

**McVAY DRILLING COMPANY**

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

15-39503

HOBBS OCD

Well Name and Num: Airbus 12 Federal 2H
Location: Sec. 12, T19S, R31E
Operator: COG
Drilling Contractor: McVay Drilling Company

MAY 24 2012

RECEIVED

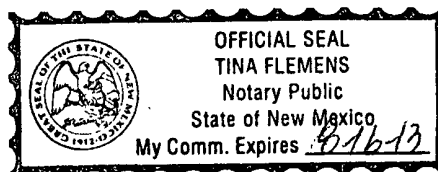
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.35	745	0.44	8497	91.10	12087
0.70	1244	8.88	8592	91.63	12180
2.21	1744	20.14	8685	88.72	13017
3.20	2126	23.83	8717	89.34	13409
3.40	2021	47.34	8939		
1.40	2660	60.23	9066		
0.61	3145	53.55	9003		
0.79	3447	75.10	9220		
0.58	3761	88.37	9403		
0.80	4264	88.46	9439		
1.16	4754	90.66	10009		
0.52	5226	89.52	10200		
0.28	5698	90.40	10674		
0.80	6198	89.60	11142		
1.25	6698	90.22	11522		
1.17	7183	88.81	11710		
0.71	7683	91.10	11994		

By: Hulub Crumb

Subscribed and sworn to before me this 14th day of November, 2011

Tina FLEMENS
Notary Public, Lea County, New Mexico



HOBBS OGD

MAY 24 2012

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COG OPERATING

Green Wood
Eddy County, NM
Airbus 12 Federal #2H
VH - Job #32K11111060

Survey: Gyro

SDI Standard Survey Report

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

Richard

Notarized this date 12th of December, 2011.

Carrie Reed

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Airbus 12 Federal #2H
Project:	Green Wood	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Airbus 12 Federal #2H	North Reference:	Grid
Wellbore:	VH - Job #32K11111060	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111060	Database:	EDM-Regulatory

Project	Green Wood		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Eddy County, NM				
Site Position:		Northing:	611,922.73 usft	Latitude:	32° 40' 52.554 N
From:	Lat/Long	Easting:	654,895.15 usft	Longitude:	103° 49' 47.669 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16"	Grid Convergence:	0 27 °

Well	Airbus 12 Federal #2H, Directional (Pathfinder)				
Well Position	+N/-S	0.0 usft	Northing:	611,922.73 usft	Latitude: 32° 40' 52.554 N
	+E/-W	0.0 usft	Easting:	654,895.15 usft	Longitude: 103° 49' 47.669 W
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft	Ground Level:	0.0 usft

Wellbore	VH - Job #32K11111060				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	11/4/2011	7.69	60.56	48,850

Design	VH - Job #32K11111060				
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	178.94	

Survey Program	Date	12/27/2011			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	8,435.0	Gyro (VH - Job #32K11111060)	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	0.11	48.73	100.0	0.1	0.1	48.73	0.1	
200.0	0.21	63.16	200.0	0.2	0.3	55.78	0.4	
300.0	0.12	36.01	300.0	0.4	0.5	54.73	0.7	
400.0	0.20	152.32	400.0	0.3	0.7	65.56	0.7	
500.0	0.41	210.87	500.0	-0.2	0.6	105.11	0.6	
600.0	0.97	204.96	600.0	-1.2	0.0	178.50	1.2	
700.0	1.04	208.24	700.0	-2.8	-0.8	195.10	2.9	
800.0	1.53	218.02	799.9	-4.6	-2.0	203.35	5.1	
900.0	1.53	209.32	899.9	-6.9	-3.5	206.90	7.7	
1,000.0	1.18	206.00	999.9	-9.0	-4.6	207.13	10.1	
1,100.0	1.02	200.50	1,099.9	-10.7	-5.4	206.54	12.0	

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Airbus 12 Federal #2H
Project:	Green Wood	TVD Reference:	WELL @ 0.0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.0usft (Original Well Elev)
Well:	Airbus 12 Federal #2H	North Reference:	Grid
Wellbore:	VH - Job #32K11111060	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111060	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	0.71	174.62	1,199.9	-12.2	-5.6	204.74	13.4
1,300.0	0.78	153.67	1,299.8	-13.4	-5.2	201.39	14.4
1,400.0	0.87	145.39	1,399.8	-14.6	-4.5	197.14	15.3
1,500.0	0.59	131.54	1,499.8	-15.6	-3.7	193.33	16.0
1,600.0	0.99	85.90	1,599.8	-15.9	-2.4	188.77	16.1
1,700.0	2.34	64.48	1,699.8	-14.9	0.3	179.01	14.9
1,800.0	3.07	66.69	1,799.7	-13.0	4.6	160.66	13.8
1,900.0	3.56	66.22	1,899.5	-10.7	9.9	137.28	14.5
2,000.0	3.70	67.77	1,999.3	-8.2	15.7	117.61	17.7
2,100.0	3.66	69.49	2,099.1	-5.9	21.7	105.15	22.4
2,200.0	3.23	68.63	2,198.9	-3.7	27.3	97.77	27.5
2,300.0	3.17	69.57	2,298.8	-1.7	32.5	93.05	32.5
2,400.0	2.75	68.91	2,398.6	0.1	37.3	89.85	37.3
2,500.0	2.03	70.14	2,498.5	1.6	41.2	87.83	41.3
2,600.0	1.37	75.96	2,598.5	2.5	44.0	86.81	44.1
2,700.0	0.90	85.89	2,698.5	2.8	46.0	86.51	46.1
2,800.0	0.66	102.53	2,798.5	2.7	47.3	86.70	47.4
2,900.0	0.35	134.31	2,898.5	2.4	48.1	87.15	48.2
3,000.0	0.28	164.38	2,998.5	1.9	48.4	87.70	48.4
3,100.0	0.28	181.75	3,098.5	1.5	48.5	88.27	48.5
3,200.0	0.23	179.43	3,198.5	1.0	48.5	88.79	48.5
3,300.0	0.24	194.10	3,298.5	0.6	48.4	89.27	48.4
3,400.0	0.19	206.23	3,398.4	0.3	48.3	89.68	48.3
3,500.0	0.17	228.12	3,498.4	0.0	48.1	89.98	48.1
3,600.0	0.14	253.52	3,598.4	-0.1	47.9	90.14	47.9
3,700.0	0.15	219.41	3,698.4	-0.3	47.7	90.30	47.7
3,800.0	0.19	231.00	3,798.4	-0.5	47.5	90.55	47.5
3,900.0	0.14	227.19	3,898.4	-0.6	47.2	90.78	47.2
4,000.0	0.03	323.95	3,998.4	-0.7	47.1	90.86	47.1
4,100.0	0.03	293.56	4,098.4	-0.7	47.1	90.82	47.1
4,200.0	0.02	5.91	4,198.4	-0.6	47.1	90.79	47.1
4,300.0	0.08	119.69	4,298.4	-0.7	47.1	90.81	47.1
4,400.0	0.17	145.08	4,398.4	-0.8	47.3	90.99	47.3
4,500.0	0.10	332.38	4,498.4	-0.9	47.3	91.05	47.3
4,600.0	0.50	7.55	4,598.4	-0.4	47.3	90.43	47.3
4,700.0	0.48	10.98	4,698.4	0.5	47.5	89.41	47.5
4,800.0	0.39	14.62	4,798.4	1.2	47.6	88.52	47.7
4,900.0	0.34	358.19	4,898.4	1.9	47.7	87.77	47.8
5,000.0	0.29	337.35	4,998.4	2.4	47.6	87.13	47.7
5,100.0	0.68	313.63	5,098.4	3.0	47.1	86.32	47.2
5,200.0	0.67	311.36	5,198.4	3.8	46.2	85.27	46.4
5,300.0	0.74	315.94	5,298.4	4.7	45.3	84.11	45.6
5,400.0	0.84	308.01	5,398.4	5.6	44.3	82.81	44.7
5,500.0	0.86	314.60	5,498.4	6.6	43.2	81.35	43.7

