

**McVAY DRILLING COMPANY**

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

COG OPERATING CO
 RECEIVED

JUL 09 2012

Well Name and Num: Superfortress 29 Fed 4H
 Location: Sec. 29, T19S, R31E
 Operator: COG
 Drilling Contractor: McVay Drilling Company

ARTESIA WEST

30-015-39975

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:

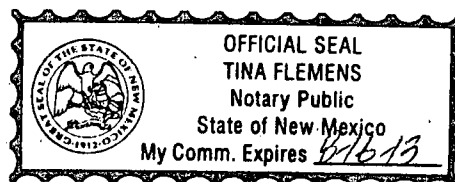
Degrees @	Depth	Degrees @	Depth	Degrees @	Depth
0.50	380	1.25	7624	90.75	12697
2.10	863	0.80	8099	87.93	13066
0.09	1103	1.67	8342	89.52	13251
3.60	1628	2.73	8453	90.30	13382
3.10	1830	16.36	8564		
1.26	2207	61.11	9008		
1.40	2542	83.97	9165		
1.20	2556	91.01	9190		
0.07	3230	87.41	9568		
0.90	3730	86.26	9757		
1.50	4212	89.60	10136		
0.03	4685	90.75	10611		
0.09	5160	87.93	11086		
1.60	5659	88.76	11277		
1.10	9150	94.18	11750		
1.60	6647	91.10	12227		
1.90	7148	92.77	12322		

RECEIVED
 SEP 17 2013
 NMOCD ARTESIA

VENDOR #				
INVOICE #				
L ACCT	CST CTR/ JIB CAT	LSWELL ALLCTN	AFE	AMOUNT
APPROVAL				

By: H. H. C. [Signature]
 Subscribed and sworn to before me this 5th day of July, 2012
Tina Flemens

Notary Public, Lea County, New Mexico



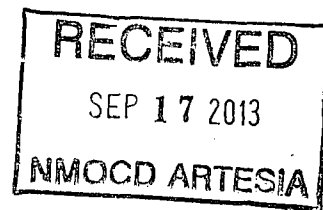
COG OPERATING

Gatuna Canyon

Eddy County, NM

Super Fortress "29" Federal #4H

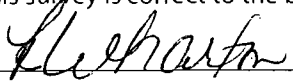
VH - Job #32K0612735



Survey: Gyro

SDI Standard Survey Report

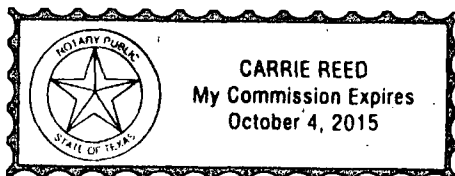
This survey is correct to the best of my knowledge and is supported by actual field data.



Notarized this date 18th of July, 2012.

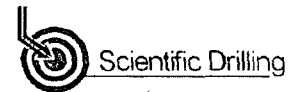


Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report



Company	COG OPERATING	Local Co-ordinate Reference:	Well Super Fortress "29" Federal #4H
Project	Gatuna Canyon	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well	Super Fortress "29" Federal #4H	North Reference:	Grid
Wellbore	VH - Job #32K0612735	Survey Calculation Method:	Minimum Curvature
Design	VH - Job #32K0612735	Database:	EDM-Regulatory

Project:	Gatuna Canyon		
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:	590,631.31 usft	Latitude:	32° 37' 22.980 N
From:	Lat/Long	Easting:	629,005.79 usft	Longitude:	103° 54' 51.559 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.23 °

Well	Super Fortress "29" Federal #4H, Directional (Pathfinder)					
Well Position	+N/-S	0.00 usft	Northing:	596,016.73 usft	Latitude:	32° 38' 16.007 N
	+E/-W	0.00 usft	Easting:	635,607.37 usft	Longitude:	103° 53' 34.109 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	0.00 usft

Wellbore		VH - Job #32K0612735			
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF200510	06/17/12	7.63	60.52	48,795

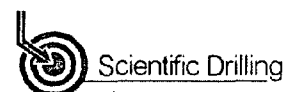
Design:	VH - Job #32K0612735				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction	
	(usft)	(usft)	(usft)	(°)	
	0.00	0.00	0.00	178.79	

Survey Program		Date : 07/21/12		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	8,287.00	Gyro (VH - Job #32K0612735)	Keeper	Keeper Gyro

Survey							
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.27	113.13	100.00	-0.09	0.22	113.13	0.24
200.00	0.31	88.30	200.00	-0.18	0.70	104.12	0.73
300.00	0.28	69.13	300.00	-0.08	1.20	93.90	1.21
400.00	0.18	113.30	400.00	-0.06	1.58	92.08	1.58
500.00	0.28	94.76	500.00	-0.14	1.96	94.07	1.97
600.00	0.32	101.22	599.99	-0.21	2.48	94.93	2.49
700.00	0.44	97.89	699.99	-0.32	3.13	95.85	3.15
800.00	0.49	84.80	799.99	-0.34	3.94	94.86	3.95
900.00	0.39	105.42	899.99	-0.39	4.69	94.71	4.71
1,000.00	0.48	100.68	999.98	-0.55	5.43	95.83	5.46
1,100.00	0.51	97.15	1,099.98	-0.69	6.29	96.24	6.33

