

Results of Directional Survey

API number:	30-025-40423		
OGRID:		Operator:	COG OPERATING LLC
		Property:	BUFFLEHEAD 10 FEDERAL # 1H

surface	ULSTR:	B	10	T 26S	R 32E
				330 FNL	1650 FEL

BH Loc	ULSTR:	O	10	T 26S	R 32E
13930 MD		9518.3	TVD	271 FSL	1687 FEL
				5009 FNL	

Top Perf/OH	ULSTR:	B	10	T 26S	R 32E
10065 MD		9517.4	TVD	1146 FNL	1737 FEL

Bot Perf/OH	ULSTR:	O	10	T 26S	R 32E
13853 MD		9520.8	TVD	348 FSL	1688 FEL
				4932 FNL	

	MD	N/S	E/W	VD
	10057	-808.10	-87.00	9517.4
TOP PERFS/OH	10065	-816.09	-87.39	9517.37
	10153	-904.01	-91.70	9517.00
	13779	-4528.40	-38.10	9523.90
BOT PERFS/OH	13853	-4602.32	-37.71	9520.82
	13875	-4624.30	-37.60	9519.90

NEXT TO LAST	13875	-4624.30	-37.60	9519.90
LAST READING	13930	-4679.30	-37.00	9518.30
TD	13930	-4679.30	-37.00	9518.30

Surface Location	330	FN	1650	FE
Projected BHL	5009	FN	1687	FE
Location of				
Top Perfs/OH	1146	FN	1737	FE
Bottom Perfs/OH	4932	FN	1688	FE

SUMMARY of Subsurface Locations

Surface Location	B-10-26S-32E	330	FN	1650	FE	Vert. Depth
Top Perfs/OH	B-10-26S-32E	1146	FN	1737	FE	9517.37
Bottom Perfs/OH	O-10-26S-32E	4932	FN	1688	FE	9520.82
Projected TD	O-10-26S-32E	5009	FN	1687	FE	9518.30

JUN 07 2012

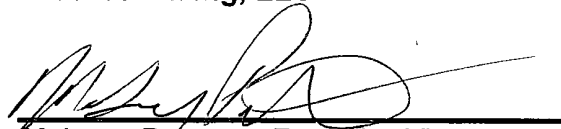
OPERATOR: COG Operating, LLC
WELL/LEASE: Bufflehead 10 Federa; # 1 H
COUNTY: Lea Co., New Mexico
Sec. 10, T26S, R32E

SUR: B-10-26s-32e, 330/N & 1650/E
BHL: O-10-26s-32e, 5009/N & 1687/E
API # 30-025-40423

**STATE OF NEW MEXICO
DEVIATION REPORT**

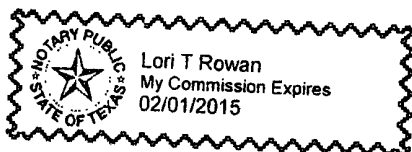
<u>Depth</u>	<u>Deviation</u>	<u>Depth</u>	<u>Deviation</u>
279	2	3,942	1 1/2
453	3/4	4,034	1 1/4
699	1/4	4,130	1 3/4
919	2 3/4	4,219	2 1/2
1,253	1 3/4	4,408	2 3/4
1,424	3/4	4,491	2 1/2
1,545	1/4	4,857	2
2,022	1/4	5,206	2
2,282	1	5,643	1 1/4
2,441	1 1/4	5,957	2
2,665	2	6,244	4 1/2
2,790	1 1/2	6,566	1 1/4
2,917	1 1/4	6,905	2
3,044	3/4	7,237	1 1/2
3,160	2	7,555	1 1/4
3,330	2 1/2	7,841	1
3,402	2 1/2	8,526	1 1/2
3,488	3	8,819	1 1/4
3,552	2 1/2	9,136	1
3,647	2	9,319	3/4
3,739	1 1/4		
3,836	3/4		

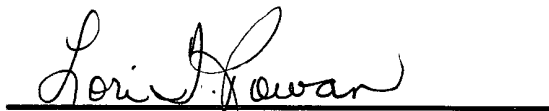
Patriot Drilling, LLC


M. Leroy Peterson, Executive Vice-
President

The foregoing instrument was acknowledged before me on this 13th day of March, 2012 by M. Leroy Peterson, Executive Vice-President of Patriot Drilling, LLC.

My Commission Expires: 02/01/2015




Lori T. Rowan
Notary Public for Ector Co., Texas

COG OPERATING

Jennings-Delaware
Lea County, NM
Bufflehead 10 Federal #1H
VH - Job #32K0212175

SUR: B-10-26s-32e, 330/N & 1650/E
BHL: O-10-26s-32e, 5009/N & 1687/E
API # 30-025-40423

Survey: Gyro

SDI Standard Survey Report

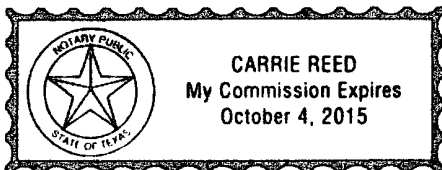
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 14th of March, 2012.

[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Bufflehead 10 Federal #1H
Project:	Jennings-Delaware	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Bufflehead 10 Federal #1H	North Reference:	Grid
Wellbore:	VH - Job #32K0212175	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0212175	Database:	EDM-Regulatory

Project:	Jennings-Delaware		
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:	Lea County, NM				
Site Position:		Northing:	387,647 59 usft	Latitude:	32° 3' 50 274 N
From:	Lat/Long	Easting:	708,869 05 usft	Longitude:	103° 39' 32 720 W
Position Uncertainty:	0 0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0 36 °

Well:	Bufflehead 10 Federal #1H, Directional (Pathfinder)					
Well Position	+N/-S	0 0 usft	Northing:	387,647 59 usft	Latitude:	32° 3' 50 274 N
	+E/-W	0 0 usft	Easting:	708,869 05 usft	Longitude:	103° 39' 32 720 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	0 0 usft

Wellbore:	VH - Job #32K0212175				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	2/16/2012	7 53	60 01	48,468

Design:	VH - Job #32K0212175				
Audit Notes:					
Version:	1 0	Phase:	ACTUAL	Tie On Depth:	0 0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0 0	0 0	0 0	179 36	

Survey Program	Date	3/12/2012		
From	To	Survey (Wellbore)	Tool Name	Description
(usft)	(usft)			
100 0	9,300 0	Gyro (VH - Job #32K0212175)	Keeper	Keeper Gyro

