

30-015-40343

COG Operating LLC

Eddy County, NM 901
Dodd Ferderal Unit 102H
Dodd Ferderal Unit 102H

Wellbore #1

Survey: MWD Surveys

Standard Survey Report

19 July, 2012



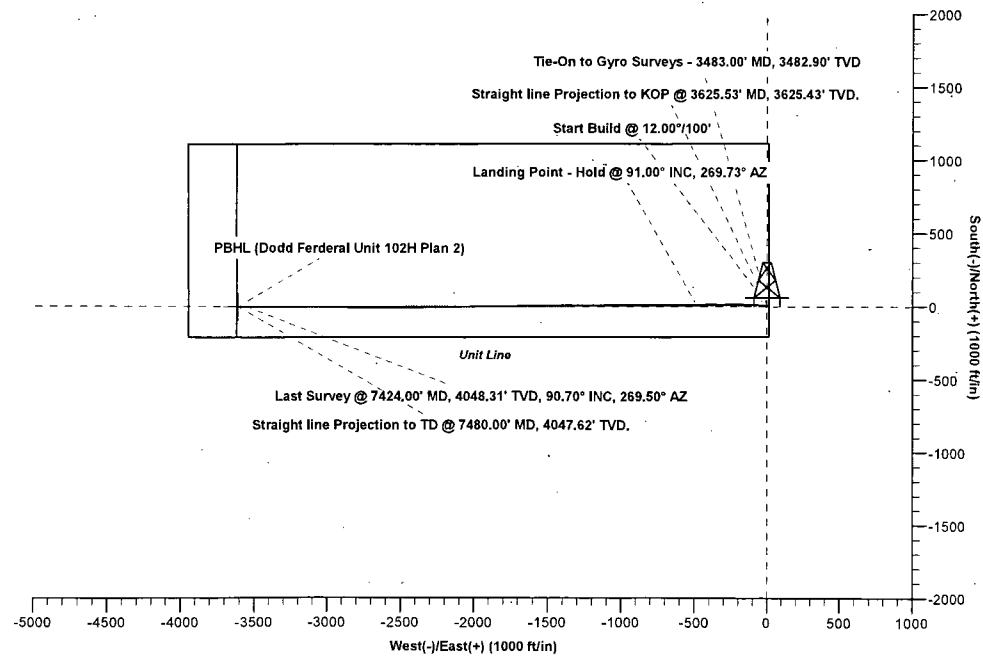
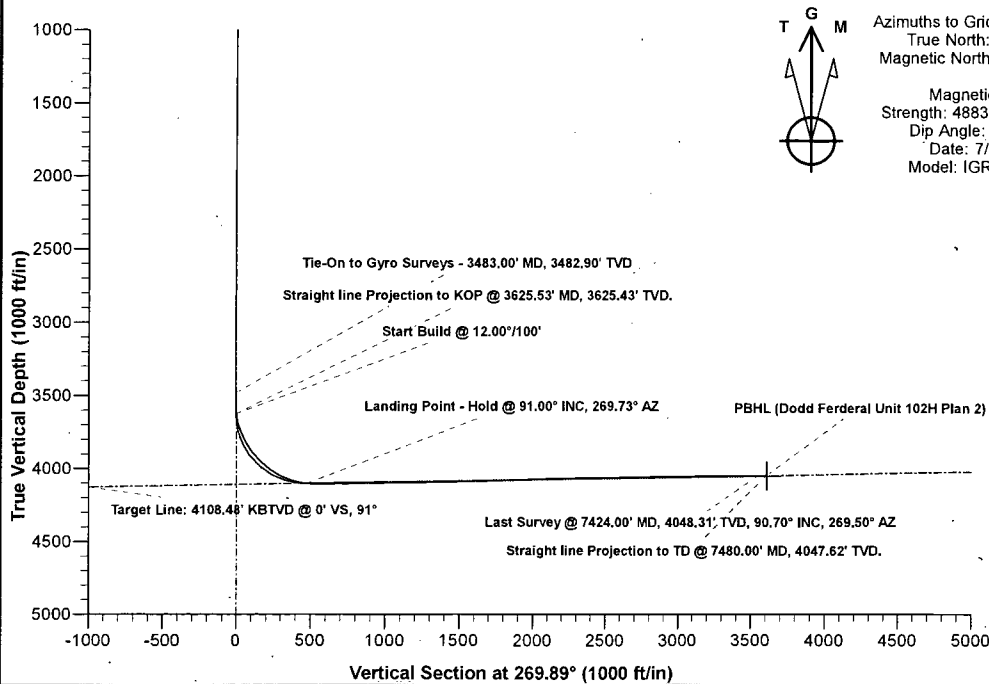
COG Operating LLC
Dodd Ferderal Unit 102H
Eddy County, NM
Plan #2



