



NM OIL CONSERVATION
ARTESIA DISTRICT

NOV 06 2015

RECEIVED

30-015-42022

I Brian Brewbaker certify that I am employed by Vaughn Energy Services. That I did on the day(s) of 07/28/15 through 07/28/15 conduct or supervise the taking of a Rate Gyro survey from a depth of 0 feet to a depth of 2032 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 Shiner Bock Well # 1 Fed Com #27H API # 30-015-42022 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

Brian Brewbaker

Brian Brewbaker
Service Technician
Vaughn Energy Services



August 4, 2015

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

Attn: Kanicia Castillo

RE: **Shiner Bock 1 Federal Com No 027H**

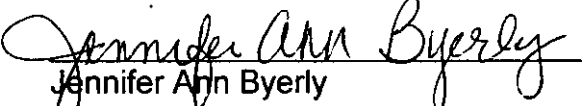
Please find enclosed a copy of the survey from 0' to 2032' ran on the above referenced well.

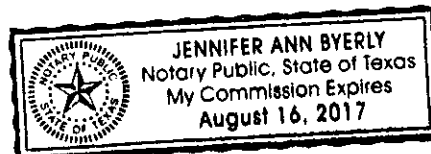
Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 4 day of August,
A.D., 2015, by Keith Havelka.

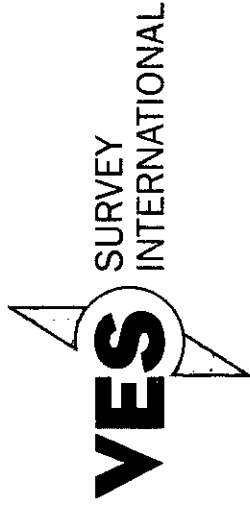

Jennifer Ann Byerly
Notary Public, State of Texas





Company: Concho

Well: Shiner Bock 1 Federal Com 027H



Rig Name: UDI 43

State/County: New Mexico/Eddy

VS-Azi: 0.000 Degrees

Latitude: 32.85949, Longitude: -103.83067

Grid North = True North -0.27 degs (NAD 27)

Grid Convergence Applied = -0.27 degs

Depth Reference : RKB= 12.5 Ft

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: hgyro_2056-de_01.ut

Minimum Curvature Method

Report Date/Time: 8/4/2015 / 12:57

VES Survey International
Midland, Texas
432-563-5444

Surveyor: Brian Brewbaker

Shiner Bock 1 Federal Com No 027H / API 30-015-42022

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	0.166	1.543	100.000	0.145	0.004	0.145	0.145	1.543	0.166
200.000	0.296	346.675	199.999	0.542	-0.052	0.542	0.545	354.542	0.142
300.000	0.315	22.392	299.998	1.048	-0.007	1.048	1.048	359.639	0.188
400.000	0.350	334.402	399.996	1.578	-0.034	1.578	1.578	358.774	0.272
500.000	0.431	284.290	499.994	1.946	-0.531	1.946	2.017	344.751	0.339
600.000	0.328	327.697	599.992	2.281	-1.049	2.281	2.511	335.316	0.297
700.000	0.566	322.928	699.989	2.918	-1.499	2.918	3.280	332.801	0.241
800.000	0.665	315.543	799.983	3.726	-2.204	3.726	4.329	329.400	0.126
900.000	0.539	325.517	899.978	4.528	-2.876	4.528	5.364	327.575	0.163
1000.000	0.552	309.951	999.973	5.225	-3.512	5.225	6.295	326.093	0.148
1100.000	0.471	294.713	1099.969	5.706	-4.255	5.706	7.118	323.291	0.158
1200.000	0.413	302.868	1199.966	6.074	-4.931	6.074	7.823	320.928	0.085
1300.000	0.504	349.736	1299.963	6.703	-5.312	6.703	8.553	321.600	0.374
1400.000	0.787	0.863	1399.957	7.823	-5.380	7.823	9.494	325.479	0.308
1500.000	0.700	2.002	1499.949	9.120	-5.349	9.120	10.573	329.609	0.088
1600.000	1.193	8.551	1599.935	10.761	-5.173	10.761	11.939	334.327	0.504

