



A GYRO TECHNOLOGIES INC. COMPANY

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

April 29, 2014

30-015-42130

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

NM OIL CONSERVATION
ARTESIA DISTRICT
OCT 06 2014
RECEIVED

Attn: Kanicia Castillo

RE: SRO State Com No. 064H

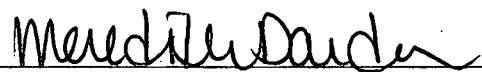
Please find enclosed a copy of the survey from 0.00' to 2430.00' ran on the
above referenced well.

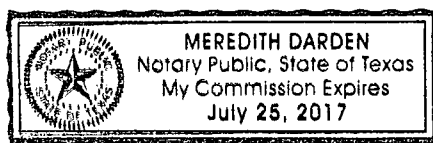
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
§
COUNTY OF NUECES §

This instrument was acknowledged before me on the 29th day of April,
A.D., 2014, by Keith Havelka.


Meredith Darden
Notary Public, State of Texas





Company: COG OPERATING LLC
Lease/Well: SRO STATE COM NO/064H

Rig Name: SCANDRILL FREEDOM
State/County: TEXAS/EDDY
Latitude: 32.06, Longitude: -104.08
GRID North is 0.13 Degrees East of True North
VS-Azi: 0.00 Degrees



NM OIL CONSERVATION
ARTESIA DISTRICT
UL 06 2014
RECEIVED

Depth Reference : R.K.B = 27 FEET

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: SRO STATE COM 64 H.ut
Minimum Curvature Method
Report Date/Time: 4/29/2014 / 16:50

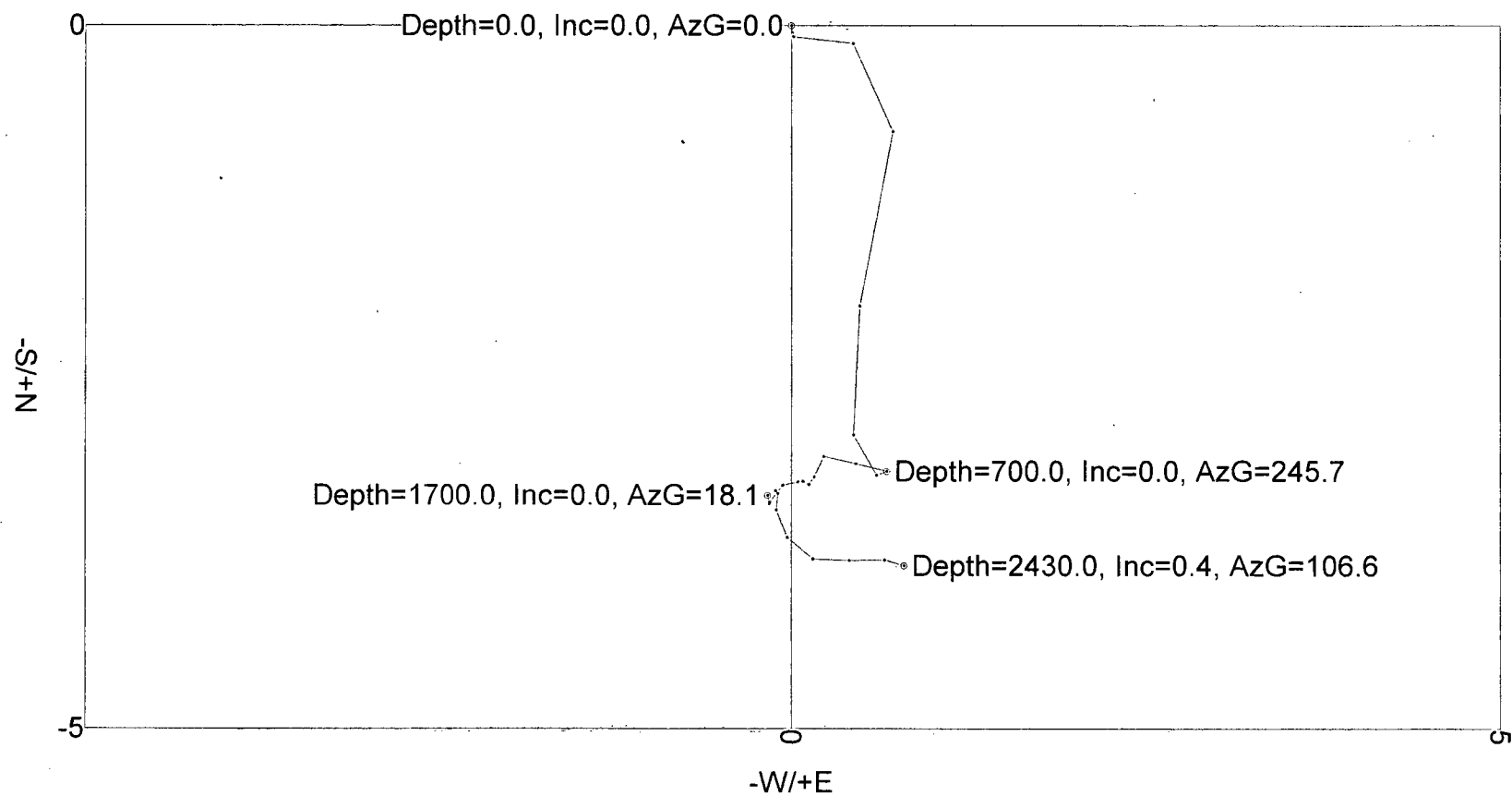
VES Survey International
West Texas
(432) 563-5444
Surveyor: Javier Estrada
SRO State Com No. 064H / API 30-015-42130

