

OCT 31 2016

RECEIVED



7/13/16

3001542941

State of New Mexico
County of Eddy

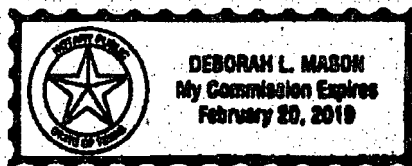
I, Donald D. Mason, certify that: I am employed by Terra Directional Services LLC; that I did on the day(s) of 06/07/2016 through 06/16/2016 conduct or supervise the taking of a MWD survey from a depth of 1211 feet to a depth of 10010 feet; that the data is true, correct, complete and within the limitations 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 #938H Well API 30-015-42941 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

OCT 31 2016

RECEIVED

COG Operating LLC

Eddy County, NM (NAD-27 2015)

Burch Keely Unit #938H

API #: 30-015-42941

SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A

PP: 330' FNL, 382' FEL, Sec 18, T17S, R30E, Unit A

BHL: 340' FNL, 207' FEL, Sec 13, T17S, R29E, Unit A

Design: BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A

Standard Survey Report

16 June, 2016





TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3876.00usft (Silver Oak 3)
Site:	Burch Keely Unit #938H	MD Reference:	KB @ 3876.00usft (Silver Oak 3)
Well:	SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A	North Reference:	Grid
Wellbore:	BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A	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 #938H			
Site Position:		Northing:	889,575.20 usft	Latitude:	32° 50' 25.124 N
From:	Map	Easting:	601,391.90 usft	Longitude:	104° 0' 11.562 W
Position Uncertainty:	0.00 usft	Slot Radius:	13.20 in	Grid Convergence:	0.18 °

Well	SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A					
Well Position	+N-S	0.00 usft	Northing:	669,575.20 usft	Latitude:	32° 50' 25.124 N
	+E-W	0.00 usft	Easting:	601,391.90 usft	Longitude:	104° 0' 11.562 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,658.00 usft

Wellbore	BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	5/24/2016	7.32	60.57	48,366

Design:	BHL: 350' FNL 230' FEL Sec 13, T17S, R29E, Unit A				
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	271.44	

Survey Program		Date	6/18/2016		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	1,156.00	VES Gyro #1 (BHL: 350' FNL, 230' FEL, S	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
1,211.00	10,010.00	TDS MWD #2 (BHL: 350' FNL, 230' FEL, S	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	0.22	292.52	100.00	0.07	-0.18	0.18	0.22	0.22	0.00
200.00	0.20	298.99	200.00	0.23	-0.51	0.51	0.03	-0.02	6.47
300.00	0.52	306.47	300.00	0.59	-1.02	1.04	0.32	0.32	7.48
400.00	0.57	326.21	399.99	1.27	-1.67	1.70	0.19	0.05	19.74
500.00	0.62	334.84	499.99	2.17	-2.17	2.23	0.10	0.05	8.63
600.00	0.42	4.37	599.98	3.03	-2.38	2.45	0.33	-0.20	29.53



