

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

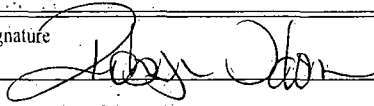
APPLICATION FOR PERMIT TO DRILL OR REENTER

1a. Type of work: ☒ DRILL ☐ REENTER		5. Lease Serial No. NMNM-86025 705
1b. Type of Well: ☒ Oil Well ☐ Gas Well ☐ Other ☒ Single Zone ☐ Multiple Zone		6. If Indian, Allottee or Tribe Name N/A 4/16/2013
2. Name of Operator COG Operating LLC <229137>		7. If Unit or CA Agreement, Name and No. N/A
3a. Address One Concho Center 600 W Illinois Ave Midland, TX 79701		8. Lease Name and Well No. McIntyre DK Federal #16H <3025247>
3b. Phone No. (include area code) (432) 685-4385		9. API Well No. 30-015 41273
4. Location of Well (Report location clearly and in accordance with any State requirements.) At surface SHL: 465' FSL & 285' FWL, Unit M At proposed prod. zone BHL: 465' FSL & 330' FEL, Unit P		10. Field and Pool, or Exploratory Loco Hills; Glorieta-Yeso 96718
14. Distance in miles and direction from nearest town or post office* 2 miles northwest of Loco Hills, NM		11. Sec., T. R. M. or Blk. and Survey or Area Sec 17, T17S, R30E
15. Distance from proposed* location to nearest property or lease line, ft. (Also to nearest drig. unit line, if any) 285'	16. No. of acres in lease 160 280	17. Spacing Unit dedicated to this well 160
18. Distance from proposed location* to nearest well, drilling, completed, applied for, on this lease, ft. 113'	19. Proposed Depth TVD: 4878' MD: 9392'	20. BLM/BIA Bond No. on file NMB000740; NMB000215
21. Elevations (Show whether DF, KDB, RT, GL, etc.) 3646' GL	22. Approximate date work will start* 04/30/2013	23. Estimated duration 10 days

24. Attachments

The following, completed in accordance with the requirements of Onshore Oil and Gas Order No. 1, shall be attached to this form:

- | | |
|---|--|
| 1. Well plat certified by a registered surveyor. | 4. Bond to cover the operations unless covered by an existing bond on file (see Item 20 above). |
| 2. A Drilling Plan. | 5. Operator certification |
| 3. A Surface Use Plan (if the location is on National Forest System Lands, the SUPO shall be filed with the appropriate Forest Service Office). | 6. Such other site specific information and/or plans as may be required by the authorized officer. |

25. Signature 	Name (Printed Typed) Robyn M. Odom	Date 02/08/2013
Title Regulatory Analyst		

Approved by (Signature) /s/ James A. Amos	Name (Printed/Typed) CARLSBAD FIELD OFFICE	Date APR 11 2013
Title FIELD MANAGER		

Application approval does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.
Conditions of approval, if any, are attached.

APPROVAL FOR TWO YEARS

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.

*(Instructions on page 2)

Roswell Controlled Water Basin

RECEIVED
APR 15 2013
NMOCD ARTESIA
SEE ATTACHED FOR
CONDITIONS OF APPROVAL

Approval Subject to General Requirements
& Special Stipulations Attached

Surface Use Plan
COG Operating, LLC
McIntyre DK Federal 16H
SL: 465' FSL & 285' FWL UL M
BHL: 465' FSL & 330' FEL UL P
Section 17, T-17-S, R-30-E
Eddy County, New Mexico

I hereby certify that I, or persons under my direct supervision, have inspected the drill site and access road proposed herein; that I am familiar with the conditions that presently exist; that I have full knowledge of State and Federal laws applicable to this operation; that the statements made in this APD package are, to the best of my knowledge, true and correct; and that the work associated with the operations proposed herein will be performed in conformity with this APD package and the terms and conditions under which it is approved. I also certify that I, or COG Operating, LLC, am responsible for the operations conducted under this application. These statements are subject to the provisions of 18 U.S.C. 1001 for the filing of false statements. Executed this 14th day of May, 2012.

Signed: _____



Printed Name: Carl Bird

Position: Drilling Engineer

Address: One Concho Center, 600 W Illinois, Midland, Texas 79701

Telephone: (432) 683-7443

Field Representative (if not above signatory): Same

E-mail: cbird@concho.com

DISTRICT I
1625 N. FRENCH DR., HOBBS, NM 88240
DISTRICT II
1301 W. GRAND AVENUE, ARTESIA, NM 88210
DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
DISTRICT IV
11885 S. ST. FRANCIS DR., SANTA FE, NM 87505

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

Form C-102
Revised August 1, 2011
Submit one copy to appropriate
District Office

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015- 41273	Pool Code 96718	Pool Name Loco Hills; Glorieta-Yeso
Property Code 302524	Property Name MCINTYRE DK FEDERAL	Well Number 16H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3646

Surface Location

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	17	17-S	30-E		465	SOUTH	285	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	17	17-S	30-E		465	SOUTH	330	EAST	EDDY

Dedicated Acres 160	Joint or Infill	Consolidation Code	Order No.
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION

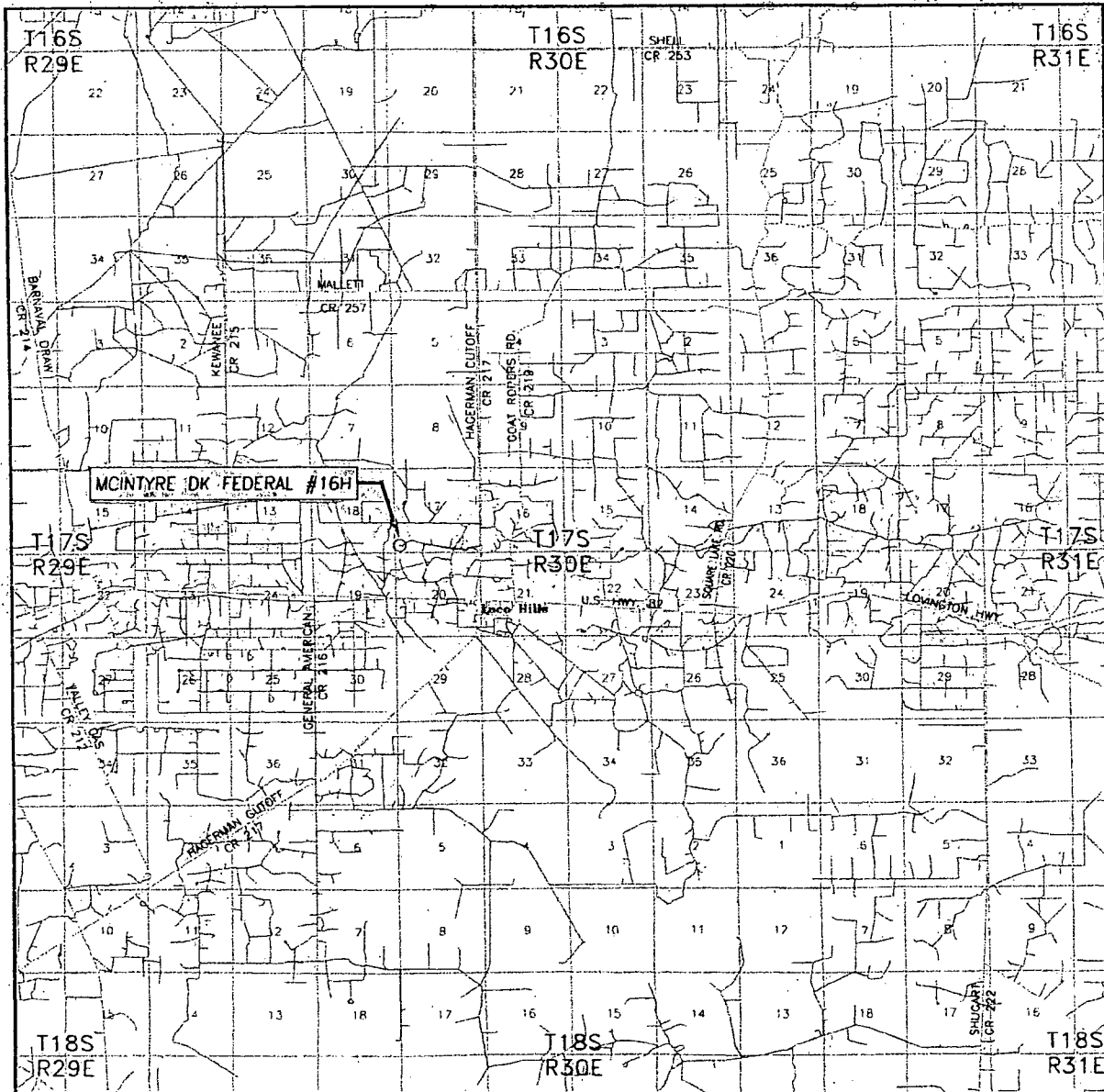
DETAIL 3644.5' 3649.0' 600' 600' 3648.0' 3650.4' Estimated Completed Interval: 485 FSL 330 FWL GEODETTIC COORDINATES NAD 27 NME SURFACE LOCATION Y=665262.2 N X=601988.9 E LAT.=32.828452° N LONG.=104.001312° W BOTTOM HOLE LOCATION Y=665276.2 N X=606653.7 E CORNER COORDINATES A) Y=666116.7 N; X=601700.9 E B) Y=666132.7 N; X=606980.5 E C) Y=664812.4 N; X=606985.3 E D) Y=664796.4 N; X=601705.4 E Project Area Producing Area GRID AZ.= 89°49'38" HORIZ.DIST.=4665.9' 285' S.L. 465' B.H. 330'	OPERATOR CERTIFICATION I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.  10/24/13 Signature Date Kelly J. Holly Printed Name kholly@concho.com E-mail Address SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. SEPTEMBER 10, 2011 Date of Survey Signature & Seal of Professional Surveyor:  Gary G. Eidson 12641 Ronald F. Eidson 3239 BKL REF. W.O.: 12-1170540 JWSC W.O.: 13.13.0109
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NEW MEXICO



Survey Date: 9/10/11	Sheet 1 of 1 Sheets		
W.O. Number: 13.13.0109	Dr By: ACR	Rev 1: 11111938	
Date: 4/16/12		12110540	Scale: 1"=100'

VICINITY MAP



SCALE: 1" = 2 MILES

SEC. 17 TWP. 17-S RGE. 30-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 465' FSL & 285' FWL

ELEVATION 3646'

