Results of Directional Survey

API number:	30-025-40035			
OGRID:		Operator:	COG OPERATING LLC	
		Property:	AIRCOBRA 12 STATE	# 2H

surface	ULSTR:	B	12	T	19S	R	34E
				510	FNL	1980	FEL

BH Loc	ULSTR:	O	12	T	19S	R	34E
14772	MD	10747.2	TVD	4744	FNL	1947	FEL

Top Perf/OH	ULSTR:	B	12	T	19S	R	34E
10900	MD	10696.9	TVD	875	FNL	1996	FEL

Bot Perf/OH	ULSTR:	O	12	T	19S	R	34E
14710	MD	10748.1	TVD	4682	FNL	1948	FEL

	MD	N/S	E/W	VD
	10879	-345.10	-15.88	10691.22
TOP PERFS/OH	**10900**	-365.31	-16.35	10696.90
	10907	-372.05	-16.50	10698.79
	14678	-4139.52	32.19	10748.51
BOT PERFS/OH	**14710**	-4171.52	32.35	10748.07
	14718	-4179.52	32.39	10747.96

NEXT TO LAST	14678	-4139.52	32.19	10748.51
LAST READING	14718	-4179.52	32.39	10747.96
TD	**14772**	-4233.52	32.66	10747.22

Surface Location	510	FN	1980	FE
Projected BHL	4744	FN	1947	FE
Location of				
Top Perfs/OH	875	FN	1996	FE
Bottom Perfs/OH	4682	FN	1948	FE

SUMMARY of Subsurface Locations

Surface Location	B-12-19S-34E	510	FN	1980	FE	Vert. Depth
Top Perfs/OH	B-12-19S-34E	875	FN	1996	FE	10696.90
Bottom Perfs/OH	O-12-19S-34E	4682	FN	1948	FE	10748.07
Projected TD	O-12-19S-34E	4744	FN	1947	FE	10747.22

McVAY DRILLING COMPANY
P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

HOBBS OCD

JUL 27 2011

RECEIVED

Well Name and Num: Aircobra 12 State #2H
Location: Sec. 12, T19S, R34E
Operator: COG
Drilling Contractor: McVay Drilling Company

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

Degrees @	Depth	Degrees @	Depth	Degrees @	Depth	Degrees @	Depth
1.00	525	1.64	6817	25.76	10415	88.90	13317
1.00	619	0.91	7317	28.23	10447	90.22	13630
0.87	953	1.06	7797	35.79	10509	88.99	13820
0.90	1300	2.10	8271	43.62	10571	88.90	13916
0.26	1646	2.56	8430	50.21	10633	90.04	14202
0.25	1865	3.04	8588	59.27	10725	89.60	14583
0.86	2215	3.33	8704	70.52	10848	91.01	14718
3.50	2562	2.02	8849	80.28	10969		
3.50	2783	1.32	8990	83.27	11031		
0.05	2969	1.06	9179	89.08	11123		
0.95	3340	1.41	9369	89.78	11154		
0.53	3833	0.70	9560	88.72	11370		
1.16	4337	0.38	10849	89.43	11740		
0.95	4838	1.32	10228	90.57	12018		
0.95	5341	2.64	10258	89.60	12296		
1.21	5841	4.31	10268	90.69	12666		
1.15	6341	18.03	10352	88.81	12945		

By: Hunt Cook

Subscribed and sworn to before me this 27th day of May, 2011

Tina Flemens
Notary Public, Lea County, New Mexico

SUR: B-12-19s-34e, 510/N & 1980/E
BHL: O-12-19s-34e, 4744/N & 1947/E
API # 30-025-40035

OFFICIAL SEAL
TINA FLEMENS
Notary Public
State of New Mexico
My Comm. Expires 8-16-13

COG OPERATING LLC
RECEIVED
MAY 31 2011
ARTESIA WEST

SUR: B-12-19s-34e, 510/N & 1980/E
BHL: O-12-19s-34e, 4744/N & 1947/E
API # 30-025-40035

COG OPERATING

Scharb
Lea County, NM
Aircobra 12 State #2H
VH - Job #32K0511425

Survey: Actual

SDI Standard Survey Report

28 May, 2011

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

Notarized this date 17th of June, 2011.

Carrie Reed
Notary Signature
County of Midland
State of Texas

CARRIE REED
My Commission Expires
October 4, 2011

Scientific Drilling
Directional Drilling Operations

Scientific Drilling International, Inc.

SDI Standard Survey Report

Scientific Drilling
Directional Drilling Operations

Company:	COG OPERATING	**Local Co-ordinate Reference:**	Well Aircobra 12 State #2H
Project:	Scharb	**TVD Reference:**	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	**MD Reference:**	WELL @ 0 0usft (Original Well Elev)
Well:	Aircobra 12 State #2H	**North Reference:**	Grid
Wellbore:	VH - Job #32K0511425	**Survey Calculation Method:**	Minimum Curvature
Design:	VH - Job #32K0511425	**Database:**	EDM-Regulatory

Project Scharb

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:**	612,439 34 usft	**Latitude:**	32° 40' 51 600 N
From:	Lat/Long	**Easting:**	753,020 58 usft	**Longitude:**	103° 30' 39 600 W
Position Uncertainty:	0 0 usft	**Slot Radius:**	13-3/16"	**Grid Convergence:**	0 44 °

Well Aircobra 12 State #2H, Directional (Pathfinder)

Well Position	**+N/-S**	0 0 usft	**Northing:**	612,439 34 usft	**Latitude:**	32° 40' 51 600 N
	+E/-W	0 0 usft	**Easting:**	753,020 58 usft	**Longitude:**	103° 30' 39 600 W
Position Uncertainty		0 0 usft	**Wellhead Elevation:**	usft	**Ground Level:**	0 0 usft

Wellbore VH - Job #32K0511425

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	5/11/2011	7 61	60 62	48,935

