



October 20, 2015

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

3001542758

Attn: Kanicia Castillo

RE: Burch Keely Unit 934H

Please find enclosed a copy of the survey from 0' to 1037' ran on the above referenced well.

Sincerely,

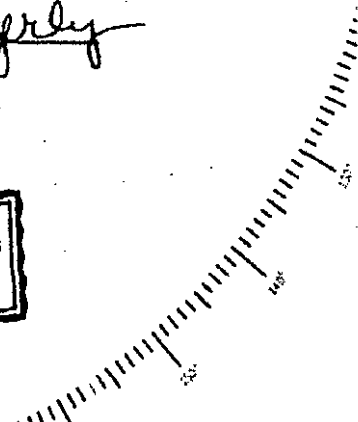
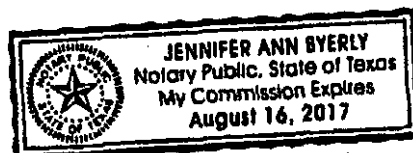

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 20 day of October, A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas

VES Survey International
P.O. Box 261021, Corpus Christi, Texas 78426
T (361) 767-0602 F (361) 767-0612
www.vessurvey.com





I JAVIER ESTRADA certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 10/15/15 through 10/15/15 conduct or supervise the taking of a RATE GYRO survey from a depth of 0 feet to a depth of 1037 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Vaughn Energy Services, that I am authorized and qualified to make this report; that this survey was conducted at the request of COG OPERATING LLC for the BURCH KEELY UNIT Well # 934H API # 30-015-42758 in EDDY County / Parish NEW MEXICO; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Vaughn Energy Services


JAVIER ESTRADA
Service Technician
Vaughn Energy Services



Company: Cog Operating LLC
Lease/Well: Burch Keely Unit /934H

Rig Name: Silver Oak 3

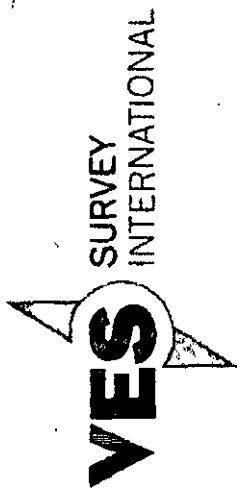
State/County: New Mexico /Eddy

VS-Azi: 0.00 Degrees

Latitude: 32.83381, Longitude: -104.01983

Grid North = True North -0.17 degs (NAD 27)