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 500' FNL 297' FEL, Sec 18, T17S, R30E, Unit A
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3676.00usft (Silver Oak 3)
Site:	Burch Keely Unit #938H	MD Reference:	KB @ 3678.00usft (Silver Oak 3)
Well:	SHL: 500' FNL 297' FEL, Sec 18, T17S, R30E, Unit A	North Reference:	Grid
Wellbore:	BHL: 350' FNL 230' FEL, Sec 13, T17S, R28E, Unit A	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FNL 230' FEL, Sec 13, T17S, R28E, Unit A	Databases:	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	0.47	342.38	699.98	3.78	-2.47	2.57	0.18	0.05	-22.01
800.00	0.67	37.59	799.98	4.64	-2.24	2.36	0.56	0.20	55.23
900.00	1.02	43.89	899.96	5.74	-1.27	1.41	0.36	0.35	6.30
1,000.00	1.32	65.18	999.94	6.87	0.40	-0.22	0.52	0.30	21.29
1,100.00	1.30	69.57	1,099.92	7.75	2.51	-2.31	0.10	-0.02	4.39
1,156.00	1.09	53.64	1,155.91	8.28	3.53	-3.32	0.70	-0.38	-28.45
Tie-In to VES Gyro									
1,211.00	0.80	68.00	1,210.90	8.74	4.31	-4.09	0.68	-0.53	28.11
First TDS MWD Survey									
1,305.00	2.90	66.80	1,304.84	9.92	7.10	-6.85	2.23	2.23	-1.28
1,399.00	4.80	70.80	1,398.63	12.15	13.00	-12.69	2.04	2.02	4.26
1,492.00	5.20	71.70	1,491.27	14.75	20.68	-20.30	0.44	0.43	0.97
1,586.00	5.80	61.30	1,584.88	18.29	28.74	-28.28	1.12	0.43	-11.08
1,679.00	5.80	60.80	1,677.40	22.77	36.83	-36.24	0.22	0.22	-0.54
1,772.00	5.50	60.20	1,769.95	27.27	44.80	-44.10	0.33	-0.32	-0.65
1,865.00	5.10	62.80	1,862.55	31.39	52.33	-51.53	0.49	-0.43	2.58
1,958.00	6.90	59.70	1,955.04	36.11	60.83	-59.90	1.96	1.94	-3.12
2,051.00	7.00	58.70	2,047.35	41.87	70.49	-69.42	0.17	0.11	-1.08
2,146.00	6.60	61.50	2,141.69	47.49	80.24	-79.02	0.55	-0.42	2.95
2,239.00	6.10	60.50	2,234.11	52.47	89.23	-87.89	0.55	-0.54	-1.08
2,332.00	5.60	59.70	2,326.63	57.19	97.45	-95.99	0.54	-0.54	-0.86
2,425.00	7.40	59.60	2,419.03	62.51	106.54	-104.93	1.94	1.94	-0.11
2,518.00	7.90	59.50	2,511.20	68.79	117.21	-115.44	0.54	0.54	-0.11
2,612.00	8.00	62.30	2,604.30	75.11	128.57	-126.64	0.43	0.11	2.96
2,705.00	8.00	63.50	2,696.39	81.00	140.09	-138.01	0.18	0.00	1.29
2,798.00	6.50	61.60	2,788.65	86.39	150.51	-148.29	1.63	-1.61	-2.04
2,892.00	6.20	61.50	2,882.07	91.35	159.65	-157.31	0.32	-0.32	-0.11
2,985.00	6.40	61.50	2,974.51	96.22	168.62	-166.15	0.22	0.22	0.00
3,078.00	6.50	64.00	3,066.92	101.00	177.91	-175.31	0.32	0.11	2.69
3,172.00	6.50	64.20	3,160.31	105.65	187.48	-184.77	0.02	0.00	0.21
3,265.00	6.60	64.50	3,252.71	110.24	197.04	-194.21	0.11	0.11	0.32
3,358.00	6.60	67.60	3,345.09	114.56	206.81	-203.86	0.38	0.00	3.33
3,453.00	6.70	69.70	3,439.45	118.58	217.05	-214.01	0.28	0.11	2.21
3,547.00	6.60	57.90	3,532.82	123.35	226.77	-223.60	1.46	-0.11	-12.55
3,640.00	6.70	57.40	3,625.20	129.11	235.87	-232.55	0.12	0.11	-0.54
3,734.00	6.70	59.00	3,718.56	134.69	245.19	-241.72	0.20	0.00	1.70
3,828.00	6.70	61.20	3,811.92	140.36	254.70	-251.09	0.27	0.00	2.34
3,921.00	5.00	67.30	3,904.43	144.54	263.19	-259.48	1.94	-1.83	8.56
4,013.00	2.60	60.90	3,996.22	147.10	268.71	-264.93	2.65	-2.61	-6.96
4,107.00	1.10	23.90	4,090.17	148.96	270.94	-267.11	1.96	-1.60	-39.36
4,200.00	1.10	4.80	4,183.15	150.67	271.38	-267.51	0.39	0.00	-20.54



TDS
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Burch Keely Unit #938H
Well: SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A
Wellbore: BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A
Design: BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A