Design VH - Job #32K0511425

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	179 57

Survey Program **Date** 5/28/2011

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100 0	10,915 0	Actual (VH - Job #32K0511425)	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 04	122 07	100 0	0 0	0 0	122 07	0 0
200 0	0 36	127 74	200 0	-0 2	0 3	126 71	0 4
300 0	0 46	127 18	300 0	-0 7	0 9	127 18	1 1
400 0	0 28	136 18	400 0	-1 1	1 4	128 43	1 7
500 0	0 59	121 76	500 0	-1 5	2 0	127 82	2 5
600 0	0 58	107 29	600 0	-2 0	2 9	124 01	3 5
700 0	0 69	112 15	700 0	-2 3	3 9	120 63	4 6
800 0	0 69	99 69	800 0	-2 7	5 1	117 59	5 7
900 0	0 84	120 46	900 0	-3 1	6 3	116 39	7 0
1,000 0	0 88	129 86	1,000 0	-4 0	7 5	117 94	8 5
1,100 0	0 51	165 18	1,099 9	-4 9	8 2	120 84	9 6

Company:	COG OPERATING	**Local Co-ordinate Reference:**	Well Aircobra 12 State #2H
Project:	Scharb	**TVD Reference:**	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	**MD Reference:**	WELL @ 0 0usft (Original Well Elev)
Well:	Aircobra 12 State #2H	**North Reference:**	Grid
Wellbore:	VH - Job #32K0511425	**Survey Calculation Method:**	Minimum Curvature
Design:	VH - Job #32K0511425	**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 68	153 80	1,199 9	-5 9	8 6	124 33	10 4
1,300 0	0 57	157 33	1,299 9	-6 9	9 1	127 16	11 4
1,400 0	0 75	154 45	1,399 9	-7 9	9 5	129 70	12 4
1,500 0	0 50	149 88	1,499 9	-8 9	10 0	131 52	13 4
1,600 0	0 41	162 29	1,599 9	-9 6	10 4	132 82	14 1
1,700 0	0 44	163 83	1,699 9	-10 3	10 6	134 27	14 8
1,800 0	0 48	165 19	1,799 9	-11 1	10 8	135 77	15 5
1,900 0	0 50	151 25	1,899 9	-11 9	11 1	136 90	16 3
2,000 0	0 61	152 59	1,999 9	-12 7	11 6	137 74	17 2
2,100 0	0 86	161 39	2,099 9	-13 9	12 1	139 10	18 4
2,200 0	1 01	166 31	2,199 9	-15 5	12 5	141 08	19 9
2,300 0	1 62	175 22	2,299 9	-17 7	12 8	144 14	21 9
2,400 0	2 40	185 86	2,399 8	-21 2	12 7	149 06	24 8
2,500 0	3 22	200 44	2,499 7	-26 0	11 5	156 03	28 4
2,600 0	4 20	208 40	2,599 5	-31 8	8 8	164 51	33 0
2,700 0	4 47	213 92	2,699 2	-38 3	4 9	172 70	38 6
2,800 0	3 45	213 05	2,798 9	-44 0	1 1	178 59	44 0
2,900 0	2 72	206 50	2,898 8	-48 7	-1 6	181 90	48 7
3,000 0	2 02	207 14	2,998 7	-52 4	-3 5	183 80	52 5
3,100 0	1 78	209 09	3,098 7	-55 3	-5 0	185 21	55 5
3,200 0	0 95	180 52	3,198 6	-57 5	-5 8	185 76	57 8
3,300 0	0 73	157 71	3,298 6	-58 9	-5 6	185 40	59 1
3,400 0	0 31	139 58	3,398 6	-59 7	-5 1	184 93	59 9
3,500 0	0 12	120 06	3,498 6	-59 9	-4 9	184 66	60 1
3,600 0	0 14	258 82	3,598 6	-60 0	-4 9	184 68	60 2
3,700 0	0 25	299 86	3,698 6	-59 9	-5 2	184 98	60 2
3,800 0	0 47	302 58	3,798 6	-59 6	-5 8	185 52	59 9
3,900 0	0 54	331 67	3,898 6	-59 0	-6 3	186 12	59 3
4,000 0	0 65	323 37	3,998 6	-58 1	-6 9	186 76	58 5
4,100 0	0 72	315 79	4,098 6	-57 2	-7 7	187 63	57 7
4,200 0	0 76	312 65	4,198 6	-56 3	-8 6	188 68	56 9
4,300 0	0 88	312 44	4,298 6	-55 3	-9 6	189 89	56 2
4,400 0	0 98	318 29	4,398 6	-54 2	-10 8	191 26	55 2
4,500 0	1 10	316 90	4,498 5	-52 8	-12 0	192 80	54 2
4,600 0	1 08	317 83	4,598 5	-51 4	-13 3	194 49	53 1
4,700 0	1 13	319 53	4,698 5	-50 0	-14 6	196 25	52 1
4,800 0	1 15	318 31	4,798 5	-48 5	-15 9	198 13	51 0
4,900 0	1 20	320 80	4,898 5	-46 9	-17 2	200 14	50 0
5,000 0	1 18	329 22	4,998 4	-45 2	-18 4	202 13	48 8
5,100 0	0 94	331 69	5,098 4	-43 6	-19 3	203 88	47 7
5,200 0	0 92	332 82	5,198 4	-42 2	-20 1	205 44	46 7
5,300 0	1 00	334 20	5,298 4	-40 7	-20 8	207 09	45 7
5,400 0	0 92	338 87	5,398 4	-39 1	-21 5	208 75	44 7
5,500 0	1 04	337 29	5,498 4	-37 6	-22 1	210 49	43 6