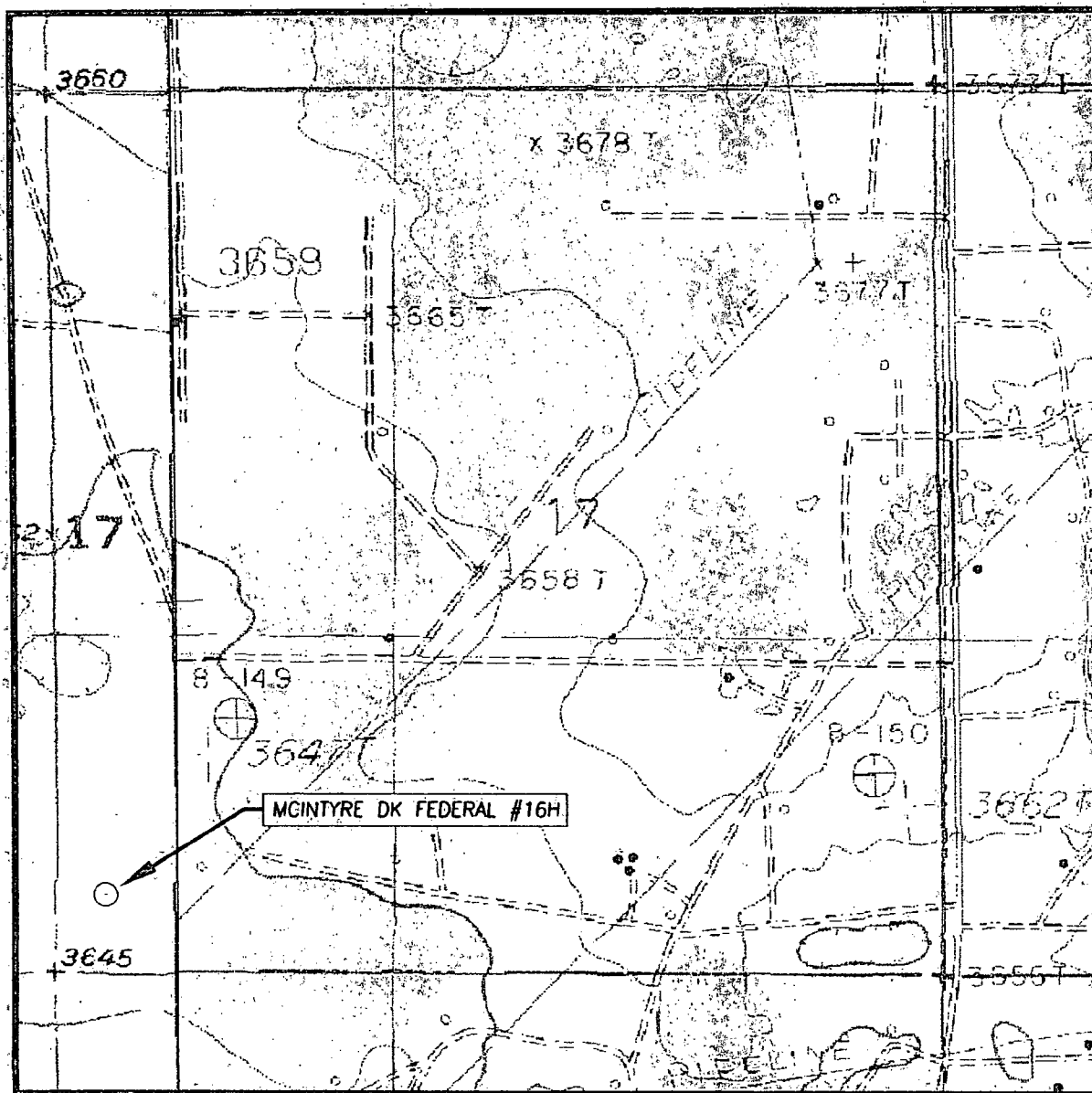
OPERATOR COG OPERATING, LLC

LEASE MCINTYRE DK FEDERAL



PROVIDING SURVEYING SERVICES
SINCE 1946
JOHN WEST SURVEYING COMPANY
412 N. DAL PASO
HOBBS, N.M. 88240
(575) 393-3117

LOCATION VERIFICATION MAP



SCALE: 1" = 1000'

CONTOUR INTERVAL:
LOCO HILLS, N.M. - 10'

SEC. 7 TWP. 17-S RGE. 30-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 465' FSL & 285' FWL

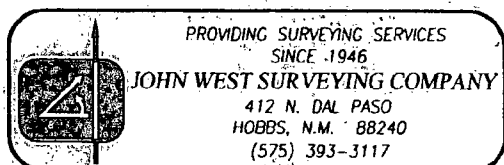
ELEVATION 3646'

OPERATOR COG OPERATING, LLC

LEASE MCINTYRE DK FEDERAL

U.S.G.S. TOPOGRAPHIC MAP

LOCO HILLS, N.M.



18

17

16

McIntyre DK Federal #16H

1 MILE

BHL

SHL

Estimated Distance SHL
to BHL 4665.9ft

Estimated Distance to Nearest
Wellbore 141ft SE

19

20

21

30

29

28



Project: SENM/KP LONGHORN
Eddy et al Co., NM

SENM Shelf Area

McIntyre DK Federal #16H

SHL: 465' FSL 285' FWL, UNIT M

BHL: 465' FSL 330' FEL, UNIT P

SEC. 17, T17S, R30E

Author:	Wellbore All Wells	Date:
W.D. Edwards		20 January 2000
Project: SENM/KP LONGHORN	Section 17/2000	1 MILE E.A.T.
ACTIVITY: SURVEILLANCE		



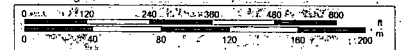
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www.delorme.com



Scale 1" = 4,400'



1" = 366.7 ft

Data Zoom 15-5



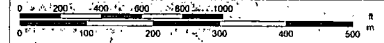
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Scale 1:11,200



1" = 933.3 ft

Data Zoom 14-2

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
McIntyre DK Federal #16H
SHL: 465' FSL & 285' FWL, UNIT M
BHL: 465' FSL & 330' FEL, UNIT P
Sec 17, T17S, R30E
Eddy County, NM

1. Proration Unit Spacing: 160 Acres
2. Ground Elevation: 3646'
3. Proposed Depths: Horizontal: **EOC (end of curve) TVD=4950' MD= 5256'**
Toe (end of lateral) TVD=4878' MD= 9392'

4. Estimated tops of geological markers:

Rustler	250'
Top of Salt	540'
Base of Salt	990'
Yates	1142'
Seven Rivers	1284'
Queen	2027'
Grayburg	2414'
San Andres	2740'
Glorieta	4152'
Paddock	4209'
Blinebry	4761'

5. Possible mineral bearing formations:

Water Sand	110'	Fresh Water
Grayburg	2414'	Oil/Gas
San Andres	2740'	Oil/Gas
Glorieta	4152'	Oil/Gas
Paddock	4209'	Oil/Gas
Blinebry	4761'	Oil/Gas

No other formations are expected to give up oil, gas or fresh water in measurable quantities. Setting 13 3/8" casing to 275' (25' into Rustler) and circulating cement back to the surface will protect the surface fresh water sand. The Salt Section will be protected by setting 9 5/8" casing to 1160' and circulating cement back to surface in a single or multi-stage job (DV Tools) and/or with an ECP. Any zones below 9 5/8" csg shoe and above TD, which contain commercial quantities of oil and/or gas, will have cement circulated across them. This isolation will be achieved by cementing tapered 7" X 5 1/2" production casing from TD to surface in single or multi-stage jobs. The tapered string will consist of 7" casing from surface to KOP and 5 1/2" casing from KOP thru curve and lateral to TD. The multiple stage cement job will have DV Tool and ECP set at KOP and second DV Tool set 50' below the 9 5/8" casing shoe. First stage will be from TD to KOP; second and third stages will be from KOP to surface. If wellbore conditions arise that require immediate action and/or a change to this program COG Operating LLC personnel will always react to protect the wellbore and/or environment.

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
McIntyre DK Federal #16H
Page 2 of 6

6. Proposed Mud System

The well will be drilled to TD with a combination of fresh water, brine, cut brine and polymer mud systems. The applicable depths and properties of these systems are as follows:

see COA

DEPTH (MD)	TYPE	WEIGHT	VISCOSITY	WATERLOSS
0-275'	Fresh Water	8.5	28	N.C.
275'-1160' ^{1100'}	Brine	10	30	N.C.
1160'-4429'	Cut Brine	8.7-9.2	30	N.C.
4429'-5256'	Cut Brine/polymer mud	8.7-9.2	30	N.C.
5256'-9392'	Cut Brine/polymer mud	8.7-9.2	30	N.C.

Sufficient mud materials will be kept at the well site to maintain mud properties and meet minimum lost circulation and weight increase requirements at all times.

Visual or electronic mud monitoring equipment shall be in place to detect volume changes indicating loss or gain of circulating fluid volume.

The mud program has been designed to minimize the volume of H₂S circulated to surface. Proper mud weights, save drilling practices and the use of H₂S scavengers will minimize hazards when penetrating H₂S bearing zones.

