

COG Operating LLC

30-015-41555

Eddy County, New Mexico (NAD 27 NME)

Stonewall 9 Fee

#3H

OH

Plan: Plan #1 07-15-13

Surface: 150' FSL, 2310' FEL, Sec 9, T19S, R26E, Unit B

PP: 330' FSL, 2310' FEL, Sec 9, T19S, R26E, Unit B

BHL: 330' FNL, 2298' FEL, Sec 9, T19S, R26E, Unit O

Standard Survey Report

15 July, 2013





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	GL @ 3357.00usft
Site:	Stonewall 9 Fee	MD Reference:	GL @ 3357.00usft
Well:	#3H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1 07-15-13	Database:	GCR-DB

Project:	Eddy County, New Mexico (NAD 27 NME)		
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:	Stonewall 9 Fee		
Site Position:		Northing:	611,835.50 usft
From:	Map	Easting:	482,702.00 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 40' 55.281603 N
		Longitude:	104° 23' 22.395862 W
		Grid Convergence:	-0.03 °

Well:	#3H		
Well Position	+N-S	0.00 usft	Northing:
	+E-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 40' 5.325374 N
		Longitude:	104° 23' 6.173539 W
		Ground Level:	3,357.00 usft

Wellbore:	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010_14	01/07/13	7.80
			Dip Angle
			(°)
			Field Strength
			(nT)
			60.42
			48,637

Design:	Plan #1-07-15-13		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			358.57

Survey Tool Program:	Date 07/15/13		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
0.00	7,896.72	Plan #1 07-15-13 (OH)	MWD
			Description
			MWD - Standard

Planned 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)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	



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Survey Report



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Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	GL @ 3357.00usft
Site:	Stonewall 9 Fee	MD Reference:	GL @ 3357.00usft
Well:	#3H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1 07-15-13	Database:	GCR DB

Planned 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)
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,720.12	0.00	0.00	2,720.12	0.00	0.00	0.00	0.00	0.00	0.00
KOP Start Build 11.00									
2,800.00	8.79	358.57	2,799.69	6.11	-0.15	6.11	11.00	11.00	0.00
2,900.00	19.79	358.57	2,896.45	30.74	-0.77	30.75	11.00	11.00	0.00
3,000.00	30.79	358.57	2,986.72	73.38	-1.84	73.40	11.00	11.00	0.00
3,100.00	41.79	358.57	3,067.21	132.45	-3.31	132.50	11.00	11.00	0.00
3,166.80	49.13	358.57	3,114.03	180.02	-4.50	180.07	11.00	11.00	0.00
PP Stonewall 9 #3H									
3,200.00	52.79	358.57	3,134.94	205.79	-5.15	205.86	11.00	11.00	0.00
3,300.00	63.79	358.57	3,187.42	290.71	-7.27	290.80	11.00	11.00	0.00
3,400.00	74.79	358.57	3,222.74	384.07	-9.61	384.19	11.00	11.00	0.00
3,500.00	85.79	358.57	3,239.58	482.45	-12.07	482.61	11.00	11.00	0.00
3,547.39	91.00	358.57	3,240.91	529.80	-13.25	529.96	11.00	11.00	0.00
LP Start 4349.53 hold at 3547.39 MD									
3,600.00	91.00	358.57	3,239.99	582.38	-14.57	582.56	0.00	0.00	0.00
3,700.00	91.00	358.57	3,238.25	682.33	-17.07	682.55	0.00	0.00	0.00
3,800.00	91.00	358.57	3,236.50	782.29	-19.57	782.53	0.00	0.00	0.00
3,900.00	91.00	358.57	3,234.76	882.24	-22.07	882.52	0.00	0.00	0.00
4,000.00	91.00	358.57	3,233.01	982.19	-24.57	982.50	0.00	0.00	0.00
4,100.00	91.00	358.57	3,231.27	1,082.15	-27.07	1,082.49	0.00	0.00	0.00
4,200.00	91.00	358.57	3,229.52	1,182.10	-29.57	1,182.47	0.00	0.00	0.00
4,300.00	91.00	358.57	3,227.77	1,282.05	-32.07	1,282.46	0.00	0.00	0.00
4,400.00	91.00	358.57	3,226.03	1,382.01	-34.57	1,382.44	0.00	0.00	0.00
4,500.00	91.00	358.57	3,224.28	1,481.96	-37.07	1,482.43	0.00	0.00	0.00
4,600.00	91.00	358.57	3,222.54	1,581.92	-39.57	1,582.41	0.00	0.00	0.00
4,700.00	91.00	358.57	3,220.79	1,681.87	-42.07	1,682.39	0.00	0.00	0.00