Company:	COG OPERATING	**Local Co-ordinate Reference:**	Well Aircobra 12 State #2H
Project:	Scharb	**TVD Reference:**	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	**MD Reference:**	WELL @ 0 0usft (Original Well Elev)
Well:	Aircobra 12 State #2H	**North Reference:**	Grid
Wellbore:	VH - Job #32K0511425	**Survey Calculation Method:**	Minimum Curvature
Design:	VH - Job #32K0511425	**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 93	338 39	5,598 4	-36 0	-22 8	212 33	42 6
5,700 0	0 84	343 60	5,698 3	-34 5	-23 3	214 00	41 6
5,800 0	0 65	357 88	5,798 3	-33 2	-23 5	215 26	40 7
5,900 0	0 75	0 54	5,898 3	-32 0	-23 5	216 30	39 7
6,000 0	0 97	354 09	5,998 3	-30 5	-23 6	217 71	38 6
6,100 0	1 03	348 53	6,098 3	-28 8	-23 9	219 65	37 4
6,200 0	1 04	349 08	6,198 3	-27 0	-24 2	221 86	36 3
6,300 0	1 15	350 14	6,298 3	-25 1	-24 6	224 32	35 2
6,400 0	1 52	345 41	6,398 2	-22 9	-25 1	227 61	33 9
6,500 0	1 95	350 39	6,498 2	-19 9	-25 7	232 21	32 5
6,600 0	2 01	349 17	6,598 1	-16 5	-26 3	237 87	31 1
6,700 0	1 79	350 25	6,698 1	-13 3	-26 9	243 76	30 0
6,800 0	1 58	346 59	6,798 0	-10 4	-27 5	249 32	29 4
6,900 0	1 51	345 39	6,898 0	-7 8	-28 1	254 58	29 2
7,000 0	1 51	345 14	6,998 0	-5 2	-28 8	259 75	29 3
7,100 0	1 23	335 13	7,097 9	-3 0	-29 6	264 28	29 7
7,200 0	1 11	337 18	7,197 9	-1 1	-30 4	267 94	30 4
7,300 0	0 92	336 88	7,297 9	0 5	-31 1	270 99	31 1
7,400 0	0 78	335 03	7,397 9	1 9	-31 7	273 41	31 8
7,500 0	0 84	327 30	7,497 9	3 1	-32 4	275 51	32 5
7,600 0	0 93	322 24	7,597 9	4 4	-33 3	277 50	33 6
7,700 0	0 97	325 37	7,697 9	5 7	-34 3	279 48	34 7
7,800 0	0 93	328 93	7,797 8	7 1	-35 2	281 44	35 9
7,900 0	1 15	322 01	7,897 8	8 6	-36 2	283 36	37 2
8,000 0	1 25	327 90	7,997 8	10 3	-37 4	285 42	38 8
8,100 0	1 71	337 29	8,097 8	12 6	-38 6	288 12	40 6
8,200 0	2 17	331 07	8,197 7	15 6	-40 0	291 35	43 0
8,300 0	2 37	331 67	8,297 6	19 1	-41 9	294 51	46 1
8,400 0	2 51	330 45	8,397 5	22 9	-44 0	297 44	49 6
8,500 0	2 62	330 30	8,497 4	26 7	-46 2	300 06	53 4
8,600 0	2 87	330 51	8,597 3	30 9	-48 6	302 46	57 6
8,700 0	2 95	328 75	8,697 2	35 3	-51 1	304 60	62 1
8,800 0	1 53	334 63	8,797 1	38 7	-53 1	306 10	65 7
8,900 0	0 76	5 90	8,897 1	40 6	-53 6	307 14	67 2
9,000 0	1 09	60 51	8,997 1	41 7	-52 7	308 36	67 2
9,100 0	0 76	93 50	9,097 1	42 1	-51 2	309 45	66 3
9,200 0	0 96	101 97	9,197 1	41 9	-49 7	310 14	65 0
9,300 0	0 97	106 89	9,297 0	41 5	-48 1	310 80	63 5
9,400 0	0 93	107 54	9,397 0	41 0	-46 5	311 41	62 0
9,500 0	0 67	108 96	9,497 0	40 6	-45 1	311 93	60 7
9,600 0	0 65	109 64	9,597 0	40 2	-44 1	312 36	59 6
9,700 0	0 48	59 15	9,697 0	40 2	-43 2	312 96	59 0
9,800 0	0 44	17 57	9,797 0	40 8	-42 7	313 69	59 0
9,900 0	0 17	326 69	9,897 0	41 3	-42 7	314 05	59 4

Scientific Drilling International, Inc.

SDI Standard Survey Report

Scientific Drilling
Directional Drilling Operations

Company:	COG OPERATING	**Local Co-ordinate Reference:**	Well Aircobra 12 State #2H
Project:	Scharb	**TVD Reference:**	WELL @ 0 0usft (Original Well Elev)
Site:	Lea County, NM	**MD Reference:**	WELL @ 0 0usft (Original Well Elev)
Well:	Aircobra 12 State #2H	**North Reference:**	Grid
Wellbore:	VH - Job #32K0511425	**Survey Calculation Method:**	Minimum Curvature
Design:	VH - Job #32K0511425	**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	0 54	278 90	9,997 0	41 5	-43 2	313 82	59 9
10,100 0	0 62	279 65	10,097 0	41 6	-44 2	313 28	60 7
10,200 0	0 91	293 52	10,197 0	42 0	-45 5	312 76	61 9
10,300 0	0 70	276 48	10,297 0	42 4	-46 8	312 19	63 2
10,400 0	0 66	272 21	10,397 0	42 5	-48 0	311 54	64 1
10,500 0	0 70	237 99	10,497 0	42 2	-49 1	310 70	64 7
10,600 0	0 57	239 78	10,597 0	41 6	-50 0	309 77	65 1
10,700 0	0 32	283 13	10,697 0	41 4	-50 7	309 25	65 5
10,800 0	0 21	289 39	10,797 0	41 6	-51 2	309 09	65 9
10,900 0	0 56	212 45	10,897 0	41 2	-51 6	308 62	66 0
10,915 0	0 64	215 35	10,912 0	41 1	-51 7	308 48	66 0