6. Proposed Casing Program

see COA

Hole Size	Interval MD	OD Casing	Weight	Grade	Condition	Jt.	brst/clps/ten
17 1/2"	0-275'	13 3/8" 0-275'	48#	H-40/J-55 Hybrid	New	ST&C	6.29/6.33/28.03
12 1/4"	275'-1160' ^{1100'}	9 5/8" 0-1160'	40#	J/K-55	New	ST&C	3.41/4.26/13.23
8 3/4"	1160'-4429'	7" 0-4429'	26#	L-80	New	LT&C	1.63/2.55/5.16
8 3/4"	4429'-5256'	5 1/2" 4429'-5256'	17#	L-80	New	LT&C	1.75/2.97/5.22
7 7/8"	5256'-9392'	5 1/2" 5256'-9392'	17#	L-80	New	LT&C	1.75/2.97/5.22

Production string will be a tapered string with 7" 26# L-80 LTC run from surface to kick off point (4429') and then crossed over to 5 1/2" 17# L-80 LTC.

7. Proposed Cement Program

13 3/8" SURFACE: (Circulate to Surface)

Lead: 0'-275'	450 sks	Class "C" w/2% CaCl ₂ +	1.32 cf/sk	14.8 ppg
Excess 162%		0.25 pps CF		

9 5/8" INTERMEDIATE:

Option #1: Single Stage (Circulate to Surface)

Lead: 0'-660'	300 sks	50:50:10 C:Poz:Gel w/ 5% Salt+ 0.25% CF	2.45 cf/sk	11.8 ppg
Excess 228%		+5 pps LCM		

Tail: 660'-1160'	200 sks	Class C w/2% CaCl ₂	1.32 cf/sk	14.8 ppg
Excess 52%				

Option #2: Multi-stage w/ DV Tool @ +/-325' (DV Tool 50' below 13 3/8" csg. Shoe)

Stage #1:

Lead: 325'-660'	150 sks	50:50:10 C:Poz:Gel w/5% Salt +5 pps LCM + 0.25 pps CF	2.45 cf/sk	11.8 ppg
Excess 250%				

Tail: 660'-1160'	200 sks	Class "C" w/2% CaCl ₂	1.32 cf/sk	14.8 ppg
Excess 52%				

Stage #2 (Circulate cement to surface)

0'-325'	150 sks	50:50:10 C:Poz:Gel w/5% salt+ 5 pps LCM + 0.25 pps CF	2.45 cf/sk	11.8 ppg
Excess 208%				

Note: Multi-stage tool to be set depending on hole conditions at approximately 325' (50' below the surface casing shoe). Cement volumes will be adjusted proportionately for depth changes of multi-stage tool.

See COA

7" X 5 1/2" TAPERED PRODUCTION CASING:

Option #1: Single Stage (Cement cal to surface)

1 st Lead:	500 sks	35:65:6 C:Poz Gel w/5% salt+ 5 pps LCM+ 0.2 % SMS+ 0.3% FL-52A+ 0.125 pps CF	2.01 cf/sk	12.5 ppg
0'-2900'				
Excess 126%				
(min. tie-back 200'				
above 9 5/8" csg shoe)				

2 nd Lead:	400 sks	50:50:2 C:Poz Gel w/5% salt+ 3 pps LCM+ 0.6 % SMS+ 0.125 pps CF+1% FL-25+ 1% BA-58	1.37 cf/sk	14.0 ppg
2900'-4429'				
Excess 138%				

Tail:	355 sks	Class "H" SOLUCEM-H w/0.7% HR-601	2.62 cf/sk	14.0 ppg
4429'-9392'				
Excess 0%				

Option #2: Multi-stage (3 Stages) with two (2) DV Tools

Stage #1: TD to KOP w/ DV Tool & ECP@ +/-4429'

Tail:	355 sks	Class "H" SOLUCEM-H w/0.7% HR-601	2.62 cf/sk	14.0 ppg
4429'-9392'				
Excess 0%				

Stage #2: DV Tool & ECP @ +/-4429'to 2nd DV Tool @ 1210' (50' below 9 5/8" csg shoe)

Lead:	250 sks	35:65:6 C:Poz Gel w/5% salt+ 5 pps LCM+ 0.2 % SMS+ 0.3% FL-52A+ 0.125 pps CF	2.01 cf/sk	12.5 ppg
1210'-4429'				
Excess 98%				
Tail:	400 sks	50:50:2 C:Poz Gel w/5% salt+ 3 pps LCM+ 0.6 % SMS+ 0.125 pps CF+1% FL-25+ 1% BA-58	1.37 cf/sk	14.0 ppg
2900'-4429'				
Excess 138%				

Corrections made by GEG 3/11/13

Stage #3: DV Tool @ 1210' (50' below 9 5/8" csg shoe) to Surface (Cement Calculated to surface)

Lead:	250 sks	35:65:6 C:Poz Gel w/5%	2.01 cf/sk	12.5 ppg
0'-1210'		salt+ 5 pps LCM+ 0.2 %		
Excess 168%		SMS+ 0.3% FL-52A+		
(min tie back 200'		0.125 pps CF		
above 9 5/8" csg shoe)				

Note: 5 1/2" casing will be run from KOP at 4429' thru curve and lateral to TD of 9392' MD.
Productive intervals will be isolated by cement as described above..

Note: FL-52A is fluid loss additive, R-3 is retarder.

Note: Multi-stage tool & ECP to be set depending on hole conditions at approximately 1210'.
Cement volumes will be adjusted proportionately for depth changes of multi-stage tool.

8. Pressure Control Equipment:

The blowout preventer equipment (BOP) shown in Exhibit #9 will consist of a double ram-type (2000 psi WP) preventer, and in some cases possibly a 2000 psi Hydril type annular preventer as provided for in Onshore Order #2. This unit will be hydraulically operated and the ram type preventer will be equipped with blind rams on top and 4 1/2" drill pipe rams on the bottom. A 13-5/8" BOP will be used during the drilling of the well. A 13 5/8" permanent casing head will be installed on the 13 3/8" casing. The BOP will be nipped up on the 13 5/8" permanent casing head and tested to 2000 psig. After setting 9-5/8", permanent "B section" well head will be installed and the BOP will then be nipped up on the permanent B . BOP and well head will be tested by a third party to 2000 psig and used continuously until total depth is reached. Pipe rams will be operationally checked each 24-hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve, choke lines and a choke manifold with a 2000 psi WP rating all of which will also be tested to working pressure by independent tester also. Any time a component of the BOP stack or choke manifold is changed or installed BOPE will be re-tested as required.

