

COG Operating LLC

Eddy County, NM (NAD27 NME)

Tarpan 33 Fee #3H

#3H

OH - Job #32H09121136

30-015-40122

Design: OH

SDI Standard Survey Report

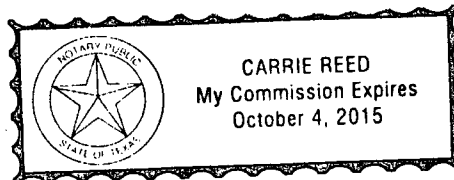
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 8th of October, 2012.



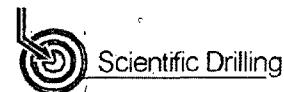
Notary Signature
County of Midland
State of Texas



Scientific Drilling



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3393.00usft (JW #4)
Site:	Tarpan 33 Fee #3H	MD Reference:	RF @ 3393.00usft (JW #4)
Well:	#3H	North Reference:	Grid
Wellbore:	OH - Job #32H09121136	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

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	Tarpan 33 Fee #3H		
Site Position:		Northing:	617,393.40 usft
From:	Map	Easting:	482,672.90 usft
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"
		Latitude:	32° 41' 50.280 N
		Longitude:	104° 23' 22.771 W
		Grid Convergence:	-0.03 °

Well	#3H		
Well Position	+N-S	0.00 usft	Northing:
	+E-W	0.00 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	usft
		Latitude:	32° 41' 50.280 N
		Longitude:	104° 23' 22.771 W
		Ground Level:	3,380.00 usft

Wellbore	OH - Job #32H09121136		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF2010	08/31/12	7.85
			Dip Angle
			(°)
			60.45
			Field Strength
			(nT)
			48,689

Design:	OH		
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
			(°)
			359.90

Survey Program	Date 10/15/12		
From	To	Survey (Wellbore)	Tool Name
(usft)	(usft)		
100.00	2,520.00	Gyro (OH - Job #32H09121136)	Keeper
2,559.00	7,690.00	MWD (OH - Job #32H09121136)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey			
Measured Depth	Inclination	Azimuth	True Vertical
(usft)	(°)	(°)	Depth
0.00	0.00	0.00	0.00
100.00	0.26	56.27	100.00
200.00	0.43	49.59	200.00
300.00	0.19	46.79	300.00
400.00	0.39	78.10	399.99
500.00	0.71	123.36	499.99
600.00	0.89	140.24	599.98
700.00	0.80	153.48	699.97
800.00	0.98	167.06	799.96
900.00	0.76	170.88	899.95
1,000.00	0.66	174.21	999.94
			North/South
			(usft)
			0.00
			0.13
			0.50
			0.85
			1.04
			0.77
			-0.17
			-1.39
			-2.85
			-4.34
			-5.57
			East/West
			(usft)
			0.00
			0.19
			0.66
			1.07
			1.52
			2.37
			3.39
			4.20
			4.70
			5.00
			5.16
			Closure Azimuth
			(°)
			0.00
			56.27
			53.25
			51.46
			55.79
			72.14
			92.92
			108.38
			121.25
			130.98
			137.18
			Closure Distance
			(usft)
			0.00
			0.23
			0.83
			1.37
			1.84
			2.49
			3.39
			4.42
			5.50
			6.62
			7.59



