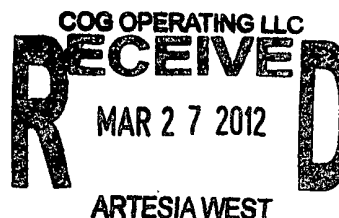




PO Box 1370
Artesia, NM 88211-1370
(575) 748-1288



March 5, 2012

COG, LLC
Fasken Center, Tower II
550 West Texas Ave, Suite 1300
Midland, TX 79701

30-015-39787

RE: Copperhead Fee A #2H
480' FSL & 1650' FWL
Sec. 31, T28S, R29E
Eddy County, New Mexico

Dear Sir,

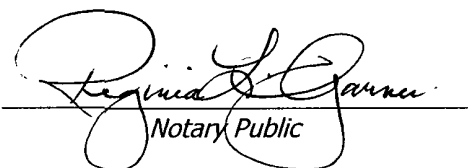
The attached is the Deviation Survey for the above captioned well.

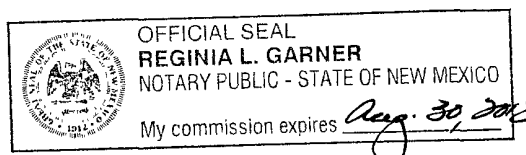
Very truly yours,


Eddie C. LaRue
Operations Manager

State of New Mexico }
County of Eddy }

The foregoing was acknowledged before me this 5th day of March, 2012.


Notary Public



Copperhead Fee A #2H

Date	Depth	Deviation	Direction	TVD
2/12/2012	174	1.30		
2/12/2012	380	2.20		
2/14/2012	648	0.60		
2/14/2012	903	0.80		
2/15/2012	1062	1.70		
2/15/2012	1255	1.40		
2/15/2012	1415	1.10		
2/15/2012	1670	2.80		
2/16/2012	1838	0.90		
2/16/2012	1996	2.60		
2/16/2012	2116	0.90		
2/16/2012	2251	0.30		
2/16/2012	2497	1.40		
2/16/2012	2583	2.10		
2/18/2012	2828	1.00		
2/18/2012	3304	0.90		
2/18/2012	3785	0.80		
2/19/2012	4232	1.00		
2/19/2012	4708	1.20		
2/19/2012	5110	2.00		
2/20/2012	5726	1.60		
2/21/2012	6216	1.50	285.79	6215.00
2/21/2012	6311	1.23	292.21	6310.00
2/22/2012	6660	20.93	339.67	6655.00
2/22/2012	6629	17.85	338.44	6625.99
2/22/2012	6787	30.51	337.03	
2/22/2012	6819	32.98	336.51	6797.00
2/23/2012	6977	44.93	347.49	
2/24/2012	7136	59.09	353.91	7018.00
2/24/2012	7231	71.75	355.84	7058.00
2/24/2012	7295	83.01	357.51	7072.00
2/25/2012	7447	91.98	1.20	7073.00
2/25/2012	7542	92.07	1.20	7069.00
2/26/2012	7923	91.54	0.41	7060.00
2/26/2012	8113	93.39	1.82	7052.00
2/26/2012	8398	89.43	2.43	7047.00
2/26/2012	8494	89.96	3.22	7047.00
2/26/2012	8589	89.43	2.61	7048.00
2/27/2012	8652	89.96	2.61	7048.00
2/27/2012	8878	89.87	3.13	7047.00
2/27/2012	8969	90.22	1.90	7045.00
2/27/2012	9255	89.78	2.13	7047.00
2/27/2012	9351	90.57	2.08	7047.00

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Copperhead Fee A #2H
Project:	Copperhead	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Copperhead Fee A #2H	North Reference:	Grid
Wellbore:	VH - Job #32K0212200	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0212200	Database:	EDM-Regulatory

Project	Copperhead		
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		Eddy County, NM			
Site Position:		Northing:	366,409 09 usft	Latitude:	32° 0' 25 200 N
From:	Lat/Long	Easting:	595,264 66 usft	Longitude:	104° 1' 33 600 W
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0 16 °

Well	Copperhead Fee A #2H, Directional (Pathfinder)					
Well Position	+N/-S	0 0 usft	Northing:	366,409 09 usft	Latitude:	32° 0' 25 200 N
	+E/-W	0 0 usft	Easting:	595,264 66 usft	Longitude:	104° 1' 33 600 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	0 0 usft

Wellbore		VH - Job #32K0212200			
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	2/20/2012	7 69	59 89	48,392

Design		VH - Job #32K0212200		
Audit Notes:				
Version:	1 0	Phase:	ACTUAL	Tie On Depth: 0 0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0 0	0 0	0 0	0 71

Survey Program		Date 3/13/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	6,033 0	Gyro (VH - Job #32K0212200)	Keeper	Keeper Gyro

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 65	229 60	100 0	-0 4	-0 4	229 60	0 6
200 0	1 00	224 17	200 0	-1 4	-1 5	227 24	2 0
300 0	1 09	220 74	300 0	-2 7	-2 7	224 93	3 8
400 0	1 05	219 93	400 0	-4 1	-3 9	223 42	5 7
500 0	0 93	213 34	499 9	-5 5	-4 9	221 89	7 4
600 0	0 97	208 73	599 9	-6 9	-5 8	219 90	9 0
700 0	0 86	149 97	699 9	-8 3	-5 8	215 00	10 2
800 0	1 07	155 05	799 9	-9 8	-5 1	207 25	11 0
900 0	0 99	157 18	899 9	-11 5	-4 3	200 69	12 3
1,000 0	0 60	136 28	999 9	-12 6	-3 6	196 04	13 1
1,100 0	0 45	137 68	1,099 9	-13 3	-3 0	192 73	13 6