Scientific Drilling International, Inc.
SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Airbus 12 Federal #2H
Project:	Green Wood	TVD Reference:	WELL @ 0 0usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0 0usft (Original Well Elev)
Well:	Airbus 12 Federal #2H	North Reference:	Grid
Wellbore:	VH - Job #32K11111060	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K11111060	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 91	309.99	5,598.4	7 6	42.1	79.75	42.7
5,700.0	0 86	321 12	5,698.4	8 7	41.0	78 01	41.9
5,800.0	0 80	319 18	5,798 4	9 8	40 0	76 23	41.2
5,900.0	0 87	311.66	5,898 4	10 8	39 0	74.47	40 5
6,000 0	0 86	320 35	5,998.3	11 9	38 0	72.56	39 8
6,100 0	0 83	315 99	6,098 3	13 0	37 0	70.60	39.2
6,200.0	0 86	319.28	6,198 3	14.1	36 0	68.59	38.7
6,300 0	0 94	314 45	6,298.3	15 3	34 9	66 40	38 1
6,400.0	0 99	310 26	6,398 3	16.4	33 7	64 05	37.5
6,500 0	1 08	299 72	6,498.3	17 4	32 2	61.59	36.6
6,600 0	1 34	294 62	6,598 3	18.4	30 3	58.79	35 5
6,700.0	0 93	298 02	6,698 2	19 2	28 5	56 01	34 4
6,800 0	0 59	353.79	6,798 2	20 1	27 8	54 06	34 3
6,900 0	0 60	10 95	6,898.2	21.2	27 8	52 74	34 9
7,000.0	0 80	67 47	6,998.2	21.9	28 6	52.46	36.0
7,100 0	0 88	71 57	7,098.2	22 5	29.9	53 13	37.4
7,200 0	0 60	71 17	7,198 2	22.9	31 2	53.73	38 6
7,300 0	0 48	43 47	7,298.2	23 3	31 9	53 85	39 6
7,400.0	0 75	65.78	7,398.2	23 9	32 8	53 93	40 6
7,500.0	0 93	129.90	7,498.2	23 7	34 0	55.20	41 5
7,600 0	0 97	135.38	7,598.2	22 5	35 3	57 42	41.8
7,700 0	0 59	183.52	7,698.2	21.4	35 8	59.13	41.7
7,800 0	0 62	189.08	7,798.1	20 4	35 7	60 30	41.1
7,900 0	0 57	200.18	7,898.1	19 4	35 4	61 35	40.4
8,000 0	0 37	169.20	7,998.1	18 6	35 3	62.26	39.9
8,100.0	1 10	92 93	8,098 1	18 2	36 4	63 39	40 7
8,200 0	1 20	67 24	8,198.1	18.6	38 3	64.12	42.5
8,300.0	0 94	55.98	8,298.1	19 4	39 9	64.04	44.4
8,400 0	0 68	76.59	8,398.1	20 0	41 2	64 06	45 8
8,435 0	0 72	93.36	8,433.1	20.1	41 6	64 25	46.2



Proj: Green Wood
 Eddy County, NM
 Well: Airbus 12 Federal #2H
 Wellbore: VH - Job #32K11111060
 Design: VH - Job #32K11111060

