

DRILLING INC. Oil Well Drilling Contractor

Post Office Box 160 Artesia, New Mexico 88211-0160 Office (575) 748-8704 Fax (575) 748-8719

August 1, 2012

30-015-39969

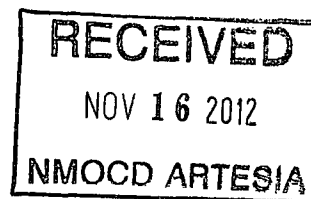
COG Operating, LLC
550 W. Texas, Suite 1300
Midland, Texas 79701

Re: Pinto 36 State Com # 2H
Sec. 36, T-18-S, R-25-E
Eddy County, New Mexico

Attn: Jim Evans

The following is a Deviation Survey on the referenced well in Eddy County, New Mexico:

402' - 0.25°	1175' - 0.75°	1680' - 1°
863' - 1°	1399' - 1°	



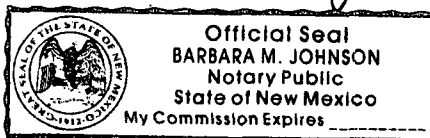
Sincerely,

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 1st day of August, 2012 by Gary W. Chappell.

NOTARY PUBLIC



COG Operating LLC

Eddy County, NM

Pinto 36 State Com 2H

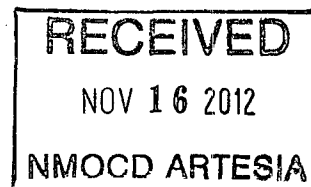
Pinto 36 State Com 2H

Wellbore #1

Survey: MWD Surveys

Standard Survey Report

30 July, 2012





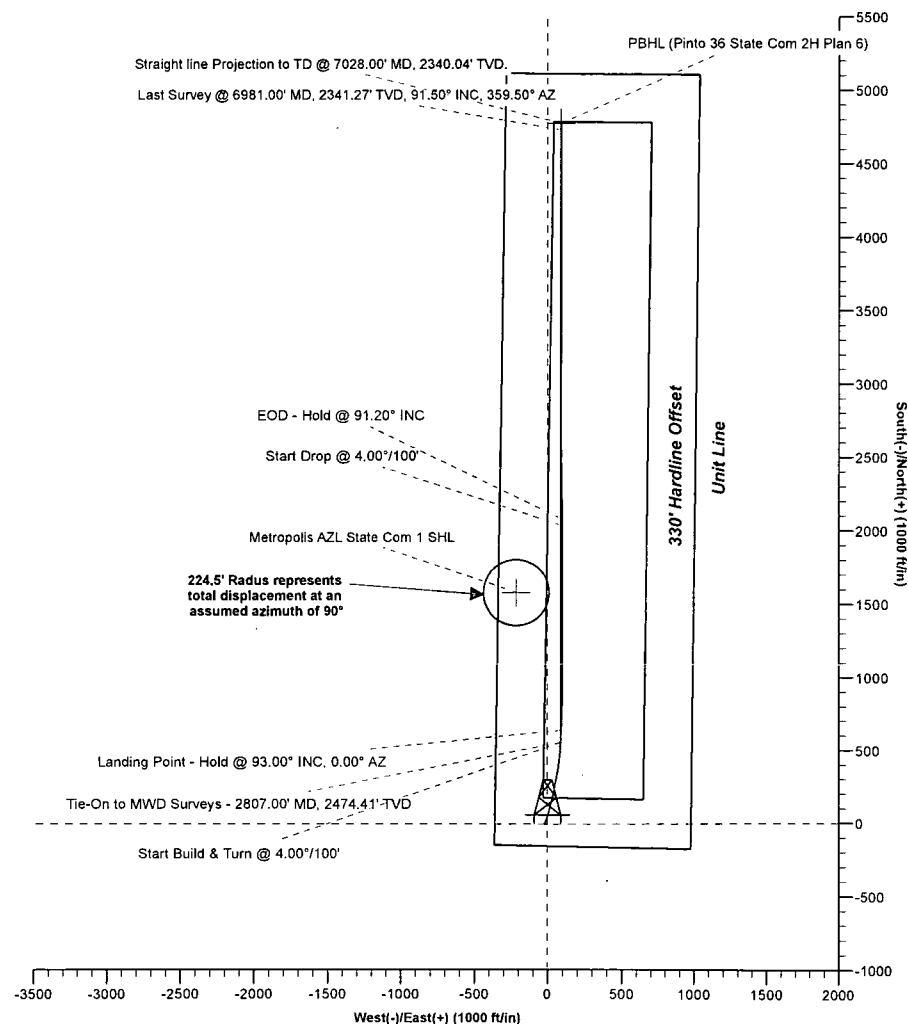
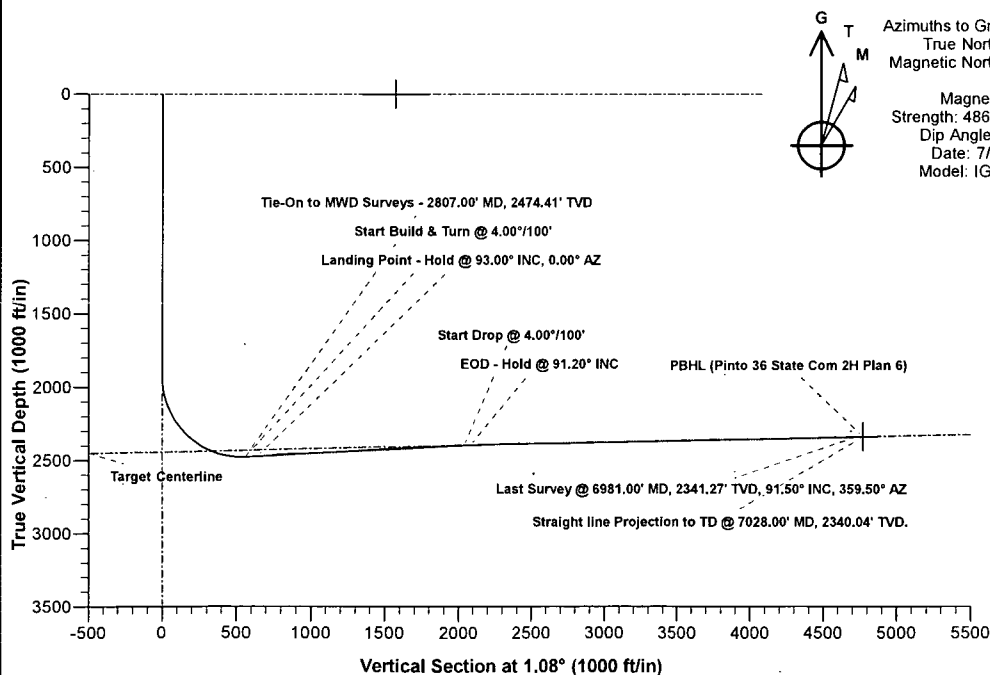