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Copperhead Fee A #2H
Project:	Copperhead	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Copperhead Fee A #2H	North Reference:	Grid
Wellbore:	VH - Job #32K0212200	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0212200	Database:	EDM-Regulatory

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200 0	0 11	166 52	1,199 9	-13 7	-2 7	191 24	14 0
1,300 0	0 17	354 21	1,299 9	-13 6	-2 7	191 25	13 9
1,400 0	0 31	25 68	1,399 9	-13 2	-2 6	191 15	13 5
1,500 0	0 66	67 71	1,499 9	-12 8	-2 0	188 72	12 9
1,600 0	2 12	66 55	1,599 8	-11 8	0 3	178 69	11 8
1,700 0	1 14	50 92	1,699 8	-10 5	2 7	165 33	10 8
1,800 0	0 53	317 30	1,799 8	-9 5	3 2	161 39	10 0
1,900 0	1 27	265 73	1,899 8	-9 2	1 8	169 10	9 4
2,000 0	1 66	290 06	1,999 7	-8 8	-0 7	184 45	8 9
2,100 0	1 48	314 23	2,099 7	-7 4	-3 0	201 81	8 0
2,200 0	1 23	311 48	2,199 7	-5 8	-4 7	218 95	7 5
2,300 0	0 52	4 32	2,299 7	-4 7	-5 5	229 63	7 2
2,400 0	1 37	78 88	2,399 7	-4 0	-4 3	227 05	5 8
2,500 0	1 03	72 67	2,499 6	-3 5	-2 2	212 76	4 1
2,600 0	0 83	78 90	2,599 6	-3 1	-0 7	192 24	3 1
2,700 0	0 76	85 85	2,699 6	-2 9	0 7	166 19	3 0
2,800 0	0 70	84 59	2,799 6	-2 8	2 0	144 50	3 4
2,900 0	0 71	91 24	2,899 6	-2 7	3 2	130 40	4 2
3,000 0	0 79	91 72	2,999 6	-2 8	4 5	121 46	5 3
3,100 0	0 67	87 88	3,099 6	-2 8	5 8	115 50	6 4
3,200 0	0 59	85 83	3,199 6	-2 7	6 9	111 43	7 4
3,300 0	0 53	67 11	3,299 6	-2 5	7 8	107 61	8 2
3,400 0	0 52	73 53	3,399 6	-2 2	8 7	104 06	9 0
3,500 0	0 50	50 16	3,499 6	-1 8	9 5	100 59	9 6
3,600 0	0 47	12 84	3,599 6	-1 1	9 9	96 28	9 9
3,700 0	0 58	6 38	3,699 5	-0 2	10 0	91 06	10 0
3,800 0	0 51	358 12	3,799 5	0 8	10 1	85 67	10 1
3,900 0	0 52	0 47	3,899 5	1 7	10 1	80 62	10 2
4,000 0	0 56	0 01	3,999 5	2 6	10 1	75 49	10 4
4,100 0	0 51	355 37	4,099 5	3 5	10 0	70 57	10 6
4,200 0	0 56	344 10	4,199 5	4 4	9 9	65 70	10 8
4,300 0	0 49	306 25	4,299 5	5 2	9 4	61 12	10 7
4,400 0	0 45	281 94	4,399 5	5 5	8 6	57 52	10 3
4,500 0	0 44	274 26	4,499 5	5 6	7 9	54 53	9 7
4,600 0	0 38	272 31	4,599 5	5 7	7 2	51 71	9 1
4,700 0	0 38	247 12	4,699 5	5 5	6 5	49 68	8 6
4,800 0	0 32	227 49	4,799 5	5 2	6 0	49 04	8 0
4,900 0	0 49	220 30	4,899 5	4 7	5 5	49 62	7 3
5,000 0	0 50	229 79	4,999 5	4 1	4 9	50 22	6 4
5,100 0	0 56	237 44	5,099 5	3 6	4 2	49 62	5 5
5,200 0	0 45	199 68	5,199 5	2 9	3 6	51 20	4 7
5,300 0	0 45	206 47	5,299 5	2 2	3 3	56 51	4 0
5,400 0	0 46	211 42	5,399 5	1 5	2 9	62 87	3 3
5,500 0	0 40	211 98	5,499 5	0 9	2 6	71 16	2 7



Scientific Drilling
Directional Drilling Operations

Project: Copperhead
Eddy County, NM
Well: Copperhead Fee A #2H
Wellbore: VH - Job #32K0212200
Design: VH - Job #32K0212200