Phoenix Technology Services

Survey Report



Company:	GOG Operating, LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, New Mexico (NAD 27 NME)	TVD Reference:	GL @ 3357.00usft
Site:	Stonewall 9 Fee	MD Reference:	GL @ 3357.00usft
Well:	#3H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1 07-15-13	Database:	GCR DB

Planned 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)	
4,800.00	91.00	358.57	3,219.05	1,781.82	-44.57	1,782.38	0.00	0.00	0.00	
4,900.00	91.00	358.57	3,217.30	1,881.78	-47.07	1,882.36	0.00	0.00	0.00	
5,000.00	91.00	358.57	3,215.56	1,981.73	-49.57	1,982.35	0.00	0.00	0.00	
5,100.00	91.00	358.57	3,213.81	2,081.68	-52.07	2,082.33	0.00	0.00	0.00	
5,200.00	91.00	358.57	3,212.07	2,181.64	-54.57	2,182.32	0.00	0.00	0.00	
5,300.00	91.00	358.57	3,210.32	2,281.59	-57.07	2,282.30	0.00	0.00	0.00	
5,400.00	91.00	358.57	3,208.58	2,381.54	-59.57	2,382.29	0.00	0.00	0.00	
5,500.00	91.00	358.57	3,206.83	2,481.50	-62.07	2,482.27	0.00	0.00	0.00	
5,600.00	91.00	358.57	3,205.09	2,581.45	-64.57	2,582.26	0.00	0.00	0.00	
5,700.00	91.00	358.57	3,203.34	2,681.40	-67.07	2,682.24	0.00	0.00	0.00	
5,800.00	91.00	358.57	3,201.60	2,781.36	-69.57	2,782.23	0.00	0.00	0.00	
5,900.00	91.00	358.57	3,199.85	2,881.31	-72.07	2,882.21	0.00	0.00	0.00	
6,000.00	91.00	358.57	3,198.11	2,981.26	-74.57	2,982.20	0.00	0.00	0.00	
6,100.00	91.00	358.57	3,196.36	3,081.22	-77.07	3,082.18	0.00	0.00	0.00	
6,200.00	91.00	358.57	3,194.62	3,181.17	-79.57	3,182.17	0.00	0.00	0.00	
6,300.00	91.00	358.57	3,192.87	3,281.12	-82.07	3,282.15	0.00	0.00	0.00	
6,400.00	91.00	358.57	3,191.12	3,381.08	-84.57	3,382.14	0.00	0.00	0.00	
6,500.00	91.00	358.57	3,189.38	3,481.03	-87.07	3,482.12	0.00	0.00	0.00	
6,600.00	91.00	358.57	3,187.63	3,580.99	-89.57	3,582.11	0.00	0.00	0.00	
6,700.00	91.00	358.57	3,185.89	3,680.94	-92.07	3,682.09	0.00	0.00	0.00	
6,800.00	91.00	358.57	3,184.14	3,780.89	-94.57	3,782.07	0.00	0.00	0.00	
6,900.00	91.00	358.57	3,182.40	3,880.85	-97.07	3,882.06	0.00	0.00	0.00	
7,000.00	91.00	358.57	3,180.65	3,980.80	-99.58	3,982.04	0.00	0.00	0.00	
7,100.00	91.00	358.57	3,178.91	4,080.75	-102.08	4,082.03	0.00	0.00	0.00	
7,200.00	91.00	358.57	3,177.16	4,180.71	-104.58	4,182.01	0.00	0.00	0.00	
7,300.00	91.00	358.57	3,175.42	4,280.66	-107.08	4,282.00	0.00	0.00	0.00	
7,400.00	91.00	358.57	3,173.67	4,380.61	-109.58	4,381.98	0.00	0.00	0.00	
7,500.00	91.00	358.57	3,171.93	4,480.57	-112.08	4,481.97	0.00	0.00	0.00	
7,600.00	91.00	358.57	3,170.18	4,580.52	-114.58	4,581.95	0.00	0.00	0.00	
7,700.00	91.00	358.57	3,168.44	4,680.47	-117.08	4,681.94	0.00	0.00	0.00	
7,800.00	91.00	358.57	3,166.69	4,780.43	-119.58	4,781.92	0.00	0.00	0.00	
7,896.92	91.00	358.57	3,165.00	4,877.30	-122.00	4,878.83	0.00	0.00	0.00	
TD at 7896.92 - PBHL Stonewall 9 #3H										



Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, New Mexico (NAD 27, NME)	TVD Reference:	GL @ 3357.00usft
Site:	Stonewall 9 Fee	MD Reference:	GL @ 3357.00usft
Well:	#3H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Plan #1 07-15-13	Database:	GCR.DB

