



30-015-42723

NM OIL CONSERVATION
ARTESIA DISTRICT

SEP 07 2015

RECEIVED

I Justin Williams certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 09/08/15 through 09/08/15 conduct or supervise the taking of a HA Gyro survey from a depth of 0 feet to a depth of 875 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 Concho for the Burch Keely Unit No Well # 948H API # 30-015-42723 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


Justin Williams
Service Technician
Vaughn Energy Services

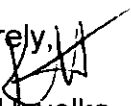
September 14, 2015

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

Attn: Kanicia Castillo

RE: Burch Keely Unit No 948H

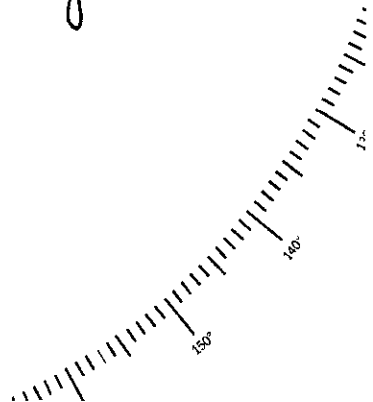
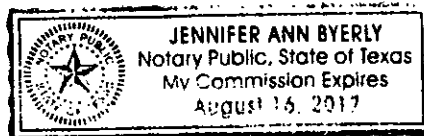
Please find enclosed a copy of the survey from 0' to 875' ran on the above referenced well.

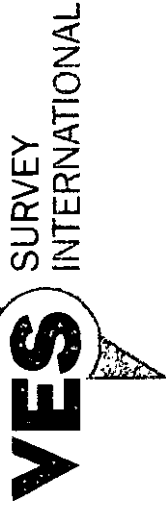
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 14 day of September, A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho

Well: Burch Keely Unit No 948H

API: 30-015-42723

Rig Name: Silver Oak 3

Location: Eddy County, New Mexico

VS-Azi: 0.000 Degrees

Latitude: 32.82270, Longitude: -104.03744

Grid North = True North -0.95 degs (NAD 27)

Grid Correction Applied = -0.95 degs

Depth Reference : RKB = 18 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hgyrosurvey.ut

Minimum Curvature Method

Report Date/Time: 9/14/2015 / 10:23

VES Survey International

Henderson, CO.

