

**McVAY DRILLING COMPANY**

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

30 015 39975
COG OPERATING INC.
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

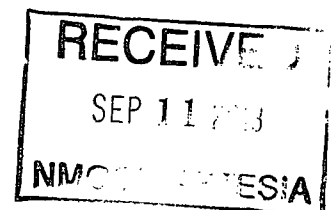
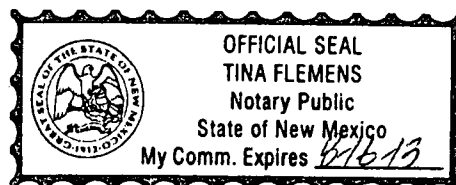
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

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		

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

By: H. H. Cramer Jr.
Subscribed and sworn to before me this 5th day of July, 2012
Tina Flemens

Notary Public, Lea County, New Mexico

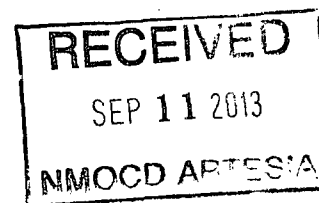


SUPERFORTRESS 29 FEDERAL #4H

30-025-39975

Sec 29-T19S-R31E

<u>Perfs</u>	<u>7 1/2% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>	
12900-13291'	3003	365916	322319	(Behind Liner)
13118-13224'	2940	150539	138306	
12696-12801'	3906	151365	149604	
12484-12590'	3906	150536	137424	
12273-12379'	3948	151913	138306	
11956-12167'	4242	230420	211176	
11745-11850'	4074	152319	132930	
11533-11639'	3948	150226	132192	
11322-11428'	3990	147906	130028	
11005-11210'	4008	231375	211302	
10688-10899'	3990	236072	186942	
10374-10582'	4032	228116	184548	
10054-10265'	3948	225678	182364	
9737-9948'	3948	220352	182994	
9420-9631'	4032	232260	184506	
9103-9314'	4116	253394	191520	
Totals	62031	3278387	2816461	



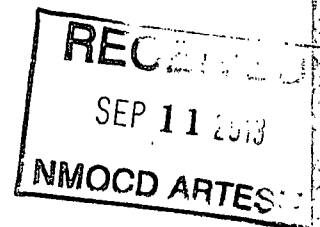
COG OPERATING

Gatuna Canyon

Eddy County, NM

Super Fortress "29" Federal #4H

VH - Job #32K0612735



Survey: Gyro

SDI Standard Survey Report

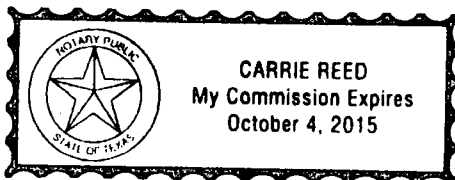
This survey is correct to the best of my knowledge and is supported by actual field data.

[Signature]

Notarized this date 15th of July, 2012.

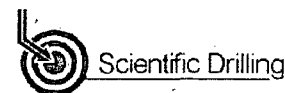
[Signature]

Notary Signature
County of Midland
State of Texas



Scientific Drilling International, Inc.

SDI Standard Survey Report



Company:	COG OPERATING	Local Co-ordinate Reference:	Well 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
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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
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00

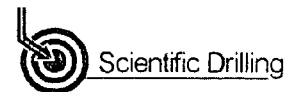
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	178.79

Survey Program		Date: 10/21/12		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.00	8,287.00	Gyro (VH - Job #32K0612735)	Keeper	Keeper Gyro

