

NM OIL CONSERVATION
ARTESIA DISTRICT

JAN 20 2015

RECEIVED

OPERATOR COG Operating
WELL/LEASE Dodd Federal Unit #598
COUNTY Eddy Co., NM

STATE OF NEW MEXICO
DEVIATION REPORT

15-40780

415	1.00
806	1.50
987	1.60
1145	0.40
1209	0.80
1398	2.50
1588	2.20
1778	1.90
1968	1.90
2031	2.20
2094	1.90
2158	2.30
2221	2.30
2284	2.00
2727	2.90
2854	2.90
2981	2.30
3360	2.50
3487	1.90
3613	1.70
3740	1.90
3866	2.20
3993	2.30
4119	2.00
4246	2.10
4373	1.60
4510	1.70

SIGNED BY:

Ron Scandolari

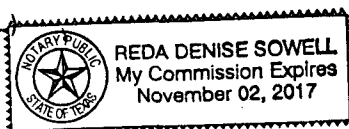
RON SCANDOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS

COUNTY OF MIDLAND

ON THIS 25 DAY OF November, 2014, BEFORE ME, R SOWELL, A NOTARY
PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED
THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.

(SEAL)



Reda Denise Sowell
NOTARY PUBLIC

NM OIL CONSERVATION

ARTESIA DISTRICT

JAN 20 2015

RECEIVED



COG Operating LLC

Eddy County, NM (NAD27 NME)

Dodd Federal Unit

#598

WB1 / Job #1412267

Design: Surveys (Basic 38)

Standard Survey Report

20 November, 2014





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #598
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3625.00usft (Basic 38)
Site:	Dodd Federal Unit	MD Reference:	KB @ 3625.00usft (Basic 38)
Well:	#598	North Reference:	Grid
Wellbore:	WB1 / Job #1412267	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 38)	Database:	Compass 5000 GCR

Project	Eddy County, NM (NAD27 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	Dodd Federal Unit		
Site Position:		Northing:	669,009.70 usft
From:	Map	Easting:	585,704.90 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 50' 19.97600 N
		Longitude:	104° 3' 15.44871 W
		Grid Convergence:	0.15 °

Well	#598		
Well Position	+N/-S	0.00 usft	Northing:
	+E/-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 49' 51.59347 N
		Longitude:	104° 2' 21.55998 W
		Ground Level:	3,613.00 usft

Wellbore	WB1 / Job #1412267				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010_14	11/10/2014	7.43	60.58	48,588

Design	Surveys (Basic 38)				
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		226.63

Survey Program	Date 11/20/2014				
From	To	Survey (Wellbore)	Tool Name	Description	
(usft)	(usft)				
100.00	920.00	VES Gyros (WB1 / Job #1412267)	VES-ISCWSA-GYRO-3	Biaxial Semi-Cont. Gyro	
987.00	4,560.00	Phoenix MWD Survey (WB1 / Job #14122)	PHX+MWD+IGRF	PHX+MWD+IGRF v3: standard declination	

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	0.07	112.70	100.00	-0.02	0.06	-0.02	0.07	0.07	0.00	
200.00	0.13	178.58	200.00	-0.16	0.12	0.03	0.12	0.06	65.88	
300.00	0.07	241.89	300.00	-0.30	0.06	0.16	0.12	-0.06	63.31	
400.00	0.25	216.34	400.00	-0.51	-0.12	0.43	0.19	0.18	-25.55	
500.00	0.22	317.83	500.00	-0.54	-0.38	0.65	0.36	-0.03	101.49	
600.00	0.48	353.14	600.00	0.02	-0.56	0.39	0.33	0.26	35.31	
700.00	1.26	36.05	699.99	1.32	0.04	-0.94	0.97	0.78	42.91	
800.00	1.64	53.43	799.95	3.06	1.84	-3.44	0.58	0.38	17.38	
920.00	1.75	75.50	919.90	4.55	4.99	-6.75	0.55	0.09	18.39	



Phoenix Technology Services
Survey Report



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Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3625.00usft (Basic 38)
Site:	Dodd Federal Unit	MD Reference:	KB @ 3625.00usft (Basic 38)
Well:	#598	North Reference:	Grid
Wellbore:	WB1 // Job #1412267	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 38)	Database:	Compass 5000 GCR

