

30015 42099

OPERATOR
WELL/LEASE
COUNTY

COG OPERATING, LLC
SRO STATE 0062H
EDDY

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 22 2014

STATE OF NEW MEXICO
DEVIATION REPORT

RECEIVED

200	2.10	6,317	1.80
629	0.60	6,602	3.00
722	0.40	6,730	3.00
812	0.30	6,792	2.80
1,004	0.20	6,886	2.10
1,097	0.20	6,981	2.40
1,192	0.20	7,077	3.20
1,293	0.10	7,172	3.70
1,475	0.40	7,266	3.40
1,666	0.40	7,361	2.80
1,855	0.40	7,539	2.70
2,033	0.20	7,568	4.70
2,222	1.40	7,593	7.30
2,328	1.60	7,624	10.10
2,489	1.00		
2,500	1.00		
3,615	0.70		
3,900	0.60		
4,186	1.30		
4,472	1.90		
4,565	1.90		
4,660	2.20		
4,892	2.60		
5,083	2.00		
5,274	1.70		
5,369	1.50		
5,464	1.70		
5,559	1.90		
5,653	1.80		
5,749	1.70		
5,844	1.70		
5,938	1.70		
6,033	1.80		
6,128	1.80		

STATE OF TEXAS

COUNTY OF MIDLAND

BY: Nora Garcia

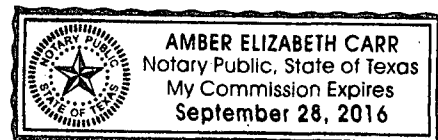
The foregoing instrument was acknowledged before me on
Dora Garcia on behalf of Patterson-UTI Drilling Company LLC.

5/14/14

, by

Amber Elizabeth Carr
Notary Public for Midland County, Texas

My Commission Expires:





A GYRO TECHNOLOGIES INC. COMPANY

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

May 1, 2014

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

NM OIL CONSERVATION
ARTESIA DISTRICT

JUL 22 2014

RECEIVED

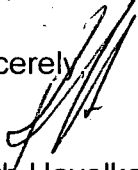
Attn: Kanicia Castillo

Re: **SRO State No 062H**

Please find enclosed a copy of the survey from 0' to 7,467' ran on the above referenced well.

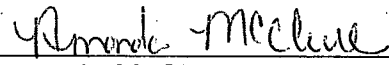
If I can be of any further service, please do not hesitate to call me at 800-606-4976.

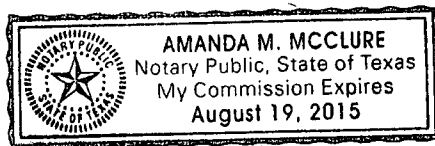
Sincerely,


Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

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


Amanda McClure
Notary Public, State of Texas



Company: COG Operating-Concho

Lease/Well: SRO State/No 062H



Rig Name: Patterson 79

State/County: New Mexico/Eddy

Latitude: 32.05, Longitude: -104.08

GRID North is 0.14 Degrees East of True North

VS-Azi: 0.00 Degrees



NM OIL CONSERVATION
ARTESIA DISTRICT
JUL 22 2014
RECEIVED

Depth Reference : RKB: 16'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: gyro survey.ut