Scientific Drilling
Directional Drilling Operations

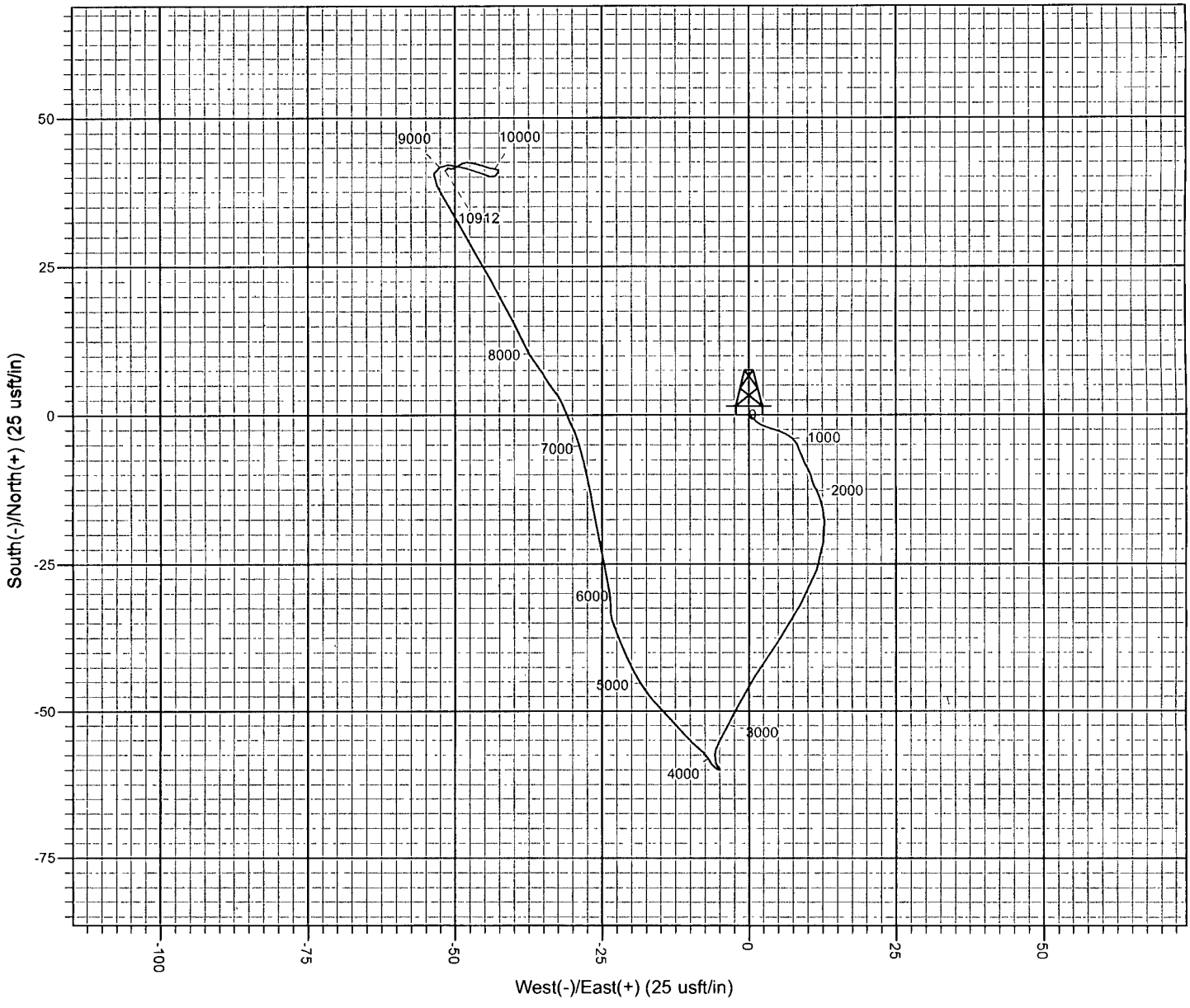
Project: Scharb
Lea County, NM
Well: Aircobra 12 State #2H
Wellbore: VH - Job #32K0511425
Design: VH - Job #32K0511425

Azimuths to Grid North
True North -0 44°
Magnetic North 7 16°

Magnetic Field
Strength: 48934 8snT
Dip Angle 60 62°
Date 5/11/2011
Model IGRF2010

WELL DETAILS: Aircobra 12 State #2H
WELL @ 0.0usft (Original Well Elev)
Ground Level: 0.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	612439.34	753020.58	32° 40' 51.600 N	103° 30' 39.600 W	



PROJECT DETAILS: Scharb
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° 40' 51.600 N
Longitude: 103° 30' 39.600 W
Positional Uncertainty: 0.0
Convergence: 0.44
Local North: Grid

Tie-in Date: 05/13/2011
Date Completed: 05/21/2011

PathFinder Energy Services, Inc.
Survey Report

COG OPERATING, LLC
AIRCOBRA 12 STATE #2H
LEA COUNTY, NM
Rig:McVAY 7
PathFinder Office Supervisor: FRANCISCO SINISTERRA
PathFinder Field Engineers: JESUS BARRAZA
NATE SCHMITZ

Survey Calculations by RX5 V6.03E using Minimum Curvature

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.40.50.5694 N LON:103.30.41.6710 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coor: X: 794176.3800 Y: 612353.8700
North Aligned To:GRID NORTH
Total Magnetic Correction: 7.16°EAST TO GRID
Vertical Section Plane: 179.57
Survey Vert. Reference: 18.50' Kelly Bushing To Ground
Altitude:3942.00' Ground To MSL