Survey	Measured Depth	Inclination	Azimuth	True Vertical	North/South	East/West	Closure Azimuth	Closure Distance
	(usft)	(°)	(°)	Depth	(usft)	(usft)	(°)	(usft)
	0 0	0 00	0 00	0 0	0 0	0 0	0 00	0 0
	100 0	0 87	342 08	100 0	0 7	-0 2	342 08	0 8
	200 0	0 94	337 47	200 0	2 2	-0 8	340 46	2 3
	300 0	0 88	13 44	300 0	3 7	-0 9	346 10	3 8
	400 0	1 16	57 64	400 0	5 0	0 1	1 33	5 0
	500 0	1 26	66 79	499 9	6 0	2 0	18 36	6 3
	600 0	1 23	75 99	599 9	6 7	4 0	31 19	7 8
	700 0	1 19	73 00	699 9	7 2	6 1	40 02	9 4
	800 0	1 18	72 94	799 9	7 8	8 0	45 77	11 2
	900 0	1 30	74 94	899 8	8 4	10 1	50 22	13 2
	1,000 0	1 99	81 46	999 8	9 0	12 9	55 23	15 8
	1,100 0	1 71	95 33	1,099 8	9 1	16 1	60 58	18 5

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Bufflehead 10 Federal #1H
Project:	Jennings-Delaware	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Bufflehead 10 Federal #1H	North Reference:	Grid
Wellbore:	VH - Job #32K0212175	Survey/Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0212175	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	1 85	107 16	1,199 7	8 5	19 2	66 12	21 0
1,300 0	1 42	117 92	1,299 7	7 4	21 8	71 18	23 0
1,400 0	0 88	141 19	1,399 6	6 3	23 4	75 03	24 2
1,500 0	0 58	169 79	1,499 6	5 2	24 0	77 85	24 5
1,600 0	0 46	181 40	1,599 6	4 3	24 0	79 96	24 4
1,700 0	0 70	192 01	1,699 6	3 3	23 9	82 24	24 1
1,800 0	0 68	196 85	1,799 6	2 1	23 6	84 93	23 7
1,900 0	0 47	202 70	1,899 6	1 1	23 3	87 18	23 3
2,000 0	0 09	298 81	1,999 6	0 8	23 0	88 00	23 1
2,100 0	0 34	328 95	2,099 6	1 1	22 8	87 25	22 8
2,200 0	0 74	334 92	2,199 6	1 9	22 4	85 06	22 5
2,300 0	1 09	326 76	2,299 6	3 3	21 6	81 27	21 8
2,400 0	1 21	323 19	2,399 6	5 0	20 4	76 37	21 0
2,500 0	1 37	331 61	2,499 5	6 9	19 2	70 39	20 4
2,600 0	1 67	319 02	2,599 5	9 0	17 7	63 05	19 9
2,700 0	1 77	312 82	2,699 5	11 2	15 6	54 48	19 2
2,800 0	1 51	315 44	2,799 4	13 1	13 6	45 91	18 9
2,900 0	1 37	303 33	2,899 4	14 7	11 6	38 32	18 8
3,000 0	1 01	307 96	2,999 4	15 9	10 0	31 98	18 8
3,100 0	0 72	11 48	3,099 4	17 1	9 4	28 76	19 5
3,200 0	1 80	71 44	3,199 3	18 2	11 0	31 13	21 3
3,300 0	2 43	65 62	3,299 3	19 6	14 4	36 36	24 3
3,400 0	2 73	59 99	3,399 2	21 7	18 4	40 37	28 4
3,500 0	3 05	56 08	3,499 0	24 3	22 7	42 99	33 3
3,600 0	2 54	52 30	3,598 9	27 2	26 6	44 44	38 1
3,700 0	1 75	47 66	3,698 9	29 6	29 5	44 97	41 8
3,800 0	1 16	30 22	3,798 8	31 5	31 2	44 73	44 3
3,900 0	0 91	67 22	3,898 8	32 6	32 4	44 79	46 0
4,000 0	1 64	102 18	3,998 8	32 6	34 5	46 61	47 5
4,100 0	1 63	107 06	4,098 7	31 9	37 3	49 43	49 1
4,200 0	2 16	122 75	4,198 7	30 5	40 2	52 85	50 5
4,300 0	3 02	132 04	4,298 6	27 7	43 8	57 67	51 8
4,400 0	3 00	121 88	4,398 4	24 6	48 0	62 88	53 9
4,500 0	2 79	120 68	4,498 3	21 9	52 3	67 24	56 7
4,600 0	2 51	121 17	4,598 2	19 6	56 2	70 82	59 5
4,700 0	2 48	122 43	4,698 1	17 3	59 9	73 93	62 4
4,800 0	2 16	126 85	4,798 0	15 0	63 3	76 68	65 0
4,900 0	2 26	124 53	4,898 0	12 7	66 4	79 15	67 6
5,000 0	2 07	132 08	4,997 9	10 4	69 4	81 47	70 1
5,100 0	2 06	135 82	5,097 8	7 9	72 0	83 74	72 4
5,200 0	2 14	132 59	5,197 8	5 3	74 6	85 90	74 8
5,300 0	2 16	135 12	5,297 7	2 7	77 3	87 96	77 3
5,400 0	2 02	135 14	5,397 6	0 2	79 9	89 88	79 9
5,500 0	1 96	137 05	5,497 6	-2 3	82 3	91 63	82 3

