

OPERATOR COG Operating
WELL/LEASE Dodd Federal Unit #636
COUNTY Eddy Co., NM.

STATE OF NEW MEXICO
DEVIATION REPORT

15-40893

298	0.67
612	0.44
922	1.25
1083	1.80
1146	3.40
1209	4.30
1272	4.80
1399	4.90
1525	3.90
1652	3.50
1842	3.10
2032	3.50
2222	3.60
2411	3.50
2601	3.80
2791	3.80
2981	3.70
3171	3.80
3361	3.80
3551	4.00
3741	3.70
3930	3.70
4120	3.60
4310	3.40
4531	3.70

NM OIL CONSERVATION

ARTESIA DISTRICT

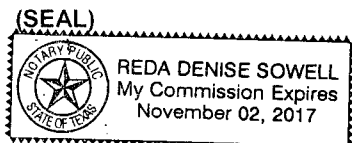
DEC 15 2014

RECEIVED

SIGNED BY: *Ron Scandolari*
RON SCANDOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 11 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.



Reda Denise Sowell
NOTARY PUBLIC



COG Operating LLC

Eddy County, NM (NAD27 NME)

Dodd Federal Unit

#636

WB1 / Job #1412049

Design: Surveys (Basic 38)

Standard Survey Report

31 October, 2014





Phoenix Technology Services
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #636
Project:	Eddy County, NM (NAD27, NME)	TVD Reference:	KB @ 3611.00usft (Basic 38)
Site:	Dodd Federal Unit	MD Reference:	KB @ 3611.00usft (Basic 38)
Well:	#636	North Reference:	Grid
Wellbore:	WB17 / Job #1412049	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 38)	Database:	Compass 5000 GCR.epdm

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:	#636		
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' 39.29080 N
		Longitude:	104° 3' 1.16210 W
		Ground Level:	3,599.00 usft

Wellbore:	WB17 / Job #1412049		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010_14	10/27/2014	7.44
			Dip Angle
			(°)
			60.58
			Field Strength
			(nT)
			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
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			359.85

Survey Program	Date: 10/31/2014		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	900.00	VES Gyro Survey (WB1 / Job #1412049)	VES-ISCWSA-GYRO-3
900.00	4,581.00	Phoenix MWD Survey (WB1 / Job #14120)	PHX+MWD+IGRF
			Description
			Biaxial Semi-Cont. Gyro
			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	0.17	161.99	100.00	-0.14	0.05	-0.14	0.17	0.17	0.00
	200.00	0.17	174.69	200.00	-0.43	0.11	-0.43	0.04	0.00	12.70
	300.00	0.38	331.51	300.00	-0.29	-0.04	-0.29	0.54	0.21	156.82
	400.00	0.21	15.12	400.00	0.18	-0.15	0.18	0.27	-0.17	43.61
	500.00	0.13	266.51	500.00	0.35	-0.21	0.35	0.28	-0.08	-108.61
	600.00	0.15	141.61	600.00	0.24	-0.25	0.24	0.25	0.02	-124.90
	700.00	0.22	85.85	700.00	0.15	0.03	0.15	0.18	0.07	-55.76
	800.00	0.71	51.91	799.99	0.55	0.71	0.55	0.54	0.49	-33.94
	900.00	0.45	42.88	899.99	1.22	1.46	1.22	0.27	-0.26	-9.03



Phoenix Technology Services
Survey Report



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Site:	Dodd Federal Unit	MD Reference:	KB @ 3611'00usft (Basic 38)
Well:	#636	North Reference:	Grid
Wellbore:	WB1 / Job #1412049	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 38)	Database:	Compass 5000 GCR epdm