Surveyor: Justin Williams

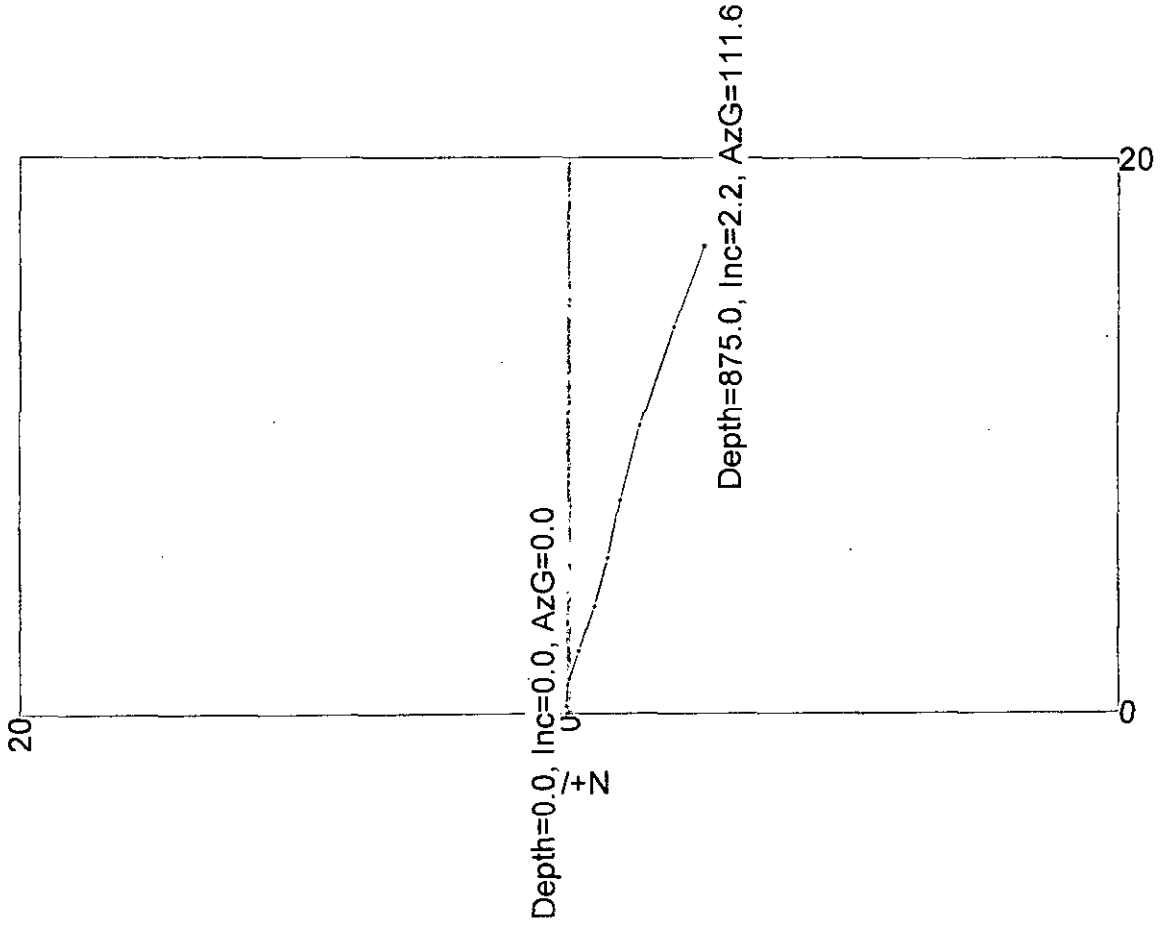
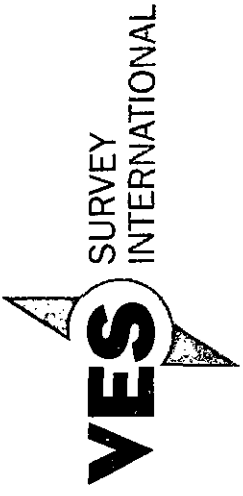
303-853-4976

Burch Keely Unit No 948H / API 30-015-42723

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
0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	****
100.000	0.335	69.457	99.999	0.103	0.274	0.103	0.292	69.457	0.335
200.000	0.574	108.366	199.996	0.047	1.023	0.047	1.024	87.345	0.377
300.000	0.909	108.467	299.988	-0.362	2.251	-0.362	2.279	99.129	0.335
400.000	1.043	109.953	399.973	-0.924	3.859	-0.924	3.968	103.460	0.136
500.000	1.032	102.139	499.957	-1.423	5.594	-1.423	5.773	104.276	0.142
600.000	1.398	102.277	599.934	-1.872	7.666	-1.872	7.892	103.723	0.366
700.000	1.814	107.601	699.895	-2.610	10.367	-2.610	10.691	104.132	0.442
800.000	2.499	110.137	799.824	-3.840	13.924	-3.840	14.443	105.417	0.691
875.000	2.208	111.633	874.760	-4.935	16.802	-4.935	17.512	106.369	0.397



VES Survey International
Henderson, CO.
Surveyor: Justin Williams
303-853-4976
Burch Keely Unit No 948H / API 30-015-42723



-W/+E

VES Survey Date: 9/8/2015



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

September 25, 2015

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

RE: Burch Keely Unit #948H
1630' FNL & 335' FEL
Sec. 23, T17S, R29E
Eddy County, New Mexico

Dear Sir,

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

Very truly yours,

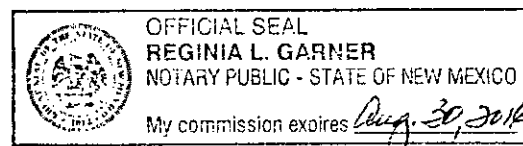
A handwritten signature in black ink, appearing to read "Eddie C. LaRue".

Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 25th day of September, 2015.

A handwritten signature in black ink, appearing to read "Regina L. Garner".

Notary Public

Burch Keely Unit #948H

Date	Depth	Deviation	Direction	TVD	Horiz Disp
9/7/2015	84	0.00			
9/8/2015	480	0.60			
9/8/2015	906	2.40			
9/10/2015	961	2.00	112.60		
9/10/2015	1023	2.20	117.10		
9/10/2015	1117	1.90	121.70		
9/10/2015	1212	1.80	124.80		
9/10/2015	1306	1.80	126.30		
9/10/2015	1401	1.50	128.80		
9/10/2015	1496	2.80	96.00		
9/10/2015	1591	2.80	89.30		
9/10/2015	1686	2.50	85.40		
9/10/2015	1780	2.20	84.80		
9/10/2015	1874	1.90	88.40		
9/10/2015	1969	2.80	91.30		
9/11/2015	2064	2.50	89.60	2162.00	
9/11/2015	2158	2.60	90.40	2156.00	
9/11/2015	2253	2.90	104.80	2251.00	
9/11/2015	2348	3.00	102.70	2346.00	
9/11/2015	2442	3.00	105.00	2440.00	
9/11/2015	2536	2.80	99.00	2534.00	
9/11/2015	2630	2.80	99.10	2628.00	
9/11/2015	2724	3.00	97.00		
9/11/2015	2819	2.90	94.30		
9/11/2015	2914	2.90	119.60		
9/11/2015	3009	2.70	121.60		
9/11/2015	3103	2.80	120.80		
9/11/2015	3197	2.80	120.70		
9/11/2015	3292	2.90	119.10		
9/11/2015	3387	2.80	117.40		
9/11/2015	3481	1.90	124.20		
9/11/2015	3575	2.00	123.40		
9/12/2015	3670	2.00	118.00	3667.00	
9/12/2015	3765	1.90	116.60	3761.00	
9/12/2015	3859	2.10	116.30	3855.00	
9/12/2015	3953	1.90	88.20	3949.00	
9/12/2015	4048	1.90	80.30	4044.00	
9/12/2015	4143	1.80	80.30	4139.00	
9/13/2015	4334	1.80	277.70		
9/16/2015	4397	4.10	276.50		
9/16/2015	4429	6.80	276.50		
9/16/2015	4460	10.60	276.10		
9/16/2015	4492	14.50	248.80		

Date	Depth	Deviation	Direction	TVD	Horiz Disp
9/16/2015	4523	18.00	273.30		
9/17/2015	4587	24.10	269.20	4576.00	
9/17/2015	4618	27.20	276.60	4604.00	
9/17/2015	4649	30.10	267.10	4631.00	
9/17/2015	4681	32.80	266.80	4659.00	
9/17/2015	4712	35.90	266.40	4689.00	
9/17/2015	4743	39.20	266.90	4709.00	
9/17/2015	4779	41.10	268.10	4733.00	
9/17/2015	4806	43.70	268.40	2756.00	
9/17/2015	4838	46.80	269.10	4279.00	
9/17/2015	4994	61.50	270.00		
9/17/2015	5025	64.50	270.30		
9/17/2015	5056	67.50	271.20		
9/17/2015	5088	70.80	272.20		
9/17/2015	5119	74.20	272.00		
9/17/2015	5151	77.40	271.70		
9/17/2015	5182	79.90	271.70		
9/17/2015	5213	83.00	272.40		
9/17/2015	5245	86.30	272.80		
9/17/2015	5277	87.60	272.80		
9/17/2015	5340	89.80	271.60		
9/17/2015	5371	90.20	270.90		
9/17/2015	5467	91.40	266.20		
9/17/2015	5560	91.70	269.50		
9/17/2015	5656	91.50	270.00		
9/17/2015	5750	90.70	269.60		
9/18/2015	5845	89.50	269.00	4933.00	
9/18/2015	5940	90.80	269.00	4933.00	
9/18/2015	6035	89.70	269.30	4933.00	
9/18/2015	6129	91.00	269.30	4932.00	
9/18/2015	6223	89.90	269.70	4931.00	
9/18/2015	6318	90.70	269.60		
9/18/2015	6413	91.40	268.80		
9/18/2015	6507	90.60	270.30		
9/18/2015	6602	91.60	269.80		
9/18/2015	6696	90.50	270.20		
9/18/2015	6791	91.30	269.60		
9/18/2015	6885	90.00	270.50		
9/19/2015	6949	90.50	270.50		
9/19/2015	7011	90.90	270.00		
9/19/2015	7107	91.50	270.00		
9/19/2015	7200	91.80	269.80		
9/19/2015	7295	91.90	270.00		
9/19/2015	7390	92.00	270.50		
9/20/2015	7579	89.10	269.40		

