

HOBBS, ARTESIA, AZTEC, SANTA FE NMOCD DISTRICT OFFICE

C-104 DENIAL NOTICE

(Date of Denial)

Jacqueta Reeves
(Contact person)

575-748-1283 ex. 2
(Phone)

Operator COG OGRID 229137
Well Name Reinder 21 Federal API Number 30 015 36538
Pool Code 97681

Your recent form C-104 for the above well is hereby rejected for the following reason(s):

C-103 Subsequent Report with complete casing and cement data not received

C-103 Subsequent Report with Completion Report not received

C-105 not received or incomplete

C-101 and C-102 not in agreement as to completion information

Logs not received

Part 5.9 violations (Specifically _____)

Directional/Deviation Survey required

C-102 that shows the results of the Directional Drill Survey and resulting bottom hole location

NSL/NSP not approved

C-104 omitted information

Section I information (name, address, OGRID, etc.)

Section II information (surface location)

Section IV information (well completion data)

- Spud date
- Ready date
- TD
- PBTD
- Perfs
- Hole size, casing/tubing size, depth set, sacks cement

Section V information (well test data)

- Box Number _____

Signature _____ Printed Name and Title _____ E-mail Address _____ Date _____ Phone _____

Other C-102 with corrected pool

The well completion identified above has **not** been granted an allowable to produce. This well completion **shall** **not** be produced until the New Mexico Oil Conservation Division issues an approved C-104. This will **not** take place until all of the items noted above are addressed to the NMOCD's satisfaction.

I. REQUEST FOR ALLOWABLE AND AUTHORIZATION TO TRANSPORT

¹ Operator name and Address COG Operating LLC 550 W. Texas Avenue, Suite 1300 Midland, TX 79701		² OGRID Number 229137
		³ Reason for Filing Code/ Effective Date NW effective 3/5/2009
⁴ API Number 30 - 015 - 36538	⁵ Pool Name Crow Flats, Abo	⁶ Pool Code 97681
⁷ Property Code 36817	⁸ Property Name REINDEER 21 FEDERAL	⁹ Well Number 3

II. ¹⁰ Surface Location

UL or lot no. E	Section 21	Township 16S	Range 28E	Lot.Idn	Feet from the 1980	North/South Line North	Feet from the 430	East/West line West	County Eddy
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¹¹ Bottom Hole Location

UL or lot no. H	Section 21	Township 16S	Range 28E	Lot Idn	Feet from the 2025	North/South line North	Feet from the 562	East/West line East	County Eddy
¹² Lse Code F	¹³ Producing Method Code F	¹⁴ Gas Connection Date	¹⁵ C-129 Permit Number	¹⁶ C-129 Effective Date	¹⁷ C-129 Expiration Date				

III. Oil and Gas Transporters

¹⁸ Transporter OGRID	¹⁹ Transporter Name and Address	²⁰ POD	²¹ O/G	²² POD ULSTR Location and Description
15694	Navajo Refining Co. Pipeline Division P O Box 159 Artesia, NM 88211-0159	5105224	O	Unit A, Section 21, T16S, R28E
036785	DCP Midstream	5105226	G	Unit A, Section 21, T16S, R28E

IV. Produced Water

²³ POD 5105228	²⁴ POD ULSTR Location and Description Unit A, Section 21, T16S, R28E
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V. Well Completion Data

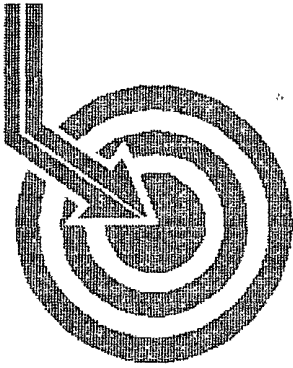
²⁵ Spud Date 12/02/09	²⁶ Ready Date 3/05/09	²⁷ TD 10,660 MD	²⁸ PBTB	²⁹ Perforations 6845 - 10,312	³⁰ DHC, MC
³¹ Hole Size	³² Casing & Tubing Size	³³ Depth Set	³⁴ Sacks Cement		
17 ½	13 3/8	562	600 sx		
12-1/4	9 5/8	1835	710 sx		
8 ¾	7	5985	500 sx		
6-1/8	4.5 liner no tbg - flow up csg	5,864	200 sx		

VI. Well Test Data

³⁵ Date New Oil 03/09/09	³⁶ Gas Delivery Date 03/09/09	³⁷ Test Date 3-14-09	³⁸ Test Length 24 hrs	³⁹ Tbg. Pressure 70	⁴⁰ Csg. Pressure 70
⁴¹ Choke Size	⁴² Oil 1353	⁴³ Water 764	⁴⁴ Gas 1243	⁴⁵ AOF	⁴⁶ Test Method F

⁴⁷ I hereby certify that the rules of the Oil Conservation Division have been complied with and that the information given above is true and complete to the best of my knowledge and belief. Signature: <i>Phyllis A. Edwards</i>		OIL CONSERVATION DIVISION DENIED	
Printed name: Phyllis A. Edwards		Apprc By Jacqui Reeves	
Title: Regulatory Analyst		Title: Date 9/30/09 (575) 748-1283 x 03	
E-mail Address: pedwards@conchoresources.com		Apprc see attachment	
Date: 3/16/2009	Phone: 432-685-4340		

30 01536597



Scientific Drilling

COG RESOURCES

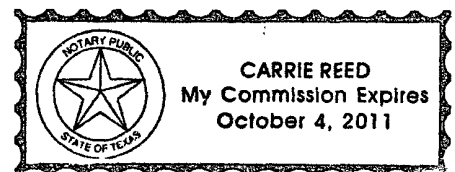
Field: Crow Flats
Site: Eddy County, NM
Well: Reindeer 21 Federal #3
Wellpath: VH - Job #32K12081007
Survey: 12/18/08

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

.....*L. Hart*.....Company Representative

Notorized this date 14th of January, 2009.

Carrie Reed
Notary Signature
County of Midland
State of Texas





Scientific Drilling International

Survey Report

Company: COG RESOURCES
Field: Crow Flats
Site: Eddy County, NM
Well: Reindeer 21 Federal #3
Wellpath: VH - Job #32K12081007

Date: 01/15/2009 **Time:** 15:35:39 **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,359.92Azi)
Survey Calculation Method: Minimum Curvature **Db:** Sybase