9. Production Hole Drilling Summary:

Drill 8 3/4" hole to 4429'. Kick off at +/- 4429', building curve at 11°/100' over +/- 827' to horizontal at 5256' MD/4950' TVD. Reduce hole size and drill 7 7/8" lateral section in a easterly direction for +/-4136' lateral to TD at +/-9392' MD, 4878' TVD. Run 7" x 5-1/2" production casing. 7" to be run from surface to kickoff point and then changed over to 5 1/2". 5 1/2" casing will be run from kickoff point to TD and both strings will be isolated by either a single stage or multi-stage cement jobs. Cement will be calculated to surface (min tie-back 200' above 9 5/8" csg shoe).

10. Auxiliary Well Control and Monitoring Equipment

A. Kelly cock will be kept in the drill string at all times.

Corrections made by GEG 3/11/13

ATTACHMENT TO FORM 3160-3
COG Operating, LLC
McIntyre DK Federal #16H
Page 6 of 6

- B. A full opening drill pipe-stabbing valve with proper drill pipe connections will be on the rig floor at all times.

11. Logging, Testing and Coring Program:

- A. The following logs will be run in the vertical portion of the hole to KOP: SLB-PEX/HRLA, HNGS.
- B. The mud logging program will consist of lagged 10' samples from KOP to TD in Horizontal hole.
- C. Drill Stem test is not anticipated.
- D. No conventional coring is anticipated.
- E. Further testing procedures will be determined after the 7" x 5 1/2" production casing has been cemented at TD based on drill shows and log evaluation.

12. Abnormal Conditions, Pressures, Temperatures and Potential Hazards:

No abnormal pressures or temperatures are anticipated. The estimated bottom hole temperature at TD is 98° Fahrenheit and estimated maximum bottom hole pressure is 2860 psi. Wells in the Loco Hills area will penetrate formations that are known or could reasonably be expected to contain Hydrogen Sulfide. Measurable gas volumes or hydrogen sulfide levels have not been encountered during drilling operations in this area; however as per Onshore order No. 6 a H2S drilling operations plan is included with this APD. If H2S concentrations exceed 100 ppm a remote operated choke will be installed (see diagram #8 & #9) and COG will comply with Onshore Order #6. All BOPE testing companies used by COG have H2S certified employees and will work on H2S locations. No major loss circulation zones have been reported in offsetting wells.

13. Anticipated Starting Date

Drilling operations will commence approximately on approximately April 30, 2013 with drilling and completion operations lasting approximately 90 days.

Corrections made by GEG 3/11/13

Plan Proposal

FOR

COG Operating, LLC
McIntyre DK Federal #16H
Eddy Co., NM

Design #3

Presented By:

Aaron Boger
Account Manager

Dusty Moyer
Well Planner

SHL
465' FSL & 285' FWL
Penetration Point
465' FSL & 330' FWL
PBHL
465' FSL & 330' FEL

WELL

Archer

COG Operating, LLC

Eddy County(NM27E)

Sec.17-T17S-R30E

McIntyre DK Federal #16H

Wellbore #1

Plan: Design #3

Standard Planning Report

25 January, 2013



Database:	EDMDBBW	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Project:	Eddy County (NM27E)	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site:	Sec 17 T17S R30E	North Reference:	Grid
Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Project:	Eddy County (NM27E)		
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		Sec 17 T17S R30E			
Site Position:		Northing:	665,262.200 usft	Latitude:	32° 49' 42.428 N
From:	Map	Easting:	601,988.900 usft	Longitude:	104° 0' 4.724 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16"	Grid Convergence:	0.18 °

Well:	McIntyre DK Federal #16H					
Well Position	+N-S	0.00 usft	Northing:	665,262.200 usft	Latitude:	32° 49' 42.428 N
	+E-W	0.00 usft	Easting:	601,988.900 usft	Longitude:	104° 0' 4.724 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	usft	Ground Level:	3,646.00 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	01/14/13	7.64	60.63	48,772

Design: Design #3				
Audit Notes:				
Version:		Phase: PLAN	Tie On Depth: 0.00	
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	89.83

Plan Sections										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N-S	+E-W	Dogleg Rate	Build Rate	Turn Rate	TFO	Target
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	(°)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,429.21	0.00	0.00	4,429.21	0.00	0.00	0.00	0.00	0.00	0.00	
5,256.48	91.00	89.83	4,950.00	1.59	529.96	11.00	11.00	0.00	89.83	McIntyre DK Fed #16I
9,391.97	91.00	89.83	4,877.83	14.00	4,664.80	0.00	0.00	0.00	0.00	McIntyre DK Fed #16I

Database	EDMDBBW	Local Co-ordinate Reference	Well McIntyre-DK Federal #16H
Company	COG Operating, LLC	TVD Reference	WELL @ 3660.00usft. (Original Well Elev)
Project	Eddy County (NM27E)	MD Reference	WELL @ 3660.00usft. (Original Well Elev)
Site	Sec. 17-T17S-R30E	North Reference	Grid
Well	McIntyre-DK Federal #16H	Survey Calculation Method	Minimum Curvature
Wellbore	Wellbore #1		
Design	Design #3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00	
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00	
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00	
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00	
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00	
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00	
KOP Build 11°/100'										
4,429.21	0.00	0.00	4,429.21	0.00	0.00	0.00	0.00	0.00	0.00	
4,450.00	2.29	89.83	4,449.99	0.00	0.41	0.41	11.00	11.00	0.00	
4,500.00	7.79	89.83	4,499.78	0.01	4.80	4.80	11.00	11.00	0.00	
4,550.00	13.29	89.83	4,548.92	0.04	13.94	13.94	11.00	11.00	0.00	
4,600.00	18.79	89.83	4,596.96	0.08	27.75	27.75	11.00	11.00	0.00	
4,650.00	24.29	89.83	4,643.45	0.14	46.10	46.10	11.00	11.00	0.00	
4,700.00	29.79	89.83	4,687.97	0.21	68.82	68.82	11.00	11.00	0.00	
4,750.00	35.29	89.83	4,730.10	0.29	95.70	95.70	11.00	11.00	0.00	