Minimum Curvature Method

Report Date/Time: 5/1/2014 / 10:36

VES Survey International

Midland,Tx

(432) 563-5444

Surveyor: Tim Dillon

SRO State No 062H / API 30-015-42099

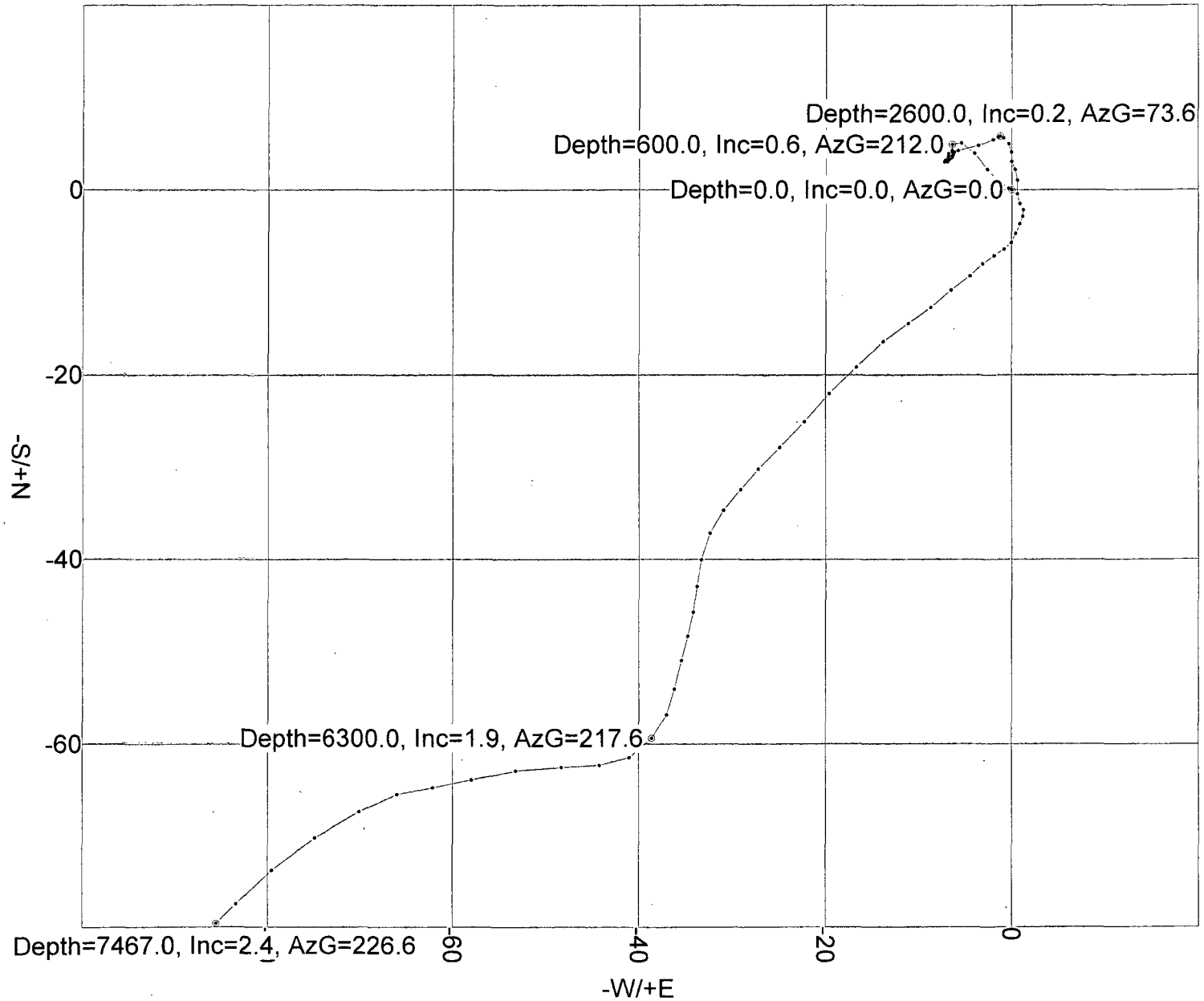
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.41	295.68	100.00	0.16	-0.32	0.36	295.68	0.41
200.00	0.93	308.61	199.99	0.82	-1.28	1.52	302.54	0.54
300.00	1.29	321.24	299.97	2.21	-2.62	3.43	310.05	0.44
400.00	1.24	321.48	399.95	3.94	-4.01	5.62	314.49	0.05
500.00	0.89	290.37	499.93	5.06	-5.41	7.41	313.05	0.67
600.00	0.57	212.01	599.93	4.90	-6.41	8.07	307.43	0.96
700.00	0.43	135.12	699.92	4.22	-6.41	7.67	303.35	0.63
800.00	0.13	333.86	799.92	4.06	-6.20	7.41	303.22	0.55
900.00	0.19	214.31	899.92	4.02	-6.34	7.51	302.37	0.28
1000.00	0.17	135.40	999.92	3.77	-6.33	7.37	300.78	0.23
1100.00	0.31	234.74	1099.92	3.51	-6.45	7.34	298.56	0.38
1200.00	0.05	58.93	1199.92	3.38	-6.63	7.44	296.98	0.36
1300.00	0.25	31.94	1299.92	3.58	-6.48	7.40	298.91	0.20
1400.00	0.03	153.71	1399.92	3.73	-6.36	7.37	300.44	0.27
1500.00	0.32	233.33	1499.92	3.54	-6.57	7.46	298.34	0.31
1600.00	0.21	185.49	1599.92	3.19	-6.81	7.52	295.12	0.24
1700.00	0.14	285.77	1699.92	3.04	-6.94	7.58	293.66	0.27
1800.00	0.25	250.80	1799.92	3.00	-7.26	7.86	292.47	0.16