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	0.09	169.47	100.00	-0.08	0.01	-0.08	0.08	169.47	0.09
200.00	0.47	85.78	200.00	-0.13	0.43	-0.13	0.45	106.32	0.46
300.00	0.76	190.88	300.00	-0.75	0.71	-0.75	1.04	136.47	0.99
400.00	0.68	190.23	399.99	-1.99	0.48	-1.99	2.05	166.40	0.08
500.00	0.38	169.59	499.98	-2.91	0.44	-2.91	2.94	171.46	0.35
600.00	0.13	67.23	599.98	-3.20	0.60	-3.20	3.25	169.40	0.43
700.00	0.04	245.65	699.98	-3.17	0.67	-3.17	3.24	168.03	0.16
800.00	0.23	289.19	799.98	-3.11	0.45	-3.11	3.15	171.72	0.21
900.00	0.04	248.46	899.98	-3.06	0.23	-3.06	3.07	175.72	0.20
1000.00	0.15	194.12	999.98	-3.21	0.16	-3.21	3.21	177.11	0.13
1100.00	0.09	355.89	1099.98	-3.26	0.12	-3.26	3.26	177.83	0.24
1200.00	0.07	215.35	1199.98	-3.24	0.08	-3.24	3.24	178.55	0.15
1300.00	0.05	359.90	1299.98	-3.24	0.05	-3.24	3.24	179.20	0.12
1400.00	0.15	236.05	1399.98	-3.27	-0.06	-3.27	3.27	181.06	0.18
1500.00	0.06	166.04	1499.98	-3.39	-0.15	-3.39	3.39	182.59	0.14
1600.00	0.05	337.99	1599.98	-3.40	-0.16	-3.40	3.40	182.64	0.11
1700.00	0.02	18.14	1699.98	-3.34	-0.17	-3.34	3.34	182.87	0.04
1800.00	0.06	74.51	1799.98	-3.30	-0.11	-3.30	3.31	181.93	0.05

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	0.05	221.29	1899.98	-3.33	-0.09	-3.33	3.33	181.61	0.11
2000.00	0.10	167.71	1999.98	-3.44	-0.11	-3.44	3.45	181.77	0.08
2100.00	0.14	152.05	2099.98	-3.64	-0.03	-3.64	3.64	180.46	0.06
2200.00	0.15	109.07	2199.98	-3.79	0.15	-3.79	3.80	177.69	0.11
2300.00	0.15	76.86	2299.98	-3.80	0.41	-3.80	3.83	173.90	0.08
2400.00	0.14	103.35	2399.98	-3.80	0.65	-3.80	3.86	170.23	0.07
2430.00	0.42	106.58	2429.98	-3.84	0.80	-3.84	3.92	168.31	0.94



VES Survey International
West Texas
(432) 563-5444
Surveyor: Javier Estrada
SRO State Com No. 064H / API 30-015-42130





A GYRO TECHNOLOGIES INC. COMPANY

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

May 1, 2014

COG Operating LLC (Concho)
One Concho Center
600 W. Illinois Avenue
Midland, TX 79701

Attn: Kanicia Castillo

Re: **SRO State Com No 064H**

Please find enclosed a copy of the survey from 2,430' to 8,587' ran on the above referenced well.

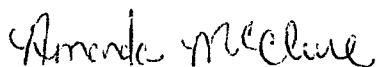
If I can be of any further service, please do not hesitate to call me at 800-606-4976.

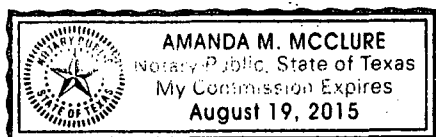
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 1 day of May, A.D., 2014, by Keith Havelka.


Amanda McClure
Notary Public, State of Texas





Company: COG OPERATING
Lease/Well: SRO STATE COM/NO 064H
Location: S15-TS26S-R28E
Rig Name: SCAN FREEDOM
State/County: NEW MEXICO/EDDY
Latitude: 32.06, Longitude: -104.08
GRID North is 0.13 Degrees East of True North
VS-Azi: 178.98 Degrees