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

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



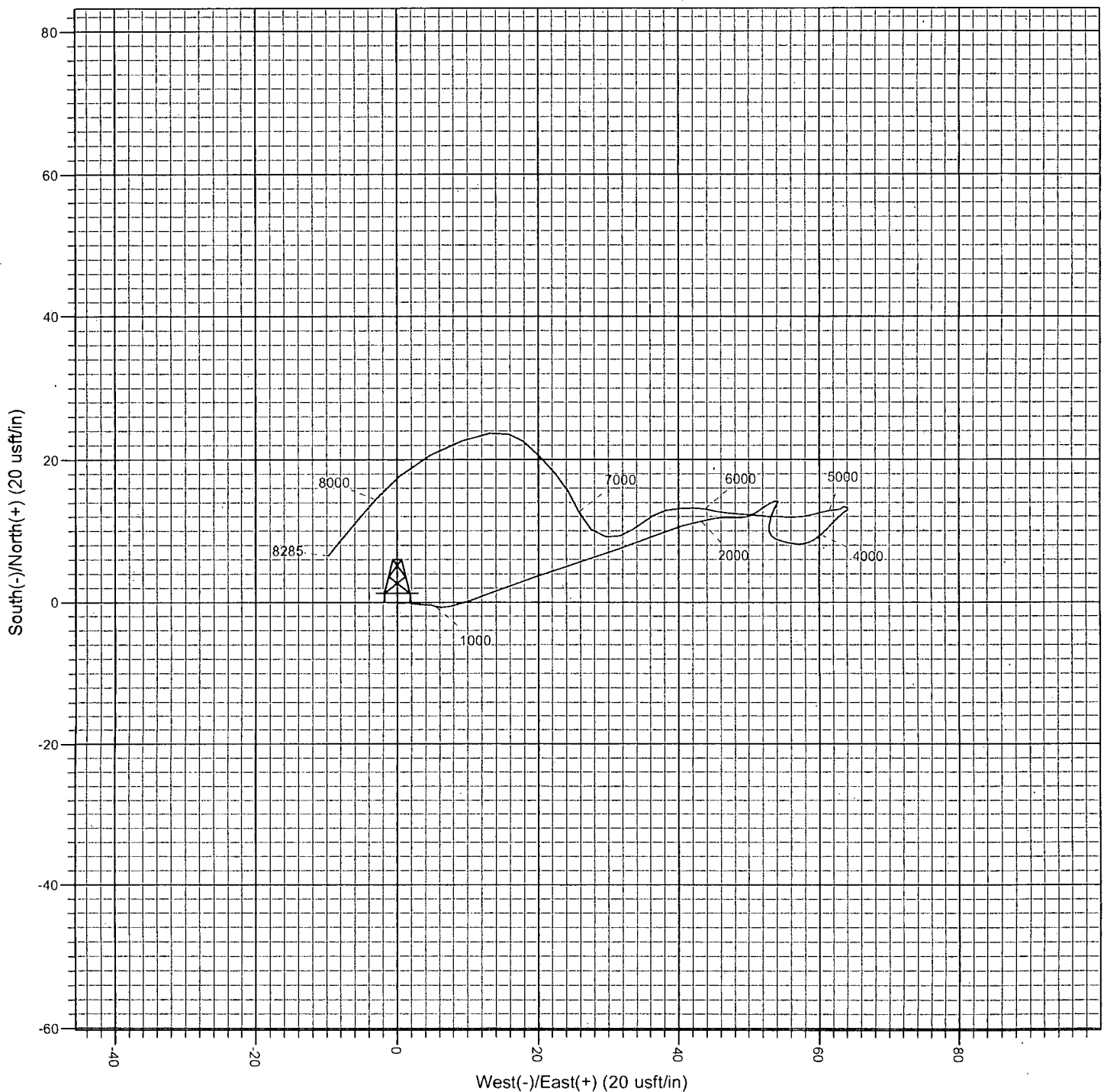
Scientific Drilling

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



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:		Latitude:	
From:	Map	Easting:		Longitude:	
Position Uncertainty:		Slot Radius:		Grid Convergence:	

Well	#4H					
Well Position	+N/-S	0.0 usft	Northing:	596,007.750 usft	Latitude:	32° 38' 15.801 N
	+E/-W	0.0 usft	Easting:	675,070.130 usft	Longitude:	103° 53' 56.000 W
Position Uncertainty	0.0 usft		Wellhead Elevation:	usft	Ground Level:	3,441.4 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	10/27/2011	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) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	178.98



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 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)	DLeg (%/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:
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	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)	D Leg (%/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
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Company: COG Operating LLC
Project: Eddy County(NAD83)
Site: Super Fortress 29 Federal
Well: #4H
Wellbore: OH
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Local Co-ordinate Reference: Well #4H
TVD Reference: KB = 17' @ 3458.4usft
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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)	
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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TVD Reference: KB = 17' @ 3458.4usft
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Survey											
MD (usft)	Inc (°)	Azi (azimuth) (°)	TVD (usft)	TVDSS (usft)	N/S (usft)	E/W (usft)	V. Sec (usft)	DLeg (°/100usft)	Northing (usft)	Easting (usft)	
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