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
THE FOLLOWING ARE SCIENTIFIC DRILLING GYRO SURVEYS.										
0.00	0.00	0.00	-0.00	0.00	0.01	0.01 S	0.05 W	0.05@	263.19	0.00
100.00	0.04	122.07	100.00	100.00	0.02	0.02 S	0.02 W	0.03@	213.91	0.04
200.00	0.36	127.74	200.00	100.00	0.24	0.23 S	0.26 E	0.35@	131.88	0.32
300.00	0.46	127.18	299.99	100.00	0.68	0.67 S	0.83 E	1.07@	128.89	0.10
400.00	0.28	136.18	399.99	100.00	1.10	1.09 S	1.32 E	1.71@	129.53	0.19
500.00	0.59	121.76	499.99	100.00	1.55	1.54 S	1.93 E	2.46@	128.57	0.33
600.00	0.58	107.29	599.98	100.00	1.98	1.96 S	2.85 E	3.46@	124.51	0.15
700.00	0.69	112.15	699.98	100.00	2.36	2.33 S	3.89 E	4.54@	120.98	0.12
800.00	0.69	99.69	799.97	100.00	2.70	2.66 S	5.04 E	5.70@	117.86	0.15
900.00	0.84	120.46	899.96	100.00	3.18	3.14 S	6.26 E	7.01@	116.59	0.31
1000.00	0.88	129.86	999.95	100.00	4.06	4.00 S	7.49 E	8.49@	118.12	0.15
1100.00	0.51	165.18	1099.94	100.00	4.98	4.92 S	8.19 E	9.55@	121.01	0.55
1200.00	0.68	153.80	1199.94	100.00	5.95	5.88 S	8.57 E	10.39@	124.49	0.21
1300.00	0.57	157.33	1299.93	100.00	6.94	6.88 S	9.02 E	11.34@	127.32	0.12
1400.00	0.75	154.45	1399.93	100.00	8.00	7.93 S	9.49 E	12.37@	129.86	0.18
1500.00	0.50	149.88	1499.92	100.00	8.97	8.89 S	9.99 E	13.38@	131.67	0.25
1600.00	0.41	162.29	1599.92	100.00	9.69	9.61 S	10.32 E	14.10@	132.96	0.13
1700.00	0.44	163.83	1699.91	100.00	10.40	10.32 S	10.54 E	14.75@	134.41	0.03
1800.00	0.48	165.19	1799.91	100.00	11.18	11.10 S	10.75 E	15.45@	135.90	0.04
1900.00	0.50	151.25	1899.91	100.00	11.97	11.88 S	11.07 E	16.24@	137.03	0.12
2000.00	0.61	152.59	1999.90	100.00	12.82	12.74 S	11.52 E	17.18@	137.87	0.11
2100.00	0.86	161.39	2099.89	100.00	14.01	13.92 S	12.01 E	18.39@	139.22	0.27
2200.00	1.01	166.31	2199.88	100.00	15.58	15.49 S	12.46 E	19.88@	141.19	0.17
2300.00	1.62	175.22	2299.85	100.00	17.85	17.75 S	12.78 E	21.88@	144.25	0.64
2400.00	2.40	185.86	2399.79	100.00	21.34	21.25 S	12.69 E	24.75@	149.16	0.86

SUR: B-12-19s-34e, 510/N & 1980/E
BHL: O-12-19s-34e, 4744/N & 1947/E
API # 30-025-40035

PathFinder Energy Services, Inc.
Survey Report

COG OPERATING, LLC
AIRCOBRA 12 STATE #2H
LEA COUNTY, NM
RIG:McVAY 7

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
2500.00	3.22	200.44	2499.67	100.00	26.05	25.96 S	11.49 E	28.39@	156.12	1.08
2600.00	4.20	208.40	2599.46	100.00	31.88	31.81 S	8.77 E	33.00@	164.59	1.11
2700.00	4.47	213.92	2699.18	100.00	38.30	38.27 S	4.85 E	38.57@	172.77	0.50
2800.00	3.45	213.05	2798.94	100.00	44.03	44.02 S	1.04 E	44.04@	178.65	1.02
2900.00	2.72	206.50	2898.79	100.00	48.66	48.67 S	1.66 W	48.70@	181.96	0.81
3000.00	2.02	207.14	2998.70	100.00	52.33	52.36 S	3.52 W	52.48@	183.85	0.70
3100.00	1.78	209.09	3098.65	100.00	55.25	55.29 S	5.08 W	55.52@	185.25	0.25
3200.00	0.95	180.52	3198.62	100.00	57.43	57.47 S	5.85 W	57.77@	185.81	1.05
3300.00	0.73	157.71	3298.61	100.00	58.85	58.89 S	5.61 W	59.16@	185.44	0.40
3400.00	0.31	139.58	3398.61	100.00	59.65	59.69 S	5.20 W	59.91@	184.97	0.45
3500.00	0.12	120.06	3498.61	100.00	59.91	59.95 S	4.93 W	60.15@	184.70	0.20
3600.00	0.14	258.82	3598.61	100.00	59.98	60.02 S	4.96 W	60.23@	184.72	0.24
3700.00	0.25	299.86	3698.61	100.00	59.90	59.94 S	5.27 W	60.17@	185.02	0.17
3800.00	0.47	302.58	3798.60	100.00	59.56	59.61 S	5.80 W	59.89@	185.56	0.22
3900.00	0.54	331.67	3898.60	100.00	58.92	58.97 S	6.37 W	59.32@	186.17	0.26
4000.00	0.65	323.37	3998.59	100.00	58.05	58.10 S	6.93 W	58.51@	186.81	0.14
4100.00	0.72	315.79	4098.59	100.00	57.14	57.20 S	7.71 W	57.71@	187.68	0.11
4200.00	0.76	312.65	4198.58	100.00	56.23	56.30 S	8.64 W	56.96@	188.72	0.06
4300.00	0.88	312.44	4298.57	100.00	55.25	55.33 S	9.69 W	56.17@	189.93	0.12
4400.00	0.98	318.29	4398.56	100.00	54.09	54.17 S	10.83 W	55.24@	191.30	0.14
4500.00	1.10	316.90	4498.54	100.00	52.74	52.83 S	12.05 W	54.19@	192.85	0.12
4600.00	1.08	317.83	4598.52	100.00	51.33	51.43 S	13.34 W	53.14@	194.54	0.03
4700.00	1.13	319.53	4698.50	100.00	49.87	49.99 S	14.61 W	52.08@	196.30	0.06
4800.00	1.15	318.31	4798.48	100.00	48.36	48.49 S	15.92 W	51.03@	198.18	0.03
4900.00	1.20	320.80	4898.46	100.00	46.79	46.92 S	17.25 W	49.99@	200.18	0.07
5000.00	1.18	329.22	4998.44	100.00	45.09	45.23 S	18.44 W	48.84@	202.18	0.18
5100.00	0.94	331.69	5098.42	100.00	43.48	43.62 S	19.35 W	47.72@	203.93	0.24
5200.00	0.92	332.82	5198.41	100.00	42.03	42.19 S	20.11 W	46.73@	205.49	0.03