Date	Depth	Deviation	Direction	TVD	Horiz Disp
9/20/2015	7674	88.90	268.60		
9/20/2015	7770	90.50	269.00		
9/20/2015	7864	91.00	269.30		
9/20/2015	7958	91.40	269.30		
9/20/2015	8053	90.60	270.40		
9/20/2015	8148	91.10	271.20		
9/20/2015	8243	91.70	270.70		
9/21/2015	8338	89.60	269.50		
9/21/2015	8432	90.00	269.50		
9/21/2015	8527	90.30	269.30		
9/21/2015	8622	90.70	269.30		
9/21/2015	8717	91.10	269.30		
9/21/2015	8812	91.00	268.80		
9/21/2015	8907	91.70	269.30		
9/21/2015	9002	90.80	270.00		
9/21/2015	9097	91.60	270.60		
9/21/2015	9190	92.10	270.60		
9/21/2015	9284	91.60	271.00		
9/21/2015	9354	92.10	270.70		



COG Operating LLC

Eddy County, NM

Burch Keely Unit #948H

SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H

PP: 1669.8' FNL, 330' FEL, Sec 23, T17S, R29E, Unit H

BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E

Design: BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E

Standard Survey Report

22 September, 2015



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #948H
Project:	Eddy County, NM	TVD Reference:	KB @ 3606.00usft (Silver Oak 3)
Site:	Burch Keely Unit #948H	MD Reference:	KB @ 3606.00usft (Silver Oak 3)
Well:	SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H	North Reference:	Grid
Wellbore:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM		
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 #948H			
Site Position:		Northing:	663,135.30 usft	Latitude: 32° 49' 21.707 N
From:	Map	Easting:	590,897.30 usft	Longitude: 104° 2' 14.782 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.16 °

Well	SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H			
Well Position	+N-S	0.00 usft	Northing: 663,135.30 usft	Latitude: 32° 49' 21.707 N
	+E-W	0.00 usft	Easting: 590,897.30 usft	Longitude: 104° 2' 14.782 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level: 3,592.00 usft

Wellbore	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	8/27/2015	7.41	60.56	48,429

Design	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00
Vertical Section:	Depth From (TVD) (usft)	+N-S (usft)	+E-W (usft)	Direction (°)
	0.00	0.00	0.00	269.70