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Bufflehead 10 Federal #1H
Project:	Jennings-Delaware	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Bufflehead 10 Federal #1H	North Reference:	Grid
Wellbore:	VH - Job #32K0212175	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0212175	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
5,600 0	1 79	137 24	5,597 5	-4 7	84 5	93 21	84 6
5,700 0	1 80	138 03	5,697 5	-7 1	86 6	94 65	86 9
5,800 0	1 64	139 87	5,797 4	-9 3	88 6	96 00	89 1
5,900 0	1 80	145 36	5,897 4	-11 7	90 4	97 37	91 2
6,000 0	1 91	136 81	5,997 3	-14 2	92 4	98 74	93 5
6,100 0	1 63	129 75	6,097 3	-16 3	94 7	99 79	96 1
6,200 0	1 59	134 35	6,197 2	-18 2	96 8	100 66	98 5
6,300 0	1 57	132 34	6,297 2	-20 1	98 8	101 51	100 8
6,400 0	1 46	131 22	6,397 2	-21 9	100 7	102 25	103 1
6,500 0	1 83	129 45	6,497 1	-23 7	102 9	102 98	105 6
6,600 0	1 77	140 55	6,597 1	-25 9	105 1	103 85	108 3
6,700 0	1 79	141 08	6,697 0	-28 3	107 1	104 82	110 8
6,800 0	1 76	140 80	6,797 0	-30 7	109 0	105 74	113 3
6,900 0	1 91	138 88	6,896 9	-33 2	111 1	106 63	116 0
7,000 0	2 11	139 78	6,996 9	-35 8	113 4	107 54	118 9
7,100 0	2 11	147 12	7,096 8	-38 8	115 6	108 55	121 9
7,200 0	2 13	151 76	7,196 7	-42 0	117 5	109 67	124 7
7,300 0	2 07	165 48	7,296 7	-45 4	118 8	110 90	127 2
7,400 0	1 82	165 65	7,396 6	-48 7	119 6	112 13	129 2
7,500 0	1 89	166 38	7,496 5	-51 8	120 4	113 27	131 1
7,600 0	1 41	162 79	7,596 5	-54 6	121 2	114 24	132 9
7,700 0	1 61	153 93	7,696 5	-57 0	122 2	115 02	134 8
7,800 0	1 66	149 15	7,796 4	-59 5	123 5	115 73	137 1
7,900 0	1 70	161 26	7,896 4	-62 2	124 7	116 49	139 4
8,000 0	1 57	157 59	7,996 3	-64 8	125 7	117 28	141 5
8,100 0	1 71	164 65	8,096 3	-67 5	126 7	118 07	143 5
8,200 0	1 61	163 68	8,196 3	-70 3	127 4	118 89	145 6
8,300 0	1 66	167 29	8,296 2	-73 1	128 2	119 70	147 5
8,400 0	1 62	184 06	8,396 2	-75 9	128 4	120 60	149 1
8,500 0	1 63	198 13	8,496 1	-78 7	127 8	121 61	150 1
8,600 0	1 56	189 60	8,596 1	-81 4	127 2	122 61	151 0
8,700 0	1 97	191 70	8,696 1	-84 4	126 6	123 69	152 1
8,800 0	1 32	202 98	8,796 0	-87 1	125 8	124 71	153 0
8,900 0	1 44	209 93	8,896 0	-89 3	124 7	125 60	153 4
9,000 0	1 65	220 00	8,995 9	-91 5	123 2	126 60	153 4
9,100 0	1 05	222 26	9,095 9	-93 3	121 6	127 48	153 3
9,200 0	1 07	249 08	9,195 9	-94 3	120 1	128 12	152 7
9,300 0	1 04	258 40	9,295 9	-94 8	118 4	128 69	151 6



Project: Jennings-Delaware
Lea County, NM
Well: Bufflehead 10 Federal #1H
Wellbore: VH - Job #32K0212175
Design: VH - Job #32K0212175

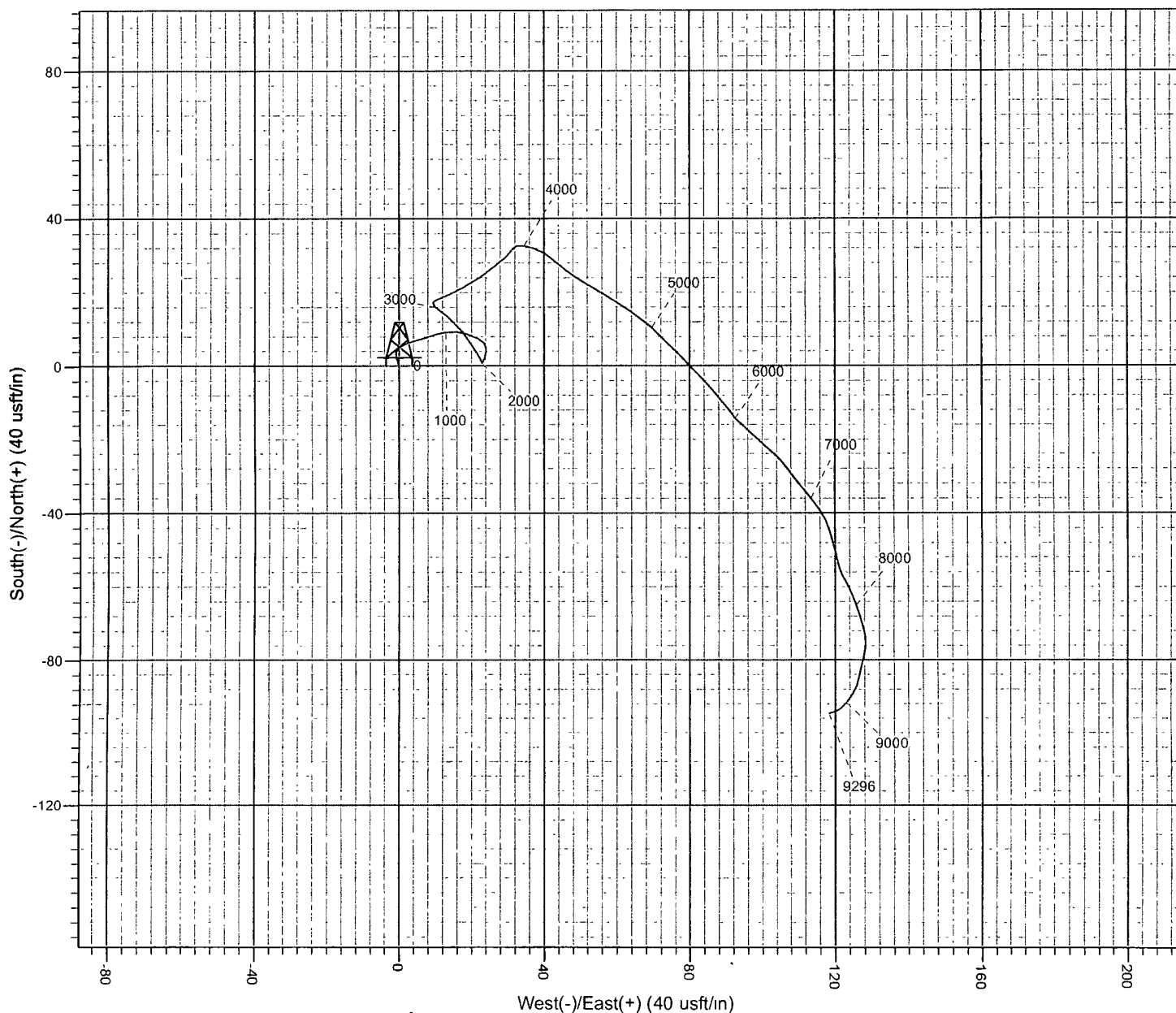


Azimuths to Grid North
True North -0 36°
Magnetic North 7 18°

Magnetic Field
Strength 48468 3snT
Dip Angle 60 01°
Date 2/16/2012
Model IGRF2010

WELL DETAILS: Bufflehead 10 Federal #1H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	387647.59	708869.05	32° 3' 50.274 N	103° 39' 32.720 W	