COG Operating LLC
Pinto 36 State Com 2H
Eddy County, NM
Plan #6



Surface Location		Ground Elev: 3490.00 WELL @ 3503.00ft (JW #4)			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.00	0.00	617446.600	466889.400	32.697409	-104.440969

TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL (Pinto 36 State Com 2H Plan 6)	2339.96	4775.10	90.10	622221.700	466979.500	32.710535	-104.440692

SECTION DETAILS											
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VFace	Annotation	
1	2807.00	91.10	2.70	2474.41	557.57	88.05	0.00	0.00	559.13	Tie-On to MWD Surveys - 2807.00' MD, 2474.41' TVD	
2	2889.50	93.00	0.00	2471.46	639.99	89.99	4.00	-54.81	641.57	Landing Point - Hold @ 93.00° INC, 0.00° AZ	
3	4289.50	93.00	0.00	2398.18	2038.07	89.99	0.00	0.00	2039.40	Start Drop @ 4.00°/100'	
4	4334.40	91.20	0.00	2396.54	2082.94	89.99	4.00	179.93	2084.26	EOD - Hold @ 91.20° INC	
5	7027.16	91.20	0.00	2339.96	4775.10	90.10	0.00	0.00	4775.95	PBHL @ 7027.16' MD - 2339.96' TVD	



Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Pinto 36 State Com 2H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3503.00ft (JW #4)
Site:	Pinto 36 State Com 2H	MD Reference:	WELL @ 3503.00ft (JW #4)
Well:	Pinto 36 State Com 2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Houston R5000 Database

Project:	Eddy County, NM		
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						Pinto 36 State Com 2H											
Site Position:			Northing:			617,446.600 ft			Latitude:			32.697410					
From:			Map			Easting:			466,889.400 ft			Longitude:			-104.440969		
Position Uncertainty:			0.00 ft			Slot Radius:			13.200 in			Grid Convergence:			-0.06 °		

Well	Pinto 36 State Com-2H					
Well Position	+N/-S	0.00 ft	Northing:	617,446.600 ft	Latitude:	32.697410
	+E/-W	0.00 ft	Easting:	466,889.400 ft	Longitude:	-104.440969
Position Uncertainty		0.00 ft	Wellhead Elevation:	ft	Ground Level:	3,490.00 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	7/17/2012	7.89	60.45	48,694

Design:		Wellbore #1			
Audit Notes:					
Version:		1.0	Phase:		ACTUAL
			Tie On Depth:		0.00
Vertical Section:		Depth From (TVD)		+N/-S	+E/-W
		(ft)		(ft)	(ft)
		0.00		0.00	0.00
					1.08

Survey Program		Date 7/30/2012		
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description
100.00	1,897.00	Gyro Surveys (Wellbore #1)	MWD	MWD - Standard
1,934.00	7,028.00	MWD Surveys (Wellbore #1)	MWD	MWD - Standard

Survey										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/-S	+E/-W	Vertical Section	Dogleg Rate	Build Rate	Turn Rate	
(ft)	(°)	(°)	(ft)	(ft)	(ft)	(ft)	(°/100ft)	(°/100ft)	(°/100ft)	
1,897.00	0.28	311.64	1,896.86	0.81	-19.00	0.46	0.00	0.00	0.00	
1,934.00	0.50	25.70	1,933.85	1.02	-19.00	0.66	1.36	0.59	200.16	
1,965.00	3.30	26.40	1,964.83	1.94	-18.55	1.59	9.03	9.03	2.26	
1,996.00	7.00	23.40	1,995.70	4.47	-17.40	4.15	11.96	11.94	-9.68	
2,027.00	10.60	21.10	2,026.33	8.87	-15.62	8.57	11.67	11.61	-7.42	
2,058.00	14.10	19.70	2,056.61	15.09	-13.32	14.83	11.33	11.29	-4.52	
2,089.00	17.60	20.60	2,086.43	23.03	-10.40	22.83	11.32	11.29	2.90	
2,120.00	20.90	21.50	2,115.69	32.57	-6.72	32.43	10.69	10.65	2.90	
2,152.00	24.10	20.80	2,145.25	43.99	-2.31	43.94	10.03	10.00	-2.19	
2,183.00	27.30	18.80	2,173.18	56.64	2.23	56.67	10.69	10.32	-6.45	

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Pinto 36 State Com 2H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3503.00ft (JW #4)
Site:	Pinto 36 State Com 2H	MD Reference:	WELL @ 3503.00ft (JW #4)
Well:	Pinto 36 State Com 2H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Houston R5000 Database