Database:	EDMDBBW	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Project:	Eddy County (NM27E)	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site:	Sec:17-T17S-R30E	North Reference:	Grid
Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	N/S (usft)	E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
4,800.00	40.79	89.83	4,769.47	0.38	126.50	126.50	11.00	11.00	0.00	
4,850.00	46.29	89.83	4,805.70	0.48	160.92	160.92	11.00	11.00	0.00	
4,900.00	51.79	89.83	4,838.47	0.60	198.67	198.67	11.00	11.00	0.00	
4,950.00	57.29	89.83	4,867.46	0.72	239.37	239.38	11.00	11.00	0.00	
5,000.00	62.79	89.83	4,892.43	0.85	282.67	282.68	11.00	11.00	0.00	
5,050.00	68.29	89.83	4,913.12	0.98	328.17	328.17	11.00	11.00	0.00	
5,100.00	73.79	89.83	4,929.37	1.13	375.44	375.44	11.00	11.00	0.00	
5,150.00	79.29	89.83	4,941.00	1.27	424.04	424.05	11.00	11.00	0.00	
5,200.00	84.79	89.83	4,947.93	1.42	473.54	473.54	11.00	11.00	0.00	
5,250.00	90.29	89.83	4,950.07	1.57	523.48	523.48	11.00	11.00	0.00	
EOC Hold to TD										
5,256.48	91.00	89.83	4,950.00	1.59	529.96	529.96	11.00	11.00	0.00	
5,300.00	91.00	89.83	4,949.24	1.72	573.47	573.47	0.00	0.00	0.00	
5,400.00	91.00	89.83	4,947.50	2.02	673.45	673.46	0.00	0.00	0.00	
5,500.00	91.00	89.83	4,945.75	2.32	773.44	773.44	0.00	0.00	0.00	
5,600.00	91.00	89.83	4,944.01	2.62	873.42	873.43	0.00	0.00	0.00	
5,700.00	91.00	89.83	4,942.26	2.92	973.41	973.41	0.00	0.00	0.00	
5,800.00	91.00	89.83	4,940.52	3.22	1,073.39	1,073.40	0.00	0.00	0.00	
5,900.00	91.00	89.83	4,938.77	3.52	1,173.38	1,173.38	0.00	0.00	0.00	
6,000.00	91.00	89.83	4,937.03	3.82	1,273.36	1,273.37	0.00	0.00	0.00	
6,100.00	91.00	89.83	4,935.28	4.12	1,373.34	1,373.35	0.00	0.00	0.00	
6,200.00	91.00	89.83	4,933.53	4.42	1,473.33	1,473.33	0.00	0.00	0.00	
6,300.00	91.00	89.83	4,931.79	4.72	1,573.31	1,573.32	0.00	0.00	0.00	
6,400.00	91.00	89.83	4,930.04	5.02	1,673.30	1,673.30	0.00	0.00	0.00	
6,500.00	91.00	89.83	4,928.30	5.32	1,773.28	1,773.29	0.00	0.00	0.00	
6,600.00	91.00	89.83	4,926.55	5.62	1,873.27	1,873.27	0.00	0.00	0.00	
6,700.00	91.00	89.83	4,924.81	5.92	1,973.25	1,973.26	0.00	0.00	0.00	
6,800.00	91.00	89.83	4,923.06	6.22	2,073.23	2,073.24	0.00	0.00	0.00	
6,900.00	91.00	89.83	4,921.32	6.52	2,173.22	2,173.23	0.00	0.00	0.00	
7,000.00	91.00	89.83	4,919.57	6.82	2,273.20	2,273.21	0.00	0.00	0.00	
7,100.00	91.00	89.83	4,917.83	7.12	2,373.19	2,373.20	0.00	0.00	0.00	
7,200.00	91.00	89.83	4,916.08	7.42	2,473.17	2,473.18	0.00	0.00	0.00	
7,300.00	91.00	89.83	4,914.34	7.72	2,573.16	2,573.17	0.00	0.00	0.00	
7,400.00	91.00	89.83	4,912.59	8.02	2,673.14	2,673.15	0.00	0.00	0.00	
7,500.00	91.00	89.83	4,910.85	8.32	2,773.12	2,773.14	0.00	0.00	0.00	
7,600.00	91.00	89.83	4,909.10	8.62	2,873.11	2,873.12	0.00	0.00	0.00	
7,700.00	91.00	89.83	4,907.36	8.92	2,973.09	2,973.11	0.00	0.00	0.00	
7,800.00	91.00	89.83	4,905.61	9.22	3,073.08	3,073.09	0.00	0.00	0.00	
7,900.00	91.00	89.83	4,903.87	9.52	3,173.06	3,173.08	0.00	0.00	0.00	
8,000.00	91.00	89.83	4,902.12	9.82	3,273.05	3,273.06	0.00	0.00	0.00	
8,100.00	91.00	89.83	4,900.38	10.12	3,373.03	3,373.05	0.00	0.00	0.00	
8,200.00	91.00	89.83	4,898.63	10.42	3,473.01	3,473.03	0.00	0.00	0.00	
8,300.00	91.00	89.83	4,896.88	10.72	3,573.00	3,573.01	0.00	0.00	0.00	
8,400.00	91.00	89.83	4,895.14	11.02	3,672.98	3,673.00	0.00	0.00	0.00	
8,500.00	91.00	89.83	4,893.39	11.32	3,772.97	3,772.98	0.00	0.00	0.00	
8,600.00	91.00	89.83	4,891.65	11.62	3,872.95	3,872.97	0.00	0.00	0.00	
8,700.00	91.00	89.83	4,889.90	11.92	3,972.94	3,972.95	0.00	0.00	0.00	
8,800.00	91.00	89.83	4,888.16	12.22	4,072.92	4,072.94	0.00	0.00	0.00	
8,900.00	91.00	89.83	4,886.41	12.52	4,172.90	4,172.92	0.00	0.00	0.00	
9,000.00	91.00	89.83	4,884.67	12.82	4,272.89	4,272.91	0.00	0.00	0.00	
9,100.00	91.00	89.83	4,882.92	13.12	4,372.87	4,372.89	0.00	0.00	0.00	
9,200.00	91.00	89.83	4,881.18	13.42	4,472.86	4,472.88	0.00	0.00	0.00	
9,300.00	91.00	89.83	4,879.43	13.72	4,572.84	4,572.86	0.00	0.00	0.00	

Database:	EDMBBBW	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Company:	COG Operating, LLC	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Project:	Eddy County (NM27E)	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site:	Sec. 17-T117S-R30E	North Reference:	Grid
Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #3		

Planned Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/S (usft)	+E/W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
TD at 9391.97									
9,391.97	91.00	89.83	4,877.83	14.00	4,664.80	4,664.82	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/S (usft)	+E/W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
hit/miss target									
Shape									
McIntyre DK Fed #16H F	0.00	0.00	4,877.83	14.00	4,664.80	665,276.200	606,653.700	32° 49' 42.418 N	103° 59' 10.054 W
- plan hits target center									
Point									

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/S (usft)	+E/W (usft)	
4,429.21	4,429.21	0.00	0.00	KOP - Build 11°/100'
5,256.48	4,950.00	1.59	529.96	EOC - Hold to TD
9,391.97	4,877.83	14.00	4,664.80	TD at 9391.97