Depth Reference : 29ft RKB

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: SROSTATECOM64H.ut

Minimum Curvature Method

Report Date/Time: 5/1/2014 / 13:51

VES Survey International

800-606-4976

Corpus Christi, Texas

Survey Engineer: Jeremy Rounsavall

SRO State Com No 064H / API 30-015-42130

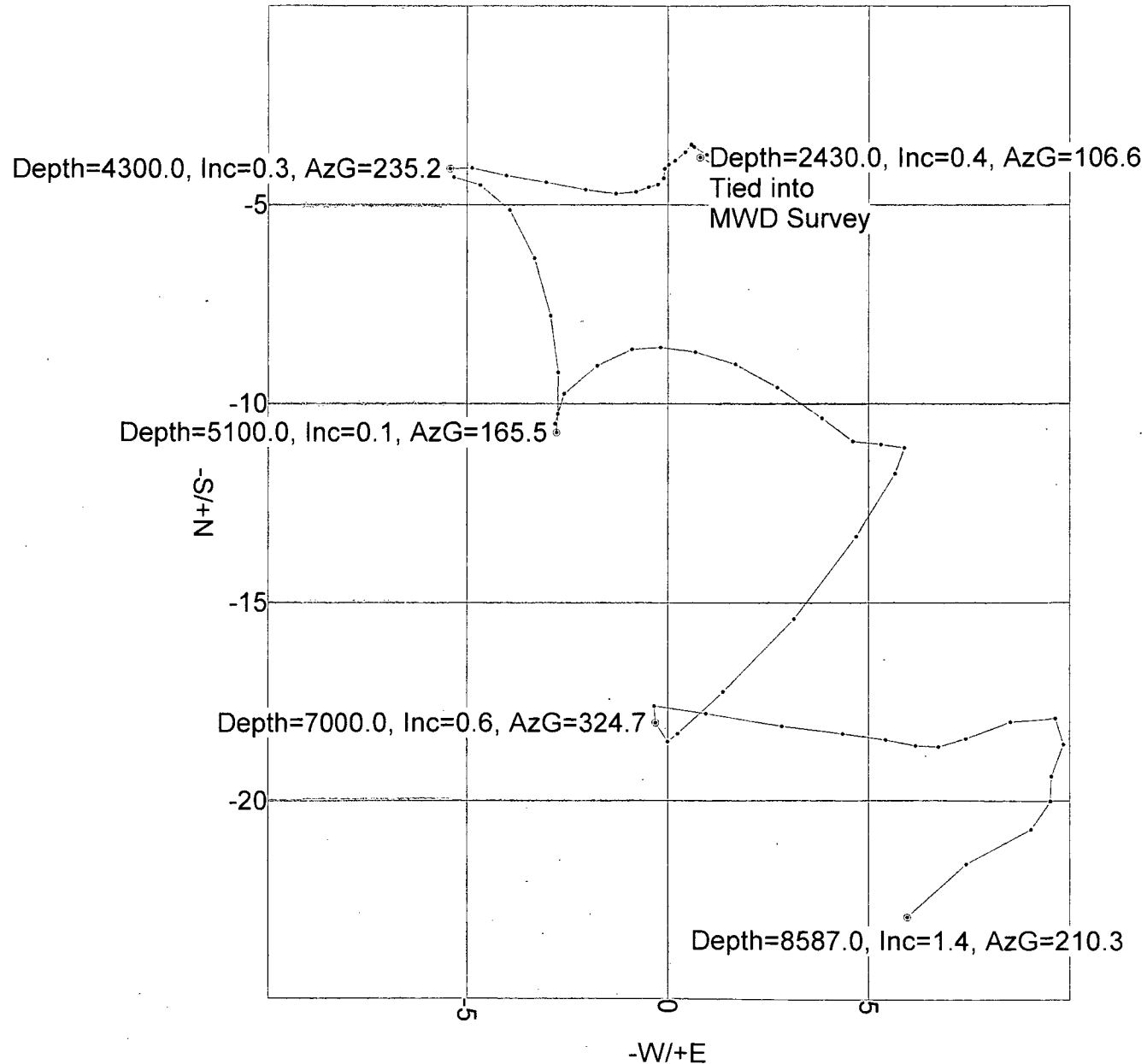
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
Tied into MWD Survey									
2430.00	0.42	106.58	2429.98	-3.81	0.80	3.82	3.89	168.14	****
2500.00	0.15	149.94	2499.98	-3.96	1.09	3.98	4.11	164.61	0.47
2600.00	0.16	358.39	2599.98	-3.93	1.15	3.95	4.10	163.69	0.30
2700.00	0.22	284.80	2699.98	-3.74	0.96	3.76	3.87	165.56	0.23
2800.00	0.22	318.39	2799.98	-3.55	0.65	3.56	3.61	169.59	0.13
2900.00	0.11	143.48	2899.98	-3.48	0.58	3.49	3.53	170.54	0.34
3000.00	0.27	239.93	2999.98	-3.68	0.44	3.69	3.70	173.24	0.30
3100.00	0.13	209.12	3099.98	-3.89	0.18	3.90	3.90	177.38	0.17
3200.00	0.11	268.78	3199.98	-4.00	0.02	4.00	4.00	179.65	0.12
3300.00	0.11	184.84	3299.98	-4.10	-0.08	4.09	4.10	181.16	0.15
3400.00	0.16	184.49	3399.98	-4.34	-0.10	4.33	4.34	181.35	0.05
3500.00	0.15	263.63	3499.98	-4.49	-0.24	4.48	4.50	183.10	0.20
3600.00	0.13	242.37	3599.98	-4.56	-0.47	4.55	4.58	185.93	0.06
3700.00	0.26	253.35	3699.97	-4.67	-0.79	4.66	4.74	189.62	0.14
3800.00	0.32	273.74	3799.97	-4.72	-1.29	4.70	4.89	195.25	0.12
3900.00	0.57	279.89	3899.97	-4.62	-2.05	4.58	5.05	203.93	0.25