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	0.47	51.80	1899.92	3.18	-7.14	7.82	294.02	-0.70
2000.00	0.17	358.85	1999.92	3.59	-6.83	7.71	297.71	0.39
2100.00	0.19	7.31	2099.91	3.90	-6.81	7.85	299.81	0.03
2200.00	1.18	80.93	2199.91	4.23	-5.77	7.15	306.22	1.14
2300.00	1.41	70.59	2299.88	4.80	-3.59	5.99	323.18	0.33
2400.00	0.57	63.09	2399.87	5.43	-1.99	5.78	339.91	0.85
2500.00	0.11	57.85	2499.86	5.71	-1.46	5.89	345.64	0.46
2600.00	0.20	73.62	2599.86	5.81	-1.22	5.93	348.16	0.09
2700.00	0.35	142.10	2699.86	5.61	-0.86	5.68	351.24	0.33
2800.00	0.61	138.16	2799.86	4.97	-0.32	4.99	356.31	0.26
2900.00	0.59	187.56	2899.85	4.06	-0.04	4.06	359.50	0.50
3000.00	0.57	167.32	2999.85	3.06	0.01	3.06	0.11	0.21
3100.00	0.52	147.38	3099.84	2.19	0.36	2.22	9.35	0.20
3200.00	0.90	180.04	3199.84	1.03	0.61	1.19	30.60	0.54
3300.00	0.81	182.24	3299.83	-0.47	0.58	0.74	128.83	0.09
3400.00	0.53	136.37	3399.82	-1.51	0.87	1.74	150.06	0.58
3500.00	0.37	168.82	3499.82	-2.16	1.25	2.49	149.98	0.29
3600.00	0.48	197.72	3599.81	-2.88	1.18	3.11	157.65	0.24
3700.00	0.52	207.36	3699.81	-3.68	0.85	3.77	166.99	0.09
3800.00	0.78	195.58	3799.80	-4.73	0.46	4.75	174.45	0.29
3900.00	0.52	222.62	3899.80	-5.72	-0.03	5.72	180.33	0.39
4000.00	0.66	232.09	3999.79	-6.41	-0.80	6.46	187.09	0.17
4100.00	0.83	241.31	4099.78	-7.12	-1.89	7.37	194.89	0.21
4200.00	0.91	228.18	4199.77	-8.00	-3.12	8.59	201.33	0.21
4300.00	1.24	224.30	4299.75	-9.30	-4.47	10.32	205.68	0.34
4400.00	1.70	239.03	4399.72	-10.84	-6.50	12.64	210.94	0.59
4500.00	1.65	219.93	4499.68	-12.71	-8.69	15.40	214.37	0.56
4600.00	1.88	246.88	4599.63	-14.46	-11.12	18.24	217.58	0.85
4700.00	2.07	222.92	4699.58	-16.42	-13.86	21.49	220.17	0.84
4800.00	2.45	228.32	4799.50	-19.17	-16.69	25.42	221.05	0.43
4900.00	2.24	221.92	4899.41	-22.05	-19.59	29.50	221.63	0.34
5000.00	2.38	221.22	4999.33	-25.06	-22.27	33.53	221.62	0.15
5100.00	2.04	226.34	5099.26	-27.86	-24.93	37.38	221.82	0.39
5200.00	1.72	221.33	5199.20	-30.22	-27.21	40.67	222.00	0.36
5300.00	1.60	219.87	5299.16	-32.42	-29.10	43.56	221.91	0.13
5400.00	1.73	218.60	5399.12	-34.67	-30.93	46.46	221.74	0.14
5500.00	1.62	200.85	5499.08	-37.17	-32.38	49.30	221.06	0.53
5600.00	1.83	195.83	5599.03	-40.03	-33.32	52.09	219.77	0.26
5700.00	1.57	180.89	5698.99	-42.94	-33.78	54.64	218.19	0.51

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5800.00	1.68	193.95	5798.95	-45.73	-34.15	57.08	216.75	0.38
5900.00	1.36	191.70	5898.91	-48.31	-34.75	59.51	215.72	0.32
6000.00	1.76	196.49	5998.88	-50.95	-35.42	62.06	214.81	0.42
6100.00	1.89	191.44	6098.83	-54.05	-36.19	65.05	213.81	0.21
6200.00	1.48	203.81	6198.78	-56.85	-37.04	67.85	213.09	0.55
6300.00	1.94	217.60	6298.74	-59.37	-38.59	70.81	213.03	0.62
6400.00	1.86	241.89	6398.68	-61.47	-41.05	73.92	213.74	0.80
6500.00	2.07	267.61	6498.63	-62.31	-44.28	76.44	215.40	0.90
6600.00	2.57	266.01	6598.55	-62.54	-48.32	79.03	217.69	0.51
6700.00	3.08	264.61	6698.42	-62.95	-53.23	82.44	220.22	0.52
6800.00	2.51	251.24	6798.31	-63.91	-57.99	86.29	222.22	0.86
6900.00	2.36	266.14	6898.22	-64.75	-62.12	89.73	223.81	0.65
7000.00	2.17	252.03	6998.14	-65.48	-65.97	92.95	225.22	0.59
7100.00	3.01	240.45	7098.04	-67.35	-70.06	97.18	226.13	0.98
7200.00	3.43	238.07	7197.88	-70.23	-74.88	102.66	226.83	0.44
7300.00	3.35	227.55	7297.70	-73.78	-79.57	108.51	227.16	0.63
7400.00	2.78	224.91	7397.56	-77.47	-83.43	113.85	227.12	0.59
7467.00	2.38	226.56	7464.49	-79.57	-85.59	116.87	227.09	0.60



VES Survey International
Midland, Tx
(432) 563-5444
Surveyor: Tim Dillon
SRO State No 062H / API 30-015-42099



VES Survey Date: 04/18/2014



COG Production, LLC

Eddy County, NM (NAD 27)

Sec 15, T26S, R28E

SRO State Com #62H

Wellbore #1

Design: Wellbore #1

DDC Survey Report

28 April, 2014





DDC
Survey Report



Company:	COG Production, LLC	Local Co-ordinate Reference:	Well SRO State Com #62H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3029.0usft (Patriot #2)
Site:	Sec 15, T26S, R28E	MD Reference:	Well @ 3029.0usft (Patriot #2)
Well:	SRO State Com #62H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Single User Db