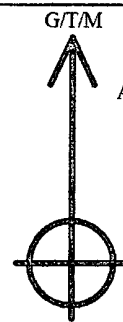
Survey

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	0.62	267.12	4899.72	2.71	2.68	-21.96	0.02	22.12	276.96
5000.00	0.59	271.00	4999.71	2.70	2.66	-23.02	0.05	23.17	276.60
5100.00	0.49	284.07	5099.71	2.81	2.78	-23.95	0.16	24.11	276.62
5200.00	0.72	261.24	5199.70	2.82	2.79	-24.98	0.33	25.14	276.36
5300.00	0.56	234.31	5299.70	2.44	2.41	-26.00	0.34	26.11	275.28
5400.00	0.67	259.17	5399.69	2.05	2.01	-26.97	0.29	27.05	274.26
5500.00	0.85	230.04	5499.68	1.46	1.42	-28.11	0.42	28.15	272.90
5600.00	0.92	233.27	5599.67	0.51	0.47	-29.33	0.09	29.33	270.91
5700.00	1.17	229.17	5699.66	-0.64	-0.68	-30.74	0.26	30.75	268.73
5800.00	1.04	215.96	5799.64	-2.04	-2.08	-32.05	0.29	32.11	266.28
5900.00	0.93	220.55	5899.62	-3.39	-3.43	-33.11	0.14	33.29	264.08
5943.00	0.49	250.12	5942.62	-3.71	-3.76	-33.51	1.30	33.72	263.60



**Scientific
Drilling**

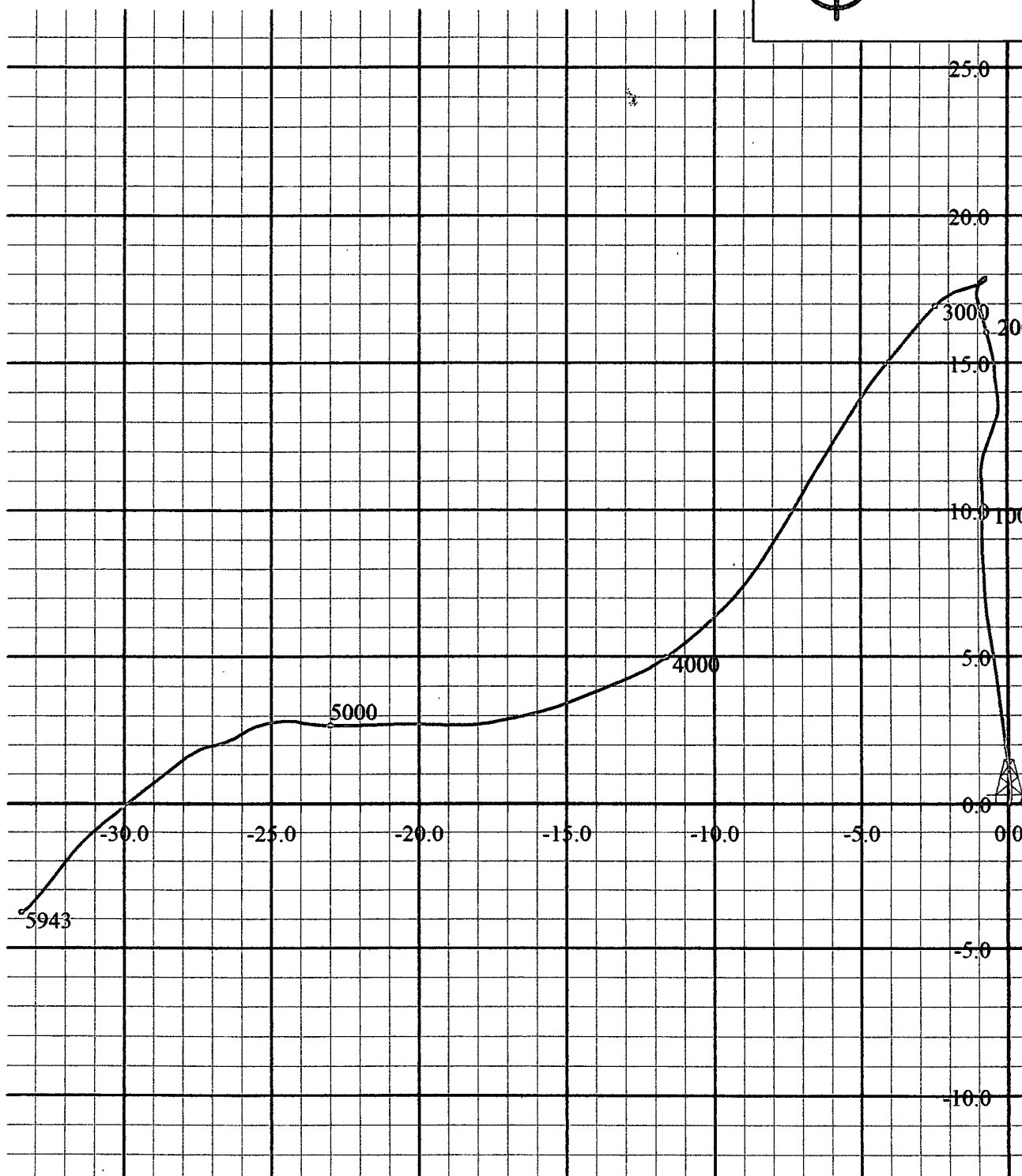
Field: Crow Flats
Site: Eddy County, NM
Well: Reindeer 21 Federal #3
Wellpath: VH - Job #32K12081007
Survey: 12/18/08



Azimuths to Grid North
True North: 0.00°
Magnetic North: 0.00°

Magnetic Field
Strength: 0nT
Dip Angle: 0.00°
Date: 01/15/2009
Model: igrf2000

South(-)/North(+) [5ft/in]



West(-)/East(+) [5ft/in]



DIRECTIONAL SURVEY REPORT

30 015 36597

COG OPERATING LLC

REINDEER 21 FEDERAL #3

EDDY COUNTY, NEW MEXICO

PREPARED BY: FRANCISCO SINISTERRA

Pathfinder Energy Services, Inc.
6213 W. County Road 112 • Midland, TX • 79706
(432)681-6000

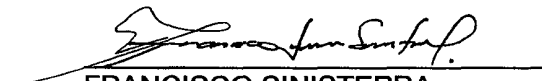
DIRECTIONAL SURVEY COMPANY REPORT:

1. NAME OF SURVEYING COMPANY: PATHFINDER ENERGY SERVICES
2. NAME OF PERSON(S) PERFORMING SURVEY:
A) SALIM TIMSAR
3. POSITION OF SAID PERSON(S): (A-F) SURVEYORS (FIELD ENGINEERS)
4. DATE(S) ON WHICH SURVEY WAS PERFORMED: 12/27/08 TO 1/19/09
5. STATE IN WHICH SURVEY WAS PERFORMED: NEW MEXICO
6. LOCATION OF WELL: EDDY COUNTY
7. TYPE OF SURVEY(S) PERFORMED: MWD
8. COMPLETE IDENTIFICATION OF WELL:

COG OPERATING LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG: PERMIAN #6

9. SURVEY CERTIFIED FROM: 6,056 TO 10,522 FEET MEASURED DEPTH.

THIS IS TO VERIFY THAT ATTACHED DOCUMENTS SHOWING THE WELL TO BE
DISPLACED AT 4,229.89 FEET ON A BEARING OF 89.40 DEGREES FROM THE
CENTER OF THE ROTARY TABLE AT A PROJECTED BIT DEPTH OF 10,600 FEET,
ARE TRUE AND CORRECT TO THE BEST OF MY KNOWLEDGE.