PROJECT DETAILS: Jennings-Delaware
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, Lea County, NM
Site Centre Latitude: 32° 3' 50.274 N
Longitude: 103° 39' 32.720 W
Positional Uncertainty: 0.0
Convergence: 0.36
Local North: Grid



COG Operating LLC

Lea County(NAD27)

Bufflehead 10 Fed

#1H

OH

Design: OH

Pathfinder X & Y Report

27 February, 2012

SUR: B-10-26s-32e, 330/N & 1650/E
BHL: O-10-26s-32e, 5009/N & 1687/E
API # 30-025-40423



A Schlumberger Company



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Bufflehead 10 Fed
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: KB = 18' @ 3276.0usft (Original Well Elev)
MD Reference: KB = 18' @ 3276.0usft (Original Well Elev)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

Project	Lea County(NAD27)		
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	Bufflehead 10 Fed		
Site Position:	Northing:	387,647.700 usft	Latitude: 32° 3' 50.275 N
From: Map	Easting:	708,869.000 usft	Longitude: 103° 39' 32.721 W
Position Uncertainty: 0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence: 0.36 °

Well	#1H		
Well Position	+N/-S	0.0 usft	Northing: 387,647.700 usft
	+E/-W	0.0 usft	Easting: 708,869.000 usft
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
			Latitude: 32° 3' 50.275 N
			Longitude: 103° 39' 32.721 W
			Ground Level: 3,258.0 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF200510	2/15/2012	7.52
			Dip Angle (°)
			60.03
			Field Strength (nT)
			48,484

Design	OH		
Audit Notes:			
Version: 1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°)
			180.51



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Bufflehead 10 Fed
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: KB = 18' @ 3276 0usft (Original Well Elev)
MD Reference: KB = 18' @ 3276 0usft (Original Well Elev)
North Reference: Grd
Survey Calculation Method: Minimum Curvature
Database: EDM 5000 1 Single User Db

Survey Program		Date	2/27/2012		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	9,000 0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
9,042 0	13,930 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	-3,276.0	0 0	0 0	0 0	0 00	387,647 70	708,869 00
100.0	0 87	342 08	100 0	-3,176 0	0 7	-0 2	-0 7	0 87	387,648 42	708,868 77
200 0	0 94	337 47	200.0	-3,076 0	2 2	-0 8	-2 2	0 10	387,649 90	708,868 22
300 0	0 88	13 44	300 0	-2,976 0	3 7	-0 9	-3 7	0 56	387,651 41	708,868 08
400 0	1 16	57 64	400 0	-2,876 0	5 0	0 1	-5 0	0 81	387,652 70	708,869 12
500 0	1 26	66 79	499 9	-2,776 1	6 0	2 0	-6 0	0 22	387,653 67	708,870 98
600.0	1 23	75 99	599 9	-2,676 1	6 7	4 0	-6 7	0 20	387,654 36	708,873 03
700 0	1 19	73 00	699 9	-2,576 1	7 2	6 1	-7 3	0 07	387,654 93	708,875 07
800 0	1 18	72.94	799 9	-2,476 1	7 8	8 0	-7 9	0 01	387,655 53	708,877.05
900 0	1 30	74 94	899 8	-2,376 2	8 4	10 1	-8 5	0 13	387,656 13	708,879.13
1,000 0	1 99	81.46	999 8	-2,276 2	9 0	12 9	-9 1	0 71	387,656.68	708,881 94
1,100 0	1 71	95 33	1,099 8	-2,176 2	9 1	16 1	-9 2	0 53	387,656 80	708,885.14
1,200 0	1 85	107 16	1,199 7	-2,076 3	8 5	19 2	-8 7	0 39	387,656 19	708,888.17
1,300 0	1 42	117.92	1,299 7	-1,976 3	7 4	21 8	-7 6	0 53	387,655 13	708,890 81
1,400 0	0 88	141 19	1,399 6	-1,876 4	6 3	23 4	-6 5	0 70	387,653 95	708,892 38
1,500 0	0 58	169 79	1,499 6	-1,776 4	5 2	24 0	-5 4	0 46	387,652 86	708,892 95
1,600 0	0 46	181.40	1,599 6	-1,676 4	4 3	24 0	-4 5	0 16	387,651 96	708,893 03
1,700 0	0 70	192 01	1,699 6	-1,576 4	3 3	23 9	-3 5	0 26	387,650 96	708,892 90
1,800 0	0 68	196 85	1,799 6	-1,476 4	2 1	23 6	-2 3	0 06	387,649 79	708,892 60
1,900 0	0 47	202.70	1,899 6	-1,376 4	1 1	23 3	-1 4	0 22	387,648 85	708,892 27
2,000 0	0 09	298 81	1,999 6	-1,276 4	0 8	23 0	-1 0	0 49	387,648 50	708,892 04



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Bufflehead 10 Fed
Well: #1H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #1H
TVD Reference: KB = 18' @ 3276 0usft (Original Well Elev)
MD Reference: KB = 18' @ 3276 0usft (Original Well Elev)
North Reference: Grd
Survey Calculation Method: Minimum Curvature
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	0 34	328 95	2,099 6	-1,176 4	1 1	22 8	-1 3	0 27	387,648.80	708,891 82
2,200 0	0 74	334 92	2,199 6	-1,076 4	1 9	22 4	-2 1	0 40	387,649 64	708,891 39
2,300 0	1 09	326 76	2,299 6	-976 4	3 3	21 6	-3 5	0 37	387,651 02	708,890 60
2,400 0	1 21	323 19	2,399 6	-876 4	5 0	20 4	-5 1	0 14	387,652 66	708,889 44
2,500 0	1 37	331 61	2,499 5	-776 5	6 9	19 2	-7 0	0 25	387,654 55	708,888 24
2,600 0	1 67	319 02	2,599 5	-676 5	9 0	17 7	-9 2	0 45	387,656 71	708,886 72
2,700 0	1 77	312 82	2,699 5	-576 5	11 2	15 6	-11 3	0 21	387,658 86	708,884 63
2,800 0	1 51	315 44	2,799 4	-476 6	13 1	13 6	-13 3	0 27	387,660.84	708,882 57
2,900 0	1 37	303 33	2,899 4	-376 6	14 7	11 6	-14 8	0 33	387,662 44	708,880 65
3,000 0	1 01	307 96	2,999 4	-276 6	15 9	10 0	-16 0	0 37	387,663 64	708,878 95
3,100 0	0 72	11 48	3,099 4	-176 6	17 1	9 4	-17 2	0 94	387,664 80	708,878 38
3,200 0	1 80	71 44	3,199 3	-76 7	18 2	11 0	-18 3	1 57	387,665 91	708,880 00
3,300 0	2 43	65 62	3,299 3	23 3	19 6	14 4	-19 7	0 66	387,667 29	708,883 42
3,400 0	2 73	59 99	3,399 2	123.2	21 7	18 4	-21 8	0 39	387,669 35	708,887 41
3,500 0	3 05	56 08	3,499 0	223 0	24 3	22 7	-24 5	0 38	387,672 03	708,891 68
3,600 0	2 54	52 30	3,598 9	322 9	27 2	26 6	-27 4	0 54	387,674 87	708,895 64
3,700 0	1 75	47 66	3,698 9	422 9	29 6	29 5	-29 8	0 81	387,677 25	708,898 52
3,800 0	1 16	30 22	3,798 8	522 8	31 5	31 2	-31 7	0 73	387,679 16	708,900 16
3,900 0	0 91	67 22	3,898 8	622 8	32 6	32 4	-32 9	0 70	387,680 34	708,901 40
4,000 0	1 64	102 18	3,998 8	722 8	32 6	34 5	-32 9	1 04	387,680 34	708,903 53
4,100 0	1 63	107 06	4,098 7	822 7	31 9	37 3	-32 3	0 14	387,679 62	708,906 29
4,200 0	2 16	122 75	4,198 7	922 7	30 5	40 2	-30 8	0 74	387,678.19	708,909 24
4,300 0	3 02	132 04	4,298 6	1,022 6	27 7	43.8	-28 1	0 95	387,675.40	708,912 78
4,400 0	3 00	121 88	4,398 4	1,122 4	24 6	48.0	-25 0	0 53	387,672 26	708,916 96
4,500 0	2 79	120 68	4,498 3	1,222 3	21 9	52 3	-22 4	0 22	387,669 63	708,921 27
4,600 0	2 51	121 17	4,598 2	1,322 2	19 6	56 2	-20 1	0 28	387,667 26	708,925 24
4,700 0	2 48	122 43	4,698 1	1,422 1	17 3	59 9	-17 8	0 06	387,664 97	708,928 94