Grid Correction Applied = -0.17 degs



Depth Reference : R.K.B = 18 FT

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: burch keely unit 934h.ut

Minimum Curvature Method

Report Date/Time: 10/20/2015 / 10:39

VES Survey International

Midland, Texas

432-563-5444

Surveyor: Javier Estrada

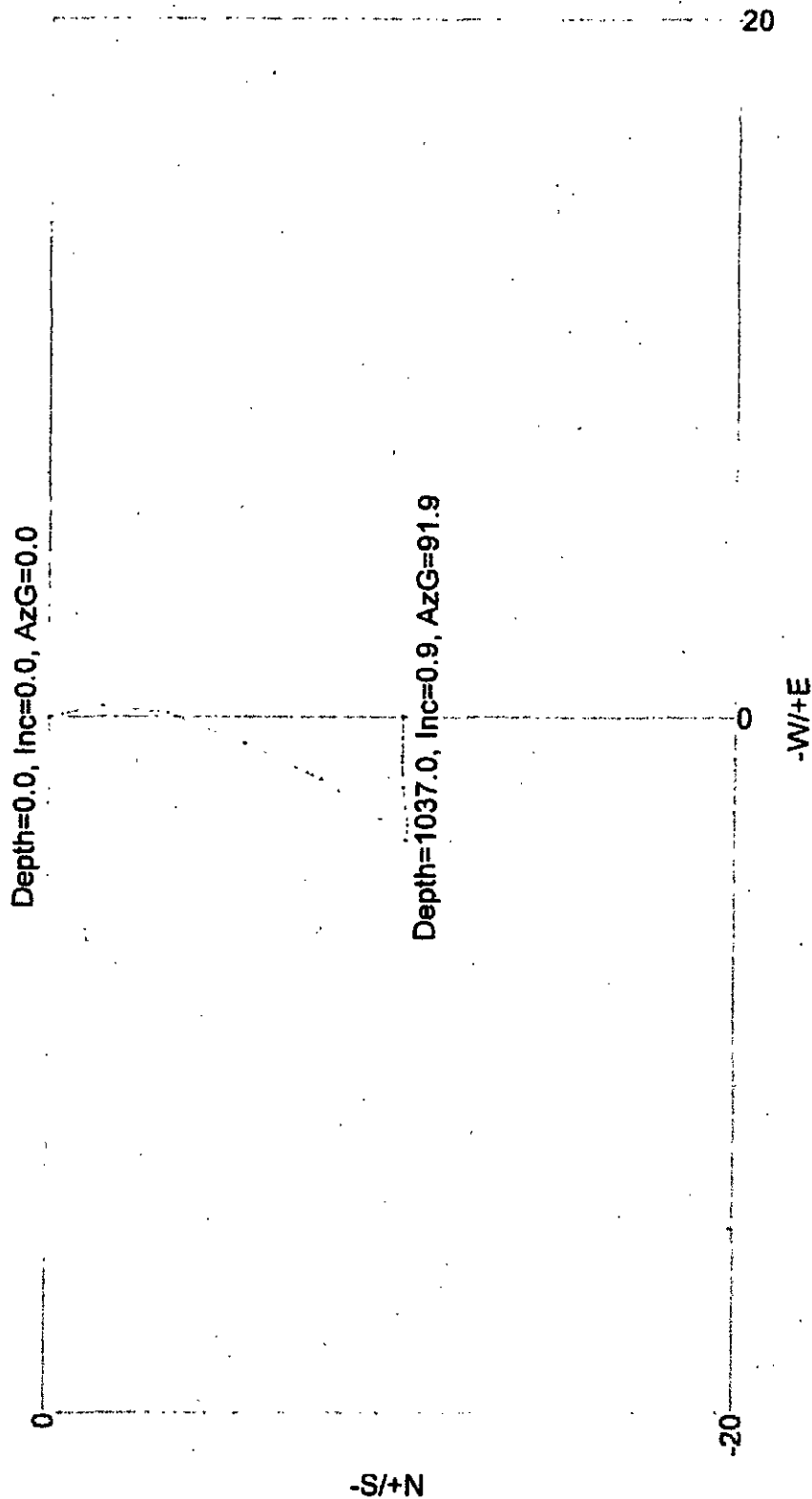
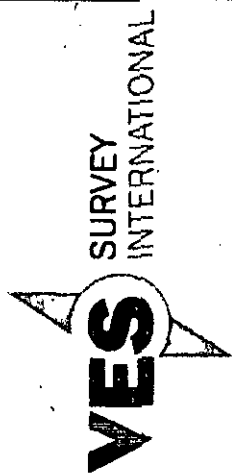
Burch Keely Unit 934H / API 30-015-42758

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	0.45	187.33	100.00	-0.38	0.09	-0.38	0.39	187.33	0.45
200.00	0.92	176.22	198.99	-1.56	0.31	-1.56	1.59	188.78	0.47
300.00	1.29	187.30	299.97	-3.44	0.11	-3.44	3.44	178.14	0.63
400.00	1.46	203.89	399.94	-5.68	-0.74	-5.68	5.72	187.42	0.23
500.00	1.38	204.98	499.91	-7.93	-1.76	-7.93	8.12	192.53	0.08
600.00	1.01	224.53	599.89	-9.65	-2.89	-9.65	10.07	196.67	0.55
700.00	0.15	182.82	699.89	-10.40	-3.51	-10.40	10.98	198.85	0.90
800.00	0.54	80.94	799.89	-10.46	-3.06	-10.46	10.89	198.28	0.58
900.00	0.69	83.34	899.88	-10.31	-1.99	-10.31	10.50	190.99	0.16
1000.00	0.93	91.85	999.87	-10.27	-0.58	-10.27	10.28	183.26	0.26
1037.00	0.93	91.89	1036.86	-10.29	0.01	-10.29	10.29	178.92	0.00



