



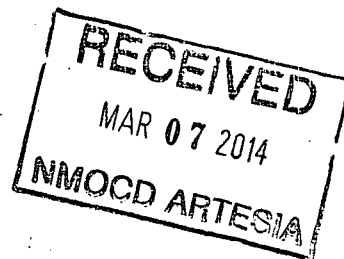
A GYRO TECHNOLOGIES INC. COMPANY

P.O. Box 261021
Corpus Christi, Texas 78426
(361) 767-0602 • (800) 606-GYRO • Fax (361) 767-0612

30-015-41442

January 30, 2014

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701



Attn: Kanicia Castillo

RE: Down South State Com No. 001H

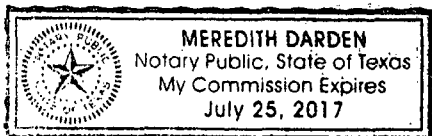
Please find enclosed a copy of the survey from 0.00' to 9062.00' ran on the
above referenced well.

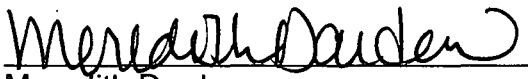
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
§
COUNTY OF NUECES §

This instrument was acknowledged before me on the 30th day of January,
A.D., 2014, by Keith Havelka.




Meredith Darden
Notary Public, State of Texas

Company: COG Operating, LLC (Concho)
Lease/Well: Down South State Com/No. 001H



Rig Name: Patterson #79
State/County: New Mexico/Eddy
Latitude: 32.03, Longitude: -104.12
GRID North is 0.11 Degrees East of True North
VS-Azi: 0.00 Degrees



RKB : 17 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut
Minimum Curvature Method
Report Date/Time: 1/30/2014 / 11:38

Vaughn Energy Services
Fort Worth, TX
817-741-3610
Surveyor: Jason Wilson
Down South State Com No. 001H / API 30-015-41442



Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.97	174.86	100.00	-0.84	0.08	-0.84	0.85	174.86	0.97
200.00	1.79	151.21	199.97	-3.06	0.90	-3.06	3.19	163.53	0.98
300.00	1.27	145.46	299.93	-5.34	2.29	-5.34	5.81	156.83	0.54
400.00	1.82	141.34	399.89	-7.49	3.91	-7.49	8.45	152.47	0.56
500.00	1.35	145.64	499.86	-9.70	5.56	-9.70	11.18	150.19	0.48
600.00	1.20	182.64	599.83	-11.72	6.17	-11.72	13.25	152.22	0.82
700.00	1.15	198.87	699.81	-13.72	5.80	-13.72	14.90	157.09	0.34
800.00	0.41	220.55	799.80	-14.94	5.24	-14.94	15.84	160.66	0.79
900.00	0.50	231.39	899.80	-15.48	4.67	-15.48	16.17	163.20	0.13
1000.00	0.46	225.75	999.79	-16.04	4.04	-16.04	16.54	165.84	0.06
1100.00	0.34	238.90	1099.79	-16.47	3.50	-16.47	16.84	167.99	0.16
1200.00	0.45	246.47	1199.79	-16.78	2.90	-16.78	17.03	170.21	0.12
1300.00	0.26	87.53	1299.79	-16.92	2.77	-16.92	17.15	170.71	0.70
1400.00	0.35	77.99	1399.79	-16.85	3.30	-16.85	17.17	168.92	0.10
1500.00	0.31	63.48	1499.79	-16.66	3.84	-16.66	17.10	167.01	0.09
1600.00	0.24	75.03	1599.78	-16.49	4.29	-16.49	17.04	165.42	0.09
1700.00	0.60	48.92	1699.78	-16.09	4.88	-16.09	16.82	163.11	0.40
1800.00	1.35	30.16	1799.77	-14.73	5.87	-14.73	15.86	158.26	0.81