FRANCISCO SINISTERRA
M/LWD SERVICE COORDINATOR

PathFinder Energy Services, Inc.

BHL Report

Page 01/01
Tie-in Date: 12/26/2008
Date Completed: 01/19/2009

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
Rig:Permian #6
PathFinder Office Supervisor: Phil LeBlanc
PathFinder Field Engineers:Salim Timsar
Bannon Eldridge
John Overton

Survey Horiz. Reference:WELLHEAD
Ref Coordinates: LAT:32.54.35.5303 N LON:104.11.16.7972 W
GRID Reference:NAD83 new mexico east Transverse Mercator
Ref GRID Coord: X: 585938.7960 Y: 694775.6330
North Aligned To:GRID NORTH
Total Magnetic Correction: 8.13° EAST TO GRID
Vertical Section Plane: 89.56
Survey Vert. Reference: 0.00' Rotary Table To Ground
Altitude:3587.00' Ground To MSL

Measured Depth	10600.00	(feet)
Inclination	90.31	(deg)
Azimuth	87.60	(deg)
True Vertical Depth	6603.10	(feet)
Vertical Section	4229.87	(feet)
Survey X cord	590168.45	(feet)
Survey Y cord	694820.28	(feet)
Survey Lat	32.90997547 N	(deg)
Survey Lon	104.17421666 W	(deg)
Rectangular Corr. N/S	44.65 N	(feet)
Rectangular Corr. E/W	4229.65 E	(feet)
Closure Distance	4229.89	(feet)
Direction of Closure	89.40	(deg)
Dogleg Severity	0.00	(deg/100ft)

PathFinder Energy Services, Inc.

Survey Report

Survey Horiz. Reference: WELLHEAD
 Ref Coordinates: LAT: 32.54.35.5303 N LON: 104.11.16.7972 W
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 Survey Vert. Reference: 0.00' Rotary Table To Ground
 Altitude: 3587.00' Ground To MSL

COG OPERATING, LLC
 REINDEER 21 FEDERAL #3
 EDDY COUNTY, NM

Rig: Permian #6

PathFinder Office Supervisor: Phil LeBlanc

PathFinder Field Engineers: Salim Timsar
 Bannon Eldridge
 John Overton

Matt Shipp

Survey Calculations by RX5 V6.01 using Minimum Curvature

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL		Closure		DLS
						Rectangular	Offsets	Dist	Dir	
						(ft)	(ft)	(ft)	(deg)	(dg/100ft)
THE FOLLOWING SURVEYS PROVIDED BY SCIENTIFIC DRILLING CONTROLS.										
100.00	0.06	10.58	99.99	0.00	0.01	0.05 N	0.01 E	0.05@	7.74	0.00
200.00	0.08	22.83	199.99	100.00	0.05	0.17 N	0.04 E	0.17@	14.59	0.02
300.00	0.33	355.44	299.99	100.00	0.05	0.52 N	0.05 E	0.52@	5.28	0.26
400.00	0.79	352.98	399.99	100.00	-0.05	1.49 N	0.06 W	1.49@	357.73	0.46
500.00	0.83	352.99	499.98	100.00	-0.21	2.89 N	0.23 W	2.90@	355.42	0.04
600.00	0.88	352.86	599.96	100.00	-0.38	4.38 N	0.42 W	4.39@	354.57	0.05
700.00	0.80	349.35	699.95	100.00	-0.60	5.82 N	0.64 W	5.86@	353.73	0.09
800.00	0.80	357.29	799.94	100.00	-0.75	7.21 N	0.80 W	7.25@	353.65	0.11
900.00	0.68	356.95	899.94	100.00	-0.80	8.50 N	0.87 W	8.54@	354.18	0.12
1000.00	0.76	2.79	999.93	100.00	-0.79	9.75 N	0.87 W	9.79@	354.93	0.11
1100.00	0.61	353.22	1099.92	100.00	-0.81	10.94 N	0.90 W	10.98@	355.32	0.19
1200.00	0.49	17.14	1199.92	100.00	-0.74	11.88 N	0.83 W	11.91@	355.99	0.26
1300.00	0.41	21.53	1299.91	100.00	-0.48	12.62 N	0.58 W	12.63@	357.39	0.09
1400.00	0.36	14.86	1399.91	100.00	-0.26	13.26 N	0.36 W	13.26@	358.43	0.07
1500.00	0.37	346.30	1499.91	100.00	-0.25	13.87 N	0.36 W	13.88@	358.51	0.18
1600.00	0.34	358.93	1599.91	100.00	-0.33	14.49 N	0.44 W	14.49@	358.25	0.08
1700.00	0.16	354.59	1699.91	100.00	-0.35	14.92 N	0.46 W	14.93@	358.23	0.18
1800.00	0.21	346.33	1799.90	100.00	-0.40	15.24 N	0.52 W	15.25@	358.06	0.06
1900.00	0.24	345.44	1899.90	100.00	-0.49	15.62 N	0.61 W	15.63@	357.75	0.03
2000.00	0.28	347.70	1999.90	100.00	-0.59	16.06 N	0.72 W	16.08@	357.44	0.04
2100.00	0.30	342.48	2099.90	100.00	-0.72	16.55 N	0.85 W	16.57@	357.06	0.03
2200.00	0.35	344.00	2199.90	100.00	-0.88	17.09 N	1.01 W	17.12@	356.61	0.05
2300.00	0.27	22.10	2299.90	100.00	-0.87	17.60 N	1.01 W	17.63@	356.72	0.22
2400.00	0.13	49.54	2399.90	100.00	-0.69	17.90 N	0.83 W	17.92@	357.34	0.17
2500.00	0.06	152.98	2499.90	100.00	-0.58	17.92 N	0.72 W	17.94@	357.69	0.16