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company	COG OPERATING	Local Co-ordinate Reference	Well Super Fortress "29" Federal #4H
Project	Gatuna Canyon	TVD Reference	WELL @ 0.00usft (Original Well Elev)
Site	Eddy County, NM	MD Reference	WELL @ 0.00usft (Original Well Elev)
Well	Super Fortress "29" Federal #4H	North Reference	Grid
Wellbore	VH - Job #32K0612735	Survey Calculation Method	Minimum Curvature
Design	VH - Job #32K0612735	Database	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
1,200.00	0.95	80.58	1,199.97	-0.61	7.55	94.60	7.57	
1,300.00	2.06	70.21	1,299.94	0.14	10.06	89.22	10.06	
1,400.00	3.01	70.34	1,399.84	1.63	14.22	83.47	14.31	
1,500.00	3.61	70.27	1,499.67	3.57	19.66	79.69	19.98	
1,600.00	3.50	72.80	1,599.48	5.54	25.53	77.76	26.13	
1,700.00	3.30	70.57	1,699.30	7.40	31.17	76.64	32.03	
1,800.00	3.09	69.58	1,799.14	9.30	36.41	75.67	37.57	
1,900.00	1.93	74.07	1,899.05	10.70	40.55	75.22	41.94	
2,000.00	1.20	78.57	1,999.01	11.37	43.20	75.25	44.67	
2,100.00	1.08	80.02	2,098.99	11.74	45.15	75.42	46.65	
2,200.00	0.82	88.66	2,198.98	11.92	46.79	75.71	48.29	
2,300.00	0.83	97.76	2,298.97	11.84	48.23	76.21	49.66	
2,400.00	0.88	75.18	2,398.95	11.94	49.69	76.49	51.10	
2,500.00	0.90	54.30	2,498.94	12.59	51.07	76.15	52.60	
2,600.00	0.95	59.30	2,598.93	13.47	52.42	75.58	54.12	
2,700.00	0.78	63.14	2,698.92	14.21	53.74	75.19	55.58	
2,800.00	0.52	199.49	2,798.92	14.09	54.19	75.43	55.99	
2,900.00	0.67	218.70	2,898.91	13.20	53.68	76.18	55.28	
3,000.00	0.72	189.42	2,998.90	12.13	53.21	77.16	54.57	
3,100.00	0.64	193.33	3,098.90	10.96	52.98	78.31	54.10	
3,200.00	0.49	171.99	3,198.89	10.00	52.91	79.30	53.84	
3,300.00	0.41	130.95	3,298.89	9.34	53.24	80.05	54.05	
3,400.00	0.43	123.73	3,398.89	8.89	53.82	80.62	54.55	
3,500.00	0.70	100.21	3,498.88	8.58	54.73	81.09	55.40	
3,600.00	0.72	103.76	3,598.87	8.32	55.94	81.54	56.56	
3,700.00	0.68	92.23	3,698.87	8.15	57.15	81.89	57.73	
3,800.00	0.60	71.99	3,798.86	8.29	58.24	81.90	58.83	
3,900.00	0.62	59.07	3,898.85	8.73	59.20	81.62	59.84	
4,000.00	0.79	49.88	3,998.85	9.45	60.19	81.08	60.93	
4,100.00	0.87	45.86	4,098.84	10.42	61.26	80.35	62.14	
4,200.00	0.83	42.34	4,198.82	11.49	62.30	79.55	63.35	
4,300.00	0.80	54.64	4,298.81	12.42	63.35	78.90	64.56	
4,400.00	0.21	43.23	4,398.81	12.96	64.05	78.56	65.35	
4,500.00	0.21	300.57	4,498.81	13.19	64.02	78.36	65.36	
4,600.00	0.20	294.99	4,598.81	13.36	63.70	78.16	65.09	
4,700.00	0.18	237.12	4,698.81	13.34	63.41	78.12	64.80	
4,800.00	0.29	225.19	4,798.81	13.08	63.10	78.29	64.44	
4,900.00	0.50	271.65	4,898.81	12.92	62.48	78.32	63.80	
5,000.00	0.62	263.64	4,998.80	12.87	61.51	78.18	62.84	
5,100.00	1.16	252.15	5,098.79	12.50	60.01	78.24	61.30	
5,200.00	1.26	260.39	5,198.77	12.00	57.96	78.30	59.19	
5,300.00	1.06	274.53	5,298.75	11.89	55.95	78.00	57.20	
5,400.00	0.87	272.48	5,398.73	12.00	54.27	77.53	55.58	
5,500.00	0.99	272.12	5,498.72	12.06	52.65	77.09	54.02	

Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well Super Fortress "29" Federal #4H
Project:	Gatuna Canyon	TVD Reference:	WELL @ 0.00usft (Original Well Elev)
Site:	Eddy County, NM	MD Reference:	WELL @ 0.00usft (Original Well Elev)
Well:	Super Fortress "29" Federal #4H	North Reference:	Grid
Wellbore:	VH - Job #32K0612735	Survey Calculation Method:	Minimum Curvature
Design:	VH - Job #32K0612735	Database:	EDM-Regulatory

Survey								
Measured Depth (usft)	Inclination (°)	Azimuth (°)	True Vertical Depth	North/South (usft)	East/West (usft)	Closure Azimuth (°)	Closure Distance (usft)	
5,600.00	1.32	276.53	5,598.70	12.23	50.64	76.43	52.10	
5,700.00	1.08	270.96	5,698.68	12.37	48.56	75.70	50.11	
5,800.00	0.84	277.13	5,798.66	12.48	46.89	75.10	48.52	
5,900.00	1.02	283.13	5,898.65	12.77	45.29	74.25	47.06	
6,000.00	0.81	276.17	5,998.64	13.05	43.72	73.38	45.63	
6,100.00	1.05	274.69	6,098.62	13.20	42.11	72.59	44.13	
6,200.00	1.16	263.69	6,198.60	13.17	40.19	71.86	42.29	
6,300.00	1.18	257.91	6,298.58	12.84	38.18	71.41	40.28	
6,400.00	1.15	240.61	6,398.56	12.13	36.30	71.52	38.27	
6,500.00	0.85	230.39	6,498.55	11.17	34.85	72.23	36.59	
6,600.00	1.15	239.89	6,598.53	10.19	33.41	73.04	34.93	
6,700.00	1.08	249.99	6,698.51	9.36	31.66	73.52	33.01	
6,800.00	1.30	277.71	6,798.49	9.19	29.65	72.77	31.04	
6,900.00	1.56	312.22	6,898.46	10.26	27.51	69.55	29.37	
7,000.00	1.88	334.08	6,998.42	12.65	25.79	63.87	28.72	
7,100.00	1.72	330.43	7,098.37	15.43	24.33	57.62	28.81	
7,200.00	2.05	318.36	7,198.32	18.07	22.40	51.11	28.78	
7,300.00	1.99	316.68	7,298.25	20.67	20.02	44.09	28.78	
7,400.00	1.31	302.96	7,398.21	22.56	17.87	38.39	28.78	
7,500.00	1.26	290.41	7,498.19	23.56	15.88	33.98	28.42	
7,600.00	1.95	261.82	7,598.15	23.70	13.17	29.05	27.12	
7,700.00	2.69	250.47	7,698.07	22.68	9.27	22.24	24.50	
7,800.00	3.07	241.53	7,797.94	20.62	4.71	12.86	21.15	
7,900.00	2.87	229.25	7,897.81	17.71	0.46	1.48	17.71	
8,000.00	2.54	222.63	7,997.70	14.44	-2.94	348.49	14.74	
8,100.00	2.03	221.75	8,097.62	11.49	-5.62	333.93	12.79	
8,200.00	1.99	218.14	8,197.56	8.80	-7.87	318.19	11.81	
8,287.00	1.79	221.29	8,284.51	6.59	-9.70	304.20	11.73	