Survey Program	Date 9/22/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	875.00	Gyro #1 (BHL: 1670' FNL, 350' FWL, Sec	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro
961.00	9,421.00	MWD #2 (BHL: 1670' FNL, 350' FWL, Sec	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	0.34	69.46	100.00	0.10	0.27	-0.27	0.34	0.34	0.00	
200.00	0.57	108.37	200.00	0.05	1.02	-1.02	0.38	0.24	38.91	
300.00	0.91	108.47	299.99	-0.36	2.25	-2.25	0.34	0.34	0.10	
400.00	1.04	109.95	399.97	-0.92	3.86	-3.85	0.14	0.13	1.49	
500.00	1.03	102.14	499.96	-1.42	5.59	-5.59	0.14	-0.01	-7.81	
600.00	1.40	102.28	599.93	-1.87	7.67	-7.66	0.37	0.37	0.14	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #948H
Project:	Eddy County, NM	TVD Reference:	KB @ 3606.00usft (Silver Oak 3)
Site:	Burch Keely Unit #948H	MD Reference:	KB @ 3606.00usft (Silver Oak 3)
Well:	SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H	North Reference:	Grid
Wellbore:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	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)	
700.00	1.81	107.60	699.89	-2.61	10.37	-10.35	0.44	0.42	5.32	
800.00	2.50	110.14	799.82	-3.84	13.92	-13.90	0.69	0.69	2.54	
875.00	2.21	111.63	874.76	-4.93	16.80	-16.78	0.40	-0.39	1.99	
TIE-IN to VES Gyro										
961.00	2.00	112.60	960.70	-6.12	19.73	-19.69	0.25	-0.24	1.12	
1,023.00	2.20	117.10	1,022.66	-7.08	21.78	-21.75	0.42	0.32	7.26	
1,117.00	1.90	121.70	1,116.60	-8.72	24.72	-24.67	0.36	-0.32	4.89	
1,211.00	1.80	124.80	1,210.55	-10.38	27.25	-27.20	0.15	-0.11	3.30	
1,306.00	1.80	126.30	1,305.50	-12.12	29.68	-29.62	0.05	0.00	1.58	
1,401.00	1.50	128.80	1,400.47	-13.78	31.85	-31.78	0.32	-0.32	2.63	
1,496.00	2.80	98.00	1,495.40	-14.88	35.12	-35.04	1.78	1.37	-32.42	
1,591.00	2.80	89.30	1,590.29	-15.18	39.74	-39.66	0.45	0.00	-9.16	
1,686.00	2.50	85.40	1,685.18	-14.98	44.12	-44.05	0.37	-0.32	-4.11	
1,780.00	2.20	84.80	1,779.11	-14.65	47.96	-47.89	0.32	-0.32	-0.64	