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
4000.00	0.58	280.98	3999.97	-4.44	-3.03	4.38	5.38	214.35	0.02
4100.00	0.57	278.38	4099.96	-4.27	-4.03	4.20	5.87	223.34	0.03
4200.00	0.43	287.77	4199.96	-4.08	-4.88	3.99	6.36	230.12	0.16
4300.00	0.26	235.25	4299.96	-4.09	-5.43	4.00	6.80	232.99	0.34
4400.00	0.34	106.13	4399.95	-4.31	-5.34	4.21	6.86	231.10	0.54
4500.00	0.46	107.72	4499.95	-4.51	-4.68	4.42	6.50	226.05	0.12
4600.00	0.70	144.77	4599.95	-5.13	-3.94	5.06	6.47	217.55	0.44
4700.00	0.87	159.40	4699.94	-6.35	-3.32	6.28	7.16	207.63	0.26
4800.00	0.85	169.84	4799.93	-7.79	-2.92	7.73	8.32	200.58	0.16
4900.00	0.80	175.38	4899.92	-9.21	-2.74	9.16	9.61	196.54	0.09
5000.00	0.40	190.50	4999.91	-10.26	-2.74	10.20	10.62	194.98	0.43
5100.00	0.14	165.47	5099.91	-10.72	-2.78	10.66	11.07	194.52	0.28
5200.00	0.40	348.58	5199.91	-10.50	-2.81	10.44	10.87	195.01	0.54
5300.00	0.58	35.94	5299.91	-9.75	-2.59	9.70	10.09	194.85	0.43
5400.00	0.69	60.96	5399.90	-9.05	-1.76	9.01	9.21	191.01	0.30
5500.00	0.42	71.14	5499.89	-8.63	-0.89	8.62	8.68	185.86	0.29
5600.00	0.42	100.41	5599.89	-8.58	-0.18	8.58	8.58	181.19	0.21
5700.00	0.58	95.68	5699.89	-8.70	0.69	8.71	8.73	175.50	0.16
5800.00	0.64	117.61	5799.88	-9.01	1.68	9.03	9.16	169.45	0.24
5900.00	0.73	120.49	5899.88	-9.59	2.72	9.63	9.97	164.16	0.10
6000.00	0.83	128.99	5999.87	-10.36	3.83	10.43	11.05	159.73	0.15
6100.00	0.28	120.59	6099.86	-10.94	4.60	11.02	11.87	157.20	0.55
6200.00	0.57	84.95	6199.86	-11.02	5.30	11.11	12.23	154.30	0.38
6300.00	0.18	143.79	6299.86	-11.10	5.89	11.21	12.57	152.04	0.50
6400.00	0.71	211.62	6399.85	-11.76	5.66	11.86	13.05	154.30	0.67
6500.00	1.42	212.01	6499.84	-13.34	4.68	13.42	14.13	160.67	0.71
6600.00	1.55	221.00	6599.80	-15.41	3.13	15.46	15.72	168.50	0.27
6700.00	1.37	226.78	6699.77	-17.25	1.37	17.27	17.30	175.44	0.23
6800.00	0.40	226.95	6799.76	-18.31	0.25	18.31	18.31	179.22	0.97
6900.00	0.05	7.72	6899.76	-18.50	0.00	18.50	18.50	180.01	0.44
7000.00	0.60	324.68	6999.75	-18.03	-0.30	18.02	18.03	180.95	0.57
7100.00	0.31	91.32	7099.75	-17.61	-0.33	17.60	17.61	181.09	0.83
7200.00	1.18	100.14	7199.74	-17.79	0.95	17.81	17.82	176.95	0.87
7300.00	1.01	99.16	7299.72	-18.12	2.83	18.16	18.34	171.11	0.16
7400.00	0.73	94.43	7399.71	-18.31	4.34	18.38	18.81	166.65	0.29
7500.00	0.52	103.20	7499.71	-18.46	5.42	18.55	19.24	163.62	0.24
7600.00	0.35	99.97	7599.70	-18.62	6.17	18.72	19.61	161.67	0.17
7700.00	0.31	84.21	7699.70	-18.64	6.74	18.76	19.82	160.11	0.10
7800.00	0.51	66.52	7799.70	-18.44	7.42	18.57	19.87	158.07	0.23