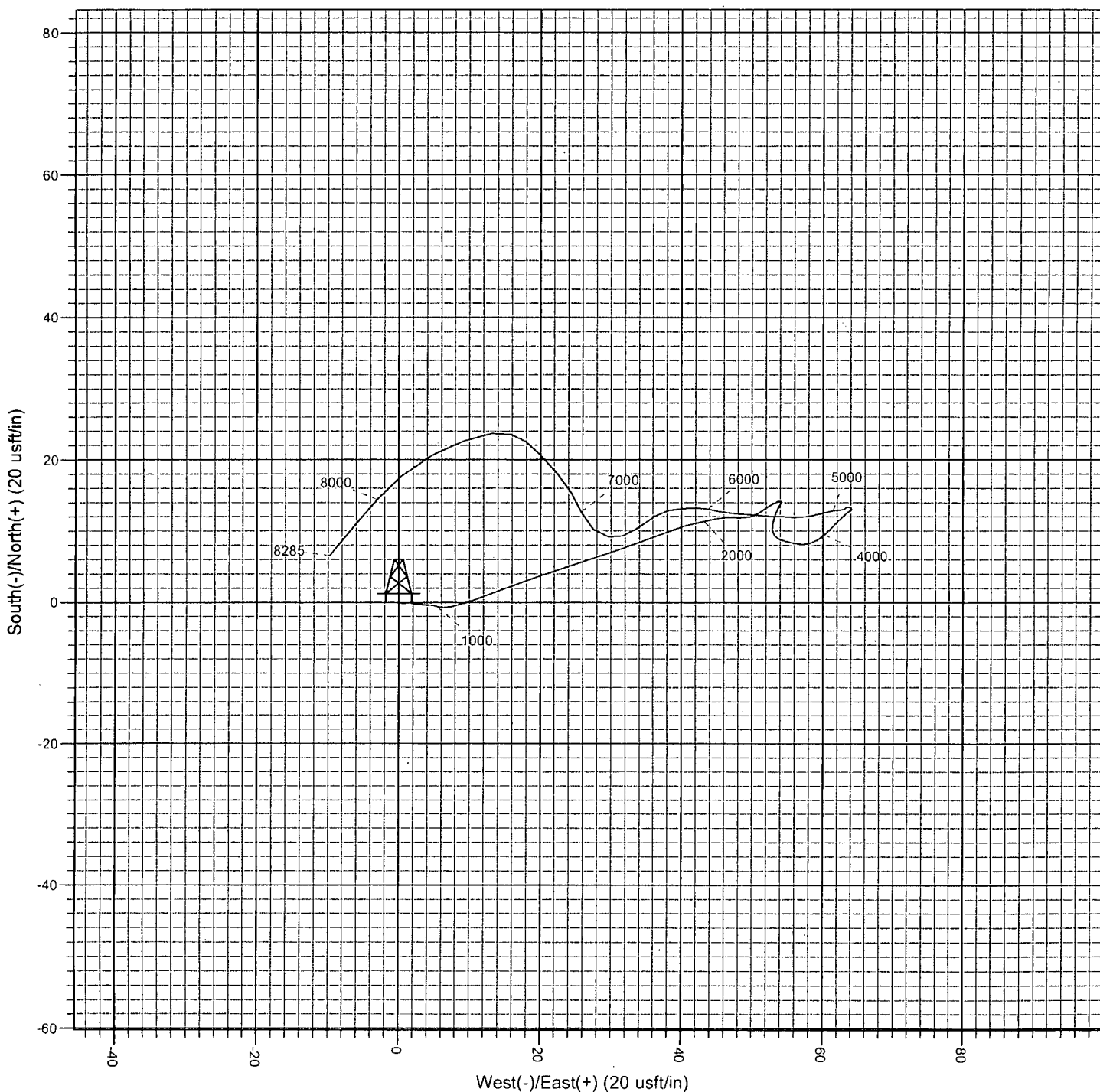
Scientific Drilling

Project: Gatuna Canyon
Eddy County, NM
Well: Super Fortress "29" Federal #4H
Wellbore: VH - Job #32K0612735
Design: VH - Job #32K0612735

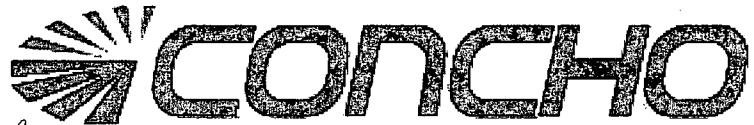
WELL DETAILS: Super Fortress "29" Federal #4H
WELL @ 0.00usft (Original Well Elev)

Ground Level: 0.00

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
0.00	0.00	596016.73	635607.37	32° 38' 16.007 N	103° 53' 34.109 W	



PROJECT DETAILS: Gatuna Canyon	SITE DETAILS: Eddy County, NM
Geodetic System: US State Plane 1927 (Exact solution)	Site Centre Latitude: 32° 37' 22.980 N
Datum: NAD 1927 (NADCON CONUS)	Longitude: 103° 54' 51.559 W
Ellipsoid: Clarke 1866	Positional Uncertainty: 0.00
Zone: New Mexico East 3001	Convergence: 0.23
System Datum: Mean Sea Level	Local North: Grid



COG Operating LLC

Eddy County(NAD83)

Super Fortress 29 Federal

#4H

OH



Design: OH

Pathfinder X&Y Report

27 June, 2012

PATHFINDER®

A Schlumberger Company



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 17' @ 3458.4usft
Site:	Super Fortress 29 Federal	MD Reference:	KB = 17' @ 3458.4usft
Well:	#4H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	OH	Database:	EDM 5000.1 Single User Db

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

Site	Super Fortress 29 Federal		
Site Position:		Northing:	596,018.670 usft
From:	Map	Easting:	676,939.610 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 38' 15.833 N
		Longitude:	103° 53' 34.137 W
		Grid Convergence:	0.24 °

Well	#4H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	usft
		Latitude:	32° 38' 15.801 N
		Longitude:	103° 53' 56.000 W
		Ground Level:	3,441.4 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF200510	10/27/2011	(°)	(°)	(nT)
			7.71	60.53	48,830

Design	OH			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.0	0.0	0.0	178.98



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Super Fortress 29 Federal
Well: #4H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17' @ 3458.4usft
MD Reference: KB = 17' @ 3458.4usft
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 5000.1 Single User Db