Project	Eddy County, NM (NAD 27)		
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	Sec 15, T26S, R28E		
Site Position:		Northing:	381,642.30 usft
From:	Map	Easting:	579,744.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 2' 56.358 N
		Longitude:	104° 4' 33.429 W
		Grid Convergence:	0.14 °

Well	SRO State Com #62H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 2' 56.358 N
		Longitude:	104° 4' 33.429 W
		Ground Level:	3,012.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	4/2/2014	7.46
			Dip Angle
			(°)
			59.87
			Field Strength
			(nT)
			48,179

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			181.93

Survey Program	Date 4/28/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.0	7,467.0	Gyro (Wellbore #1)	Good_gyro
7,536.0	12,575.0	MWD (Wellbore #1)	MWD default
			Description
			Good Gyro
			MWD - Standard

Survey									
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(usft)	(usft)	Section	Rate	Rate	Rate
(usft)			(usft)			(usft)	(°/100usft)	(°/100usft)	(°/100usft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.41	295.68	100.0	0.2	-0.3	-0.1	0.41	0.41	0.00
200.0	0.93	308.61	200.0	0.8	-1.3	-0.8	0.54	0.52	12.93
300.0	1.29	321.24	300.0	2.2	-2.6	-2.1	0.43	0.36	12.63
400.0	1.24	321.48	399.9	3.9	-4.0	-3.8	0.05	-0.05	0.24
500.0	0.89	290.37	499.9	5.0	-5.4	-4.9	0.66	-0.35	-31.11
600.0	0.57	212.01	599.9	4.9	-6.4	-4.7	0.96	-0.32	-78.36
700.0	0.43	135.12	699.9	4.2	-6.4	-4.0	0.63	-0.14	-76.89
800.0	0.13	333.86	799.9	4.0	-6.2	-3.8	0.55	-0.30	-161.26
900.0	0.19	214.31	899.9	4.0	-6.3	-3.8	0.28	0.06	-119.55



DDC
Survey Report



Company:	COG Production, LLC	Local Co-ordinate Reference:	Well SRO State Com #62H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3029.0usft (Patriot #2)
Site:	Sec 15, T26S, R28E	MD Reference:	Well @ 3029.0usft (Patriot #2)
Well:	SRO State Com #62H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
1,000.0	0.17	135.40	999.9	3.8	-6.3	-3.5	0.23	-0.02	-78.91
1,100.0	0.31	234.74	1,099.9	3.5	-6.4	-3.3	0.38	0.14	99.34
1,200.0	0.05	58.93	1,199.9	3.4	-6.6	-3.1	0.36	-0.26	-175.81
1,300.0	0.25	31.94	1,299.9	3.6	-6.5	-3.4	0.21	0.20	-26.99
1,400.0	0.03	153.71	1,399.9	3.7	-6.3	-3.5	0.27	-0.22	121.77
1,500.0	0.32	233.33	1,499.9	3.5	-6.5	-3.3	0.32	0.29	79.62
1,600.0	0.21	185.49	1,599.9	3.2	-6.8	-3.0	0.24	-0.11	-47.84
1,700.0	0.14	285.77	1,699.9	3.0	-6.9	-2.8	0.27	-0.07	100.28
1,800.0	0.25	250.80	1,799.9	3.0	-7.2	-2.8	0.16	0.11	-34.97
1,900.0	0.47	51.80	1,899.9	3.2	-7.1	-2.9	0.71	0.22	161.00
2,000.0	0.17	358.85	1,999.9	3.6	-6.8	-3.4	0.39	-0.30	-52.95
2,100.0	0.19	7.31	2,099.9	3.9	-6.8	-3.7	0.03	0.02	8.46
2,200.0	1.18	80.93	2,199.9	4.2	-5.7	-4.0	1.14	0.99	73.62
2,300.0	1.41	70.59	2,299.9	4.8	-3.6	-4.7	0.33	0.23	-10.34
2,400.0	0.57	63.09	2,399.9	5.4	-2.0	-5.4	0.85	-0.84	-7.50
2,500.0	0.11	57.85	2,499.9	5.7	-1.4	-5.7	0.46	-0.46	-5.24
2,600.0	0.20	73.62	2,599.9	5.8	-1.2	-5.8	0.10	0.09	15.77
2,700.0	0.35	142.10	2,699.9	5.6	-0.8	-5.6	0.33	0.15	68.48
2,800.0	0.61	138.16	2,799.9	5.0	-0.3	-5.0	0.26	0.26	-3.94
2,900.0	0.59	187.56	2,899.9	4.1	0.0	-4.1	0.50	-0.02	49.40
3,000.0	0.57	167.32	2,999.8	3.1	0.0	-3.1	0.20	-0.02	-20.24
3,100.0	0.52	147.38	3,099.8	2.2	0.4	-2.2	0.20	-0.05	-19.94
3,200.0	0.90	180.04	3,199.8	1.0	0.6	-1.1	0.54	0.38	32.66
3,300.0	0.81	182.24	3,299.8	-0.4	0.6	0.4	0.10	-0.09	2.20
3,400.0	0.53	136.37	3,399.8	-1.5	0.9	1.5	0.58	-0.28	-45.87
3,500.0	0.37	168.82	3,499.8	-2.1	1.3	2.1	0.29	-0.16	32.45
3,600.0	0.48	197.72	3,599.8	-2.9	1.2	2.8	0.24	0.11	28.90
3,700.0	0.52	207.36	3,699.8	-3.7	0.9	3.6	0.09	0.04	9.64
3,800.0	0.78	195.58	3,799.8	-4.7	0.5	4.7	0.29	0.26	-11.78
3,900.0	0.52	222.62	3,899.8	-5.7	0.0	5.7	0.40	-0.26	27.04
4,000.0	0.66	232.09	3,999.8	-6.4	-0.8	6.4	0.17	0.14	9.47
4,100.0	0.83	241.31	4,099.8	-7.1	-1.9	7.2	0.21	0.17	9.22
4,200.0	0.91	228.18	4,199.8	-8.0	-3.1	8.1	0.21	0.08	-13.13
4,300.0	1.24	224.30	4,299.8	-9.3	-4.4	9.4	0.34	0.33	-3.88
4,400.0	1.70	239.03	4,399.7	-10.8	-6.5	11.0	0.59	0.46	14.73
4,500.0	1.65	219.93	4,499.7	-12.7	-8.7	13.0	0.56	-0.05	-19.10
4,600.0	1.88	246.88	4,599.6	-14.4	-11.1	14.8	0.85	0.23	26.95
4,700.0	2.07	222.92	4,699.6	-16.4	-13.8	16.9	0.84	0.19	-23.96
4,800.0	2.45	228.32	4,799.5	-19.1	-16.7	19.7	0.44	0.38	5.40
4,900.0	2.24	221.92	4,899.4	-22.0	-19.6	22.7	0.34	-0.21	-6.40
5,000.0	2.38	221.22	4,999.3	-25.0	-22.2	25.8	0.14	0.14	-0.70
5,100.0	2.04	226.34	5,099.3	-27.8	-24.9	28.6	0.39	-0.34	5.12
5,200.0	1.72	221.33	5,199.2	-30.2	-27.2	31.1	0.36	-0.32	-5.01