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 VES Gyro Survey									
1,019.00	0.80	20.20	1,018.98	2.34	2.06	2.34	0.35	0.29	-19.06
First Phoenix MWD Survey									
1,083.00	1.80	350.20	1,082.96	3.75	2.05	3.75	1.84	1.56	-46.88
1,146.00	3.40	347.20	1,145.90	6.55	1.47	6.55	2.55	2.54	-4.76
1,209.00	4.30	349.00	1,208.75	10.69	0.60	10.69	1.44	1.43	2.86
1,272.00	4.80	355.30	1,271.56	15.63	-0.07	15.63	1.12	0.79	10.00
1,335.00	4.80	355.50	1,334.34	20.89	-0.49	20.89	0.03	0.00	0.32
1,399.00	4.90	8.00	1,398.11	26.27	-0.32	26.27	1.66	0.16	19.53
1,462.00	4.40	4.60	1,460.90	31.34	0.25	31.34	0.91	-0.79	-5.40
1,525.00	3.90	3.59	1,523.74	35.89	0.58	35.88	0.80	-0.79	-1.60
1,589.00	3.60	359.70	1,587.60	40.07	0.70	40.07	0.61	-0.47	-6.08
1,652.00	3.50	0.80	1,650.48	43.97	0.72	43.97	0.19	-0.16	1.75
1,715.00	3.40	1.00	1,713.36	47.76	0.78	47.76	0.16	-0.16	0.32
1,779.00	3.20	1.20	1,777.26	51.44	0.85	51.44	0.31	-0.31	0.31
1,842.00	3.10	0.40	1,840.16	54.90	0.90	54.90	0.17	-0.16	-1.27
1,905.00	3.30	358.20	1,903.06	58.42	0.85	58.42	0.37	0.32	-3.49
1,968.00	3.30	356.50	1,965.96	62.04	0.69	62.04	0.16	0.00	-2.70
2,032.00	3.50	355.70	2,029.85	65.83	0.43	65.83	0.32	0.31	-1.25
2,095.00	3.90	357.80	2,092.72	69.89	0.20	69.89	0.67	0.63	3.33
2,158.00	3.90	359.60	2,155.57	74.17	0.10	74.17	0.19	0.00	2.86
2,222.00	3.60	358.30	2,219.43	78.36	0.03	78.36	0.49	-0.47	-2.03
2,285.00	3.60	358.30	2,282.31	82.31	-0.09	82.31	0.00	0.00	0.00
2,411.00	3.50	355.60	2,408.07	90.10	-0.50	90.10	0.15	-0.08	-2.14
2,474.00	3.70	356.90	2,470.94	94.05	-0.76	94.05	0.34	0.32	2.06
2,538.00	3.80	357.70	2,534.80	98.23	-0.95	98.23	0.18	0.16	1.25
2,601.00	3.80	359.20	2,597.67	102.40	-1.07	102.40	0.16	0.00	2.38
2,665.00	4.00	358.60	2,661.52	106.75	-1.15	106.75	0.32	0.31	-0.94
2,728.00	3.90	0.80	2,724.37	111.09	-1.18	111.09	0.29	-0.16	3.49
2,791.00	3.80	0.30	2,787.23	115.32	-1.13	115.32	0.17	-0.16	-0.79
2,855.00	3.80	3.30	2,851.09	119.56	-1.00	119.56	0.31	0.00	4.69
2,918.00	3.80	3.90	2,913.95	123.73	-0.74	123.73	0.06	0.00	0.95
2,981.00	3.70	0.30	2,976.81	127.84	-0.59	127.84	0.41	-0.16	-5.71
3,045.00	3.70	0.20	3,040.68	131.97	-0.57	131.97	0.01	0.00	-0.16
3,108.00	3.90	0.60	3,103.54	136.15	-0.54	136.15	0.32	0.32	0.63
3,171.00	3.80	2.40	3,166.40	140.37	-0.43	140.38	0.25	-0.16	2.86
3,235.00	3.80	1.70	3,230.26	144.61	-0.28	144.61	0.07	0.00	-1.09
3,298.00	3.90	0.30	3,293.12	148.84	-0.20	148.84	0.22	0.16	-2.22
3,361.00	3.80	1.00	3,355.97	153.07	-0.16	153.07	0.18	-0.16	1.11
3,424.00	3.80	358.70	3,418.83	157.25	-0.17	157.25	0.24	0.00	-3.65
3,487.00	3.90	0.10	3,481.69	161.48	-0.21	161.48	0.22	0.16	2.22
3,550.00	4.00	1.60	3,544.54	165.82	-0.15	165.82	0.23	0.16	2.38
3,613.00	3.70	359.00	3,607.40	170.04	-0.12	170.04	0.55	-0.48	-4.13



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Survey Report



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Wellbore:	WB1 / Job #1412049	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Basic 38)	Database:	Compass 5000 GCR (epdm)

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)
3,676.00	3.80	359.70	3,670.27	174.16	-0.17	174.16	0.17	0.16	1.11
3,803.00	4.00	359.00	3,796.97	182.80	-0.27	182.80	0.16	0.16	-0.55
3,866.00	4.00	1.00	3,859.82	187.20	-0.27	187.20	0.22	0.00	3.17
3,929.00	3.70	1.30	3,922.68	191.42	-0.18	191.42	0.48	-0.48	0.48
3,992.00	3.50	357.50	3,985.55	195.38	-0.22	195.38	0.49	-0.32	-6.03
4,056.00	3.20	358.30	4,049.44	199.12	-0.36	199.12	0.47	-0.47	1.25
4,119.00	3.60	1.20	4,112.33	202.85	-0.37	202.85	0.69	0.63	4.60
4,183.00	3.40	0.30	4,176.21	206.76	-0.32	206.76	0.32	-0.31	-1.41
4,247.00	3.60	4.70	4,240.09	210.66	-0.14	210.66	0.52	0.31	6.88
4,310.00	3.40	356.10	4,302.98	214.49	-0.11	214.49	0.89	-0.32	-13.65
4,373.00	3.30	355.10	4,365.87	218.16	-0.39	218.16	0.18	-0.16	-1.59
4,436.00	3.30	355.30	4,428.76	221.78	-0.69	221.78	0.02	0.00	0.32
4,499.00	3.60	359.30	4,491.65	225.56	-0.87	225.56	0.61	0.48	6.35
4,531.00	3.70	359.50	4,523.58	227.60	-0.89	227.60	0.32	0.31	0.63
Last Phoenix MWD Survey									
4,581.00	3.70	359.50	4,573.48	230.83	-0.91	230.83	0.00	0.00	0.00
Projection to TD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
900.00	899.99	1.22	1.46	Tie-on to VES Gyro Survey
1,019.00	1,018.98	2.34	2.06	First Phoenix MWD Survey
4,531.00	4,523.58	227.60	-0.89	Last Phoenix MWD Survey
4,581.00	4,573.48	230.83	-0.91	Projection to TD

Checked By: _____ Approved By: _____ Date: _____