Survey Program Date 6/27/2012

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	8,287.0	Gyro #1 (OH)	NS-GYRO-MS	North sensing gyrocompassing m/s
8,342.0	13,375.0	MWD #2 (OH)	MWD	MWD - Standard

MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V.Sec (usft)	DLegs (°/100usft)	Northing (usft)	Easting (usft)
0.0	0.00	0.00	0.0	-3,458.4	0.0	0.0	0.0	0.00	596,007.75	675,070.13
100.0	0.27	113.13	100.0	-3,358.4	-0.1	0.2	0.1	0.27	596,007.66	675,070.35
200.0	0.31	88.30	200.0	-3,258.4	-0.2	0.7	0.2	0.13	596,007.57	675,070.83
300.0	0.28	69.13	300.0	-3,158.4	-0.1	1.2	0.1	0.10	596,007.67	675,071.33
400.0	0.18	113.30	400.0	-3,058.4	-0.1	1.6	0.1	0.20	596,007.69	675,071.71
500.0	0.28	94.76	500.0	-2,958.4	-0.1	2.0	0.2	0.12	596,007.61	675,072.09
600.0	0.32	101.22	600.0	-2,858.4	-0.2	2.5	0.3	0.05	596,007.54	675,072.61
700.0	0.44	97.89	700.0	-2,758.4	-0.3	3.1	0.4	0.12	596,007.43	675,073.26
800.0	0.49	84.80	800.0	-2,658.4	-0.3	3.9	0.4	0.12	596,007.41	675,074.07
900.0	0.39	105.42	900.0	-2,558.4	-0.4	4.7	0.5	0.19	596,007.36	675,074.82
1,000.0	0.48	100.68	1,000.0	-2,458.4	-0.6	5.4	0.7	0.10	596,007.20	675,075.56
1,100.0	0.51	97.15	1,100.0	-2,358.4	-0.7	6.3	0.8	0.04	596,007.06	675,076.42
1,200.0	0.95	80.58	1,200.0	-2,258.4	-0.6	7.5	0.7	0.48	596,007.14	675,077.68
1,300.0	2.06	70.21	1,299.9	-2,158.5	0.1	10.1	0.0	1.14	596,007.89	675,080.19
1,400.0	3.01	70.34	1,399.8	-2,058.6	1.6	14.2	-1.4	0.95	596,009.38	675,084.35
1,500.0	3.61	70.27	1,499.7	-1,958.7	3.6	19.7	-3.2	0.60	596,011.32	675,089.79
1,600.0	3.50	72.80	1,599.5	-1,858.9	5.5	25.5	-5.1	0.19	596,013.29	675,095.66
1,700.0	3.30	70.57	1,699.3	-1,759.1	7.4	31.2	-6.8	0.24	596,015.15	675,101.30
1,800.0	3.09	69.58	1,799.1	-1,659.3	9.3	36.4	-8.6	0.22	596,017.05	675,106.54
1,900.0	1.93	74.07	1,899.0	-1,559.4	10.7	40.6	-10.0	1.18	596,018.45	675,110.68
2,000.0	1.20	78.57	1,999.0	-1,459.4	11.4	43.2	-10.6	0.74	596,019.12	675,113.33



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Super Fortress 29 Federal
Well: #4H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17' @ 3458.4usft
MD Reference: KB = 17' @ 3458.4usft
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)	D/Leg (%/100usft)	Northing (usft)	Easting (usft)		
2,100.0	1.08	80.02	2,099.0	-1,359.4	11.7	45.2	-10.9	0.12	596,019.49	675,115.28		
2,200.0	0.82	88.66	2,199.0	-1,259.4	11.9	46.8	-11.1	0.30	596,019.67	675,116.92		
2,300.0	0.83	97.76	2,299.0	-1,159.4	11.8	48.2	-11.0	0.13	596,019.59	675,118.36		
2,400.0	0.88	75.18	2,399.0	-1,059.4	11.9	49.7	-11.0	0.34	596,019.69	675,119.82		
2,500.0	0.90	54.30	2,498.9	-959.5	12.6	51.1	-11.7	0.32	596,020.34	675,121.20		
2,600.0	0.95	59.30	2,598.9	-859.5	13.5	52.4	-12.5	0.09	596,021.22	675,122.55		
2,700.0	0.78	63.14	2,698.9	-759.5	14.2	53.7	-13.2	0.18	596,021.96	675,123.87		
2,800.0	0.52	199.49	2,798.9	-659.5	14.1	54.2	-13.1	1.21	596,021.84	675,124.32		
2,900.0	0.67	218.70	2,898.9	-559.5	13.2	53.7	-12.2	0.25	596,020.95	675,123.81		
3,000.0	0.72	189.42	2,998.9	-459.5	12.1	53.2	-11.2	0.35	596,019.88	675,123.34		
3,100.0	0.64	193.33	3,098.9	-359.5	11.0	53.0	-10.0	0.09	596,018.71	675,123.11		
3,200.0	0.49	171.99	3,198.9	-259.5	10.0	52.9	-9.0	0.26	596,017.75	675,123.04		
3,300.0	0.41	130.95	3,298.9	-159.5	9.3	53.2	-8.4	0.32	596,017.09	675,123.37		
3,400.0	0.43	123.73	3,398.9	-59.5	8.9	53.8	-7.9	0.06	596,016.64	675,123.95		
3,500.0	0.70	100.21	3,498.9	40.5	8.6	54.7	-7.6	0.35	596,016.33	675,124.86		
3,600.0	0.72	103.76	3,598.9	140.5	8.3	55.9	-7.3	0.05	596,016.07	675,126.07		
3,700.0	0.68	92.23	3,698.9	240.5	8.1	57.1	-7.1	0.15	596,015.90	675,127.28		
3,800.0	0.60	71.99	3,798.9	340.5	8.3	58.2	-7.2	0.24	596,016.04	675,128.37		
3,900.0	0.62	59.07	3,898.9	440.5	8.7	59.2	-7.7	0.14	596,016.48	675,129.33		
4,000.0	0.79	49.88	3,998.8	540.4	9.4	60.2	-8.4	0.20	596,017.20	675,130.32		
4,100.0	0.87	45.86	4,098.8	640.4	10.4	61.3	-9.3	0.10	596,018.17	675,131.39		
4,200.0	0.83	42.34	4,198.8	740.4	11.5	62.3	-10.4	0.07	596,019.24	675,132.43		
4,300.0	0.80	54.64	4,298.8	840.4	12.4	63.4	-11.3	0.18	596,020.17	675,133.48		
4,400.0	0.21	43.23	4,398.8	940.4	13.0	64.0	-11.8	0.60	596,020.71	675,134.18		
4,500.0	0.21	300.57	4,498.8	1,040.4	13.2	64.0	-12.0	0.33	596,020.94	675,134.15		
4,600.0	0.20	294.99	4,598.8	1,140.4	13.4	63.7	-12.2	0.02	596,021.11	675,133.83		
4,700.0	0.18	237.12	4,698.8	1,240.4	13.3	63.4	-12.2	0.18	596,021.09	675,133.54		