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
7900.00	0.85	70.12	7899.69	-18.01	8.53	18.15	19.93	154.64	0.34
8000.00	0.51	112.09	7999.69	-17.92	9.64	18.09	20.35	151.71	0.58
8100.00	0.61	203.02	8099.68	-18.57	9.84	18.75	21.02	152.08	0.80
8200.00	0.38	195.43	8199.68	-19.38	9.55	19.55	21.61	153.77	0.24
8300.00	0.37	168.91	8299.68	-20.01	9.52	20.18	22.16	154.55	0.17
8400.00	0.76	234.34	8399.67	-20.71	9.04	20.87	22.60	156.41	0.69
8500.00	1.36	245.36	8499.66	-21.59	7.43	21.72	22.83	161.02	0.63
8587.00	1.39	210.26	8586.63	-22.93	5.96	23.03	23.69	165.43	0.95



VES Survey International
800-606-4976
Corpus Christi, Texas
Survey Engineer: Jeremy Rounsavall
SRO State Com No 064H / API 30-015-42130



VES Survey Date: 04/19/2014



COG Operating LLC

Eddy County, NM (NAD27 NME)

SRO State Com

#64H

WB1/Job #1410531

Survey: Phoenix MWD Survey

Standard Survey Report

05 May, 2014

NM OIL CONSERVATION
ARTESIA DISTRICT
OCT 06 2014
RECEIVED





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #64H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3037.60usft (Scandril Freedom)
Site:	SRO State Com	MD Reference:	KB @ 3037.60usft (Scandril Freedom)
Well:	#64H	North Reference:	Grid
Wellbore:	WB1/Job #1410531	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Scandril Freedom)	Database:	GCR DB

Project	Eddy 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	SRO State Com		
Site Position:		Northing:	386,965.90 usft
From:	Map	Easting:	564,751.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 3' 49.36391 N
		Longitude:	104° 7' 27.51995 W
		Grid Convergence:	0.11 °

Well	#64H, 2450' FNL & 710' FWL		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 3' 27.08971 N
		Longitude:	104° 4' 51.02047 W
		Ground Level:	3,011.60 usft

Wellbore	WB1/Job #1410531		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010_14	04/20/14	7.46
			Dip Angle
			(°)
			59.88
			Field Strength
			(nT)
			48,179

Design	Surveys (Scandril Freedom)		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			178.98

Survey Program	Date 05/05/14		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	2,430.00	Gyro Survey (WB1/Job #1410531)	CB-GYRO-MS
2,500.00	8,587.00	VES Survey Run 2 (WB1/Job #1410531)	VES-ISCWSA-GYRO-3
8,587.00	16,852.00	Phoenix MWD Survey (WB1/Job #141053)	MWD
			Description
			Camera based gyro multishot
			Biaxial Semi-Cont. 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)	
8,587.00	1.39	210.26	8,586.63	-22.95	5.98	23.05	0.00	0.00	0.00	
Tie-on to VES Gyro										
8,638.00	1.80	169.40	8,637.61	-24.27	5.81	24.37	2.31	0.80	-80.12	
First Pheonix MWD Survey										
8,669.00	1.90	183.00	8,668.60	-25.26	5.88	25.36	1.45	0.32	43.87	
8,701.00	2.80	176.80	8,700.57	-26.57	5.89	26.67	2.92	2.81	-19.38	
8,732.00	5.70	175.30	8,731.48	-28.86	6.06	28.97	9.36	9.35	-4.84	
8,764.00	8.30	172.70	8,763.24	-32.74	6.48	32.85	8.18	8.13	-8.13	