VES Survey International
Midland, Texas
432-563-5444

Surveyor: Javier Estrada
Burch Keely Unit 934H / API 30-015-42758



V.E.S. Survey Date: 10/14/2015



PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288

October 26, 2015

COG, LLC
One Concho Center
600 W. Illinois Ave.
Midland, TX 79701

RE: Burch Keely Unit #934H
2456' FSL & 210' FEL
Sec. 13, T17S, R29E
Eddy County, New Mexico

Dear Sir,

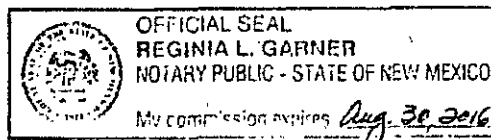
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 26th day of October, 2015.

Notary Public

Burch Keely Unit #934H

Date	Depth	Deviation	Direction
10/13/2015	147	0.60	
10/13/2015	239	1.10	
10/14/2015	480	1.30	
10/14/2015	689	0.40	
10/15/2015	1108	0.40	
10/16/2015	1406	5.00	142.50
10/16/2015	1501	5.30	143.90
10/16/2015	1595	5.00	145.60
10/16/2015	1690	4.70	148.70
10/16/2015	1878	4.20	123.60
10/16/2015	1973	4.40	122.80
10/16/2015	2068	3.80	124.40
10/16/2015	2160	4.90	113.90
10/16/2015	2253	4.80	115.70
10/17/2015	2347	5.50	120.30
10/17/2015	2442	5.50	120.70
10/17/2015	2537	5.30	121.10
10/17/2015	2652	5.10	118.80
10/17/2015	2821	5.80	136.20
10/17/2015	2915	5.80	137.00
10/17/2015	3010	5.80	137.80
10/17/2015	3106	4.40	134.40
10/17/2015	3200	4.30	135.60
10/17/2015	3294	4.40	134.60
10/17/2015	3389	4.40	136.90
10/17/2015	3483	3.70	137.40
10/17/2015	3483	3.70	137.40
10/17/2015	3673	3.50	140.00
10/17/2015	3768	3.40	140.20
10/17/2015	3862	3.30	139.20
10/18/2015	3957	3.20	142.00
10/18/2015	4052	3.10	142.50
10/18/2015	4146	1.90	141.10
10/18/2015	4241	0.40	205.00
10/18/2015	4336	1.00	271.00
10/18/2015	4367	2.50	284.50
10/18/2015	4399	4.50	284.00
10/18/2015	4431	6.60	279.90
10/18/2015	4462	8.90	275.80
10/18/2015	4493	11.30	274.60
10/18/2015	4524	13.50	274.60
10/18/2015	4556	15.70	275.20
10/18/2015	4587	18.00	275.00

Date	Depth	Deviation	Direction
10/18/2015	4619	20.80	
10/18/2015	4650	24.40	274.10
10/18/2015	4682	28.20	273.30
10/18/2015	4713	32.00	271.50
10/19/2015	4745	35.60	269.90
10/19/2015	4776	39.50	269.00
10/19/2015	4808	43.40	268.60
10/19/2015	4839	47.40	268.30
10/19/2015	4871	50.70	268.80
10/19/2015	4888	66.10	269.00
10/19/2015	4901	53.20	268.30
10/19/2015	4933	56.40	268.80
10/19/2015	4965	54.30	268.80
10/19/2015	4996	63.00	2166.60
10/19/2015	5059	68.70	269.70
10/19/2015	5091	71.40	270.20
10/19/2015	5122	74.10	269.70
10/19/2015	5153	78.10	269.10
10/19/2015	5184	81.40	268.60
10/19/2015	5216	84.40	268.90
10/19/2015	5247	85.60	269.70
10/19/2015	5279	86.10	269.90
10/20/2015	5353	88.80	269.60
10/20/2015	5416	89.50	269.60
10/20/2015	5511	89.70	269.00
10/20/2015	5605	89.80	268.50
10/20/2015	5700	90.70	269.00
10/20/2015	5795	91.70	269.90
10/20/2015	5885	92.50	270.10
10/20/2015	5985	92.00	270.70
10/20/2015	6080	90.90	271.00
10/20/2015	6173	91.70	271.10
10/21/2015	6363	89.90	270.50
10/21/2015	6457	91.30	270.50
10/21/2015	6551	90.50	269.90
10/21/2015	6656	91.60	269.70
10/21/2015	6741	91.60	268.70
10/21/2015	6835	89.70	268.80
10/21/2015	6929	90.60	268.40
10/21/2015	7022	90.10	269.70
10/21/2015	7118	91.30	269.40
10/22/2015	7213	90.30	269.20
10/22/2015	7307	91.70	269.70
10/22/2015	7403	90.00	269.70
10/22/2015	7497	90.60	269.00