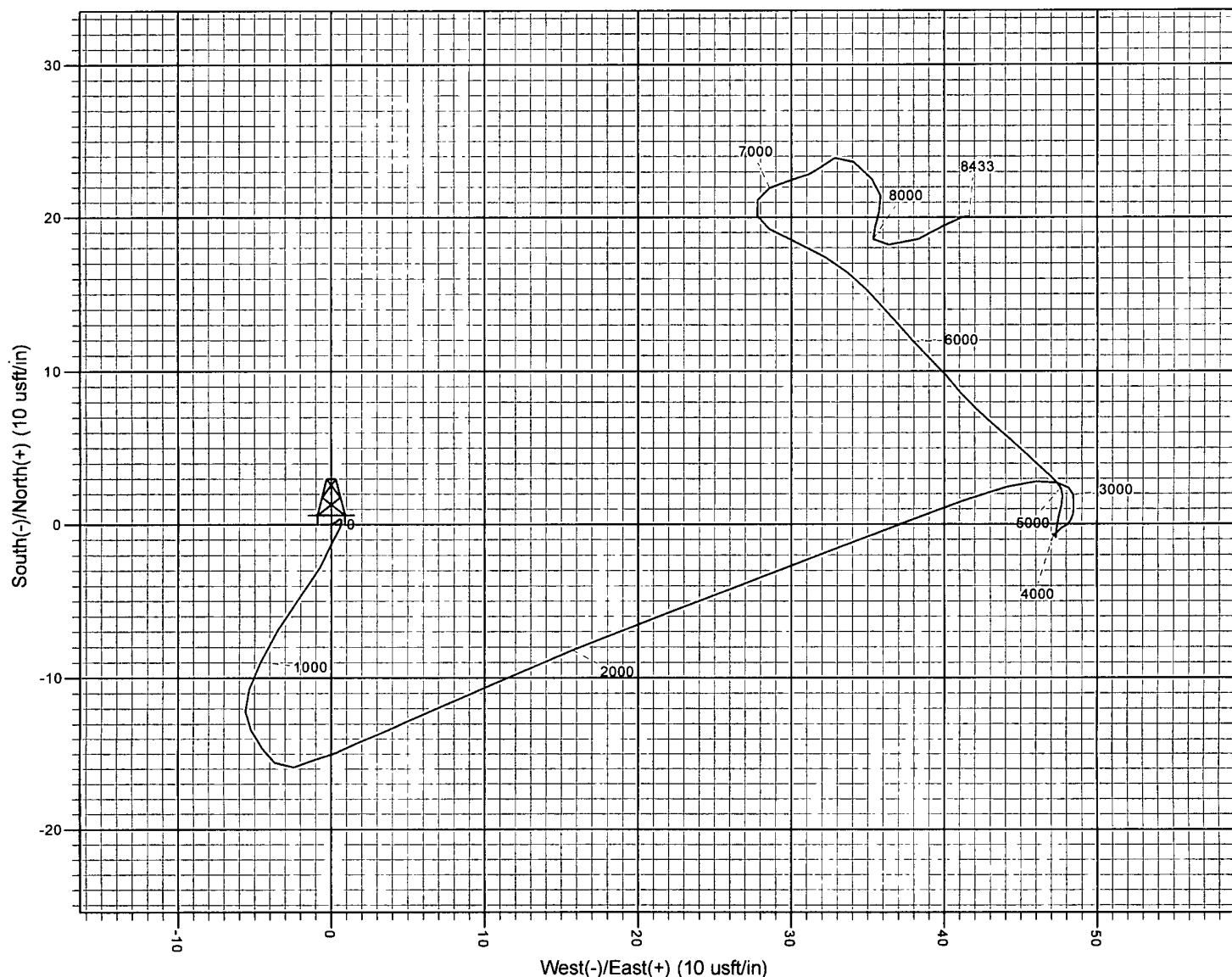


Azimuths to Grnd North
 True North: -0.27°
 Magnetic North: 7.42°

Magnetic Field
 Strength: 48850 5nT
 Dip Angle: 60.56°
 Date: 11/4/2011
 Model: IGRF2010

WELL DETAILS: Airbus 12 Federal #2H
 WELL @ 0.0usft (Original Well Elev)

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.0	0.0	611922.73	654895.15	32° 40' 52.554 N	103° 49' 47.669 W	



PROJECT DETAILS: Green Wood
 Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001
 System Datum: Mean Sea Level

SITE DETAILS: Eddy County, NM
 Site Centre Latitude: 32° 40' 52.554 N
 Longitude: 103° 49' 47.669 W
 Positional Uncertainty: 0.0
 Convergence: 0.27
 Local North: Grid



COG Operating LLC

Eddy County(NAD27)

Airbus 12 Federal

#2H

OH

Design: OH

Pathfinder X & Y Report

14 November, 2011

PATHFINDER®

A Schlumberger Company



Smith International, Inc.
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Project	Eddy County(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	Airbus 12 Federal		
Site Position:		Northing:	611,922.900 usft
From:	Map	Easting:	654,895.100 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 40' 52.556 N
		Longitude:	103° 49' 47.669 W
		Grid Convergence:	0.27 °

Well	#2H					
Well Position	+N/-S	0.0 usft	Northing:	611,922.900 usft	Latitude:	32° 40' 52.556 N
	+E/-W	0.0 usft	Easting:	654,895.100 usft	Longitude:	103° 49' 47.669 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	usft	Ground Level:	3,615.0 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010	4/7/2011	7.76	60.57	48,881

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	178.94



Smith International, Inc.
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey Program		Date	11/14/2011		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	8,435.0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s	
8,497.0	13,457.0	MWD #1 (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	-3,632.0	0.0	0.0	0.0	0.00	611,922.90	654,895.10
100.0	0.11	48.73	100.0	-3,532.0	0.1	0.1	-0.1	0.11	611,922.96	654,895.17
200.0	0.21	63.16	200.0	-3,432.0	0.2	0.3	-0.2	0.11	611,923.11	654,895.41
300.0	0.12	36.01	300.0	-3,332.0	0.4	0.5	-0.4	0.12	611,923.28	654,895.63
400.0	0.20	152.32	400.0	-3,232.0	0.3	0.7	-0.3	0.28	611,923.21	654,895.78
500.0	0.41	210.87	500.0	-3,132.0	-0.2	0.6	0.2	0.35	611,922.75	654,895.67
600.0	0.97	204.96	600.0	-3,032.0	-1.2	0.0	1.2	0.56	611,921.67	654,895.13
700.0	1.04	208.24	700.0	-2,932.0	-2.8	-0.8	2.8	0.09	611,920.10	654,894.35
800.0	1.53	218.02	799.9	-2,832.1	-4.6	-2.0	4.6	0.54	611,918.25	654,893.09
900.0	1.53	209.32	899.9	-2,732.1	-6.9	-3.5	6.8	0.23	611,916.04	654,891.62
1,000.0	1.18	206.00	999.9	-2,632.1	-9.0	-4.6	8.9	0.36	611,913.95	654,890.51
1,100.0	1.02	200.50	1,099.9	-2,532.1	-10.7	-5.4	10.6	0.19	611,912.19	654,889.75
1,200.0	0.71	174.62	1,199.9	-2,432.1	-12.2	-5.6	12.1	0.49	611,910.74	654,889.50
1,300.0	0.78	153.67	1,299.8	-2,332.2	-13.4	-5.2	13.3	0.28	611,909.51	654,889.86
1,400.0	0.87	145.39	1,399.8	-2,232.2	-14.6	-4.5	14.5	0.15	611,908.28	654,890.59
1,500.0	0.59	131.54	1,499.8	-2,132.2	-15.6	-3.7	15.5	0.33	611,907.31	654,891.41
1,600.0	0.99	85.90	1,599.8	-2,032.2	-15.9	-2.4	15.8	0.72	611,907.03	654,892.65
1,700.0	2.34	64.48	1,699.8	-1,932.2	-14.9	0.3	14.9	1.46	611,907.97	654,895.36
1,800.0	3.07	66.69	1,799.7	-1,832.3	-13.0	4.6	13.1	0.74	611,909.91	654,899.66
1,900.0	3.56	66.22	1,899.5	-1,732.5	-10.7	9.9	10.9	0.49	611,912.22	654,904.96
2,000.0	3.70	67.77	1,999.3	-1,632.7	-8.2	15.7	8.5	0.17	611,914.69	654,910.79