Pathfinder Pathfinder X & Y Report



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Site: Bufflehead 10 Fed
Well: #1H
Wellbore: OH
Design: OH

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North Reference: Grid
Survey Calculation Method: Minimum Curvature
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	2 16	126 85	4,798 0	1,522.0	15 0	63 3	-15 5	0 37	387,662 67	708,932 27
4,900 0	2 26	124 53	4,898 0	1,622 0	12 7	66 4	-13 3	0 13	387,660 43	708,935.41
5,000 0	2 07	132 08	4,997 9	1,721 9	10 4	69 4	-11 0	0 34	387,658 10	708,938 37
5,100 0	2 06	135 82	5,097 8	1,821 8	7 9	72 0	-8 5	0 14	387,655 60	708,940 96
5,200 0	2 14	132 59	5,197.8	1,921 8	5 3	74 6	-6 0	0 14	387,653 05	708,943 59
5,300 0	2 16	135 12	5,297 7	2,021 7	2 7	77 3	-3 4	0 10	387,650 45	708,946 29
5,400 0	2 02	135 14	5,397 6	2,121 6	0 2	79 9	-0 9	0 14	387,647 86	708,948 87
5,500 0	1 96	137 05	5,497 6	2,221 6	-2 3	82 3	1 6	0 09	387,645 36	708,951 28
5,600 0	1 79	137 24	5,597 5	2,321 5	-4 7	84.5	4.0	0 17	387,642 96	708,953 50
5,700 0	1 80	138 03	5,697 5	2,421 5	-7 1	86 6	6 3	0 03	387,640 65	708,955 61
5,800 0	1 64	139 87	5,797 4	2,521 4	-9 3	88 6	8 5	0 17	387,638 39	708,957 58
5,900 0	1 80	145 36	5,897 4	2,621 4	-11 7	90.4	10 9	0 23	387,636 00	708,959 40
6,000 0	1 91	136 81	5,997 3	2,721 3	-14 2	92 4	13 4	0 30	387,633.49	708,961 43
6,100 0	1 63	129 75	6,097 3	2,821 3	-16.3	94.7	15 5	0 35	387,631.37	708,963 67
6,200 0	1 59	134 35	6,197 2	2,921 2	-18 2	96 8	17 3	0 14	387,629.49	708,965 75
6,300 0	1 57	132 34	6,297 2	3,021 2	-20 1	98 8	19 2	0 06	387,627 60	708,967 76
6,400 0	1 46	131 22	6,397 2	3,121 2	-21 9	100 7	21 0	0 11	387,625 84	708,969 73
6,500 0	1 83	129 45	6,497 1	3,221 1	-23 7	102 9	22 8	0.37	387,623 98	708,971 92
6,600 0	1 77	140 55	6,597 1	3,321 1	-25 9	105 1	25 0	0 35	387,621 78	708,974 13
6,700 0	1 79	141 08	6,697 0	3,421 0	-28 3	107 1	27 4	0 03	387,619 37	708,976 10
6,800 0	1 76	140 80	6,797 0	3,521 0	-30 7	109 0	29 8	0 03	387,616 96	708,978 05
6,900 0	1.91	138 88	6,896 9	3,620 9	-33 2	111 1	32 2	0 16	387,614 52	708,980.11
7,000 0	2 11	139 78	6,996 9	3,720 9	-35 8	113 4	34 8	0.20	387,611 86	708,982 40
7,100 0	2 11	147 12	7,096 8	3,820.8	-38 8	115 6	37 8	0 27	387,608 90	708,984 59
7,200 0	2 13	151 76	7,196 7	3,920 7	-42 0	117 5	40 9	0 17	387,605.72	708,986 47
7,300 0	2 07	165 48	7,296 7	4,020 7	-45 4	118 8	44 3	0 51	387,602 34	708,987.80
7,400 0	1 82	165 65	7,396 6	4,120 6	-48 7	119 6	47 6	0 25	387,599.05	708,988.64



