

Form 3160-4
(April 2004)

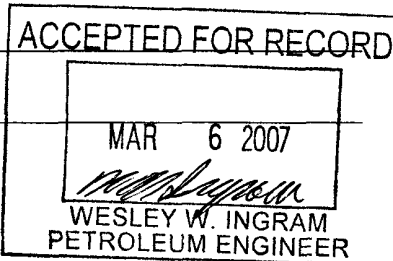
UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
WELL COMPLETION OR RECOMPLETION REPORT AND LOG

ARTESIA

FORM APPROVED
OMB NO. 1004-0137
Expires: March 31, 2007

1a. Type of Well ☒ Oil Well ☐ Gas Well ☐ Dry ☐ Other		5. Lease Serial No. NMM-100844							
b. Type of Completion: ☒ New Well ☐ Work Over ☐ Deepen ☐ Plug Back ☐ Diff. Resrv. Other _____		6. If Indian, Allottee or Tribe Name ---							
2. Name of Operator COG Operating LLC		7. Unit or CA Agreement Name and No.							
3. Address 550 W. Texas, Suite 1300, Midland, TX 79701		8. Lease Name and Well No. Reindeer Federal #1							
3a. Phone No. (include area code) 432-685-4340		9. AFI Well No. 30-015-33746							
4. Location of Well (Report location clearly and in accordance with Federal requirements)* At surface 660' FSL & 1680' FWL, Unit N At top prod. interval reported below At total depth 663' FSL & 300' FEL, Unit P		10. Field and Pool, or Exploratory Crows Flat Wolfcamp 97102							
14. Date Spudded 09/20/2006		15. Date T.D. Reached 10/09/2006							
16. Date Completed 10/26/2006 ☐ D & A ☒ Ready to Prod.		17. Elevations (DF, RKB, RT, GL)* 3589' GL							
18. Total Depth: MD 9695' TVD		19. Plug Back T.D.: MD 9641' TVD							
20. Depth Bridge Plug Set: MD see below TVD		21. Type Electric & Other Mechanical Logs Run (Submit copy of each) On file							
22. Was well cored? ☒ No ☐ Yes (Submit analysis) Was DST run? ☒ No ☐ Yes (Submit report) Directional Survey? ☒ No ☐ Yes (Submit copy)									
23. Casing and Liner Record (Report all strings set in well)									
Hole Size	Size/Grade	Wt. (#/ft.)	Top (MD)	Bottom (MD)	Stage Cementer Depth	No. of Sks & Type of Cement	Slurry Vol. (BBL)	Cement Top*	Amount Pulled
17-1/2	13-3/8	48		502		500 sx Cl C		Surface	
12-1/4	9-5/8	24 3/6		1830		800 sx Cl C		Surface	
8-3/4	7	20 2/6		9225		550 sx Cl C			
6-1/8	4-1/2	11.6	8917	11699	liner	310 sx H	CIBP's @	11437, 11290,	11065,8853,7165
				Plg back	6283	250 sx	time drill	to 9695	
7-7/8	5-1/2	17		9695		2600 sx C			
24. Tubing Record									
Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	Size	Depth Set (MD)	Packer Depth (MD)	
None	None	None							
25. Producing Intervals				26. Perforation Record					
Formation		Top	Bottom	Perforated Interval		Size	No. Holes	Perf. Status	
A) Wolfcamp				7350' - 7625'		4 SPF	59	Open	
B) Wolfcamp				7956' - 8289'		4 SPF	59	Open	
C) Wolfcamp				8677' - 9438'		4 SPF	52	Plugged CIBP @ 8515'	
D)									
27. Acid, Fracture, Treatment, Cement Squeeze, etc.									
Depth Interval		Amount and Type of Material							
7350' - 7625'		Frac w/ 7938 gals 15% HCl, 121,632# gel, 11,049# 100 mesh sand, 5555# LiteProp, & 69,452 16/30# sand.							
7956' - 8289'		Frac w/5997 gals 15% HCl, 83,622 gals gel, 8025# 100 mesh sand, 78,557# 16/30 sand.							
8677' - 9438'		Acidize w/ 500 gals acid. Frac w/3977 15% HCL, 135,127 gal gel, 11,073# 100 mesh sand, 20,406# 14/30 LiteProp and 85,993# 16/30 sand.							
28. Production - Interval A									
Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
10/27/2006	02/15/2006	24	→	174	182	319	42.2		FLOWING
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	
			→					PRODUCING	
28a. Production - Interval B									
Date First Produced	Test Date	Hours Tested	Test Production	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
			→						
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	
			→						

*(See instructions and spaces for additional data on page 2)



28b. Production - Interval C

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

28c. Production - Interval D

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr. API	Gas Gravity	Production Method
Choke Size	Tbg. Press. Flwg. SI	Csg. Press.	24 Hr. Rate →	Oil BBL	Gas MCF	Water BBL	Gas/Oil Ratio	Well Status	

29. Disposition of Gas (Sold, used for fuel, vented, etc.)

SOLD

30. Summary of Porous Zones (Include Aquifers):

Show all important zones of porosity and contents thereof: Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries.

31. Formation (Log) Markers

Formation	Top	Bottom	Descriptions, Contents, etc.	Name	Top Meas. Depth
Yates	390				
Queen	1120				
San Andres	1950				
Abo Sh	5420				
Wolfcamp	6535				

32. Additional remarks (include plugging procedure):

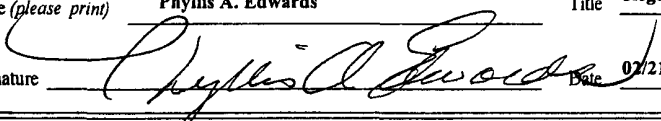
33. Indicate which items have been attached by placing a check in the appropriate boxes:

- ☐ Electrical/Mechanical Logs (1 full set req'd.) ☐ Geologic Report ☐ DST Report ☐ Directional Survey
☐ Sundry Notice for plugging and cement verification ☐ Core Analysis ☒ Other:

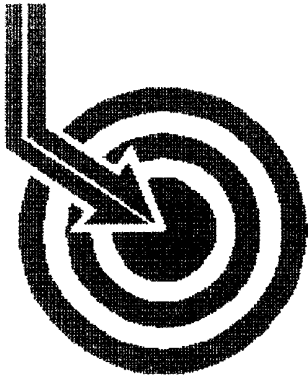
34. I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions)*

Name (please print) Phyllis A. EdwardsTitle Regulatory Analyst

Signature


Date 02/21/2007

Title 18 U.S.C Section 1001 and Title 43 U.S.C Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.



Scientific Drilling

NOV 23 PM 1:25

COG RESOURCES

Field: Crow Flats Morrow
Site: Eddy County, NM
Well: Reindeer Fed #1
Wellpath: VH - Job #32K0906760
Survey: 09/20/06

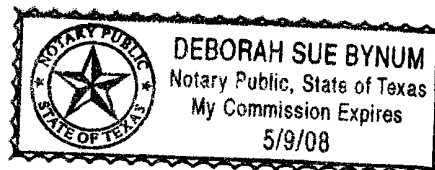
NM 100844-DW

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

.....*R. Wharton*.....Company Representative

Notorized this date 29th of October, 2006.