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.10	34.33	1899.74	-12.91	7.01	-12.91	14.69	151.51	0.26
2000.00	1.15	35.84	1999.72	-11.31	8.14	-11.31	13.93	144.25	0.05
2100.00	0.76	46.53	2099.71	-10.04	9.20	-10.04	13.62	137.48	0.43
2200.00	0.72	34.96	2199.70	-9.07	10.04	-9.07	13.53	132.08	0.15
2300.00	0.74	32.82	2299.69	-8.01	10.75	-8.01	13.41	126.70	0.03
2400.00	0.16	58.21	2399.69	-7.40	11.22	-7.40	13.44	123.41	0.60
2500.00	0.45	40.92	2499.69	-7.03	11.59	-7.03	13.56	121.23	0.31
2600.00	0.45	44.01	2599.69	-6.45	12.12	-6.45	13.73	118.01	0.02
2700.00	0.42	34.33	2699.68	-5.86	12.60	-5.86	13.90	114.95	0.08
2800.00	0.45	46.16	2799.68	-5.29	13.09	-5.29	14.12	111.99	0.10
2900.00	0.70	53.87	2899.68	-4.65	13.87	-4.65	14.63	108.55	0.26
3000.00	0.69	58.40	2999.67	-3.98	14.87	-3.98	15.40	104.98	0.06
3100.00	0.67	44.59	3099.66	-3.25	15.79	-3.25	16.12	101.64	0.16
3200.00	0.25	358.54	3199.66	-2.62	16.19	-2.62	16.40	99.19	0.52
3300.00	0.49	345.55	3299.66	-1.98	16.08	-1.98	16.20	97.02	0.25
3400.00	0.10	330.43	3399.65	-1.49	15.93	-1.49	16.00	95.33	0.39
3500.00	0.34	354.84	3499.65	-1.11	15.86	-1.11	15.90	94.02	0.25
3600.00	0.59	350.90	3599.65	-0.31	15.75	-0.31	15.75	91.13	0.26
3700.00	0.50	354.24	3699.65	0.63	15.62	0.63	15.64	87.68	0.10
3800.00	0.22	352.85	3799.64	1.25	15.56	1.25	15.61	85.40	0.28
3900.00	0.33	343.91	3899.64	1.71	15.45	1.71	15.55	83.68	0.12
4000.00	0.39	345.81	3999.64	2.32	15.29	2.32	15.47	81.39	0.07
4100.00	0.34	324.45	4099.64	2.89	15.03	2.89	15.31	79.11	0.15
4200.00	0.55	310.15	4199.64	3.44	14.49	3.44	14.90	76.63	0.24
4300.00	0.48	308.49	4299.63	4.02	13.80	4.02	14.37	73.76	0.07
4400.00	0.45	299.90	4399.63	4.47	13.13	4.47	13.87	71.19	0.08
4500.00	0.23	295.68	4499.63	4.75	12.61	4.75	13.48	69.35	0.22
4600.00	0.77	292.29	4599.62	5.09	11.81	5.09	12.87	66.68	0.54
4700.00	0.23	286.73	4699.62	5.41	11.00	5.41	12.26	63.83	0.54
4800.00	0.37	285.93	4799.62	5.55	10.50	5.55	11.87	62.12	0.13
4900.00	1.09	282.40	4899.61	5.84	9.26	5.84	10.95	57.73	0.73
5000.00	0.77	274.80	4999.59	6.11	7.65	6.11	9.79	51.42	0.35
5100.00	1.27	269.94	5099.58	6.16	5.88	6.16	8.51	43.64	0.51
5200.00	1.29	266.83	5199.55	6.10	3.64	6.10	7.10	30.85	0.07
5300.00	0.81	254.25	5299.54	5.84	1.84	5.84	6.13	17.45	0.53
5400.00	1.20	234.60	5399.52	5.05	0.30	5.05	5.06	3.44	0.51
5500.00	0.91	206.36	5499.50	3.73	-0.90	3.73	3.84	346.40	0.58
5600.00	1.16	201.76	5599.49	2.07	-1.63	2.07	2.64	321.77	0.26
5700.00	1.08	211.65	5699.47	0.32	-2.50	0.32	2.52	277.37	0.21