Smith International, Inc.
Pathfinder X & Y Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
2,100.0	3.66	69.49	2,099.1	-1,532.9	-5.9	21.7	6.3	0.12	611,917.03	654,916.76	
2,200.0	3.23	68.63	2,198.9	-1,433.1	-3.7	27.3	4.2	0.43	611,919.18	654,922.38	
2,300.0	3.17	69.57	2,298.7	-1,333.3	-1.7	32.5	2.3	0.08	611,921.17	654,927.59	
2,400.0	2.75	68.91	2,398.6	-1,233.4	0.1	37.3	0.6	0.42	611,923.00	654,932.42	
2,500.0	2.03	70.14	2,498.5	-1,133.5	1.6	41.2	-0.8	0.72	611,924.46	654,936.32	
2,600.0	1.37	75.96	2,598.5	-1,033.5	2.5	44.0	-1.6	0.68	611,925.36	654,939.15	
2,700.0	0.90	85.89	2,698.5	-933.5	2.8	46.0	-1.9	0.51	611,925.70	654,941.09	
2,800.0	0.66	102.53	2,798.5	-833.5	2.7	47.3	-1.9	0.33	611,925.63	654,942.44	
2,900.0	0.35	134.31	2,898.4	-733.6	2.4	48.1	-1.5	0.41	611,925.29	654,943.22	
3,000.0	0.28	164.38	2,998.4	-633.6	1.9	48.4	-1.0	0.18	611,924.85	654,943.50	
3,100.0	0.28	181.75	3,098.4	-533.6	1.5	48.5	-0.6	0.08	611,924.37	654,943.56	
3,200.0	0.23	179.43	3,198.4	-433.6	1.0	48.5	-0.1	0.05	611,923.92	654,943.56	
3,300.0	0.24	194.10	3,298.4	-333.6	0.6	48.4	0.3	0.06	611,923.52	654,943.51	
3,400.0	0.19	206.23	3,398.4	-233.6	0.3	48.3	0.6	0.07	611,923.17	654,943.38	
3,500.0	0.17	228.12	3,498.4	-133.6	0.0	48.1	0.9	0.07	611,922.92	654,943.20	
3,600.0	0.14	253.52	3,598.4	-33.6	-0.1	47.9	1.0	0.07	611,922.78	654,942.97	
3,700.0	0.15	219.41	3,698.4	66.4	-0.3	47.7	1.1	0.09	611,922.65	654,942.77	
3,800.0	0.19	231.00	3,798.4	166.4	-0.5	47.5	1.3	0.05	611,922.44	654,942.56	
3,900.0	0.14	227.19	3,898.4	266.4	-0.6	47.2	1.5	0.05	611,922.26	654,942.34	
4,000.0	0.03	323.95	3,998.4	366.4	-0.7	47.1	1.6	0.15	611,922.19	654,942.24	
4,100.0	0.03	293.56	4,098.4	466.4	-0.7	47.1	1.5	0.02	611,922.23	654,942.20	
4,200.0	0.02	5.91	4,198.4	566.4	-0.6	47.1	1.5	0.03	611,922.25	654,942.17	
4,300.0	0.08	119.69	4,298.4	666.4	-0.7	47.1	1.5	0.09	611,922.24	654,942.24	
4,400.0	0.17	145.08	4,398.4	766.4	-0.8	47.3	1.7	0.10	611,922.08	654,942.38	
4,500.0	0.10	332.38	4,498.4	866.4	-0.9	47.3	1.7	0.27	611,922.04	654,942.43	
4,600.0	0.50	7.55	4,598.4	966.4	-0.4	47.3	1.2	0.42	611,922.55	654,942.44	
4,700.0	0.48	10.98	4,698.4	1,066.4	0.5	47.5	0.4	0.04	611,923.39	654,942.58	