Deborah Sue Bynum
Notary Signature
County of Midland
State of Texas





Scientific Drilling International Survey Report

Company: COG RESOURCES
Field: Crow Flats Morrow
Site: Eddy County, NM
Well: Reindeer Fed #1
Wellpath: VH - Job #32K0906760

Date: 10/29/2006 Time: 13:21:58 Page: 1
Co-ordinate(NE) Reference: Site: Eddy County, NM, Grid North
Vertical (TVD) Reference: SITE 0.0
Section (VS) Reference: Well (0.00N,0.00E,247.96Azi)
Survey Calculation Method: Minimum Curvature Db: Sybase

Survey: 09/20/06 Start Date: 10/20/2006
Company: Scientific Drilling Internatio Engineer: Rehders w/Capitan
Tool: Keeper, Keeper Gyro Tied-to: From Surface

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClSD ft	ClSA deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
100.00	0.82	152.84	100.00	-0.06	-0.64	0.33	0.82	0.72	152.84
200.00	1.35	208.13	199.98	0.78	-2.31	0.10	1.11	2.31	177.58
300.00	2.07	225.79	299.94	3.35	-4.61	-1.75	0.88	4.93	200.81
400.00	2.39	231.52	399.86	7.03	-7.17	-4.68	0.39	8.56	213.14
500.00	2.31	233.11	499.78	10.97	-9.67	-7.92	0.10	12.50	219.32
600.00	1.85	233.91	599.71	14.49	-11.83	-10.84	0.46	16.05	222.49
700.00	1.71	240.25	699.66	17.53	-13.53	-13.44	0.24	19.07	224.81
800.00	1.44	245.65	799.62	20.27	-14.78	-15.88	0.31	21.70	227.04
900.00	1.24	247.62	899.60	22.60	-15.71	-18.02	0.21	23.91	228.92
1000.00	0.94	247.77	999.58	24.51	-16.44	-19.78	0.30	25.72	230.28
1100.00	0.74	248.63	1099.57	25.97	-16.98	-21.14	0.20	27.12	231.23
1200.00	0.59	263.91	1199.56	27.11	-17.27	-22.26	0.23	28.17	232.19
1300.00	0.48	266.37	1299.56	28.01	-17.35	-23.19	0.11	28.96	233.19
1400.00	0.35	272.66	1399.55	28.68	-17.37	-23.91	0.14	29.55	234.01
1500.00	0.35	265.15	1499.55	29.25	-17.38	-24.52	0.05	30.05	234.68
1600.00	0.40	268.49	1599.55	29.87	-17.41	-25.17	0.05	30.61	235.33
1700.00	0.52	260.34	1699.55	30.64	-17.50	-25.97	0.14	31.32	236.03
1800.00	0.57	267.32	1799.54	31.55	-17.60	-26.91	0.08	32.16	236.82
1900.00	0.61	263.18	1899.54	32.53	-17.68	-27.94	0.06	33.07	237.67
2000.00	0.60	262.43	1999.53	33.55	-17.82	-28.99	0.01	34.02	238.42
2100.00	0.59	270.48	2099.53	34.54	-17.88	-30.02	0.08	34.94	239.22
2200.00	0.68	270.68	2199.52	35.56	-17.87	-31.13	0.09	35.89	240.14
2300.00	0.55	278.39	2299.51	36.52	-17.79	-32.20	0.15	36.79	241.08
2400.00	0.72	273.93	2399.51	37.50	-17.68	-33.30	0.18	37.70	242.04
2500.00	0.61	277.99	2499.50	38.53	-17.56	-34.45	0.12	38.67	242.99
2600.00	0.65	271.55	2599.50	39.51	-17.47	-35.55	0.08	39.61	243.82
2700.00	0.64	273.99	2699.49	40.53	-17.42	-36.67	0.03	40.60	244.59
2800.00	0.60	279.64	2799.48	41.48	-17.29	-37.74	0.07	41.52	245.39
2900.00	0.68	277.00	2899.48	42.44	-17.13	-38.85	0.09	42.46	246.20
3000.00	0.75	275.83	2999.47	43.54	-16.99	-40.09	0.07	43.54	247.03
3100.00	0.67	279.04	3099.46	44.62	-16.83	-41.32	0.09	44.62	247.83
3200.00	0.72	284.70	3199.45	45.62	-16.58	-42.50	0.08	45.62	248.69
3300.00	0.80	279.18	3299.45	46.72	-16.31	-43.80	0.11	46.74	249.57
3400.00	0.68	283.78	3399.44	47.80	-16.06	-45.07	0.13	47.84	250.39
3500.00	0.51	282.15	3499.43	48.65	-15.83	-46.08	0.17	48.72	251.05
3600.00	0.56	281.25	3599.43	49.43	-15.64	-46.99	0.05	49.53	251.60
3700.00	0.70	272.95	3699.42	50.39	-15.51	-48.08	0.17	50.52	252.12
3800.00	0.52	279.31	3799.42	51.33	-15.40	-49.14	0.19	51.50	252.59
3900.00	0.74	268.28	3899.41	52.32	-15.35	-50.23	0.25	52.53	253.01
4000.00	0.78	263.75	3999.40	53.58	-15.44	-51.55	0.07	53.82	253.32
4100.00	0.78	262.32	4099.39	54.90	-15.61	-52.91	0.02	55.16	253.56
4200.00	0.91	266.56	4199.38	56.31	-15.75	-54.37	0.14	56.61	253.85
4300.00	0.92	260.70	4299.37	57.84	-15.92	-55.96	0.09	58.18	254.11
4400.00	0.69	260.09	4399.36	59.22	-16.16	-57.34	0.23	59.58	254.26
4500.00	0.63	265.68	4499.35	60.33	-16.30	-58.48	0.09	60.71	254.42
4600.00	0.56	255.99	4599.35	61.34	-16.46	-59.51	0.12	61.74	254.54
4700.00	0.21	75.99	4699.34	61.64	-16.54	-59.80	0.77	62.05	254.54
4800.00	0.58	266.18	4799.34	61.94	-16.53	-60.13	0.79	62.36	254.63



Scientific Drilling International

Survey Report

Company: COG RESOURCES
Field: Crow Flats Morrow
Site: Eddy County, NM
Well: Reindeer Fed #1
Wellpath: VH - Job #32K0906760

Date: 10/29/2006 Time: 13:21:58 Page: 2
Co-ordinate(NE) Reference: Site: Eddy County, NM, Grid North
Vertical (TVD) Reference: SITE 0.0
Section (VS) Reference: Well (0.00N,0.00E,247.96Azi)
Survey Calculation Method: Minimum Curvature Db: Sybase