Archer

COG Operating, LLC

Eddy County(NM27E)

Sec.17-T17S-R30E

McIntyre DK Federal #16H

Wellbore #1

Design #3

Anticollision Report

25 January, 2013



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Reference:	Design #3		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date	01/25/13		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.00	9,391.97	Design #3 (Wellbore #1)	MWD	MWD - Standard	

Summary:						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sec 17-T17S-R30E						
McIntyre DK Federal #1 - Wellbore #1 - Wellbore #1	9,370.73	4,868.96	101.78	-34.79	0.745	Level 1, CC, ES, SF
McIntyre DK Federal #11 - Wellbore #1 - Wellbore #1	7,414.63	4,742.00	216.80	111.67	2.062	CC, ES, SF
McIntyre DK Federal #7 - Wellbore #1 - Wellbore #1	4,688.00	4,666.35	128.53	108.43	6.395	CC, ES
McIntyre DK Federal #7 - Wellbore #1 - Wellbore #1	4,700.00	4,676.89	128.65	108.48	6.380	SF
McIntyre DK Federal #8 - Wellbore #1 - Wellbore #1	6,093.70	4,924.68	115.94	68.20	2.429	CC, ES
McIntyre DK Federal #8 - Wellbore #1 - Wellbore #1	6,100.00	4,924.58	116.11	68.21	2.424	SF
McIntyre DK Federal #9 - Wellbore #1 - Wellbore #1	8,731.86	4,887.52	134.82	-69.99	0.658	Level 1, CC, ES, SF