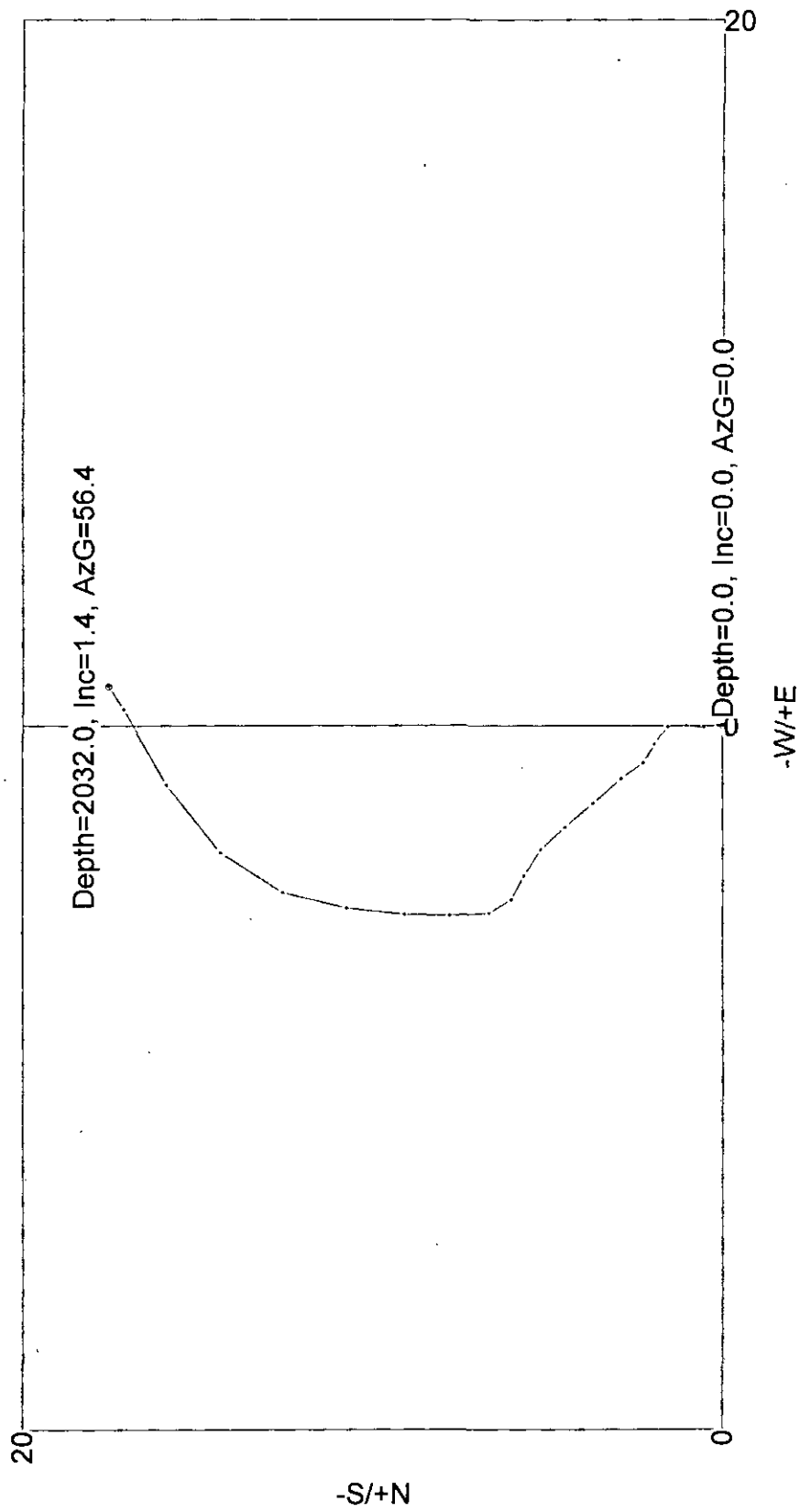
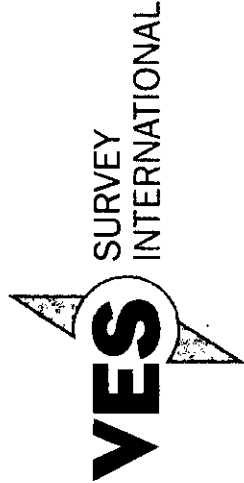
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.000	0.981	20.104	1699.917	12.594	-4.723	12.594	13.451	339.442	0.304
1800.000	1.459	40.639	1799.894	14.365	-3.600	14.365	14.809	345.931	0.641
1900.000	1.407	62.674	1899.864	15.894	-1.680	15.894	15.983	353.967	0.550
2000.000	1.436	57.253	1999.833	17.136	0.465	17.136	17.142	1.553	0.138
2032.000	1.380	56.361	2031.823	17.566	1.123	17.566	17.602	3.657	0.187