Date	Depth	Deviation	Direction
10/22/2015	7592	91.60	268.50
10/22/2015	7686	92.00	269.90
10/22/2015	7780	91.00	270.70
10/22/2015	7875	92.50	270.50
10/22/2015	7970	90.50	272.20
10/22/2015	8065	91.80	270.90
10/22/2015	8159	90.80	270.60
10/22/2015	8254	91.90	270.50
10/22/2015	8348	90.80	270.60
10/23/2015	8535	90.20	269.80
10/23/2015	8630	91.30	269.70
10/23/2015	8723	90.40	269.70
10/23/2015	9008	91.00	269.10
10/23/2015	9102	89.20	270.00
10/23/2015	9197	90.20	270.10
10/23/2015	9291	91.80	269.80
10/23/2015	9386	92.10	270.30
10/23/2015	9481	92.40	271.20



12/12/15

State of New Mexico
County of Eddy

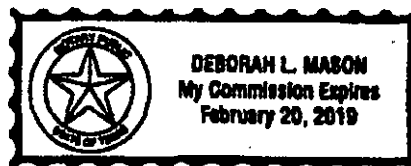
I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 10/16/2015 through 10/23/2015 conduct or supervise the taking of a MWD survey from a depth of 1218 feet to a depth of 9579 feet; that the data is true, correct, complete and within the limitations of the tool as set forth by Terra Directional Services LLC; that I am authorized and qualified to make this report; that this survey was conducted at the request of COG Operating LLC for the Burch Keely Unit #934H Well API 30-015-42758 in Eddy County, New Mexico; and that I have reviewed this report and find that it conforms to the principles and procedures as set forth by Terra Directional Services LLC.

A handwritten signature of Donald D. Mason in black ink, written over a horizontal line.

Donald D. Mason
President

State of Texas
County of Burnet

Before me, a notary public, on this day personally appeared Donald D. Mason, known to me to be the person whose name is subscribed to the foregoing document and, being by me first duly sworn, declared that the statements therein contained are true and correct.

A handwritten signature of Deborah L. Mason in black ink, written over a horizontal line.

Notary Public's Signature



NM OIL CONSERVATION
ARTESIA DISTRICT
MAY 27 2016
RECEIVED

COG Operating LLC

Eddy County, NM (NAD-27 2015)

Burch Keely Unit #934H

SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I

PP: 2290.9' FSL, 330' FEL, Sec 13, T17S, R29E, Unit I

30-015-42758

BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L

Design: BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L

Standard Survey Report

12 December, 2015





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3851.00usft (Silver Oak 3)
Site:	Burch Keely Unit #934H	MD Reference:	KB @ 3851.00usft (Silver Oak 3)
Well:	SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I	North Reference:	Grid
Wellbore:	BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	Database:	EDM 5000.1 Single User Db

Project:	Eddy County, NM (NAD-27 2015)		
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 #934H					
Site Position:		Northing:	667,230.80 usft	Latitude:	32° 50' 2.080 N
From:	Map	Easting:	596,293.60 usft	Longitude:	104° 1' 11.401 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.17 °

Well:	SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I, PP: 2290' FSL, 330' FEL, Sec 13, T17S, R29E, Unit I					
Well Position	+N-S	0.00 usft	Northing:	687,230.80 usft	Latitude:	32° 50' 2.080 N
	+E-W	0.00 usft	Easting:	596,293.60 usft	Longitude:	104° 1' 11.401 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,633.00 usft

Wellbore		BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	9/25/2015	7.39	60.57	48,429

Design:	BHL 2290' FSL 350' FWL Sec 13, T17S, R29E Unit L				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	267.87	