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	1.59	210.97	5799.44	-1.67	-3.72	-1.67	4.08	245.75	0.51
5900.00	1.20	219.84	5899.41	-3.67	-5.10	-3.67	6.29	234.27	0.45
6000.00	1.77	202.80	5999.38	-5.90	-6.37	-5.90	8.69	227.20	0.72
6100.00	2.10	204.80	6099.32	-8.99	-7.74	-8.99	11.86	220.73	0.33
6200.00	1.79	207.78	6199.26	-12.03	-9.24	-12.03	15.17	217.51	0.32
6300.00	1.92	205.21	6299.21	-14.93	-10.68	-14.93	18.36	215.57	0.16
6400.00	1.30	233.22	6399.17	-17.13	-12.30	-17.13	21.09	215.69	0.99
6500.00	1.70	242.87	6499.14	-18.48	-14.53	-18.48	23.51	218.17	0.47
6600.00	2.14	267.94	6599.08	-19.23	-17.72	-19.23	26.14	222.66	0.94
6700.00	2.00	272.68	6699.02	-19.21	-21.33	-19.21	28.71	227.99	0.22
6800.00	2.97	267.81	6798.92	-19.23	-25.66	-19.23	32.07	233.15	0.99
6900.00	2.35	270.47	6898.81	-19.31	-30.30	-19.31	35.93	237.49	0.63
7000.00	1.70	254.62	6998.75	-19.69	-33.78	-19.69	39.10	239.77	0.85
7100.00	1.51	248.83	7098.71	-20.56	-36.45	-20.56	41.85	240.57	0.25
7200.00	1.18	254.63	7198.69	-21.31	-38.67	-21.31	44.16	241.15	0.36
7300.00	1.07	260.75	7298.67	-21.73	-40.59	-21.73	46.04	241.83	0.17
7400.00	1.05	275.53	7398.65	-21.79	-42.42	-21.79	47.69	242.81	0.27
7500.00	1.67	269.53	7498.62	-21.72	-44.79	-21.72	49.78	244.13	0.64
7600.00	1.59	280.21	7598.58	-21.48	-47.62	-21.48	52.24	245.72	0.31
7700.00	1.54	243.52	7698.55	-21.84	-50.19	-21.84	54.74	246.49	0.99
7800.00	1.46	206.74	7798.51	-23.58	-51.97	-23.58	57.07	245.60	0.95
7900.00	1.39	201.97	7898.48	-25.84	-53.00	-25.84	58.97	244.00	0.14
8000.00	0.63	192.09	7998.47	-27.51	-53.57	-27.51	60.22	242.82	0.77
8100.00	0.74	179.02	8098.46	-28.69	-53.67	-28.69	60.86	241.87	0.19
8200.00	0.46	158.37	8198.45	-29.71	-53.51	-29.71	61.21	240.96	0.35
8300.00	0.87	174.62	8298.45	-30.84	-53.29	-30.84	61.57	239.94	0.44
8400.00	2.30	208.66	8398.41	-33.35	-54.18	-33.35	63.63	238.38	1.66
8500.00	2.60	218.86	8498.32	-36.88	-56.57	-36.88	67.53	236.90	0.53
8600.00	2.79	221.01	8598.21	-40.49	-59.59	-40.49	72.04	235.81	0.21
8700.00	1.92	232.22	8698.12	-43.35	-62.51	-43.35	76.07	235.26	0.97
8800.00	2.35	230.08	8798.05	-45.69	-65.41	-45.69	79.79	235.07	0.43
8900.00	2.31	220.52	8897.97	-48.54	-68.30	-48.54	83.79	234.60	0.39
9000.00	2.15	215.58	8997.89	-51.60	-70.70	-51.60	87.53	233.88	0.26
9062.00	2.12	216.29	9059.85	-53.47	-72.05	-53.47	89.72	233.42	0.06



