

Results of Directional Survey

API number:	30-025-40309		
OGRID:		Operator:	COG OPERATING LLC
		Property:	GUNNER 8 FEDERAL # 8H

surface	ULSTR:	M	08	T	26S	R	34E
				990	FSL	330	FWL

BH Loc	ULSTR:	E	05	T	26S	R	34E
17225	MD	9706.0	TVD	1989	FNL	326	FWL
				8571	FSL		

Top Perf/OH	ULSTR:	M	08	T	26S	R	34E
10059	MD	9847.8	TVD	1414	FSL	450	FWL

Bot Perf/OH	ULSTR:	E	05	T	26S	R	34E
17194	MD	9706.6	TVD	2020	FNL	326	FWL
				8540	FSL		

	MD	N/S	E/W	VD
	10028	394.70	121.50	9839
TOP PERFS/OH	10059	424.40	119.80	9847.80
	10059	424.40	119.80	9847.80
	17177	7533.30	-3.60	9706.90
BOT PERFS/OH	17194	7550.30	-3.64	9706.58
	17225	7581.30	-3.70	9706.00

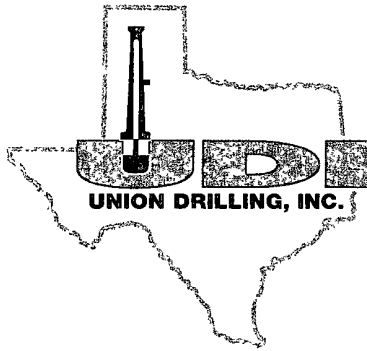
NEXT TO LAST	17177	7533.30	-3.60	9706.90
LAST READING	17225	7581.30	-3.70	9706.00
TD	17225	7581.30	-3.70	9706.00

Surface Location	990	FS	330	FW
Projected BHL	8571	FS	326	FW
Location of				
Top Perfs/OH	1414	FS	450	FW
Bottom Perfs/OH	8540	FS	326	FW

SUMMARY of Subsurface Locations

Surface Location	M-08-26S-34E	990	FS	330	FW	Vert. Depth
Top Perfs/OH	M-08-26S-34E	1414	FS	450	FW	9847.80
Bottom Perfs/OH	E-05-26S-34E	8540	FS	326	FW	9706.58
Projected TD	E-05-26S-34E	8571	FS	326	FW	9706.00

MAR 22 2012



SUR: M-08-26s-34e, 990/S & 330/W
 BHL: E-5-26s-34e, 8571/S & 326/W
 API # 30-025-40309

Well Name & Number: Gunner 8 Federal #8H

API Number: 30-025-40309

Location: 990 FSL & 330 FWL, Lot M, Sec. 8, Township 26-S, Range 34-E, Lea County, New Mexico

Operator: COG Operating, LLC

Drilling Contractor: Union Drilling, Inc.

The undersigned hereby certifies that he is an authorized representative of the drilling Contractor who drilled the above described well and that deviation survey tests were conducted and he obtained the following results:

RECORD OF INCLINATION

*11 Measured Depth (feet)	*12 Course Length (Hundreds of feet)	*13 Angle of Inclination (Degrees)	*14 Displacement per Hundred Feet (Sine of Angle X100)	*15 Course Displacement (feet)	*16 Accumulative Displacement (feet)
822	822	1.5	2.62	21.52	21.52
1769	947	.2	0.35	3.31	24.82
2600	831	.6	1.05	8.70	33.53
3538	938	1.3	2.27	21.28	54.81
4524	986	1	1.75	17.21	72.02
5332	808	1.2	2.09	16.92	88.94
6118	786	1	1.75	13.72	102.66
7063	945	.4	0.70	6.60	109.26
7995	932	.5	0.87	8.13	117.39
8542	547	.1	0.17	0.95	118.34
9459	917	4.13	7.21	66.08	184.43
DIRECTIONAL	TOOK OVER				

Drilling Contractor: Union Drilling, Inc.

By: Jim Mayfield
Jim Mayfield

Title: Division Manager

Subscribed and sworn to before me this 28TH Day of December, 2011.

Laura Jo Young
Notary Public

My Commission Expires: July 29, 2014

COUNTY OF TAYLOR)
)
STATE OF TEXAS)



HOBBS OCD

FEB 23 2012

RECEIVED

COG OPERATING

Wildcat (Lea County, NM)
Lea County, NM
Gunner 8 Federal #8H
VH - Job #32K11111141

HOBBS OCD

FEB 23 2012

RECEIVED

Survey: Gyro

SDI Standard Survey Report

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

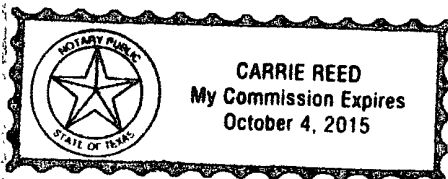
Shepherd

Notarized this date 12th of December, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas

SUR: M-08-26s-34e, 990/S & 330/W
BHL: E-5-26s-34e, 8571/S & 326/W
API # 30-025-40309



Scientific Drilling
Directional Drilling Operations

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Gunner 8 Federal #8H
Project:	Wildcat (Lea County, NM)	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Gunner 8 Federal #8H	North Reference:	Grid
Wellbore:	VH - Job #32K11111141	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111141	Database:	EDM-Regulatory

Project:	Wildcat (Lea 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:	Lea County, NM				
Site Position:		Northing:	764,295 41 usft	Latitude:	33° 5' 52 800 N
From:	Lat/Long	Easting:	769,294 77 usft	Longitude:	103° 27' 14 400 W
Position Uncertainty:	0 0 usft	Slot Radius:	0"	Grid Convergence:	0 48 °

Well:	Gunner 8 Federal #8H, Directional (Pathfinder)					
Well Position	+N/-S	0 0 usft	Northing:	384,112 92 usft	Latitude:	32° 3' 11 862 N
	+E/-W	0 0 usft	Easting:	758,519 23 usft	Longitude:	103° 29' 56 098 W
Position Uncertainty		0 0 usft	Wellhead Elevation:	usft	Ground Level:	0 0 usft

Wellbore	VH - Job #32K11111141				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/22/2011	7 49	60 03	48,503

Design:	VH - Job #32K11111141			
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	359 86

Survey Program		Date 12/27/2011		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	10,000 0	Gyro (VH - Job #32K11111141)	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 75	339 82	100 0	0 6	-0 2	339 82	0 7
200 0	0 87	36 73	200 0	1 8	0 0	0 08	1 8
300 0	0 98	30 81	300 0	3 2	0 9	15 71	3 3
400 0	1 35	38 35	400 0	4 8	2 1	23 10	5 3
500 0	1 48	51 72	499 9	6 6	3 8	30 13	7 6
600 0	1 86	69 77	599 9	7 9	6 3	38 69	10 2
700 0	1 78	75 30	699 8	8 9	9 4	46 54	12 9
800 0	1 61	73 83	799 8	9 7	12 2	51 66	15 6
900 0	1 19	80 73	899 8	10 2	14 6	54 99	17 8
1,000 0	0 67	85 16	999 7	10 4	16 2	57 21	19 3
1,100 0	0 37	86 94	1,099 7	10 5	17 1	58 45	20 1