Survey Program		Date	12/12/2015		
From (usft)	To (usft)	Survey (Wellbore)	Test Name	Description	
100.00	1,037.00	VES Gyro #1 (BHL: 2290' FSL 350' FWL,	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
1,218.00	9,579.00	TDS MWD #2 (BHL: 2290' FSL 350' FWL	MWD	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)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.45	167.33	100.00	-0.38	0.09	-0.07	0.45	0.45	0.00
200.00	0.92	170.22	199.99	-1.56	0.31	-0.25	0.47	0.47	2.89
300.00	1.29	197.30	299.97	-3.42	0.11	0.02	0.63	0.37	27.08
400.00	1.46	203.89	399.94	-5.66	-0.74	0.95	0.23	0.17	6.59
500.00	1.38	204.98	499.91	-7.92	-1.76	2.08	0.08	-0.08	1.09
600.00	1.01	224.63	599.89	-9.64	-2.89	3.25	0.55	-0.37	19.65



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3651.00usft (Silver Oak 3)
Site:	Burch Keady Unit #934H	MD Reference:	KB @ 3651.00usft (Silver Oak 3)
Well:	SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I	North Reference:	Grid
Wellbore:	BHL: 2280' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 2280' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	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)
700.00	0.15	182.62	699.89	-10.40	-3.52	3.90	0.80	-0.86	-42.01
800.00	0.54	80.84	799.89	-10.45	-3.06	3.45	0.59	0.39	-101.86
900.00	0.69	83.34	899.88	-10.30	-2.00	2.38	0.15	0.15	2.70
1,000.00	0.93	91.86	999.87	-10.26	-0.59	0.97	0.27	0.24	8.52
1,037.00	0.93	91.89	1,036.86	-10.28	0.01	0.37	0.00	0.00	0.08
TIE-IN to VES Gyro									
1,218.00	1.20	116.60	1,217.83	-11.18	3.18	-2.76	0.29	0.15	13.65
First TDS MWD Survey									
1,312.00	3.10	134.50	1,311.78	-13.40	5.87	-5.37	2.12	2.02	19.04
1,406.00	5.00	142.50	1,405.53	-18.43	10.18	-9.48	2.10	2.02	8.51
1,501.00	5.30	143.90	1,500.14	-25.26	15.28	-14.33	0.34	0.32	1.47
1,595.00	5.00	145.80	1,593.76	-32.15	20.15	-18.95	0.36	-0.32	1.81
1,690.00	4.70	148.70	1,688.42	-38.89	24.52	-23.05	0.42	-0.32	3.26
1,784.00	4.40	147.80	1,782.13	-45.23	28.44	-26.74	0.33	-0.32	-0.96
1,878.00	4.20	123.60	1,875.87	-50.19	33.23	-31.34	1.93	-0.21	-25.74
1,973.00	4.40	122.80	1,970.60	-54.09	39.19	-37.15	0.22	0.21	-0.84
2,068.00	3.80	124.40	2,065.36	-57.84	44.85	-42.67	0.84	-0.63	1.68
2,160.00	4.90	113.90	2,157.09	-61.15	50.98	-48.65	1.47	1.20	-11.41
2,253.00	4.80	113.70	2,249.78	-64.33	58.15	-55.72	0.11	-0.11	-0.22
2,347.00	5.50	120.30	2,343.38	-68.18	65.64	-63.06	0.97	0.74	7.02
2,442.00	5.50	120.70	2,437.94	-72.80	73.49	-70.73	0.04	0.00	0.42
2,537.00	5.30	121.10	2,532.52	-77.39	81.16	-78.23	0.21	-0.21	0.42
2,632.00	5.10	118.80	2,627.13	-81.69	88.61	-85.52	0.30	-0.21	-2.42
2,727.00	5.80	131.80	2,721.71	-86.93	95.89	-92.59	1.50	0.74	13.79
2,821.00	5.80	136.20	2,815.22	-93.53	102.71	-99.16	0.46	0.00	4.57
2,915.00	5.80	137.00	2,908.74	-100.44	109.24	-105.43	0.09	0.00	0.85
3,010.00	5.80	137.80	3,003.26	-107.50	115.74	-111.66	0.09	0.00	0.84
3,106.00	4.40	134.40	3,098.87	-113.67	121.63	-117.32	1.49	-1.46	-3.54
3,200.00	4.30	135.60	3,192.60	-118.71	126.67	-122.17	0.14	-0.11	1.28
3,294.00	4.40	134.60	3,286.33	-123.76	131.70	-127.01	0.13	0.11	-1.08
3,389.00	4.40	136.90	3,381.05	-128.98	136.78	-131.90	0.19	0.00	2.42
3,483.00	3.70	137.40	3,474.82	-133.85	141.30	-136.23	0.75	-0.74	0.53
3,578.00	3.60	138.20	3,569.83	-138.33	145.38	-140.12	0.12	-0.11	0.84
3,673.00	3.50	140.00	3,664.44	-142.77	149.22	-143.81	0.16	-0.11	1.89
3,768.00	3.40	140.20	3,759.27	-147.16	152.88	-147.31	0.11	-0.11	0.21
3,863.00	3.30	139.20	3,854.11	-151.39	156.47	-150.74	0.12	-0.11	-1.05
3,957.00	3.20	142.00	3,947.96	-155.51	159.86	-153.97	0.20	-0.11	2.98
4,052.00	3.10	142.50	4,042.81	-159.64	163.05	-157.01	0.11	-0.11	0.53
4,146.00	1.90	141.10	4,138.72	-162.86	165.58	-159.41	1.28	-1.28	-1.49
4,241.00	0.40	205.00	4,231.70	-164.39	166.43	-160.20	1.85	-1.58	67.26
4,336.00	1.00	271.00	4,326.70	-164.68	165.46	-159.22	0.96	0.63	69.47