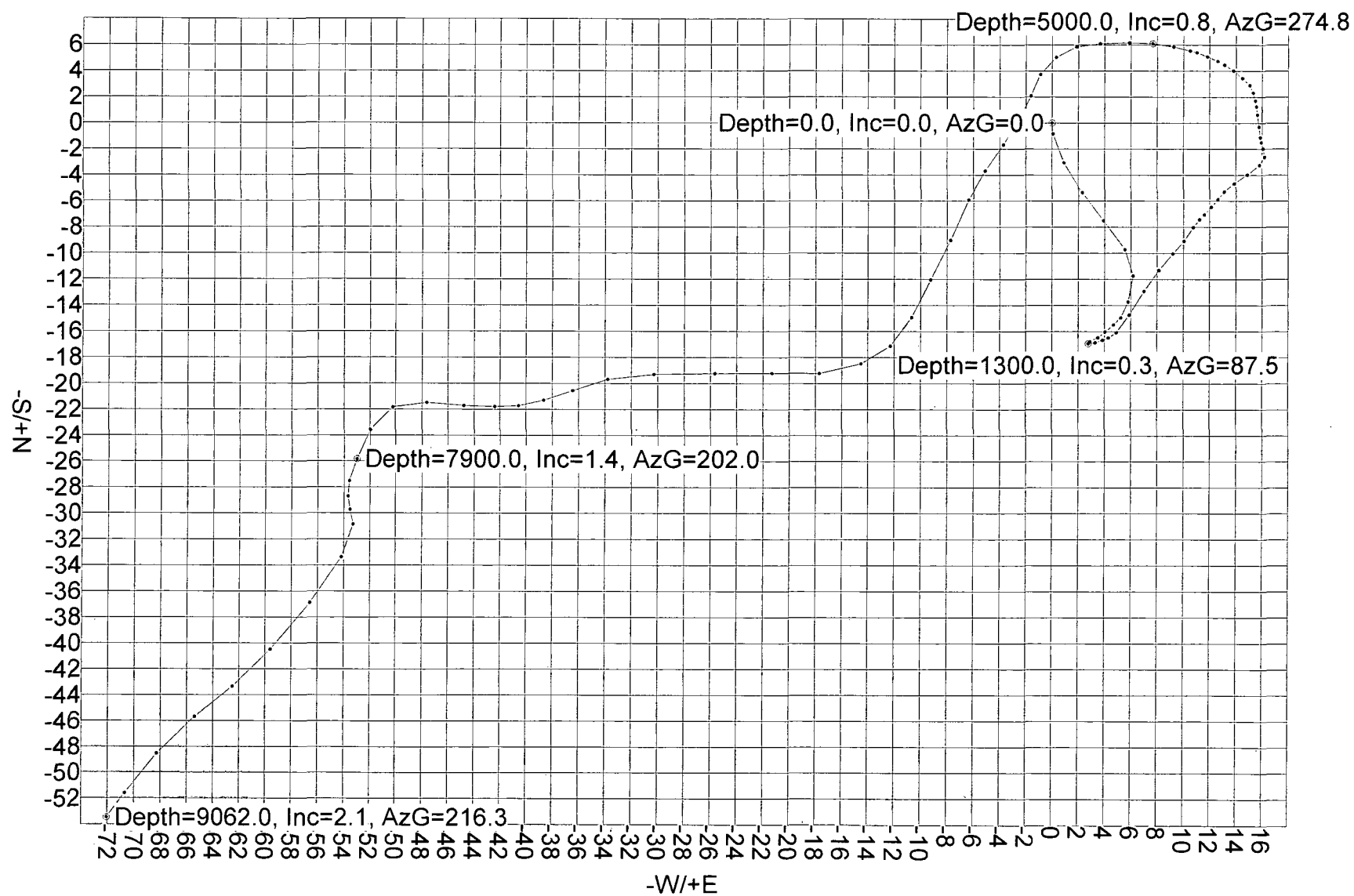
Vaughn Energy Services

Fort Worth, TX

817- 741-3610

Surveyor: Jason Wilson

Down South State Com No. 001H / API 30-015-41442



VES Survey Date: 01/08/2014



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 19, T26S, R28E

Down South State Com #1H

Wellbore #1

Survey: MWD

DDC Survey Report

20 January, 2014





Survey Certification Sheet

COG Operating
Company

WT-131107
Job Number

1/20/14
Date

Sec19, T26S, R28E
Lease

Down South State Com #1H
Well Name

Eddy, NM
County & State

API: 30-015-41442

Surveyed OH from a depth of:
Surveyed ST#1 from a depth of:

7241 feet to 10467 feet MD
10182 feet to 12188 feet MD

Type of Survey:

MWD

Directional Supervisor/Surveyor:

George Sample

The data and calculations for this survey have been checked by me and conform to the standards and procedures set forth by **The Directional Drilling Company (DDC)**. This report represents a true and correct Directional survey of this well based on the original data obtained at the well site. Wellbore Coordinates are calculated using minimum curvature.

Digitally signed by Larry Wright
DN: cn=Larry Wright, o=The
Directional Drilling Company,
ou=GM of Guidance Services,
email=larryw@directionaldrillers.c
om, c=US
Date: 2014.01.31 12:20:23 -06'00'

Larry Wright
MWD General Manager



DDC
Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well: Down South State Com #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	WELL @ 3083.0usft (Patterson #79)
Site:	Sec 19, T26S, R28E	MD Reference:	WELL @ 3083.0usft (Patterson #79)
Well:	Down South State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM (NAD 27)		