VES Survey International
Midland, Texas
432-563-5444

Surveyor: Brian Brewbaker

Shiner Bock 1 Federal Com No 027H / API 30-015-42022



NOV 06 2015

RECEIVED

1 of 2

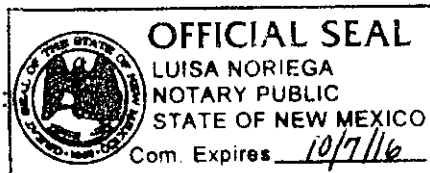
WELL NAME AND NUMBER Shiner Bock 1 Federal Com No. 7HLOCATION Section 1, T17S, R31E, Unit M, 990 FSL, 150 FWL, Eddy CtyOPERATOR COG Operating LLCDRILLING CONTRACTOR United Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and had conducted deviation test and obtained the following results:

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
.3° @ 319'	5.1° @ 4074'	56.7° @ 6094'
.3° @ 572'	4.6° @ 4452'	59.9° @ 6126'
.7° @ 796'	4.7° @ 4649'	63.4° @ 6158'
.4° @ 1068'	4.3° @ 4745'	66.6° @ 6190'
1.4° @ 1389'	4.1° @ 5321'	69.1° @ 6222'
1.2° @ 1659'	4.2° @ 5353'	72.0° @ 6254'
1.4° @ 2023'	3.4° @ 5385'	74.8° @ 6287'
1.3° @ 2117'	1.2° @ 5485'	77.5° @ 6319'
3.9° @ 2341'	1.1° @ 5417'	80.0° @ 6352'
3.3° @ 2496'	1.1° @ 5548'	83.0° @ 6383'
4.4° @ 2593'	3.5° @ 5611'	86.5° @ 6415'
4.1° @ 2632'	2.9° @ 5643'	88.6° @ 6448'
3.6° @ 2728'	12.3° @ 5676'	89.4° @ 6535'
4.9° @ 3304'	42.1° @ 5933'	88.8° @ 6631'
4.4° @ 3400'	45.6° @ 5963'	90.8° @ 6726'
5.7° @ 3495'	48.3° @ 5997'	90.5° @ 6821'
5.1° @ 3880'	51.0° @ 6029'	90.2° @ 6917'
5.1° @ 3977'	54.1° @ 6061'	89.7° @ 7013'

Drilling Contractor- UNITED DRILLING, INC.By: Angel Salazar
(Angel Salazar)Title: Vice PresidentSubscribed and sworn to before me this 10th day of August 2015.Luisa Noriega
Notary PublicCharras NM
County State

My Commission Expires:

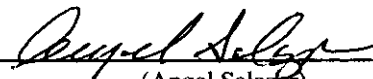


WELL NAME AND NUMBER Shiner Bock 1 Federal Com No. 7H
 LOCATION Section 1, T17S, R31E, Unit M, 990 FSL, 150 FWL, Eddy Cty
 OPERATOR COG Operating LLC
 DRILLING CONTRACTOR United Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and had conducted deviation test and obtained the following results:

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
91.4° @ 7109'	91.2° @ 8942'	
91.3° @ 7205'	90.6° @ 9037'	
91.3° @ 7302'	90.1° @ 9134'	
91.2° @ 7398'	90.2° @ 9230'	
90.8° @ 7591'	90.2° @ 9327'	
90.8° @ 7688'	89.8° @ 9424'	
90.5° @ 7785'	89.6° @ 9520'	
90.2° @ 7881'	90.5° @ 9617'	
91.1° @ 7978'	89.7° @ 9713'	
90.9° @ 8074'	89.7° @ 9809'	
91.6° @ 8170'	91.8° @ 9906'	
91.3° @ 8266'	91.6° @ 10003'	
90.8° @ 8363'	92.1° @ 10099'	
92.2° @ 8459'	92.2° @ 10194'	
92.8° @ 8556'	91.6° @ 10289'	
93.5° @ 8652'	91.8° @ 10384'	
93.2° @ 8748'	91.2° @ 10576'	
91.5° @ 8845'	90.8° @ 10672'	

Drilling Contractor- UNITED DRILLING, INC.