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Gunner 8 Federal #8H
Project:	Wildcat (Lea County, NM)	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Gunner 8 Federal #8H	North Reference:	Grid
Wellbore:	VH - Job #32K11111141	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111141	Database:	EDM-Regulatory

Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
1,200 0	0 17	63 47	1,199 7	10 6	17 6	58 91	20 5
1,300 0	0 29	86 82	1,299 7	10 7	17 9	59 27	20 9
1,400 0	0 07	45 78	1,399 7	10 7	18 2	59 55	21 2
1,500 0	0 09	344 99	1,499 7	10 8	18 3	59 31	21 2
1,600 0	0 11	161 43	1,599 7	10 8	18 3	59 35	21 2
1,700 0	0 04	82 67	1,699 7	10 7	18 3	59 64	21 3
1,800 0	0 07	109 96	1,799 7	10 7	18 4	59 81	21 3
1,900 0	0 18	198 76	1,899 7	10 6	18 4	60 21	21 3
2,000 0	0 12	172 60	1,999 7	10 3	18 4	60 76	21 1
2,100 0	0 07	94 16	2,099 7	10 2	18 5	61 11	21 1
2,200 0	0 30	161 41	2,199 7	9 9	18 6	61 90	21 1
2,300 0	0 50	122 06	2,299 7	9 5	19 1	63 62	21 3
2,400 0	0 50	115 60	2,399 7	9 0	19 8	65 50	21 8
2,500 0	0 64	101 19	2,499 7	8 7	20 8	67 17	22 5
2,600 0	0 63	99 33	2,599 7	8 5	21 9	68 65	23 5
2,700 0	0 86	70 83	2,699 7	8 7	23 1	69 37	24 7
2,800 0	1 28	77 91	2,799 7	9 2	24 9	69 77	26 6
2,900 0	1 24	71 09	2,899 7	9 8	27 0	70 13	28 8
3,000 0	1 54	65 95	2,999 6	10 7	29 3	69 99	31 2
3,100 0	1 73	67 34	3,099 6	11 8	31 9	69 71	34 0
3,200 0	1 96	75 66	3,199 5	12 8	35 0	69 89	37 2
3,300 0	1 93	75 12	3,299 5	13 7	38 2	70 34	40 6
3,400 0	1 43	60 02	3,399 4	14 7	41 0	70 24	43 5
3,500 0	1 34	42 83	3,499 4	16 2	42 8	69 28	45 8
3,600 0	1 47	45 59	3,599 4	18 0	44 5	68 05	48 0
3,700 0	1 69	48 28	3,699 4	19 8	46 6	66 93	50 6
3,800 0	2 17	51 54	3,799 3	22 0	49 1	65 89	53 8
3,900 0	2 34	43 53	3,899 2	24 6	52 0	64 65	57 6
4,000 0	2 19	41 02	3,999 1	27 6	54 7	63 25	61 2
4,100 0	1 82	38 76	4,099 1	30 2	56 9	62 02	64 5
4,200 0	1 92	41 20	4,199 0	32 7	59 0	60 98	67 5
4,300 0	1 73	39 85	4,299 0	35 2	61 1	60 08	70 5
4,400 0	1 37	27 91	4,398 9	37 4	62 6	59 17	72 9
4,500 0	1 27	3 97	4,498 9	39 5	63 3	57 99	74 6
4,600 0	1 20	24 24	4,598 9	41 6	63 8	56 88	76 1
4,700 0	1 35	44 15	4,698 9	43 4	65 0	56 28	78 2
4,800 0	1 51	55 58	4,798 8	45 0	66 9	56 09	80 7
4,900 0	1 90	86 30	4,898 8	45 8	69 7	56 65	83 4
5,000 0	2 40	105 92	4,998 7	45 4	73 3	58 25	86 2
5,100 0	2 16	104 68	5,098 6	44 3	77 2	60 13	89 0
5,200 0	1 24	115 75	5,198 6	43 4	80 0	61 52	91 0
5,300 0	1 26	116 46	5,298 6	42 4	81 9	62 63	92 3
5,400 0	0 87	120 09	5,398 6	41 5	83 6	63 57	93 3
5,500 0	1 01	123 66	5,498 5	40 7	85 0	64 42	94 2

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Gunner 8 Federal #8H
Project:	Wildcat (Lea County, NM)	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Gunner 8 Federal #8H	North Reference:	Grid
Wellbore:	VH - Job #32K11111141	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111141	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	0 89	116 65	5,598 5	39 8	86 4	65 24	95 1	
5,700 0	0 78	125 16	5,698 5	39 1	87 6	65 96	96 0	
5,800 0	0 66	124 41	5,798 5	38 4	88 7	66 59	96 6	
5,900 0	0 62	120 11	5,898 5	37 8	89 6	67 14	97 3	
6,000 0	0 75	117 59	5,998 5	37 2	90 7	67 68	98 0	
6,100 0	0 62	124 26	6,098 5	36 6	91 7	68 24	98 7	
6,200 0	0 51	113 92	6,198 5	36 1	92 5	68 68	99 3	
6,300 0	0 52	119 43	6,298 5	35 7	93 4	69 06	100 0	
6,400 0	0 48	128 94	6,398 5	35 2	94 1	69 47	100 5	
6,500 0	0 37	138 19	6,498 5	34 7	94 6	69 84	100 8	
6,600 0	0 36	126 76	6,598 5	34 3	95 1	70 16	101 1	
6,700 0	0 33	129 62	6,698 5	33 9	95 6	70 45	101 4	
6,800 0	0 34	135 15	6,798 5	33 5	96 0	70 74	101 7	
6,900 0	0 35	132 25	6,898 5	33 1	96 4	71 04	101 9	
7,000 0	0 26	109 30	6,998 5	32 8	96 9	71 27	102 3	
7,100 0	0 26	110 58	7,098 5	32 7	97 3	71 43	102 6	
7,200 0	0 42	102 24	7,198 5	32 5	97 9	71 61	103 1	
7,300 0	0 40	106 86	7,298 5	32 3	98 6	71 83	103 7	
7,400 0	0 53	81 79	7,398 5	32 3	99 3	71 98	104 5	
7,500 0	0 57	82 74	7,498 5	32 4	100 3	72 08	105 4	
7,600 0	0 43	88 54	7,598 4	32 5	101 2	72 18	106 3	
7,700 0	0 28	110 72	7,698 4	32 4	101 8	72 32	106 8	
7,800 0	0 35	111 64	7,798 4	32 2	102 3	72 51	107 2	
7,900 0	0 35	120 08	7,898 4	32 0	102 8	72 73	107 7	
8,000 0	0 36	141 01	7,998 4	31 6	103 3	73 00	108 0	
8,100 0	0 33	161 94	8,098 4	31 1	103 6	73 31	108 1	
8,200 0	0 35	174 34	8,198 4	30 5	103 7	73 62	108 1	
8,300 0	0 41	171 11	8,298 4	29 8	103 8	73 97	108 0	
8,400 0	0 44	158 18	8,398 4	29 1	104 0	74 36	108 0	
8,500 0	0 50	162 59	8,498 4	28 3	104 3	74 79	108 0	
8,600 0	0 69	146 69	8,598 4	27 4	104 7	75 33	108 2	
8,700 0	0 83	149 80	8,698 4	26 3	105 4	76 00	108 6	
8,800 0	0 81	157 28	8,798 4	25 0	106 0	76 73	109 0	
8,900 0	0 70	178 42	8,898 4	23 7	106 3	77 41	109 0	
9,000 0	0 59	188 61	8,998 4	22 6	106 3	77 98	108 7	
9,100 0	0 71	200 92	9,098 4	21 5	106 0	78 51	108 1	
9,200 0	0 69	214 97	9,198 4	20 5	105 4	79 01	107 4	
9,300 0	0 66	221 26	9,298 4	19 5	104 7	79 43	106 5	
9,400 0	0 68	223 61	9,398 4	18 7	103 9	79 81	105 6	
9,500 0	0 56	267 40	9,498 4	18 2	103 0	79 96	104 6	
9,600 0	0 62	258 90	9,598 4	18 1	102 0	79 93	103 6	
9,700 0	0 97	274 42	9,698 3	18 1	100 6	79 82	102 2	
9,800 0	1 39	279 85	9,798 3	18 3	98 6	79 46	100 3	
9,900 0	1 63	287 48	9,898 3	19 0	96 0	78 82	97 9	