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
2600.00	0.11	222.90	2599.90	100.00	-0.63	17.81 N	0.76 W	17.82@	357.54	0.11
2700.00	0.10	245.14	2699.90	100.00	-0.77	17.70 N	0.91 W	17.72@	357.06	0.04
2800.00	0.30	255.78	2799.90	100.00	-1.11	17.60 N	1.24 W	17.64@	355.97	0.20
2900.00	0.37	248.52	2899.90	100.00	-1.66	17.42 N	1.80 W	17.51@	354.11	0.08
3000.00	0.60	226.80	2999.89	100.00	-2.35	16.94 N	2.48 W	17.12@	351.68	0.29
3100.00	0.72	217.91	3099.89	100.00	-3.12	16.08 N	3.25 W	16.41@	348.59	0.16
3200.00	0.93	220.18	3199.87	100.00	-4.04	14.97 N	4.16 W	15.53@	344.49	0.21
3300.00	0.84	212.35	3299.86	100.00	-4.97	13.73 N	5.07 W	14.64@	339.73	0.15
3400.00	0.91	212.72	3399.85	100.00	-5.80	12.44 N	5.89 W	13.77@	334.66	0.07
3500.00	0.99	209.80	3499.84	100.00	-6.67	11.02 N	6.75 W	12.93@	328.52	0.09
3600.00	0.95	209.51	3599.82	100.00	-7.52	9.55 N	7.59 W	12.20@	321.54	0.04
3700.00	0.95	214.78	3699.81	100.00	-8.41	8.15 N	8.47 W	11.75@	313.90	0.09
3800.00	0.87	222.80	3799.80	100.00	-9.41	6.91 N	9.46 W	11.72@	306.16	0.15
3900.00	0.86	229.35	3899.79	100.00	-10.50	5.87 N	10.54 W	12.07@	299.09	0.10
4000.00	0.77	234.30	3999.78	100.00	-11.62	4.99 N	11.66 W	12.68@	293.15	0.11
4100.00	0.75	246.71	4099.77	100.00	-12.77	4.34 N	12.81 W	13.52@	288.70	0.17
4200.00	0.78	247.51	4199.76	100.00	-14.01	3.82 N	14.04 W	14.55@	285.21	0.03
4300.00	0.76	251.15	4299.75	100.00	-15.27	3.34 N	15.29 W	15.65@	282.33	0.05
4400.00	0.69	258.06	4399.74	100.00	-16.49	3.00 N	16.51 W	16.78@	280.31	0.11
4500.00	0.62	259.51	4499.73	100.00	-17.61	2.78 N	17.63 W	17.85@	278.96	0.07
4600.00	0.63	270.70	4599.73	100.00	-18.69	2.69 N	18.71 W	18.90@	278.17	0.12
4700.00	0.60	272.92	4699.72	100.00	-19.76	2.72 N	19.78 W	19.97@	277.83	0.04
4800.00	0.64	268.13	4799.72	100.00	-20.84	2.73 N	20.87 W	21.04@	277.45	0.06
4900.00	0.62	267.12	4899.71	100.00	-21.94	2.68 N	21.96 W	22.13@	276.97	0.02
5000.00	0.59	271.00	4999.71	100.00	-23.00	2.67 N	23.02 W	23.17@	276.61	0.05
5100.00	0.49	284.07	5099.70	100.00	-23.93	2.78 N	23.95 W	24.11@	276.62	0.16

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

Page 03/08

Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
5200.00	0.72	261.24	5199.70	100.00	-24.96	2.79 N	24.98 W	25.14@	276.37	0.33
5300.00	0.56	234.31	5299.69	100.00	-25.98	2.41 N	26.00 W	26.11@	275.29	0.34
5400.00	0.67	259.17	5399.68	100.00	-26.96	2.01 N	26.97 W	27.05@	274.26	0.29
5500.00	0.85	230.04	5499.68	100.00	-28.10	1.43 N	28.12 W	28.15@	272.90	0.42
5600.00	0.92	233.27	5599.66	100.00	-29.32	0.47 N	29.33 W	29.33@	270.92	0.09
5700.00	1.17	229.17	5699.65	100.00	-30.75	0.68 S	30.74 W	30.75@	268.73	0.26
5800.00	1.04	215.96	5799.63	100.00	-32.06	2.08 S	32.05 W	32.12@	266.28	0.28
5900.00	0.93	220.55	5899.61	100.00	-33.14	3.43 S	33.11 W	33.29@	264.08	0.13
** TIE IN PROVIDED BY SCIENTIFIC DRILLING CONTROLS AT 5943' MD.										
5943.00	0.49	250.12	5942.61	43.00	-33.54	3.76 S	33.51 W ✓	33.72@	263.60	1.30
THE FOLLOWING ARE PATHFINDER MWD SURVEYS.										
6056.00	0.26	349.86	6055.61	113.00	-34.04	3.67 S	34.01 W	34.21@	263.84	0.52
6088.00	0.97	62.53	6087.61	32.00	-33.81	3.48 S	33.78 W	33.96@	264.13	2.90
6120.00	5.10	87.21	6119.56	32.00	-32.14	3.28 S	32.12 W	32.29@	264.17	13.24
6152.00	9.85	90.53	6151.28	32.00	-27.98	3.24 S	27.96 W	28.15@	263.40	14.90
6184.00	14.77	92.70	6182.53	32.00	-21.17	3.45 S	21.14 W	21.42@	260.72	15.44
6216.00	20.05	93.57	6213.05	32.00	-11.62	3.99 S	11.59 W	12.26@	251.01	16.52
6248.00	24.36	92.80	6242.67	32.00	0.45	4.65 S	0.48 E	4.68@	174.07	13.50
6279.00	28.84	91.85	6270.38	31.00	14.31	5.21 S	14.35 E	15.26@	109.95	14.52
6311.00	32.45	91.54	6297.91	32.00	30.61	5.69 S	30.65 E	31.17@	100.51	11.29
6343.00	35.79	90.89	6324.40	32.00	48.55	6.06 S	48.59 E	48.97@	97.11	10.50
6375.00	38.95	90.95	6349.83	32.00	67.96	6.38 S	68.01 E	68.31@	95.36	9.88
6407.00	42.47	91.30	6374.08	32.00	88.82	6.79 S	88.88 E	89.13@	94.37	11.02
6439.00	46.60	90.69	6396.89	32.00	111.25	7.17 S	111.31 E	111.54@	93.69	12.98
6471.00	50.56	89.59	6418.05	32.00	135.24	7.22 S	135.30 E	135.49@	93.06	12.64
6503.00	53.64	88.90	6437.71	32.00	160.49	6.89 S	160.55 E	160.69@	92.46	9.77