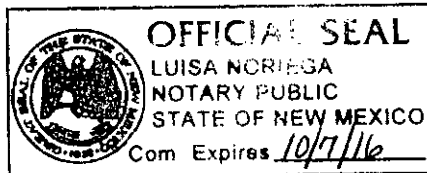
By: 
 (Angel Salazar)

Title: Vice President

Subscribed and sworn to before me this 10th day of August 2015.


 Notary Public

My Commission Expires:



Chaves NM
 County State



COG Operating LLC

Eddy County, NM

Shiner Bock 1 Federal Com #27H

SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M

BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P

Design: BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P

Standard Survey Report

07 August, 2015





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Shiner Bock 1 Federal Com #27H
Project:	Eddy County, NM	TVD Reference:	KB @ 4010.0usft (United 43)
Site:	Shiner Bock 1 Federal Com #27H	MD Reference:	KB @ 4010.0usft (United 43)
Well:	SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M	North Reference:	Grid
Wellbore:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	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	Shiner Bock 1 Federal Com #27H			
Site Position:		Northing:	676,764.70 usft	Latitude: 32° 51' 34.199 N
From:	Map	Easting:	654,355.00 usft	Longitude: 103° 49' 50.386 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.27 °

Well	SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M			
Well Position	+N/-S	0.0 usft	Northing:	676,764.70 usft
	+E/-W	0.0 usft	Easting:	654,355.00 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level: 3,998.0 usft

Wellbore	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P			
Magnetics	Model Name	Sample Date	Declination	Dip Angle
			(°)	(°)
	IGRF2015	7/16/2015	7.33	60.63
				Field Strength (nT)
				48,482

Design	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	91.89

Survey Program	Date 8/7/2015			
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100.0	2,032.0	Gyro #1 (BHL: 970' FSL, 350' FEL, Sec 1,	NS-GYRO-SS	NS Gyro single shots
2,117.0	10,745.0	MWD #2 (BHL: 970' FSL, 350' FEL, Sec 1,	MWD	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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
100.0	0.17	1.81	100.0	0.1	0.0	0.0	0.17	0.17	0.00	
200.0	0.30	346.95	200.0	0.5	0.0	-0.1	0.14	0.13	-14.87	
300.0	0.32	22.66	300.0	1.0	0.0	0.0	0.19	0.02	35.72	
400.0	0.35	334.67	400.0	1.6	0.0	-0.1	0.27	0.04	-47.99	
500.0	0.43	284.56	500.0	1.9	-0.5	-0.6	0.34	0.08	-50.11	
600.0	0.33	327.97	600.0	2.3	-1.0	-1.1	0.30	-0.10	43.41	