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Gunner 8 Federal #8H
Project:	Wildcat (Lea County, NM)	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Gunner 8 Federal #8H	North Reference:	Grid
Wellbore:	VH - Job #32K11111141	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111141	Database:	EDM-Regulatory

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
10,000 0	2 38	285 79	9,998 2	20 0	92 7	77 84	94 8



Scientific Drilling
Directional Drilling Operations

Project: Wildcat (Lea County, NM)
Lea County, NM
Well: Gunner 8 Federal #8H
Wellbore: VH - Job #32K11111141
Design: VH - Job #32K11111141

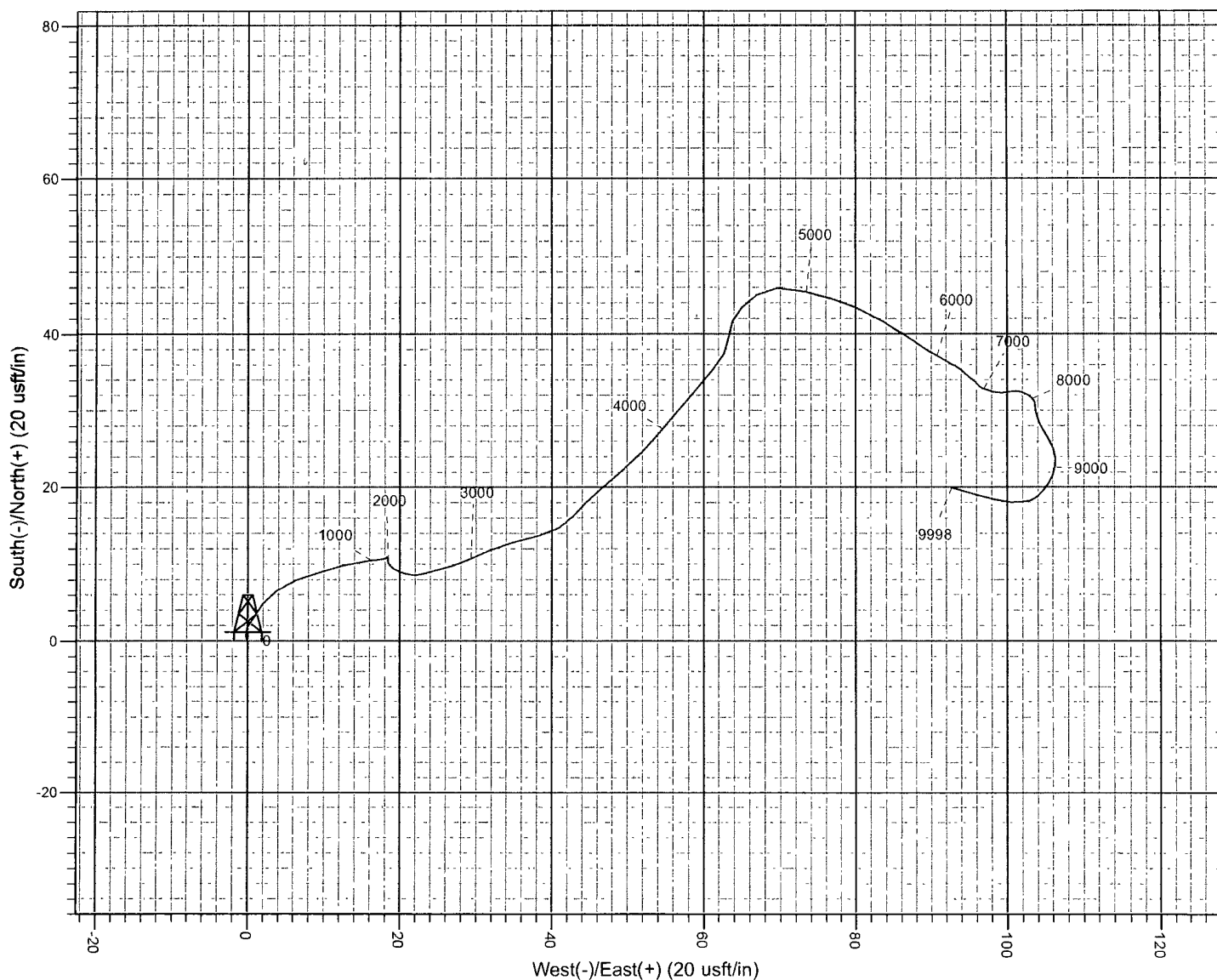


Azimuths to Grid North
True North -0.44°
Magnetic North 7.05°

Magnetic Field
Strength 48503 1snT
Dip Angle 60.03°
Date 11/22/2011
Model IGRF2010

WELL DETAILS: Gunner 8 Federal #8H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	384112.92	758519.23	32° 3' 11.862 N	103° 29' 56.098 W	



PROJECT DETAILS: Wildcat (Lea County, NM)
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: 33° 5' 52.800 N
Longitude: 103° 27' 14.400 W
Positional Uncertainty: 0.0
Convergence: 0.48
Local North: Grid



COG Operating LLC

Lea County(NAD27)

Gunner 8 Federal

#8H

OH

Design: OH

Pathfinder X & Y Report

29 December, 2011

SUR: M-08-26s-34e, 990/S & 330/W
BHL: E-5-26s-34e, 8571/S & 326/W
API # 30-025-40309

PATHFINDER®
A Schlumberger Company



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
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)
Geo Datum: NAD 1927 (NADCON CONUS)
Map Zone: New Mexico East 3001

System Datum: Mean Sea Level

Site Gunner 8 Federal

Site Position:	From:	Map	Northing:	384,112.900 usft	Latitude:	32° 3' 11 862 N
			Easting:	758,519 100 usft	Longitude:	103° 29' 56 099 W
Position Uncertainty:	0 0 usft		Slot Radius:	13-3/16 "	Grid Convergence:	0 44 °

Well #8H

Well Position	+N/-S	0 0 usft	Northing:	384,112 900 usft	Latitude:	32° 3' 11 862 N
	+E/-W	0 0 usft	Easting:	758,519.100 usft	Longitude:	103° 29' 56 099 W
Position Uncertainty	0 0 usft		Wellhead Elevation:	usft	Ground Level:	3,361 0 usft