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
6535.00	56.63	88.51	6456.00	32.00	186.74	6.29 S	186.79 E	186.90@	91.93	9.40
6567.00	59.79	88.71	6472.85	32.00	213.93	5.63 S	213.98 E	214.05@	91.51	9.89
6599.00	63.14	89.93	6488.14	32.00	242.04	5.31 S	242.09 E	242.14@	91.26	10.99
6631.00	66.65	89.01	6501.71	32.00	271.01	5.03 S	271.06 E	271.10@	91.06	11.27
6663.00	71.40	87.08	6513.17	32.00	300.87	4.01 S	300.91 E	300.93@	90.76	15.87
6695.00	75.71	85.59	6522.22	32.00	331.50	2.04 S	331.53 E	331.53@	90.35	14.19
6727.00	79.67	85.33	6529.04	32.00	362.68	0.43 N	362.69 E	362.69@	89.93	12.40
6759.00	80.28	85.58	6534.61	32.00	394.11	2.93 N	394.10 E	394.11@	89.57	2.06
6791.00	82.31	85.32	6539.46	32.00	425.66	5.44 N	425.63 E	425.66@	89.27	6.39
6823.00	84.86	85.24	6543.03	32.00	457.37	8.06 N	457.32 E	457.39@	88.99	7.97
6855.00	86.79	85.55	6545.36	32.00	489.20	10.62 N	489.13 E	489.25@	88.76	6.11
6887.00	87.23	86.23	6547.03	32.00	521.09	12.91 N	521.00 E	521.16@	88.58	2.53
6903.00	87.23	86.07	6547.80	16.00	537.04	13.98 N	536.95 E	537.13@	88.51	1.00
6935.00	87.14	86.18	6549.38	32.00	568.94	16.14 N	568.84 E	569.07@	88.37	0.44
6966.00	87.76	86.36	6550.75	31.00	599.86	18.16 N	599.74 E	600.02@	88.27	2.08
6998.00	87.85	86.69	6551.98	32.00	631.79	20.09 N	631.66 E	631.98@	88.18	1.07
7030.00	87.67	86.98	6553.23	32.00	663.73	21.86 N	663.58 E	663.94@	88.11	1.07
7062.00	87.58	86.73	6554.56	32.00	695.67	23.61 N	695.51 E	695.91@	88.06	0.83
7094.00	87.85	86.30	6555.83	32.00	727.60	25.56 N	727.42 E	727.87@	87.99	1.59
7125.00	89.16	86.38	6556.64	31.00	758.54	27.54 N	758.35 E	758.85@	87.92	4.23
7157.00	90.13	86.56	6556.84	32.00	790.49	29.51 N	790.29 E	790.84@	87.86	3.08
7189.00	89.96	86.78	6556.82	32.00	822.45	31.36 N	822.23 E	822.83@	87.82	0.87
7221.00	90.75	87.51	6556.62	32.00	854.42	32.96 N	854.19 E	854.83@	87.79	3.36
7253.00	91.54	88.79	6555.98	32.00	886.40	33.99 N	886.17 E	886.82@	87.80	4.70
7285.00	91.89	89.26	6555.02	32.00	918.39	34.54 N	918.15 E	918.80@	87.85	1.83
7317.00	92.33	89.39	6553.84	32.00	950.37	34.91 N	950.13 E	950.77@	87.90	1.43

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets		Closure Dist Dir		DLS (dg/100ft)
(ft)	(deg)	(deg)	(ft)	(ft)	(ft)	(ft)	(ft)	(ft)	(deg)	(dg/100ft)
7349.00	91.98	89.78	6552.64	32.00	982.34	35.14 N	982.10 E	982.73@	87.95	1.64
7381.00	91.80	89.89	6551.58	32.00	1014.33	35.24 N	1014.09 E	1014.70@	88.01	0.66
7413.00	92.07	89.94	6550.50	32.00	1046.31	35.28 N	1046.07 E	1046.66@	88.07	0.86
7445.00	91.80	90.91	6549.42	32.00	1078.29	35.05 N	1078.05 E	1078.62@	88.14	3.15
7477.00	91.71	91.00	6548.44	32.00	1110.26	34.51 N	1110.03 E	1110.56@	88.22	0.40
7509.00	91.10	91.32	6547.66	32.00	1142.24	33.87 N	1142.01 E	1142.51@	88.30	2.15
7540.00	91.01	91.47	6547.09	31.00	1173.22	33.11 N	1173.00 E	1173.46@	88.38	0.56
7572.00	91.10	91.53	6546.50	32.00	1205.19	32.27 N	1204.98 E	1205.41@	88.47	0.34
7604.00	90.66	91.83	6546.01	32.00	1237.17	31.34 N	1236.96 E	1237.36@	88.55	1.66
7636.00	90.75	92.00	6545.61	32.00	1269.14	30.27 N	1268.94 E	1269.30@	88.63	0.60
7663.00	90.48	92.61	6545.32	27.00	1296.11	29.18 N	1295.92 E	1296.25@	88.71	2.47
7713.00	90.57	93.62	6544.86	50.00	1346.01	26.46 N	1345.84 E	1346.10@	88.87	2.03
7745.00	90.04	93.67	6544.69	32.00	1377.92	24.43 N	1377.78 E	1377.99@	88.98	1.66
7777.00	89.16	93.49	6544.92	32.00	1409.85	22.43 N	1409.71 E	1409.89@	89.09	2.81
7809.00	88.02	93.59	6545.70	32.00	1441.76	20.46 N	1441.64 E	1441.79@	89.19	3.58
7840.00	88.02	93.46	6546.78	31.00	1472.66	18.55 N	1472.57 E	1472.68@	89.28	0.42
7872.00	88.20	93.64	6547.83	32.00	1504.57	16.57 N	1504.49 E	1504.58@	89.37	0.79
7904.00	89.16	93.15	6548.57	32.00	1536.49	14.68 N	1536.42 E	1536.49@	89.45	3.37
7936.00	89.34	93.66	6548.99	32.00	1568.41	12.78 N	1568.36 E	1568.41@	89.53	1.69
7968.00	89.78	94.04	6549.23	32.00	1600.32	10.63 N	1600.29 E	1600.32@	89.62	1.82
8000.00	90.84	94.85	6549.06	32.00	1632.21	8.15 N	1632.19 E	1632.21@	89.71	4.17
8032.00	89.25	93.42	6549.03	32.00	1664.10	5.84 N	1664.11 E	1664.12@	89.80	6.68
8064.00	87.93	91.06	6549.82	32.00	1696.05	4.59 N	1696.07 E	1696.08@	89.84	8.45
8096.00	87.49	91.56	6551.10	32.00	1728.01	3.86 N	1728.04 E	1728.04@	89.87	2.08
8128.00	88.46	91.23	6552.23	32.00	1759.98	3.08 N	1760.01 E	1760.01@	89.90	3.20
8159.00	90.31	92.33	6552.56	31.00	1790.95	2.12 N	1790.99 E	1790.99@	89.93	6.94

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
 REINDEER 21 FEDERAL #3
 EDDY COUNTY, NM
 RIG:Permian #6