Local Co-ordinate Reference: Well SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A
TVD Reference: KB @ 3676.00usft (Silver Oak 3)
MD Reference: KB @ 3676.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
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)
4,231.00	1.40	345.30	4,214.15	151.33	271.31	-267.42	1.67	0.97	-62.90
4,262.00	3.10	312.60	4,245.12	152.26	270.59	-266.68	6.66	5.48	-105.48
4,293.00	6.20	296.30	4,276.02	153.57	288.48	-264.53	10.77	10.00	-52.58
4,325.00	10.00	291.90	4,307.69	155.38	264.35	-260.36	12.02	11.88	-13.75
4,356.00	14.20	290.90	4,338.00	157.74	258.29	-254.25	13.56	13.55	-3.23
4,387.00	17.60	289.10	4,367.81	160.63	250.31	-246.20	11.08	10.97	-5.81
4,419.00	20.00	288.20	4,398.10	163.92	240.54	-236.34	7.55	7.50	-2.81
4,449.00	22.00	288.70	4,426.10	167.33	230.34	-228.07	6.69	6.67	1.67
4,480.00	24.10	288.00	4,454.63	171.14	218.82	-214.45	6.83	6.77	-2.26
4,511.00	28.50	286.40	4,482.65	175.05	206.17	-201.70	8.05	7.74	-5.16
4,542.00	28.70	283.90	4,510.12	178.79	192.30	-187.75	8.02	7.10	-8.06
4,574.00	30.80	281.50	4,537.91	182.27	176.81	-172.18	7.54	6.56	-7.50
4,605.00	33.00	278.50	4,564.22	185.10	160.89	-155.98	8.75	7.10	-9.68
4,636.00	35.70	274.70	4,589.82	187.09	143.32	-138.57	11.12	8.71	-12.26
4,667.00	38.10	271.80	4,614.61	188.13	124.74	-119.97	9.56	7.74	-9.35
4,698.00	40.60	267.20	4,638.58	187.94	105.10	-100.34	12.39	8.06	-14.84
4,729.00	44.30	265.20	4,661.46	186.54	84.23	-79.51	12.70	11.94	-6.45
4,760.00	47.50	264.40	4,683.03	184.52	62.06	-57.40	10.49	10.32	-2.58
4,792.00	48.70	264.40	4,704.40	182.20	38.36	-33.76	3.75	3.75	0.00
4,823.00	49.10	264.20	4,724.77	179.88	15.11	-10.59	1.38	1.29	-0.65
4,854.00	49.70	264.30	4,744.95	177.52	-8.31	12.77	1.95	1.94	0.32
4,885.00	50.20	264.10	4,764.90	175.12	-31.92	36.31	1.69	1.61	-0.65
4,916.00	50.70	264.10	4,784.63	172.68	-55.69	60.01	1.61	1.61	0.00
4,947.00	49.90	264.80	4,804.44	170.32	-79.43	83.68	2.86	-2.58	1.61
4,955.16	49.79	264.70	4,809.70	169.73	-85.64	89.88	1.62	-1.29	1.28
As-Drilled PP									
4,978.00	49.50	265.00	4,824.49	168.17	-102.97	107.17	1.62	-1.29	1.29
5,009.00	52.50	266.10	4,843.99	166.31	-126.99	131.13	10.06	9.68	3.55
5,041.00	56.10	267.20	4,862.66	164.80	-152.93	157.02	11.59	11.25	3.44
5,072.00	59.90	268.10	4,879.09	163.72	-179.19	183.25	12.50	12.26	2.90
5,103.00	64.00	268.40	4,893.66	162.89	-206.53	210.56	13.25	13.23	0.97
5,134.00	68.00	268.40	4,906.27	162.10	-234.83	238.83	12.90	12.90	0.00
5,165.00	72.00	268.00	4,916.87	161.18	-263.94	267.91	12.96	12.90	-1.29
5,197.00	74.70	267.80	4,926.04	160.06	-294.58	298.51	8.46	8.44	-0.63
5,228.00	77.10	267.60	4,933.59	158.85	-324.62	328.51	7.77	7.74	-0.65
5,259.00	78.40	267.40	4,939.80	157.53	-354.94	358.78	7.45	7.42	-0.65
5,290.00	81.80	267.50	4,944.94	156.17	-385.49	389.29	8.07	8.06	0.32
5,321.00	85.40	267.80	4,948.37	154.90	-416.27	420.03	11.33	11.29	0.97
5,355.00	89.50	267.60	4,949.88	153.54	-450.20	453.92	12.07	12.06	-0.59
5,448.00	91.30	268.30	4,949.22	150.18	-544.14	547.74	2.05	1.91	0.74
5,542.00	92.30	268.60	4,946.30	147.83	-637.06	640.57	1.20	1.08	0.54