Pathfinder
Pathfinder X & Y Report



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Wellbore: OH
Design: OH

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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)
7,500 0	1 89	166 38	7,496 5	4,220 5	-51 8	120 4	50 7	0 07	387,595 91	708,989 43
7,600 0	1 41	162 79	7,596 5	4,320 5	-54 6	121 2	53 5	0 49	387,593 13	708,990 18
7,700 0	1 61	153 93	7,696 5	4,420 5	-57 0	122 2	55 9	0 31	387,590 69	708,991 16
7,800 0	1 66	149 15	7,796 4	4,520 4	-59 5	123 5	58 4	0 15	387,588 19	708,992 52
7,900 0	1 70	161 26	7,896 4	4,620 4	-62 2	124 7	61 0	0 36	387,585 54	708,993 74
8,000 0	1 57	157 59	7,996 3	4,720 3	-64 8	125 7	63 7	0 17	387,582 87	708,994 74
8,100 0	1 71	164 65	8,096 3	4,820 3	-67 5	126 7	66 4	0 25	387,580 16	708,995 66
8,200 0	1 61	163 68	8,196 3	4,920 3	-70 3	127 4	69 2	0 10	387,577 38	708,996 44
8,300 0	1 66	167 29	8,296 2	5,020 2	-73 1	128 2	71 9	0 11	387,574 61	708,997 16
8,400 0	1 62	184 06	8,396 2	5,120 2	-75 9	128 4	74 8	0 48	387,571 79	708,997 38
8,500 0	1 63	198 13	8,496 1	5,220 1	-78 7	127 8	77 5	0 40	387,569 03	708,996 83
8,600 0	1 56	189 60	8,596 1	5,320 1	-81 4	127 2	80 2	0 25	387,566 34	708,996 16
8,700 0	1 97	191 70	8,696 1	5,420 1	-84 4	126 6	83 3	0 42	387,563 31	708,995 59
8,800 0	1 32	202 98	8,796 0	5,520 0	-87 1	125 8	86 0	0 72	387,560 57	708,994 79
8,900 0	1 44	209 93	8,896 0	5,620 0	-89 3	124 7	88 2	0 21	387,558 42	708,993 71
9,000 0	1 65	220 00	8,995 9	5,719 9	-91 5	123 2	90 4	0 34	387,556 23	708,992 16
9,042 0	1 85	225 35	9,037 9	5,761 9	-92 4	122 3	91 3	0 61	387,555 29	708,991 29
9,073 0	6 77	213 14	9,068 8	5,792 8	-94 3	120 9	93 2	16 06	387,553 40	708,989 94
9,105 0	11 43	212 19	9,100 4	5,824 4	-98 6	118 2	97 5	14 57	387,549 14	708,987 21
9,137 0	15 56	211 33	9,131 5	5,855 5	-104 9	114 3	103 9	12 92	387,542 79	708,983 29
9,169 0	18 91	210 30	9,162 1	5,886 1	-113 1	109 4	112 1	10 51	387,534 64	708,978 44
9,200 0	22 42	209 00	9,191 1	5,915 1	-122 6	104 0	121 6	11 42	387,525 13	708,973 04
9,232 0	25 59	208 74	9,220 3	5,944 3	-134 0	97 8	133 1	9 91	387,513 73	708,966 76
9,264 0	28 84	208 09	9,248 8	5,972 8	-146 8	90 8	146 0	10 20	387,500 86	708,959 80
9,296 0	32 36	208 18	9,276 3	6,000 3	-161 2	83 1	160 5	11 00	387,486 50	708,952 12
9,327 0	35 79	208 06	9,302 0	6,026 0	-176 5	74 9	175 8	11 07	387,471 18	708,943 93
9,359 0	39 57	208 05	9,327 3	6,051 3	-193 8	65 7	193 2	11 81	387,453 92	708,934 74



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Bufflehead 10 Fed
Well: #1H
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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)
9,391 0	43 62	209 60	9,351 2	6,075 2	-212 4	55 5	211 9	13 06	387,435 32	708,924 49
9,423 0	47.75	210 47	9,373 6	6,097 6	-232.2	44 0	231 8	13 05	387,415 51	708,913 02
9,455 0	51 18	209 88	9,394 4	6,118 4	-253.2	31 8	252 9	10 81	387,394 48	708,900 80
9,486 0	53 82	207 40	9,413 3	6,137 3	-274 8	20 0	274 6	10 62	387,372 90	708,889 03
9,518 0	56.98	205 49	9,431 4	6,155 4	-298 4	8 3	298.3	11 03	387,349 32	708,877 31
9,550 0	60 59	203 95	9,448 0	6,172 0	-323 2	-3 1	323 3	12 01	387,324 46	708,865 87
9,582 0	64 28	202 30	9,462 8	6,186 8	-349 3	-14 3	349.4	12 40	387,298 37	708,854 74
9,613 0	68 06	200 05	9,475 3	6,199 3	-375 8	-24 5	376 0	13 88	387,271 94	708,844.50
9,645 0	72 02	197 91	9,486 3	6,210 3	-404 2	-34 3	404 5	13 88	387,243 50	708,834 73
9,677 0	74.39	195 20	9,495 5	6,219 5	-433 6	-43 0	433 9	10 98	387,214.14	708,826 01
9,709 0	77 47	192 72	9,503 3	6,227 3	-463 7	-50 5	464 1	12 21	387,184 02	708,818 53
9,740 0	80 02	190 69	9,509 3	6,233 3	-493 4	-56 6	493 9	10 44	387,154 25	708,812 36
9,772 0	82 13	188 84	9,514 3	6,238.3	-524 6	-62.0	525 1	8 72	387,123 10	708,807 00
9,804 0	84 94	187 17	9,517 9	6,241 9	-556 1	-66 4	556 7	10 20	387,091 62	708,802 58
9,835 0	88 46	185 76	9,519 7	6,243 7	-586 8	-69 9	587 4	12 23	387,060 87	708,799 09
9,867 0	89 52	184 44	9,520 2	6,244 2	-618 7	-72 8	619 3	5 29	387,029 00	708,796 25
9,962 0	90 66	184.44	9,520 1	6,244 1	-713.4	-80 1	714 1	1 20	386,934 29	708,788 89
9,994 0	91 89	184 44	9,519 4	6,243 4	-745 3	-82.6	746 0	3 84	386,902 40	708,786 42
10,057 0	91 71	183 57	9,517 4	6,241 4	-808.1	-87.0	808 9	1.41	386,839 58	708,782.02
10,153 0	88 81	182 07	9,517 0	6,241 0	-904 0	-91.7	904 8	3 40	386,743.71	708,777.30
10,248 0	90 57	182 25	9,517 5	6,241 5	-998 9	-95.3	999 7	1 86	386,648 78	708,773 72
10,344 0	88 64	181 19	9,518 1	6,242 1	-1,094 9	-98 2	1,095 7	2 29	386,552 84	708,770 84
10,439 0	88 20	179 52	9,520 8	6,244 8	-1,189 8	-98 8	1,190 7	1 82	386,457.88	708,770 25
10,534 0	91 10	178 12	9,521 3	6,245 3	-1,284 8	-96 8	1,285 6	3 39	386,362 91	708,772.20
10,630 0	90 22	177 50	9,520 2	6,244 2	-1,380 7	-93 1	1,381 5	1.12	386,266 99	708,775 87
10,725 0	89 96	177 50	9,520 1	6,244 1	-1,475 6	-89 0	1,476.4	0 27	386,172 08	708,780 01
10,820 0	89 87	177 15	9,520 2	6,244 2	-1,570 5	-84.6	1,571 2	0 38	386,077 18	708,784 45