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	Sec 19, T26S, R28E		
Site Position:		Northing:	375,876.20 usft
From:	Map	Easting:	566,529.24 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 1' 59.579 N
		Longitude:	104° 7' 7.111 W
		Grid Convergence:	0.11 °

Well:	Down South State Com #1H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 1' 59.579 N
		Longitude:	104° 7' 7.111 W
		Ground Level:	3,065.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	IGRF2010	12/17/2013	(°)
			Dip Angle
			(°)
			Field Strength
			(nT)
			7.51
			59.85
			48,193

Design	Wellbore #1		
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
			(°)
			269.52

Survey/Program	Date 1/20/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		Description
100.0	7,200.0	VES Gyro (Wellbore #1)	Good_gyro
7,241.0	10,467.0	MWD (Wellbore #1)	MWD default
			Good Gyro
			MWD - Standard

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn	
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate	
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)	
FIRST SURVEY OH @ 7241' MD / 7240' TVD										
7,241.0	1.80	268.10	7,239.7	-21.4	-39.7	39.9	1.73	1.51	32.85	
7,273.0	5.00	252.30	7,271.6	-21.9	-41.5	41.7	10.33	10.00	-49.38	
7,305.0	8.90	249.40	7,303.4	-23.1	-45.2	45.4	12.23	12.19	-9.06	
7,336.0	12.10	251.00	7,333.8	-25.1	-50.5	50.7	10.36	10.32	5.16	
7,368.0	14.30	252.80	7,365.0	-27.3	-57.4	57.7	6.99	6.88	5.63	
7,399.0	17.10	254.00	7,394.8	-29.7	-65.5	65.7	9.09	9.03	3.87	
7,431.0	19.60	256.80	7,425.2	-32.2	-75.2	75.5	8.28	7.81	8.75	
7,462.0	22.60	260.50	7,454.1	-34.4	-86.2	86.5	10.58	9.68	11.94	
7,494.0	25.40	263.70	7,483.4	-36.2	-99.1	99.4	9.65	8.75	10.00	