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Super Fortress 29 Federal
Well: #4H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:
Well #4H
KB = 17' @ 3458.4usft
KB = 17' @ 3458.4usft
Grid
Minimum Curvature
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	0.29	225.19	4,798.8	1,340.4	13.1	63.1	-12.0	0.12	596,020.83	675,133.23	
4,900.0	0.50	271.65	4,898.8	1,440.4	12.9	62.5	-11.8	0.37	596,020.67	675,132.61	
5,000.0	0.62	263.64	4,998.8	1,540.4	12.9	61.5	-11.8	0.14	596,020.62	675,131.64	
5,100.0	1.16	252.15	5,098.8	1,640.4	12.5	60.0	-11.4	0.57	596,020.25	675,130.14	
5,200.0	1.26	260.39	5,198.8	1,740.4	12.0	58.0	-11.0	0.20	596,019.75	675,128.09	
5,300.0	1.06	274.53	5,298.7	1,840.3	11.9	56.0	-10.9	0.35	596,019.64	675,126.08	
5,400.0	0.87	272.48	5,398.7	1,940.3	12.0	54.3	-11.0	0.19	596,019.75	675,124.40	
5,500.0	0.99	272.12	5,498.7	2,040.3	12.1	52.7	-11.1	0.12	596,019.81	675,122.78	
5,600.0	1.32	276.53	5,598.7	2,140.3	12.2	50.6	-11.3	0.34	596,019.98	675,120.77	
5,700.0	1.08	270.96	5,698.7	2,240.3	12.4	48.6	-11.5	0.27	596,020.12	675,118.69	
5,800.0	0.84	277.13	5,798.7	2,340.3	12.5	46.9	-11.6	0.26	596,020.23	675,117.02	
5,900.0	1.02	283.13	5,898.6	2,440.2	12.8	45.3	-12.0	0.20	596,020.52	675,115.42	
6,000.0	0.81	276.17	5,998.6	2,540.2	13.1	43.7	-12.3	0.24	596,020.80	675,113.85	
6,100.0	1.05	274.69	6,098.6	2,640.2	13.2	42.1	-12.4	0.24	596,020.95	675,112.24	
6,200.0	1.16	263.69	6,198.6	2,740.2	13.2	40.2	-12.4	0.24	596,020.92	675,110.32	
6,300.0	1.18	257.91	6,298.6	2,840.2	12.8	38.2	-12.2	0.12	596,020.59	675,108.31	
6,400.0	1.15	240.61	6,398.6	2,940.2	12.1	36.3	-11.5	0.35	596,019.88	675,106.43	
6,500.0	0.85	230.39	6,498.5	3,040.1	11.2	34.8	-10.5	0.35	596,018.92	675,104.98	
6,600.0	1.15	239.89	6,598.5	3,140.1	10.2	33.4	-9.6	0.34	596,017.94	675,103.54	
6,700.0	1.08	249.99	6,698.5	3,240.1	9.4	31.7	-8.8	0.21	596,017.11	675,101.79	
6,800.0	1.30	277.71	6,798.5	3,340.1	9.2	29.6	-8.7	0.61	596,016.94	675,099.78	
6,900.0	1.56	312.22	6,898.5	3,440.1	10.3	27.5	-9.8	0.88	596,018.01	675,097.64	
7,000.0	1.88	334.08	6,998.4	3,540.0	12.7	25.8	-12.2	0.72	596,020.40	675,095.92	
7,100.0	1.72	330.43	7,098.4	3,640.0	15.4	24.3	-15.0	0.20	596,023.18	675,094.46	
7,200.0	2.05	318.36	7,198.3	3,739.9	18.1	22.4	-17.7	0.51	596,025.82	675,092.53	
7,300.0	1.99	316.68	7,298.3	3,839.9	20.7	20.0	-20.3	0.08	596,028.42	675,090.15	
7,400.0	1.31	302.96	7,398.2	3,939.8	22.6	17.9	-22.2	0.78	596,030.31	675,088.00	



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Super Fortress 29 Federal
Well: #4H
Wellbore: OH
Design: OH