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)
Tie-on to Gyro Survey									
987.00	1.60	62.30	986.87	5.24	6.81	-8.55	0.62	-0.22	-19.70
First Phoenix MWD Survey									
1,019.00	1.40	64.00	1,018.86	5.62	7.56	-9.35	0.64	-0.63	5.31
1,082.00	0.90	74.90	1,081.85	6.08	8.73	-10.52	0.86	-0.79	17.30
1,145.00	0.40	121.50	1,144.85	6.10	9.39	-11.01	1.09	-0.79	73.97
1,209.00	0.80	176.60	1,208.84	5.53	9.61	-10.78	1.03	0.63	86.09
1,272.00	1.30	210.60	1,271.83	4.48	9.27	-9.81	1.24	0.79	53.97
1,335.00	1.80	213.40	1,334.81	3.04	8.36	-8.16	0.80	0.79	4.44
1,398.00	2.50	226.50	1,397.77	1.27	6.82	-5.83	1.35	1.11	20.79
1,462.00	2.50	227.20	1,461.70	-0.64	4.78	-3.04	0.05	0.00	1.09
1,525.00	2.30	228.30	1,524.65	-2.42	2.83	-0.40	0.33	-0.32	1.75
1,588.00	2.20	226.90	1,587.60	-4.08	1.00	2.07	0.18	-0.16	-2.22
1,652.00	2.10	227.30	1,651.56	-5.72	-0.75	4.48	0.16	-0.16	0.63
1,715.00	1.80	220.60	1,714.52	-7.25	-2.25	6.61	0.60	-0.48	-10.63
1,778.00	1.90	227.60	1,777.49	-8.71	-3.66	8.64	0.39	0.16	11.11
1,841.00	1.90	237.50	1,840.45	-9.97	-5.31	10.71	0.52	0.00	15.71
1,905.00	1.70	231.80	1,904.42	-11.13	-6.95	12.70	0.42	-0.31	-8.91
1,968.00	1.90	231.80	1,967.39	-12.36	-8.51	14.67	0.32	0.32	0.00
2,031.00	2.20	227.90	2,030.35	-13.81	-10.23	16.92	0.52	0.48	-6.19
2,094.00	1.90	225.60	2,093.31	-15.35	-11.87	19.17	0.49	-0.48	-3.65
2,157.00	2.30	225.90	2,156.27	-16.96	-13.52	21.48	0.64	0.63	0.48
2,220.00	2.30	227.60	2,219.22	-18.70	-15.37	24.01	0.11	0.00	2.70
2,283.00	2.00	229.20	2,282.17	-20.27	-17.13	26.37	0.49	-0.48	2.54
2,348.00	2.50	223.90	2,347.12	-22.03	-18.97	28.92	0.83	0.77	-8.15
2,411.00	2.80	229.30	2,410.05	-24.02	-21.09	31.83	0.62	0.48	8.57
2,474.00	2.70	229.50	2,472.98	-25.99	-23.39	34.85	0.16	-0.16	0.32
2,600.00	2.60	230.90	2,598.85	-29.72	-27.86	40.66	0.09	-0.08	1.11
2,727.00	2.90	228.20	2,725.70	-33.68	-32.49	46.75	0.26	0.24	-2.13
2,854.00	2.90	234.00	2,852.54	-37.71	-37.49	53.14	0.23	0.00	4.57
2,981.00	2.30	234.60	2,979.41	-41.07	-42.16	58.85	0.47	-0.47	0.47
3,107.00	2.40	225.60	3,105.30	-44.38	-46.11	64.00	0.30	0.08	-7.14
3,234.00	2.40	222.80	3,232.19	-48.19	-49.82	69.31	0.09	0.00	-2.20
3,360.00	2.50	228.40	3,358.07	-51.95	-53.66	74.69	0.21	0.08	4.44
3,487.00	1.90	233.50	3,484.98	-55.05	-57.43	79.55	0.50	-0.47	4.02
3,613.00	1.70	238.70	3,610.92	-57.26	-60.70	83.45	0.20	-0.16	4.13
3,740.00	1.90	243.20	3,737.86	-59.19	-64.19	87.31	0.19	0.16	3.54
3,866.00	2.20	232.20	3,863.77	-61.61	-67.97	91.72	0.39	0.24	-8.73
3,993.00	2.30	230.30	3,990.68	-64.73	-71.85	96.69	0.10	0.08	-1.50
4,119.00	2.00	231.80	4,116.59	-67.71	-75.53	101.40	0.24	-0.24	1.19
4,246.00	2.10	235.40	4,243.51	-70.40	-79.18	105.90	0.13	0.08	2.83
4,373.00	1.60	224.60	4,370.44	-72.98	-82.34	109.98	0.48	-0.39	-8.50
4,510.00	1.70	226.30	4,507.38	-75.75	-85.16	113.92	0.08	0.07	1.24



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Survey Report



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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)
Last Phoenix MWD Survey									
4,560.00	1.70	226.30	4,557.36	-76.77	-86.23	115.40	0.00	0.00	0.00
Projection to TD									

Design Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
920.00	919.90	4.55	4.99	Tie-on to Gyro Survey	
987.00	986.87	5.24	6.81	First Phoenix MWD Survey	
4,510.00	4,507.38	-75.75	-85.16	Last Phoenix MWD Survey	
4,560.00	4,557.36	-76.77	-86.23	Projection to TD	

Checked By: _____	Approved By: _____	Date: _____
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