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #64H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3037.60usft (Scandriil Freedom)
Site:	SRO State Com	MD Reference:	KB @ 3037.60usft (Scandriil Freedom)
Well:	#64H	North Reference:	Grid
Wellbore:	WB1/Job #1410531	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Scandriil Freedom)	Database:	GCR 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)
8,796.00	10.40	172.80	8,794.81	-37.90	7.14	38.02	6.56	6.56	0.31
8,827.00	12.60	174.30	8,825.19	-44.04	7.83	44.17	7.16	7.10	4.84
8,859.00	15.20	176.90	8,856.25	-51.70	8.40	51.84	8.35	8.13	8.13
8,890.00	16.40	179.90	8,886.08	-60.13	8.63	60.28	4.68	3.87	9.68
8,922.00	18.40	176.50	8,916.61	-69.69	8.94	69.84	7.01	6.25	-10.63
8,953.00	20.50	173.20	8,945.84	-79.97	9.89	80.13	7.64	6.77	-10.65
8,985.00	21.60	171.20	8,975.71	-91.35	11.45	91.54	4.11	3.44	-6.25
9,017.00	24.70	170.30	9,005.13	-103.77	13.48	103.99	9.75	9.69	-2.81
9,048.00	28.90	170.50	9,032.79	-117.55	15.81	117.81	13.55	13.55	0.65
9,080.00	33.10	169.80	9,060.21	-133.78	18.63	134.09	13.17	13.13	-2.19
9,111.00	37.30	169.80	9,085.54	-151.36	21.80	151.73	13.55	13.55	0.00
9,143.00	42.30	170.60	9,110.12	-171.54	25.27	171.96	15.71	15.63	2.50
9,175.00	47.00	171.30	9,132.88	-193.75	28.80	194.23	14.77	14.69	2.19
9,206.00	51.90	172.30	9,153.02	-217.05	32.15	217.59	15.99	15.81	3.23
9,238.00	56.60	173.30	9,171.72	-242.81	35.40	243.40	14.90	14.69	3.13
9,270.00	60.80	174.70	9,188.34	-270.00	38.25	270.64	13.65	13.13	4.38
9,301.00	62.90	178.10	9,202.97	-297.27	39.96	297.93	11.81	6.77	10.97
9,333.00	66.30	180.10	9,216.69	-326.17	40.41	326.84	12.03	10.63	6.25
9,364.00	70.30	180.80	9,228.15	-354.96	40.18	355.62	13.07	12.90	2.26
9,396.00	74.00	181.20	9,237.96	-385.41	39.65	386.06	11.62	11.56	1.25
9,428.00	77.30	181.50	9,245.89	-416.40	38.91	417.03	10.35	10.31	0.94
9,459.00	80.20	182.30	9,251.93	-446.79	37.91	447.39	9.69	9.35	2.58
9,543.00	87.60	183.50	9,260.85	-530.14	33.68	530.66	8.92	8.81	1.43
9,638.00	90.70	183.20	9,262.26	-624.96	28.13	625.36	3.28	3.26	-0.32
9,733.00	90.60	182.10	9,261.19	-719.85	23.74	720.16	1.16	-0.11	-1.16
9,828.00	87.90	181.60	9,262.43	-814.78	20.67	815.02	2.89	-2.84	-0.53
9,922.00	89.40	181.50	9,264.64	-908.72	18.13	908.90	1.60	1.60	-0.11
10,017.00	90.80	180.70	9,264.48	-1,003.70	16.30	1,003.83	1.70	1.47	-0.84
10,112.00	89.80	180.50	9,263.98	-1,098.69	15.31	1,098.79	1.07	-1.05	-0.21
10,206.00	91.50	180.90	9,262.91	-1,192.67	14.16	1,192.74	1.86	1.81	0.43
10,301.00	91.00	180.60	9,260.84	-1,287.64	12.92	1,287.67	0.61	-0.53	-0.32
10,395.00	90.20	180.10	9,259.86	-1,381.64	12.34	1,381.64	1.00	-0.85	-0.53
10,490.00	91.60	180.10	9,258.37	-1,476.62	12.18	1,476.60	1.47	1.47	0.00
10,585.00	91.80	180.00	9,255.55	-1,571.58	12.09	1,571.55	0.24	0.21	-0.11
10,679.00	90.70	179.60	9,253.50	-1,665.56	12.42	1,665.51	1.25	-1.17	-0.43
10,774.00	90.60	179.60	9,252.42	-1,760.55	13.09	1,760.50	0.11	-0.11	0.00
10,868.00	90.30	178.90	9,251.68	-1,854.53	14.32	1,854.50	0.81	-0.32	-0.74
10,962.00	88.80	178.10	9,252.42	-1,948.50	16.78	1,948.49	1.81	-1.60	-0.85
11,056.00	89.60	178.10	9,253.73	-2,042.43	19.89	2,042.47	0.85	0.85	0.00
11,151.00	90.80	177.70	9,253.40	-2,137.37	23.37	2,137.45	1.33	1.26	-0.42
11,245.00	89.50	177.90	9,253.15	-2,231.30	26.98	2,231.42	1.40	-1.38	0.21
11,338.00	90.40	177.60	9,253.23	-2,324.22	30.63	2,324.40	1.02	0.97	-0.32
11,433.00	90.10	177.40	9,252.82	-2,419.13	34.78	2,419.37	0.38	-0.32	-0.21
11,527.00	87.90	177.60	9,254.46	-2,513.02	38.88	2,513.32	2.35	-2.34	0.21