TDS
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A
Project:	Eddy County, NM (NAD-27 2015)	TVD Reference:	KB @ 3676.00usft (Silver Oak 3)
Site:	Burch Keely Unit #936H	MD Reference:	KB @ 3676.00usft (Silver Oak 3)
Well:	SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A	North Reference:	Grid
Wellbore:	BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A	Survey Calculation Method:	Minimum Curvature
Design:	BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A	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)	Buid Rate (°/100usft)	Turn Rate (°/100usft)	
5,835.00	91.00	269.60	4,943.62	148.53	-730.01	733.46	1.84	-1.40	0.86	
5,728.00	91.70	269.70	4,941.43	145.96	-822.98	826.39	0.76	0.75	0.11	
5,822.00	90.20	269.80	4,939.87	145.55	-916.96	920.33	1.60	-1.60	0.11	
5,915.00	90.20	269.90	4,939.55	145.31	-1,009.96	1,013.30	0.11	0.00	0.11	
6,009.00	90.20	270.30	4,939.22	145.47	-1,103.96	1,107.27	0.43	0.00	0.43	
6,102.00	90.20	270.50	4,938.90	146.12	-1,196.96	1,200.25	0.22	0.00	0.22	
6,195.00	90.20	269.80	4,938.57	146.36	-1,289.96	1,293.23	0.75	0.00	-0.75	
6,289.00	90.80	269.70	4,937.75	145.95	-1,383.95	1,387.18	0.65	0.64	-0.11	
6,382.00	91.00	269.80	4,936.29	145.55	-1,476.94	1,480.13	0.24	0.22	0.11	
6,476.00	91.10	269.80	4,934.57	145.22	-1,570.92	1,574.08	0.11	0.11	0.00	
6,569.00	91.30	270.20	4,932.62	145.22	-1,663.90	1,667.03	0.48	0.22	0.43	
6,661.00	91.60	270.50	4,930.29	145.78	-1,755.87	1,758.98	0.46	0.33	0.33	
6,755.00	91.70	270.70	4,927.59	148.77	-1,849.83	1,852.93	0.24	0.11	0.21	
6,848.00	92.10	271.10	4,924.50	148.23	-1,942.76	1,945.88	0.61	0.43	0.43	
6,941.00	91.00	269.80	4,921.99	148.96	-2,035.72	2,038.82	1.83	-1.18	-1.40	
7,035.00	91.30	270.50	4,920.10	149.20	-2,129.70	2,132.78	0.81	0.32	0.74	
7,128.00	90.00	269.10	4,919.05	148.88	-2,222.69	2,225.73	2.05	-1.40	-1.51	
7,221.00	90.50	269.30	4,918.64	147.58	-2,315.68	2,318.66	0.58	0.54	0.22	
7,314.00	91.10	269.80	4,917.34	148.85	-2,408.67	2,411.60	0.84	0.65	0.54	
7,407.00	91.70	270.00	4,915.07	148.69	-2,501.64	2,504.54	0.68	0.65	0.22	
7,501.00	91.00	269.60	4,912.85	148.36	-2,595.61	2,598.47	0.86	-0.74	-0.43	
7,594.00	91.60	269.80	4,910.74	145.87	-2,688.59	2,691.41	0.68	0.65	0.22	
7,688.00	92.60	270.50	4,907.30	148.12	-2,782.52	2,785.32	1.30	1.08	0.74	
7,782.00	91.00	270.20	4,904.35	146.69	-2,876.47	2,879.25	1.73	-1.70	-0.32	
7,875.00	90.30	269.50	4,903.29	146.45	-2,969.47	2,972.21	1.06	-0.75	-0.75	
7,968.00	90.90	270.00	4,902.32	146.04	-3,062.46	3,065.16	0.84	0.65	0.54	
8,062.00	90.20	269.20	4,901.42	145.38	-3,156.45	3,159.11	1.13	-0.74	-0.85	
8,156.00	90.70	269.80	4,900.68	144.58	-3,250.44	3,253.05	0.83	0.53	0.64	
8,249.00	91.10	270.20	4,899.22	144.56	-3,343.43	3,346.01	0.61	0.43	0.43	
8,342.00	91.40	270.70	4,897.19	145.29	-3,436.41	3,439.97	0.63	0.32	0.54	
8,436.00	89.80	270.50	4,896.20	146.28	-3,530.39	3,532.95	1.72	-1.70	-0.21	
8,529.00	90.20	269.00	4,896.20	145.87	-3,623.39	3,625.91	1.67	-0.43	-1.61	
8,622.00	90.70	269.30	4,895.47	144.48	-3,716.38	3,718.83	0.63	0.54	0.32	
8,716.00	90.90	270.00	4,894.16	143.92	-3,810.36	3,812.78	0.77	0.21	0.74	
8,809.00	89.80	269.10	4,893.59	143.19	-3,903.36	3,905.72	1.53	-1.18	-0.97	
8,902.00	89.80	267.60	4,893.92	140.51	-3,996.31	3,998.58	1.61	0.00	-1.61	
8,995.00	90.20	268.20	4,893.92	137.10	-4,089.25	4,091.41	0.78	0.43	0.65	
9,089.00	90.20	268.40	4,893.59	134.31	-4,183.21	4,185.26	0.21	0.00	0.21	
9,182.00	91.20	269.30	4,892.45	132.45	-4,276.18	4,278.16	1.45	1.08	0.97	
9,276.00	92.00	270.30	4,889.83	132.12	-4,370.14	4,372.08	1.36	0.85	1.06	
9,369.00	90.50	269.80	4,887.80	132.20	-4,463.12	4,465.03	1.70	-1.61	-0.54	