DDC
Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Down South State Com #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	WELL @ 3083.0usft (Patterson #79)
Site:	Sec 19, T26S, R28E	MD Reference:	WELL @ 3083.0usft (Patterson #79)
Well:	Down South State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,525.0	28.20	265.40	7,511.0	-37.5	-113.0	113.3	9.36	9.03	5.48
7,557.0	31.50	266.00	7,538.8	-38.7	-128.9	129.2	10.35	10.31	1.88
7,588.0	34.10	266.80	7,564.8	-39.7	-145.6	145.9	8.50	8.39	2.58
7,619.0	36.00	267.50	7,590.2	-40.6	-163.4	163.7	6.26	6.13	2.26
7,651.0	38.40	269.10	7,615.7	-41.2	-182.7	183.1	8.09	7.50	5.00
7,682.0	41.20	270.50	7,639.5	-41.2	-202.6	202.9	9.48	9.03	4.52
7,714.0	44.80	270.50	7,662.9	-41.0	-224.4	224.7	11.25	11.25	0.00
7,745.0	48.60	270.20	7,684.2	-40.9	-246.9	247.3	12.28	12.26	-0.97
7,777.0	51.30	269.80	7,704.8	-40.9	-271.4	271.8	8.49	8.44	-1.25
7,808.0	53.90	269.70	7,723.6	-41.0	-296.1	296.4	8.39	8.39	-0.32
7,840.0	56.50	269.10	7,741.9	-41.3	-322.3	322.7	8.27	8.13	-1.88
7,871.0	59.10	268.80	7,758.4	-41.8	-348.6	348.9	8.43	8.39	-0.97
7,903.0	61.20	269.00	7,774.3	-42.3	-376.3	376.6	6.58	6.56	0.63
7,934.0	63.40	269.00	7,788.7	-42.8	-403.7	404.1	7.10	7.10	0.00
7,966.0	65.30	270.00	7,802.6	-43.0	-432.6	432.9	6.57	5.94	3.13
7,997.0	67.80	270.70	7,814.9	-42.9	-461.0	461.4	8.33	8.06	2.26
8,032.0	71.50	270.20	7,827.1	-42.6	-493.8	494.2	10.66	10.57	-1.43
8,063.0	75.20	270.50	7,835.9	-42.4	-523.5	523.9	11.97	11.94	0.97
8,095.0	78.30	270.40	7,843.3	-42.2	-554.7	555.0	9.69	9.69	-0.31
8,126.0	80.00	270.40	7,849.1	-42.0	-585.1	585.4	5.48	5.48	0.00
8,158.0	80.70	270.70	7,854.5	-41.7	-616.7	617.0	2.37	2.19	0.94
8,189.0	83.40	270.50	7,858.8	-41.3	-647.4	647.7	8.73	8.71	-0.65
8,221.0	87.30	270.00	7,861.4	-41.2	-679.2	679.6	12.29	12.19	-1.56
8,347.0	91.30	269.50	7,862.9	-41.8	-805.2	805.5	3.20	3.17	-0.40
8,473.0	91.70	269.00	7,859.6	-43.4	-931.2	931.5	0.51	0.32	-0.40
8,568.0	92.00	268.60	7,856.5	-45.4	-1,026.1	1,026.4	0.53	0.32	-0.42
8,662.0	92.40	268.30	7,852.9	-47.9	-1,120.0	1,120.3	0.53	0.43	-0.32
8,757.0	91.90	269.50	7,849.4	-49.8	-1,214.9	1,215.3	1.37	-0.53	1.26
8,852.0	92.50	269.30	7,845.7	-50.7	-1,309.8	1,310.2	0.67	0.63	-0.21
8,947.0	92.40	270.40	7,841.6	-51.0	-1,404.7	1,405.1	1.16	-0.11	1.16
9,042.0	92.10	271.20	7,837.9	-49.7	-1,499.6	1,500.0	0.90	-0.32	0.84
9,137.0	90.10	272.10	7,836.1	-46.9	-1,594.6	1,594.9	2.31	-2.11	0.95
9,232.0	90.90	271.60	7,835.3	-43.9	-1,689.5	1,689.8	0.99	0.84	-0.53
9,327.0	89.30	271.40	7,835.1	-41.4	-1,784.5	1,784.8	1.70	-1.68	-0.21
9,422.0	89.30	270.90	7,836.3	-39.5	-1,879.5	1,879.7	0.53	0.00	-0.53
9,517.0	90.00	270.70	7,836.8	-38.1	-1,974.5	1,974.7	0.77	0.74	-0.21
9,611.0	90.40	270.20	7,836.5	-37.4	-2,068.5	2,068.7	0.68	0.43	-0.53
9,706.0	91.00	269.10	7,835.4	-38.0	-2,163.4	2,163.7	1.32	0.63	-1.16
9,801.0	91.40	268.60	7,833.4	-39.9	-2,258.4	2,258.7	0.67	0.42	-0.53
9,897.0	91.10	267.90	7,831.3	-42.8	-2,354.3	2,354.6	0.79	-0.31	-0.73
9,992.0	91.20	267.40	7,829.4	-46.7	-2,449.2	2,449.5	0.54	0.11	-0.53
10,087.0	91.50	267.00	7,827.1	-51.4	-2,544.1	2,544.4	0.53	0.32	-0.42
10,182.0	92.20	266.50	7,824.1	-56.7	-2,638.9	2,639.3	0.91	0.74	-0.53