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Shiner Bock 1 Federal Com #27H
Project:	Eddy County, NM	TVD Reference:	KB @ 4010.0usft (United 43)
Site:	Shiner Bock 1 Federal Com #27H	MD Reference:	KB @ 4010.0usft (United 43)
Well:	SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M	North Reference:	Grid
Wellbore:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	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)	
700.0	0.57	323.20	700.0	2.9	-1.5	-1.6	0.24	0.24	-4.77	
800.0	0.67	315.81	800.0	3.7	-2.2	-2.3	0.13	0.10	-7.39	
900.0	0.54	325.79	900.0	4.5	-2.9	-3.0	0.16	-0.13	9.97	
1,000.0	0.55	310.22	1,000.0	5.2	-3.5	-3.7	0.15	0.01	-15.57	
1,100.0	0.47	294.98	1,100.0	5.7	-4.2	-4.4	0.16	-0.08	-15.24	
1,200.0	0.41	303.14	1,200.0	6.1	-4.9	-5.1	0.09	-0.06	8.16	
1,300.0	0.50	350.01	1,300.0	6.7	-5.3	-5.5	0.37	0.09	46.87	
1,400.0	0.79	1.13	1,400.0	7.8	-5.3	-5.6	0.31	0.28	11.13	
1,500.0	0.70	2.27	1,499.9	9.1	-5.3	-5.6	0.09	-0.09	1.14	
1,600.0	1.19	8.82	1,599.9	10.8	-5.1	-5.5	0.50	0.49	6.55	
1,700.0	0.98	20.37	1,699.9	12.6	-4.7	-5.1	0.30	-0.21	11.55	
1,800.0	1.46	40.91	1,799.9	14.4	-3.5	-4.0	0.64	0.48	20.54	
1,900.0	1.41	62.94	1,899.9	15.9	-1.6	-2.1	0.55	-0.05	22.04	
2,000.0	1.44	57.52	1,999.8	17.1	0.5	0.0	0.14	0.03	-5.42	
2,032.0	1.38	56.63	2,031.8	17.6	1.2	0.6	0.19	-0.18	-2.79	
TIE-IN to VES Gyro										
2,117.0	1.30	58.30	2,116.8	18.6	2.9	2.3	0.10	-0.09	1.96	
2,149.0	1.20	61.60	2,148.8	19.0	3.5	2.9	0.38	-0.31	10.31	
2,181.0	0.20	106.90	2,180.8	19.1	3.8	3.2	3.34	-3.13	141.56	
2,212.0	1.30	232.90	2,211.8	18.9	3.6	3.0	4.60	3.55	406.45	
2,245.0	2.70	232.90	2,244.8	18.2	2.7	2.1	4.24	4.24	0.00	
2,341.0	3.90	233.50	2,340.6	14.9	-1.7	-2.2	1.25	1.25	0.63	
2,438.0	3.30	234.10	2,437.4	11.3	-6.7	-7.0	0.62	-0.62	0.62	
2,535.0	4.40	220.30	2,534.2	6.8	-11.3	-11.5	1.47	1.13	-14.23	
2,632.0	4.10	220.40	2,630.9	1.3	-16.0	-16.0	0.31	-0.31	0.10	
2,728.0	3.60	222.00	2,726.7	-3.5	-20.2	-20.1	0.53	-0.52	1.67	
2,824.0	4.40	211.80	2,822.5	-8.9	-24.2	-23.9	1.11	0.83	-10.63	
2,920.0	3.90	211.90	2,918.2	-14.8	-27.8	-27.3	0.52	-0.52	0.10	
3,016.0	5.20	216.50	3,013.9	-21.1	-32.2	-31.4	1.41	1.35	4.79	
3,113.0	4.70	217.90	3,110.6	-27.7	-37.2	-36.3	0.53	-0.52	1.44	
3,209.0	5.70	212.60	3,206.2	-34.8	-42.2	-41.0	1.15	1.04	-5.52	
3,304.0	4.90	214.70	3,300.8	-42.2	-47.0	-45.6	0.87	-0.84	2.21	
3,400.0	4.40	215.50	3,396.4	-48.5	-51.5	-49.9	0.53	-0.52	0.83	
3,495.0	5.70	207.50	3,491.1	-55.7	-55.8	-54.0	1.55	1.37	-8.42	
3,591.0	5.60	206.60	3,586.6	-64.1	-60.1	-58.0	0.14	-0.10	-0.94	
3,687.0	5.30	206.90	3,682.2	-72.2	-64.2	-61.8	0.31	-0.31	0.31	
3,784.0	5.30	208.20	3,778.8	-80.2	-68.4	-65.7	0.12	0.00	1.34	
3,880.0	5.10	206.40	3,874.4	-87.9	-72.4	-69.4	0.27	-0.21	-1.88	
3,977.0	5.10	205.90	3,971.0	-95.6	-76.2	-73.0	0.05	0.00	-0.52	
4,074.0	5.10	206.10	4,067.6	-103.4	-79.9	-76.5	0.02	0.00	0.21	
4,170.0	4.90	205.30	4,163.2	-110.9	-83.6	-79.9	0.22	-0.21	-0.83	
4,267.0	4.90	202.90	4,259.9	-118.5	-86.9	-83.0	0.21	0.00	-2.47	