Pathfinder
Pathfinder X & Y Report

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MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
10,916 0	89 96	177 06	9,520 4	6,244 4	-1,666.4	-79.7	1,667 0	0 13	385,981 31	708,789 30
11,010 0	92 24	177 68	9,518 6	6,242 6	-1,760 3	-75 4	1,760 9	2 51	385,887 43	708,793 61
11,106.0	91 71	178.29	9,515 3	6,239 3	-1,856.2	-72 0	1,856 7	0 84	385,791 55	708,796 98
11,202 0	89 87	178 12	9,513 9	6,237 9	-1,952 1	-69 0	1,952 6	1 92	385,695 61	708,799 99
11,297.0	89 16	178 82	9,514 7	6,238 7	-2,047 1	-66 5	2,047 6	1 05	385,600 65	708,802 53
11,392 0	89 96	178 91	9,515 5	6,239 5	-2,142 0	-64 6	2,142 5	0 85	385,505 67	708,804 41
11,487 0	90 66	178 65	9,515 0	6,239 0	-2,237 0	-62 6	2,237 5	0 79	385,410 69	708,806 43
11,582 0	89 08	178 65	9,515 2	6,239 2	-2,332 0	-60 3	2,332 4	1 66	385,315 72	708,808 67
11,678 0	89 60	178 38	9,516 3	6,240 3	-2,427 9	-57 8	2,428 4	0 61	385,219 76	708,811 16
11,773 0	90 84	178 56	9,515 9	6,239 9	-2,522 9	-55 3	2,523 3	1 32	385,124 80	708,813 69
11,868 0	88 29	179 08	9,516 6	6,240 6	-2,617.9	-53 4	2,618.2	2 74	385,029 83	708,815 65
11,963 0	88 20	178 91	9,519 5	6,243 5	-2,712 8	-51 7	2,713 2	0 20	384,934 89	708,817 31
12,058.0	89 69	179 79	9,521 3	6,245 3	-2,807 8	-50.6	2,808.1	1 82	384,839 91	708,818.39
12,154 0	89 96	179 52	9,521 6	6,245 6	-2,903 8	-50 0	2,904 1	0 40	384,743 91	708,818.97
12,250 0	90 40	179 79	9,521 3	6,245 3	-2,999 8	-49 5	3,000 1	0 54	384,647 92	708,819 55
12,345 0	90 13	179 52	9,520 8	6,244 8	-3,094.8	-48 9	3,095 1	0 40	384,552 92	708,820 12
12,440 0	89 78	179 17	9,520 9	6,244 9	-3,189 8	-47.8	3,190 1	0 52	384,457 93	708,821 21
12,535 0	91 01	179 00	9,520 3	6,244 3	-3,284 8	-46 3	3,285 0	1 31	384,362 94	708,822.72
12,630 0	91 19	179 17	9,518 4	6,242 4	-3,379 7	-44 8	3,380 0	0 26	384,267 97	708,824 24
12,732 0	91 01	179 79	9,516 5	6,240 5	-3,481 7	-43.8	3,482 0	0 63	384,166 00	708,825 17
12,828 0	88 72	180 05	9,516 7	6,240.7	-3,577 7	-43 7	3,577 9	2 40	384,070.00	708,825 30
12,923 0	89 08	179 79	9,518 5	6,242 5	-3,672 7	-43.6	3,672 9	0 47	383,975 02	708,825 43
13,019 0	89 08	178 82	9,520 1	6,244 1	-3,768 7	-42 4	3,768.9	1 01	383,879 04	708,826 60
13,114 0	89 34	179 61	9,521 4	6,245.4	-3,863 6	-41 1	3,863.9	0 88	383,784 06	708,827 90
13,209 0	89 60	180 84	9,522 3	6,246 3	-3,958 6	-41 5	3,958 8	1 32	383,689 07	708,827 52
13,304 0	89 34	180 49	9,523 1	6,247 1	-4,053 6	-42 6	4,053 8	0 46	383,594 08	708,826 42
13,399 0	87 32	178 65	9,525 9	6,249 9	-4,148 6	-41 9	4,148 8	2 88	383,499 13	708,827 13



Pathfinder
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13,493 0	89 60	179 61	9,528 4	6,252 4	-4,242 5	-40 4	4,242 7	2.63	383,405 18	708,828 56
13,589 0	90 31	179 52	9,528 5	6,252 5	-4,338 5	-39 7	4,338 7	0 75	383,309.18	708,829 29
13,684 0	91 01	179 35	9,527 4	6,251 4	-4,433 5	-38 8	4,433 7	0 76	383,214 20	708,830 23
13,779 0	93 21	179 88	9,523 9	6,247 9	-4,528 4	-38 1	4,528 6	2 38	383,119 27	708,830 86
13,875 0	91 63	179 44	9,519.9	6,243 9	-4,624 3	-37 6	4,624 5	1 71	383,023 36	708,831 43
13,930 0	91.63	179 44	9,518.3	6,242.3	-4,679 3	-37 0	4,679 5	0 00	382,968 38	708,831 97

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,073 0	9,068 8	-94 3	120 9	KOP - 9073 0 'MD, 9068 8 'TVD, 213.14 'AZI, 6 77 'INC, -94 3 'N, 120 9 'E
9,867 0	9,520 2	-618 7	-72 8	LP - 9867 0 'MD, 9520.2 'TVD, 184 44 'AZI, 89 52 'INC, -618 7 'N, -72 8 'E
13,930 0	9,518 3	-4,679.3	-37 0	BHL - 13930 0 'MD, 9518 3 'TVD, 179.44 'AZI, 91 63 'INC, -4679 3 'N, -37 0 'E

Checked By: _____ Approved By: _____ Date: _____



Project: Lea County(NAD27)
Site: Bufflehead 10 Fed
Well: #1H
Wellbore: OH
Plan: Post Gyro Plan #2 (#1H/OH)