Smith International, Inc.
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD27)
Site: Airbus 12 Federal
Well: #2H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #2H
TVD Reference: RKB-17' @ 3632.0usft (Original Well Elev)
MD Reference: RKB-17' @ 3632.0usft (Original Well Elev)
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	0.39	14.62	4,798.4	1,166.4	1.2	47.6	-0.3	0.09	611,924.13	654,942.75
4,900.0	0.34	358.19	4,898.4	1,266.4	1.9	47.7	-1.0	0.12	611,924.76	654,942.82
5,000.0	0.29	337.35	4,998.4	1,366.4	2.4	47.6	-1.5	0.12	611,925.29	654,942.72
5,100.0	0.68	313.63	5,098.4	1,466.4	3.0	47.1	-2.2	0.43	611,925.93	654,942.19
5,200.0	0.67	311.36	5,198.4	1,566.4	3.8	46.2	-3.0	0.03	611,926.72	654,941.32
5,300.0	0.74	315.94	5,298.4	1,666.4	4.7	45.3	-3.8	0.09	611,927.57	654,940.43
5,400.0	0.84	308.01	5,398.4	1,766.4	5.6	44.3	-4.8	0.15	611,928.49	654,939.41
5,500.0	0.86	314.60	5,498.4	1,866.4	6.6	43.2	-5.8	0.10	611,929.47	654,938.29
5,600.0	0.91	309.99	5,598.4	1,966.4	7.6	42.1	-6.8	0.09	611,930.51	654,937.15
5,700.0	0.86	321.12	5,698.4	2,066.4	8.7	41.0	-7.9	0.18	611,931.60	654,936.07
5,800.0	0.80	319.18	5,798.4	2,166.4	9.8	40.0	-9.1	0.07	611,932.71	654,935.14
5,900.0	0.87	311.66	5,898.3	2,266.3	10.8	39.0	-10.1	0.13	611,933.75	654,934.12
6,000.0	0.86	320.35	5,998.3	2,366.3	11.9	38.0	-11.2	0.13	611,934.83	654,933.08
6,100.0	0.83	315.99	6,098.3	2,466.3	13.0	37.0	-12.3	0.07	611,935.93	654,932.09
6,200.0	0.86	319.28	6,198.3	2,566.3	14.1	36.0	-13.4	0.06	611,937.02	654,931.10
6,300.0	0.94	314.45	6,298.3	2,666.3	15.3	34.9	-14.6	0.11	611,938.16	654,930.03
6,400.0	0.99	310.26	6,398.3	2,766.3	16.4	33.7	-15.8	0.09	611,939.29	654,928.78
6,500.0	1.08	299.72	6,498.3	2,866.3	17.4	32.2	-16.8	0.21	611,940.32	654,927.30
6,600.0	1.34	294.62	6,598.2	2,966.2	18.4	30.3	-17.8	0.28	611,941.27	654,925.42
6,700.0	0.93	298.02	6,698.2	3,066.2	19.2	28.5	-18.7	0.42	611,942.14	654,923.64
6,800.0	0.59	353.79	6,798.2	3,166.2	20.1	27.8	-19.6	0.77	611,943.03	654,922.87
6,900.0	0.60	10.95	6,898.2	3,266.2	21.2	27.8	-20.6	0.18	611,944.06	654,922.91
7,000.0	0.80	67.47	6,998.2	3,366.2	21.9	28.6	-21.4	0.69	611,944.84	654,923.66
7,100.0	0.88	71.57	7,098.2	3,466.2	22.5	29.9	-21.9	0.10	611,945.35	654,925.03
7,200.0	0.60	71.17	7,198.2	3,566.2	22.9	31.2	-22.3	0.28	611,945.76	654,926.26
7,300.0	0.48	43.47	7,298.2	3,666.2	23.3	31.9	-22.7	0.28	611,946.24	654,927.04
7,400.0	0.75	65.78	7,398.2	3,766.2	23.9	32.8	-23.3	0.36	611,946.81	654,927.92



Smith International, Inc.

Pathfinder X & Y Report



A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
7,500.0	0.93	129.90	7,498.2	3,866.2	23.7	34.0	-23.0	0.90	611,946.56	654,929.14
7,600.0	0.97	135.38	7,598.1	3,966.1	22.5	35.3	-21.9	0.10	611,945.43	654,930.36
7,700.0	0.59	183.52	7,698.1	4,066.1	21.4	35.8	-20.7	0.72	611,944.32	654,930.92
7,800.0	0.62	189.08	7,798.1	4,166.1	20.4	35.7	-19.7	0.07	611,943.27	654,930.81
7,900.0	0.57	200.18	7,898.1	4,266.1	19.4	35.4	-18.7	0.13	611,942.27	654,930.55
8,000.0	0.37	169.20	7,998.1	4,366.1	18.6	35.3	-17.9	0.32	611,941.48	654,930.44
8,100.0	1.10	92.93	8,098.1	4,466.1	18.2	36.4	-17.5	1.07	611,941.12	654,931.46
8,200.0	1.20	67.24	8,198.1	4,566.1	18.6	38.3	-17.9	0.52	611,941.47	654,933.38
8,300.0	0.94	55.98	8,298.1	4,666.1	19.4	39.9	-18.7	0.33	611,942.34	654,935.03
8,400.0	0.68	76.59	8,398.1	4,766.1	20.0	41.2	-19.3	0.39	611,942.93	654,936.28
8,435.0	0.72	93.36	8,433.1	4,801.1	20.1	41.6	-19.3	0.59	611,942.97	654,936.71
8,497.0	0.44	68.37	8,495.1	4,863.1	20.1	42.2	-19.3	0.60	611,943.03	654,937.32
8,529.0	1.49	167.07	8,527.1	4,895.1	19.8	42.4	-19.0	5.05	611,942.67	654,937.52
8,561.0	5.01	184.55	8,559.0	4,927.0	18.0	42.4	-17.2	11.30	611,940.87	654,937.51
KOP - 8561.0 'MD, 8559.0 'TVD, 18.0 'N, 42.4 'E										
8,592.0	8.88	188.04	8,589.8	4,957.8	14.3	42.0	-13.5	12.56	611,937.16	654,937.06
8,623.0	12.75	185.05	8,620.2	4,988.2	8.5	41.3	-7.7	12.61	611,931.38	654,936.43
8,654.0	16.44	181.70	8,650.2	5,018.2	0.7	40.9	0.1	12.21	611,923.58	654,936.00
8,685.0	20.14	179.09	8,679.6	5,047.6	-9.0	40.9	9.8	12.22	611,913.86	654,935.95
8,717.0	23.83	178.23	8,709.3	5,077.3	-21.0	41.1	21.8	11.57	611,901.88	654,936.24
8,748.0	26.91	177.22	8,737.3	5,105.3	-34.3	41.7	35.1	10.03	611,888.61	654,936.77
8,780.0	29.90	177.08	8,765.5	5,133.5	-49.5	42.4	50.3	9.35	611,873.41	654,937.53
8,812.0	33.24	177.08	8,792.7	5,160.7	-66.2	43.3	67.0	10.44	611,856.68	654,938.38
8,843.0	37.02	177.82	8,818.1	5,186.1	-84.0	44.1	84.8	12.27	611,838.87	654,939.17
8,875.0	41.15	178.55	8,842.9	5,210.9	-104.2	44.7	105.0	12.99	611,818.70	654,939.80
8,907.0	44.85	179.31	8,866.3	5,234.3	-126.0	45.1	126.8	11.68	611,796.89	654,940.21
8,939.0	47.40	179.72	8,888.5	5,256.5	-149.1	45.3	149.9	8.02	611,773.82	654,940.40