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Shiner Bock 1 Federal Com #27H
Project:	Eddy County, NM	TVD Reference:	KB @ 4010.0usft (United 43)
Site:	Shiner Bock 1 Federal Com #27H	MD Reference:	KB @ 4010.0usft (United 43)
Well:	SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M	North Reference:	Grid
Wellbore:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	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)
4,362.0	4.90	202.90	4,354.5	-126.0	-90.1	-85.9	0.00	0.00	0.00
4,458.0	4.70	204.70	4,450.2	-133.3	-93.3	-88.9	0.26	-0.21	1.88
4,552.0	4.60	205.10	4,543.9	-140.2	-96.5	-91.9	0.11	-0.11	0.43
4,649.0	4.70	205.80	4,640.6	-147.3	-99.9	-95.0	0.12	0.10	0.72
4,745.0	4.30	205.80	4,736.3	-154.1	-103.2	-98.1	0.42	-0.42	0.00
4,841.0	5.30	211.00	4,831.9	-161.2	-107.1	-101.7	1.13	1.04	5.42
4,937.0	5.30	211.80	4,927.5	-168.7	-111.7	-106.1	0.08	0.00	0.83
5,032.0	5.20	211.70	5,022.1	-176.1	-116.3	-110.4	0.11	-0.11	-0.11
5,127.0	5.10	212.00	5,116.7	-183.4	-120.8	-114.7	0.11	-0.11	0.32
5,224.0	4.90	211.80	5,213.4	-190.5	-125.2	-118.9	0.21	-0.21	-0.21
5,321.0	4.10	220.90	5,310.1	-196.7	-129.7	-123.1	1.10	-0.82	9.38
5,353.0	4.20	223.00	5,342.0	-198.4	-131.2	-124.6	0.57	0.31	6.56
5,385.0	3.40	228.40	5,373.9	-199.9	-132.7	-126.1	2.74	-2.50	16.88
5,417.0	2.40	240.70	5,405.9	-200.8	-134.0	-127.3	3.66	-3.13	38.44
5,449.0	1.50	264.00	5,437.9	-201.2	-135.0	-128.3	3.69	-2.81	72.81
5,485.0	1.20	281.60	5,473.8	-201.2	-135.9	-129.2	1.41	-0.83	48.89
5,517.0	1.10	278.80	5,505.8	-201.1	-136.5	-129.8	0.36	-0.31	-8.75
5,548.0	1.10	281.00	5,536.8	-201.0	-137.1	-130.4	0.14	0.00	7.10
5,580.0	0.30	113.60	5,568.8	-201.0	-137.3	-130.6	4.36	-2.50	-523.13
5,611.0	3.50	105.80	5,599.8	-201.2	-136.3	-129.6	10.33	10.32	-25.16
5,643.0	7.90	101.60	5,631.6	-202.0	-133.2	-126.5	13.80	13.75	-13.13
5,676.0	12.30	96.20	5,664.1	-202.8	-127.5	-120.8	13.62	13.33	-16.36
5,708.0	17.10	93.90	5,695.1	-203.5	-119.4	-112.7	15.11	15.00	-7.19
5,739.0	21.80	94.10	5,724.3	-204.2	-109.1	-102.3	15.16	15.16	0.65
5,772.0	26.00	94.00	5,754.5	-205.1	-95.8	-89.0	12.73	12.73	-0.30
5,804.0	29.50	92.60	5,782.8	-206.0	-80.9	-74.1	11.12	10.94	-4.38
5,836.0	32.10	92.00	5,810.3	-206.6	-64.5	-57.7	8.18	8.13	-1.88
5,869.0	34.50	89.80	5,837.8	-206.9	-46.4	-39.6	8.14	7.27	-6.67
5,901.0	37.90	87.30	5,863.7	-206.4	-27.5	-20.7	11.58	10.63	-7.81
5,933.0	42.10	84.90	5,888.2	-205.0	-7.0	-0.3	13.98	13.13	-7.50
5,965.0	45.60	84.40	5,911.2	-202.9	15.0	21.7	10.99	10.94	-1.56
5,997.0	48.30	84.40	5,933.1	-200.7	38.3	44.9	8.44	8.44	0.00
6,029.0	51.00	84.90	5,953.8	-198.4	62.6	69.1	8.52	8.44	1.56
6,061.0	54.10	85.40	5,973.3	-196.2	87.9	94.3	9.77	9.69	1.56
6,094.0	56.70	87.10	5,992.0	-194.5	115.0	121.3	8.95	7.88	5.15
6,126.0	59.90	88.50	6,008.8	-193.4	142.2	148.5	10.67	10.00	4.38
6,158.0	63.40	89.70	6,024.0	-193.0	170.3	176.6	11.42	10.94	3.75
6,190.0	66.60	90.70	6,037.5	-193.1	199.3	205.6	10.39	10.00	3.13
6,222.0	69.10	90.90	6,049.6	-193.5	229.0	235.2	7.83	7.81	0.63
6,254.0	72.00	91.20	6,060.2	-194.1	259.1	265.4	9.11	9.06	0.94
6,287.0	74.80	91.50	6,069.7	-194.8	290.8	297.0	8.53	8.48	0.91
6,319.0	77.50	91.50	6,077.3	-195.6	321.8	328.1	8.44	8.44	0.00