Scientific Drilling International, Inc.
SDI Standard Survey Report

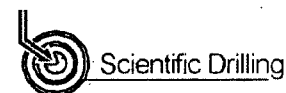


Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3393.00usft (JW #4)
Site:	Tarpan 33 Fee #3H	MD Reference:	RF @ 3393.00usft (JW #4)
Well:	#3H	North Reference:	Grid
Wellbore:	OH - Job #32H09121136	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,100.00	0.69	188.33	1,099.93	-6.74	5.13	142.71	8.47
1,200.00	0.51	193.14	1,199.93	-7.77	4.94	147.53	9.21
1,300.00	0.46	180.66	1,299.92	-8.60	4.84	150.65	9.87
1,400.00	0.47	173.92	1,399.92	-9.41	4.88	152.61	10.60
1,500.00	0.58	176.76	1,499.92	-10.32	4.95	154.40	11.45
1,600.00	0.67	174.09	1,599.91	-11.41	5.04	156.19	12.47
1,700.00	0.65	183.12	1,699.90	-12.56	5.07	158.03	13.54
1,800.00	0.57	174.16	1,799.90	-13.62	5.09	159.53	14.54
1,900.00	0.43	186.46	1,899.89	-14.49	5.09	160.63	15.36
2,000.00	0.40	186.74	1,999.89	-15.21	5.01	161.76	16.01
2,100.00	0.41	178.31	2,099.89	-15.91	4.98	162.62	16.67
2,200.00	0.28	156.12	2,199.89	-16.49	5.09	162.85	17.26
2,300.00	0.42	158.60	2,299.88	-17.06	5.32	162.67	17.87
2,400.00	0.24	134.62	2,399.88	-17.55	5.60	162.28	18.42
2,500.00	0.44	103.55	2,499.88	-17.78	6.13	160.99	18.81
2,520.00	0.42	94.46	2,519.88	-17.81	6.27	160.59	18.88
Gyro Tie-in							
2,559.00	0.44	122.57	2,558.88	-17.90	6.54	159.92	19.06
2,590.00	0.88	64.21	2,589.88	-17.86	6.86	158.99	19.13
2,621.00	4.40	22.02	2,620.84	-16.65	7.52	155.70	18.27
2,653.00	8.62	16.22	2,652.63	-13.21	8.65	146.78	15.79
2,684.00	12.94	13.28	2,683.07	-7.60	10.10	126.96	12.64
2,707.95	16.32	12.45	2,706.24	-1.70	11.44	98.46	11.56
PP=330' FSL Tarpan 33 Fee #3H							
2,715.00	17.32	12.27	2,712.99	0.29	11.88	88.59	11.88
2,746.00	21.43	11.13	2,742.23	10.36	13.95	53.39	17.38
2,777.00	25.15	9.63	2,770.70	22.42	16.15	35.76	27.63
2,808.00	29.19	9.37	2,798.27	36.38	18.48	26.93	40.80
2,839.00	33.06	10.51	2,824.81	52.16	21.25	22.17	56.32
2,871.00	35.61	10.77	2,851.23	69.89	24.59	19.38	74.09
2,902.00	38.25	10.07	2,876.01	88.21	27.95	17.58	92.53
2,933.00	41.50	9.37	2,899.79	107.80	31.30	16.19	112.25
2,964.00	45.20	8.93	2,922.33	128.80	34.68	15.07	133.39
2,996.00	48.28	8.58	2,944.26	151.83	38.23	14.13	156.57
3,027.00	48.80	9.02	2,964.79	174.79	41.78	13.44	179.72
3,058.00	51.23	9.29	2,984.70	198.24	45.56	12.94	203.41
3,089.00	54.08	9.19	3,003.51	222.56	49.52	12.54	228.00
3,121.00	57.55	8.50	3,021.48	248.71	53.59	12.16	254.42
3,152.00	61.20	6.82	3,037.27	275.15	57.13	11.73	281.02
3,183.00	64.45	7.20	3,051.43	302.52	60.50	11.31	308.51
3,215.00	67.53	7.43	3,064.45	331.51	64.22	10.96	337.67
3,246.00	70.84	7.07	3,075.46	360.25	67.88	10.67	366.59
3,277.00	74.13	6.38	3,084.79	389.60	71.34	10.38	396.08
3,308.00	76.59	5.68	3,092.63	419.43	74.49	10.07	425.99
3,339.00	79.49	5.50	3,099.05	449.61	77.44	9.77	456.23