Smith International, Inc.
Pathfinder X & Y Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
8,971.0	50.21	179.88	8,909.5	5,277.5	-173.2	45.4	174.0	8.79	611,749.75	654,940.48
9,003.0	53.55	180.31	8,929.3	5,297.3	-198.3	45.3	199.1	10.49	611,724.58	654,940.44
9,035.0	56.98	180.64	8,947.5	5,315.5	-224.6	45.1	225.4	10.75	611,698.28	654,940.22
9,066.0	60.23	180.65	8,963.7	5,331.7	-251.1	44.8	251.9	10.48	611,671.83	654,939.92
9,098.0	63.49	180.27	8,978.8	5,346.8	-279.3	44.6	280.1	10.24	611,643.62	654,939.70
9,130.0	66.13	179.74	8,992.4	5,360.4	-308.2	44.6	309.0	8.39	611,614.66	654,939.70
9,161.0	68.68	179.41	9,004.3	5,372.3	-336.9	44.8	337.6	8.28	611,586.04	654,939.91
9,193.0	71.67	179.06	9,015.1	5,383.1	-367.0	45.2	367.7	9.40	611,555.95	654,940.31
9,220.0	75.10	178.10	9,022.9	5,390.9	-392.8	45.9	393.6	13.15	611,530.09	654,940.95
9,250.0	78.70	178.10	9,029.7	5,397.7	-422.0	46.8	422.8	12.00	611,500.89	654,941.92
9,282.0	82.39	178.19	9,034.9	5,402.9	-453.6	47.8	454.4	11.53	611,469.34	654,942.94
9,314.0	85.82	178.46	9,038.2	5,406.2	-485.4	48.8	486.2	10.75	611,437.53	654,943.87
9,345.0	87.41	178.63	9,040.0	5,408.0	-516.3	49.6	517.1	5.16	611,406.60	654,944.66
9,377.0	87.58	178.90	9,041.4	5,409.4	-548.3	50.2	549.1	1.00	611,374.64	654,945.35
9,408.0	88.37	179.51	9,042.5	5,410.5	-579.2	50.7	580.1	3.22	611,343.66	654,945.78
9,439.0	88.46	179.95	9,043.4	5,411.4	-610.2	50.8	611.1	1.45	611,312.67	654,945.93
9,471.0	88.37	179.77	9,044.3	5,412.3	-642.2	50.9	643.1	0.63	611,280.68	654,946.00
9,564.0	88.11	179.69	9,047.1	5,415.1	-735.2	51.3	736.0	0.29	611,187.73	654,946.44
9,627.0	88.81	179.77	9,048.8	5,416.8	-798.1	51.6	799.0	1.12	611,124.75	654,946.74
9,723.0	90.31	178.98	9,049.6	5,417.6	-894.2	52.7	895.0	1.77	611,028.74	654,947.79
LP - 9723.0 'MD, 9049.6 'TVD, -894.2 'N, 52.7 'E										
9,818.0	90.04	178.81	9,049.3	5,417.3	-989.1	54.5	990.0	0.34	610,933.78	654,949.62
9,914.0	89.69	178.63	9,049.5	5,417.5	-1,085.1	56.7	1,086.0	0.41	610,837.81	654,951.76
10,009.0	90.66	178.72	9,049.2	5,417.2	-1,180.1	58.9	1,181.0	1.03	610,742.83	654,953.96
10,105.0	89.78	178.98	9,048.8	5,416.8	-1,276.0	60.8	1,277.0	0.96	610,646.86	654,955.89
10,200.0	89.52	177.75	9,049.4	5,417.4	-1,371.0	63.5	1,371.9	1.32	610,551.90	654,958.60
10,296.0	90.22	179.95	9,049.6	5,417.6	-1,467.0	65.4	1,467.9	2.40	610,455.92	654,960.52



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Pathfinder X & Y Report

PATHFINDER
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Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey										
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)
10,391.0	90.57	179.69	9,049.0	5,417.0	-1,562.0	65.7	1,562.9	0.46	610,360.93	654,960.82
10,487.0	90.13	179.25	9,048.4	5,416.4	-1,658.0	66.6	1,658.9	0.65	610,264.93	654,961.71
10,580.0	90.31	179.33	9,048.0	5,416.0	-1,751.0	67.8	1,751.9	0.21	610,171.94	654,962.86
10,674.0	90.40	178.19	9,047.5	5,415.5	-1,844.9	69.8	1,845.9	1.22	610,077.97	654,964.89
10,768.0	91.54	178.10	9,045.9	5,413.9	-1,938.9	72.8	1,939.9	1.22	609,984.03	654,967.94
10,863.0	88.72	179.86	9,045.6	5,413.6	-2,033.8	74.5	2,034.9	3.50	609,889.06	654,969.63
10,955.0	89.69	180.04	9,046.9	5,414.9	-2,125.8	74.6	2,126.8	1.07	609,797.07	654,969.71
11,048.0	89.43	179.25	9,047.6	5,415.6	-2,218.8	75.2	2,219.8	0.89	609,704.08	654,970.28
11,142.0	89.60	179.07	9,048.4	5,416.4	-2,312.8	76.6	2,313.8	0.26	609,610.09	654,971.66
11,237.0	89.69	178.63	9,049.0	5,417.0	-2,407.8	78.5	2,408.8	0.47	609,515.11	654,973.57
11,332.0	90.04	179.60	9,049.2	5,417.2	-2,502.8	79.9	2,503.8	1.09	609,420.13	654,975.04
11,427.0	90.40	178.63	9,048.9	5,416.9	-2,597.8	81.4	2,598.8	1.09	609,325.14	654,976.50
11,522.0	90.22	180.57	9,048.4	5,416.4	-2,692.8	82.1	2,693.8	2.05	609,230.15	654,977.17
11,679.0	89.16	179.51	9,049.2	5,417.2	-2,849.7	82.0	2,850.8	0.95	609,073.15	654,977.06
11,710.0	88.81	179.77	9,049.8	5,417.8	-2,880.7	82.2	2,881.8	1.41	609,042.16	654,977.25
11,805.0	90.22	178.72	9,050.6	5,418.6	-2,975.7	83.4	2,976.8	1.85	608,947.18	654,978.50
11,901.0	90.92	177.40	9,049.6	5,417.6	-3,071.7	86.7	3,072.7	1.56	608,851.24	654,981.75
11,994.0	91.10	180.83	9,048.0	5,416.0	-3,164.6	88.1	3,165.7	3.69	608,758.28	654,983.19
12,087.0	91.10	181.18	9,046.2	5,414.2	-3,257.6	86.5	3,258.6	0.38	608,665.31	654,981.56
12,180.0	91.63	180.75	9,044.0	5,412.0	-3,350.6	84.9	3,351.5	0.73	608,572.35	654,979.99
12,274.0	91.10	180.44	9,041.7	5,409.7	-3,444.5	83.9	3,445.5	0.65	608,478.38	654,979.02
12,368.0	90.57	179.94	9,040.4	5,408.4	-3,538.5	83.6	3,539.4	0.78	608,384.39	654,978.71
12,461.0	90.31	179.95	9,039.7	5,407.7	-3,631.5	83.7	3,632.4	0.28	608,291.40	654,978.79
12,552.0	89.52	179.67	9,039.8	5,407.8	-3,722.5	84.0	3,723.4	0.92	608,200.40	654,979.10
12,645.0	88.55	179.13	9,041.4	5,409.4	-3,815.5	85.0	3,816.4	1.19	608,107.42	654,980.07
12,737.0	87.85	178.46	9,044.2	5,412.2	-3,907.4	86.9	3,908.4	1.05	608,015.49	654,982.00
12,829.0	88.81	178.67	9,046.9	5,414.9	-3,999.3	89.2	4,000.3	1.07	607,923.55	654,984.31