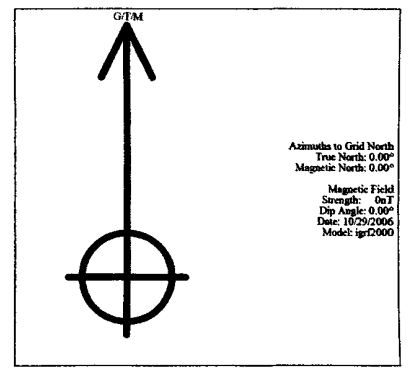
Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
4900.00	0.63	262.09	4899.34	62.95	-16.64	-61.18	0.07	63.40	254.79
5000.00	0.70	252.14	4999.33	64.09	-16.90	-62.31	0.13	64.56	254.83
5100.00	0.64	247.98	5099.32	65.26	-17.30	-63.41	0.08	65.72	254.74
5200.00	0.67	253.37	5199.32	66.40	-17.67	-64.48	0.07	66.86	254.67
5300.00	0.53	240.51	5299.31	67.44	-18.07	-65.45	0.19	67.89	254.57
5400.00	0.46	220.84	5399.31	68.26	-18.60	-66.11	0.18	68.68	254.29
5500.00	0.52	207.10	5499.30	68.96	-19.31	-66.58	0.13	69.32	253.83
5600.00	0.52	215.56	5599.30	69.69	-20.08	-67.05	0.08	69.99	253.33
5700.00	0.55	221.52	5699.30	70.50	-20.81	-67.63	0.06	70.76	252.90
5800.00	0.48	193.72	5799.29	71.17	-21.57	-68.05	0.26	71.39	252.41
5900.00	0.46	173.07	5899.29	71.52	-22.38	-68.10	0.17	71.68	251.81
6000.00	0.48	151.18	5999.29	71.58	-23.15	-67.85	0.18	71.69	251.16
6100.00	0.54	131.48	6099.28	71.32	-23.82	-67.30	0.18	71.39	250.51
6200.00	0.38	168.78	6199.28	71.17	-24.46	-66.88	0.33	71.21	249.91
6300.00	0.64	133.57	6299.28	71.00	-25.17	-66.41	0.40	71.02	249.24
6400.00	0.63	133.58	6399.27	70.54	-25.94	-65.61	0.01	70.55	248.43
6461.00	0.54	141.84	6460.27	70.33	-26.39	-65.19	0.20	70.33	247.96



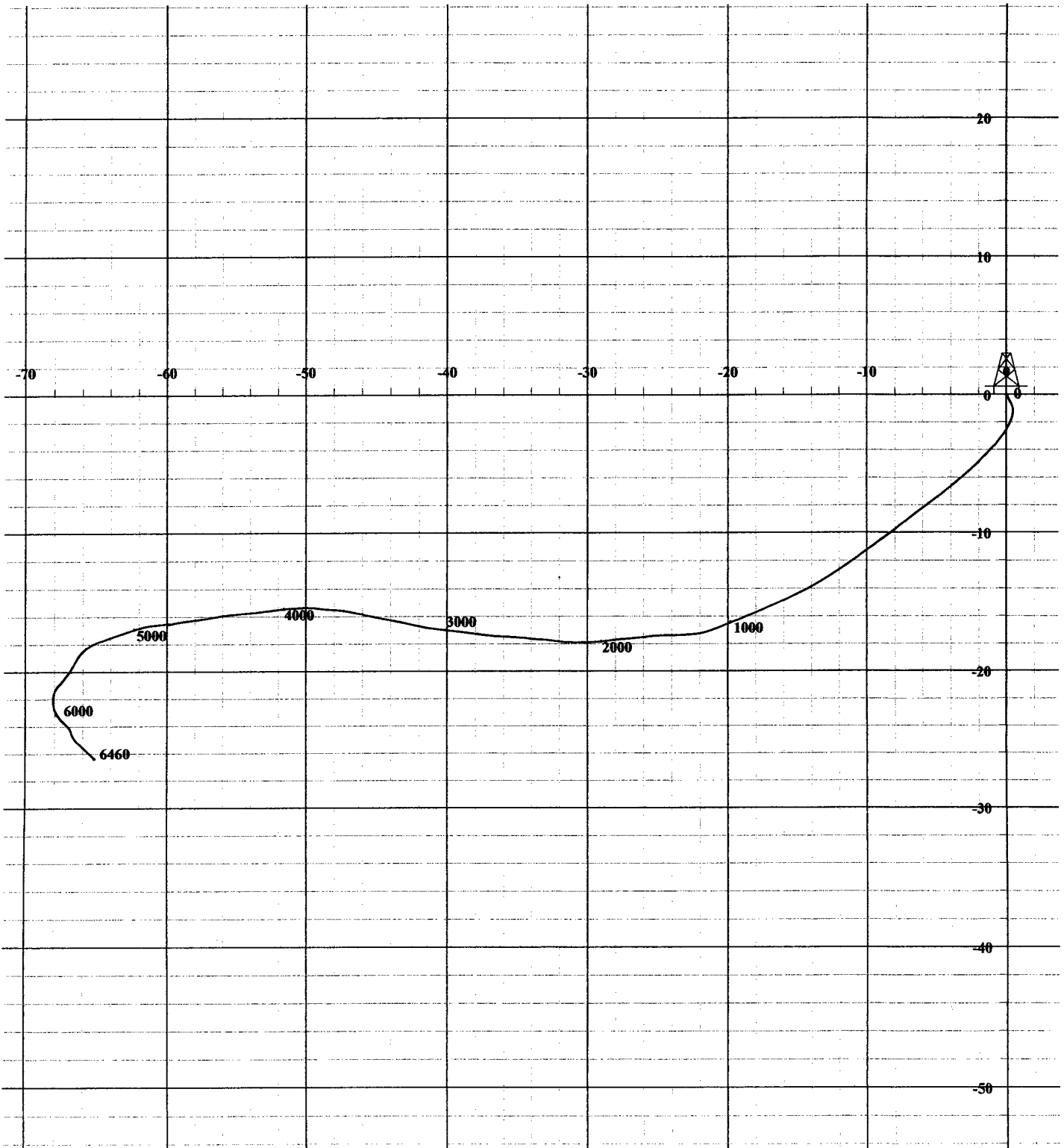
Scientific
Drilling

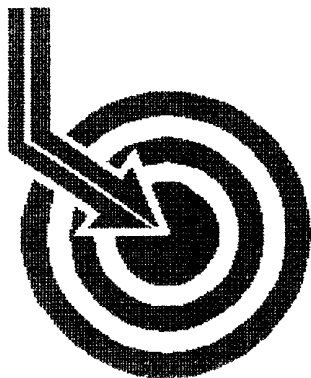
Field: Crow Flats Morrow
Site: Eddy County, NM
Well: Reindeer Fed #1
Wellpath: VH - Job #32K0906760
Survey: 09/20/06



West(-)/East(+) [10ft/in]

South(-)/North(+) [10ft/in]





Scientific Drilling

COG RESOURCES

Field: Crow Flats Morrow
Site: Eddy County, NM
Well: Reindeer Fed #1
Wellpath: DH - Job #32D0906765
Survey: 09/22/06-10/09/06

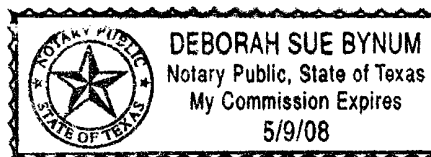
This survey is correct to the best of my knowledge
and is supported by actual field data.