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	4/12/2011	7 55	60 07	48,575

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)	Direction (°)
	0 0	0 0	0 0	359 86



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey Program		Date			
		12/29/2011			
From (usft)	To (usft)	Survey (Wellbore)		Tool Name	Description
100 0	9,300.0	Gryo #1 (OH)		NS-GYRO-MS	North sensing gyrocompassing m/s
9,359 0	17,225 0	MWD #2 (OH)		MWD	MWD - Standard

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)	
0 0	0 00	0 00	0 0	-3,382 0	0 0	0 0	0 0	0 00	384,112 90	758,519 10	
100 0	0 75	339 82	100.0	-3,282 0	0.6	-0 2	0 6	0 75	384,113.51	758,518 87	
200 0	0 87	36 73	200 0	-3,182 0	1 8	0 0	1 8	0 78	384,114 74	758,519 10	
300 0	0 98	30 81	300 0	-3,082 0	3 2	0 9	3 2	0 15	384,116 08	758,519 99	
400 0	1 35	38.35	400 0	-2,982 0	4 8	2 1	4 8	0 40	384,117 74	758,521 16	
500 0	1 48	51 72	499 9	-2,882 1	6 6	3 8	6 6	0 35	384,119 46	758,522 91	
600 0	1 86	69 77	599 9	-2,782.1	7 9	6 3	7 9	0 64	384,120 82	758,525 44	
700 0	1 78	75 30	699 8	-2,682.2	8 9	9 4	8 9	0 19	384,121.78	758,528.47	
800 0	1 61	73.83	799 8	-2,582 2	9 7	12 2	9 6	0 18	384,122 56	758,531 32	
900.0	1 19	80 73	899.8	-2,482 2	10 2	14.6	10 2	0 45	384,123 12	758,533 70	
1,000 0	0 67	85.16	999 7	-2,382 3	10.4	16 2	10 4	0 52	384,123.34	758,535 30	
1,100 0	0 37	86.94	1,099.7	-2,282.3	10 5	17 1	10.5	0 30	384,123 41	758,536.21	
1,200 0	0 17	63.47	1,199 7	-2,182.3	10.6	17 6	10 5	0 22	384,123.49	758,536.66	
1,300 0	0 29	86.82	1,299 7	-2,082 3	10 7	17 9	10 6	0 15	384,123.57	758,537 05	
1,400 0	0 07	45.78	1,399 7	-1,982 3	10.7	18 2	10 7	0 24	384,123.63	758,537 34	
1,500.0	0 09	344 99	1,499 7	-1,882.3	10 8	18 3	10 8	0 08	384,123 74	758,537 37	
1,600.0	0 11	161 43	1,599 7	-1,782 3	10 8	18.3	10.8	0 20	384,123 73	758,537 38	
1,700 0	0 04	82.67	1,699 7	-1,682.3	10 7	18 3	10 7	0 11	384,123.64	758,537 44	
1,800 0	0 07	109 96	1,799 7	-1,582 3	10 7	18 4	10 7	0 04	384,123 63	758,537 54	
1,900.0	0 18	198 76	1,899 7	-1,482 3	10 6	18 4	10 5	0 19	384,123 46	758,537 54	
2,000 0	0 12	172 60	1,999 7	-1,382 3	10 3	18 4	10 3	0 09	384,123 20	758,537 51	



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
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)
2,100.0	0.07	94.16	2,099.7	-1,282.3	10.2	18.5	10.2	0.13	384,123.10	758,537.58
2,200.0	0.30	161.41	2,199.7	-1,182.3	9.9	18.6	9.9	0.28	384,122.84	758,537.72
2,300.0	0.50	122.06	2,299.7	-1,082.3	9.5	19.1	9.4	0.33	384,122.36	758,538.18
2,400.0	0.50	115.60	2,399.7	-982.3	9.0	19.8	9.0	0.06	384,121.94	758,538.94
2,500.0	0.64	101.19	2,499.7	-882.3	8.7	20.8	8.7	0.20	384,121.65	758,539.88
2,600.0	0.63	99.33	2,599.7	-782.3	8.5	21.9	8.5	0.02	384,121.45	758,540.97
2,700.0	0.86	70.83	2,699.7	-682.3	8.7	23.1	8.6	0.43	384,121.61	758,542.22
2,800.0	1.28	77.91	2,799.7	-582.3	9.2	24.9	9.1	0.44	384,122.09	758,544.02
2,900.0	1.24	71.09	2,899.7	-482.3	9.8	27.0	9.7	0.16	384,122.67	758,546.14
3,000.0	1.54	65.95	2,999.6	-382.4	10.7	29.3	10.6	0.32	384,123.57	758,548.39
3,100.0	1.73	67.34	3,099.6	-282.4	11.8	31.9	11.7	0.19	384,124.70	758,551.01
3,200.0	1.96	75.66	3,199.5	-182.5	12.8	35.0	12.7	0.35	384,125.70	758,554.06
3,300.0	1.93	75.12	3,299.5	-82.5	13.7	38.2	13.6	0.04	384,126.56	758,557.35
3,400.0	1.43	60.02	3,399.4	17.4	14.7	41.0	14.6	0.66	384,127.62	758,560.05
3,500.0	1.34	42.83	3,499.4	117.4	16.2	42.8	16.1	0.42	384,129.10	758,561.93
3,600.0	1.47	45.59	3,599.4	217.4	18.0	44.5	17.8	0.15	384,130.85	758,563.64
3,700.0	1.69	48.28	3,699.4	317.4	19.8	46.6	19.7	0.23	384,132.73	758,565.66
3,800.0	2.17	51.54	3,799.3	417.3	22.0	49.1	21.9	0.49	384,134.89	758,568.24
3,900.0	2.34	43.53	3,899.2	517.2	24.6	52.0	24.5	0.36	384,137.55	758,571.13
4,000.0	2.19	41.02	3,999.1	617.1	27.6	54.7	27.4	0.18	384,140.47	758,573.79
4,100.0	1.82	38.76	4,099.1	717.1	30.2	56.9	30.1	0.38	384,143.15	758,576.04
4,200.0	1.92	41.20	4,199.0	817.0	32.7	59.0	32.6	0.13	384,145.65	758,578.14
4,300.0	1.73	39.85	4,299.0	917.0	35.2	61.1	35.0	0.19	384,148.07	758,580.21
4,400.0	1.37	27.91	4,398.9	1,016.9	37.4	62.6	37.2	0.48	384,150.28	758,581.73
4,500.0	1.27	3.97	4,498.9	1,116.9	39.5	63.3	39.4	0.56	384,152.44	758,582.37
4,600.0	1.20	24.24	4,598.9	1,216.9	41.6	63.8	41.4	0.44	384,154.50	758,582.88
4,700.0	1.35	44.15	4,698.9	1,316.9	43.4	65.0	43.2	0.46	384,156.30	758,584.13