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3851.00usft (Silver Oak 3)
Site:	Burch Keely Unit #934H	MD Reference:	KB @ 3851.00usft (Silver Oak 3)
Well:	SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I	North Reference:	Grid
Wellbore:	BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	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)
4,387.00	2.50	284.50	4,357.68	-184.50	184.53	-158.31	4.99	4.84	43.55
4,399.00	4.50	284.00	4,389.62	-184.02	182.84	-156.43	6.25	6.25	-1.56
4,431.00	6.60	279.90	4,421.47	-183.40	159.81	-153.43	6.87	6.56	-12.81
4,462.00	6.90	275.80	4,452.18	-182.86	155.47	-149.31	7.63	7.42	-13.23
4,493.00	11.30	274.60	4,482.70	-162.37	150.05	-143.92	7.77	7.74	-3.87
4,524.00	13.50	275.10	4,512.98	-161.80	143.42	-137.31	7.11	7.10	1.61
4,556.00	15.70	275.20	4,543.94	-161.08	135.39	-129.31	6.88	6.88	0.31
4,587.00	18.00	275.00	4,573.61	-160.28	128.44	-120.39	7.42	7.42	-0.65
4,619.00	20.80	274.70	4,603.79	-159.39	115.85	-109.84	8.76	8.75	-0.94
4,650.00	24.40	274.10	4,632.40	-158.48	103.97	-98.01	11.84	11.81	-1.94
4,682.00	28.20	273.30	4,661.08	-157.57	89.83	-83.91	11.93	11.88	-2.50
4,713.00	32.00	271.50	4,687.80	-156.93	74.30	-68.41	12.60	12.26	-5.81
4,745.00	35.80	269.90	4,714.49	-156.73	58.50	-50.84	11.59	11.25	-5.00
4,776.00	39.50	269.00	4,739.06	-156.91	37.61	-31.78	12.70	12.58	-2.90
4,808.00	43.40	268.60	4,763.04	-157.36	16.44	-10.58	12.22	12.19	-1.25
4,839.00	47.40	268.30	4,784.80	-157.96	-5.62	11.49	12.92	12.90	-0.97
4,871.00	50.70	268.80	4,805.77	-158.57	-29.78	35.65	10.38	10.31	1.56
4,901.00	53.70	268.30	4,824.16	-159.17	-53.47	59.35	10.09	10.00	-1.67
4,933.00	56.40	268.80	4,842.49	-159.83	-79.69	85.58	8.53	8.44	1.56
4,965.00	59.30	268.80	4,859.52	-160.40	-106.78	112.66	9.06	9.06	0.00
4,996.00	63.00	268.60	4,874.47	-161.02	-133.92	139.81	11.95	11.94	-0.65
5,028.00	66.10	269.00	4,888.22	-161.62	-162.80	168.70	9.75	9.68	1.25
5,059.00	68.70	269.70	4,900.13	-161.84	-191.42	197.30	8.84	8.39	2.26
5,091.00	71.40	270.20	4,911.05	-161.97	-221.49	227.38	8.56	8.44	1.58
5,122.00	74.10	269.70	4,920.24	-161.99	-251.10	256.94	8.84	8.71	-1.61
5,153.00	78.10	269.10	4,927.89	-162.31	-281.18	287.02	13.04	12.90	-1.94
5,184.00	81.40	268.60	4,933.20	-162.92	-311.87	317.51	10.78	10.65	-1.81
5,216.00	84.40	268.90	4,937.16	-163.62	-343.42	349.26	9.42	9.38	0.94
5,247.00	85.60	269.70	4,939.86	-163.99	-374.30	380.13	4.65	3.87	2.58
5,279.00	86.10	269.90	4,942.18	-164.10	-406.21	412.03	1.68	1.56	0.63
5,311.00	87.70	269.70	4,943.91	-164.22	-438.16	443.97	5.04	5.00	-0.63
5,353.00	88.80	269.60	4,945.19	-164.47	-480.14	485.92	2.83	2.82	-0.24
5,416.00	89.50	269.60	4,946.12	-164.81	-543.13	546.88	1.11	1.11	0.00
5,511.00	89.70	269.00	4,946.79	-166.07	-638.12	643.86	0.67	0.21	-0.63
5,605.00	89.80	268.50	4,947.20	-168.12	-732.10	737.84	0.54	0.11	-0.53
5,700.00	90.70	269.00	4,946.78	-170.20	-827.08	832.83	1.08	0.95	0.53
5,795.00	91.70	269.90	4,944.79	-171.11	-922.05	927.77	1.42	1.05	0.95
5,890.00	92.50	270.10	4,941.31	-171.11	-1,016.98	1,022.64	0.87	0.84	0.21
5,985.00	92.00	270.70	4,937.58	-170.44	-1,111.81	1,117.47	0.82	-0.53	0.63
6,080.00	90.80	271.00	4,935.18	-169.04	-1,206.87	1,212.31	1.20	-1.16	0.32
6,173.00	91.70	271.10	4,933.07	-167.33	-1,299.83	1,305.15	0.87	0.86	0.11



