

OPERATOR _____ COG _____
WELL/LEASE Dodd Federal Unit 613 _____
COUNTY Eddy _____

STATE OF NEW MEXICO
DEVIATION REPORT

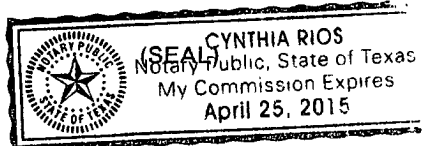
30-015-39667

108	0.71
198	0.83
293	0.35
589	0.90
834	0.84
1090	0.74
1141	0.51
1205	0.37
1268	1.08
1332	2.36
1395	3.01
1458	3.63
1522	4.00
1585	5.12
1648	5.70
1712	6.47
1775	7.06
1997	8.98
2060	9.18
2123	9.69
2218	8.75
2281	8.93
2377	9.92
2472	9.76
2567	9.18
2758	9.93
2853	9.64
2948	9.49
3044	9.35
3129	9.70
3140	9.19
3224	9.57
3234	10.11
3519	9.02
3614	9.60
3710	9.10
3802	9.73
3896	9.49
4087	9.78
4182	9.68
4277	9.51
4372	8.80
4499	8.71
4530	8.57

SIGNED BY: R. Scandolari
RON SCANDOLARI, VP-CONTRACT DRILLING

STATE OF TEXAS
COUNTY OF MIDLAND

ON THIS 28 DAY OF February, 2012, BEFORE ME, C RIOS, A NOTARY
PUBLIC, PERSONALLY APPEARED RON SCANDOLARI, WHO ACKNOWLEDGED AND EXECUTED
THIS DOCUMENT. WITNESS MY HAND AND OFFICIAL SEAL.



Cynthia Rios
NOTARY PUBLIC

30-015-39667



COG OPERATING LLC

Eddy County, NM (NAN27 NME)

Dodd Federal Unit #613

Dodd Federal Unit #613

OH - Job #32D0212158

Design: Actual

SDI Standard Survey Report

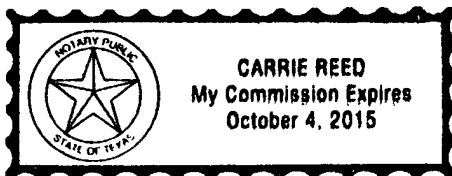
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 15th of March, 2012.

[Signature]

Notary Signature
County of Midland
State of Texas





Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING LLC	Local Co-ordinate Reference:	Site Dodd Federal Unit #613
Project:	Eddy County, NM (NAN27 NME)	TVD Reference:	RF @ 3642 0usft (Basic #35)
Site:	Dodd Federal Unit #613	MD Reference:	RF @ 3642 0usft (Basic #35)
Well:	Dodd Federal Unit #613	North Reference:	Grid
Wellbore:	OH - Job #32D0212158	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Project	Eddy County, NM (NAN27 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 #613		
Site Position:	Map	Northing:	668,843 30 usft
From:		Easting:	588,412 60 usft
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"
		Latitude:	32° 50' 18 258 N
		Longitude:	104° 2' 43 717 W
		Grid Convergence:	0 16 °

Well	Dodd Federal Unit #613		
Well Position	+N/-S	0 0 usft	Northing:
	+E/-W	0 0 usft	Easting:
Position Uncertainty	0 0 usft	Wellhead Elevation:	usft
		Latitude:	32° 50' 18 258 N
		Longitude:	104° 2' 43 717 W
		Ground Level:	3,630 0 usft

Wellbore	OH - Job #32D0212158				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/14/2012	7 77	60 66	48,865

Design	Actual			
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth:
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0 0	0 0	0 0	257 67

Survey Program	Date 2/18/2012				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100 0	1,035 0	Gyro (OH - Job #32D0212158)	Keeper	Standard Wireline Keeper ver 1 0 2	
1,141 0	4,580 0	MWD (OH - Job #32D0212158)	MWD	MWD - Standard	

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0	
100 0	0 35	245 89	100.0	-0 1	-0 3	245 89	0 3	
200 0	0 18	229 81	200 0	-0 4	-0 7	242 63	0 8	
300 0	0 80	187 14	300 0	-1 1	-0 9	217 69	1 4	
400 0	1 35	188 13	400.0	-3 0	-1 1	200 75	3 2	
500 0	0 83	188 92	500 0	-4 9	-1 4	196 17	5 1	
600 0	0 54	169 60	600.0	-6 1	-1 4	193 40	6 2	
700 0	0 60	115 71	699 9	-6 8	-0 9	187 48	6 8	
800 0	0 70	118 30	799 9	-7 3	0 1	179 04	7 3	
900 0	0 59	98 59	899.9	-7 6	1 2	171 30	7 7	
1,000 0	0 50	111 71	999 9	-7 9	2 1	165 18	8 1	