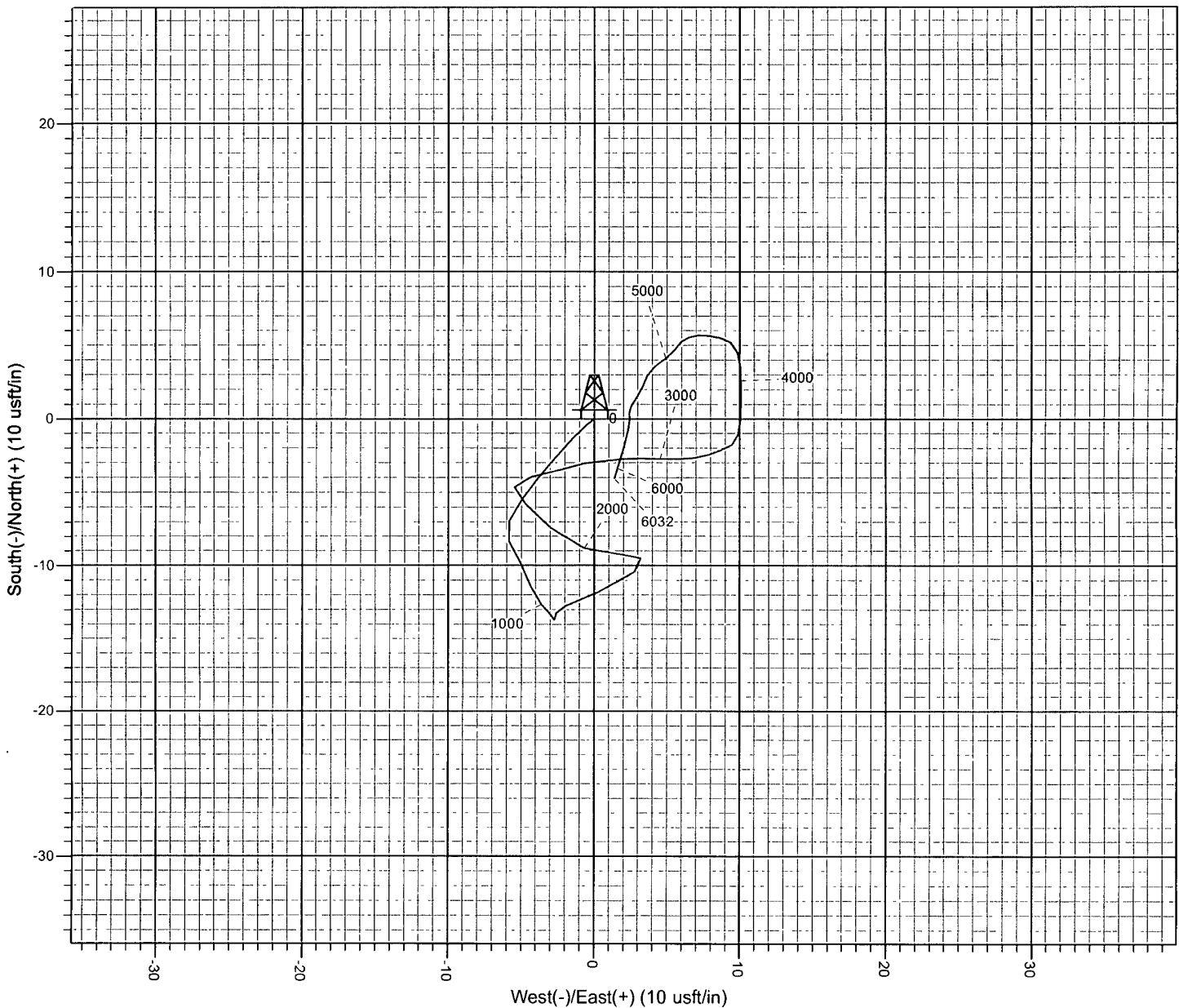


Azimuths to Grid North
True North -0 16°
Magnetic North 7 53°

Magnetic Field
Strength: 48391 5nT
Dip Angle: 59 89°
Date: 2/20/2012
Model: IGRF2010

WELL DETAILS: Copperhead Fee A #2H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0 0	0.0	366409.09	595264.66	32° 0' 25.200 N	104° 1' 33.600 W	



PROJECT DETAILS: Copperhead
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

SITE DETAILS: Eddy County, NM
Site Centre Latitude: 32° 0' 25.200 N
Longitude: 104° 1' 33.600 W
Positional Uncertainty: 0 0
Convergence: 0.16
Local North: Grid



COG Operating LLC

Eddy County(NAD83)

Copperhead Fee A

#2H

OH

Design: OH

Pathfinder X & Y Report

06 March, 2012

PATHFINDER[®]

A Schlumberger Company



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000 1 Single User Db

Project	Eddy County(NAD83)		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		
Map Zone:	New Mexico Eastern Zone		

Site	Copperhead Fee A		
Site Position:		Northing:	364,382.010 usft
From:	Map	Easting:	636,257.100 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 0' 5.028 N
		Longitude:	104° 1' 37.651 W
		Grid Convergence:	0.16 °

Well	#2H		
Well Position	+N/-S	0.0 usft	Northing: 364,382.010 usft
	+E/-W	0.0 usft	Easting: 636,257.100 usft
Position Uncertainty	0.0 usft		Latitude: 32° 0' 5.028 N
		Wellhead Elevation:	usft
			Longitude: 104° 1' 37.651 W
			Ground Level: 2,918.2 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF200510	2/17/2012	7.69
			Dip Angle (°)
			59.91
			Field Strength (nT)
			48,408

Design	OH		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction (°)
			0.71



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey Program		Date	3/6/2012			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description		
100 0	6,000 0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s		
6,121.0	12,299.0	MWD #2 (OH)	MWD	MWD - Standard		