DDC
Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Down South State Com #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	WELL @ 3083.0usft (Patterson #79)
Site:	Sec 19, T26S, R28E	MD Reference:	WELL @ 3083.0usft (Patterson #79)
Well:	Down South State Com #1H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,277.0	93.20	267.50	7,819.6	-61.7	-2,733.7	2,734.1	1.49	1.05	1.05	
10,372.0	89.40	270.50	7,817.4	-63.4	-2,828.6	2,829.0	5.10	-4.00	3.16	
TD OH @ 10467' MD / 7824' TVD										
10,467.0	83.00	276.90	7,823.7	-57.3	-2,923.1	2,923.5	9.51	-6.74	6.74	

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,241.0	7,239.7	-21.4	-39.7	FIRST SURVEY OH @ 7241' MD / 7240' TVD
10,467.0	7,823.7	-57.3	-2,923.1	TD OH @ 10467' MD / 7824' TVD

Checked By: _____ Approved By: _____ Date: _____



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 19, T26S, R28E

Down South State Com #1H

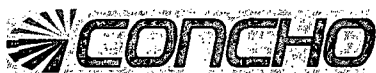
Sidetrack #1

Survey: ST#1

DDC Survey Report

20 January, 2014





DDC
Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Down South State Com #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	WELL @ 3083.0usft (Patterson #79)
Site:	Sec 19, T26S, R28E	MD Reference:	WELL @ 3083.0usft (Patterson #79)
Well:	Down South State Com #1H	North Reference:	Grid
Wellbore:	Sidetrack #1	Survey Calculation Method:	Minimum Curvature
Design:	Sidetrack #1	Database:	EDM:5000.1:Single User Db

Project:	Eddy County, NM (NAD 27)		
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:	Sec 19, T26S, R28E		
Site Position:		Northing:	375,876.20 usft
From:	Map	Easting:	566,529.24 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 1' 59.579 N
		Longitude:	104° 7' 7.111 W
		Grid Convergence:	0.11 °

Well:	Down South State Com #1H					
Well Position	+N/-S	0.0 usft	Northing:	375,876.20 usft	Latitude:	32° 1' 59.579 N
	+E/-W	0.0 usft	Easting:	566,529.24 usft	Longitude:	104° 7' 7.111 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,065.0 usft	

Wellbore		Sidetrack #1			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/17/2014	7.50	59.85	48,185

Design		Sidetrack #1		
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 10,087.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	269.52

Survey Program		Date: 1/20/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	7,200.0	VES Gyro (Wellbore #1)	Good_gyro	Good Gyro
7,241.0	10,087.0	MWD (Wellbore #1)	MWD default	MWD - Standard
10,182.0	12,188.0	ST#1 (Sidetrack #1)	MWD default	MWD - Standard