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:
Database:
Well #4H
KB = 17' @ 3458.4usft
KB = 17' @ 3458.4usft
Grid
Minimum Curvature
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	1.26	290.41	7,498.2	4,039.8	23.6	15.9	-23.3	0.29	596,031.31	675,086.01	
7,600.0	1.95	261.82	7,598.1	4,139.7	23.7	13.2	-23.5	1.04	596,031.45	675,083.30	
7,700.0	2.69	250.47	7,698.1	4,239.7	22.7	9.3	-22.5	0.87	596,030.43	675,079.40	
7,800.0	3.07	241.53	7,797.9	4,339.5	20.6	4.7	-20.5	0.59	596,028.37	675,074.84	
7,900.0	2.87	229.25	7,897.8	4,439.4	17.7	0.5	-17.7	0.67	596,025.46	675,070.59	
8,000.0	2.54	222.63	7,997.7	4,539.3	14.4	-2.9	-14.5	0.45	596,022.19	675,067.19	
8,100.0	2.03	221.75	8,097.6	4,639.2	11.5	-5.6	-11.6	0.51	596,019.24	675,064.51	
8,200.0	1.99	218.14	8,197.6	4,739.2	8.8	-7.9	-8.9	0.13	596,016.55	675,062.26	
8,287.0	1.79	221.29	8,284.5	4,826.1	6.6	-9.7	-6.8	0.26	596,014.34	675,060.43	
8,342.0	1.67	230.92	8,339.5	4,881.1	5.4	-10.9	-5.6	0.57	596,013.19	675,059.24	
8,374.0	1.23	209.56	8,371.5	4,913.1	4.9	-11.4	-5.1	2.16	596,012.60	675,058.71	
8,406.0	2.73	169.22	8,403.5	4,945.1	3.8	-11.4	-4.0	6.13	596,011.55	675,058.68	
KOP - 8406.0 'MD, 8403.5 'TVD, 169.22 'AZI, 2.73 'INC, 3.8 'N, -11.4 'E											
8,437.0	6.16	163.50	8,434.4	4,976.0	1.5	-10.8	-1.7	11.14	596,009.23	675,059.29	
8,469.0	10.20	165.26	8,466.0	5,007.6	-2.9	-9.6	2.7	12.65	596,004.84	675,060.50	
8,501.0	11.96	168.86	8,497.4	5,039.0	-8.9	-8.3	8.8	5.91	595,998.85	675,061.86	
8,533.0	14.16	175.81	8,528.6	5,070.2	-16.1	-7.3	15.9	8.44	595,991.69	675,062.79	
8,564.0	16.36	176.86	8,558.5	5,100.1	-24.2	-6.8	24.1	7.15	595,983.55	675,063.31	
8,596.0	18.38	177.39	8,589.0	5,130.6	-33.7	-6.3	33.6	6.33	595,974.01	675,063.78	
8,628.0	19.87	176.86	8,619.3	5,160.9	-44.2	-5.8	44.1	4.69	595,963.54	675,064.31	
8,660.0	18.99	173.61	8,649.5	5,191.1	-54.8	-4.9	54.7	4.36	595,952.93	675,065.19	
8,691.0	22.51	173.00	8,678.4	5,220.0	-65.7	-3.7	65.6	11.38	595,942.03	675,066.47	
8,723.0	26.29	173.52	8,707.6	5,249.2	-78.8	-2.1	78.8	11.83	595,928.90	675,068.02	
8,755.0	30.25	174.93	8,735.8	5,277.4	-93.9	-0.6	93.9	12.55	595,913.83	675,069.53	
8,787.0	33.41	176.34	8,762.9	5,304.5	-110.7	0.7	110.7	10.14	595,897.00	675,070.81	
8,818.0	36.49	176.69	8,788.3	5,329.9	-128.5	1.8	128.5	9.96	595,879.28	675,071.88	
8,850.0	39.57	177.48	8,813.5	5,355.1	-148.2	2.8	148.2	9.74	595,859.59	675,072.88	



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #4H
Project:	Eddy County(NAD83)	TVD Reference:	KB = 17' @ 3458.4usft
Site:	Super Fortress 29 Federal	MD Reference:	KB = 17' @ 3458.4usft
Well:	#4H	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)	
8,882.0	43.79	179.59	8,837.4	5,379.0	-169.4	3.3	169.5	13.90	595,838.33	675,073.41	
8,914.0	48.19	180.29	8,859.7	5,401.3	-192.4	3.3	192.5	13.84	595,815.32	675,073.43	
8,945.0	52.41	180.03	8,879.5	5,421.1	-216.3	3.2	216.3	13.63	595,791.47	675,073.36	
8,976.0	56.98	179.41	8,897.4	5,439.0	-241.6	3.4	241.6	14.83	595,766.18	675,073.49	
9,008.0	61.11	178.35	8,913.8	5,455.4	-269.0	3.9	269.0	13.21	595,738.75	675,074.03	
9,039.0	65.69	177.48	8,927.7	5,469.3	-296.7	4.9	296.7	14.99	595,711.06	675,075.04	
9,071.0	70.70	177.65	8,939.6	5,481.2	-326.4	6.2	326.4	15.66	595,681.38	675,076.31	
9,103.0	75.97	178.89	8,948.8	5,490.4	-357.0	7.1	357.1	16.88	595,650.75	675,077.23	
9,133.0	81.34	179.36	8,954.7	5,496.3	-386.4	7.5	386.5	17.97	595,621.35	675,077.67	
9,165.0	86.97	179.85	8,957.9	5,499.5	-418.2	7.8	418.3	17.66	595,589.53	675,077.89	
9,190.0	91.01	179.41	8,958.4	5,500.0	-443.2	7.9	443.3	16.26	595,564.54	675,078.05	
LP - 9190.0 'MD, 8958.4 'TVD, 179.41 'AZI, 91.01 'INC, -443.2 'N, 7.9 'E											
9,285.0	93.12	176.42	8,954.9	5,496.5	-538.1	11.4	538.2	3.85	595,469.68	675,081.51	
9,379.0	90.75	175.54	8,951.8	5,493.4	-631.8	18.0	632.0	2.69	595,375.97	675,088.09	
9,472.0	90.66	176.42	8,950.6	5,492.2	-724.5	24.5	724.9	0.95	595,283.21	675,094.61	
9,568.0	87.41	175.19	8,952.2	5,493.8	-820.3	31.5	820.7	3.62	595,187.50	675,101.63	
9,661.0	86.79	171.94	8,956.9	5,498.5	-912.5	41.9	913.1	3.55	595,095.21	675,112.04	
9,757.0	86.26	172.03	8,962.8	5,504.4	-1,007.4	55.3	1,008.3	0.56	595,000.33	675,125.40	
9,852.0	88.20	173.26	8,967.4	5,509.0	-1,101.5	67.4	1,102.6	2.42	594,906.22	675,137.55	
9,946.0	90.66	174.84	8,968.3	5,509.9	-1,195.0	77.2	1,196.2	3.11	594,812.75	675,147.29	
10,041.0	91.19	175.54	8,966.8	5,508.4	-1,289.7	85.1	1,291.0	0.92	594,718.09	675,155.25	
10,136.0	89.60	179.15	8,966.1	5,507.7	-1,384.5	89.5	1,385.9	4.15	594,623.22	675,159.65	
10,232.0	90.04	179.85	8,966.4	5,508.0	-1,480.5	90.4	1,481.9	0.86	594,527.22	675,160.49	
10,324.0	90.40	181.52	8,966.1	5,507.7	-1,572.5	89.3	1,573.9	1.86	594,435.23	675,159.39	
10,420.0	91.36	182.58	8,964.6	5,506.2	-1,668.4	85.8	1,669.7	1.49	594,339.31	675,155.96	
10,515.0	92.77	182.75	8,961.2	5,502.8	-1,763.3	81.4	1,764.4	1.49	594,244.47	675,151.54	
10,611.0	90.75	180.82	8,958.2	5,499.8	-1,859.2	78.4	1,860.3	2.91	594,148.58	675,148.55	