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Site:	Dodd Federal Unit #613	MD Reference:	RF @ 3642 0usft (Basic #35)
Well:	Dodd Federal Unit #613	North Reference:	Grid
Wellbore:	OH - Job #32D0212158	Survey Calculation Method:	Minimum Curvature
Design:	Actual	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,035 0	0 69	131 91	1,034 9	-8 1	2 4	163 56	8 4
Gyro Tie-in							
1,141 0	0 51	167 05	1,140 9	-9 0	3 0	161 70	9 4
1,205 0	0 37	277 04	1,204 9	-9 2	2 8	162 97	9 6
1,268 0	1 08	258 21	1,267 9	-9 3	2 0	167 65	9 5
1,332 0	2 36	248 65	1,331 9	-9 9	0 2	178 72	9 9
1,395 0	3 01	252 90	1,394 8	-10 9	-2 6	193 29	11 2
1,458 0	3 63	253 74	1,457 7	-11 9	-6 1	206 97	13 4
1,522 0	4 00	256 03	1,521 6	-13 0	-10 2	218 00	16 5
1,585 0	5 12	252 88	1,584 4	-14 4	-15 0	226 20	20 8
1,648 0	5 70	256 44	1,647 1	-15 9	-20 7	232 43	26 1
1,712 0	6 47	258 68	1,710 7	-17 4	-27 3	237 54	32 4
1,775 0	7 06	264 70	1,773 3	-18 4	-34 7	241 99	39 3
1,837 0	7 78	264 28	1,834 8	-19 2	-42 7	245 75	46 8
1,901 0	8 18	262 62	1,898 1	-20 2	-51 5	248 54	55 3
1,997 0	8 98	266 06	1,993 1	-21 6	-65 7	251 79	69 2
2,060 0	9 18	266 57	2,055 3	-22 3	-75 6	253 60	78 9
2,123 0	9 69	264 51	2,117 4	-23 1	-85 9	254 97	89 0
2,218 0	8 75	261 29	2,211 2	-24 9	-101 0	256 14	104 1
2,281 0	8 93	260 32	2,273 5	-26 5	-110 6	256 54	113 7
2,377 0	9 92	261 08	2,368 2	-29 0	-126 1	257 04	129 4
2,472 0	9 76	260 16	2,461 8	-31 7	-142 1	257 44	145 6
2,567 0	9 18	260 85	2,555 5	-34 2	-157 5	257 74	161 2
2,662 0	10 12	260 80	2,649 1	-36 8	-173 3	258 02	177 1
2,758 0	9 93	259 09	2,743 7	-39 7	-189 7	258 18	193 8
2,853 0	9 64	257 47	2,837 3	-43 0	-205 5	258 19	210 0
2,948 0	9 49	256 65	2,931 0	-46 5	-220 9	258 11	225 8
3,044 0	9 35	257 67	3,025 7	-50 0	-236 2	258 05	241 5
3,140 0	9 19	256 68	3,120 4	-53 4	-251 3	258 00	256 9
3,234 0	10 11	257 23	3,213 1	-57 0	-266 7	257 94	272 7
3,329 0	9 70	258 04	3,306 7	-60 5	-282 6	257 92	289 0
3,424 0	9 57	259 09	3,400 3	-63 6	-298 2	257 95	304 9
3,519 0	9 02	257 94	3,494 1	-66 7	-313 2	257 98	320 3
3,614 0	9 60	261 65	3,587 8	-69 4	-328 4	258 07	335 6
3,710 0	9 10	261 87	3,682 5	-71 6	-343 8	258 23	351 2
3,802 0	9 73	259 49	3,773 3	-74 1	-358 6	258 33	366 2
3,896 0	9 49	259 11	3,866 0	-77 0	-374 1	258 37	381 9
3,991 0	9 07	258 30	3,959 7	-80 0	-389 1	258 38	397 2
4,086 0	9 78	259 86	4,053 5	-82 9	-404 4	258 41	412 8
4,182 0	9 68	261 03	4,148 1	-85 6	-420 4	258 49	429 0
4,277 0	9 51	260 15	4,241 7	-88 2	-436 0	258 56	444 8
4,372 0	8 80	257 70	4,335 5	-91 1	-450 8	258 58	459 9
4,499 0	8 71	258 79	4,461 1	-95 0	-469 7	258 56	479 3
4,530 0	8 57	258 49	4,491 7	-96 0	-474 3	258 56	483 9
Last MWD Survey							



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Design:	Actual	Database:	EDM-Regulatory