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
0.0	0 00	0 00	0 0	-2,936 2	0 0	0 0	0 0	0 00	364,382.01	636,257.10
100 0	0 65	229 60	100 0	-2,836 2	-0 4	-0 4	-0 4	0 65	364,381.64	636,256 67
200 0	1 00	224 17	200.0	-2,736 2	-1 4	-1 5	-1 4	0 36	364,380 65	636,255 63
300 0	1 09	220 74	300 0	-2,636.2	-2 7	-2 7	-2 7	0 11	364,379 30	636,254 40
400.0	1 05	219 93	400.0	-2,536 2	-4 1	-3 9	-4 2	0 04	364,377 88	636,253 19
500 0	0 93	213 34	499 9	-2,436 3	-5 5	-4 9	-5 6	0 17	364,376 50	636,252 16
600 0	0 97	208 73	599.9	-2,336 3	-6 9	-5 8	-7 0	0 09	364,375.08	636,251 30
700.0	0 86	149 97	699 9	-2,236 3	-8 3	-5 8	-8 4	0 90	364,373 69	636,251.27
800.0	1 07	155.05	799.9	-2,136 3	-9 8	-5 1	-9 9	0 23	364,372 19	636,252 04
900 0	0 99	157 18	899 9	-2,036 3	-11 5	-4 3	-11 5	0 09	364,370 55	636,252 77
1,000.0	0 60	136 28	999.9	-1,936.3	-12 6	-3 6	-12 7	0 48	364,369.37	636,253 47
1,100 0	0 45	137 68	1,099.9	-1,836.3	-13 3	-3 0	-13 3	0 15	364,368 70	636,254.09
1,200 0	0 11	166 52	1,199 9	-1,736 3	-13 7	-2 7	-13 7	0 36	364,368 32	636,254 38
1,300.0	0 17	354 21	1,299 9	-1,636.3	-13.6	-2 7	-13 7	0 28	364,368.37	636,254.39
1,400 0	0 31	25 68	1,399.9	-1,536 3	-13 2	-2 6	-13 3	0 19	364,368 77	636,254.49
1,500 0	0 66	67 71	1,499 9	-1,436 3	-12 8	-2 0	-12 8	0 48	364,369.23	636,255.14
1,600.0	2 12	66 55	1,599 8	-1,336.4	-11.8	0 3	-11 8	1 46	364,370 18	636,257 37
1,700 0	1 14	50.92	1,699.8	-1,236 4	-10.5	2 7	-10 4	1.07	364,371.55	636,259 84
1,800 0	0 53	317 30	1,799 8	-1,136 4	-9 5	3 2	-9 5	1 29	364,372 51	636,260 30
1,900 0	1 27	265.73	1,899 8	-1,036 4	-9 2	1 8	-9 2	1.03	364,372 77	636,258.88
2,000 0	1 66	290 06	1,999 7	-936 5	-8 8	-0 7	-8 8	0 73	364,373 18	636,256 41



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936 2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936 2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
2,100.0	1.48	314.23	2,099.7	-836.5	-7.4	-3.0	-7.5	0.68	364,374.58	636,254.13	
2,200.0	1.23	311.48	2,199.7	-736.5	-5.8	-4.7	-5.9	0.26	364,376.19	636,252.40	
2,300.0	0.52	4.32	2,299.7	-636.5	-4.7	-5.5	-4.7	1.01	364,377.36	636,251.63	
2,400.0	1.37	78.88	2,399.7	-536.5	-4.0	-4.3	-4.0	1.33	364,378.04	636,252.84	
2,500.0	1.03	72.67	2,499.6	-436.6	-3.5	-2.2	-3.5	0.36	364,378.54	636,254.87	
2,600.0	0.83	78.90	2,599.6	-336.6	-3.1	-0.7	-3.1	0.22	364,378.95	636,256.43	
2,700.0	0.76	85.85	2,699.6	-236.6	-2.9	0.7	-2.9	0.12	364,379.13	636,257.81	
2,800.0	0.70	84.59	2,799.6	-136.6	-2.8	2.0	-2.7	0.06	364,379.24	636,259.08	
2,900.0	0.71	91.24	2,899.6	-36.6	-2.7	3.2	-2.7	0.08	364,379.28	636,260.30	
3,000.0	0.79	91.72	2,999.6	63.4	-2.8	4.5	-2.7	0.08	364,379.25	636,261.61	
3,100.0	0.67	87.88	3,099.6	163.4	-2.8	5.8	-2.7	0.13	364,379.25	636,262.89	
3,200.0	0.59	85.83	3,199.6	263.4	-2.7	6.9	-2.6	0.08	364,379.31	636,263.98	
3,300.0	0.53	67.11	3,299.6	363.4	-2.5	7.8	-2.4	0.19	364,379.53	636,264.92	
3,400.0	0.52	73.53	3,399.6	463.4	-2.2	8.7	-2.1	0.06	364,379.83	636,265.78	
3,500.0	0.50	50.16	3,499.6	563.4	-1.8	9.5	-1.6	0.21	364,380.24	636,266.55	
3,600.0	0.47	12.84	3,599.6	663.4	-1.1	9.9	-1.0	0.31	364,380.92	636,266.98	
3,700.0	0.58	6.38	3,699.5	763.3	-0.2	10.0	-0.1	0.12	364,381.83	636,267.13	
3,800.0	0.51	358.12	3,799.5	863.3	0.8	10.1	0.9	0.11	364,382.77	636,267.17	
3,900.0	0.52	0.47	3,899.5	963.3	1.7	10.1	1.8	0.02	364,383.67	636,267.16	
4,000.0	0.56	0.01	3,999.5	1,063.3	2.6	10.1	2.7	0.04	364,384.61	636,267.16	
4,100.0	0.51	355.37	4,099.5	1,163.3	3.5	10.0	3.7	0.07	364,385.55	636,267.13	
4,200.0	0.56	344.10	4,199.5	1,263.3	4.4	9.9	4.6	0.12	364,386.46	636,266.96	
4,300.0	0.49	306.25	4,299.5	1,363.3	5.2	9.4	5.3	0.35	364,387.18	636,266.48	
4,400.0	0.45	281.94	4,399.5	1,463.3	5.5	8.6	5.6	0.20	364,387.52	636,265.75	
4,500.0	0.44	274.26	4,499.5	1,563.3	5.6	7.9	5.7	0.06	364,387.63	636,264.98	
4,600.0	0.38	272.31	4,599.5	1,663.3	5.7	7.2	5.7	0.06	364,387.67	636,264.27	
4,700.0	0.38	247.12	4,699.5	1,763.3	5.5	6.5	5.6	0.17	364,387.55	636,263.63	