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3393.00usft (JW #4)
Site:	Tarpan 33 Fee #3H	MD Reference:	RF @ 3393.00usft (JW #4)
Well:	#3H	North Reference:	Grid
Wellbore:	OH - Job #32H09121136	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
3,370.00	82.52	6.14	3,103.90	480.06	80.55	9.52	486.77
3,402.00	84.59	6.56	3,107.49	511.67	84.06	9.33	518.52
3,433.00	86.35	7.17	3,109.94	542.35	87.76	9.19	549.40
3,464.00	88.46	7.79	3,111.34	573.05	91.79	9.10	580.35
3,526.00	92.55	5.89	3,110.79	634.59	99.17	8.88	642.29
3,589.00	91.89	4.01	3,108.35	697.30	104.60	8.53	705.11
3,651.00	91.36	1.55	3,106.59	759.20	107.61	8.07	766.79
3,713.00	91.98	358.91	3,104.79	821.17	107.86	7.48	828.22
3,776.00	92.15	358.47	3,102.52	884.11	106.42	6.86	890.49
3,838.00	92.42	358.29	3,100.05	946.04	104.66	6.31	951.81
3,900.00	92.86	358.47	3,097.19	1,007.95	102.91	5.83	1,013.19
3,962.00	93.03	358.29	3,094.00	1,069.84	101.16	5.40	1,074.61
4,025.00	93.39	359.08	3,090.48	1,132.72	99.72	5.03	1,137.10
4,087.00	93.83	358.47	3,086.57	1,194.58	98.40	4.71	1,198.63
4,150.00	92.77	358.65	3,082.95	1,257.46	96.82	4.40	1,261.18
4,212.00	92.59	357.77	3,080.05	1,319.36	94.88	4.11	1,322.77
4,306.00	92.95	358.03	3,075.50	1,413.19	91.44	3.70	1,416.14
4,399.00	93.46	357.53	3,070.30	1,505.97	87.84	3.34	1,508.53
4,493.00	92.95	358.12	3,065.05	1,599.76	84.28	3.02	1,601.98
4,586.00	92.24	358.82	3,060.84	1,692.63	81.80	2.77	1,694.60
4,680.00	92.86	358.38	3,056.66	1,786.51	79.51	2.55	1,788.27
4,774.00	91.80	358.65	3,052.84	1,880.39	77.07	2.35	1,881.97
4,868.00	92.24	358.56	3,049.52	1,974.31	74.79	2.17	1,975.72
4,961.00	91.19	358.29	3,046.74	2,067.23	72.23	2.00	2,068.49
5,055.00	91.80	358.47	3,044.29	2,161.16	69.58	1.84	2,162.28
5,148.00	92.24	358.21	3,041.01	2,254.06	66.88	1.70	2,255.05
5,242.00	92.86	357.85	3,036.83	2,347.91	63.66	1.55	2,348.78
5,335.00	92.24	357.59	3,032.69	2,440.75	59.96	1.41	2,441.48
5,429.00	92.95	357.33	3,028.43	2,534.56	55.80	1.26	2,535.17
5,522.00	91.98	358.91	3,024.43	2,627.42	52.75	1.15	2,627.95
5,616.00	92.68	358.65	3,020.61	2,721.32	50.75	1.07	2,721.79
5,710.00	91.78	358.68	3,016.95	2,815.22	48.56	0.99	2,815.64
5,803.00	91.98	358.03	3,013.90	2,908.13	45.89	0.90	2,908.49
5,897.00	92.33	357.41	3,010.37	3,001.99	42.16	0.80	3,002.29
5,990.00	92.95	357.24	3,006.08	3,094.79	37.82	0.70	3,095.02
6,084.00	91.89	357.94	3,002.11	3,188.62	33.87	0.61	3,188.80
6,177.00	92.51	358.47	2,998.54	3,281.51	30.96	0.54	3,281.65
6,270.00	91.07	358.79	2,995.64	3,374.43	28.74	0.49	3,374.55
6,364.00	91.64	358.48	2,993.42	3,468.38	26.50	0.44	3,468.48
6,457.00	92.33	359.00	2,990.20	3,561.30	24.46	0.39	3,561.38
6,551.00	92.24	359.00	2,986.45	3,655.21	22.82	0.36	3,655.28
6,644.00	92.95	359.35	2,982.24	3,748.10	21.48	0.33	3,748.17
6,738.00	91.71	359.50	2,978.42	3,842.02	20.54	0.31	3,842.07
6,831.00	92.58	358.94	2,974.93	3,934.94	19.27	0.28	3,934.99



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	RF @ 3393.00usft (JW #4)
Site:	Tarpan 33 Fee #3H	MD Reference:	RF @ 3393.00usft (JW #4)
Well:	#3H	North Reference:	Grid
Wellbore:	OH - Job #32H09121136	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
6,925.00	91.58	0.18	2,971.52	4,028.88	18.55	0.26	4,028.92
7,019.00	92.69	359.18	2,968.02	4,122.81	18.03	0.25	4,122.85
7,112.00	91.68	359.14	2,964.48	4,215.73	16.66	0.23	4,215.76
7,206.00	92.55	359.62	2,961.01	4,309.66	15.65	0.21	4,309.69
7,299.00	91.98	358.91	2,957.33	4,402.58	14.46	0.19	4,402.60
7,393.00	91.36	358.91	2,954.59	4,496.52	12.67	0.16	4,496.54
7,487.00	92.07	358.56	2,951.78	4,590.45	10.59	0.13	4,590.47
7,581.00	93.09	358.61	2,947.55	4,684.33	8.28	0.10	4,684.34
7,643.00	93.63	358.34	2,943.91	4,746.20	6.63	0.08	4,746.20
Last MWD Survey							
7,681.42	93.63	358.34	2,941.48	4,784.52	5.52	0.07	4,784.53
PBHL-Tarpan 33 Fee #3H							
7,690.00	93.63	358.34	2,940.94	4,793.09	5.27	0.06	4,793.09
Projection to Bit							