Pathfinder Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
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	1.51	55.58	4,798.8	1,416.8	45.0	66.9	44.8	0.33	384,157.89	758,586.03
4,900.0	1.90	86.30	4,898.8	1,516.8	45.8	69.7	45.7	0.98	384,158.75	758,588.77
5,000.0	2.40	105.92	4,998.7	1,616.7	45.4	73.3	45.2	0.88	384,158.28	758,592.44
5,100.0	2.16	104.68	5,098.6	1,716.6	44.3	77.2	44.1	0.25	384,157.23	758,596.28
5,200.0	1.24	115.75	5,198.6	1,816.6	43.4	80.0	43.2	0.97	384,156.28	758,599.08
5,300.0	1.26	116.46	5,298.6	1,916.6	42.4	81.9	42.2	0.03	384,155.32	758,601.04
5,400.0	0.87	120.09	5,398.6	2,016.6	41.5	83.6	41.3	0.40	384,154.45	758,602.68
5,500.0	1.01	123.66	5,498.5	2,116.5	40.7	85.0	40.5	0.15	384,153.58	758,604.07
5,600.0	0.89	116.65	5,598.5	2,216.5	39.8	86.4	39.6	0.17	384,152.74	758,605.49
5,700.0	0.78	125.16	5,698.5	2,316.5	39.1	87.6	38.9	0.17	384,152.00	758,606.75
5,800.0	0.66	124.41	5,798.5	2,416.5	38.4	88.7	38.2	0.12	384,151.29	758,607.78
5,900.0	0.62	120.11	5,898.5	2,516.5	37.8	89.6	37.6	0.06	384,150.69	758,608.72
6,000.0	0.75	117.59	5,998.5	2,616.5	37.2	90.7	37.0	0.13	384,150.11	758,609.77
6,100.0	0.62	124.26	6,098.5	2,716.5	36.6	91.7	36.4	0.15	384,149.51	758,610.80
6,200.0	0.51	113.92	6,198.5	2,816.5	36.1	92.5	35.9	0.15	384,149.02	758,611.65
6,300.0	0.52	119.43	6,298.5	2,916.5	35.7	93.4	35.5	0.05	384,148.62	758,612.45
6,400.0	0.48	128.94	6,398.5	3,016.5	35.2	94.1	35.0	0.09	384,148.13	758,613.17
6,500.0	0.37	138.19	6,498.5	3,116.5	34.7	94.6	34.5	0.13	384,147.63	758,613.71
6,600.0	0.36	126.76	6,598.5	3,216.5	34.3	95.1	34.1	0.07	384,147.20	758,614.18
6,700.0	0.33	129.62	6,698.5	3,316.5	33.9	95.6	33.7	0.03	384,146.83	758,614.65
6,800.0	0.34	135.15	6,798.5	3,416.5	33.5	96.0	33.3	0.03	384,146.43	758,615.09
6,900.0	0.35	132.25	6,898.5	3,516.5	33.1	96.4	32.9	0.02	384,146.02	758,615.52
7,000.0	0.26	109.30	6,998.5	3,616.5	32.8	96.9	32.6	0.15	384,145.74	758,615.96
7,100.0	0.26	110.58	7,098.5	3,716.5	32.7	97.3	32.4	0.01	384,145.58	758,616.39
7,200.0	0.42	102.24	7,198.5	3,816.5	32.5	97.9	32.3	0.17	384,145.42	758,616.96
7,300.0	0.40	106.86	7,298.5	3,916.5	32.3	98.6	32.1	0.04	384,145.25	758,617.65
7,400.0	0.53	81.79	7,398.5	4,016.5	32.3	99.3	32.1	0.24	384,145.21	758,618.44



Pathfinder Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
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)
7,500.0	0 57	82 74	7,498 5	4,116.5	32 4	100 3	32.2	0 04	384,145 34	758,619 39
7,600 0	0 43	88 54	7,598 4	4,216 4	32 5	101 2	32 3	0 15	384,145 41	758,620.26
7,700 0	0 28	110 72	7,698 4	4,316 4	32 4	101 8	32 2	0 20	384,145 34	758,620 87
7,800 0	0 35	111.64	7,798 4	4,416 4	32 2	102 3	32 0	0 07	384,145 14	758,621 38
7,900 0	0 35	120.08	7,898 4	4,516 4	32 0	102 8	31 7	0 05	384,144 87	758,621 93
8,000 0	0 36	141 01	7,998 4	4,616 4	31 6	103 3	31 3	0 13	384,144 47	758,622 39
8,100 0	0 33	161.94	8,098 4	4,716 4	31 1	103 6	30 8	0 13	384,143 96	758,622 67
8,200 0	0 35	174.34	8,198 4	4,816 4	30 5	103 7	30.2	0 08	384,143 38	758,622.79
8,300 0	0 41	171 11	8,298 4	4,916 4	29 8	103 8	29 6	0 06	384,142 72	758,622.88
8,400 0	0 44	158 18	8,398 4	5,016 4	29 1	104.0	28 9	0 10	384,142 01	758,623.08
8,500 0	0 50	162 59	8,498 4	5,116 4	28 3	104 3	28 1	0 07	384,141 24	758,623.35
8,600 0	0 69	146 69	8,598 4	5,216 4	27 4	104.7	27 2	0 25	384,140.32	758,623.81
8,700 0	0 83	149 80	8,698 4	5,316.4	26 3	105 4	26 0	0 15	384,139 19	758,624 51
8,800 0	0 81	157.28	8,798 4	5,416.4	25 0	106 0	24 7	0 11	384,137 91	758,625 14
8,900.0	0 70	178.42	8,898 4	5,516 4	23 7	106 3	23.5	0 30	384,136 65	758,625 43
9,000 0	0 59	188.61	8,998 4	5,616 4	22 6	106 3	22 4	0 16	384,135 53	758,625 37
9,100 0	0 71	200 92	9,098.4	5,716 4	21 5	106 0	21 3	0 18	384,134.44	758,625.08
9,200 0	0 69	214 97	9,198 4	5,816 4	20 5	105 4	20 2	0 17	384,133 37	758,624.51
9,300 0	0 66	221 26	9,298 4	5,916 4	19 5	104 7	19 3	0 08	384,132 44	758,623 78
9,359 0	0 70	229.67	9,357 4	5,975 4	19 1	104 2	18 8	0 18	384,131 95	758,623.29
9,396 0	0 53	237 40	9,394 4	6,012 4	18 8	103 9	18.6	0 51	384,131.71	758,622.97
9,427 0	0 88	328 19	9,425 4	6,043.4	18 9	103 6	18 7	3 33	384,131.84	758,622 72
9,459 0	4 13	351 92	9,457 3	6,075 3	20.3	103 3	20 0	10 45	384,133 19	758,622 43
9,491 0	10 46	357 64	9,489.1	6,107 1	24 3	103 0	24 1	19 89	384,137 24	758,622 15
9,522 0	15 56	0 10	9,519 2	6,137.2	31 3	102.9	31 1	16 54	384,144.21	758,622.04
9,554 0	20 84	357 46	9,549 6	6,167 6	41 3	102.7	41 0	16.70	384,154.20	758,621 80
9,585 0	25 85	359 74	9,578 1	6,196 1	53 6	102 4	53 3	16 42	384,166.47	758,621 52