TDS
Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD-27 2015)
Site: Burch Kestly Unit #838H
Well: BHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A
Wellbore: BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A
Design: BHL: 350' FNL, 230' FEL, Sec 13, T17S, R29E, Unit A

Local Co-ordinate Reference:

TVD Reference:

MD Reference:

North Reference:

Survey Calculation Method:

Database:

Well SHL: 500' FNL, 297' FEL, Sec 18, T17S, R30E, Unit A

KB @ 3676.00usft (Silver Oak 3)

KB @ 3676.00usft (Silver Oak 3)

Grid

Minimum Curvature

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)
9,482.00	90.90	270.00	4,886.66	132.04	-4,556.11	4,567.99	0.48	0.43	0.22
9,556.00	91.00	270.40	4,885.11	132.37	-4,650.10	4,651.95	0.44	0.11	0.43
9,850.00	91.50	270.80	4,883.06	133.18	-4,744.07	4,745.92	0.57	0.53	0.21
9,743.00	92.60	271.40	4,879.73	134.81	-4,838.98	4,838.85	1.48	1.18	0.88
9,837.00	91.40	270.70	4,876.45	136.53	-4,930.82	4,932.79	1.48	-1.28	-0.74
9,930.00	92.50	271.00	4,873.28	137.91	-5,023.85	6,025.73	1.23	1.18	0.32
Final MWD Survey									
10,010.00	92.50	271.00	4,869.79	139.30	-5,103.77	5,105.65	0.00	0.00	0.00
Projection to Bit/VD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates	+N-S (usft)	+E-W (usft)	Comment
1,158.00	1,155.91	8.28		3.63	Tie-In to VES Gyro
1,211.00	1,210.90	8.74		4.31	First TDS MWD Survey
4,865.18	4,869.70	169.73		-85.64	As-Drilled PP
9,930.00	4,873.28	137.81		-5,023.85	Final MWD Survey
10,010.00	4,869.79	139.30		-5,103.77	Projection to Bit/VD

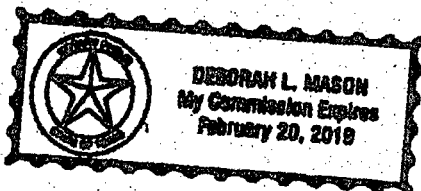
Checked By:

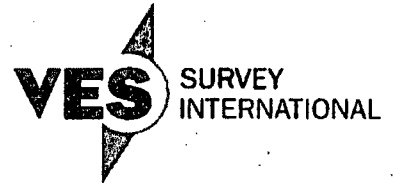
Deborah L. Mason

Approved By:

[Signature]

Date: 7/13/2016





June 8, 2016

NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 31 2016

RECEIVED

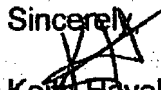
Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo

RE: Burch Keely Unit No. 938H

Please find enclosed a copy of the survey from 0' to 1156' ran on the above referenced well.