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,520.00	2,519.88	-17.81	6.27	Gyro Tie-in
7,643.00	2,943.91	4,746.20	6.63	Last MWD Survey
7,690.00	2,940.94	4,793.09	5.27	Projection to Bit



Azimuths to Grid North
 True North: 0.03°
 Magnetic North: 7.88°
 Magnetic Field
 Strength: 48689.75nT
 Dip Angle: 60.45°
 Date: 8/31/2012
 Model: IGRF2010

To convert a Magnetic Direction to a Grid Direction, Add 7.88°
 To convert a True Direction to a Grid Direction, Add 0.03°

Tarpan 33 Fee #3H
 Eddy County, NM (NAN27 NME)
 Northing: (Y) 617393.40
 Easting: (X) 482672.90
 Plan #3 vs Actual - 7-7/8" Hole

WELL DETAILS:						
Ground Level: 3380.00						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	617393.40	482672.90	32° 41' 50.280 N	104° 23' 22.771 W	

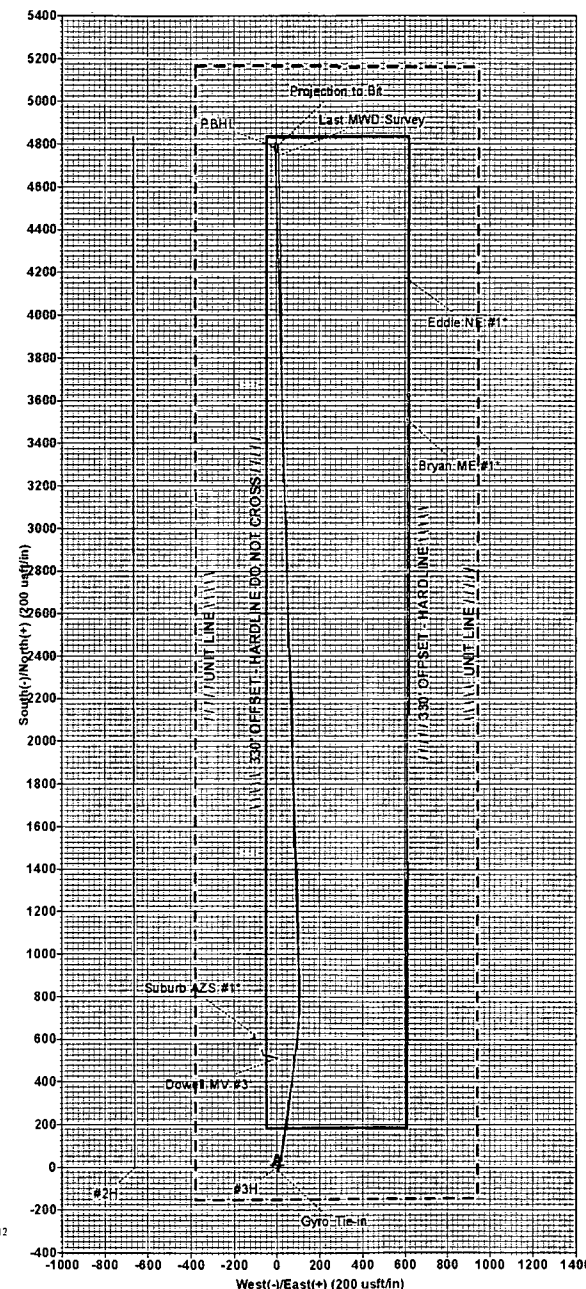
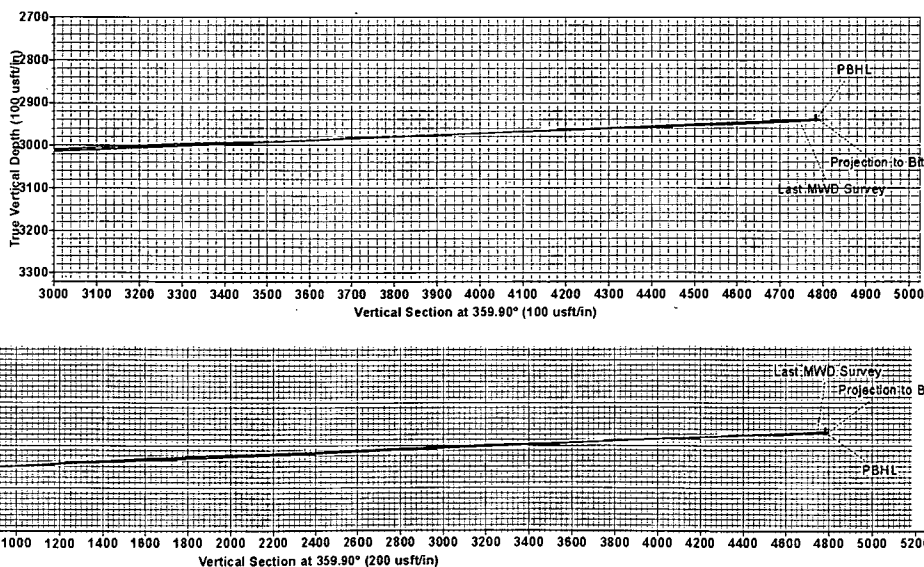
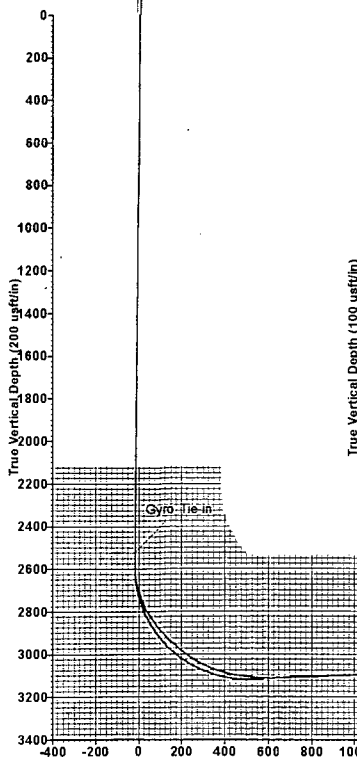
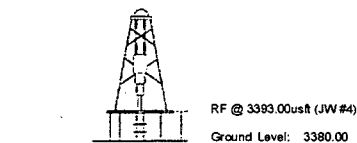
SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	Vsect	Target
2520.00	0.42	94.46	2519.88	-17.81	6.27	0.00	0.00	-17.82	
2597.00	0.42	94.46	2596.88	-17.85	6.84	0.00	0.00	-17.86	
3438.31	92.40	8.00	3118.00	519.99	86.44	10.98	-88.44	519.84	
3759.06	92.40	358.37	3104.55	839.59	104.23	3.00	-89.82	839.41	
7708.96	92.40	358.37	2939.45	4784.43	-8.10	0.00	0.00	4784.44	PBHL