DDC
Survey Report



Company:	COG Production, LLC	Local Co-ordinate Reference:	Well SRO State Com #62H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3029.0usft (Patriot #2)
Site:	Sec 15, T26S, R28E	MD Reference:	Well @ 3029.0usft (Patriot #2)
Well:	SRO State Com #62H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
5,300.0	1.60	219.87	5,299.2	-32.4	-29.1	33.3	0.13	-0.12	-1.46
5,400.0	1.73	218.60	5,399.1	-34.6	-30.9	35.6	0.14	0.13	-1.27
5,500.0	1.62	200.85	5,499.1	-37.1	-32.3	38.2	0.53	-0.11	-17.75
5,600.0	1.83	195.83	5,599.0	-40.0	-33.3	41.1	0.26	0.21	-5.02
5,700.0	1.57	180.89	5,699.0	-42.9	-33.7	44.0	0.51	-0.26	-14.94
5,800.0	1.68	193.95	5,799.0	-45.7	-34.1	46.8	0.39	0.11	13.06
5,900.0	1.36	191.70	5,898.9	-48.3	-34.7	49.4	0.33	-0.32	-2.25
6,000.0	1.76	196.49	5,998.9	-50.9	-35.4	52.1	0.42	0.40	4.79
6,100.0	1.89	191.44	6,098.8	-54.0	-36.1	55.2	0.21	0.13	-5.05
6,200.0	1.48	203.81	6,198.8	-56.8	-37.0	58.0	0.55	-0.41	12.37
6,300.0	1.94	217.60	6,298.7	-59.3	-38.5	60.6	0.61	0.46	13.79
6,400.0	1.86	241.89	6,398.7	-61.4	-41.0	62.8	0.80	-0.08	24.29
6,500.0	2.07	267.61	6,498.6	-62.3	-44.2	63.7	0.90	0.21	25.72
6,600.0	2.57	266.01	6,598.5	-62.5	-48.3	64.1	0.50	0.50	-1.60
6,700.0	3.08	264.61	6,698.4	-62.9	-53.2	64.7	0.51	0.51	-1.40
6,800.0	2.51	251.24	6,798.3	-63.9	-57.9	65.8	0.86	-0.57	-13.37
6,900.0	2.36	266.14	6,898.2	-64.7	-62.1	66.7	0.65	-0.15	14.90
7,000.0	2.17	252.03	6,998.1	-65.4	-65.9	67.6	0.59	-0.19	-14.11
7,100.0	3.01	240.45	7,098.0	-67.3	-70.0	69.6	0.99	0.84	-11.58
7,200.0	3.43	238.07	7,197.9	-70.2	-74.8	72.7	0.44	0.42	-2.38
7,300.0	3.35	227.55	7,297.7	-73.7	-79.5	76.4	0.63	-0.08	-10.52
7,400.0	2.78	224.91	7,397.6	-77.4	-83.4	80.2	0.59	-0.57	-2.64
TIE IN @ 7467' MD / 7465' TVD									
7,467.0	2.38	226.56	7,464.5	-79.5	-85.5	82.4	0.61	-0.60	2.46
7,536.0	2.70	230.60	7,533.4	-81.5	-87.8	84.5	0.53	0.46	5.86
7,568.0	4.70	237.10	7,565.4	-82.7	-89.5	85.7	6.38	6.25	20.31
7,599.0	7.30	236.40	7,596.2	-84.5	-92.2	87.6	8.39	8.39	-2.26
7,631.0	10.10	226.80	7,627.8	-87.6	-96.0	90.7	9.83	8.75	-30.00
7,663.0	12.90	223.40	7,659.2	-92.1	-100.5	95.4	9.00	8.75	-10.63
7,694.0	15.70	224.00	7,689.2	-97.6	-105.8	101.1	9.04	9.03	1.94
7,726.0	18.40	225.90	7,719.8	-104.2	-112.4	108.0	8.61	8.44	5.94
7,758.0	21.20	225.70	7,749.9	-111.8	-120.2	115.8	8.75	8.75	-0.63
7,789.0	24.40	224.10	7,778.5	-120.3	-128.6	124.6	10.51	10.32	-5.16
7,820.0	27.60	222.00	7,806.3	-130.2	-137.9	134.8	10.74	10.32	-6.77
7,852.0	31.20	220.40	7,834.2	-142.1	-148.2	147.0	11.51	11.25	-5.00
7,883.0	34.50	219.20	7,860.3	-155.0	-159.0	160.3	10.85	10.65	-3.87
7,915.0	37.80	216.30	7,886.1	-169.9	-170.5	175.6	11.61	10.31	-9.06
7,946.0	40.90	212.80	7,910.1	-186.1	-181.7	192.1	12.30	10.00	-11.29
7,978.0	43.90	210.70	7,933.7	-204.5	-193.0	210.9	10.37	9.38	-6.56
8,009.0	46.90	208.10	7,955.5	-223.7	-203.8	230.4	11.37	9.68	-8.39
8,041.0	50.50	207.10	7,976.6	-245.0	-215.0	252.1	11.49	11.25	-3.13
8,072.0	54.50	205.90	7,995.4	-267.0	-225.9	274.5	13.26	12.90	-3.87
8,104.0	58.00	204.30	8,013.2	-291.1	-237.2	298.9	11.70	10.94	-5.00