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
8191.00	90.13	92.38	6552.44	32.00	1822.91	0.80 N	1822.96 E	1822.96@	89.97	0.58
8223.00	90.48	91.92	6552.27	32.00	1854.88	0.40 S	1854.94 E	1854.94@	90.01	1.81
8255.00	90.75	91.75	6551.93	32.00	1886.85	1.42 S	1886.92 E	1886.92@	90.04	1.00
8286.00	91.19	92.09	6551.40	31.00	1917.82	2.46 S	1917.90 E	1917.90@	90.07	1.79
8318.00	90.92	92.39	6550.81	32.00	1949.78	3.71 S	1949.87 E	1949.87@	90.11	1.26
8350.00	91.01	92.09	6550.27	32.00	1981.74	4.96 S	1981.84 E	1981.84@	90.14	0.98
8382.00	90.66	91.97	6549.81	32.00	2013.71	6.10 S	2013.81 E	2013.82@	90.17	1.16
8414.00	90.40	92.24	6549.51	32.00	2045.67	7.27 S	2045.79 E	2045.80@	90.20	1.17
8446.00	89.69	91.66	6549.49	32.00	2077.65	8.36 S	2077.77 E	2077.79@	90.23	2.86
8478.00	89.34	91.17	6549.76	32.00	2109.63	9.15 S	2109.76 E	2109.78@	90.25	1.88
8509.00	88.29	90.51	6550.40	31.00	2140.61	9.60 S	2140.75 E	2140.77@	90.26	4.00
8541.00	87.58	90.27	6551.55	32.00	2172.59	9.82 S	2172.73 E	2172.75@	90.26	2.34
8573.00	87.67	90.05	6552.88	32.00	2204.56	9.91 S	2204.70 E	2204.72@	90.26	0.74
8605.00	87.32	89.37	6554.28	32.00	2236.53	9.75 S	2236.67 E	2236.69@	90.25	2.39
8637.00	87.23	89.21	6555.80	32.00	2268.49	9.35 S	2268.63 E	2268.65@	90.24	0.57
8669.00	87.41	88.92	6557.29	32.00	2300.46	8.83 S	2300.59 E	2300.61@	90.22	1.07
8701.00	88.02	89.43	6558.57	32.00	2332.43	8.37 S	2332.56 E	2332.58@	90.21	2.48
8733.00	87.85	89.26	6559.72	32.00	2364.41	8.01 S	2364.54 E	2364.55@	90.19	0.75
8765.00	88.20	89.15	6560.83	32.00	2396.39	7.56 S	2396.52 E	2396.53@	90.18	1.15
8797.00	88.55	89.63	6561.73	32.00	2428.38	7.22 S	2428.50 E	2428.51@	90.17	1.86
8829.00	89.25	89.72	6562.35	32.00	2460.37	7.04 S	2460.50 E	2460.51@	90.16	2.21
8861.00	89.78	90.27	6562.62	32.00	2492.37	7.04 S	2492.49 E	2492.50@	90.16	2.39
8893.00	90.40	90.32	6562.57	32.00	2524.36	7.20 S	2524.49 E	2524.50@	90.16	1.94
8925.00	90.04	90.09	6562.45	32.00	2556.36	7.32 S	2556.49 E	2556.50@	90.16	1.33
8957.00	89.69	89.86	6562.52	32.00	2588.36	7.30 S	2588.49 E	2588.50@	90.16	1.31
8989.00	89.60	89.57	6562.72	32.00	2620.36	7.14 S	2620.49 E	2620.50@	90.16	0.95

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
9021.00	88.55	88.66	6563.24	32.00	2652.35	6.65 S	2652.48 E	2652.49@	90.14	4.34
9053.00	88.81	88.86	6563.97	32.00	2684.34	5.96 S	2684.47 E	2684.47@	90.13	1.03
9085.00	88.99	89.16	6564.59	32.00	2716.34	5.40 S	2716.46 E	2716.46@	90.11	1.09
9117.00	89.16	89.18	6565.10	32.00	2748.33	4.94 S	2748.45 E	2748.45@	90.10	0.53
9148.00	89.25	89.63	6565.53	31.00	2779.33	4.62 S	2779.44 E	2779.45@	90.10	1.48
9180.00	89.43	89.38	6565.90	32.00	2811.32	4.34 S	2811.44 E	2811.44@	90.09	0.96
9212.00	89.69	89.90	6566.15	32.00	2843.32	4.14 S	2843.44 E	2843.44@	90.08	1.82
9244.00	89.69	90.12	6566.32	32.00	2875.32	4.15 S	2875.44 E	2875.44@	90.08	0.69
9276.00	88.90	89.60	6566.72	32.00	2907.32	4.07 S	2907.44 E	2907.44@	90.08	2.95
9308.00	88.90	89.88	6567.33	32.00	2939.31	3.92 S	2939.43 E	2939.43@	90.08	0.87
9340.00	89.43	90.61	6567.80	32.00	2971.31	4.06 S	2971.43 E	2971.43@	90.08	2.82
9372.00	89.96	90.64	6567.97	32.00	3003.30	4.41 S	3003.42 E	3003.43@	90.08	1.66
9404.00	89.25	89.86	6568.19	32.00	3035.30	4.55 S	3035.42 E	3035.43@	90.09	3.30
9436.00	88.99	89.28	6568.68	32.00	3067.29	4.31 S	3067.42 E	3067.42@	90.08	1.99
9468.00	89.08	89.31	6569.22	32.00	3099.29	3.92 S	3099.41 E	3099.41@	90.07	0.30
9500.00	89.08	89.18	6569.73	32.00	3131.28	3.49 S	3131.40 E	3131.41@	90.06	0.41
9532.00	87.93	88.55	6570.57	32.00	3163.27	2.86 S	3163.39 E	3163.39@	90.05	4.10
9563.00	87.32	87.43	6571.85	31.00	3194.23	1.77 S	3194.34 E	3194.34@	90.03	4.11
9595.00	87.58	87.40	6573.27	32.00	3226.18	0.33 S	3226.27 E	3226.27@	90.01	0.82
9627.00	87.85	87.55	6574.55	32.00	3258.13	1.08 N	3258.22 E	3258.22@	89.98	0.97
9659.00	87.49	87.87	6575.85	32.00	3290.09	2.35 N	3290.17 E	3290.17@	89.96	1.51
9691.00	87.32	87.44	6577.30	32.00	3322.04	3.66 N	3322.11 E	3322.11@	89.94	1.44
9723.00	87.32	87.09	6578.80	32.00	3353.98	5.19 N	3354.03 E	3354.04@	89.91	1.09
9755.00	87.32	87.50	6580.29	32.00	3385.92	6.70 N	3385.96 E	3385.97@	89.89	1.28
9787.00	87.14	87.61	6581.84	32.00	3417.86	8.06 N	3417.90 E	3417.91@	89.86	0.66
9819.00	87.32	87.75	6583.39	32.00	3449.80	9.35 N	3449.83 E	3449.85@	89.84	0.71

