429.0
6,570.0	3.04	185.95	6,536.7	-431.6	-45.9	186.08	434.0
6,664.0	2.77	189.09	6,630.6	-436.3	-46.6	186.09	438.8
6,757.0	2.66	189.50	6,723.5	-440.7	-47.3	186.12	443.2
6,880.0	2.52	191.94	6,846.3	-446.1	-48.3	186.18	448.7
6,974.0	3.03	206.61	6,940.2	-450.4	-49.8	186.32	453.1
7,011.0	2.81	206.72	6,977.2	-452.0	-50.7	186.40	454.9

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,090.0	2,089.4	36.0	13.5	Gyro Tie-in
7,011.0	6,977.2	-452.0	-50.7	Last MWD Survey
7,044.0	7,010.1	-453.5	-51.4	Projection to Bit