.....*Deborah Sue Bynum*.....Company Representative

Notorized this date 14th of November, 2006.

Deborah Sue Bynum
Notary Signature

County of Midland
State of Texas





Scientific Drilling International Survey Report

Company: COG RESOURCES
Field: Crow Flats Morrow
Site: Eddy County, NM
Well: Reindeer Fed #1
Wellpath: VH - Job #32K0906760

Date: 11/16/2006 Time: 11:09:01 Page: 2
Co-ordinate(NE) Reference: Site: Eddy County, NM, Grid North
Vertical (TVD) Reference: SITE 0.0
Section (VS) Reference: Well (0.00N,0.00E,247.96Azi)
Survey Calculation Method: Minimum Curvature Db: Sybase

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
4900.00	0.63	262.09	4899.34	62.95	-16.64	-61.18	0.07	63.40	254.79
5000.00	0.70	252.14	4999.33	64.09	-16.90	-62.31	0.13	64.56	254.83
5100.00	0.64	247.98	5099.32	65.26	-17.30	-63.41	0.08	65.72	254.74
5200.00	0.67	253.37	5199.32	66.40	-17.67	-64.48	0.07	66.86	254.67
5300.00	0.53	240.51	5299.31	67.44	-18.07	-65.45	0.19	67.89	254.57
5400.00	0.46	220.84	5399.31	68.26	-18.60	-66.11	0.18	68.68	254.29
5500.00	0.52	207.10	5499.30	68.96	-19.31	-66.58	0.13	69.32	253.83
5600.00	0.52	215.56	5599.30	69.69	-20.08	-67.05	0.08	69.99	253.33
5700.00	0.55	221.52	5699.30	70.50	-20.81	-67.63	0.06	70.76	252.90
5800.00	0.48	193.72	5799.29	71.17	-21.57	-68.05	0.26	71.39	252.41
5900.00	0.46	173.07	5899.29	71.52	-22.38	-68.10	0.17	71.68	251.81
6000.00	0.48	151.18	5999.29	71.58	-23.15	-67.85	0.18	71.69	251.16
6100.00	0.54	131.48	6099.28	71.32	-23.82	-67.30	0.18	71.39	250.51
6200.00	0.38	168.78	6199.28	71.17	-24.46	-66.88	0.33	71.21	249.91
6300.00	0.64	133.57	6299.28	71.00	-25.17	-66.41	0.40	71.02	249.24
6400.00	0.63	133.58	6399.27	70.54	-25.94	-65.61	0.01	70.55	248.43
6461.00	0.54	141.84	6460.27	70.33	-26.39	-65.19	0.20	70.33	247.96



Scientific Drilling International Survey Report

Company: COG RESOURCES	Date: 11/06/2006	Time: 20:55:10	Page: 1
Field: Crow Flats Morrow	Co-ordinate(NE) Reference:	Site: Eddy County, NM, Grid North	
Site: Eddy County, NM	Vertical (TVD) Reference:	SITE 0.0	
Well: Reindeer Fed #1	Section (VS) Reference:	Well (0.00N,0.00E,90.00Azi)	
Wellpath: DH - Job #32D0906765	Survey Calculation Method:	Minimum Curvature	Db: Sybase

Survey: 09/22/06-10/09/06	Start Date: 09/22/2006
MWD 6125'-9695'	
Company: Scientific Drilling Internatio	Engineer: Calvert/Johns/Lopez/Puntney/Lo
Tool: MWD;MWD	Tied-to: From: Definitive Path

Survey

MD ft	Incl deg	Azim deg	TVD ft	VS ft	N/S ft	E/W ft	DLS deg/100ft	ClsD ft	ClsA deg
6080.00	0.52	135.02	6079.28	-67.43	-23.70	-67.43	0.00	71.47	250.64
6125.00	10.24	90.01	6124.03	-63.28	-23.84	-63.28	21.95	67.62	249.35
6157.00	15.12	90.47	6155.24	-56.25	-23.88	-56.25	15.25	61.11	247.00
6188.00	19.65	90.20	6184.82	-46.99	-23.93	-46.99	14.62	52.74	243.01
6219.00	24.16	91.64	6213.58	-35.43	-24.13	-35.43	14.65	42.87	235.75
6250.00	27.24	92.65	6241.51	-22.00	-24.64	-22.00	10.04	33.03	221.76
6281.00	30.95	92.38	6268.59	-6.95	-25.30	-6.95	11.98	26.23	195.35
6312.00	34.49	92.02	6294.67	9.80	-25.94	9.80	11.44	27.73	159.31
6344.00	37.60	91.37	6320.54	28.61	-26.49	28.61	9.79	39.00	132.79
6375.00	40.31	91.03	6344.64	48.10	-26.90	48.10	8.77	55.11	119.22
6406.00	43.46	91.03	6367.72	68.79	-27.27	68.79	10.16	74.00	111.63
6437.00	46.50	89.37	6389.64	90.70	-27.34	90.70	10.51	94.73	106.77
6468.00	49.62	88.65	6410.36	113.75	-26.94	113.75	10.21	116.90	103.32
6500.00	51.95	88.60	6430.59	138.53	-26.34	138.53	7.28	141.02	100.77
6531.00	53.80	89.88	6449.30	163.25	-26.02	163.25	6.82	165.31	99.06
6562.00	56.70	89.17	6466.97	188.71	-25.80	188.71	9.54	190.47	97.79
6593.00	60.43	89.32	6483.13	215.16	-25.46	215.16	12.04	216.66	96.75
6624.00	63.86	88.36	6497.62	242.56	-24.90	242.56	11.40	243.83	95.86
6655.00	67.02	88.73	6510.50	270.74	-24.18	270.74	10.25	271.82	95.10
6686.00	70.08	88.84	6521.83	299.58	-23.57	299.58	9.88	300.51	94.50
6717.00	72.91	87.97	6531.67	328.96	-22.75	328.96	9.51	329.75	93.96
6749.00	75.57	89.27	6540.36	359.75	-22.01	359.75	9.19	360.42	93.50
6780.00	78.17	89.80	6547.40	389.93	-21.77	389.93	8.55	390.54	93.20
6811.00	80.84	89.55	6553.05	420.41	-21.59	420.41	8.65	420.97	92.94
6842.00	83.42	90.10	6557.29	451.12	-21.50	451.12	8.51	451.63	92.73
6873.00	85.18	90.21	6560.37	481.96	-21.58	481.96	5.69	482.45	92.56
6904.00	86.87	89.73	6562.52	512.89	-21.57	512.89	5.67	513.34	92.41
6936.00	88.92	89.17	6563.70	544.86	-21.26	544.86	6.64	545.28	92.23
6967.00	89.60	90.92	6564.10	575.86	-21.29	575.86	6.06	576.25	92.12
6998.00	89.97	91.36	6564.21	606.85	-21.90	606.85	1.85	607.25	92.07
7029.00	89.06	88.93	6564.48	637.85	-21.98	637.85	8.37	638.23	91.97
7060.00	88.96	88.44	6565.01	668.83	-21.27	668.83	1.61	669.17	91.82
7092.00	89.06	88.38	6565.57	700.82	-20.38	700.82	0.36	701.11	91.67
7123.00	89.13	88.51	6566.06	731.80	-19.54	731.80	0.48	732.06	91.53
7154.00	89.29	88.62	6566.48	762.79	-18.76	762.79	0.63	763.02	91.41
7185.00	88.52	91.13	6567.08	793.78	-18.70	793.78	8.47	794.00	91.35
7216.00	88.38	90.23	6567.91	824.77	-19.06	824.77	2.94	824.99	91.32
7247.00	88.45	90.94	6568.77	855.75	-19.38	855.75	2.30	855.97	91.30
7278.00	88.55	90.25	6569.58	886.74	-19.70	886.74	2.25	886.96	91.27
7309.00	88.12	88.69	6570.48	917.73	-19.42	917.73	5.22	917.93	91.21
7340.00	87.98	88.27	6571.54	948.70	-18.59	948.70	1.43	948.88	91.12
7372.00	88.01	89.12	6572.66	980.67	-17.87	980.67	2.66	980.83	91.04
7403.00	89.02	89.60	6573.46	1011.66	-17.52	1011.66	3.61	1011.81	90.99
7434.00	89.56	88.57	6573.85	1042.65	-17.02	1042.65	3.75	1042.79	90.94
7465.00	89.56	88.77	6574.08	1073.64	-16.30	1073.64	0.65	1073.76	90.87
7496.00	89.70	88.94	6574.28	1104.63	-15.69	1104.63	0.71	1104.74	90.81
7527.00	89.76	89.20	6574.43	1135.63	-15.18	1135.63	0.86	1135.73	90.77
7556.00	89.73	89.10	6574.56	1164.62	-14.75	1164.62	0.36	1164.72	90.73
7589.00	89.80	88.44	6574.69	1197.62	-14.04	1197.62	2.01	1197.70	90.67