Surface Location		Ground Elev: 3628.00 WELL @ 3642.00ft (Original Well Elev)			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	674215.100	585900.600	32.853185	-104.053613

TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL (Dodd Ferderal Unit 102H Plan 2)	4045.36	-6.90	-3611.90	674208.200	582288.700	32.853192	-104.065375

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Annotation
1	3483.00	0.42	306.07	3482.90	7.58	4.92	0.00	0.00	-4.94	Tie-On to Gyro Surveys - 3483.00' MD, 3482.90' TVD
2	3625.53	0.42	306.07	3625.43	8.20	4.08	0.00	0.00	-4.10	Start Build @ 12.00°/100'
3	4381.04	91.00	269.73	4100.00	7.99	-481.71	12.00	-36.34	481.70	Landing Point - Hold @ 91.00° INC, 269.73° AZ
4	7511.74	91.00	269.73	4045.36	-6.90	-3611.90	0.00	0.00	3611.91	TD @ 7511.74' MD, 4045.36' TVD



Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site: Dodd/Federal Unit 102H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3642.00ft (Original Well Elev)
Site:	Dodd/Federal Unit 102H	MD Reference:	WELL @ 3642.00ft (Original Well Elev)
Well:	Dodd/Federal Unit 102H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Houston R5000 Database

Project	Eddy County, NM	System Datum:	Mean Sea Level
Map System:	US State Plane 1927 (Exact solution)		
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Dodd/Federal Unit 102H				
Site Position:		Northing:	674,215.100 ft	Latitude:	32.853185
From:	Map	Easting:	585,900.600 ft	Longitude:	-104.053613
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	0.15 °

Well	Dodd/Federal Unit 102H					
Well Position	+N-S	0.00 ft	Northing:	674,215.100 ft	Latitude:	32.853185
	+E-W	0.00 ft	Easting:	585,900.600 ft	Longitude:	-104.053613
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	3,628.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	7/6/2012	7.73	60.66	48,834

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction	
	(ft)	(ft)	(ft)	(°)	
	0.00	0.00	0.00		269.89

Survey Program	Date	7/19/2012			
From	To	Survey (Wellbore)	Tool Name	Description	
(ft)	(ft)				
100.00	3,483.00	Gyro Surveys (Wellbore #1)	MWD	MWD - Standard	
3,499.00	7,480.00	MWD Surveys (Wellbore #1)	MWD	MWD - Standard	

Survey									
Measured	Inclination	Azimuth	Vertical	+N-S	+E-W	Vertical	Dogleg	Build	Turn
Depth	(°)	(°)	Depth	(ft)	(ft)	Section	Rate	Rate	Rate
(ft)			(ft)			(ft)	(°/100ft)	(°/100ft)	(°/100ft)
3,483.00	0.42	306.07	3,482.90	7.58	4.92	-4.94	0.00	0.00	0.00
3,499.00	0.30	316.20	3,498.90	7.65	4.85	-4.86	0.85	-0.75	63.31
3,531.00	0.20	260.00	3,530.90	7.70	4.73	-4.75	0.79	-0.31	-175.63
3,563.00	0.80	206.50	3,562.90	7.49	4.58	-4.59	2.19	1.88	-167.19
3,595.00	3.50	262.60	3,594.88	7.16	3.51	-3.53	9.77	8.44	175.31
3,626.00	7.90	267.90	3,625.72	6.96	0.44	-0.46	14.28	14.19	17.10
3,658.00	12.20	273.50	3,657.22	7.09	-5.13	5.12	13.76	13.44	17.50
3,690.00	15.80	275.80	3,688.26	7.74	-12.84	12.83	11.38	11.25	7.19
3,722.00	18.50	275.60	3,718.84	8.67	-22.23	22.22	8.44	8.44	-0.63
3,753.00	20.70	274.20	3,748.04	9.55	-32.59	32.57	7.26	7.10	-4.52