PathFinder Energy Services, Inc.
Survey Report

COG OPERATING, LLC
AIRCOBRA 12 STATE #2H
LEA COUNTY, NM
RIG:McVAY 7

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
5300.00	1.00	334.20	5298.40	100.00	40.53	40.69 S	20.86 W	45.72@	207.14	0.08
5400.00	0.92	338.87	5398.38	100.00	38.99	39.15 S	21.53 W	44.68@	208.80	0.11
5500.00	1.04	337.29	5498.37	100.00	37.40	37.57 S	22.17 W	43.62@	210.54	0.12
5600.00	0.93	338.39	5598.35	100.00	35.80	35.97 S	22.81 W	42.60@	212.38	0.11
5700.00	0.84	343.60	5698.34	100.00	34.34	34.52 S	23.32 W	41.66@	214.04	0.12
5800.00	0.65	357.88	5798.33	100.00	33.07	33.25 S	23.55 W	40.74@	215.31	0.26
5900.00	0.75	0.54	5898.32	100.00	31.85	32.02 S	23.56 W	39.76@	216.34	0.10
6000.00	0.97	354.09	5998.31	100.00	30.35	30.53 S	23.64 W	38.61@	217.76	0.24
6100.00	1.03	348.53	6098.30	100.00	28.63	28.81 S	23.91 W	37.44@	219.69	0.11
6200.00	1.04	349.08	6198.28	100.00	26.85	27.03 S	24.26 W	36.32@	221.91	0.01
6300.00	1.15	350.14	6298.26	100.00	24.97	25.15 S	24.60 W	35.19@	224.37	0.11
6400.00	1.52	345.41	6398.24	100.00	22.69	22.88 S	25.11 W	33.97@	227.66	0.39
6500.00	1.95	350.39	6498.19	100.00	19.73	19.92 S	25.73 W	32.54@	232.25	0.46
6600.00	2.01	349.17	6598.13	100.00	16.32	16.52 S	26.34 W	31.09@	237.91	0.07
6700.00	1.79	350.25	6698.08	100.00	13.06	13.26 S	26.94 W	30.02@	243.79	0.22
6800.00	1.58	346.59	6798.03	100.00	10.17	10.38 S	27.52 W	29.41@	249.34	0.24
6900.00	1.51	345.39	6898.00	100.00	7.55	7.76 S	28.17 W	29.22@	254.59	0.08
7000.00	1.51	345.14	6997.96	100.00	5.00	5.21 S	28.84 W	29.31@	259.75	0.01
7100.00	1.23	335.13	7097.93	100.00	2.74	2.97 S	29.63 W	29.78@	264.28	0.37
7200.00	1.11	337.18	7197.91	100.00	0.87	1.10 S	30.46 W	30.48@	267.93	0.13
7300.00	0.92	336.88	7297.90	100.00	-0.76	0.53 N	31.15 W	31.15@	270.98	0.19
7400.00	0.78	335.03	7397.88	100.00	-2.12	1.89 N	31.75 W	31.81@	273.40	0.14
7500.00	0.84	327.30	7497.88	100.00	-3.36	3.12 N	32.44 W	32.59@	275.49	0.12
7600.00	0.93	322.24	7597.86	100.00	-4.63	4.38 N	33.33 W	33.61@	277.48	0.12
7700.00	0.97	325.37	7697.85	100.00	-5.97	5.72 N	34.31 W	34.78@	279.46	0.07
7800.00	0.93	328.93	7797.84	100.00	-7.37	7.11 N	35.21 W	35.92@	281.41	0.07
7900.00	1.15	322.01	7897.82	100.00	-8.87	8.59 N	36.24 W	37.25@	283.34	0.25
8000.00	1.25	327.90	7997.80	100.00	-10.59	10.31 N	37.44 W	38.83@	285.39	0.16

PathFinder Energy Services, Inc.
Survey Report

COG OPERATING, LLC
AIRCOBRA 12 STATE #2H
LEA COUNTY, NM
RIG:McVAY 7

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
8100.00	1.71	337.29	8097.76	100.00	-12.90	12.61 N	38.60 W	40.60@	288.09	0.52
8200.00	2.17	331.07	8197.71	100.00	-15.94	15.64 N	40.09 W	43.03@	291.32	0.50
8300.00	2.37	331.67	8297.63	100.00	-19.43	19.12 N	41.98 W	46.13@	294.48	0.20
8400.00	2.51	330.45	8397.54	100.00	-23.17	22.84 N	44.05 W	49.62@	297.41	0.15
8500.00	2.62	330.30	8497.44	100.00	-27.08	26.73 N	46.26 W	53.43@	300.03	0.11
8600.00	2.87	330.51	8597.32	100.00	-31.26	30.90 N	48.62 W	57.61@	302.44	0.25
8700.00	2.95	328.75	8697.19	100.00	-35.66	35.28 N	51.19 W	62.17@	304.57	0.12
8800.00	1.53	334.63	8797.11	100.00	-39.08	38.68 N	53.10 W	65.69@	306.08	1.44
8900.00	0.76	5.90	8897.09	100.00	-40.95	40.55 N	53.60 W	67.21@	307.11	0.96
9000.00	1.09	60.51	8997.08	100.00	-42.07	41.68 N	52.71 W	67.19@	308.34	0.90
9100.00	0.76	93.50	9097.07	100.00	-42.49	42.11 N	51.22 W	66.30@	309.43	0.61
9200.00	0.96	101.97	9197.06	100.00	-42.26	41.89 N	49.73 W	65.03@	310.11	0.24
9300.00	0.97	106.89	9297.05	100.00	-41.83	41.47 N	48.10 W	63.51@	310.77	0.08
9400.00	0.93	107.54	9397.03	100.00	-41.33	40.98 N	46.52 W	62.00@	311.38	0.04
9500.00	0.67	108.96	9497.02	100.00	-40.89	40.55 N	45.19 W	60.72@	311.90	0.26
9600.00	0.65	109.64	9597.02	100.00	-40.50	40.17 N	44.11 W	59.66@	312.32	0.02
9700.00	0.48	59.15	9697.01	100.00	-40.51	40.19 N	43.21 W	59.01@	312.93	0.51
9800.00	0.44	17.57	9797.01	100.00	-41.09	40.77 N	42.74 W	59.07@	313.65	0.33
9900.00	0.17	326.69	9897.01	100.00	-41.58	41.26 N	42.70 W	59.38@	314.02	0.36
10000.00	0.54	278.90	9997.00	100.00	-41.78	41.46 N	43.25 W	59.91@	313.79	0.44
10100.00	0.62	279.65	10097.00	100.00	-41.95	41.62 N	44.25 W	60.75@	313.25	0.08
** TIE IN TO SCIENTIFIC DRILLING GYRO SURVEY AT 10200'MD.										
10200.00	0.91	293.52	10196.99	100.00	-42.37	42.03 N	45.51 W	61.95@	312.72	0.34
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
10228.00	1.32	281.73	10224.98	28.00	-42.53	42.18 N	46.03 W	62.44@	312.50	1.67
10258.00	2.64	190.50	10254.97	30.00	-41.92	41.58 N	46.49 W	62.37@	311.80	9.92
10290.00	8.79	169.85	10286.80	32.00	-38.79	38.44 N	46.20 W	60.10@	309.76	19.96
10321.00	13.72	165.28	10317.19	31.00	-32.89	32.55 N	44.84 W	55.41@	305.97	16.15
10352.00	18.03	165.72	10347.01	31.00	-24.66	24.34 N	42.73 W	49.17@	299.67	13.91