TDS
Survey Report



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Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3651.00usft (Silver Oak 3)
Site:	Burch Keely Unit #934H	MD Reference:	KB @ 3651.00usft (Silver Oak 3)
Well:	SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit I	North Reference:	Grid
Wellbore:	BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L	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)	
6,268.00	90.70	271.10	4,931.08	-165.51	-1,394.79	1,399.97	1.05	-1.05	0.00	
6,363.00	89.90	270.50	4,930.58	-164.18	-1,489.77	1,494.85	1.05	-0.84	-0.83	
6,457.00	91.30	270.50	4,929.60	-163.36	-1,583.76	1,588.74	1.49	1.49	0.00	
6,551.00	90.50	269.90	4,928.12	-163.03	-1,677.75	1,682.65	1.06	-0.85	-0.64	
6,646.00	91.60	269.70	4,926.38	-163.37	-1,772.73	1,777.58	1.18	1.16	-0.21	
6,741.00	91.60	268.70	4,923.73	-164.69	-1,867.68	1,872.51	1.05	0.00	-1.05	
6,835.00	89.70	268.80	4,922.66	-166.74	-1,961.85	1,966.49	2.02	-2.02	0.11	
6,929.00	90.60	268.40	4,922.41	-169.04	-2,055.82	2,060.48	1.05	0.96	-0.43	
7,022.00	90.10	269.70	4,921.85	-170.58	-2,148.81	2,153.48	1.50	-0.54	1.40	
7,116.00	91.30	269.40	4,920.67	-171.33	-2,244.59	2,249.41	1.29	1.25	-0.31	
7,213.00	90.30	269.80	4,919.35	-172.00	-2,339.58	2,344.36	1.13	-1.05	0.42	
7,307.00	91.70	269.70	4,917.71	-172.41	-2,433.56	2,438.29	1.49	1.49	-0.11	
7,403.00	90.00	269.70	4,916.28	-172.91	-2,529.55	2,534.23	1.77	-1.77	0.00	
7,497.00	90.60	269.00	4,915.79	-173.98	-2,623.54	2,628.19	0.98	0.64	-0.74	
7,592.00	91.60	268.50	4,913.97	-176.05	-2,718.50	2,723.16	1.18	1.05	-0.53	
7,686.00	92.00	269.90	4,911.01	-177.36	-2,812.44	2,817.09	1.55	0.43	1.49	
7,780.00	91.00	270.70	4,908.55	-176.87	-2,906.40	2,910.97	1.36	-1.06	0.85	
7,875.00	92.50	270.50	4,905.65	-175.87	-3,001.35	3,005.81	1.59	1.58	-0.21	
7,970.00	90.50	271.20	4,903.17	-174.46	-3,096.30	3,100.85	2.23	-2.11	0.74	
8,065.00	91.80	270.90	4,901.26	-172.72	-3,191.27	3,195.48	1.40	1.37	-0.32	
8,159.00	90.80	270.60	4,899.13	-171.49	-3,285.23	3,289.34	1.11	-1.06	-0.32	