DESIGN TARGET DETAILS					
Name	TVD	+N/-S	+E/-W	Northing	Easting
PBHL-Tarpan 33 Fee #3H	2939.45	4784.43	-8.10	622177.40	482664.80

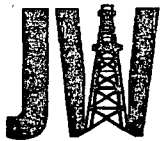
SITE DETAILS: Tarpan 33 Fee
 Site Centre Northing: 617393.40
 Easting: 482672.90
 Positional Uncertainty: 0.00
 Convergence: -0.03
 Local North: Grid

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

Map System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone Name: New Mexico East 3001
 Local Origin: Well #3H, Grid North
 Latitude: 32° 41' 50.280 N
 Longitude: 104° 23' 22.771 W
 Grid East: 482672.90
 Grid North: 617393.40
 Scale Factor: 1.000
 Geomagnetic Model: IGRF2010
 Sample Date: 31-Aug-12
 Magnetic Declination: 7.85°
 Dip Angle from Horizontal: 60.45°
 Magnetic Field Strength: 48689
 To convert a Magnetic Direction to a Grid Direction, Add 7.88°
 To convert a Magnetic Direction to a True Direction, Add 7.85° East
 To convert a True Direction to a Grid Direction, Add 0.03°



Julio Pina
 12-49, September 25, 2012
 Scientific Drilling
 2034 Trade Drive
 Midland, TX 79703



DRILLING INC. Oil Well Drilling Contractor

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

September 20, 2012

COG Operating, LLC
One Concho Center 600 W. Illinois Avenue
Midland, Texas 79701

Re: Tarpan "33" Fee # 3 H
Sec. 33, T-18-S, R -26-E
Eddy County, Texas

Attn: Jim Evans

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

343' - 0.75°	1173' - 0.75°	1778' - 1°
689' - 0.5°	1403' - 1°	2247' - 0.25°

Sincerely,

Gary W. Chappell
Contracts Manager

STATE OF NEW MEXICO)
COUNTY OF EDDY)

The foregoing was acknowledged before me this 20th day of September, 2012 by Gary W. Chappell.

NOTARY PUBLIC