Age Group	Percentage
18-29	85%
30-49	75%
50-69	65%
70+	55%

OH

09 October, 2006



Scientific Drilling

Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD 27 NME)
Site: Reindeer Federal #1
Well: Reindeer Federal #1
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Well Reindeer Federal #1
TVD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
MD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.14 Single User Db

Project	Eddy County, NM (NAD 27 NME)		
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	Reindeer Federal #1			
Site Position:		Northing:	691,937.85 ft	Latitude: 32° 54' 7.655 N
From:	Map	Easting:	545,998.40 ft	Longitude: 104° 11' 0.467 W
Position Uncertainty:	0.0 ft	Slot Radius:	0.00000 ft	Grid Convergence: 0.08 °

Well	Reindeer Federal #1, 660 FSL & 1680 FWL			
Well Position	+N/-S	0.0 ft	Northing:	691,937.90 ft
	+E/-W	0.0 ft	Easting:	545,998.40 ft
Position Uncertainty	0.0 ft	Wellhead Elevation:	ft	Ground Level: 3,589.0 ft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF200510	2006-10-09	8.47	60.83	49,440

Design	Actual				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	90.00	

Survey Program	Date	2006-10-09			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.0	6,080.0	GYRO (OH)	Keeper	Keeper Standard Rate Gyro	
6,125.0	9,695.0	MWD (OH)	MWD	MWD - Standard ISCWSA	

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.82	152.92	100.0	-0.6	0.3	0.3	0.82	0.82	0.00
200.0	1.35	208.21	200.0	-2.3	0.1	0.1	1.11	0.53	55.29
300.0	2.07	225.87	299.9	-4.6	-1.8	-1.8	0.88	0.72	17.66
400.0	2.39	231.60	399.9	-7.2	-4.7	-4.7	0.39	0.32	5.73
500.0	2.31	233.19	499.8	-9.7	-7.9	-7.9	0.10	-0.08	1.59
600.0	1.85	233.99	599.7	-11.8	-10.9	-10.9	0.46	-0.46	0.80
700.0	1.71	240.33	699.7	-13.5	-13.5	-13.5	0.24	-0.14	6.34
800.0	1.44	245.73	799.6	-14.8	-15.9	-15.9	0.31	-0.27	5.40
900.0	1.24	247.70	899.6	-15.7	-18.0	-18.0	0.21	-0.20	1.97
1,000.0	0.94	247.85	999.6	-16.4	-19.8	-19.8	0.30	-0.30	0.15
1,100.0	0.74	248.71	1,099.6	-17.0	-21.2	-21.2	0.20	-0.20	0.86