8,254.00	91.90	270.50	4,896.89	-170.58	-3,380.20	3,384.20	1.16	1.16	-0.11	
8,348.00	90.80	270.60	4,894.67	-169.68	-3,474.17	3,478.07	1.18	-1.17	0.11	
8,441.00	92.00	270.40	4,892.40	-168.87	-3,567.14	3,570.95	1.31	1.29	-0.22	
8,535.00	90.20	269.80	4,890.60	-168.71	-3,661.11	3,664.85	2.02	-1.91	-0.64	
8,630.00	91.30	269.70	4,889.35	-169.12	-3,756.10	3,759.79	1.16	1.16	-0.11	
8,723.00	90.40	269.70	4,887.97	-169.61	-3,849.09	3,852.73	0.97	-0.97	0.00	
8,818.00	91.90	269.30	4,886.07	-170.44	-3,944.06	3,947.67	1.63	1.58	-0.42	
8,913.00	90.00	269.00	4,884.49	-171.84	-4,039.04	4,042.63	2.02	-2.00	-0.32	
9,008.00	91.00	269.10	4,883.66	-173.42	-4,134.02	4,137.61	1.06	1.05	0.11	
9,102.00	89.20	270.00	4,883.50	-174.16	-4,228.01	4,231.56	2.14	-1.91	0.96	
9,197.00	90.20	270.10	4,884.00	-174.07	-4,323.01	4,326.49	1.06	1.05	0.11	
9,291.00	91.80	269.80	4,882.36	-174.16	-4,418.99	4,420.41	1.73	1.70	-0.32	
9,386.00	92.10	270.30	4,879.12	-174.07	-4,511.94	4,515.29	0.81	0.32	0.53	
9,481.00	92.40	271.20	4,875.39	-172.83	-4,606.85	4,610.09	1.00	0.32	0.95	
Final MWD Survey										
9,576.00	92.40	271.20	4,871.29	-170.78	-4,704.75	4,707.84	0.00	0.00	0.00	
Projection to BHTD										



TDS
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Burch Keely Unit #934H
Well: BHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit 1
Wellbore: BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L
Design: BHL: 2290' FSL, 350' FWL, Sec 13, T17S, R29E, Unit L

Local Co-ordinate Reference: Well SHL: 2455' FSL, 210' FEL, Sec 13, T17S, R29E, Unit 1
TVD Reference: KB @ 3851.00usft (Silver Oak 3)
BMD Reference: KB @ 3851.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,037.00	1,036.88	-10.28	0.01	TIE-IN to VES Gyro
1,218.00	1,217.83	-11.18	3.18	First TDS MWD Survey
9,481.00	4,875.30	-172.83	-4,608.85	Final MWD Survey
9,678.00	4,871.29	-170.78	-4,704.75	Projection to Bit/VD

Checked By:

Deborah L. Mason

Approved By:

Julie

Date:

12/12/2015