Sincerely,

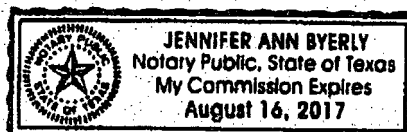

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 8th day of June,
A.D., 2016, 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





Company: Concho

Lease/Well: Burch Keely Unit No./938H

Rig Name: Silver Oak 3

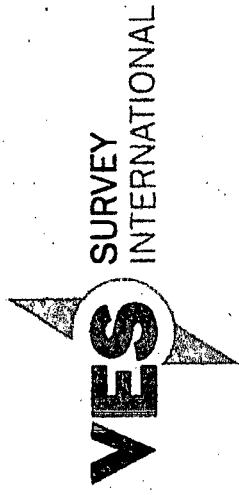
State/County: New Mexico/Eddy

VS-Azi: 0.00 Degrees

Latitude: 32.84031, Longitude: -104.00321

Grid North = True North -0.18 degs (NAD 27)

Grid Correction Applied = -0.18 degs



Depth Reference : RKB = 18 Foot

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: ...eely unit 938h_gyro survey.ut

Minimum Curvature Method

Report Date/Time: 6/8/2016 / 15:45

VES Survey International
Midland Tx

(432) 583-5444

Surveyor: Gene Heliss

Burch Keely Unit No. 938H / API 30-015-42841

NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 31 2016

RECEIVED

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	0.22	282.62	100.00	0.07	-0.17	0.07	0.19	292.62	0.22
200.00	0.20	286.99	200.00	0.23	-0.50	0.23	0.55	294.68	0.03
300.00	0.52	306.47	300.00	0.58	-1.02	0.58	1.17	299.77	0.32
400.00	0.57	326.21	399.99	1.27	-1.66	1.27	2.09	307.34	0.19
500.00	0.62	334.84	499.99	2.17	-2.17	2.17	3.07	315.05	0.10
600.00	0.42	4.37	599.98	3.03	-2.37	3.03	3.84	321.95	0.33
700.00	0.47	342.36	699.98	3.78	-2.46	3.78	4.52	326.82	0.18
800.00	0.67	37.69	799.98	4.64	-2.23	4.64	5.15	334.26	0.55
900.00	1.02	43.89	899.96	5.74	-1.26	5.74	5.88	347.62	0.37
1000.00	1.32	65.18	999.94	6.87	0.41	6.87	6.88	3.38	0.52
1100.00	1.30	69.57	1099.92	7.76	2.52	7.76	8.15	18.00	0.10
1166.00	1.09	63.64	1155.91	8.29	3.54	8.29	9.01	23.15	0.70