DDC
Survey Report



Company:	COG Production, LLC	Local Co-ordinate Reference:	Well SRO State Com #62H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3029.0usft (Patriot #2)
Site:	Sec 15, T26S, R28E	MD Reference:	Well @ 3029.0usft (Patriot #2)
Well:	SRO State Com #62H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
8,135.0	61.80	202.20	8,028.8	-315.7	-247.8	323.9	13.59	12.26	-6.77
8,167.0	64.90	199.40	8,043.1	-342.5	-257.9	351.0	12.45	9.69	-8.75
8,198.0	67.70	197.10	8,055.6	-369.4	-266.8	378.2	11.30	9.03	-7.42
8,230.0	69.50	193.70	8,067.3	-398.2	-274.7	407.2	11.38	5.63	-10.63
8,261.0	71.80	191.80	8,077.5	-426.7	-281.2	435.9	9.41	7.42	-6.13
8,293.0	74.10	189.10	8,086.9	-456.8	-286.7	466.2	10.80	7.19	-8.44
8,327.0	77.40	187.30	8,095.3	-489.4	-291.4	498.9	10.98	9.71	-5.29
8,359.0	79.70	184.50	8,101.6	-520.6	-294.6	530.2	11.19	7.19	-8.75
8,391.0	80.60	183.10	8,107.1	-552.0	-296.7	561.7	5.15	2.81	-4.38
8,422.0	81.50	182.10	8,111.9	-582.6	-298.1	592.3	4.31	2.90	-3.23
8,454.0	83.80	181.70	8,116.0	-614.3	-299.1	624.1	7.29	7.19	-1.25
8,581.0	90.40	181.00	8,122.4	-741.1	-302.1	750.8	5.23	5.20	-0.55
8,676.0	91.80	180.60	8,120.6	-836.0	-303.5	845.8	1.53	1.47	-0.42
8,771.0	90.30	179.90	8,118.9	-931.0	-303.9	940.7	1.74	-1.58	-0.74
8,866.0	89.70	178.50	8,118.9	-1,026.0	-302.5	1,035.6	1.60	-0.63	-1.47
8,961.0	90.40	178.50	8,118.8	-1,121.0	-300.1	1,130.4	0.74	0.74	0.00
9,024.0	91.00	178.50	8,118.0	-1,183.9	-298.4	1,193.3	0.95	0.95	0.00
9,056.0	91.30	178.20	8,117.4	-1,215.9	-297.5	1,225.2	1.33	0.94	-0.94
9,151.0	90.10	177.50	8,116.2	-1,310.8	-293.9	1,320.0	1.46	-1.26	-0.74
9,246.0	91.30	177.50	8,115.1	-1,405.7	-289.8	1,414.7	1.26	1.26	0.00
9,342.0	89.40	178.50	8,114.5	-1,501.7	-286.4	1,510.5	2.24	-1.98	1.04
9,437.0	90.30	178.90	8,114.7	-1,596.6	-284.3	1,605.3	1.04	0.95	0.42
9,532.0	89.20	178.50	8,115.1	-1,691.6	-282.1	1,700.2	1.23	-1.16	-0.42
9,628.0	89.90	178.50	8,115.9	-1,787.6	-279.6	1,796.0	0.73	0.73	0.00
9,723.0	88.50	178.20	8,117.2	-1,882.5	-276.9	1,890.8	1.51	-1.47	-0.32
9,818.0	89.20	178.20	8,119.1	-1,977.5	-273.9	1,985.6	0.74	0.74	0.00
9,913.0	90.40	178.50	8,119.5	-2,072.4	-271.2	2,080.4	1.30	1.26	0.32
10,008.0	91.50	178.50	8,117.9	-2,167.4	-268.7	2,175.2	1.16	1.16	0.00
10,103.0	90.60	179.20	8,116.1	-2,262.3	-266.8	2,270.0	1.20	-0.95	0.74
10,198.0	89.20	179.20	8,116.3	-2,357.3	-265.4	2,364.9	1.47	-1.47	0.00
10,294.0	90.10	179.20	8,116.9	-2,453.3	-264.1	2,460.8	0.94	0.94	0.00
10,389.0	88.70	179.20	8,117.9	-2,548.3	-262.8	2,555.7	1.47	-1.47	0.00
10,484.0	89.60	178.90	8,119.3	-2,643.3	-261.2	2,650.6	1.00	0.95	-0.32
10,579.0	90.60	178.90	8,119.1	-2,738.3	-259.4	2,745.4	1.05	1.05	0.00
10,674.0	89.00	179.60	8,119.5	-2,833.2	-258.1	2,840.3	1.84	-1.68	0.74
10,769.0	89.40	179.60	8,120.8	-2,928.2	-257.5	2,935.2	0.42	0.42	0.00
10,865.0	89.60	179.60	8,121.6	-3,024.2	-256.8	3,031.2	0.21	0.21	0.00
10,960.0	90.60	180.30	8,121.5	-3,119.2	-256.7	3,126.1	1.28	1.05	0.74
11,056.0	90.10	179.60	8,120.9	-3,215.2	-256.6	3,222.0	0.90	-0.52	-0.73
11,151.0	91.30	179.20	8,119.7	-3,310.2	-255.6	3,316.9	1.33	1.26	-0.42
11,247.0	90.30	178.20	8,118.4	-3,406.2	-253.5	3,412.8	1.47	-1.04	-1.04
11,343.0	91.70	178.20	8,116.7	-3,502.1	-250.4	3,508.6	1.46	1.46	0.00
11,438.0	89.90	178.50	8,115.4	-3,597.1	-247.7	3,603.4	1.92	-1.89	0.32
11,534.0	88.50	178.50	8,116.7	-3,693.0	-245.2	3,699.2	1.46	-1.46	0.00