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936 2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000 1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
4,800.0	0.32	227.49	4,799.5	1,863.3	5.2	6.0	5.3	0.13	364,387.24	636,263.12	
4,900.0	0.49	220.30	4,899.5	1,963.3	4.7	5.5	4.8	0.18	364,386.72	636,262.64	
5,000.0	0.50	229.79	4,999.5	2,063.3	4.1	4.9	4.2	0.08	364,386.11	636,262.03	
5,100.0	0.56	237.44	5,099.5	2,163.3	3.6	4.2	3.6	0.09	364,385.57	636,261.28	
5,200.0	0.45	199.68	5,199.5	2,263.3	2.9	3.6	3.0	0.34	364,384.94	636,260.74	
5,300.0	0.45	206.47	5,299.5	2,363.3	2.2	3.3	2.2	0.05	364,384.21	636,260.43	
5,400.0	0.46	211.42	5,399.5	2,463.3	1.5	2.9	1.5	0.04	364,383.52	636,260.05	
5,500.0	0.40	211.98	5,499.5	2,563.3	0.9	2.6	0.9	0.06	364,382.88	636,259.65	
5,600.0	0.26	173.29	5,599.5	2,663.3	0.3	2.4	0.4	0.26	364,382.36	636,259.49	
5,700.0	0.22	178.64	5,699.5	2,763.3	-0.1	2.4	0.0	0.05	364,381.94	636,259.53	
5,800.0	0.59	191.43	5,799.5	2,863.3	-0.8	2.3	-0.7	0.38	364,381.25	636,259.43	
5,900.0	0.73	196.39	5,899.5	2,963.3	-1.9	2.0	-1.9	0.15	364,380.13	636,259.15	
6,000.0	1.06	196.64	5,999.5	3,063.3	-3.4	1.6	-3.4	0.33	364,378.63	636,258.70	
6,121.0	1.76	189.99	6,120.4	3,184.2	-6.3	1.0	-6.3	0.59	364,375.73	636,258.06	
6,216.0	1.49	285.79	6,215.4	3,279.2	-7.4	-0.5	-7.4	2.55	364,374.63	636,256.62	
6,311.0	1.23	292.21	6,310.4	3,374.2	-6.7	-2.6	-6.7	0.32	364,375.35	636,254.48	
6,403.0	2.02	303.19	6,402.3	3,466.1	-5.4	-4.9	-5.5	0.92	364,376.61	636,252.21	
6,469.0	1.93	289.84	6,468.3	3,532.1	-4.4	-6.9	-4.5	0.71	364,377.63	636,250.19	
6,501.0	2.81	309.61	6,500.3	3,564.1	-3.7	-8.0	-3.8	3.72	364,378.31	636,249.08	
6,533.0	5.98	330.09	6,532.2	3,596.0	-1.8	-9.5	-1.9	10.90	364,380.25	636,247.65	
6,565.0	9.76	338.70	6,563.9	3,627.7	2.2	-11.3	2.1	12.34	364,384.23	636,245.83	
6,597.0	13.63	339.05	6,595.2	3,659.0	8.3	-13.6	8.1	12.10	364,390.28	636,243.50	
6,629.0	17.85	338.44	6,626.0	3,689.8	16.4	-16.8	16.1	13.20	364,398.36	636,240.34	
6,660.0	20.93	339.67	6,655.2	3,719.0	26.0	-20.4	25.7	10.02	364,407.98	636,236.67	
6,692.0	22.69	338.61	6,684.9	3,748.7	37.1	-24.7	36.8	5.64	364,419.09	636,232.44	
6,724.0	24.80	338.61	6,714.2	3,778.0	49.1	-29.4	48.7	6.59	364,431.08	636,227.74	
6,756.0	27.87	337.56	6,742.9	3,806.7	62.2	-34.7	61.8	9.70	364,444.25	636,222.43	