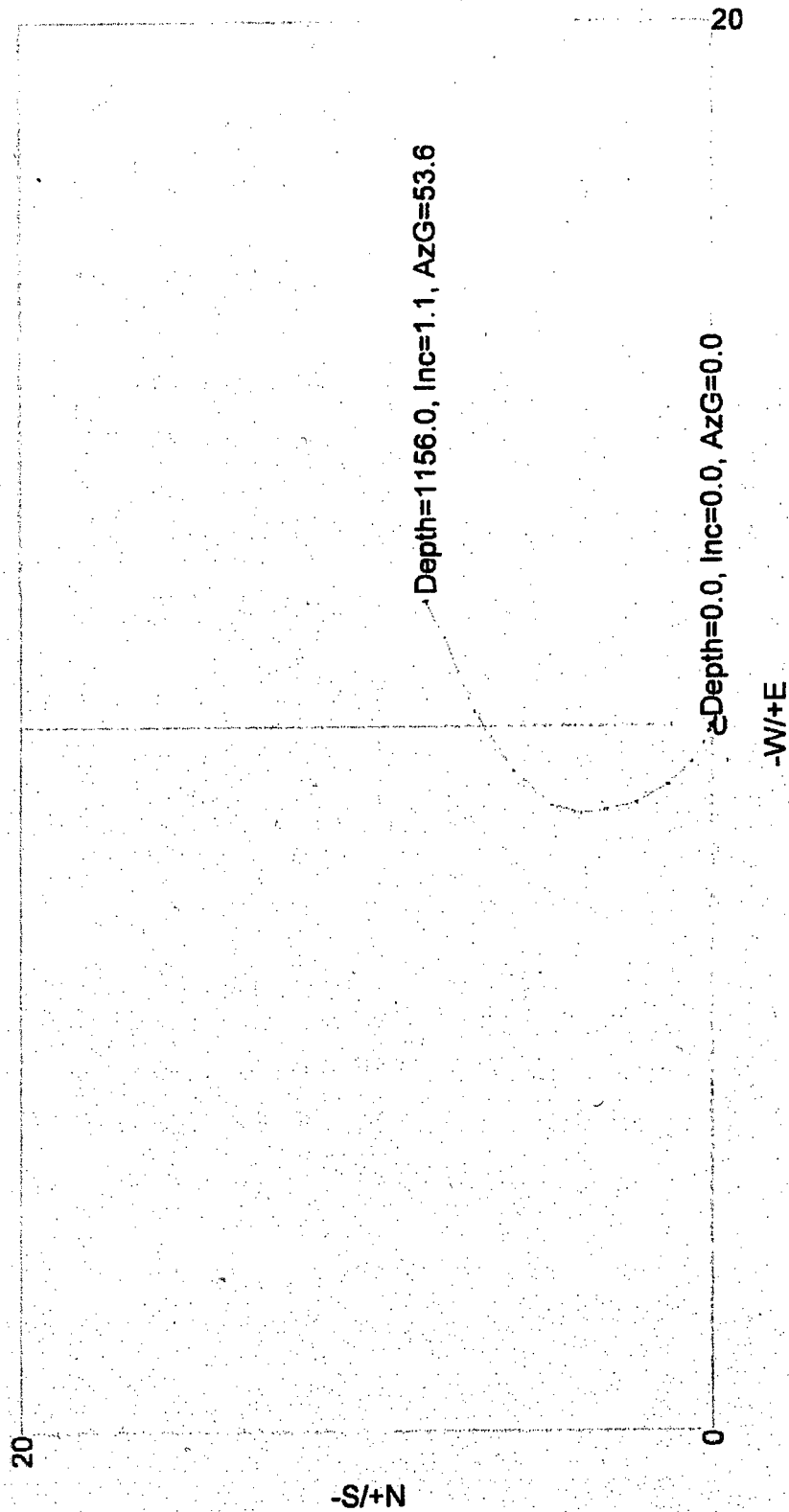
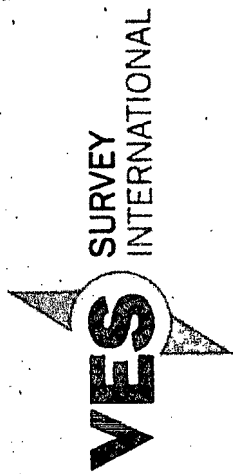
VES Survey International

Midland Tx

(432) 563-5444

Surveyor: Gene Heiss

Burch Keely Unit No. 938H / API 30-015-42941



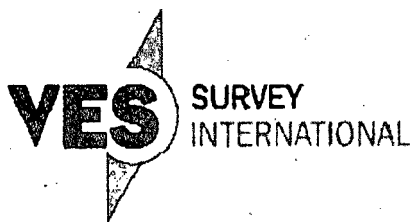
VES Survey Date: 6/6/2016



I Gene Heiss certify that I am employed by VES Survey International. That I did on the day(s) of 06/06/16 through 06/06/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 1,156.00 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 Well # 938H API # 30-015-42941 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 VES Survey International.

A handwritten signature in dark ink, appearing to read "Gene Heiss", is written over a horizontal line.

Gene Heiss
Service Technician
VES Survey International



I Gene Heiss certify that I am employed by VES Survey International. That I did on the day(s) of 06/06/16 through 06/06/16 conduct or supervise the taking of a Rate Gyro survey from a depth of 0.00 feet to a depth of 1,156.00 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 Well # 938H API # 30-015-42941 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 VES Survey International.

A handwritten signature in black ink, appearing to read "Gene Heiss", is written over a horizontal line.

Gene Heiss
Service Technician
VES Survey International



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

NM OIL CONSERVATION
ARTESIA DISTRICT

OCT 31 2016

RECEIVED

June 20, 2016

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

RE: Burch Keely Unit 938H
500' FNL & 297' FEL
Sec. 18, T17S, R30E
Eddy County, New Mexico

Dear Sir,

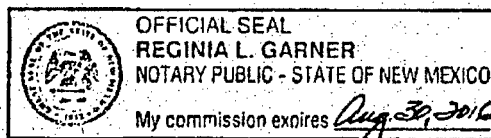
The attached is the Deviation Survey for the above captioned well.

Very truly yours,

Chris Graham
Drilling Superintendent

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 20th day of June, 2016.