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Survey Report

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AIRCOBRA 12 STATE #2H
LEA COUNTY, NM
RIG:McVAY 7

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
10383.00	22.16	167.65	10376.11	31.00	-14.28	13.98 N	40.29 W	42.65@	289.13	13.49
10415.00	25.76	169.76	10405.35	32.00	-1.52	1.23 N	37.76 W	37.78@	271.87	11.56
10447.00	28.23	170.99	10433.86	32.00	12.82	13.09 S	35.34 W	37.69@	249.68	7.91
10479.00	31.74	171.08	10461.58	32.00	28.63	28.88 S	32.85 W	43.74@	228.68	10.97
10509.00	35.79	171.14	10486.51	30.00	45.12	45.35 S	30.27 W	54.53@	213.73	13.50
10540.00	39.83	171.48	10511.00	31.00	63.93	64.13 S	27.41 W	69.75@	203.14	13.05
10571.00	43.62	173.00	10534.13	31.00	84.39	84.57 S	24.63 W	88.09@	196.24	12.65
10602.00	46.78	174.09	10555.97	31.00	106.26	106.43 S	22.16 W	108.71@	191.76	10.49
10633.00	50.21	175.26	10576.51	31.00	129.39	129.54 S	20.02 W	131.08@	188.78	11.42
10664.00	52.67	178.13	10595.83	31.00	153.59	153.74 S	18.63 W	154.86@	186.91	10.74
10695.00	55.75	178.76	10613.96	31.00	178.73	178.87 S	17.95 W	179.77@	185.73	10.07
10725.00	59.27	179.36	10630.07	30.00	204.03	204.17 S	17.54 W	204.92@	184.91	11.85
10756.00	62.96	179.00	10645.05	31.00	231.17	231.30 S	17.15 W	231.94@	184.24	11.95
10787.00	65.42	178.70	10658.54	31.00	259.07	259.20 S	16.59 W	259.73@	183.66	7.98
10817.00	67.36	179.09	10670.56	30.00	286.55	286.68 S	16.06 W	287.13@	183.21	6.58
10848.00	70.52	179.55	10681.70	31.00	315.48	315.61 S	15.72 W	316.00@	182.85	10.29
10879.00	73.69	181.09	10691.22	31.00	344.97	345.10 S	15.88 W	345.47@	182.64	11.27
10907.00	74.92	181.51	10698.79	28.00	371.92	372.05 S	16.50 W	372.42@	182.54	4.62
10938.00	77.12	182.40	10706.28	31.00	401.97	402.11 S	17.52 W	402.49@	182.50	7.62
10969.00	80.28	182.49	10712.36	31.00	432.33	432.48 S	18.82 W	432.89@	182.49	10.20
11000.00	81.87	182.12	10717.17	31.00	462.92	463.08 S	20.05 W	463.51@	182.48	5.26
11031.00	83.27	181.46	10721.17	31.00	493.63	493.80 S	21.01 W	494.25@	182.44	4.99
11061.00	85.47	180.79	10724.12	30.00	523.47	523.65 S	21.60 W	524.10@	182.36	7.66
11092.00	87.93	179.98	10725.90	31.00	554.42	554.60 S	21.80 W	555.02@	182.25	8.35
11123.00	89.08	179.74	10726.71	31.00	585.40	585.58 S	21.73 W	585.99@	182.13	3.79
11154.00	89.78	179.76	10727.02	31.00	616.40	616.58 S	21.59 W	616.96@	182.01	2.26
11185.00	90.22	179.88	10727.02	31.00	647.40	647.58 S	21.50 W	647.94@	181.90	1.47
11216.00	90.22	179.37	10726.90	31.00	678.40	678.58 S	21.29 W	678.92@	181.80	1.65