Pathfinder Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
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)
9,617.0	30.16	4.32	9,606.3	6,224.3	68.6	103.0	68.3	15.04	384,181.47	758,622.09
9,648.0	34.65	8.53	9,632.5	6,250.5	85.1	104.9	84.8	16.20	384,197.96	758,623.99
9,680.0	39.13	11.43	9,658.1	6,276.1	104.0	108.2	103.7	15.02	384,216.87	758,627.34
9,712.0	43.97	10.56	9,682.0	6,300.0	124.8	112.3	124.5	15.23	384,237.70	758,631.38
9,743.0	47.22	7.48	9,703.7	6,321.7	146.7	115.7	146.4	12.66	384,259.57	758,634.84
9,775.0	50.91	6.51	9,724.7	6,342.7	170.7	118.7	170.4	11.76	384,283.56	758,637.77
9,806.0	55.49	5.19	9,743.3	6,361.3	195.3	121.2	195.0	15.16	384,308.24	758,640.29
9,838.0	59.53	3.52	9,760.4	6,378.4	222.3	123.2	221.9	13.37	384,335.15	758,642.33
9,869.0	61.55	1.94	9,775.7	6,393.7	249.2	124.5	248.9	7.88	384,362.11	758,643.62
9,901.0	63.58	0.80	9,790.4	6,408.4	277.6	125.2	277.3	7.09	384,390.50	758,644.29
9,933.0	65.33	359.39	9,804.2	6,422.2	306.5	125.2	306.2	6.76	384,419.37	758,644.34
9,964.0	67.09	357.90	9,816.7	6,434.7	334.8	124.6	334.5	7.18	384,447.73	758,643.66
9,996.0	69.47	356.85	9,828.6	6,446.6	364.5	123.2	364.2	8.04	384,477.42	758,642.30
10,028.0	72.37	356.58	9,839.0	6,457.0	394.7	121.5	394.4	9.10	384,507.61	758,640.57
10,059.0	74.92	357.11	9,847.8	6,465.8	424.4	119.8	424.1	8.39	384,537.31	758,638.93
10,091.0	77.73	357.46	9,855.3	6,473.3	455.5	118.4	455.2	8.85	384,568.36	758,637.46
10,122.0	79.67	357.25	9,861.4	6,479.4	485.8	117.0	485.5	6.29	384,598.73	758,636.06
10,150.0	81.16	357.41	9,866.1	6,484.1	513.4	115.7	513.1	5.35	384,626.31	758,634.77
10,182.0	83.27	357.70	9,870.4	6,488.4	545.1	114.3	544.8	6.65	384,657.98	758,633.42
10,214.0	85.30	357.88	9,873.6	6,491.6	576.9	113.1	576.6	6.37	384,689.80	758,632.19
10,244.0	85.38	357.96	9,876.0	6,494.0	606.8	112.0	606.5	0.38	384,719.68	758,631.11
10,276.0	85.47	358.29	9,878.6	6,496.6	638.7	111.0	638.4	1.07	384,751.56	758,630.06
10,309.0	85.30	357.91	9,881.2	6,499.2	671.5	109.9	671.3	1.26	384,784.43	758,628.97
10,340.0	86.53	357.74	9,883.4	6,501.4	702.4	108.7	702.2	4.01	384,815.33	758,627.80
10,372.0	88.99	357.90	9,884.7	6,502.7	734.4	107.5	734.1	7.70	384,847.28	758,626.58
10,403.0	90.84	358.05	9,884.7	6,502.7	765.4	106.4	765.1	5.99	384,878.26	758,625.49
10,498.0	90.48	358.59	9,883.6	6,501.6	860.3	103.6	860.1	0.68	384,973.21	758,622.70



Pathfinder
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382.0usft (21' KB)
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)
10,593.0	90.66	358.59	9,882.7	6,500.7	955.3	101.3	955.0	0.19	385,068.18	758,620.36
10,688.0	90.04	358.83	9,882.1	6,500.1	1,050.3	99.1	1,050.0	0.70	385,163.15	758,618.23
10,783.0	90.22	358.36	9,881.9	6,499.9	1,145.2	96.8	1,145.0	0.53	385,258.12	758,615.90
10,877.0	90.04	357.77	9,881.7	6,499.7	1,239.2	93.6	1,238.9	0.66	385,352.07	758,612.72
10,972.0	90.04	357.49	9,881.6	6,499.6	1,334.1	89.7	1,333.9	0.29	385,446.99	758,608.79
11,067.0	90.48	357.64	9,881.2	6,499.2	1,429.0	85.7	1,428.8	0.49	385,541.90	758,604.76
11,162.0	90.31	358.11	9,880.5	6,498.5	1,523.9	82.1	1,523.7	0.53	385,636.83	758,601.23
11,256.0	89.60	359.65	9,880.6	6,498.6	1,617.9	80.3	1,617.7	1.80	385,730.81	758,599.40
11,351.0	88.99	359.93	9,881.8	6,499.8	1,712.9	79.9	1,712.7	0.71	385,825.80	758,599.05
11,446.0	90.66	0.14	9,882.1	6,500.1	1,807.9	80.0	1,807.7	1.77	385,920.80	758,599.11
11,541.0	89.08	0.29	9,882.3	6,500.3	1,902.9	80.4	1,902.7	1.67	386,015.79	758,599.46
11,636.0	88.37	0.58	9,884.4	6,502.4	1,997.9	81.1	1,997.7	0.81	386,110.77	758,600.18
11,730.0	88.55	359.42	9,886.9	6,504.9	2,091.8	81.1	2,091.6	1.25	386,204.73	758,600.18
11,825.0	89.87	358.87	9,888.2	6,506.2	2,186.8	79.7	2,186.6	1.51	386,299.71	758,598.77
11,920.0	91.28	359.10	9,887.3	6,505.3	2,281.8	78.0	2,281.6	1.50	386,394.69	758,597.08
12,015.0	91.71	358.76	9,884.8	6,502.8	2,376.7	76.2	2,376.5	0.58	386,489.64	758,595.31
12,109.0	91.01	359.04	9,882.6	6,500.6	2,470.7	74.4	2,470.5	0.80	386,583.59	758,593.51
12,204.0	89.78	358.57	9,881.9	6,499.9	2,565.7	72.4	2,565.5	1.39	386,678.57	758,591.53
12,299.0	89.52	358.83	9,882.5	6,500.5	2,660.6	70.3	2,660.5	0.39	386,773.54	758,589.37
12,394.0	90.75	358.97	9,882.3	6,500.3	2,755.6	68.4	2,755.4	1.30	386,868.52	758,587.55
12,489.0	90.66	358.22	9,881.1	6,499.1	2,850.6	66.1	2,850.4	0.80	386,963.49	758,585.22
12,583.0	92.15	358.44	9,878.8	6,496.8	2,944.5	63.4	2,944.3	1.60	387,057.42	758,582.48
12,678.0	92.07	358.91	9,875.3	6,493.3	3,039.4	61.2	3,039.3	0.50	387,152.33	758,580.28
12,773.0	94.79	358.55	9,869.6	6,487.6	3,134.2	59.1	3,134.1	2.89	387,247.12	758,578.18
12,868.0	93.30	359.22	9,862.9	6,480.9	3,229.0	57.2	3,228.8	1.72	387,341.87	758,576.34
12,962.0	93.91	359.42	9,857.0	6,475.0	3,322.8	56.1	3,322.6	0.68	387,435.67	758,575.23
13,057.0	94.09	0.01	9,850.4	6,468.4	3,417.5	55.7	3,417.4	0.65	387,530.44	758,574.75