PROJECT DETAILS: Eddy County(NAD83)
Geodetic System: US State Plane 1983
Datum: North American Datum 1983
Ellipsoid: GRS 1980
Zone: New Mexico Eastern Zone
System Datum: Mean Sea Level
Local North: Grid

EOW

SECTION DETAILS									
MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
8287.0	1.79	221.29	8284.5	6.6	-9.7	0.00	0.00	-6.8	
8485.0	0.00	0.00	8482.5	4.3	-11.7	0.90	180.00	-4.5	
9230.6	89.46	173.00	8960.0	-465.2	45.9	12.00	173.00	466.0	
9569.2	89.66	179.77	8962.6	-803.0	67.2	2.00	88.30	804.0	
13388.0	89.66	179.77	8985.0	-4621.6	82.7	0.00	0.00	4622.4	PBHL (SF 29 fed #4H)

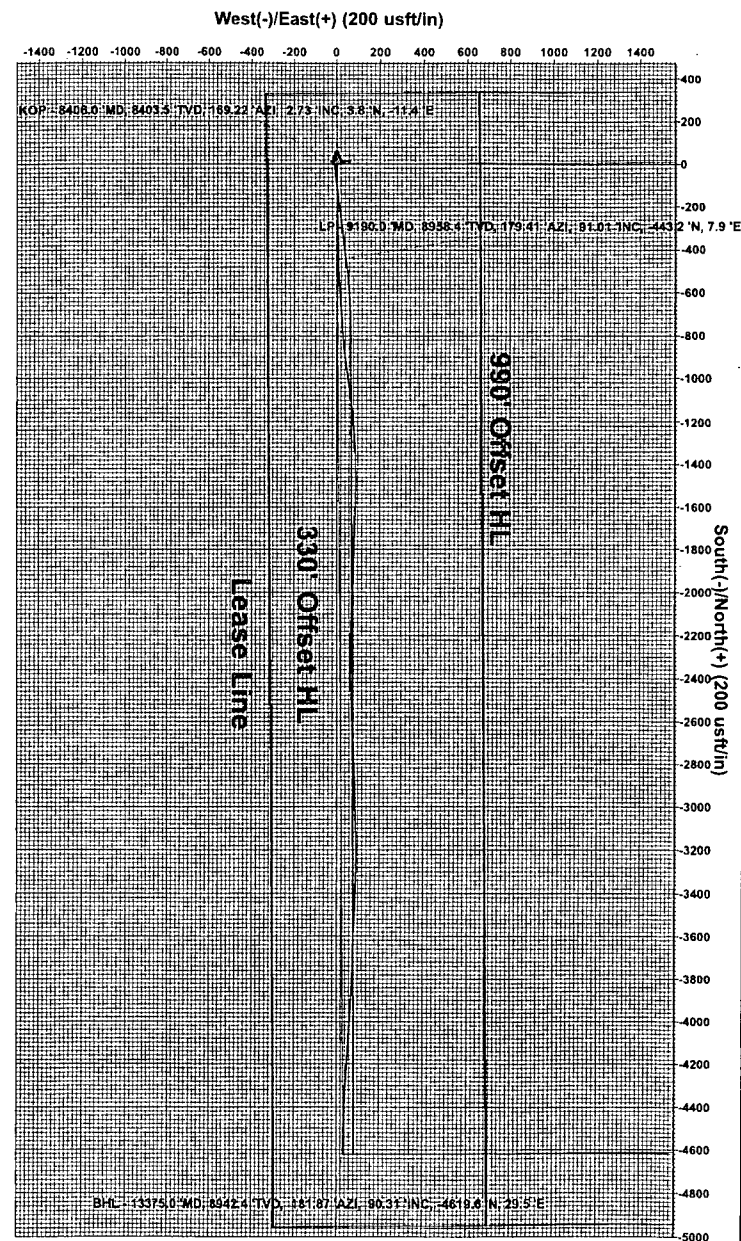
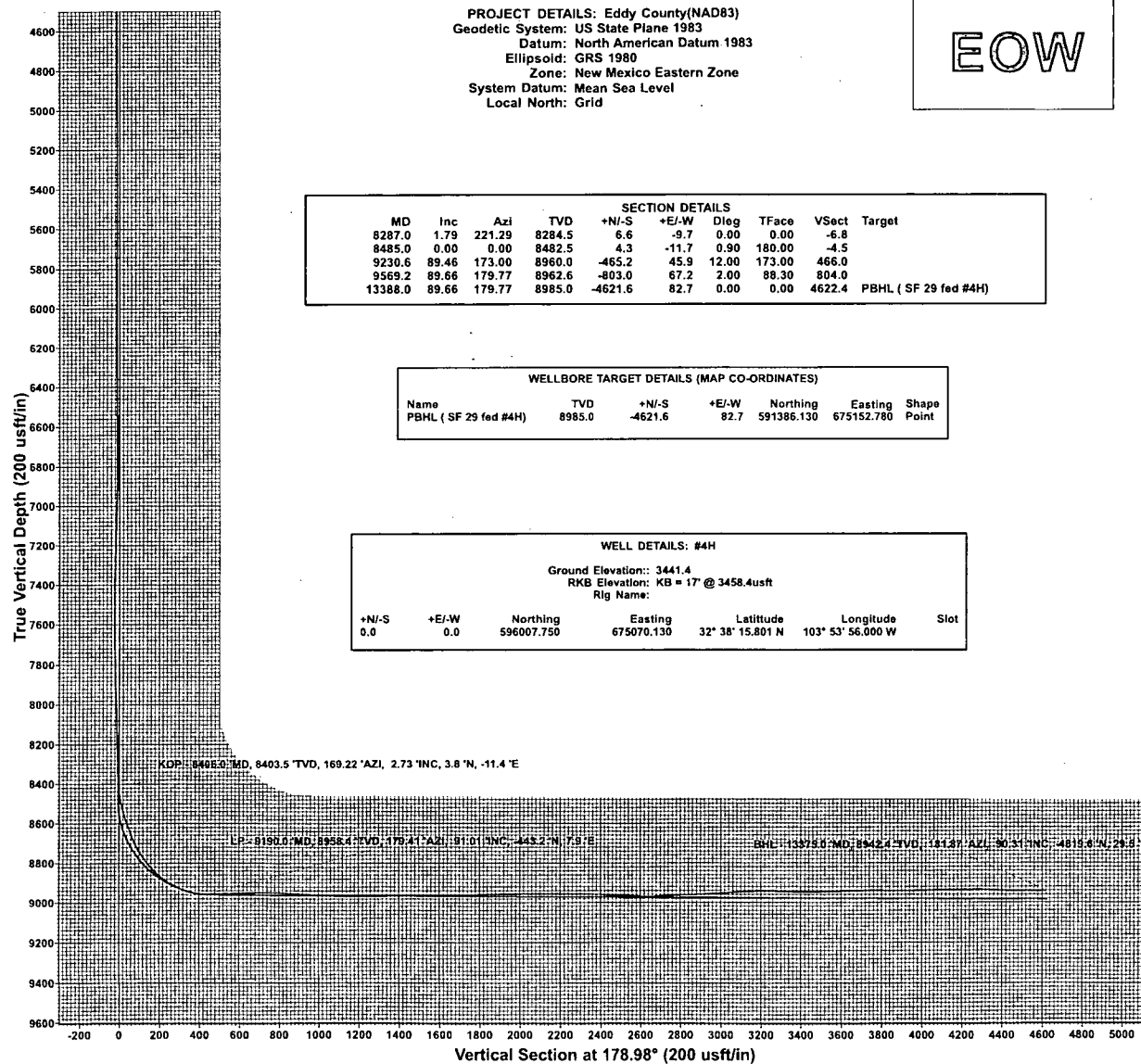
WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (SF 29 fed #4H)	8985.0	-4621.6	82.7	591386.130	675152.780	Point

WELL DETAILS: #4H

Ground Elevation: 3441.4
RKB Elevation: KB = 17' @ 3458.4usft
Rig Name:

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Spot
0.0	0.0	596007.750	675070.130	32° 38' 15.801 N	103° 53' 56.000 W	



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

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

Checked: _____ Date: _____