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #64H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3037.60usft (Scandrift Freedom)
Site:	SRO State Com	MD Reference:	KB @ 3037.60usft (Scandrift Freedom)
Well:	#64H	North Reference:	Grid
Wellbore:	WB1/Job #1410531	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Scandrift Freedom)	Database:	GCR 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)
11,621.00	89.10	177.80	9,256.92	-2,606.91	42.65	2,607.26	1.29	1.28	0.21
11,715.00	91.20	178.10	9,256.68	-2,700.85	46.01	2,701.24	2.26	2.23	0.32
11,809.00	90.90	177.70	9,254.95	-2,794.77	49.45	2,795.21	0.53	-0.32	-0.43
11,903.00	90.00	177.00	9,254.21	-2,888.66	53.80	2,889.16	1.21	-0.96	-0.74
11,997.00	91.60	176.20	9,252.90	-2,982.48	59.37	2,983.07	1.90	1.70	-0.85
12,091.00	90.60	176.40	9,251.10	-3,076.27	65.44	3,076.95	1.08	-1.06	0.21
12,185.00	91.20	176.80	9,249.62	-3,170.09	71.01	3,170.85	0.77	0.64	0.43
12,280.00	90.70	177.30	9,248.05	-3,264.95	75.90	3,265.79	0.74	-0.53	0.53
12,373.00	89.90	177.90	9,247.56	-3,357.87	79.79	3,358.76	1.08	-0.86	0.65
12,468.00	89.30	179.40	9,248.22	-3,452.84	82.03	3,453.75	1.70	-0.63	1.58
12,562.00	90.00	179.00	9,248.80	-3,546.83	83.35	3,547.75	0.86	0.74	-0.43
12,656.00	90.70	178.10	9,248.22	-3,640.79	85.72	3,641.74	1.21	0.74	-0.96
12,750.00	90.60	177.40	9,247.16	-3,734.71	89.41	3,735.71	0.75	-0.11	-0.74
12,844.00	88.80	177.60	9,247.65	-3,828.62	93.51	3,829.68	1.93	-1.91	0.21
12,938.00	88.60	178.90	9,249.78	-3,922.55	96.38	3,923.64	1.40	-0.21	1.38
13,032.00	89.10	179.70	9,251.67	-4,016.52	97.53	4,017.62	1.00	0.53	0.85
13,126.00	90.50	180.50	9,252.00	-4,110.52	97.37	4,111.60	1.72	1.49	0.85
13,220.00	90.60	181.00	9,251.09	-4,204.50	96.14	4,205.55	0.54	0.11	0.53
13,314.00	91.60	180.80	9,249.29	-4,298.47	94.66	4,299.48	1.08	1.06	-0.21
13,408.00	92.30	181.70	9,246.09	-4,392.40	92.61	4,393.35	1.21	0.74	0.96
13,502.00	92.40	181.30	9,242.24	-4,486.29	90.15	4,487.18	0.44	0.11	-0.43
13,596.00	91.80	181.60	9,238.79	-4,580.19	87.78	4,581.03	0.71	-0.64	0.32
13,690.00	91.40	181.10	9,236.17	-4,674.13	85.56	4,674.91	0.68	-0.43	-0.53
13,784.00	91.10	181.10	9,234.12	-4,768.09	83.76	4,768.82	0.32	-0.32	0.00
13,878.00	90.20	181.10	9,233.05	-4,862.06	81.95	4,862.75	0.96	-0.96	0.00
13,972.00	90.70	179.50	9,232.31	-4,956.06	81.46	4,956.72	1.78	0.53	-1.70
14,067.00	90.40	180.10	9,231.40	-5,051.05	81.79	5,051.71	0.71	-0.32	0.63
14,161.00	90.90	180.40	9,230.33	-5,145.04	81.38	5,145.68	0.62	0.53	0.32
14,255.00	90.10	180.70	9,229.51	-5,239.03	80.48	5,239.64	0.91	-0.85	0.32
14,349.00	89.30	178.90	9,230.00	-5,333.03	80.81	5,333.62	2.10	-0.85	-1.91
14,443.00	89.50	179.80	9,230.99	-5,427.02	81.88	5,427.61	0.98	0.21	0.96
14,537.00	90.30	180.30	9,231.15	-5,521.01	81.79	5,521.60	1.00	0.85	0.53
14,631.00	90.80	179.30	9,230.25	-5,615.01	82.12	5,615.58	1.19	0.53	-1.06
14,725.00	89.90	176.00	9,229.68	-5,708.91	85.98	5,709.54	3.64	-0.96	-3.51
14,819.00	89.80	173.50	9,229.92	-5,802.51	94.58	5,803.28	2.66	-0.11	-2.66
14,913.00	90.10	173.80	9,230.00	-5,895.93	104.97	5,896.87	0.45	0.32	0.32
15,008.00	90.60	174.60	9,229.42	-5,990.45	114.57	5,991.54	0.99	0.53	0.84
15,102.00	91.40	175.70	9,227.78	-6,084.09	122.52	6,085.31	1.45	0.85	1.17
15,196.00	92.00	176.00	9,225.00	-6,177.80	129.32	6,179.13	0.71	0.64	0.32
15,290.00	91.30	176.20	9,222.29	-6,271.55	135.71	6,272.97	0.77	-0.74	0.21
15,384.00	92.20	177.10	9,219.42	-6,365.34	141.20	6,366.85	1.35	0.96	0.96
15,478.00	91.70	176.70	9,216.22	-6,459.15	146.28	6,460.73	0.68	-0.53	-0.43
15,573.00	87.80	175.70	9,216.63	-6,553.92	152.57	6,555.60	4.24	-4.11	-1.05