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

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Measured Depth (ft)	Incl (deg)	Drift Dir. (deg)	TVD (ft)	Course Length (ft)	Vertical Section (ft)	TOTAL Rectangular Offsets (ft) (ft)		Closure Dist Dir (ft) (deg)		DLS (dg/100ft)
9851.00	87.14	87.49	6584.93	32.00	3481.75	10.68 N	3481.77 E	3481.79@	89.82	0.99
9883.00	86.88	87.37	6586.60	32.00	3513.68	12.11 N	3513.69 E	3513.71@	89.80	0.89
9915.00	87.14	87.63	6588.27	32.00	3545.62	13.51 N	3545.62 E	3545.65@	89.78	1.15
9947.00	87.67	86.79	6589.72	32.00	3577.56	15.06 N	3577.55 E	3577.58@	89.76	3.10
9979.00	87.93	87.02	6590.95	32.00	3609.50	16.79 N	3609.48 E	3609.52@	89.73	1.08
10011.00	87.67	86.78	6592.18	32.00	3641.44	18.52 N	3641.41 E	3641.45@	89.71	1.11
10042.00	87.85	86.98	6593.39	31.00	3672.38	20.20 N	3672.34 E	3672.39@	89.68	0.87
10074.00	87.67	87.22	6594.64	32.00	3704.33	21.82 N	3704.27 E	3704.34@	89.66	0.94
10106.00	87.93	86.90	6595.87	32.00	3736.28	23.46 N	3736.21 E	3736.28@	89.64	1.29
10138.00	88.64	87.23	6596.82	32.00	3768.23	25.10 N	3768.15 E	3768.23@	89.62	2.45
10170.00	89.69	87.85	6597.29	32.00	3800.21	26.47 N	3800.12 E	3800.21@	89.60	3.81
10202.00	89.69	87.71	6597.46	32.00	3832.19	27.71 N	3832.09 E	3832.19@	89.59	0.44
10234.00	89.87	87.81	6597.59	32.00	3864.18	28.96 N	3864.07 E	3864.18@	89.57	0.64
10266.00	88.72	87.67	6597.98	32.00	3896.16	30.23 N	3896.04 E	3896.16@	89.56	3.62
10298.00	88.02	87.26	6598.89	32.00	3928.12	31.64 N	3927.99 E	3928.12@	89.54	2.53
10330.00	87.76	87.37	6600.07	32.00	3960.08	33.14 N	3959.94 E	3960.08@	89.52	0.88
10362.00	88.20	87.52	6601.20	32.00	3992.03	34.56 N	3991.89 E	3992.04@	89.50	1.45
10394.00	89.08	87.46	6601.96	32.00	4024.00	35.96 N	4023.85 E	4024.01@	89.49	2.76
10426.00	89.08	87.87	6602.47	32.00	4055.98	37.27 N	4055.82 E	4055.99@	89.47	1.28
10458.00	89.08	87.50	6602.98	32.00	4087.96	38.56 N	4087.79 E	4087.97@	89.46	1.16
10490.00	89.34	87.40	6603.43	32.00	4119.94	39.98 N	4119.75 E	4119.95@	89.44	0.87
10522.00	90.31	87.60	6603.52	32.00	4151.91	41.38 N	4151.72 E	4151.93@	89.43	3.09
STRAIGHT LINE PROJECTION TO BIT @ 10600' MD.										
10600.00	90.31	87.60	6603.10	78.00	4229.87	44.65 N	4229.65 E	4229.89@	89.40	0.00

PathFinder Energy Services, Inc.

Survey Report

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
EDDY COUNTY, NM
RIG:Permian #6

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

PATHFINDER ENERGY SERVICES

TIE-IN SURVEY INFORMATION SHEET

CLIENT INFORMATION

CLIENT:	COG Operating L.L.C.		
LEASE / WELL No.:	Reindeer 21	Federal #3	
WELL LOCATION:	Eddy County		
COUNTY / STATE / COUNTRY:	Eddy County	NM	USA
RIG:	Permian #6		
API WELL No:	30-015-36538		
JOB No:	101008161-WT-WT		
P.O. / AFE No.			
DIRECTIONAL COMPANY:	Pathfinder		

WELL SITE INFORMATION

MAGNETIC DECLINATION:			
On Wall Plat:	8.23	LWD Calculated:	8.13
		Agreed Upon:	8.13
X =	585938.796000	Feet	Y = 694775.633000
			Feet
SITE LATITUDE:	32° 54' 35.5303" N	SITE LONGITUDE:	104° 11' 16.7972" W
GRID SYSTEM:	TRUE ☐ UTM ☐ LAMBERT ☒	ZONE:	New Mexico East
PROPOSED DRIFT DIRECTION:	89.56		
KELLY BUSHING ELEVATION:	24.75'		
ALTITUDE:	3587'	Feet	WATER DEPTH: N/A
			Feet

TIE-IN SURVEY

MEASURED DEPTH:	5943'		
DRIFT ANGLE:	0.49		
DRIFT DIRECTION:	250.12		
TRUE VERTICAL DEPTH:	5942.61'		
VERTICAL SECTION:	-33.53'		
RECTANGULAR COORDINATE (N / S) :	3.76' S		
RECTANGULAR COORDINATE (E / W) :	33.51' W		
CLOSURE DISTANCE / DIRECTION:	33.72'	263.6	
SURVEY CALCULATION METHOD:	AA ☐	MC ☒	RC ☐ BT ☐
SOURCE OF TIE-IN DATA (COMPANY):	Scientific Drilling Controls		
COPY OF TIE-IN SURVEY REPORT	☒ YES ☐ NO		

WELL PLAN

KICKOFF DEPTH:	6072	TOTAL DEPTH:	10806
KICKOFF ANGLE:	0	MAX ANGLE:	90.43

PES Engineers: _____

**Signature of both field engineers required if applicable

Directional Driller: _____

DATE: _____

PathFinder Energy Services, Inc.

Magnetic & Grid Calculations

COG OPERATING, LLC
REINDEER 21 FEDERAL #3
WOLFCAMP ; CROW FLATS
Rig:Permian #6

Sat Jan 17 15:41:51 2009

Coordinates

Latitude: 32.909870 N (32 deg. 54 min. 35.5303 sec.)
Longitude: 104.187999 W (-104 deg. 11 min. 16.7972 sec.)
Elevation: 3587.00 feet.
Calculation Date: Dec/26/2008

Magnetic Calculations

Model: IGRF2005
Dip Angle: 60.7885 degrees
Total Magnetic Field: 0.49232 gauss
Magnetic Declination: 8.205472 degrees
Horizontal Intensity: 0.240272 gauss

To Convert a Magnetic Dir. to a TRUE North Dir. Add 8.205472 Degr

Transverse Mercator Grid Calculations NAD83

Grid System: Transverse Mercator: new mexico east
Ellipsoid: GRS80
X: 585938.7960 feet
Y: 694775.6330 feet
True to Grid: (convergence) -0.078963 degrees
Magnetic to Grid: 8.126509 degrees

To Convert a Magnetic Dir. to a GRID dir. Add 8.126509 Degr.

Directional Survey Report

[illegible]

Remarks : The OUTRUN Survey will be called definitive

00708107

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°  S C I E N T I F I C   D R I L L I N G   C O N T R O L S   °
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Outrun Survey
for
COG

Page 2

Well No.: REINDEER 21 FED #3

Date : 18-DEC-2008

Job No. : 32K12081007

GRID

Proposal : 89.56

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Depth      T.V.D.      V.S.      Inc      Azimuth      Latitude      Departure      D-leg
( Feet )   ( Feet )   ( Feet )   Deg.      Deg.      ( Feet )   ( Feet )   /100
#####