1,874.00	1.90	88.40	1,873.04	-14.45	51.32	-51.24	0.35	-0.32	3.83	
1,969.00	2.80	91.30	1,967.96	-14.46	55.21	-55.14	0.96	0.95	3.05	
2,064.00	2.50	89.60	2,062.86	-14.49	59.60	-59.53	0.33	-0.32	-1.79	
2,158.00	2.60	90.40	2,156.77	-14.49	63.79	-63.71	0.11	0.11	0.85	
2,253.00	2.90	104.80	2,251.66	-15.12	68.27	-68.19	0.79	0.32	15.16	
2,348.00	3.00	102.70	2,346.54	-16.28	73.01	-72.93	0.15	0.11	-2.21	
2,442.00	3.00	105.00	2,440.41	-17.46	77.79	-77.70	0.13	0.00	2.45	
2,536.00	2.80	99.00	2,534.29	-18.46	82.43	-82.34	0.39	-0.21	-6.38	
2,630.00	2.80	99.10	2,628.17	-19.18	86.97	-86.87	0.01	0.00	0.11	
2,724.00	3.00	97.00	2,722.05	-19.84	91.68	-91.57	0.24	0.21	-2.23	
2,819.00	2.90	94.30	2,816.93	-20.33	96.54	-96.43	0.18	-0.11	-2.84	
2,914.00	2.90	119.60	2,911.81	-21.69	101.03	-100.91	1.34	0.00	26.63	
3,009.00	2.70	121.60	3,006.70	-24.05	105.02	-104.89	0.23	-0.21	2.11	
3,103.00	2.80	120.80	3,100.59	-26.39	108.88	-108.74	0.11	0.11	-0.85	
3,197.00	2.80	120.70	3,194.48	-28.74	112.83	-112.67	0.01	0.00	-0.11	
3,292.00	2.90	119.10	3,289.36	-31.09	116.92	-116.76	0.13	0.11	-1.68	
3,387.00	2.80	117.40	3,384.24	-33.33	121.08	-120.90	0.14	-0.11	-1.79	
3,481.00	1.90	124.20	3,478.16	-35.26	124.41	-124.22	1.00	-0.96	7.23	
3,575.00	2.00	123.40	3,572.11	-37.04	127.07	-126.87	0.11	0.11	-0.85	
3,670.00	2.00	118.00	3,667.05	-38.73	129.91	-129.71	0.20	0.00	-5.68	
3,765.00	1.90	116.60	3,761.99	-40.21	132.79	-132.57	0.12	-0.11	-1.47	
3,859.00	2.10	116.30	3,855.94	-41.67	135.72	-135.50	0.21	0.21	-0.32	
3,953.00	1.90	88.20	3,949.88	-42.39	138.82	-138.60	1.05	-0.21	-29.89	
4,048.00	1.90	80.30	4,044.83	-42.07	141.95	-141.73	0.28	0.00	-8.32	
4,143.00	1.80	80.30	4,139.78	-41.55	144.97	-144.75	0.11	-0.11	0.00	
4,238.00	1.80	76.80	4,234.73	-40.96	147.90	-147.68	0.12	0.00	-3.68	
4,270.00	1.80	75.00	4,266.72	-40.72	148.87	-148.66	0.18	0.00	-5.63	
4,302.00	0.90	54.90	4,298.71	-40.44	149.56	-149.35	3.14	-2.81	-62.81	