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Shiner Bock 1 Federal Corn #27H
Project:	Eddy County, NM	TVD Reference:	KB @ 4010.0usft (United 43)
Site:	Shiner Bock 1 Federal Corn #27H	MD Reference:	KB @ 4010.0usft (United 43)
Well:	SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M	North Reference:	Grid
Wellbore:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	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)
6,352.0	80.00	91.40	6,083.8	-196.4	354.2	360.4	7.58	7.58	-0.30
6,383.0	83.00	91.60	6,088.3	-197.2	384.8	391.1	9.70	9.68	0.65
6,415.0	86.50	90.60	6,091.3	-197.9	416.7	423.0	11.37	10.94	-3.13
6,448.0	88.60	88.40	6,092.7	-197.6	449.6	455.9	9.21	6.36	-6.67
6,535.0	89.40	88.30	6,094.2	-195.1	536.6	542.7	0.93	0.92	-0.11
6,631.0	88.80	88.40	6,095.7	-192.3	632.5	638.5	0.63	-0.63	0.10
6,726.0	90.80	89.40	6,096.0	-190.5	727.5	733.4	2.35	2.11	1.05
6,821.0	90.50	89.90	6,095.0	-189.9	822.5	828.3	0.61	-0.32	0.53
6,917.0	90.20	89.10	6,094.4	-189.1	918.5	924.2	0.89	-0.31	-0.83
7,013.0	89.70	89.00	6,094.5	-187.5	1,014.5	1,020.1	0.53	-0.52	-0.10
7,109.0	91.40	89.80	6,093.5	-186.5	1,110.5	1,116.0	1.96	1.77	0.83
7,205.0	91.30	89.50	6,091.3	-185.9	1,206.4	1,211.9	0.33	-0.10	-0.31
7,302.0	91.30	89.70	6,089.1	-185.2	1,303.4	1,308.8	0.21	0.00	0.21
7,398.0	91.20	90.00	6,087.0	-184.9	1,399.4	1,404.7	0.33	-0.10	0.31
7,495.0	90.90	89.60	6,085.2	-184.6	1,496.4	1,501.6	0.52	-0.31	-0.41
7,591.0	90.80	89.50	6,083.8	-183.8	1,592.4	1,597.5	0.15	-0.10	-0.10
7,688.0	90.80	89.50	6,082.4	-183.0	1,689.3	1,694.4	0.00	0.00	0.00
7,785.0	90.50	89.30	6,081.3	-182.0	1,786.3	1,791.3	0.37	-0.31	-0.21
7,881.0	90.20	89.30	6,080.7	-180.8	1,882.3	1,887.3	0.31	-0.31	0.00
7,978.0	91.10	89.60	6,079.6	-179.9	1,979.3	1,984.2	0.98	0.93	0.31
8,074.0	90.90	88.90	6,078.0	-178.6	2,075.3	2,080.0	0.76	-0.21	-0.73
8,170.0	91.60	88.40	6,075.9	-176.4	2,171.2	2,175.9	0.90	0.73	-0.52
8,266.0	91.30	88.40	6,073.4	-173.7	2,267.2	2,271.7	0.31	-0.31	0.00
8,363.0	90.80	87.80	6,071.7	-170.5	2,364.1	2,368.4	0.81	-0.52	-0.62
8,459.0	92.20	87.90	6,069.1	-166.9	2,460.0	2,464.2	1.46	1.46	0.10
8,556.0	92.80	89.50	6,064.9	-164.7	2,556.9	2,560.9	1.76	0.62	1.65
8,652.0	93.50	90.30	6,059.6	-164.5	2,652.7	2,656.7	1.11	0.73	0.83
8,748.0	93.20	90.10	6,054.0	-164.8	2,748.6	2,752.5	0.38	-0.31	-0.21
8,845.0	91.50	91.60	6,050.1	-166.3	2,845.5	2,849.4	2.34	-1.75	1.55
8,942.0	91.20	91.10	6,047.8	-168.6	2,942.4	2,946.4	0.60	-0.31	-0.52
9,037.0	90.60	91.30	6,046.3	-170.6	3,037.4	3,041.3	0.67	-0.63	0.21
9,134.0	90.10	91.00	6,045.7	-172.5	3,134.4	3,138.3	0.60	-0.52	-0.31
9,230.0	90.20	90.90	6,045.4	-174.1	3,230.3	3,234.3	0.15	0.10	-0.10
9,327.0	90.20	88.70	6,045.1	-173.8	3,327.3	3,331.2	2.27	0.00	-2.27
9,424.0	89.80	88.60	6,045.1	-171.5	3,424.3	3,428.1	0.43	-0.41	-0.10
9,520.0	89.60	88.80	6,045.6	-169.3	3,520.3	3,523.9	0.29	-0.21	0.21
9,617.0	90.50	89.80	6,045.5	-168.1	3,617.3	3,620.8	1.39	0.93	1.03
9,713.0	89.70	88.70	6,045.3	-166.8	3,713.3	3,716.7	1.42	-0.83	-1.15
9,809.0	89.70	88.80	6,045.8	-164.8	3,809.2	3,812.6	0.10	0.00	0.10
9,906.0	91.80	89.30	6,044.6	-163.1	3,906.2	3,909.5	2.23	2.16	0.52
10,003.0	91.60	88.60	6,041.7	-161.4	4,003.1	4,006.3	0.75	-0.21	-0.72