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #64H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3037.60usft (Scandriil Freedom)
Site:	SRO State Com	MD Reference:	KB @ 3037.60usft (Scandriil Freedom)
Well:	#64H	North Reference:	Grid
Wellbore:	WB1/Job #1410531	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Scandriil Freedom)	Database:	GCR 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)
15,666.00	87.80	176.80	9,220.20	-6,646.65	158.65	6,648.42	1.18	0.00	1.18
15,760.00	92.10	179.40	9,220.29	-6,740.57	161.77	6,742.38	5.35	4.57	2.77
15,854.00	92.40	180.00	9,216.60	-6,834.49	162.26	6,836.30	0.71	0.32	0.64
15,948.00	90.70	180.40	9,214.05	-6,928.46	161.93	6,930.24	1.86	-1.81	0.43
16,043.00	91.30	180.20	9,212.39	-7,023.44	161.43	7,025.20	0.67	0.63	-0.21
16,137.00	87.40	178.40	9,213.46	-7,117.40	162.58	7,119.17	4.57	-4.15	-1.91
16,231.00	88.10	178.40	9,217.15	-7,211.29	165.20	7,213.09	0.74	0.74	0.00
16,325.00	89.10	178.20	9,219.45	-7,305.22	167.99	7,307.06	1.08	1.06	-0.21
16,419.00	89.60	178.90	9,220.51	-7,399.19	170.37	7,401.05	0.92	0.53	0.74
16,513.00	90.10	178.90	9,220.76	-7,493.17	172.17	7,495.05	0.53	0.53	0.00
16,607.00	89.80	177.90	9,220.84	-7,587.13	174.80	7,589.04	1.11	-0.32	-1.06
16,701.00	90.30	177.60	9,220.76	-7,681.06	178.49	7,683.02	0.62	0.53	-0.32
16,797.00	91.50	178.10	9,219.25	-7,776.98	182.09	7,778.99	1.35	1.25	0.52
Last Pheonix MWD Survey									
16,852.00	91.50	178.10	9,217.81	-7,831.93	183.91	7,833.96	0.00	0.00	0.00
Perjection to Bit									

Survey Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,587.00	8,586.63	-22.95	5.98	Tie-on to VES Gyro
8,638.00	8,637.61	-24.27	5.81	First Pheonix MWD Survey
16,797.00	9,219.25	-7,776.98	182.09	Last Pheonix MWD Survey
16,852.00	9,217.81	-7,831.93	183.91	Perjection to Bit

Checked By: _____	Approved By: _____	Date: _____
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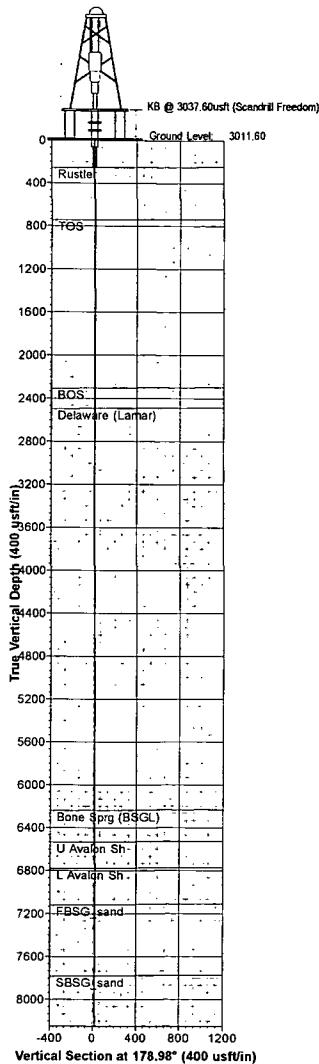
Project: Eddy County, NM (NAD27 NME)
Site: SRO State Com
Well: #64H
Wellbore: WB1/Job #1410531
Design: Plan #2 04-20-14
Rig: Scandril Freedom



PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: -0.13°
Magnetic North: 7.32°
Magnetic Field
Strength: 48178.9nT
Dip Angle: 59.88°
Date: 04/20/2014
Model: IGRF2010_14



WELL DETAILS						
+N/-S	+E/-W	Northing	Ground Level Easting	Latitude	Longitude	
0.00	0.00	384744.00	578223.10	32° 3' 27.08971 N	104° 4' 51.02047 W	

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
1	8587.00	1.39	210.26	8586.63	-22.95	5.98	0.00	0.00	23.05	Tie-on to Gyro
2	8796.00	1.39	210.26	8795.57	-27.33	3.42	0.00	0.00	27.38	KOP: 12°/100' Build
3	9539.34	90.41	178.95	9263.00	-508.01	6.25	12.00	-31.31	508.04	LP: Hold 90.41° Inc, 178.95° Azm
4	16880.94	90.41	178.95	9211.00	-7848.20	140.20	0.00	0.00	7849.45	PBHL-SRO State Com #64H TD at 16880.94

DESIGN TARGET DETAILS									
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape	
PBHL-SRO State Com #64H	9211.00	-7848.20	140.20	376895.60	578363.30	32° 2' 9.41622 N	104° 4' 49.60489 W	Point	
- plan hits target center									

LEGEND

- #64H, WB1/Job #1410531, Surveys (Scandril Freedom) V0
- #63H, WB1/Job #1410518, Plan #2 04-30-14 V0
- Plan #2 04-20-14

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well #64H, Grid North
Latitude: 32° 3' 27.08971 N
Longitude: 104° 4' 51.02047 W
Grid East: 578223.10
Grid North: 384744.00
Scale Factor: 1.000
Geomagnetic Model: IGRF2010_14
Sample Date: 20-Apr-14
Magnetic Declination: 7.46°
Dip Angle from Horizontal: 59.88°
Magnetic Field Strength: 48179
To convert a Magnetic Direction to a Grid Direction, Add 7.32°
To convert a Magnetic Direction to a True Direction, Add 7.46° East
To convert a True Direction to a Grid Direction, Subtract 0.13°

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DpDr
8923.75	8926.19	TBSG_sand	-0.30	178.98