Company:	COG Production, LLC	Local Co-ordinate Reference:	Well SRO State Com #62H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3029.0usft (Patriot #2)
Site:	Sec 15, T26S, R28E	MD Reference:	Well @ 3029.0usft (Patriot #2)
Well:	SRO State Com #62H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	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)
11,629.0	89.60	178.50	8,118.3	-3,788.0	-242.7	3,794.0	1.16	1.16	0.00
11,724.0	88.70	179.60	8,119.7	-3,882.9	-241.1	3,888.9	1.50	-0.95	1.16
11,819.0	89.70	179.90	8,121.0	-3,977.9	-240.7	3,983.8	1.10	1.05	0.32
11,915.0	90.80	179.60	8,120.6	-4,073.9	-240.3	4,079.7	1.19	1.15	-0.31
12,010.0	89.70	179.20	8,120.2	-4,168.9	-239.3	4,174.6	1.23	-1.16	-0.42
12,106.0	91.10	178.90	8,119.5	-4,264.9	-237.7	4,270.5	1.49	1.46	-0.31
12,200.0	89.70	177.80	8,118.9	-4,358.9	-235.0	4,364.3	1.89	-1.49	-1.17
12,296.0	90.80	177.50	8,118.4	-4,454.8	-231.1	4,460.0	1.19	1.15	-0.31
12,391.0	89.20	177.10	8,118.4	-4,549.7	-226.6	4,554.7	1.74	-1.68	-0.42
TD @ 12575' MD / 8121' TVD									
12,575.0	89.20	177.10	8,121.0	-4,733.4	-217.3	4,738.0	0.00	0.00	0.00

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
7,467.0	7,464.5	-79.5	-85.5	TIE IN @ 7467' MD / 7465' TVD	
12,575.0	8,121.0	-4,733.4	-217.3	TD @ 12575' MD / 8121' TVD	

Checked By: _____	Approved By: _____	Date: _____
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Company Name: COG Production, LLC
SRO State Com #62H
Eddy County, NM (NAD 27)
Rig: Patriot #2
Created By: James Dawson
Date: 04/28/2014

SRO State Com #62H
Eddy County, NM (NAD 27)
Q140351 & WT-140326
Design #2



Azimuths to Grid North

Magnetic North: 7.32°

Magnetic Field

Strength: 48179.3snT

Dip Angle: 59.87°

Date: 4/2/2014

Model: IGRF2010

PROJECT DETAILS: Eddy County, NM (NAD 27)