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)
2,214.00	30.40	16.90	2,200.33	70.88	6.80	70.99	10.43	10.00	-6.13
2,245.00	33.80	14.40	2,226.59	86.74	11.23	86.93	11.77	10.97	-8.06
2,276.00	37.00	12.90	2,251.86	104.19	15.46	104.46	10.70	10.32	-4.84
2,307.00	40.50	12.70	2,276.03	123.11	19.75	123.46	11.30	11.29	-0.65
2,338.00	43.50	13.40	2,299.06	143.31	24.44	143.74	9.79	9.68	2.26
2,370.00	46.60	13.40	2,321.67	165.34	29.69	165.87	9.69	9.69	0.00
2,401.00	49.60	12.70	2,342.37	187.81	34.90	188.44	9.82	9.68	-2.26
2,432.00	52.60	12.90	2,361.83	211.34	40.24	212.06	9.69	9.68	0.65
2,463.00	56.00	12.90	2,379.92	235.87	45.86	236.69	10.97	10.97	0.00
2,494.00	59.10	12.20	2,396.55	261.40	51.54	262.33	10.18	10.00	-2.26
2,525.00	62.30	10.90	2,411.72	287.89	56.95	288.91	10.95	10.32	-4.19
2,557.00	65.50	9.90	2,425.80	316.15	62.13	317.26	10.39	10.00	-3.13
2,588.00	68.80	9.50	2,437.84	344.30	66.94	345.50	10.71	10.65	-1.29
2,619.00	72.10	9.20	2,448.21	373.12	71.69	374.41	10.68	10.65	-0.97
2,650.00	75.50	7.60	2,456.86	402.57	76.03	403.93	12.04	10.97	-5.16
2,681.00	78.80	5.80	2,463.75	432.58	79.55	434.00	12.06	10.65	-5.81
2,713.00	82.00	4.60	2,469.09	464.00	82.41	465.47	10.66	10.00	-3.75
2,744.00	85.20	3.50	2,472.54	494.72	84.59	496.23	10.91	10.32	-3.55
2,776.00	88.50	3.20	2,474.30	526.62	86.45	528.15	10.35	10.31	-0.94
2,807.00	91.10	2.70	2,474.41	557.57	88.05	559.13	8.54	8.39	-1.61
2,839.00	91.70	2.10	2,473.63	589.53	89.39	591.11	2.65	1.88	-1.88
2,932.00	94.30	2.50	2,468.76	682.32	93.11	683.96	2.83	2.80	0.43
3,026.00	94.10	1.30	2,461.87	776.02	96.22	777.69	1.29	-0.21	-1.28
3,119.00	92.20	0.40	2,456.76	868.86	97.60	870.55	2.26	-2.04	-0.97
3,213.00	92.40	0.60	2,452.99	962.78	98.42	964.47	0.30	0.21	0.21
3,306.00	92.90	0.70	2,448.69	1,055.68	99.47	1,057.36	0.55	0.54	0.11
3,400.00	92.70	359.90	2,444.10	1,149.56	99.96	1,151.24	0.88	-0.21	-0.85
3,494.00	93.40	0.20	2,439.10	1,243.43	100.05	1,245.09	0.81	0.74	0.32
3,587.00	94.00	0.60	2,433.10	1,336.23	100.69	1,337.89	0.77	0.65	0.43
3,681.00	93.60	0.00	2,426.87	1,430.02	101.19	1,431.68	0.77	-0.43	-0.64
3,774.00	92.70	359.70	2,421.76	1,522.88	100.94	1,524.51	1.02	-0.97	-0.32
3,868.00	93.80	359.90	2,416.43	1,616.73	100.61	1,618.34	1.19	1.17	0.21
3,962.00	92.70	359.70	2,411.10	1,710.58	100.29	1,712.16	1.19	-1.17	-0.21
4,055.00	93.10	359.90	2,406.39	1,803.46	99.96	1,805.02	0.48	0.43	0.22
4,149.00	91.80	359.70	2,402.37	1,897.37	99.63	1,898.91	1.40	-1.38	-0.21
4,243.00	92.60	359.90	2,398.77	1,991.30	99.31	1,992.81	0.88	0.85	0.21
4,336.00	91.50	359.30	2,395.44	2,084.23	98.66	2,085.72	1.35	-1.18	-0.65
4,430.00	91.10	359.00	2,393.31	2,178.20	97.26	2,179.64	0.53	-0.43	-0.32
4,524.00	91.80	359.00	2,390.93	2,272.15	95.62	2,273.55	0.74	0.74	0.00
4,617.00	91.10	358.40	2,388.57	2,365.10	93.51	2,366.44	0.99	-0.75	-0.65
4,711.00	90.10	359.20	2,387.59	2,459.07	91.55	2,460.36	1.36	-1.06	0.85
4,804.00	90.60	359.00	2,387.02	2,552.06	90.08	2,553.30	0.58	0.54	-0.22
4,898.00	90.80	0.00	2,385.87	2,646.05	89.26	2,647.26	1.08	0.21	1.06