Notary Public

Burch Keely Unit 938H

Date	Depth	Deviation	Direction
6/5/2016	205	0.60	
6/5/2016	333	1.10	
6/6/2016	428	0.90	
6/6/2016	697	0.70	
6/6/2016	970	1.50	
6/8/2016	1211	0.80	68.00
6/8/2016	1305	2.90	66.80
6/8/2016	1399	4.80	70.80
6/8/2016	1492	5.20	71.70
6/8/2016	1586	5.60	61.30
6/8/2016	1679	5.80	60.80
6/8/2016	1772	5.50	60.20
6/8/2016	1865	5.10	62.60
6/8/2016	1958	6.90	59.70
6/8/2016	2051	7.00	58.70
6/8/2016	2146	6.60	61.50
6/8/2016	2239	6.10	60.50
6/8/2016	2332	5.60	69.70
6/8/2016	2425	7.40	59.60
6/8/2016	2518	7.90	59.50
6/8/2016	2612	8.00	62.30
6/8/2016	2705	8.00	63.50
6/8/2016	2789	6.50	61.60
6/8/2016	2892	6.20	61.50
6/9/2016	2985	6.40	61.50
6/9/2016	3078	6.50	64.00
6/9/2016	3172	6.50	64.20
6/9/2016	3265	6.60	64.50
6/9/2016	3453	6.70	69.70
6/9/2016	3457	6.60	57.90
6/9/2016	3640	6.70	57.40
6/9/2016	3734	6.70	59.70
6/9/2016	3828	6.70	61.20
6/9/2016	3971	5.00	67.30
6/9/2016	4107	1.10	23.90
6/9/2016	4200	1.10	4.80
6/9/2016	4231	1.40	345.30
6/9/2016	4325	10.00	291.90
6/9/2016	4356	14.20	290.90
6/9/2016	4387	17.60	289.10
6/9/2016	4419	2.00	288.20
6/10/2016	4511	26.50	286.40

Date	Depth	Deviation	Direction
6/10/2016	4667	38.10	271.80
6/10/2016	4760	27.50	264.40
6/10/2016	4854	49.70	264.30
6/10/2016	4916	50.70	264.10
6/10/2016	4947	49.90	264.60
6/10/2016	4978	49.50	265.00
6/10/2016	5041	56.10	267.20
6/10/2016	5103	64.00	268.40
6/10/2016	5165	72.00	268.00
6/11/2016	5228	77.10	267.60
6/11/2016	5259	79.40	267.40
6/11/2016	5290	81.90	267.50
6/11/2016	5355	89.50	267.60
6/11/2016	5449	91.30	
6/11/2016	5542	92.30	268.80
6/11/2016	5635	91.00	269.60
6/12/2016	5822	90.20	269.80
6/12/2016	5915	90.20	269.90
6/12/2016	6009	90.20	270.30
6/12/2016	6102	90.20	270.50
6/12/2016	6289	90.80	269.70
6/12/2016	6382	91.00	269.80
6/12/2016	6476	91.10	269.80
6/12/2016	6569	91.30	270.20
6/12/2016	6755	91.70	270.70
6/12/2016	6848	92.10	271.10
6/12/2016	6941	91.00	269.80
6/12/2016	7035	91.30	270.50
6/13/2016	7128	90.00	269.10
6/13/2016	7221	90.50	269.30
6/13/2016	7314	91.10	269.80
6/13/2016	7594	91.60	269.80
6/13/2016	7688	92.60	270.50
6/14/2016	7782	91.00	270.20
6/14/2016	7875	90.30	269.50
6/14/2016	7968	90.90	270.00
6/14/2016	8062	90.20	269.20
6/14/2016	8156	90.70	269.80
6/14/2016	8249	91.10	220.20
6/14/2016	8342	91.40	270.70
6/14/2016	8436	85.80	270.50
6/14/2016	8622	90.70	269.30
6/15/2016	8716	90.90	270.00
6/15/2016	8809	89.80	269.10
6/15/2016	8902	89.80	267.60

Date	Depth	Deviation	Direction
6/15/2016	8995	90.20	268.20
6/15/2016	9089	90.20	268.40
6/15/2016	9182	91.20	269.30
6/15/2016	9276	92.00	270.30
6/15/2016	9367	90.50	269.80
6/15/2016	9462	90.90	270.00
6/15/2016	9556	91.00	270.40
6/15/2016	9650	91.50	270.60
6/15/2016	9743	92.60	271.40
6/16/2016	9837	91.40	270.70
6/16/2016	9930	92.50	271.00