Survey Report

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Project:	Eddy County, NM	TVD Reference:	WELL @ 3642.00ft (Original Well Elev)
Site:	Dodd/Federal Unit 102H	MD Reference:	WELL @ 3642.00ft (Original Well Elev)
Well:	Dodd/Federal Unit 102H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Houston R5000 Database

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
3,785.00	23.80	274.40	3,777.65	10.46	-44.67	44.65	9.69	9.69	0.63
3,817.00	27.50	273.20	3,806.50	11.37	-58.49	58.47	11.68	11.56	-3.75
3,849.00	30.70	271.90	3,834.45	12.05	-74.04	74.01	10.19	10.00	-4.06
3,880.00	33.90	271.80	3,860.65	12.59	-90.59	90.57	10.32	10.32	-0.32
3,912.00	37.30	272.80	3,886.67	13.34	-109.20	109.18	10.78	10.63	3.13
3,944.00	40.70	273.00	3,911.53	14.36	-129.31	129.28	10.63	10.63	0.63
3,975.00	44.20	272.30	3,934.40	15.33	-150.21	150.18	11.39	11.29	-2.26
4,007.00	47.10	271.60	3,956.77	16.10	-173.08	173.04	9.20	9.06	-2.19
4,039.00	50.40	270.20	3,977.87	16.47	-197.13	197.10	10.82	10.31	-4.38
4,070.00	53.10	268.60	3,997.06	16.21	-221.47	221.44	9.61	8.71	-5.16
4,102.00	56.40	268.80	4,015.52	15.62	-247.59	247.56	10.33	10.31	0.63
4,134.00	59.50	269.50	4,032.50	15.22	-274.71	274.68	9.86	9.69	2.19
4,166.00	62.80	269.50	4,047.94	14.97	-302.73	302.70	10.31	10.31	0.00
4,197.00	66.10	270.50	4,061.31	14.98	-330.69	330.66	11.04	10.65	3.23
4,229.00	69.90	270.00	4,073.30	15.10	-360.36	360.33	11.96	11.88	-1.56
4,261.00	74.10	268.90	4,083.18	14.81	-390.78	390.75	13.53	13.13	-3.44
4,292.00	78.10	268.20	4,090.63	14.05	-420.86	420.83	13.09	12.90	-2.26
4,324.00	82.50	268.10	4,096.02	13.03	-452.38	452.35	13.75	13.75	-0.31
4,356.00	85.90	269.70	4,099.25	12.42	-484.20	484.18	11.73	10.63	5.00
4,388.00	87.80	270.00	4,101.01	12.33	-516.15	516.13	6.01	5.94	0.94
4,482.00	90.40	270.20	4,102.49	12.50	-610.13	610.11	2.77	2.77	0.21
4,577.00	91.40	269.90	4,101.00	12.58	-705.12	705.09	1.10	1.05	-0.32
4,673.00	91.40	269.60	4,098.65	12.16	-801.09	801.06	0.31	0.00	-0.31
4,768.00	91.40	269.40	4,096.33	11.33	-896.06	896.03	0.21	0.00	-0.21
4,862.00	91.40	268.90	4,094.03	9.94	-990.02	990.00	0.53	0.00	-0.53
4,957.00	91.10	270.70	4,091.96	9.61	-1,084.99	1,084.97	1.92	-0.32	1.89
5,053.00	90.80	270.10	4,090.37	10.28	-1,180.97	1,180.95	0.70	-0.31	-0.63
5,148.00	90.70	269.70	4,089.12	10.11	-1,275.97	1,275.94	0.43	-0.11	-0.42
5,243.00	90.10	269.10	4,088.46	9.12	-1,370.96	1,370.94	0.89	-0.63	-0.63
5,338.00	91.00	269.60	4,087.55	8.04	-1,465.95	1,465.93	1.08	0.95	0.53
5,433.00	90.60	268.90	4,086.22	6.80	-1,560.93	1,560.91	0.85	-0.42	-0.74
5,529.00	91.20	268.90	4,084.71	4.95	-1,656.90	1,656.89	0.63	0.63	0.00
5,624.00	92.10	269.10	4,081.98	3.30	-1,751.84	1,751.83	0.97	0.95	0.21
5,719.00	92.30	269.30	4,078.33	1.97	-1,846.76	1,846.76	0.30	0.21	0.21
5,814.00	92.30	268.90	4,074.52	0.48	-1,941.67	1,941.67	0.42	0.00	-0.42
5,909.00	92.20	268.60	4,070.79	-1.59	-2,036.58	2,036.58	0.33	-0.11	-0.32
6,005.00	91.00	269.10	4,068.11	-3.52	-2,132.52	2,132.52	1.35	-1.25	0.52
6,100.00	91.20	268.90	4,066.29	-5.17	-2,227.49	2,227.49	0.30	0.21	-0.21
6,195.00	91.30	268.70	4,064.21	-7.16	-2,322.44	2,322.45	0.24	0.11	-0.21
6,290.00	91.30	269.60	4,062.06	-8.57	-2,417.41	2,417.42	0.95	0.00	0.95
6,386.00	92.00	270.10	4,059.29	-8.82	-2,513.37	2,513.38	0.90	0.73	0.52
6,480.00	90.60	270.60	4,057.16	-8.25	-2,607.34	2,607.35	1.58	-1.49	0.53
6,575.00	90.90	270.50	4,055.92	-7.34	-2,702.33	2,702.34	0.33	0.32	-0.11