Scientific Drilling

Survey Report



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Site: Reindeer Federal #1
Well: Reindeer Federal #1
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Well Reindeer Federal #1
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MD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.14 Single User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
1,200.0	0.59	263.99	1,199.6	-17.2	-22.3	-22.3	0.23	-0.15	15.28
1,300.0	0.48	266.45	1,299.6	-17.3	-23.2	-23.2	0.11	-0.11	2.46
1,400.0	0.35	272.74	1,399.6	-17.3	-23.9	-23.9	0.14	-0.13	6.29
1,500.0	0.35	265.23	1,499.6	-17.3	-24.5	-24.5	0.05	0.00	-7.51
1,600.0	0.40	268.57	1,599.6	-17.4	-25.2	-25.2	0.05	0.05	3.34
1,700.0	0.52	260.42	1,699.5	-17.5	-26.0	-26.0	0.14	0.12	-8.15
1,800.0	0.57	267.40	1,799.5	-17.6	-26.9	-26.9	0.08	0.05	6.98
1,900.0	0.61	263.26	1,899.5	-17.6	-28.0	-28.0	0.06	0.04	-4.14
2,000.0	0.60	262.51	1,999.5	-17.8	-29.0	-29.0	0.01	-0.01	-0.75
2,100.0	0.59	270.56	2,099.5	-17.8	-30.0	-30.0	0.08	-0.01	8.05
2,200.0	0.68	270.76	2,199.5	-17.8	-31.2	-31.2	0.09	0.09	0.20
2,300.0	0.55	278.47	2,299.5	-17.7	-32.2	-32.2	0.15	-0.13	7.71
2,400.0	0.72	274.01	2,399.5	-17.6	-33.3	-33.3	0.18	0.17	-4.46
2,500.0	0.61	278.07	2,499.5	-17.5	-34.5	-34.5	0.12	-0.11	4.06
2,600.0	0.65	271.63	2,599.5	-17.4	-35.6	-35.6	0.08	0.04	-6.44
2,700.0	0.64	274.07	2,699.5	-17.4	-36.7	-36.7	0.03	-0.01	2.44
2,800.0	0.60	279.72	2,799.5	-17.2	-37.8	-37.8	0.07	-0.04	5.65
2,900.0	0.68	277.08	2,899.5	-17.1	-38.9	-38.9	0.09	0.08	-2.64
3,000.0	0.75	275.91	2,999.5	-16.9	-40.1	-40.1	0.07	0.07	-1.17
3,100.0	0.67	279.12	3,099.5	-16.8	-41.3	-41.3	0.09	-0.08	3.21
3,200.0	0.72	284.78	3,199.5	-16.5	-42.5	-42.5	0.08	0.05	5.66
3,300.0	0.80	279.26	3,299.4	-16.3	-43.8	-43.8	0.11	0.08	-5.52
3,400.0	0.68	283.86	3,399.4	-16.0	-45.1	-45.1	0.13	-0.12	4.60
3,500.0	0.51	282.23	3,499.4	-15.8	-46.1	-46.1	0.17	-0.17	-1.63
3,600.0	0.56	281.33	3,599.4	-15.6	-47.0	-47.0	0.05	0.05	-0.90
3,700.0	0.70	273.03	3,699.4	-15.4	-48.1	-48.1	0.17	0.14	-8.30
3,800.0	0.52	279.39	3,799.4	-15.3	-49.2	-49.2	0.19	-0.18	6.36
3,900.0	0.74	268.36	3,899.4	-15.3	-50.3	-50.3	0.25	0.22	-11.03
4,000.0	0.78	263.83	3,999.4	-15.4	-51.6	-51.6	0.07	0.04	-4.53
4,100.0	0.78	262.40	4,099.4	-15.5	-52.9	-52.9	0.02	0.00	-1.43
4,200.0	0.91	266.64	4,199.4	-15.7	-54.4	-54.4	0.14	0.13	4.24
4,300.0	0.92	260.78	4,299.4	-15.8	-56.0	-56.0	0.09	0.01	-5.86
4,400.0	0.69	260.17	4,399.4	-16.1	-57.4	-57.4	0.23	-0.23	-0.61
4,500.0	0.63	265.76	4,499.4	-16.2	-58.5	-58.5	0.09	-0.06	5.59
4,600.0	0.56	256.07	4,599.3	-16.4	-59.5	-59.5	0.12	-0.07	-9.69
4,700.0	0.21	76.07	4,699.3	-16.5	-59.8	-59.8	0.77	-0.35	180.00
4,800.0	0.58	266.26	4,799.3	-16.4	-60.2	-60.2	0.79	0.37	-169.81
4,900.0	0.63	262.17	4,899.3	-16.6	-61.2	-61.2	0.07	0.05	-4.09
5,000.0	0.70	252.22	4,999.3	-16.8	-62.3	-62.3	0.13	0.07	-9.95
5,100.0	0.64	248.06	5,099.3	-17.2	-63.4	-63.4	0.08	-0.06	-4.16
5,200.0	0.67	253.45	5,199.3	-17.6	-64.5	-64.5	0.07	0.03	5.39
5,300.0	0.53	240.59	5,299.3	-18.0	-65.5	-65.5	0.19	-0.14	-12.86
5,400.0	0.46	220.92	5,399.3	-18.5	-66.1	-66.1	0.18	-0.07	-19.67
5,500.0	0.52	207.18	5,499.3	-19.2	-66.6	-66.6	0.13	0.06	-13.74
5,600.0	0.52	215.64	5,599.3	-20.0	-67.1	-67.1	0.08	0.00	8.46
5,700.0	0.55	221.60	5,699.3	-20.7	-67.7	-67.7	0.06	0.03	5.96
5,800.0	0.48	193.80	5,799.3	-21.5	-68.1	-68.1	0.26	-0.07	-27.80
5,900.0	0.46	173.15	5,899.3	-22.3	-68.1	-68.1	0.17	-0.02	-20.65
6,000.0	0.48	151.26	5,999.3	-23.1	-67.9	-67.9	0.18	0.02	-21.89
6,125.0	10.24	90.01	6,123.6	-23.5	-56.5	-56.5	8.01	7.81	-49.00
6,157.0	15.12	90.47	6,154.8	-23.5	-49.5	-49.5	15.25	15.25	1.44
6,188.0	19.65	90.20	6,184.4	-23.6	-40.2	-40.2	14.62	14.61	-0.87
6,219.0	24.16	91.64	6,213.1	-23.8	-28.7	-28.7	14.65	14.55	4.65
6,250.0	27.24	92.65	6,241.1	-24.3	-15.2	-15.2	10.04	9.94	3.26