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
6,787.0	30.51	337.03	6,770.0	3,833.8	76.2	-40.5	75.7	8.56	364,458.19	636,216.60	
6,819.0	32.98	336.51	6,797.2	3,861.0	91.7	-47.1	91.1	7.77	364,473.66	636,209.95	
6,851.0	35.09	337.38	6,823.7	3,887.5	108.1	-54.2	107.5	6.77	364,490.14	636,202.94	
6,882.0	37.28	337.56	6,848.7	3,912.5	125.0	-61.2	124.3	7.07	364,507.05	636,195.93	
6,914.0	39.57	341.51	6,873.8	3,937.6	143.7	-68.1	142.8	10.49	364,525.68	636,189.00	
6,946.0	41.94	345.03	6,898.0	3,961.8	163.7	-74.1	162.7	10.31	364,545.68	636,183.00	
6,977.0	44.93	347.49	6,920.5	3,984.3	184.4	-79.1	183.4	11.08	364,566.38	636,177.95	
7,009.0	48.19	349.69	6,942.5	4,006.3	207.1	-83.7	206.1	11.34	364,589.15	636,173.37	
7,041.0	50.65	351.01	6,963.4	4,027.2	231.1	-87.8	230.0	8.30	364,613.11	636,169.30	
7,073.0	52.85	351.80	6,983.2	4,047.0	255.9	-91.6	254.8	7.14	364,637.96	636,165.55	
7,104.0	55.75	352.59	7,001.2	4,065.0	280.9	-95.0	279.7	9.58	364,662.89	636,162.13	
7,136.0	59.09	353.91	7,018.5	4,082.3	307.7	-98.1	306.4	11.00	364,689.67	636,158.97	
7,168.0	63.31	354.87	7,033.9	4,097.7	335.6	-100.9	334.3	13.45	364,717.57	636,156.23	
7,199.0	67.09	355.40	7,046.9	4,110.7	363.6	-103.3	362.3	12.29	364,745.60	636,153.85	
7,231.0	71.75	355.84	7,058.1	4,121.9	393.5	-105.5	392.1	14.62	364,775.47	636,151.56	
7,263.0	76.59	356.02	7,066.9	4,130.7	424.2	-107.7	422.8	15.13	364,806.17	636,149.38	
7,295.0	83.01	357.51	7,072.5	4,136.3	455.6	-109.5	454.2	20.58	364,837.59	636,147.61	
7,321.0	88.37	359.53	7,074.5	4,138.3	481.5	-110.2	480.1	22.02	364,863.50	636,146.94	
7,352.0	90.22	1.20	7,074.9	4,138.7	512.5	-110.0	511.1	8.04	364,894.49	636,147.14	
7,447.0	91.98	1.20	7,073.0	4,136.8	607.4	-108.0	606.1	1.85	364,989.45	636,149.13	
7,542.0	92.07	1.20	7,069.7	4,133.5	702.4	-106.0	701.0	0.09	365,084.37	636,151.12	
7,637.0	91.54	0.94	7,066.7	4,130.5	797.3	-104.2	795.9	0.62	365,179.31	636,152.89	
7,733.0	91.19	0.94	7,064.4	4,128.2	893.3	-102.6	891.9	0.36	365,275.27	636,154.46	
7,828.0	90.84	0.85	7,062.7	4,126.5	988.2	-101.2	986.9	0.38	365,370.24	636,155.95	
7,923.0	91.54	0.41	7,060.7	4,124.5	1,083.2	-100.1	1,081.9	0.87	365,465.21	636,156.99	
8,018.0	92.24	0.32	7,057.6	4,121.4	1,178.1	-99.5	1,176.8	0.74	365,560.16	636,157.60	
8,113.0	93.39	1.82	7,052.9	4,116.7	1,273.0	-97.7	1,271.7	1.99	365,655.02	636,159.37	



Pathfinder
Pathfinder X & Y Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000 1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
8,208.0	91 10	1 11	7,049.2	4,113.0	1,367.9	-95.3	1,366.6	2.52	365,749.91	636,161.79	
8,398.0	89 43	2.43	7,048.3	4,112.1	1,557.8	-89.4	1,556.6	1.12	365,939.81	636,167.66	
8,494.0	89 96	3.22	7,048.9	4,112.7	1,653.7	-84.7	1,652.5	0.99	366,035.69	636,172.39	
8,589.0	89 69	2.52	7,049.1	4,112.9	1,748.6	-80.0	1,747.4	0.79	366,130.57	636,177.15	
8,684.0	90.57	3.31	7,048.9	4,112.7	1,843.4	-75.1	1,842.4	1.24	366,225.45	636,181.98	
8,778.0	89 87	3.13	7,048.6	4,112.4	1,937.3	-69.8	1,936.3	0.77	366,319.30	636,187.26	
8,874.0	91.19	3.05	7,047.7	4,111.5	2,033.1	-64.7	2,032.2	1.38	366,415.15	636,192.43	
8,969.0	90 22	1.90	7,046.5	4,110.3	2,128.0	-60.6	2,127.1	1.58	366,510.05	636,196.54	
9,064.0	89 52	2.87	7,046.7	4,110.5	2,223.0	-56.6	2,222.1	1.26	366,604.97	636,200.49	
9,160.0	89 43	1.82	7,047.6	4,111.4	2,318.9	-52.7	2,318.0	1.10	366,700.88	636,204.42	
9,255.0	89 78	2.13	7,048.3	4,112.1	2,413.8	-49.4	2,413.0	0.49	366,795.82	636,207.69	
9,351.0	90.57	2.08	7,048.0	4,111.8	2,509.7	-45.9	2,509.0	0.82	366,891.76	636,211.22	
9,446.0	90 31	1.82	7,047.2	4,111.0	2,604.7	-42.6	2,604.0	0.39	366,986.70	636,214.45	
9,542.0	88 11	0.59	7,048.6	4,112.4	2,700.7	-40.6	2,699.9	2.63	367,082.66	636,216.47	
9,637.0	89 43	1.55	7,050.6	4,114.4	2,795.6	-38.9	2,794.9	1.72	367,177.62	636,218.24	
9,733.0	91.63	1.47	7,049.7	4,113.5	2,891.6	-36.3	2,890.9	2.29	367,273.58	636,220.77	
9,828.0	89.25	1.11	7,049.0	4,112.8	2,986.5	-34.2	2,985.9	2.53	367,368.54	636,222.91	
9,924.0	91 19	2.17	7,048.6	4,112.4	3,082.5	-31.4	3,081.9	2.30	367,464.50	636,225.66	
10,020.0	89 69	1.29	7,047.9	4,111.7	3,178.4	-28.5	3,177.8	1.81	367,560.45	636,228.56	
10,116.0	92.77	2.26	7,045.8	4,109.6	3,274.4	-25.6	3,273.8	3.36	367,656.36	636,231.53	
10,211.0	91 63	2.52	7,042.2	4,106.0	3,369.2	-21.6	3,368.7	1.23	367,751.21	636,235.49	
10,307.0	90 31	3.05	7,040.5	4,104.3	3,465.1	-16.9	3,464.6	1.48	367,847.08	636,240.15	
10,403.0	90 04	2.78	7,040.3	4,104.1	3,560.9	-12.1	3,560.5	0.40	367,942.96	636,245.03	
10,498.0	87 93	3.84	7,041.9	4,105.7	3,655.8	-6.6	3,655.4	2.49	368,037.78	636,250.52	
10,593.0	88 55	3.49	7,044.9	4,108.7	3,750.5	-0.5	3,750.2	0.75	368,132.54	636,256.59	
10,689.0	89.43	3.66	7,046.5	4,110.3	3,846.3	5.5	3,846.1	0.93	368,228.33	636,262.57	
10,784.0	87 85	0.85	7,048.8	4,112.6	3,941.2	9.2	3,941.0	3.39	368,323.22	636,266.31	