Survey Report

Company:	COG Operating LLC	Local Co-ordinate Reference:	Site Pinto 36 State Com 2H
Project:	Eddy County, NM	TVD Reference:	WELL @ 3503.00ft (JW #4)
Site:	Pinto 36 State Com 2H	MD Reference:	WELL @ 3503.00ft (JW #4)
Well:	Pinto 36 State Com 2H	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)	
4,992.00	91.30	0.20	2,384.15	2,740.03	89.43	2,741.23	0.57	0.53	0.21	
5,085.00	91.50	0.00	2,381.88	2,833.00	89.59	2,834.19	0.30	0.22	-0.22	
5,179.00	91.80	0.00	2,379.17	2,926.96	89.59	2,928.13	0.32	0.32	0.00	
5,272.00	90.60	0.40	2,377.23	3,019.94	89.92	3,021.10	1.36	-1.29	0.43	
5,366.00	91.30	0.40	2,375.67	3,113.92	90.57	3,115.08	0.74	0.74	0.00	
5,459.00	91.30	0.20	2,373.56	3,206.90	91.06	3,208.04	0.21	0.00	-0.22	
5,553.00	91.50	0.20	2,371.26	3,300.87	91.39	3,302.01	0.21	0.21	0.00	
5,646.00	91.70	0.00	2,368.66	3,393.83	91.55	3,394.96	0.30	0.22	-0.22	
5,740.00	91.80	0.00	2,365.79	3,487.79	91.55	3,488.89	0.11	0.11	0.00	
5,834.00	90.80	0.00	2,363.66	3,581.76	91.55	3,582.85	1.06	-1.06	0.00	
5,927.00	91.00	0.00	2,362.20	3,674.75	91.55	3,675.82	0.22	0.22	0.00	
6,020.00	91.10	0.20	2,360.50	3,767.74	91.71	3,768.80	0.24	0.11	0.22	
6,114.00	91.30	359.90	2,358.53	3,861.72	91.79	3,862.76	0.38	0.21	-0.32	
6,207.00	90.40	0.40	2,357.15	3,954.70	92.04	3,955.74	1.11	-0.97	0.54	
6,301.00	91.00	0.00	2,356.00	4,048.70	92.36	4,049.72	0.77	0.64	-0.43	
6,394.00	91.30	359.90	2,354.13	4,141.68	92.28	4,142.68	0.34	0.32	-0.11	
6,488.00	91.10	359.70	2,352.16	4,235.66	91.96	4,236.64	0.30	-0.21	-0.21	
6,582.00	91.70	0.20	2,349.87	4,329.63	91.87	4,330.59	0.83	0.64	0.53	
6,675.00	91.80	0.00	2,347.03	4,422.58	92.04	4,423.53	0.24	0.11	-0.22	
6,769.00	90.60	0.40	2,345.06	4,516.56	92.36	4,517.50	1.35	-1.28	0.43	
6,863.00	91.00	359.90	2,343.75	4,610.55	92.61	4,611.48	0.68	0.43	-0.53	
6,956.00	91.30	359.90	2,341.88	4,703.53	92.45	4,704.44	0.32	0.32	0.00	
6,981.00	91.50	359.50	2,341.27	4,728.52	92.32	4,729.42	1.79	0.80	-1.60	
Last Survey @ 6981.00' MD, 2341.27' TVD, 91.50° INC, 359.50° AZ										
7,028.00	91.50	359.50	2,340.04	4,775.50	91.91	4,776.39	0.00	0.00	0.00	
Straight line Projection to TD @ 7028.00' MD, 2340.04' TVD.										

Survey Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
6,981.00	2,341.27	4,728.52	92.32	Last Survey @ 6981.00' MD, 2341.27' TVD, 91.50° INC, 359.50° AZ
7,028.00	2,340.04	4,775.50	91.91	Straight line Projection to TD @ 7028.00' MD, 2340.04' TVD.