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4000.00	3999.78	-11.62	0.77	234.30	4.99	-11.66	0.11
4100.00	4099.77	-12.77	0.75	246.71	4.33	-12.80	0.17
4200.00	4199.76	-14.00	0.78	247.51	3.81	-14.03	0.03
4300.00	4299.76	-15.26	0.76	251.15	3.34	-15.29	0.05
4400.00	4399.75	-16.48	0.69	258.06	3.00	-16.51	0.11
4500.00	4499.74	-17.61	0.62	259.51	2.78	-17.63	0.07
4600.00	4599.73	-18.69	0.63	270.70	2.69	-18.71	0.12
4700.00	4699.73	-19.76	0.60	272.92	2.72	-19.78	0.04
4800.00	4799.72	-20.84	0.64	268.13	2.73	-20.86	0.07
4900.00	4899.72	-21.94	0.62	267.12	2.68	-21.96	0.02
5000.00	4999.71	-23.00	0.59	271.00	2.67	-23.02	0.05
5100.00	5099.71	-23.92	0.49	284.07	2.78	-23.95	0.16
5200.00	5199.70	-24.96	0.72	261.24	2.79	-24.98	0.33
5300.00	5299.69	-25.98	0.56	234.31	2.40	-26.00	0.34
5400.00	5399.69	-26.95	0.67	259.17	2.01	-26.97	0.29
5500.00	5499.68	-28.10	0.85	230.04	1.42	-28.11	0.42
5600.00	5599.67	-29.32	0.92	233.27	0.47	-29.33	0.09
5700.00	5699.65	-30.75	1.17	229.17	-0.68	-30.74	0.26
5800.00	5799.63	-32.06	1.04	215.96	-2.08	-32.05	0.29
5900.00	5899.62	-33.13	0.93	220.55	-3.43	-33.11	0.14
5943.00	5942.61	-33.53	0.49	250.12	-3.76	-33.51	1.30

The Horizontal Displacement (in Feet) at
Measured Depth 5943.00 is 33.72 in a Direction of 263.60 Degrees

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° S C I E N T I F I C   D R I L L I N G   C O N T R O L S   °
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Delete this line and one of these below !

Inrun
 Outrun
 Survey Data

Ascii file for : COG
 Well Name : REINDEER 21 FED #3
 Location : EDDY COUNTY, NEW MEXICO
 Survey date : 18-DEC-2008
 SDC Job No. : 32K12081007
 Referenced to : GRID North
 Units of Depth : Feet
 Survey Type : KEEPER GYRO SURVEY
 of the :

Meas'd Depth	Inc Deg	Azimuth Deg
0.00	0.00	359.92
100.00	0.06	10.58
200.00	0.08	22.83
300.00	0.33	355.44
400.00	0.79	352.98
500.00	0.83	352.99
600.00	0.88	352.86
700.00	0.80	349.35
800.00	0.80	357.29
900.00	0.68	356.95
1000.00	0.76	2.79
1100.00	0.61	353.22
1200.00	0.49	17.14
1300.00	0.41	21.53
1400.00	0.36	14.86
1500.00	0.37	346.30
1600.00	0.34	358.93
1700.00	0.16	354.59
1800.00	0.21	346.33
1900.00	0.24	345.44
2000.00	0.28	347.70
2100.00	0.30	342.48
2200.00	0.35	344.00
2300.00	0.27	22.10
2400.00	0.13	49.54
2500.00	0.06	152.98
2600.00	0.11	222.90
2700.00	0.10	245.14
2800.00	0.30	255.78
2900.00	0.37	248.52
3000.00	0.60	226.80
3100.00	0.72	217.91
3200.00	0.93	220.18
3300.00	0.84	212.35
3400.00	0.91	212.72
3500.00	0.99	209.80
3600.00	0.95	209.51
3700.00	0.95	214.78

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° S C I E N T I F I C D R I L L I N G C O N T R O L S °
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Outrun Survey
for
COG

Page 1

Well No.: REINDEER 21 FED #3

Date : 18-DEC-2008

Job No. : 32K12081007

Proposal : 89.56

Depth (Feet)	T.V.D. (Feet)	V.S. (Feet)	Inc Deg.	GRID Azimuth Deg.	Latitude (Feet)	Departure (Feet)	D-leg /100
0.00	0.00	0.00	0.00	359.92	0.00	0.00	0.00
100.00	100.00	0.01	0.06	10.58	0.05	0.01	0.06
200.00	200.00	0.05	0.08	22.83	0.17	0.05	0.02
300.00	300.00	0.05	0.33	355.44	0.52	0.05	0.26
400.00	399.99	-0.04	0.79	352.98	1.49	-0.06	0.46
500.00	499.98	-0.21	0.83	352.99	2.89	-0.23	0.04
600.00	599.97	-0.38	0.88	352.86	4.37	-0.41	0.05
700.00	699.96	-0.59	0.80	349.35	5.82	-0.64	0.10
800.00	799.95	-0.74	0.80	357.29	7.21	-0.80	0.11
900.00	899.94	-0.80	0.68	356.95	8.49	-0.86	0.12
1000.00	999.93	-0.79	0.76	2.79	9.75	-0.86	0.11
1100.00	1099.93	-0.81	0.61	353.22	10.94	-0.89	0.19
1200.00	1199.92	-0.74	0.49	17.14	11.88	-0.83	0.26
1300.00	1299.92	-0.48	0.41	21.53	12.62	-0.57	0.09
1400.00	1399.92	-0.26	0.36	14.86	13.26	-0.36	0.07
1500.00	1499.92	-0.25	0.37	346.30	13.87	-0.36	0.18
1600.00	1599.91	-0.33	0.34	358.93	14.48	-0.44	0.08
1700.00	1699.91	-0.34	0.16	354.59	14.92	-0.46	0.18
1800.00	1799.91	-0.40	0.21	346.33	15.24	-0.52	0.06
1900.00	1899.91	-0.49	0.24	345.44	15.62	-0.61	0.03
2000.00	1999.91	-0.59	0.28	347.70	16.06	-0.71	0.04
2100.00	2099.91	-0.72	0.30	342.48	16.55	-0.85	0.03
2200.00	2199.91	-0.88	0.35	344.00	17.09	-1.01	0.05
2300.00	2299.91	-0.87	0.27	22.10	17.60	-1.00	0.22
2400.00	2399.91	-0.69	0.13	49.54	17.89	-0.83	0.17
2500.00	2499.91	-0.58	0.06	152.98	17.92	-0.72	0.16
2600.00	2599.91	-0.62	0.11	222.90	17.80	-0.76	0.11
2700.00	2699.91	-0.77	0.10	245.14	17.70	-0.91	0.04
2800.00	2799.91	-1.10	0.30	255.78	17.60	-1.24	0.20
2900.00	2899.90	-1.66	0.37	248.52	17.41	-1.79	0.08
3000.00	2999.90	-2.35	0.60	226.80	16.94	-2.48	0.29
3100.00	3099.89	-3.12	0.72	217.91	16.08	-3.24	0.16
3200.00	3199.88	-4.04	0.93	220.18	14.97	-4.15	0.21
3300.00	3299.87	-4.96	0.84	212.35	13.73	-5.07	0.15
3400.00	3399.86	-5.79	0.91	212.72	12.44	-5.89	0.07
3500.00	3499.84	-6.66	0.99	209.80	11.02	-6.75	0.09
3600.00	3599.83	-7.51	0.95	209.51	9.55	-7.59	0.04
3700.00	3699.82	-8.40	0.95	214.78	8.15	-8.47	0.09
3800.00	3799.80	-9.40	0.87	222.80	6.91	-9.46	0.15
3900.00	3899.79	-10.50	0.86	229.35	5.87	-10.54	0.10

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