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Site:	Copperhead Fee A	MD Reference:	KB = 18' @ 2936.2usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)		TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
10,879.0	90.66	1 20		7,050.0	4,113.8	4,036.2	10.9	4,036.0	2.98	368,418.19	636,268.01
10,975.0	91.98	2 08		7,047.8	4,111.6	4,132.1	13.7	4,132.0	1.65	368,514.12	636,270.75
11,070.0	91.01	3 31		7,045.3	4,109.1	4,227.0	18.1	4,226.9	1.65	368,608.98	636,275.22
11,165.0	87.58	1.29		7,046.5	4,110.3	4,321.9	21.9	4,321.8	4.19	368,703.88	636,279.03
11,261.0	89.78	2 70		7,048.7	4,112.5	4,417.8	25.3	4,417.7	2.72	368,799.78	636,282.37
11,356.0	88.64	2 96		7,050.0	4,113.8	4,512.6	30.0	4,512.7	1.23	368,894.66	636,287.06
11,451.0	90.66	2.96		7,050.6	4,114.4	4,607.5	34.9	4,607.6	2.13	368,989.52	636,291.97
11,546.0	89.96	2.52		7,050.1	4,113.9	4,702.4	39.4	4,702.5	0.87	369,084.41	636,296.51
11,641.0	89.25	2 26		7,050.8	4,114.6	4,797.3	43.4	4,797.5	0.80	369,179.33	636,300.47
11,736.0	88.55	0.41		7,052.6	4,116.4	4,892.3	45.6	4,892.5	2.08	369,274.28	636,302.68
11,832.0	85.30	359.62		7,057.7	4,121.5	4,988.1	45.6	4,988.3	3.48	369,370.13	636,302.71
11,927.0	89.16	0.50		7,062.3	4,126.1	5,083.0	45.7	5,083.2	4.17	369,465.00	636,302.81
12,022.0	91.45	0.85		7,061.8	4,125.6	5,178.0	46.8	5,178.2	2.44	369,559.98	636,303.93
12,117.0	94.26	1.82		7,057.1	4,120.9	5,272.8	49.0	5,273.0	3.13	369,654.83	636,306.14
12,213.0	94.26	1.20		7,050.0	4,113.8	5,368.5	51.6	5,368.7	0.64	369,750.53	636,308.66
12,299.0	94.26	1.20		7,043.6	4,107.4	5,454.3	53.4	5,454.5	0.00	369,836.27	636,310.46

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
6,533.0	6,532.2	-1.8	-9.5	KOP - 6533.0 'MD, 6532.2 'TVD, 330.09 'AZI, 5.98 'INC, -1.8 'N, -9.5 'E
7,352.0	7,074.9	512.5	-110.0	LP - 7352.0 'MD, 7074.9 'TVD, 1.20 'AZI, 90.22 'INC, 512.5 'N, -110.0 'E
12,299.0	7,043.6	5,454.3	53.4	BHL - 12299.0 'MD, 7043.6 'TVD, 1.20 'AZI, 94.26 'INC, 5454.3 'N, 53.4 'E

Checked By: _____ Approved By: _____ Date: _____



Project: Eddy County(NAD83)
Site: Copperhead Fee A
Well: #2H
Wellbore: OH
Plan: Post Gyro Plan #2 (#2H/OH)