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
FIRST SURVEY ST @ 10182' MD / 7824' TVD										
10,182.0	92.20	266.50	7,824.1	-56.7	-2,638.9	2,639.3	0.91	0.74	-0.53	
10,277.0	89.30	265.10	7,822.8	-63.7	-2,733.6	2,734.1	3.39	-3.05	-1.47	
10,372.0	89.00	264.70	7,824.2	-72.1	-2,828.2	2,828.7	0.53	-0.32	-0.42	
10,467.0	89.90	265.80	7,825.1	-80.0	-2,922.9	2,923.5	1.50	0.95	1.16	
10,562.0	91.70	266.30	7,823.8	-86.6	-3,017.7	3,018.3	1.97	1.89	0.53	
10,657.0	91.40	267.90	7,821.2	-91.4	-3,112.5	3,113.2	1.71	-0.32	1.68	
10,751.0	92.50	269.10	7,818.0	-93.8	-3,206.4	3,207.1	1.73	1.17	1.28	
10,847.0	92.40	268.60	7,813.9	-95.7	-3,302.3	3,303.0	0.53	-0.10	-0.52	



DDC
Survey Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Down South State Com #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	WELL @ 3083'0usft (Patterson #79)
Site:	Sec 19, T26S, R28E	MD Reference:	WELL @ 3083'0usft (Patterson #79)
Well:	Down South State Com #1H	North Reference:	Grid
Wellbore:	Sidetrack #1	Survey Calculation Method:	Minimum Curvature
Design:	Sidetrack #1	Database:	EDM 5000.1 Single User Db

Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
10,942.0	92.40	267.90	7,810.0	-98.6	-3,397.2	3,397.9	0.74	0.00	-0.74	
11,038.0	91.90	270.40	7,806.4	-100.1	-3,493.1	3,493.8	2.65	-0.52	2.60	
11,133.0	92.20	269.80	7,803.0	-99.9	-3,588.0	3,588.7	0.71	0.32	-0.63	
11,229.0	90.20	270.00	7,800.9	-100.1	-3,684.0	3,684.7	2.09	-2.08	0.21	
11,324.0	90.40	269.70	7,800.4	-100.3	-3,779.0	3,779.7	0.38	0.21	-0.32	
11,417.0	90.60	269.10	7,799.6	-101.3	-3,872.0	3,872.7	0.68	0.22	-0.65	
11,512.0	90.30	268.80	7,798.9	-103.0	-3,967.0	3,967.7	0.45	-0.32	-0.32	
11,608.0	91.20	269.80	7,797.6	-104.2	-4,062.9	4,063.7	1.40	0.94	1.04	
11,703.0	91.40	269.10	7,795.5	-105.1	-4,157.9	4,158.7	0.77	0.21	-0.74	
11,798.0	91.40	268.40	7,793.2	-107.2	-4,252.9	4,253.6	0.74	0.00	-0.74	
11,892.0	91.50	270.70	7,790.8	-107.9	-4,346.8	4,347.6	2.45	0.11	2.45	
11,987.0	91.70	270.50	7,788.1	-106.9	-4,441.8	4,442.5	0.30	0.21	-0.21	
12,083.0	91.70	269.80	7,785.3	-106.7	-4,537.7	4,538.5	0.73	0.00	-0.73	
TD @ 12188' MD / 7782' TVD										
12,188.0	91.70	269.80	7,782.2	-107.0	-4,642.7	4,643.4	0.00	0.00	0.00	

Survey Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
10,182.0	7,824.1	-56.7	-2,638.9	FIRST SURVEY ST @ 10182' MD / 7824' TVD	
12,188.0	7,782.2	-107.0	-4,642.7	TD @ 12188' MD / 7782' TVD	

Checked By: _____	Approved By: _____	Date: _____
-------------------	--------------------	-------------