Smith International, Inc.
Pathfinder X & Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #2H
Project:	Eddy County(NAD27)	TVD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Site:	Airbus 12 Federal	MD Reference:	RKB-17' @ 3632.0usft (Original Well Elev)
Well:	#2H	North Reference:	Gnd
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
12,923.0	88.11	178.23	9,049.5	5,417.5	-4,093.3	91.7	4,094.3	0.88	607,829.62	654,986.85	
13,017.0	88.72	179.20	9,052.1	5,420.1	-4,187.2	93.9	4,188.2	1.22	607,735.69	654,988.96	
13,110.0	90.04	180.54	9,053.1	5,421.1	-4,280.2	94.1	4,281.2	2.02	607,642.70	654,989.17	
13,202.0	90.13	180.20	9,052.9	5,420.9	-4,372.2	93.5	4,373.2	0.38	607,550.70	654,988.57	
13,295.0	89.60	179.45	9,053.1	5,421.1	-4,465.2	93.8	4,466.2	0.99	607,457.70	654,988.86	
13,409.0	89.34	178.66	9,054.2	5,422.2	-4,579.2	95.6	4,580.2	0.73	607,343.72	654,990.74	
13,457.0	89.34	178.66	9,054.7	5,422.7	-4,627.2	96.8	4,628.2	0.00	607,295.74	654,991.86	
BHL - 13457.0 'MD, 9054.7 'TVD, -4627.2 'N, 96.8 'E											

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,561.0	8,559.0	18.0	42.4	KOP - 8561.0 'MD, 8559.0 'TVD, 18.0 'N, 42.4 'E
9,723.0	9,049.6	-894.2	52.7	LP - 9723.0 'MD, 9049.6 'TVD, -894.2 'N, 52.7 'E
13,457.0	9,054.7	-4,627.2	96.8	BHL - 13457.0 'MD, 9054.7 'TVD, -4627.2 'N, 96.8 'E

Checked By: _____	Approved By: _____	Date: _____
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Project: Eddy County(NA)
 Site: Airbus 12 Federa
 Well: #2H
 Wellbore: OH
 Plan: Post Gyro Plan #1 (#2H/OH)



Azimuths to Grid North
 True North: -0.27°
 Magnetic North: 7.49°

Magnetic Field
 Strength: 48881.2snT
 Dip Angle: 60.57°
 Date: 4/7/2011
 Model: IGRF2010