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Local/Co-ordinate Reference: Well #4H
TVD Reference: KB = 17' @ 3458.4usft
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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)	
10,706.0	90.48	182.05	8,957.2	5,498.8	-1,954.1	76.0	1,955.2	1.33	594,053.61	675,146.18	
10,801.0	91.45	183.28	8,955.6	5,497.2	-2,049.0	71.6	2,050.0	1.65	593,958.73	675,141.76	
10,897.0	89.16	181.61	8,955.1	5,496.7	-2,144.9	67.5	2,145.8	2.95	593,862.83	675,137.66	
10,991.0	89.52	181.70	8,956.2	5,497.8	-2,238.9	64.8	2,239.7	0.39	593,768.88	675,134.95	
11,086.0	87.93	179.68	8,958.3	5,499.9	-2,333.8	63.7	2,334.6	2.71	593,673.91	675,133.81	
11,181.0	88.11	178.45	8,961.6	5,503.2	-2,428.8	65.2	2,429.5	1.31	593,578.99	675,135.36	
11,277.0	87.76	178.01	8,965.0	5,506.6	-2,524.7	68.2	2,525.5	0.59	593,483.09	675,138.32	
11,371.0	88.81	177.48	8,967.8	5,509.4	-2,618.5	71.9	2,619.4	1.25	593,389.21	675,142.02	
11,465.0	91.98	177.30	8,967.2	5,508.8	-2,712.4	76.2	2,713.4	3.38	593,295.32	675,146.30	
11,560.0	92.59	177.30	8,963.4	5,505.0	-2,807.2	80.6	2,808.2	0.64	593,200.50	675,150.77	
11,655.0	92.86	178.09	8,958.9	5,500.5	-2,902.1	84.5	2,903.1	0.88	593,105.69	675,154.58	
11,750.0	94.18	178.62	8,953.0	5,494.6	-2,996.8	87.2	2,997.9	1.50	593,010.91	675,157.31	
11,846.0	92.77	178.45	8,947.2	5,488.8	-3,092.6	89.6	3,093.7	1.48	592,915.12	675,159.76	
11,941.0	91.36	179.68	8,943.8	5,485.4	-3,187.6	91.2	3,188.7	1.97	592,820.20	675,161.30	
12,036.0	88.29	180.99	8,944.1	5,485.7	-3,282.5	90.6	3,283.6	3.51	592,725.21	675,160.75	
12,131.0	88.11	181.26	8,947.1	5,488.7	-3,377.5	88.8	3,378.5	0.34	592,630.28	675,158.88	
12,227.0	91.10	182.66	8,947.7	5,489.3	-3,473.4	85.5	3,474.4	3.44	592,534.35	675,155.60	
12,322.0	92.77	182.75	8,944.5	5,486.1	-3,568.2	81.0	3,569.1	1.76	592,439.51	675,151.12	
12,417.0	91.28	182.40	8,941.2	5,482.8	-3,663.1	76.7	3,663.9	1.61	592,344.67	675,146.86	
12,512.0	89.25	182.49	8,940.7	5,482.3	-3,758.0	72.7	3,758.7	2.14	592,249.76	675,142.80	
12,604.0	89.78	182.58	8,941.5	5,483.1	-3,849.9	68.6	3,850.5	0.58	592,157.86	675,138.73	
12,697.0	90.75	182.93	8,941.1	5,482.7	-3,942.8	64.1	3,943.3	1.11	592,064.97	675,134.26	
12,790.0	92.59	183.81	8,938.4	5,480.0	-4,035.6	58.7	4,036.0	2.19	591,972.17	675,128.80	
12,882.0	90.84	184.33	8,935.6	5,477.2	-4,127.3	52.1	4,127.6	1.98	591,880.45	675,122.27	
12,974.0	89.43	184.07	8,935.4	5,477.0	-4,219.0	45.4	4,219.2	1.56	591,788.70	675,115.54	
13,066.0	87.93	182.22	8,937.5	5,479.1	-4,310.9	40.4	4,310.9	2.59	591,696.87	675,110.49	
13,159.0	88.20	182.22	8,940.7	5,482.3	-4,403.8	36.8	4,403.7	0.29	591,603.99	675,106.89	



Pathfinder
Pathfinder X&Y Report

PATHFINDER
A Schlumberger Company

Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Super Fortress 29 Federal
Well: #4H
Wellbore: OH
Design: OH

Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17' @ 3458.4usft
MD Reference: KB = 17' @ 3458.4usft
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)	D Leg (%/100usft)	Northing (usft)	Easting (usft)	
13,251.0	89.52	181.79	8,942.5	5,484.1	-4,495.7	33.5	4,495.6	1.51	591,512.07	675,103.67	
13,328.0	90.31	181.87	8,942.6	5,484.2	-4,572.6	31.1	4,572.5	1.03	591,435.11	675,101.21	
13,375.0	90.31	181.87	8,942.4	5,484.0	-4,619.6	29.5	4,619.4	0.00	591,388.14	675,099.68	
BHL - 13375.0 'MD, 8942.4 'TVD, 181.87 'AZI, 90.31 'INC, -4619.6 'N, 29.5 'E											

Design/Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
8,406.0	8,403.5	3.8	-11.4	KOP - 8406.0 'MD, 8403.5 'TVD, 169.22 'AZI, 2.73 'INC, 3.8 'N, -11.4 'E	
9,190.0	8,958.4	-443.2	7.9	LP - 9190.0 'MD, 8958.4 'TVD, 179.41 'AZI, 91.01 'INC, -443.2 'N, 7.9 'E	
13,375.0	8,942.4	-4,619.6	29.5	BHL - 13375.0 'MD, 8942.4 'TVD, 181.87 'AZI, 90.31 'INC, -4619.6 'N, 29.5 'E	

Checked By: _____ Approved By: _____ Date: _____



Project: Eddy County(NAD83)
Site: Super Fortress 29 Federa
Well: #4H
Wellbore: OH
Plan: Post Gyro Plan #2 (#4H/OH)