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LEA COUNTY, NM
RIG:McVAY 7

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
11247.00	89.25	179.29	10727.04	31.00	709.40	709.58 S	20.93 W	709.89@	181.69	3.14
11277.00	88.99	178.99	10727.50	30.00	739.40	739.57 S	20.48 W	739.85@	181.59	1.32
11308.00	88.99	179.07	10728.05	31.00	770.39	770.56 S	19.96 W	770.82@	181.48	0.26
11339.00	88.81	179.24	10728.65	31.00	801.38	801.55 S	19.50 W	801.79@	181.39	0.80
11370.00	88.72	179.27	10729.31	31.00	832.38	832.54 S	19.10 W	832.76@	181.31	0.31
11401.00	88.55	179.20	10730.05	31.00	863.37	863.53 S	18.68 W	863.73@	181.24	0.59
11432.00	88.64	179.58	10730.81	31.00	894.36	894.52 S	18.35 W	894.71@	181.18	1.26
11463.00	89.87	179.14	10731.22	31.00	925.35	925.52 S	18.01 W	925.69@	181.11	4.21
11555.00	90.40	179.96	10731.00	92.00	1017.35	1017.51 S	17.28 W	1017.66@	180.97	1.06
11648.00	89.69	180.03	10730.93	93.00	1110.35	1110.51 S	17.28 W	1110.64@	180.89	0.77
11740.00	89.43	180.08	10731.63	92.00	1202.34	1202.51 S	17.36 W	1202.63@	180.83	0.29
11833.00	89.78	179.16	10732.27	93.00	1295.34	1295.50 S	16.75 W	1295.61@	180.74	1.06
11926.00	90.66	179.91	10731.92	93.00	1388.34	1388.50 S	15.99 W	1388.59@	180.66	1.24
12018.00	90.57	179.62	10730.93	92.00	1480.33	1480.49 S	15.61 W	1480.57@	180.60	0.33
12111.00	88.81	179.58	10731.43	93.00	1573.33	1573.48 S	14.97 W	1573.56@	180.54	1.89
12203.00	89.52	179.86	10732.77	92.00	1665.32	1665.47 S	14.52 W	1665.54@	180.50	0.83
12296.00	89.60	179.93	10733.49	93.00	1758.31	1758.47 S	14.35 W	1758.53@	180.47	0.11
12388.00	90.13	179.57	10733.70	92.00	1850.31	1850.47 S	13.94 W	1850.52@	180.43	0.70
12481.00	89.52	179.39	10733.99	93.00	1943.31	1943.46 S	13.10 W	1943.51@	180.39	0.68
12573.00	89.69	179.22	10734.62	92.00	2035.31	2035.45 S	11.98 W	2035.49@	180.34	0.26
12666.00	89.69	178.83	10735.13	93.00	2128.30	2128.44 S	10.40 W	2128.46@	180.28	0.42
12759.00	89.08	179.32	10736.12	93.00	2221.29	2221.42 S	8.90 W	2221.44@	180.23	0.84
12852.00	87.41	177.92	10738.97	93.00	2314.23	2314.34 S	6.66 W	2314.35@	180.16	2.34
12945.00	88.81	177.35	10742.04	93.00	2407.12	2407.21 S	2.83 W	2407.21@	180.07	1.63
13037.00	89.96	177.44	10743.03	92.00	2499.05	2499.11 S	1.35 E	2499.11@	179.97	1.25
13130.00	90.04	176.62	10743.03	93.00	2591.96	2591.98 S	6.17 E	2591.99@	179.86	0.89
13222.00	88.90	177.48	10743.88	92.00	2683.86	2683.86 S	10.91 E	2683.88@	179.77	1.55
13316.00	89.96	178.22	10744.81	94.00	2777.81	2777.78 S	14.43 E	2777.82@	179.70	1.37

PathFinder Energy Services, Inc.
Survey Report

COG OPERATING, LLC
AIRCOBRA 12 STATE #2H
LEA COUNTY, NM
RIG:McVAY 7

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft)	(ft)	Closure Dist (ft)	Dir (deg)	DLS (dg/100ft)
13437.00	90.92	177.87	10743.88	121.00	2898.77	2898.71 S	18.56 E	2898.77@	179.63	0.85
13533.00	89.96	178.89	10743.15	96.00	2994.74	2994.66 S	21.27 E	2994.74@	179.59	1.46
13629.00	90.22	178.67	10743.00	96.00	3090.73	3090.64 S	23.32 E	3090.73@	179.57	0.35
13725.00	88.99	179.93	10743.66	96.00	3186.72	3186.63 S	24.49 E	3186.72@	179.56	1.83
13819.00	88.99	179.63	10745.31	94.00	3280.71	3280.61 S	24.85 E	3280.71@	179.57	0.32
13916.00	88.90	179.45	10747.10	97.00	3377.69	3377.59 S	25.63 E	3377.69@	179.57	0.21
14013.00	89.87	179.67	10748.14	97.00	3474.69	3474.58 S	26.38 E	3474.69@	179.57	1.03
14109.00	89.96	179.19	10748.28	96.00	3570.68	3570.58 S	27.33 E	3570.68@	179.56	0.51
14202.00	90.04	178.75	10748.28	93.00	3663.68	3663.56 S	29.00 E	3663.68@	179.55	0.48
14298.00	90.13	178.89	10748.14	96.00	3759.67	3759.54 S	30.98 E	3759.67@	179.53	0.17
14393.00	90.40	179.49	10747.70	95.00	3854.67	3854.53 S	32.32 E	3854.67@	179.52	0.69
14487.00	89.43	180.31	10747.84	94.00	3948.66	3948.53 S	32.49 E	3948.66@	179.53	1.35
14583.00	89.60	180.11	10748.65	96.00	4044.65	4044.53 S	32.14 E	4044.65@	179.54	0.27
14678.00	90.57	179.82	10748.51	95.00	4139.65	4139.52 S	32.19 E	4139.65@	179.55	1.07
14718.00	91.01	179.62	10747.96	40.00	4179.65	4179.52 S	32.39 E	4179.65@	179.56	1.21
STRAIGHT LINE PROJECTION TO BIT DEPTH AT 14772'MD.										
14772.00	91.01	179.62	10747.01	54.00	4233.64	4233.51 S	32.75 E	4233.64@	179.56	0.00

** The survey data at tie-in point was furnished by a recognized survey company and entered as submitted. Survey stations above the tie-in point represent recalculated data by PathFinder Energy Services, Inc. and may reflect minor changes due to rounding differences between survey programs. Only survey stations taken by qualified PathFinder personnel are subject to certification.