Checked By: _____	Approved By: _____	Date: _____
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CRESCENT

DIRECTIONAL DRILLING

Minimum Curvature Calculation

Client: COG Operating LLC
 Well: Pinto 36 State Com 2H
 County: Eddy
 Rig: JW #4

M.W.D. OPERATORS: M. Rainey/CJ Hall
 DIRECTIONAL DRILLERS: D. Patterson/F. Smith
 Tool Azimuth to Grid North: 0.06
 Job #: PB-12457

Vertical Section Angle: 1.08

Sur #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N/-S	+E/-W	DLS
40	3774.00	92.70	359.70	2421.76	1524.51	1522.88	100.95	1.02
41	3868.00	93.80	359.90	2416.43	1618.33	1616.72	100.62	1.19
42	3962.00	92.70	359.70	2411.10	1712.16	1710.57	100.29	1.19
43	4055.00	93.10	359.90	2406.40	1805.01	1803.45	99.97	0.48
44	4149.00	91.80	359.70	2402.38	1898.90	1897.36	99.64	1.40
45	4243.00	92.60	359.90	2398.77	1992.81	1991.29	99.31	0.88
46	4336.00	91.50	359.30	2395.44	2085.72	2084.23	98.66	1.35
47	4430.00	91.10	359.00	2393.31	2179.64	2178.19	97.27	0.53
48	4524.00	91.80	359.00	2390.93	2273.55	2272.15	95.63	0.74
49	4617.00	91.10	358.40	2388.58	2366.44	2365.09	93.52	0.99
50	4711.00	90.10	359.20	2387.60	2460.35	2459.07	91.55	1.36
51	4804.00	90.60	359.00	2387.03	2553.30	2552.05	90.09	0.58
52	4898.00	90.80	0.00	2385.88	2647.25	2646.04	89.27	1.08
53	4992.00	91.30	0.20	2384.16	2741.22	2740.02	89.43	0.57
54	5085.00	91.50	0.00	2381.88	2834.18	2833.00	89.59	0.30
55	5179.00	91.80	0.00	2379.18	2928.13	2926.96	89.59	0.32
56	5272.00	90.60	0.40	2377.23	3021.09	3019.93	89.92	1.36
57	5366.00	91.30	0.40	2375.67	3115.07	3113.92	90.58	0.74
58	5459.00	91.30	0.20	2373.56	3208.04	3206.89	91.06	0.21
59	5553.00	91.50	0.20	2371.26	3302.00	3300.86	91.39	0.21
60	5646.00	91.70	0.00	2368.67	3394.95	3393.83	91.55	0.30
61	5740.00	91.80	0.00	2365.80	3488.89	3487.78	91.55	0.11
62	5834.00	90.80	0.00	2363.66	3582.85	3581.76	91.55	1.06
63	5927.00	91.00	0.00	2362.20	3675.82	3674.75	91.55	0.22
64	6020.00	91.10	0.20	2360.50	3768.79	3767.73	91.71	0.24
65	6114.00	91.30	359.90	2358.53	3862.75	3861.71	91.80	0.38
66	6207.00	90.40	0.40	2357.15	3955.73	3954.70	92.04	1.11
67	6301.00	91.00	0.00	2356.00	4049.71	4048.69	92.37	0.77
68	6394.00	91.30	359.90	2354.14	4142.68	4141.67	92.29	0.34
69	6488.00	91.10	359.70	2352.17	4236.63	4235.65	91.96	0.30
70	6582.00	91.70	0.20	2349.87	4330.58	4329.62	91.88	0.83
71	6675.00	91.80	0.00	2347.03	4423.53	4422.58	92.04	0.24
72	6769.00	90.60	0.40	2345.06	4517.49	4516.56	92.37	1.35
73	6863.00	91.00	359.90	2343.75	4611.47	4610.55	92.61	0.68
74	6956.00	91.30	359.90	2341.88	4704.43	4703.53	92.45	0.32
75	6981.00	91.50	359.50	2341.27	4729.42	4728.52	92.32	1.79
BHL	7028.00	91.50	359.50	2340.04	4776.38	4775.50	91.91	0.00