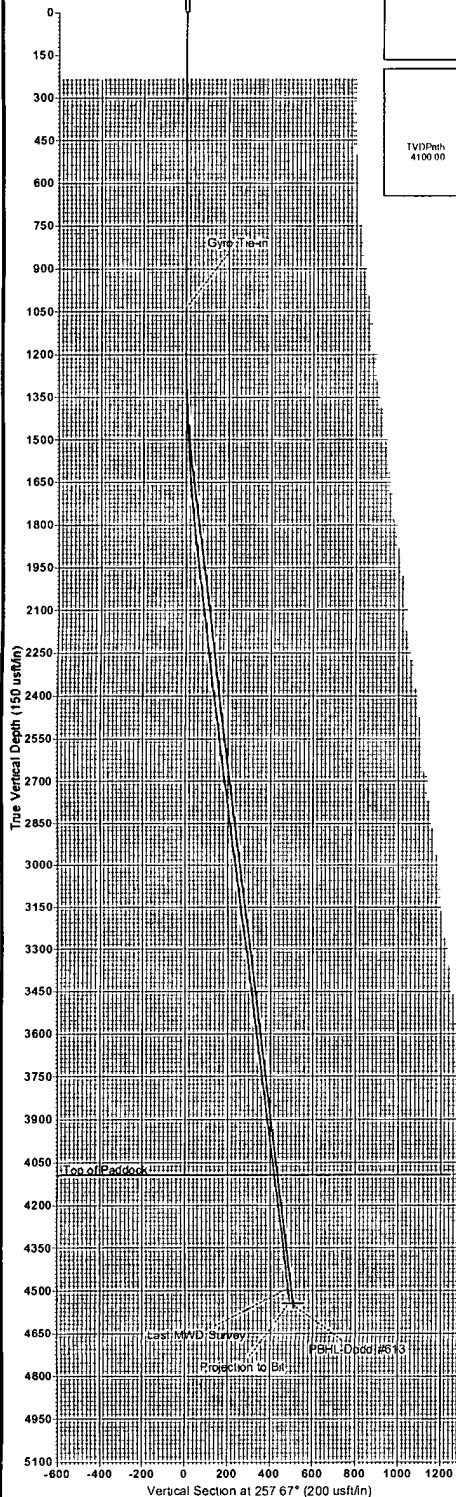
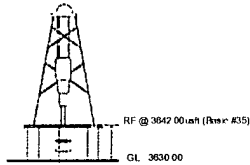
Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
4,580 0	8 57	258 49	4,541 1	-97 4	-481 6	258 56	491 4
Projection to Bit							

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,035 0	1,034 9	-8 1	2 4	Gyro Tie-in
4,530 0	4,491 7	-96 0	-474 3	Last MWD Survey
4,580 0	4,541 1	-97 4	-481 6	Projection to Bit



Azimuth to Grid North
True North -0.16°
Magnetic North -7.61°
Magnetic Field Strength 38855 Gauss
Dip Angle 60.06°
Date 07/14/2012
Model IGRF 2010
To convert a Magnetic Direction to a Grid Direction Add 7.61°
To convert a True Direction to a Grid Direction Subtract 0.16°

Dodd Federal Unit #613
Eddy County, NM (NAN27 NME)
Northing (Y) 668843.30
Easting (X) 588412.60
Plan #2 vs Actual 7-7/8" Hole



WELL DETAILS

		Dodd Federal Unit #613	
Ground Level	3630.00	Latitude	32° 50' 18.256 N
Northing	668843.30	Longitude	104° 2' 43.717 W
East	588412.60	Skid	

SECTION DETAILS

Sec	MD	Inc	Ar	TVD	+N-S	+E-W	Deg	TFace	VSec	Target
1	1035.00	0.69	131.81	1034.93	-8.07	7.38	0.00	0.00	-0.00	
2	1150.00	0.69	131.81	1149.82	-9.00	3.41	0.00	0.00	-1.41	
3	1637.54	0.22	256.99	1630.48	-18.34	-32.45	2.00	130.32	35.82	
4	4590.28	0.22	256.99	4570.00	-108.80	-497.90	0.00	0.00	509.36	PBHL Dodd #613

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	North	East	Latitude	Longitude	Shape
PBHL Dodd #613	4550.00	-108.80	-497.90	668734.50	587915.00	32° 50' 17.104 N	104° 2' 46.553 W	Circle (Radius: 50.00)
plan has target center								

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
4100.00	4134.39	Top of Paddock	0.00	

CASING DETAILS

TVD	MD	Name	Size
1050.00		8.5" Casing	8.5"

SITE DETAILS

Dodd Federal Unit #613	
Site Centre Northing	668843.30
East	588412.60
Positional Uncertainty	0.00
Convergence	0.16
Local North	Grid

Map System US State Plane 1927 (Exact solution)
Datum NAD 1927 (NADCON CONUS)
Ellipsoid Clarke 1866
Zone Name New Mexico Fm 3001

Local Origin See Dodd Federal Unit #613, Grid North

Latitude 32° 50' 18.256 N
Longitude 104° 2' 43.717 W

Grid East 588412.60
Grid North 668843.30
Scale Factor 1.000

Geographic Model IGRF 2010
Sample Date 14-Feb-12
Magnetic Declination 7.77°
Dip Angle from Horizontal 60.06°
Magnetic Field Strength 48855

To convert a Magnetic Direction to a Grid Direction Add 7.61°
To convert a Magnetic Direction to a True Direction Add 7.77° East
To convert a True Direction to a Grid Direction Subtract 0.16°

PROJECT DETAILS

Eddy County NM (NAN27 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