Scientific Drilling

Survey Report



Company: COG Operating LLC
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Site: Reindeer Federal #1
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Survey Calculation Method: Minimum Curvature
Database: EDM 2003.14 Single User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N-S (ft)	+E-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
6,281.0	30.95	92.38	6,268.2	-25.0	-0.2	-0.2	11.98	11.97	-0.87
6,312.0	34.49	92.02	6,294.2	-25.6	16.6	16.6	11.44	11.42	-1.16
6,344.0	37.60	91.37	6,320.1	-26.2	35.4	35.4	9.79	9.72	-2.03
6,375.0	40.31	91.03	6,344.2	-26.6	54.9	54.9	8.77	8.74	-1.10
6,406.0	43.46	91.03	6,367.3	-26.9	75.6	75.6	10.16	10.16	0.00
6,437.0	46.50	89.37	6,389.2	-27.0	97.5	97.5	10.51	9.81	-5.35
6,468.0	49.62	88.65	6,409.9	-26.6	120.5	120.5	10.21	10.06	-2.32
6,500.0	51.95	88.60	6,430.2	-26.0	145.3	145.3	7.28	7.28	-0.16
6,531.0	53.80	89.88	6,448.9	-25.7	170.0	170.0	6.82	5.97	4.13
6,562.0	56.70	89.17	6,466.5	-25.5	195.5	195.5	9.54	9.35	-2.29
6,593.0	60.43	89.32	6,482.7	-25.1	221.9	221.9	12.04	12.03	0.48
6,624.0	63.96	88.36	6,497.2	-24.6	249.4	249.4	11.71	11.39	-3.10
6,655.0	67.02	88.73	6,510.0	-23.9	277.5	277.5	9.93	9.87	1.19
6,686.0	70.08	88.84	6,521.4	-23.2	306.4	306.4	9.88	9.87	0.35
6,717.0	72.91	87.97	6,531.2	-22.4	335.8	335.8	9.51	9.13	-2.81
6,749.0	75.57	89.27	6,539.9	-21.7	366.6	366.6	9.19	8.31	4.06
6,780.0	78.17	89.80	6,546.9	-21.4	396.7	396.7	8.55	8.39	1.71
6,811.0	80.84	89.55	6,552.6	-21.3	427.2	427.2	8.65	8.61	-0.81
6,842.0	83.42	90.10	6,556.8	-21.2	457.9	457.9	8.51	8.32	1.77
6,873.0	85.18	90.21	6,559.9	-21.3	488.8	488.8	5.69	5.68	0.35
6,904.0	86.87	89.73	6,562.0	-21.2	519.7	519.7	5.67	5.45	-1.55
6,936.0	88.92	89.17	6,563.2	-20.9	551.7	551.7	6.64	6.41	-1.75
6,967.0	89.60	90.92	6,563.6	-21.0	582.7	582.7	6.06	2.19	5.65
6,998.0	89.97	91.36	6,563.7	-21.6	613.7	613.7	1.85	1.19	1.42
7,029.0	89.06	88.93	6,564.0	-21.6	644.7	644.7	8.37	-2.94	-7.84
7,060.0	88.96	88.44	6,564.5	-20.9	675.6	675.6	1.61	-0.32	-1.58
7,092.0	89.06	88.38	6,565.1	-20.0	707.6	707.6	0.36	0.31	-0.19
7,123.0	89.13	88.51	6,565.6	-19.2	738.6	738.6	0.48	0.23	0.42
7,154.0	89.29	88.62	6,566.0	-18.4	769.6	769.6	0.63	0.52	0.35
7,185.0	88.52	91.13	6,566.6	-18.4	800.6	800.6	8.47	-2.48	8.10
7,216.0	88.38	90.23	6,567.4	-18.7	831.6	831.6	2.94	-0.45	-2.90
7,247.0	88.45	90.94	6,568.3	-19.0	862.6	862.6	2.30	0.23	2.29
7,278.0	88.55	90.25	6,569.1	-19.4	893.5	893.5	2.25	0.32	-2.23
7,309.0	88.12	88.69	6,570.0	-19.1	924.5	924.5	5.22	-1.39	-5.03
7,340.0	87.98	88.27	6,571.1	-18.3	955.5	955.5	1.43	-0.45	-1.35
7,372.0	88.01	89.12	6,572.2	-17.5	987.5	987.5	2.66	0.09	2.66
7,403.0	89.02	89.60	6,573.0	-17.2	1,018.5	1,018.5	3.61	3.26	1.55
7,434.0	89.56	88.57	6,573.4	-16.7	1,049.5	1,049.5	3.75	1.74	-3.32
7,465.0	89.56	88.77	6,573.6	-16.0	1,080.4	1,080.4	0.65	0.00	0.65
7,496.0	89.70	88.94	6,573.8	-15.4	1,111.4	1,111.4	0.71	0.45	0.55
7,527.0	89.76	89.20	6,574.0	-14.9	1,142.4	1,142.4	0.86	0.19	0.84
7,556.0	89.73	89.10	6,574.1	-14.4	1,171.4	1,171.4	0.36	-0.10	-0.34
7,589.0	89.80	88.44	6,574.2	-13.7	1,204.4	1,204.4	2.01	0.21	-2.00
7,620.0	90.03	89.20	6,574.3	-13.1	1,235.4	1,235.4	2.56	0.74	2.45
7,652.0	90.13	88.59	6,574.2	-12.5	1,267.4	1,267.4	1.93	0.31	-1.91
7,683.0	89.63	88.59	6,574.3	-11.7	1,298.4	1,298.4	1.61	-1.61	0.00
7,714.0	89.76	88.54	6,574.4	-10.9	1,329.4	1,329.4	0.45	0.42	-0.16
7,745.0	89.70	89.24	6,574.6	-10.3	1,360.4	1,360.4	2.27	-0.19	2.26
7,776.0	89.73	89.37	6,574.7	-9.9	1,391.4	1,391.4	0.43	0.10	0.42
7,807.0	89.80	89.62	6,574.9	-9.7	1,422.4	1,422.4	0.84	0.23	0.81
7,838.0	89.90	89.75	6,575.0	-9.5	1,453.4	1,453.4	0.53	0.32	0.42
7,869.0	89.90	89.86	6,575.0	-9.4	1,484.4	1,484.4	0.35	0.00	0.35
7,901.0	90.07	89.84	6,575.0	-9.3	1,516.4	1,516.4	0.53	0.53	-0.06
7,932.0	89.80	90.06	6,575.1	-9.3	1,547.4	1,547.4	1.12	-0.87	0.71