CRESCENT

DIRECTIONAL DRILLING

Minimum Curvature Calculation

Client: COG Operating LLC
Well: Pinto 36 State Com 2H
County: Eddy
Rig: JW #4

M.W.D. OPERATORS: M. Rainey/CJ Hall
DIRECTIONAL DRILLERS: D. Patterson/F. Smith
Tool Azimuth to Grid North: 0.06
Job #: PB-12457

Vertical Section Angle: 1.08

Sur #	Meas. Depth	Inc.	Azm.	T.V.D.	Ver. Sect.	+N/-S	+E/-W	DLS
Tie In	1897.00	0.28	311.64	1896.86	0.45	0.81	-19.00	0.00
1	1934.00	0.50	25.70	1933.86	0.66	1.02	-19.00	1.36
2	1965.00	3.30	26.40	1964.84	1.59	1.94	-18.54	9.03
3	1996.00	7.00	23.40	1995.71	4.14	4.47	-17.39	11.96
4	2027.00	10.60	21.10	2026.34	8.57	8.87	-15.62	11.67
5	2058.00	14.10	19.70	2056.62	14.83	15.08	-13.32	11.33
6	2089.00	17.60	20.60	2086.43	22.83	23.03	-10.39	11.32
7	2120.00	20.90	21.50	2115.70	32.43	32.56	-6.72	10.69
8	2152.00	24.10	20.80	2145.26	43.93	43.98	-2.31	10.03
9	2183.00	27.30	18.80	2173.19	56.66	56.63	2.23	10.69
10	2214.00	30.40	16.90	2200.34	70.99	70.87	6.81	10.43
11	2245.00	33.80	14.40	2226.59	86.93	86.73	11.23	11.77
12	2276.00	37.00	12.90	2251.86	104.46	104.18	15.46	10.70
13	2307.00	40.50	12.70	2276.03	123.45	123.10	19.76	11.30
14	2338.00	43.50	13.40	2299.07	143.74	143.30	24.44	9.79
15	2370.00	46.60	13.40	2321.67	165.86	165.33	29.69	9.69
16	2401.00	49.60	12.70	2342.37	188.43	187.81	34.90	9.82
17	2432.00	52.60	12.90	2361.84	212.05	211.33	40.24	9.69
18	2463.00	56.00	12.90	2379.93	236.69	235.87	45.86	10.97
19	2494.00	59.10	12.20	2396.56	262.32	261.40	51.54	10.18
20	2525.00	62.30	10.90	2411.73	288.90	287.88	56.95	10.95
21	2557.00	65.50	9.90	2425.80	317.26	316.14	62.13	10.39
22	2588.00	68.80	9.50	2437.84	345.50	344.30	66.95	10.71
23	2619.00	72.10	9.20	2448.21	374.40	373.12	71.69	10.68
24	2650.00	75.50	7.60	2456.86	403.93	402.56	76.04	12.04
25	2681.00	78.80	5.80	2463.75	434.00	432.58	79.56	12.06
26	2713.00	82.00	4.60	2469.09	465.46	463.99	82.42	10.66
27	2744.00	85.20	3.50	2472.55	496.23	494.72	84.59	10.91
28	2776.00	88.50	3.20	2474.30	528.15	526.61	86.46	10.35
29	2807.00	91.10	2.70	2474.41	559.13	557.57	88.05	8.54
30	2839.00	91.70	2.10	2473.63	591.11	589.53	89.39	2.65
31	2932.00	94.30	2.50	2468.76	683.95	682.32	93.12	2.83
32	3026.00	94.10	1.30	2461.88	777.69	776.01	96.23	1.29
33	3119.00	92.20	0.40	2456.77	870.54	868.86	97.60	2.26
34	3213.00	92.40	0.60	2453.00	964.46	962.78	98.42	0.30
35	3306.00	92.90	0.70	2448.70	1057.36	1055.67	99.48	0.55
36	3400.00	92.70	359.90	2444.10	1151.24	1149.56	99.97	0.88
37	3494.00	93.40	0.20	2439.10	1245.09	1243.42	100.05	0.81
38	3587.00	94.00	0.60	2433.10	1337.89	1336.23	100.70	0.77
39	3681.00	93.60	0.00	2426.87	1431.67	1430.02	101.19	0.77