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Shiner Bock 1 Federal Com #27H
Project:	Eddy County, NM	TVD Reference:	KB @ 4010.0usft (United 43)
Site:	Shiner Bock 1 Federal Com #27H	MD Reference:	KB @ 4010.0usft (United 43)
Well:	SHL: 1160' FSL, 170' FWL, Sec 1, T17S, R31E, Unit M	North Reference:	Grid
Wellbore:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 970' FSL, 350' FEL, Sec 1, T17S, R31E, Unit P	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)	
10,099.0	92.10	88.20	6,038.6	-158.7	4,099.1	4,102.1	0.67	0.52	-0.42	
10,194.0	92.20	87.20	6,035.0	-154.9	4,193.9	4,196.7	1.06	0.11	-1.05	
10,289.0	91.60	88.00	6,031.9	-150.9	4,288.8	4,291.4	1.05	-0.63	0.84	
10,384.0	91.80	90.50	6,029.1	-149.7	4,383.7	4,386.3	2.64	0.21	2.63	
10,479.0	91.50	90.90	6,026.3	-150.8	4,478.7	4,481.2	0.53	-0.32	0.42	
10,576.0	91.20	89.90	6,024.0	-151.5	4,575.6	4,578.1	1.08	-0.31	-1.03	
10,672.0	90.80	90.10	6,022.4	-151.5	4,671.6	4,674.1	0.47	-0.42	0.21	
Final MWD Survey										
10,745.0	90.80	90.10	6,021.4	-151.6	4,744.6	4,747.0	0.00	0.00	0.00	
Projection to Bit/TD										

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
2,032.0	2,031.8	17.6	1.2	TIE-IN to VES Gyro	
10,672.0	6,022.4	-151.5	4,671.6	Final MWD Survey	
10,745.0	6,021.4	-151.6	4,744.6	Projection to Bit/TD	

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