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #948H
Project:	Eddy County, NM	TVD Reference:	KB @ 3606.00usft (Silver Oak 3)
Site:	Burch Keely Unit #948H	MD Reference:	KB @ 3606.00usft (Silver Oak 3)
Well:	SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H	North Reference:	Grid
Wellbore:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	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)
4,334.00	1.80	277.70	4,330.70	-40.23	149.27	-149.06	7.92	2.81	-428.75
4,365.00	3.20	277.50	4,361.67	-40.05	147.93	-147.72	4.52	4.52	-0.65
4,397.00	4.10	276.50	4,393.61	-39.81	145.91	-145.70	2.82	2.81	-3.13
4,429.00	6.80	276.50	4,425.46	-39.46	142.89	-142.68	8.44	8.44	0.00
4,460.00	10.60	276.10	4,456.10	-38.95	138.23	-138.02	12.26	12.26	-1.29
4,492.00	14.50	274.80	4,487.33	-38.30	131.31	-131.10	12.22	12.19	-4.06
4,523.00	18.00	273.30	4,517.08	-37.70	122.66	-122.46	11.37	11.29	-4.84
4,555.00	21.20	271.00	4,547.23	-37.32	111.93	-111.73	10.28	10.00	-7.19
4,587.00	24.10	269.20	4,576.76	-37.31	99.61	-99.41	9.32	9.06	-5.63
4,618.00	27.20	267.60	4,604.70	-37.69	86.20	-86.00	10.25	10.00	-5.16
4,649.00	30.10	267.10	4,631.90	-38.38	71.35	-71.15	9.39	9.35	-1.61
4,681.00	32.80	266.80	4,659.20	-39.27	54.68	-54.48	8.45	8.44	-0.94
4,712.00	35.90	266.40	4,684.79	-40.31	37.23	-37.01	10.03	10.00	-1.29
4,743.00	39.20	266.90	4,709.36	-41.41	18.37	-18.15	10.69	10.65	1.61
4,774.00	41.10	268.10	4,733.06	-42.28	-1.60	1.82	6.62	6.13	3.87
4,806.00	43.70	268.40	4,756.68	-42.94	-23.17	23.39	8.15	8.13	0.94
4,838.00	46.80	269.10	4,779.21	-43.43	-45.88	46.11	9.81	9.69	2.19
4,869.00	49.50	269.70	4,799.89	-43.67	-68.97	69.20	8.83	8.71	1.94
4,900.00	52.30	269.70	4,819.44	-43.80	-93.03	93.26	9.03	9.03	0.00
4,931.00	55.60	269.60	4,837.68	-43.95	-118.09	118.32	10.65	10.65	-0.32
4,962.00	58.60	269.90	4,854.52	-44.06	-144.11	144.34	9.71	9.68	0.97
4,994.00	61.50	270.00	4,870.49	-44.09	-171.84	172.06	9.07	9.06	0.31
5,025.00	64.50	270.30	4,884.56	-44.01	-199.45	199.68	9.72	9.68	0.97
5,056.00	67.50	271.20	4,897.17	-43.64	-227.77	227.99	10.03	9.68	2.90
5,088.00	70.80	272.20	4,908.56	-42.75	-257.65	257.87	10.72	10.31	3.13
5,119.00	74.20	272.00	4,917.88	-41.67	-287.20	287.41	10.98	10.97	-0.65
5,151.00	77.40	271.70	4,925.73	-40.67	-318.20	318.41	10.04	10.00	-0.94
5,182.00	79.90	271.70	4,931.83	-39.76	-348.58	348.78	8.06	8.06	0.00
5,213.00	83.00	272.40	4,936.44	-38.67	-379.21	379.40	10.25	10.00	2.26
5,245.00	86.30	272.80	4,939.42	-37.22	-411.03	411.22	10.39	10.31	1.25
5,277.00	87.60	272.80	4,941.12	-35.66	-442.95	443.13	4.06	4.06	0.00
5,308.00	88.90	271.90	4,942.07	-34.39	-473.90	474.08	5.10	4.19	-2.90
5,340.00	89.80	271.60	4,942.43	-33.41	-505.89	506.06	2.96	2.81	-0.94
5,371.00	90.20	270.90	4,942.43	-32.74	-536.88	537.04	2.60	1.29	-2.26
5,467.00	91.40	269.20	4,941.09	-32.65	-632.87	633.03	2.17	1.25	-1.77
5,560.00	91.70	269.50	4,938.58	-33.71	-725.82	725.99	0.46	0.32	0.32
5,656.00	91.50	270.00	4,935.90	-34.13	-821.79	821.95	0.56	-0.21	0.52
5,750.00	90.70	269.60	4,934.09	-34.45	-915.77	915.94	0.95	-0.85	-0.43
5,845.00	89.50	269.00	4,933.93	-35.61	-1,010.76	1,010.93	1.41	-1.26	-0.63
5,940.00	90.80	269.00	4,933.68	-37.27	-1,105.74	1,105.92	1.37	1.37	0.00
6,035.00	89.70	269.30	4,933.26	-38.68	-1,200.73	1,200.91	1.20	-1.16	0.32
6,129.00	91.00	269.30	4,932.69	-39.83	-1,294.72	1,294.91	1.38	1.38	0.00