Pathfinder
Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382 0usft (21' KB)
MD Reference: WELL @ 3382 0usft (21' KB)
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)
13,152 0	91 80	358 73	9,845 5	6,463 5	3,512 4	54.6	3,512 3	2.76	387,625 30	758,573 71
13,246 0	92.07	357 88	9,842 3	6,460 3	3,606 3	51 8	3,606.2	0 95	387,719 20	758,570 93
13,340.0	92 24	357 59	9,838 8	6,456 8	3,700.2	48 1	3,700.0	0.36	387,813 06	758,567 22
13,435 0	92 24	358 39	9,835 1	6,453 1	3,795 0	44 8	3,794 9	0.84	387,907 93	758,563 89
13,530 0	91 45	357 47	9,832 0	6,450 0	3,889 9	41 4	3,889 8	1 28	388,002.82	758,560.46
13,624 0	91 28	355 73	9,829 8	6,447.8	3,983 7	35 8	3,983 6	1 86	388,096 62	758,554 89
13,719 0	93 30	357 64	9,826 0	6,444 0	4,078 5	30 3	4,078 4	2 93	388,191 38	758,549 40
13,814 0	94 18	359 12	9,819 8	6,437 8	4,173.2	27 6	4,173 2	1 81	388,286 14	758,546 72
13,909.0	92 24	1 00	9,814 5	6,432 5	4,268.1	27 7	4,268.0	2 84	388,380 98	758,546 82
14,004 0	91 28	359.70	9,811 5	6,429 5	4,363 0	28.3	4,362 9	1 70	388,475 93	758,547.40
14,098 0	92 42	0 00	9,808 5	6,426 5	4,457 0	28 1	4,456 9	1 25	388,569 88	758,547 15
14,193 0	92 15	359.82	9,804.7	6,422 7	4,551.9	27 9	4,551 8	0 34	388,664.80	758,547 00
14,288 0	92 33	358.96	9,801 0	6,419 0	4,646 8	26.9	4,646 7	0 92	388,759 72	758,545 99
14,383 0	92 15	359.66	9,797 3	6,415.3	4,741 7	25 7	4,741 7	0.76	388,854 64	758,544 85
14,477 0	92 15	357 28	9,793 8	6,411 8	4,835 6	23.2	4,835 6	2 53	388,948.54	758,542 34
14,572 0	92 59	358.45	9,789 8	6,407 8	4,930 5	19 7	4,930 4	1 31	389,043 39	758,538.80
14,667 0	92 33	2 29	9,785 8	6,403 8	5,025 4	20 3	5,025 3	4 05	389,138 28	758,539 42
14,762 0	92 42	0.11	9,781 8	6,399.8	5,120 3	22.3	5,120 2	2 29	389,233 17	758,541 41
14,856 0	92 68	2.09	9,777 6	6,395.6	5,214.2	24.1	5,214 1	2 12	389,327 06	758,543 21
14,950 0	90 92	0 64	9,774 7	6,392 7	5,308.1	26 3	5,308 0	2 43	389,420 98	758,545 45
15,045 0	90 84	0.12	9,773 2	6,391 2	5,403.1	27 0	5,403.0	0 55	389,515 96	758,546 08
15,140.0	91 54	0.10	9,771 3	6,389 3	5,498 0	27 2	5,498 0	0 74	389,610 94	758,546 26
15,235 0	91 63	1.34	9,768 6	6,386 6	5,593.0	28 4	5,592 9	1 31	389,705 90	758,547 45
15,330 0	91 10	0 93	9,766.4	6,384.4	5,688 0	30 2	5,687 9	0 71	389,800 85	758,549 33
15,424 0	91 71	0 02	9,764 1	6,382 1	5,781 9	31.0	5,781.8	1 17	389,894 82	758,550 11
15,519 0	91 80	0.03	9,761 2	6,379 2	5,876 9	31 1	5,876 8	0.10	389,989 77	758,550 15
15,614 0	92 15	1 15	9,757 9	6,375 9	5,971 8	32 0	5,971 7	1 23	390,084.71	758,551 13



Pathfinder Pathfinder X & Y Report



Company: COG Operating LLC
Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #8H
TVD Reference: WELL @ 3382.0usft (21' KB)
MD Reference: WELL @ 3382 0usft (21' KB)
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)
15,709 0	90.48	357 31	9,755 7	6,373 7	6,066 8	30 8	6,066 7	4 41	390,179.65	758,549 85
15,803 0	91 71	358 61	9,753 9	6,371 9	6,160 7	27 4	6,160 6	1 90	390,273 57	758,546 51
15,898 0	92 33	358.99	9,750 6	6,368.6	6,255 6	25 4	6,255.5	0.77	390,368.49	758,544 52
15,993 0	91 98	358 61	9,747.0	6,365.0	6,350 5	23 4	6,350 4	0 54	390,463 41	758,542 53
16,088.0	91 89	358.96	9,743 8	6,361 8	6,445.4	21 4	6,445.4	0 38	390,558 33	758,540 52
16,182.0	92 24	358 41	9,740.4	6,358.4	6,539 3	19 3	6,539.3	0 69	390,652.24	758,538 36
16,277.0	92 15	357 76	9,736 8	6,354.8	6,634 2	16 1	6,634.2	0.69	390,747.12	758,535.19
16,372 0	91 45	356.84	9,733.8	6,351 8	6,729 1	11 6	6,729 0	1.22	390,841.97	758,530.72
16,466 0	92.15	358 48	9,730 8	6,348 8	6,822 9	7 8	6,822 9	1 90	390,935 84	758,526 88
16,561 0	92.42	357 57	9,727 0	6,345.0	6,917 8	4 5	6,917 8	1 00	391,030 70	758,523 61
16,656 0	93.65	359 31	9,722 0	6,340 0	7,012 6	1 9	7,012 6	2 24	391,125 53	758,521.03
16,724.0	92 59	356 93	9,718 3	6,336 3	7,080 5	-0 3	7,080 5	3 83	391,193 39	758,518 80
16,819 0	92 33	0.17	9,714 2	6,332 2	7,175 4	-2.7	7,175.3	3 42	391,288 26	758,516 40
16,914 0	90 84	359.49	9,711 6	6,329 6	7,270 3	-3 0	7,270 3	1 72	391,383 22	758,516.11
17,008 0	91 10	359.74	9,710 0	6,328 0	7,364.3	-3 6	7,364 3	0.38	391,477 20	758,515 48
17,103 0	91 01	0 17	9,708.2	6,326 2	7,459 3	-3 7	7,459 3	0 46	391,572 18	758,515.41
17,177.0	91 10	359.93	9,706 9	6,324.9	7,533.3	-3 6	7,533 3	0 35	391,646 17	758,515 47
17,225 0	91 10	359.93	9,706 0	6,324 0	7,581 3	-3 7	7,581 2	0 00	391,694 16	758,515.41