Geodetic System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone: New Mexico East 3001
System Datum: Mean Sea Level

WELL DETAILS: SRO State Com #62H

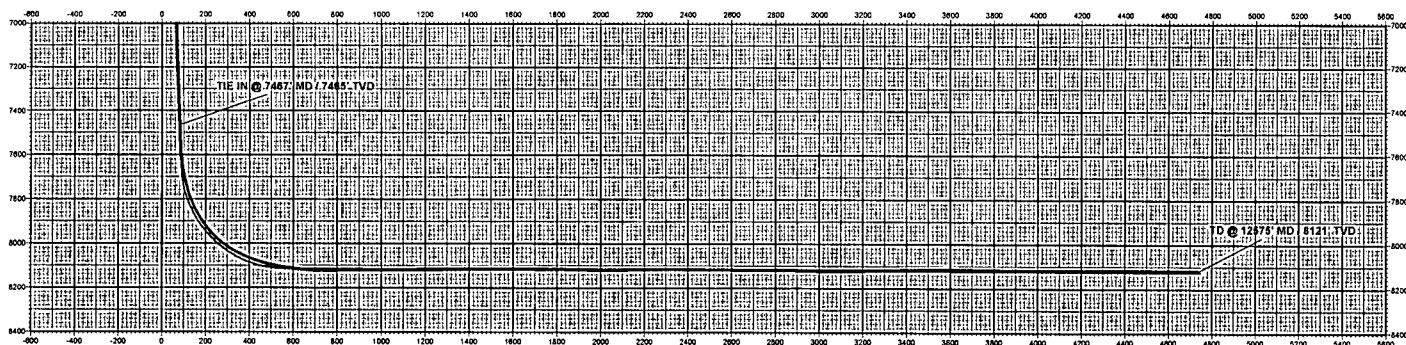
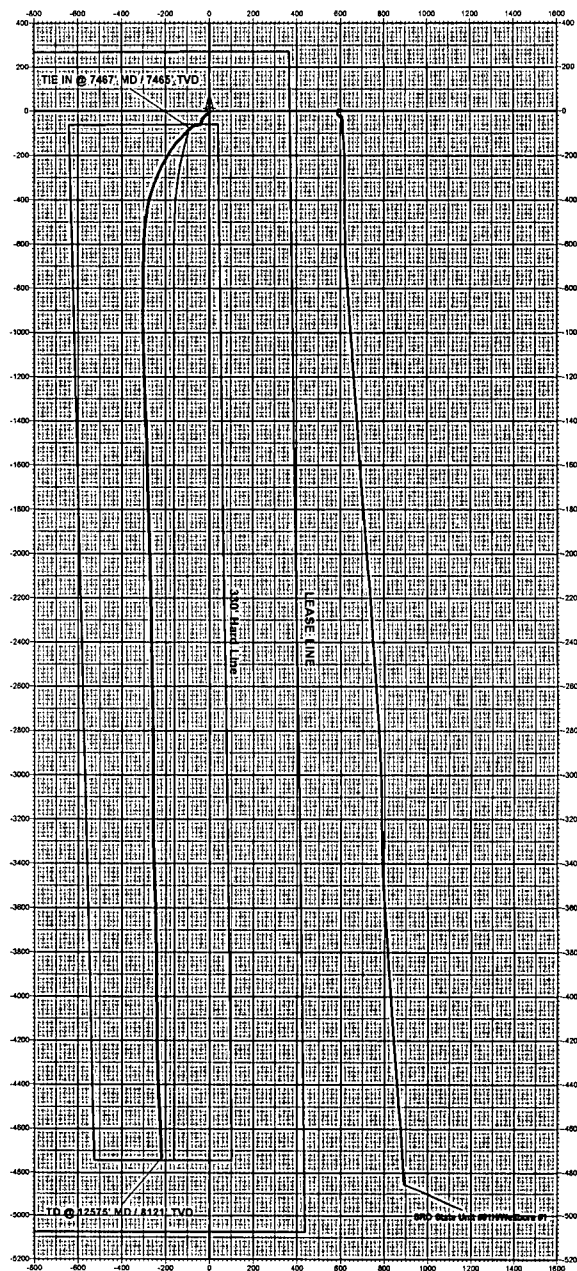
Ground Level: 3012.0
+N-S +E-W Northing Easting Latitude Longitude
0.0 0.0 381842.30 679744.40 32° 2' 58.358 N 104° 4' 33.423 W

DESIGN TARGET DETAILS

Name TVD +N-S +E-W Northing Easting Latitude Longitude
PBHL SRO State Com #62H 8125.0 -4745.5 -165.3 376896.50 679554.10 32° 2' 9.395 N 104° 4' 36.422 W
- plan hits target center

ANNOTATIONS

MD Inc Azi TVD +N-S +E-W V-Sect Departure Annotation
7487.0 2.28 126.56 7484.5 -79.5 -85.5 82.4 156.0 TIE IN @ 7487' MD / 7465' TVD
12875.0 69.20 177.10 8121.0 -4733.4 -217.3 4738.0 4871.1 TO @ 12575' MD / 8121' TVD



Vertical Section at 181.93° (200 usf/in)