Survey Report

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Site:	Dodd Ferderal Unit 102H	MD Reference:	WELL @ 3642.00ft (Original Well Elev)
Well:	Dodd Ferderal Unit 102H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Houston R5000 Database

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	
6,671.00	91.60	270.20	4,053.82	-6.75	-2,798.30	2,798.31	0.79	0.73	-0.31	
6,766.00	90.50	270.80	4,052.08	-5.92	-2,893.28	2,893.29	1.32	-1.16	0.63	
6,861.00	91.10	270.80	4,050.76	-4.60	-2,988.26	2,988.26	0.63	0.63	0.00	
6,956.00	90.00	270.30	4,049.84	-3.68	-3,083.25	3,083.25	1.27	-1.16	-0.53	
7,051.00	90.30	270.20	4,049.60	-3.27	-3,178.25	3,178.25	0.33	0.32	-0.11	
7,147.00	90.80	270.10	4,048.67	-3.02	-3,274.24	3,274.24	0.53	0.52	-0.10	
7,242.00	89.50	269.70	4,048.43	-3.18	-3,369.24	3,369.24	1.43	-1.37	-0.42	
7,337.00	90.00	269.50	4,048.84	-3.85	-3,464.24	3,464.24	0.57	0.53	-0.21	
7,424.00	90.70	269.50	4,048.31	-4.61	-3,551.23	3,551.23	0.80	0.80	0.00	
Last Survey @ 7424.00' MD, 4048.31' TVD, 90.70° INC, 269.50° AZ										
7,480.00	90.70	269.50	4,047.62	-5.09	-3,607.23	3,607.23	0.00	0.00	0.00	
Straight line Projection to TD @ 7480.00' MD, 4047.62' TVD										

Survey Annotations					
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates			
		+N/-S (ft)	+E/-W (ft)	Comment	
7,424.00	4,048.31	-4.61	-3,551.23	Last Survey @ 7424.00' MD, 4048.31' TVD, 90.70° INC, 269.50° AZ	
7,480.00	4,047.62	-5.09	-3,607.23	Straight line Projection to TD @ 7480.00' MD, 4047.62' TVD	

Checked By: _____	Approved By: _____	Date: _____
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Company: COG Operating LLC (Concho)

Lease/Well: Dodd Fed/102H



Rig Name: UDI 40

State/County: New Mexico / Eddy

Latitude: 32.85

GRID North is 0.15 Degrees East of True North

VS-Azi: 0.00 Degrees



Depth Reference : RKB = 14'