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
9,491.0	9,489 1	24 3	103 0	KOP - 9491 0 'MD, 9489 1 'TVD, 24.3 'N, 103.0 'E
10,403 0	9,884 7	765.4	106 4	LP - 10403.0 'MD, 9884 7 'TVD, 765 4 'N, 106 4 'E
17,225 0	9,706 0	7,581.3	-3 7	BHL - 17455 0 'MD, 0 0 'TVD, 0 0 'N, 0 0 'E



Project: Lea County(NAD27)
Site: Gunner 8 Federal
Well: #8H
Wellbore: OH
Plan: Post GyroPlan #3 (#8H/OH)



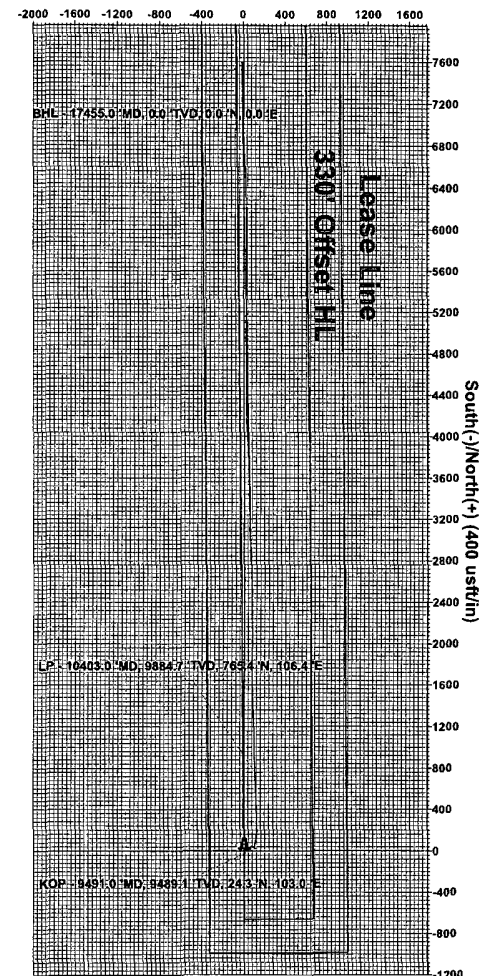
Azimuths to Grid North
True North: -0.44°
Magnetic North: 7.11°

Magnetic Field
Strength: 48575.1nT
Dip Angle: 60.07°
Date: 4/12/2011
Model: IGRF200510

PATHFINDER

A Schlumberger Company

West(-)/East(+) (400 usft/in)



WELL DETAILS: #8H

Ground Elevation: 3361.0
RKB Elevation: WELL @ 3382 0usft (21' KB)
Rig Name: 21' KB

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0 0	0 0	384112 900	758519 100	32° 3' 11 862 N	103° 29' 5 6 099 W	

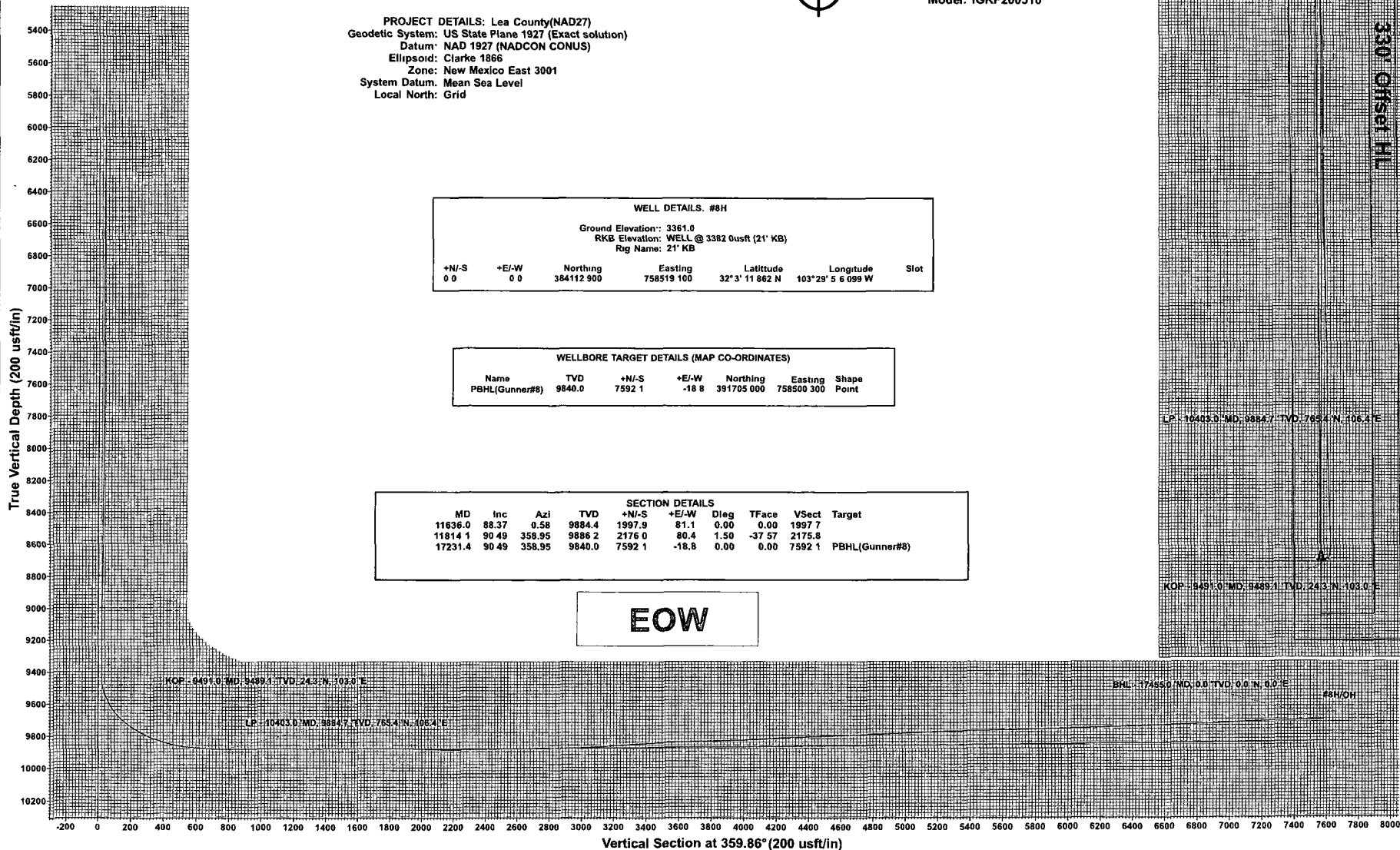
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL(Gunner#8)	9840.0	7592 1	-18 8	391705 000	758500 300	Point

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
11636.0	88.37	0.58	9884.4	1997.9	81.1	0.00	0.00	1997 7	
11814.1	90.49	358.95	9886.2	2176 0	80.4	1.50	-37 57	2175.8	
17231.4	90.49	358.95	9840.0	7592 1	-18.8	0.00	0.00	7592 1	PBHL(Gunner#8)

EOW



Plan Post GyroPlan #3 (#8H/OH)

Created By Sam Biffle Date: 10/30, December 29 2011

COG Operating LLC
Lea County(NAD27)
Gunner 8 Federal
21' KB
OH
Post GyroPlan #3