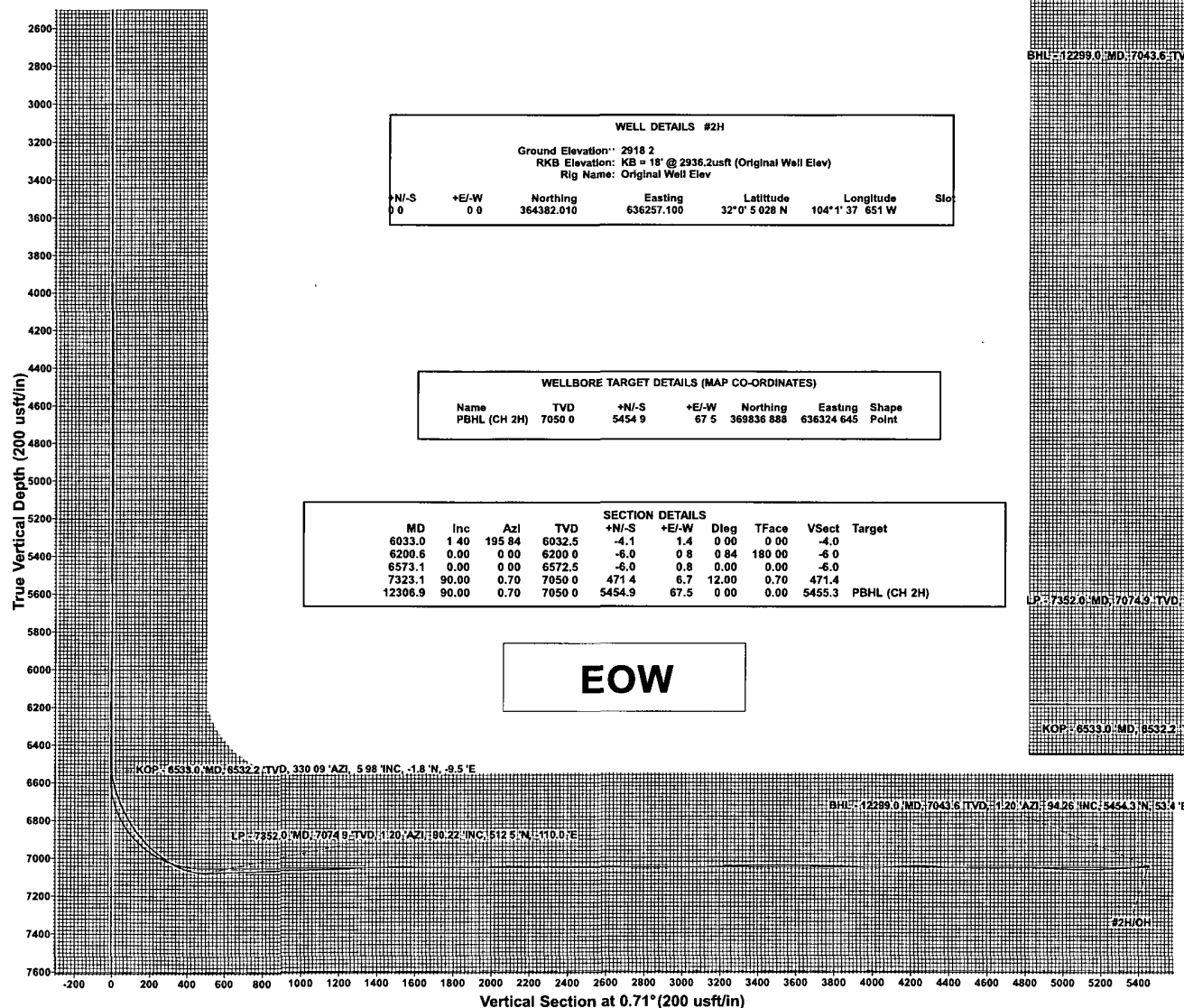


Azimuths to Grid North
True North: -0.16°
Magnetic North: 7.52°

Magnetic Field
Strength: 48407.9snT
Dip Angle: 59.91°
Date: 2/17/2012
Model: IGRF200510

PATHFINDER®

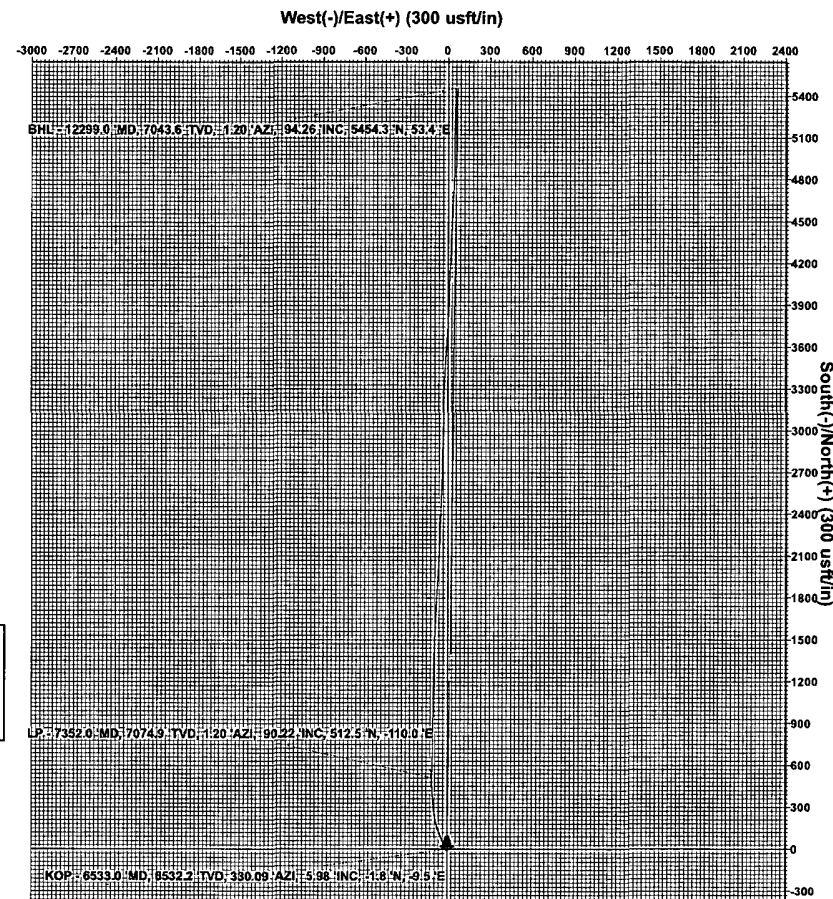
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WELL DETAILS #2H						
Ground Elevation: 2918.2						
RKB Elevation: KB = 18' @ 2936.2usft (Original Well Elev)						
Rig Name: Original Well Elev						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slope
0 0	0 0	364382.010	636257.100	32° 0' 5 028 N	104° 1' 37 651 W	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (CH 2H)	7050 0	5454 9	67 5	369836 888	636324 645	Point

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
6033.0	1.40	195.84	6032.5	-4.1	1.4	0.00	0.00	-4.0	
6200.6	0.00	0.00	6200.0	-6.0	0.8	0.84	180.00	-6.0	
6573.1	0.00	0.00	6572.5	-6.0	0.8	0.00	0.00	-6.0	
7323.1	90.00	0.70	7050.0	471.4	6.7	12.00	0.70	471.4	
12306.9	90.00	0.70	7050.0	5454.9	67.5	0.00	0.00	5455.3	PBHL (CH 2H)



PROJECT DETAILS: Eddy County(NAD83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid

Plan Post Gyro Plan #2 (#2H/OH)			
Created By	Michael Trout	Date	14 13, March 06 2012
Checked		Date	