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: e-line gyro_ed.ut

Minimum Curvature Method

Report Date/Time: 7/24/2012 / 12:41

Vaughn Energy Services

Woodward, Oklahoma

580-254-5000

Surveyor: Michael Hair

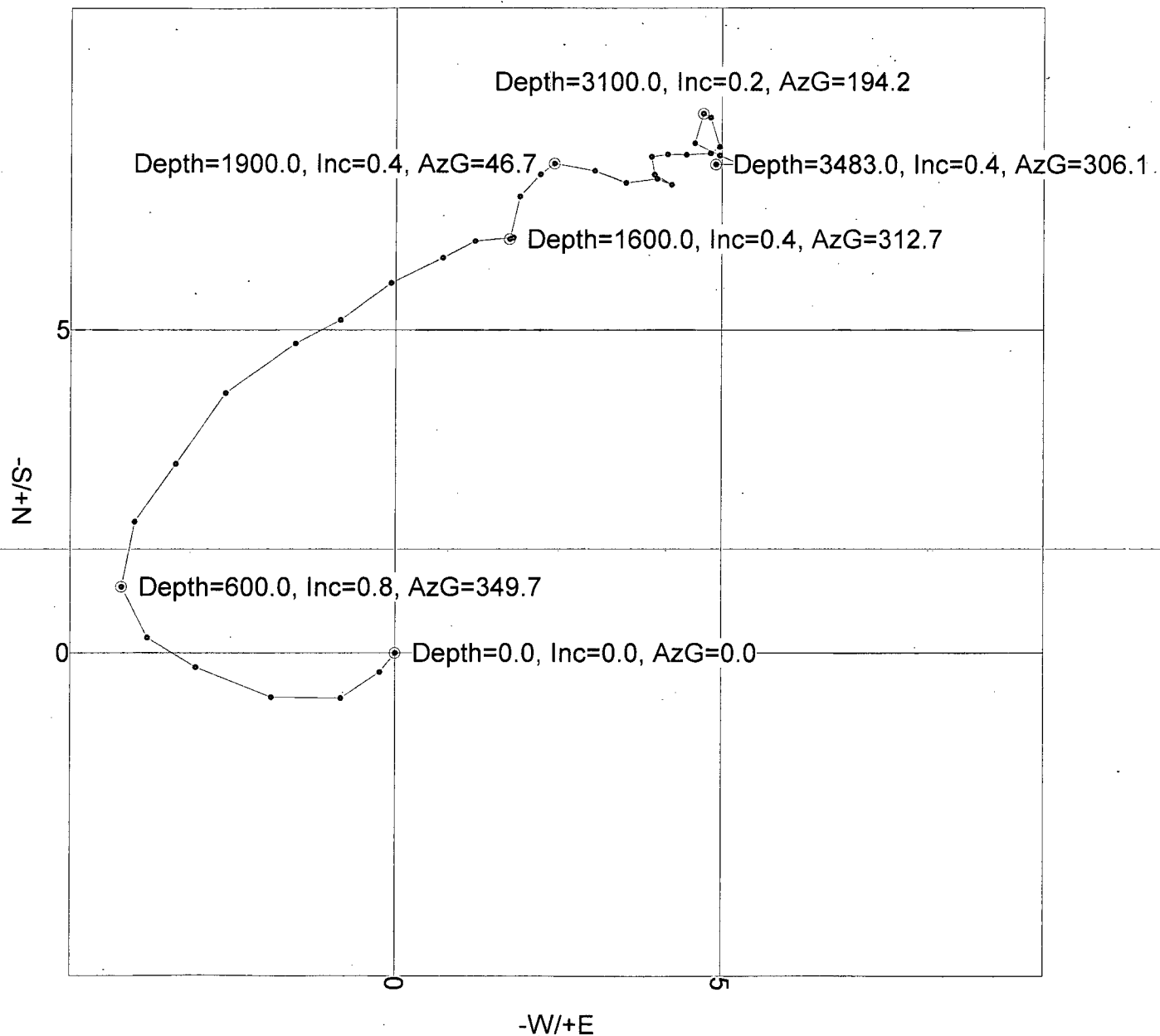
Dodd Fed 102H / API 30-015-40343

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	0.43	218.60	100.00	-0.30	-0.24	0.38	218.60	0.43
200.00	0.44	253.80	200.00	-0.70	-0.84	1.09	230.31	0.26
300.00	0.81	279.85	299.99	-0.68	-1.91	2.03	250.31	0.46
400.00	0.66	306.65	399.98	-0.22	-3.08	3.08	265.94	0.37
500.00	0.34	291.96	499.98	0.24	-3.81	3.82	273.55	0.34
600.00	0.78	349.73	599.97	1.02	-4.21	4.33	283.64	0.67
700.00	0.53	43.78	699.97	2.03	-4.01	4.49	296.85	0.64
800.00	0.73	28.53	799.96	2.92	-3.39	4.47	310.82	0.26
900.00	0.81	40.35	899.95	4.02	-2.62	4.80	326.91	0.18
1000.00	0.75	69.87	999.94	4.79	-1.55	5.03	342.10	0.40
1100.00	0.19	28.59	1099.94	5.16	-0.85	5.23	350.61	0.62
1200.00	0.95	58.69	1199.94	5.73	-0.07	5.73	359.31	0.79
1300.00	0.11	114.14	1299.93	6.12	0.72	6.17	6.72	0.89
1400.00	0.58	54.20	1399.93	6.38	1.22	6.50	10.79	0.53
1500.00	0.34	143.57	1499.93	6.44	1.80	6.68	15.66	0.67
1600.00	0.37	312.69	1599.93	6.41	1.75	6.65	15.23	0.71
1700.00	0.67	41.37	1699.92	7.07	1.90	7.32	15.03	0.76
1800.00	0.14	216.02	1799.92	7.41	2.21	7.74	16.63	0.81

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	0.45	46.67	1899.92	7.58	2.43	7.96	17.75	0.58
2000.00	0.58	138.86	1999.92	7.47	3.04	8.06	22.17	0.75
2100.00	0.29	37.84	2099.91	7.28	3.53	8.09	25.86	0.70
2200.00	0.40	112.59	2199.91	7.35	4.01	8.37	28.62	0.43
2300.00	0.13	293.76	2299.91	7.25	4.23	8.40	30.25	0.53