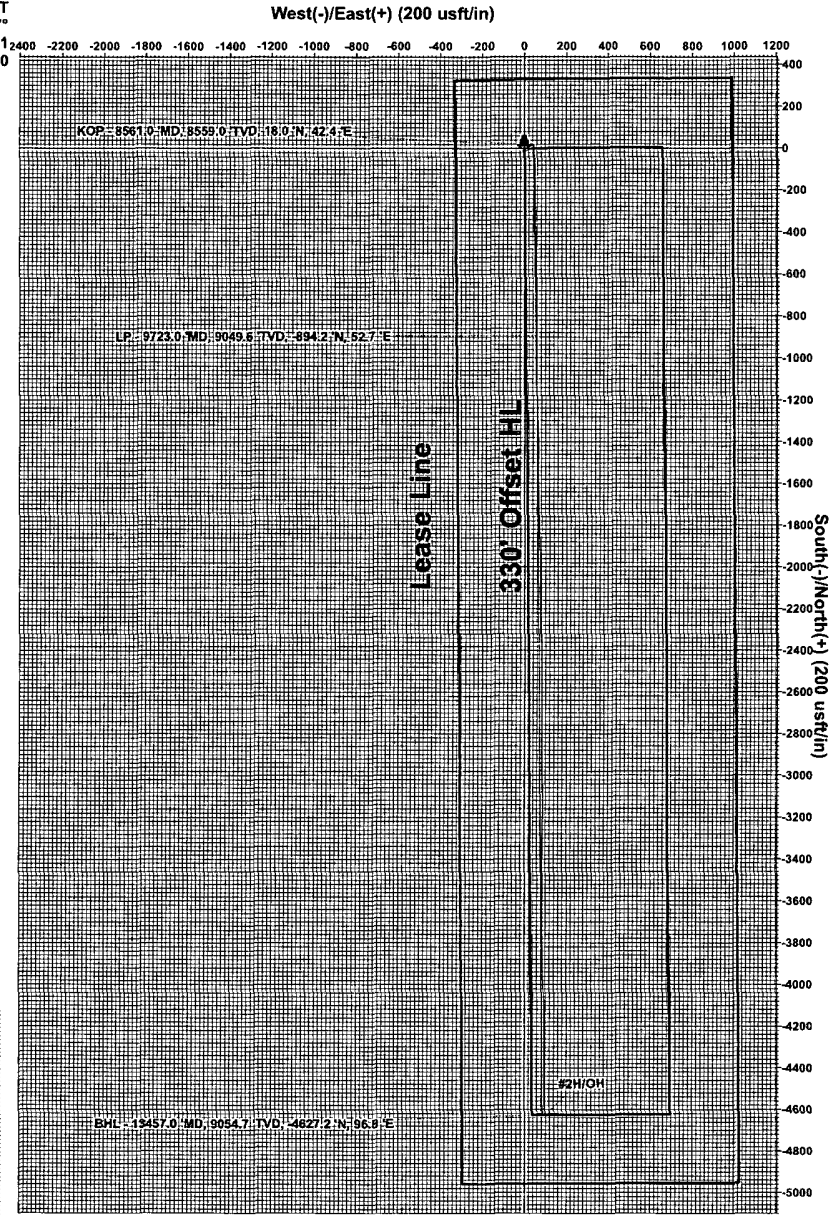
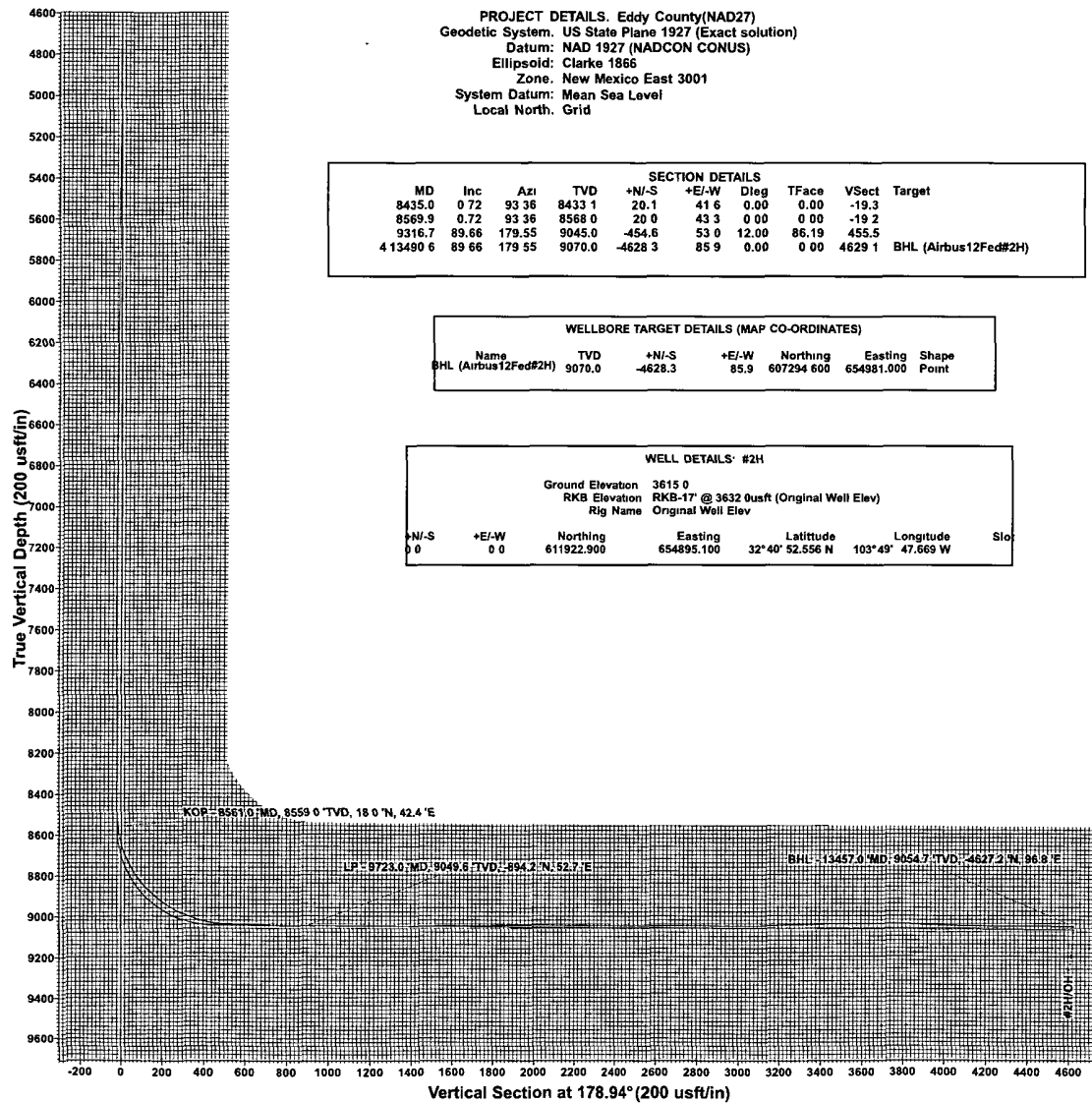
PATHFINDER
 A Schlumberger Company

PROJECT DETAILS: Eddy County(NAD27)
 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
 Local North: Grid

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSecl	Target
8435.0	0.72	93.38	8433.1	20.1	41.6	0.00	0.00	-19.3	
8569.9	0.72	93.38	8568.0	20.0	43.3	0.00	0.00	-19.2	
9316.7	89.66	179.55	9045.0	-454.6	53.0	12.00	86.19	455.5	
413490.6	89.66	179.55	9070.0	-4628.3	85.9	0.00	0.00	4629.1	BHL (Airbus12Fed#2H)

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)						
Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
BHL (Airbus12Fed#2H)	9070.0	-4628.3	85.9	607294.600	654981.000	Point

WELL DETAILS: #2H						
Ground Elevation		3615.0				
RKB Elevation		RKB-17' @ 3632.0usft (Original Well Elev)				
Rig Name		Original Well Elev				
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slope
0.0	0.0	611922.900	654895.100	32°40' 52.556 N	103°49' 47.669 W	



Plan Post Gyro Plan #1 (#2H/OH)
 Created By: Sam Biffle Date: 10 21, November 14 2011
 Checked: _____ Date: _____