Design Targets										
Target Name										
- hit/miss target	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting		Latitude	Longitude
- Shape	(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)			
PP-Stonewall 9 #3H	0.00	360.00	3,114.01	180.00	-4.50	606,966.50	484,081.50		32° 40' 7.106573 N	104° 23' 6.227239 W
- plan hits target center										
- Point										
PBHL-Stonewall 9 #3H	0.00	360.00	3,165.00	4,877.30	-122.00	611,663.80	483,964.00		32° 40' 53.588895 N	104° 23' 7.628805 W
- plan hits target center										
- Point										

Formations					
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,534.47	3,240.98	TL, 3250' TVD @ 0 VZ, 91.0° Inc		-1.00	358.57

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment	
		+N/-S (usft)	+E/-W (usft)		
2720	2720	0	0	KOP Start Build 11.00	
3547	3241	530	-13	LP Start 4349.53 hold at 3547.39 MD	
7897	3165	4877	-122	TD at 7896.92	

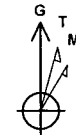
Checked By: _____	Approved By: _____	Date: _____
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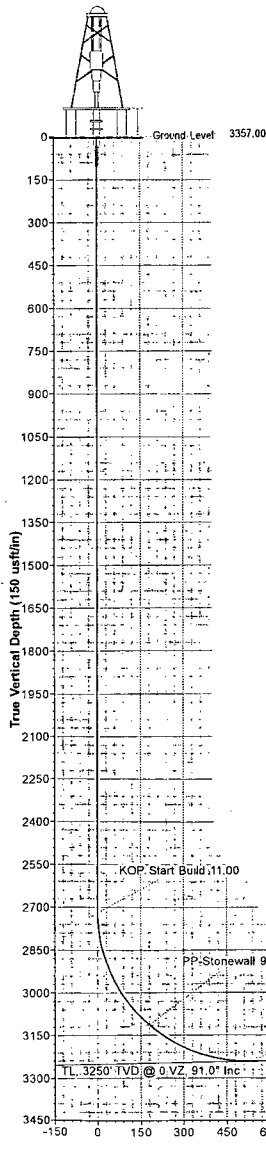
Project: Eddy County, New Mexico (NAD 27 NME)
Site: Stonewall 9 Fee
Well: #3H
Wellbore: OH
Design: Plan #1 07-15-13



PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: 0.03°
Magnetic North: 7.83°
Magnetic Field
Strength: 48637.05nT
Dip Angle: 60.42°
Date: 01/07/2013
Model: IGRF2010_14



WELL DETAILS									
	-N/S	-E/W	Northing	Ground Level	3357.00	Latitude	Longitude		
	0.00	0.00	606786.50	Easting	484086.00	32° 40' 5.325374 N	104° 23' 6.173539 W		

SECTION DETAILS									
Sec	MD'	Inc	Azi	TVD	-N/S	-E/W	Dleg	TFace	Vsect
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2	2720.12	0.00	0.00	2720.12	0.00	0.00	0.00	0.00	0.00
3	3547.39	91.00	358.57	3240.91	529.80	-13.25	11.00	358.57	529.96
4	7896.92	91.00	358.57	3165.00	4877.30	-122.00	0.00	0.00	4878.83

Annotation: KOP Start Build 11.00, LP Start 4349.53 hold at 3547.39 MD, TD at 7896.92

DESIGN TARGET DETAILS									
Name	TVD	-N/S	-E/W	Northing	Easting	Latitude	Longitude	Shape	
PP-Stonewall 9 #3H	3114.01	180.00	-4.50	606966.50	484081.50	32° 40' 7.106573 N	104° 23' 6.227239 W	Point	- plan hits target center
PBHL-Stonewall 9 #3H	3165.00	4877.30	-122.00	611663.80	483964.00	32° 40' 53.588895 N	104° 23' 7.628804 W	Point	- plan hits target center

PROJECT DETAILS: Eddy County, New Mexico (NAD 27 NME)
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

SITE DETAILS: Stonewall 9 Fee
Site Centre Northing: 611835.50
Easting: 482702.00
Positional Uncertainty: 0.00
Convergence: -0.03
Local North: Grid

LEGEND
— Plan #1 07-15-13

Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well #3H, Grid North
Latitude: 32° 40' 5.325374 N
Longitude: 104° 23' 6.173539 W
Grid East: 484086.00
Grid North: 606786.50
Scale Factor: 1.000
Geomagnetic Model: IGRF2010_14
Sample Date: 07-Jan-13
Magnetic Declination: 7.80°
Dip Angle from Horizontal: 60.42°
Magnetic Field Strength: 48637
To convert a Magnetic Direction to a Grid Direction, Add 7.83°
To convert a Magnetic Direction to a True Direction, Add 7.80° East
To convert a True Direction to a Grid Direction, Add 0.03°

FORMATION TOP DETAILS
TVDPath MDPath Formation DipAngle DipDir
3240.97 3534.47 TL 3250' TVD @ 0 VZ 91.0° Inc -1.00 358.57