2400.00	0.23	304.70	2399.91	7.41	3.97	8.41	28.14	0.11
2500.00	0.23	36.54	2499.91	7.69	3.92	8.63	27.02	0.33
2600.00	0.21	134.72	2599.91	7.72	4.17	8.78	28.37	0.33
2700.00	0.23	52.20	2699.91	7.72	4.46	8.91	30.00	0.29
2800.00	0.27	115.47	2799.91	7.74	4.83	9.12	31.95	0.26
2900.00	0.25	340.41	2899.91	7.84	4.97	9.28	32.35	0.48
3000.00	0.30	345.72	2999.91	8.29	4.83	9.60	30.22	0.06
3100.00	0.23	194.20	3099.91	8.35	4.72	9.59	29.46	0.51
3200.00	0.32	197.67	3199.91	7.90	4.59	9.13	30.14	0.10
3300.00	0.54	80.51	3299.91	7.71	4.97	9.17	32.78	0.74
3400.00	0.30	214.05	3399.90	7.57	5.28	9.23	34.91	0.78
3483.00	0.42	306.07	3482.90	7.57	4.91	9.02	32.98	0.64



Vaughn Energy Services
Woodward, Oklahoma
580-254-5000
Surveyor: Michael Hair
Dodd Fed 102H / API 30-015-40343



VES Survey Date: 07/14/2012

RECEIVED
FEB 27 2013
NMOCD ARTESIA

WELL NAME AND NUMBER Dodd Federal Unit 10 No. 2H
LOCATION Section 10, T17S, R29E, Lot A, 1115 FNL, 15 FEL, Eddy County
OPERATOR COG Operating LLC
DRILLING CONTRACTOR United Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling contractor who drilled the above described well and had conducted deviation test and obtained the following results:

Degrees @ Depth	Degrees @ Depth	Degrees @ Depth
.2° @ 141'		
.3° @ 217'		
.7° @ 515'		
1.2° @ 915'		
.7° @ 1345'		
.5° @ 1746'		
.4° @ 2314'		
.1° @ 2790'		
.3° @ 3200'		

Drilling Contractor- UNITED DRILLING, INC.

By: Luisa Noriega
(Luisa Noriega)

Title: Asst. Office Manager

Subscribed and sworn to before me this 24th day of July, 2012.

Charles Martin
Notary Public
Chaves New Mexico
County State

My Commission Expires: 10/8/12