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #948H
Project:	Eddy County, NM	TVD Reference:	KB @ 3606.00usft (Silver Oak 3)
Site:	Burch Keely Unit #948H	MD Reference:	KB @ 3606.00usft (Silver Oak 3)
Well:	SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H	North Reference:	Grid
Wellbore:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	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)
6,223.00	89.90	269.70	4,931.95	-40.65	-1,388.71	1,388.90	1.25	-1.17	0.43
6,318.00	90.70	269.60	4,931.45	-41.23	-1,483.71	1,483.90	0.85	0.84	-0.11
6,413.00	91.40	268.80	4,929.71	-42.56	-1,578.68	1,578.88	1.12	0.74	-0.84
6,507.00	90.60	270.30	4,928.07	-43.29	-1,672.66	1,672.86	1.81	-0.85	1.60
6,602.00	91.60	269.80	4,926.25	-43.21	-1,767.64	1,767.84	1.18	1.05	-0.53
6,696.00	90.50	270.20	4,924.53	-43.21	-1,861.62	1,861.82	1.25	-1.17	0.43
6,791.00	91.30	269.60	4,923.03	-43.38	-1,956.61	1,956.81	1.05	0.84	-0.63
6,885.00	90.00	270.50	4,921.97	-43.30	-2,050.60	2,050.80	1.68	-1.38	0.96
6,949.00	90.50	270.50	4,921.69	-42.74	-2,114.60	2,114.79	0.78	0.78	0.00
7,011.00	90.90	270.00	4,920.93	-42.47	-2,176.59	2,176.78	1.03	0.65	-0.81
7,107.00	91.50	270.00	4,918.92	-42.47	-2,272.57	2,272.76	0.63	0.63	0.00
7,200.00	91.80	269.80	4,916.24	-42.63	-2,365.53	2,365.72	0.39	0.32	-0.22
7,295.00	91.90	270.00	4,913.17	-42.79	-2,460.48	2,460.67	0.24	0.11	0.21
7,390.00	92.00	270.50	4,909.94	-42.38	-2,555.42	2,555.61	0.54	0.11	0.53
7,484.00	91.80	269.70	4,906.83	-42.22	-2,649.37	2,649.56	0.88	-0.21	-0.85
7,579.00	89.10	269.40	4,906.08	-42.96	-2,744.36	2,744.54	2.86	-2.84	-0.32
7,674.00	88.90	268.60	4,907.74	-44.62	-2,839.33	2,839.52	0.87	-0.21	-0.84
7,770.00	90.50	269.00	4,908.24	-46.63	-2,935.30	2,935.51	1.72	1.67	0.42
7,864.00	91.00	269.30	4,907.01	-48.02	-3,029.28	3,029.49	0.62	0.53	0.32
7,958.00	91.40	269.30	4,905.04	-49.17	-3,123.26	3,123.47	0.43	0.43	0.00
8,053.00	90.60	270.40	4,903.38	-49.42	-3,218.24	3,218.45	1.43	-0.84	1.16
8,148.00	91.10	271.20	4,901.97	-48.09	-3,313.22	3,313.42	0.99	0.53	0.84
8,243.00	91.70	271.70	4,899.65	-45.69	-3,408.16	3,408.35	0.82	0.63	0.53
8,338.00	89.60	269.50	4,898.57	-44.70	-3,503.14	3,503.32	3.20	-2.21	-2.32
8,432.00	90.00	269.50	4,898.90	-45.52	-3,597.13	3,597.32	0.43	0.43	0.00
8,527.00	90.30	269.30	4,898.65	-46.51	-3,692.13	3,692.32	0.38	0.32	-0.21
8,622.00	90.70	269.30	4,897.83	-47.67	-3,787.11	3,787.31	0.42	0.42	0.00
8,717.00	91.10	269.30	4,896.33	-48.83	-3,882.10	3,882.30	0.42	0.42	0.00
8,812.00	91.00	268.80	4,894.59	-50.41	-3,977.07	3,977.28	0.54	-0.11	-0.53
8,907.00	91.70	269.30	4,892.35	-51.98	-4,072.03	4,072.24	0.91	0.74	0.53
9,002.00	90.80	270.00	4,890.28	-52.56	-4,167.00	4,167.22	1.20	-0.95	0.74
9,097.00	91.60	270.60	4,888.29	-52.07	-4,261.98	4,262.19	1.05	0.84	0.63
9,190.00	92.10	270.60	4,885.29	-51.09	-4,354.92	4,355.13	0.54	0.54	0.00
9,284.00	91.60	271.00	4,882.26	-49.78	-4,448.86	4,449.06	0.68	-0.53	0.43
9,354.00	92.10	270.70	4,880.00	-48.74	-4,518.82	4,519.01	0.83	0.71	-0.43
Final MWD Survey									
9,421.00	92.10	270.70	4,877.54	-47.92	-4,585.77	4,585.96	0.00	0.00	0.00
Projection to Bit/TD									

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Burch Keely Unit #948H
Project:	Eddy County, NM	TVD Reference:	KB @ 3606.00usft (Silver Oak 3)
Site:	Burch Keely Unit #948H	MD Reference:	KB @ 3606.00usft (Silver Oak 3)
Well:	SHL: 1630' FNL, 335' FEL, Sec 23, T17S, R29E, Unit H	North Reference:	Grid
Wellbore:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 1670' FNL, 350' FWL, Sec 23, T17S, R29E, Unit E	Database:	EDM 5000.1 Single User Db

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
+N/-S (usft)	+E/-W (usft)			
875.00	874.76	-4.93	16.80	TIE-IN to VES Gyro
9,354.00	4,880.00	-48.74	-4,518.82	Final MWD Survey
9,421.00	4,877.54	-47.92	-4,585.77	Projection to Bit/TD

Checked By: _____	Approved By: _____	Date: _____
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