Scientific Drilling

Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD 27 NME)
Site: Reindeer Federal #1
Well: Reindeer Federal #1
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Well Reindeer Federal #1
TVD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
MD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.14 Single User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,963.0	90.03	90.64	6,575.1	-9.5	1,578.4	1,578.4	2.01	0.74	1.87
7,994.0	88.96	90.38	6,575.4	-9.7	1,609.4	1,609.4	3.55	-3.45	-0.84
8,025.0	89.13	91.36	6,575.9	-10.2	1,640.4	1,640.4	3.21	0.55	3.16
8,056.0	89.36	90.49	6,576.3	-10.7	1,671.4	1,671.4	2.90	0.74	-2.81
8,087.0	89.63	90.10	6,576.6	-10.9	1,702.4	1,702.4	1.53	0.87	-1.26
8,118.0	89.26	91.36	6,576.9	-11.3	1,733.4	1,733.4	4.24	-1.19	4.06
8,149.0	89.36	91.51	6,577.2	-12.0	1,764.3	1,764.3	0.58	0.32	0.48
8,180.0	89.40	90.13	6,577.6	-12.5	1,795.3	1,795.3	4.45	0.13	-4.45
8,212.0	89.16	90.67	6,578.0	-12.7	1,827.3	1,827.3	1.85	-0.75	1.69
8,243.0	89.36	89.55	6,578.4	-12.8	1,858.3	1,858.3	3.67	0.65	-3.61
8,274.0	89.29	89.41	6,578.7	-12.5	1,889.3	1,889.3	0.50	-0.23	-0.45
8,305.0	89.70	90.11	6,579.0	-12.4	1,920.3	1,920.3	2.62	1.32	2.26
8,336.0	90.10	90.82	6,579.1	-12.6	1,951.3	1,951.3	2.63	1.29	2.29
8,367.0	90.34	90.93	6,579.0	-13.1	1,982.3	1,982.3	0.85	0.77	0.35
8,398.0	89.06	89.16	6,579.1	-13.1	2,013.3	2,013.3	7.05	-4.13	-5.71
8,430.0	88.79	90.23	6,579.7	-12.9	2,045.3	2,045.3	3.45	-0.84	3.34
8,461.0	88.89	90.21	6,580.3	-13.1	2,076.3	2,076.3	0.33	0.32	-0.06
8,492.0	88.12	89.32	6,581.2	-12.9	2,107.3	2,107.3	3.80	-2.48	-2.87
8,523.0	88.05	88.13	6,582.2	-12.2	2,138.3	2,138.3	3.84	-0.23	-3.84
8,554.0	88.18	89.09	6,583.2	-11.5	2,169.2	2,169.2	3.12	0.42	3.10
8,585.0	88.75	88.99	6,584.0	-11.0	2,200.2	2,200.2	1.87	1.84	-0.32
8,616.0	88.65	88.50	6,584.7	-10.3	2,231.2	2,231.2	1.61	-0.32	-1.58
8,648.0	88.69	88.72	6,585.5	-9.5	2,263.2	2,263.2	0.70	0.12	0.69
8,679.0	88.55	87.95	6,586.2	-8.6	2,294.2	2,294.2	2.52	-0.45	-2.48
8,710.0	88.65	88.24	6,587.0	-7.6	2,325.1	2,325.1	0.99	0.32	0.94
8,741.0	89.73	88.23	6,587.4	-6.6	2,356.1	2,356.1	3.48	3.48	-0.03
8,772.0	89.87	87.45	6,587.5	-5.5	2,387.1	2,387.1	2.56	0.45	-2.52
8,803.0	89.93	87.33	6,587.6	-4.1	2,418.1	2,418.1	0.43	0.19	-0.39
8,835.0	90.03	87.51	6,587.6	-2.6	2,450.0	2,450.0	0.64	0.31	0.56
8,866.0	90.40	87.73	6,587.5	-1.3	2,481.0	2,481.0	1.39	1.19	0.71
8,897.0	90.67	86.35	6,587.2	0.3	2,512.0	2,512.0	4.54	0.87	-4.45
8,928.0	89.87	88.20	6,587.1	1.7	2,542.9	2,542.9	6.50	-2.58	5.97
8,959.0	89.83	87.08	6,587.1	3.0	2,573.9	2,573.9	3.62	-0.13	-3.61
8,990.0	89.76	88.67	6,587.2	4.2	2,604.9	2,604.9	5.13	-0.23	5.13
9,021.0	89.90	88.48	6,587.3	4.9	2,635.9	2,635.9	0.76	0.45	-0.61
9,052.0	89.53	87.56	6,587.5	6.0	2,666.9	2,666.9	3.20	-1.19	-2.97
9,083.0	89.53	87.41	6,587.7	7.4	2,697.8	2,697.8	0.48	0.00	-0.48
9,115.0	89.76	89.05	6,587.9	8.4	2,729.8	2,729.8	5.18	0.72	5.12
9,146.0	90.00	89.54	6,588.0	8.7	2,760.8	2,760.8	1.76	0.77	1.58
9,177.0	90.17	89.50	6,588.0	9.0	2,791.8	2,791.8	0.56	0.55	-0.13
9,208.0	89.83	88.81	6,588.0	9.5	2,822.8	2,822.8	2.48	-1.10	-2.23
9,239.0	90.07	88.56	6,588.0	10.2	2,853.8	2,853.8	1.12	0.77	-0.81
9,270.0	89.39	91.33	6,588.1	10.2	2,884.8	2,884.8	9.20	-2.19	8.94
9,301.0	89.53	91.54	6,588.4	9.4	2,915.8	2,915.8	0.81	0.45	0.68
9,325.5	89.66	91.55	6,588.6	8.8	2,940.2	2,940.2	0.55	0.55	0.03
PBHL (RF #1)									
9,332.0	89.70	91.55	6,588.6	8.6	2,946.8	2,946.8	0.55	0.55	0.03
9,364.0	89.02	90.49	6,589.0	8.0	2,978.8	2,978.8	3.94	-2.12	-3.31
9,395.0	88.89	91.25	6,589.6	7.6	3,009.7	3,009.7	2.49	-0.42	2.45
9,426.0	88.62	91.75	6,590.2	6.7	3,040.7	3,040.7	1.83	-0.87	1.61
9,457.0	88.72	90.63	6,591.0	6.1	3,071.7	3,071.7	3.63	0.32	-3.61
9,488.0	88.89	90.94	6,591.6	5.7	3,102.7	3,102.7	1.14	0.55	1.00
9,519.0	88.96	90.72	6,592.2	5.2	3,133.7	3,133.7	0.74	0.23	-0.71
9,550.0	88.99	91.21	6,592.7	4.7	3,164.7	3,164.7	1.58	0.10	1.58
9,582.0	89.19	91.46	6,593.2	4.0	3,196.7	3,196.7	1.00	0.62	0.78

Scientific Drilling

Survey Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD 27 NME)
Site: Reindeer Federal #1
Well: Reindeer Federal #1
Wellbore: OH
Design: Actual

Local Co-ordinate Reference: Well Reindeer Federal #1
TVD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
MD Reference: GL=3589, KB=3607 @ 3607.0ft (GL=3589, KB=3607)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: EDM 2003.14 Single User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
9,613.0	89.23	91.18	6,593.7	3.2	3,227.7	3,227.7	0.91	0.13	-0.90
9,639.0	89.23	90.81	6,594.0	2.8	3,253.7	3,253.7	1.42	0.00	-1.42
Last MWD Survey									
9,695.0	89.23	90.81	6,594.8	2.0	3,309.6	3,309.6	0.00	0.00	0.00
Projection to Bit									

Targets

Target Name

- hit/miss target
 - Shape

Dip Angle (°) Dip Dir. (°) TVD (ft) +N/-S (ft) +E/-W (ft) Northing (ft) Easting (ft) Latitude Longitude

PBHL (RF #1) 0.00 359.99 6,590.0 0.0 2,940.0 691,937.90 548,938.40 32° 54' 7.613 N 104° 10' 25.983 W
 - actual wellpath misses by 8.9ft at 9325.5ft MD (6588.6 TVD, 8.8 N, 2940.2 E)
 - Point

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
9,639.0	6,594.0	2.8	3,253.7	Last MWD Survey
9,695.0	6,594.8	2.0	3,309.6	Projection to Bit

Checked By: _____

Approved By: _____

Date: _____

COG Operating LLC

Project: Eddy County, NM (NAD 27 NME)
 Site: Reindeer Federal #1
 Well: Reindeer Federal #1
 Wellbore: OH
 Design: Plan vs Actual



SECTION DETAILS

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	DLeg	TFace	VSec	Target
1	6080.0	0.52	135.10	6079.3	-23.6	-67.5	0.00	0.00	-67.5	
2	6844.5	89.49	89.49	6567.6	-22.4	419.6	11.66	-45.61	419.6	
3	9365.1	89.49	89.49	6590.0	0.0	2940.0	0.00	0.00	2940.0	PBHL (RF #1)
4	9725.1	89.49	89.49	6593.2	3.2	3300.0	0.00	0.00	3300.0	

WELLBORE TARGET DETAILS (MAP CO-ORDINATES)

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
PBHL (RF #1)	6590.0	0.0	2940.0	691937.90	548938.40	Point

WELL DETAILS: Reindeer Federal #1

+N/-S	+E/-W	Northing	Ground Level: Easting	3589.0 Latitude	Longitude	Slot
0.0	0.0	691937.90	545998.40	32° 54' 7.655 N	104° 11' 0.467 W	

PROJECT DETAILS: Eddy County, NM (NAD 27 NME)

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

Plan: Plan #4 (Reindeer Federal #1/OH)

Created By: Julio Piña Date: 09-Oct-06
 Checked: _____ Date: _____
 Reviewed: _____ Date: _____
 Approved: _____ Date: _____



Azimuths to Grid North
 True North: -0.08°
 Magnetic North: 8.38°
 Magnetic Field
 Strength: 49440.45nT
 Dip Angle: 60.83°
 Date: 2006-10-09
 Model: IGRF200510