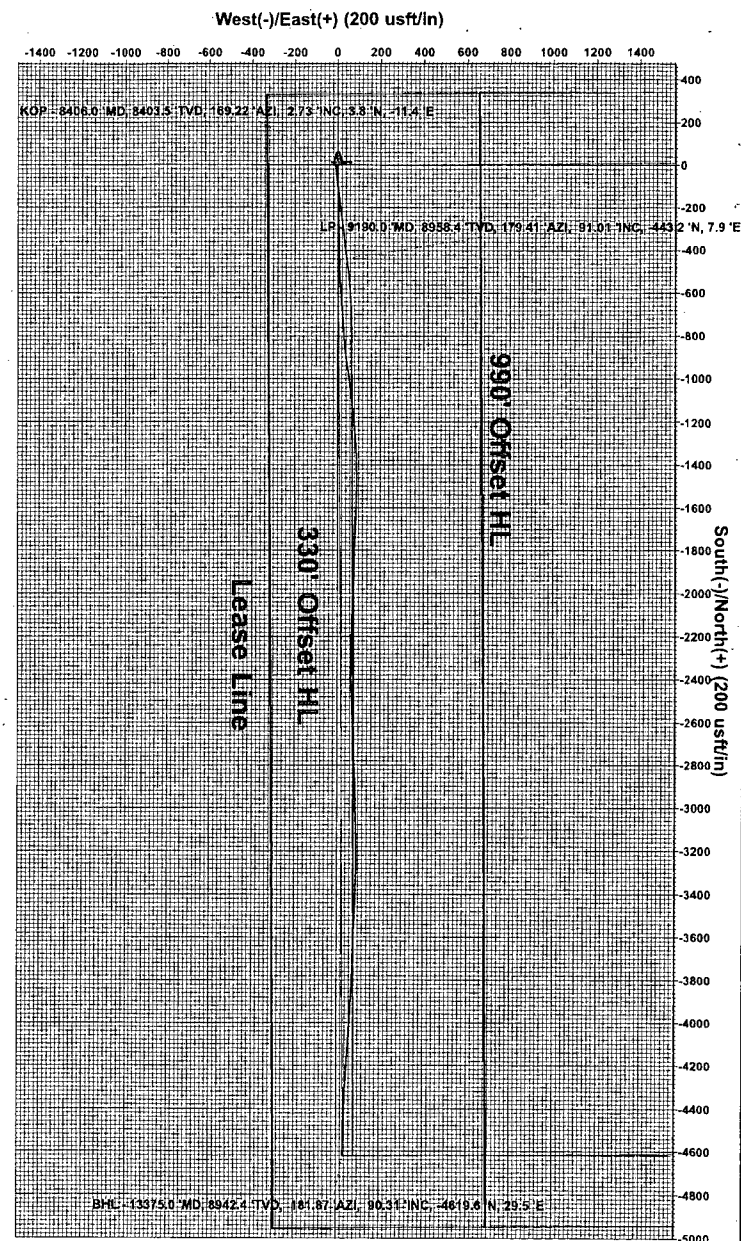
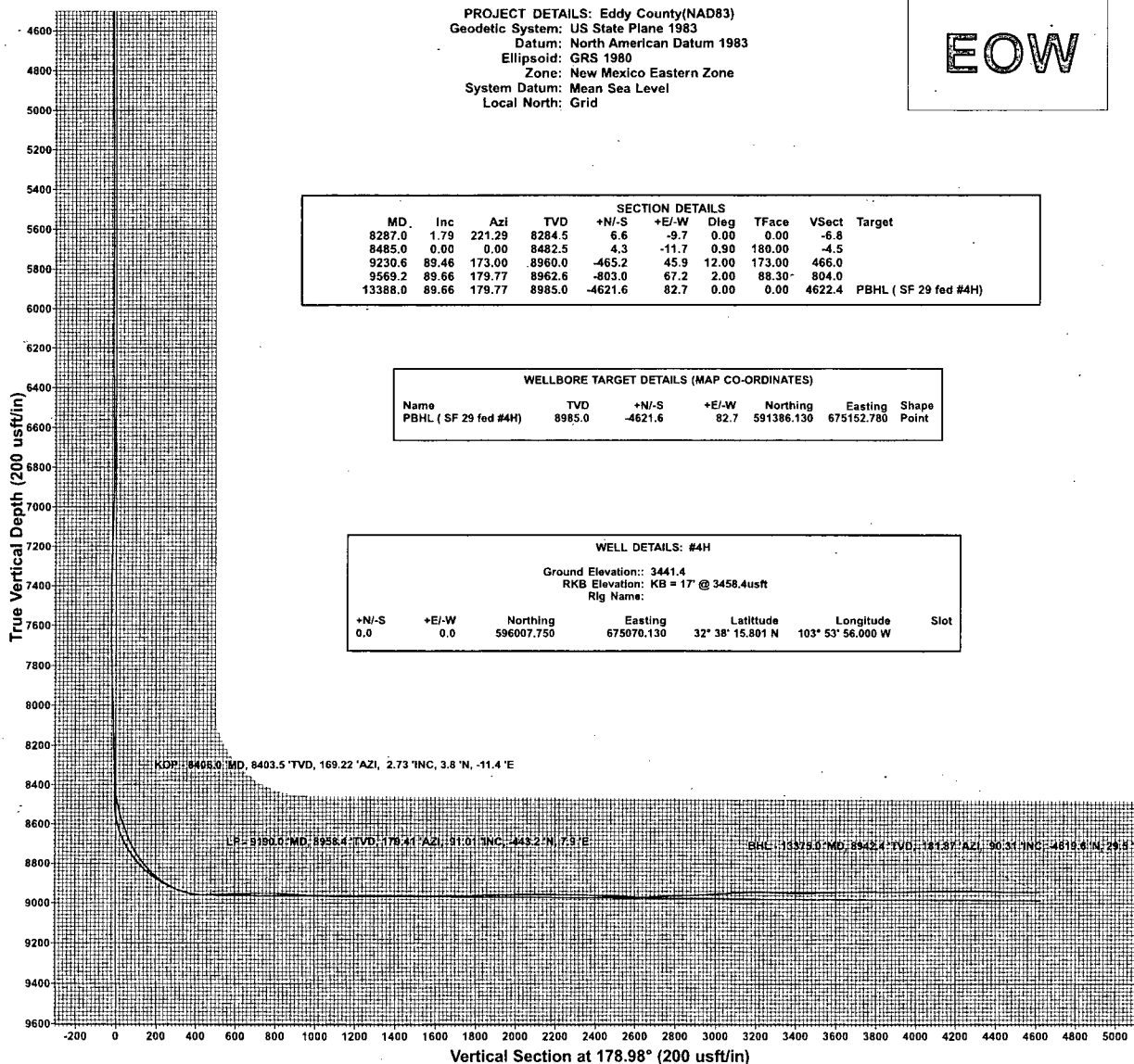


Azimuths to Grid North
True North: -0.23°
Magnetic North: 7.48°

Magnetic Field
Strength: 48830.2snT
Dip Angle: 60.53°
Date: 10/27/2011
Model: IGRF200510

PATHFINDER

A Schlumberger Company



Plan: Post Gyro Plan #2 (#4H/OH)

Created By: Sam Biffe Date: 8:51, June 27 2012

Checked: _____ Date: _____