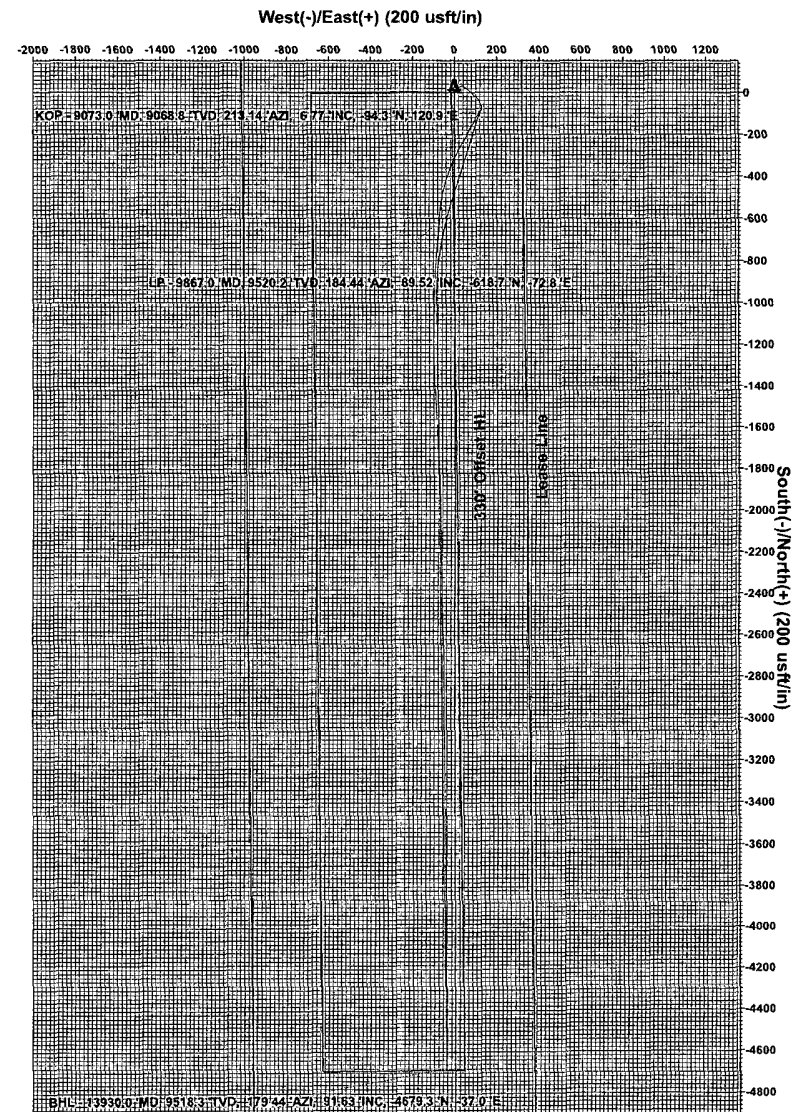
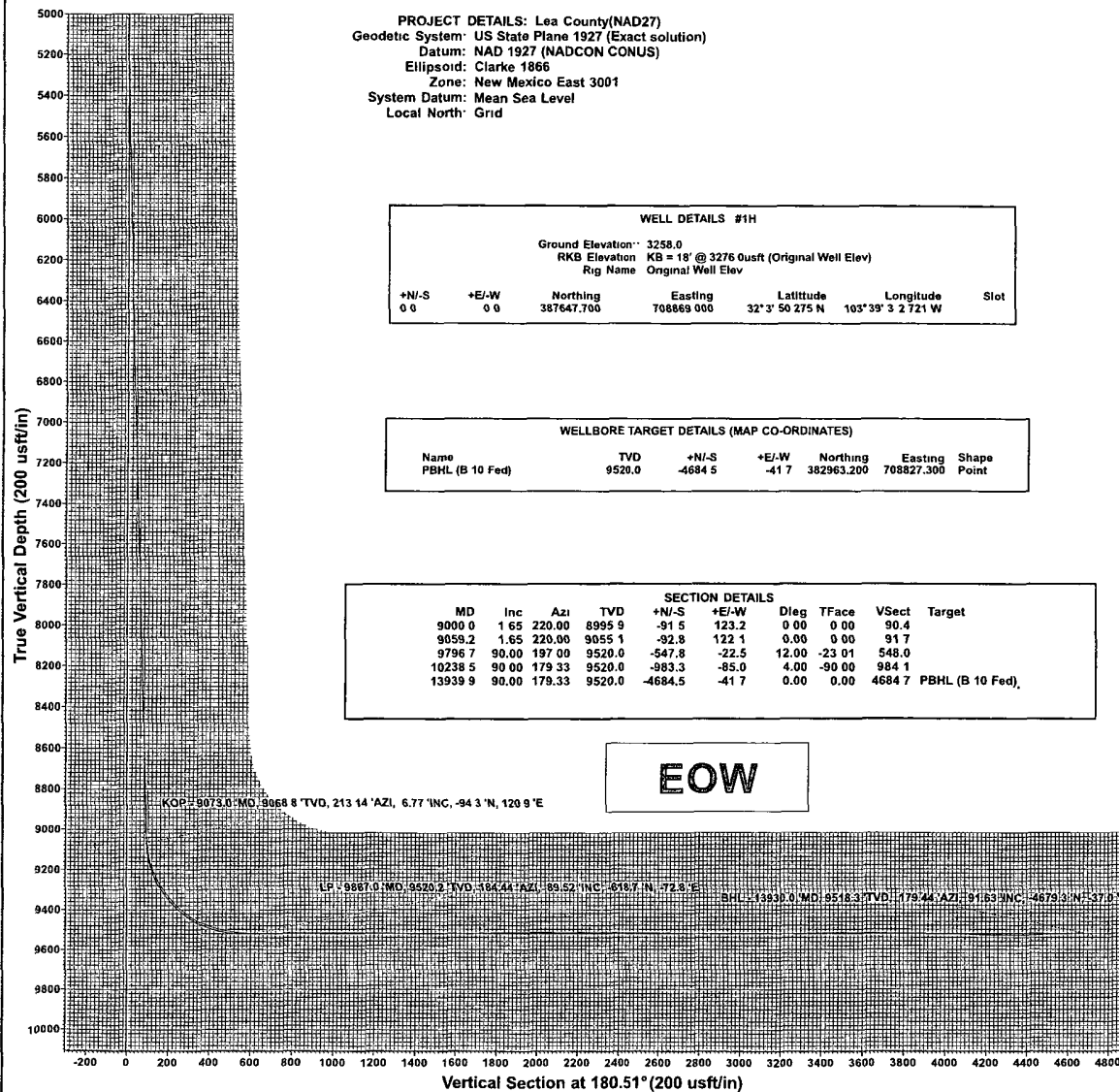


Azimuths to Grid North
True North: -0.36°
Magnetic North: 7.17°

Magnetic Field
Strength: 48483.8nT
Dip Angle: 60.03°
Date: 2/15/2012
Model: IGRF200510



A Schlumberger Company



Plan: Post Gyro Plan #2 (#1H/OH)

Created By: Michael Trout Date: 15 24, February 27 2012

Checked: _____ Date: _____

CON Operating LLC
Lea County(NAD27)
Bufflehead 10 Fed
#1H
Original Well Elev
OH
Post Gyro Plan #2