Sec 17-T17S-R30E - McIntyre DK Federal #1 - Wellbore #1 - Wellbore #1										Offset Site Error: 0.00 usft			
Survey Program: 100-MWD										Offset Well Error: 0.00 usft			
Reference		Offset		Semi-Major Axis		Distance		Warning					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	91.48	-120.80	4,665.20	4,666.77				
100.00	100.00	93.43	93.43	0.10	0.11	91.48	-120.73	4,665.20	4,666.76	4,666.56	0.20	N/A	
200.00	200.00	200.77	200.77	0.32	0.32	91.48	-120.67	4,665.11	4,666.68	4,666.03	0.64	7,266.407	
300.00	300.00	315.39	315.39	0.55	0.57	91.48	-120.73	4,664.74	4,666.36	4,665.24	1.11	4,194.789	
400.00	400.00	425.48	425.48	0.77	0.81	91.48	-120.65	4,664.04	4,665.72	4,664.14	1.58	2,958.348	
500.00	500.00	520.43	520.43	1.00	1.00	91.48	-120.67	4,663.46	4,665.10	4,663.10	2.00	2,334.705	
600.00	600.00	623.12	623.12	1.22	1.21	91.48	-120.67	4,662.80	4,664.46	4,662.02	2.44	1,915.269	
700.00	700.00	721.74	721.73	1.45	1.42	91.49	-121.01	4,662.21	4,663.87	4,661.00	2.87	1,626.654	
800.00	800.00	838.76	838.74	1.67	1.67	91.49	-121.59	4,661.24	4,663.05	4,659.70	3.34	1,394.830	
900.00	900.00	950.74	950.72	1.89	1.92	91.50	-122.13	4,659.99	4,661.94	4,658.13	3.81	1,222.455	
1,000.00	1,000.00	1,069.46	1,069.42	2.12	2.18	91.51	-122.96	4,658.28	4,660.53	4,656.23	4.30	1,084.123	
1,100.00	1,100.00	1,192.33	1,192.26	2.34	2.45	91.52	-123.71	4,655.94	4,658.64	4,653.85	4.80	971.374	
1,200.00	1,200.00	1,324.00	1,323.89	2.57	2.75	91.53	-124.29	4,652.68	4,656.18	4,650.87	5.32	875.983	
1,300.00	1,300.00	1,441.34	1,441.18	2.79	3.01	91.53	-124.57	4,649.06	4,653.09	4,647.29	5.80	802.489	
1,400.00	1,400.00	1,537.72	1,537.51	3.02	3.20	91.54	-124.82	4,646.02	4,649.94	4,643.72	6.22	747.528	
1,500.00	1,500.00	1,632.19	1,631.94	3.24	3.39	91.54	-125.00	4,643.12	4,646.88	4,640.25	6.63	700.637	
1,600.00	1,600.00	1,722.16	1,721.87	3.47	3.57	91.54	-124.71	4,640.52	4,643.99	4,636.95	7.04	659.645	
1,700.00	1,700.00	1,809.42	1,809.09	3.69	3.75	91.53	-123.95	4,638.25	4,641.36	4,633.91	7.45	623.329	
1,800.00	1,800.00	1,905.56	1,905.20	3.92	3.96	91.52	-122.71	4,635.92	4,638.90	4,631.03	7.87	589.237	
1,900.00	1,900.00	2,000.00	1,999.60	4.14	4.16	91.50	-121.19	4,633.70	4,636.51	4,628.22	8.30	558.697	
2,000.00	2,000.00	2,087.87	2,087.43	4.37	4.34	91.48	-119.54	4,631.82	4,634.32	4,625.61	8.71	532.143	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00usft	Output errors are at	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #1 - Wellbore #1 - Wellbore #1														Offset Site Error:	0.00 usft
Survey Program: 100-MWD														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)					
2,100.00	2,100.00	2,172.74	2,172.27	4.59	4.52	91.46	-117.76	4,630.27	4,632.45	4,623.34	9.11	508.497			
2,200.00	2,200.00	2,252.07	2,251.57	4.82	4.68	91.44	-115.99	4,629.12	4,630.94	4,621.44	9.50	487.548			
2,300.00	2,300.00	2,329.72	2,329.20	5.04	4.84	91.41	-114.26	4,628.37	4,629.92	4,620.04	9.88	468.516			
2,400.00	2,400.00	2,409.61	2,409.07	5.27	5.00	91.39	-112.56	4,627.97	4,629.36	4,619.10	10.27	450.798			
2,500.00	2,500.00	2,500.00	2,499.44	5.49	5.19	91.37	-110.71	4,627.85	4,629.17	4,618.50	10.68	433.520			
2,517.48	2,517.48	2,510.53	2,509.97	5.53	5.21	91.37	-110.49	4,627.85	4,629.17	4,618.43	10.74	431.064			
2,600.00	2,600.00	2,582.23	2,581.65	5.72	5.36	91.35	-109.09	4,627.98	4,629.27	4,618.20	11.07	418.148			
2,700.00	2,700.00	2,662.18	2,661.59	5.94	5.52	91.33	-107.56	4,628.36	4,629.72	4,618.26	11.46	403.987			
2,800.00	2,800.00	2,739.22	2,738.61	6.17	5.68	91.31	-106.03	4,629.11	4,630.54	4,618.80	11.84	390.973			
2,900.00	2,900.00	2,814.79	2,814.16	6.39	5.84	91.29	-104.56	4,630.23	4,632.08	4,619.85	12.23	378.896			
3,000.00	3,000.00	2,900.00	2,899.33	6.61	6.02	91.27	-102.61	4,632.00	4,634.08	4,621.45	12.63	366.991			
3,100.00	3,100.00	2,961.18	2,960.46	6.84	6.15	91.25	-100.92	4,633.63	4,636.62	4,623.64	12.98	357.204			
3,200.00	3,200.00	3,041.80	3,041.00	7.06	6.31	91.22	-98.46	4,636.20	4,639.74	4,626.36	13.37	346.964			
3,300.00	3,300.00	3,134.29	3,133.41	7.29	6.51	91.18	-95.92	4,639.37	4,643.11	4,629.32	13.79	336.803			
3,400.00	3,400.00	3,261.11	3,260.11	7.51	6.76	91.15	-92.87	4,643.65	4,646.48	4,632.21	14.27	325.679			
3,500.00	3,500.00	3,429.73	3,428.64	7.74	7.11	91.09	-88.71	4,647.19	4,648.48	4,633.64	14.84	313.320			
3,600.00	3,600.00	3,554.51	3,553.39	7.96	7.37	91.06	-85.86	4,648.62	4,649.58	4,634.27	15.32	303.540			
3,700.00	3,700.00	3,665.89	3,664.74	8.19	7.60	91.03	-83.57	4,649.43	4,650.27	4,634.50	15.77	294.820			
3,800.00	3,800.00	3,768.39	3,767.21	8.41	7.82	91.00	-81.53	4,650.06	4,650.84	4,634.63	16.21	286.893			
3,900.00	3,900.00	3,855.77	3,854.58	8.64	8.00	90.98	-79.90	4,650.64	4,651.49	4,634.87	16.62	279.915			
4,000.00	4,000.00	3,946.77	3,945.56	8.86	8.19	90.97	-78.49	4,651.56	4,652.47	4,635.44	17.03	273.166			
4,100.00	4,100.00	4,052.12	4,050.90	9.09	8.41	90.95	-77.07	4,652.62	4,653.44	4,635.97	17.48	266.272			
4,200.00	4,200.00	4,188.39	4,187.16	9.31	8.70	90.93	-75.39	4,653.48	4,654.09	4,636.11	17.99	258.751			
4,300.00	4,300.00	4,298.84	4,297.59	9.54	8.94	90.91	-73.99	4,653.48	4,654.07	4,635.63	18.44	252.339			
4,400.00	4,400.00	4,489.75	4,488.47	9.76	9.34	90.91	-73.63	4,651.45	4,653.01	4,633.94	19.07	243.983			
4,429.21	4,429.21	4,521.52	4,520.22	9.83	9.40	90.92	-74.71	4,650.76	4,652.39	4,633.18	19.20	242.267			
4,450.00	4,449.99	4,540.24	4,538.92	9.87	9.44	1.10	-75.38	4,650.35	4,651.54	4,632.24	19.30	241.063			
4,500.00	4,499.78	4,585.02	4,583.66	9.97	9.53	1.14	-77.02	4,649.43	4,646.15	4,626.81	19.35	240.150			
4,550.00	4,548.92	4,632.29	4,630.89	10.08	9.63	1.18	-78.81	4,648.49	4,636.07	4,616.82	19.25	240.799			
4,600.00	4,596.96	4,680.01	4,678.57	10.19	9.73	1.25	-80.61	4,647.54	4,621.35	4,602.34	19.01	243.101			
4,650.00	4,643.45	4,726.09	4,724.61	10.31	9.83	1.33	-82.36	4,646.63	4,602.12	4,583.50	18.62	247.187			
4,700.00	4,687.97	4,770.12	4,768.59	10.46	9.92	1.43	-84.03	4,645.76	4,578.55	4,560.47	18.08	253.192			
4,750.00	4,730.10	4,811.68	4,810.12	10.64	10.00	1.56	-85.60	4,644.93	4,550.88	4,533.46	17.42	261.299			
4,800.00	4,769.47	4,850.40	4,848.80	10.87	10.08	1.72	-87.07	4,644.16	4,519.34	4,502.71	16.63	271.733			
4,850.00	4,805.70	4,885.91	4,884.28	11.17	10.16	1.93	-88.41	4,643.46	4,484.24	4,468.49	15.75	284.745			
4,900.00	4,838.47	4,900.00	4,898.36	11.54	10.19	2.18	-88.94	4,643.18	4,445.92	4,431.16	14.76	301.121			
4,950.00	4,867.46	4,900.00	4,898.36	12.02	10.19	2.51	-88.94	4,643.18	4,404.88	4,391.15	13.73	320.830			
5,000.00	4,892.43	4,900.00	4,898.36	12.59	10.19	2.97	-88.94	4,643.18	4,361.45	4,348.74	12.71	343.165			
5,050.00	4,913.12	4,900.00	4,898.36	13.27	10.19	3.67	-88.94	4,643.18	4,315.96	4,304.19	11.76	366.902			
5,100.00	4,929.37	4,900.00	4,898.36	14.05	10.19	4.84	-88.94	4,643.18	4,268.76	4,257.78	10.98	388.770			
5,150.00	4,941.00	4,900.00	4,898.36	14.92	10.19	7.16	-88.94	4,643.18	4,220.25	4,209.71	10.54	400.289			
5,200.00	4,947.93	4,900.00	4,898.36	15.86	10.19	13.73	-88.94	4,643.18	4,170.84	4,159.55	11.29	369.521			
5,250.00	4,950.07	4,900.00	4,898.36	16.86	10.19	76.82	-88.94	4,643.18	4,120.94	4,094.55	26.39	156.169			
5,256.48	4,950.00	4,900.00	4,898.36	17.00	10.19	104.78	-88.94	4,643.18	4,114.46	4,088.03	26.43	155.688			
5,300.00	4,949.24	4,900.00	4,898.36	17.91	10.19	104.78	-88.94	4,643.18	4,070.96	4,043.65	27.31	149.050			
5,400.00	4,947.50	4,900.00	4,898.36	20.13	10.19	104.78	-88.94	4,643.18	3,970.99	3,941.54	29.46	134.805			
5,500.00	4,945.75	4,900.00	4,898.36	22.46	10.19	104.78	-88.94	4,643.18	3,871.03	3,839.31	31.72	122.044			
5,600.00	4,944.01	4,900.00	4,898.36	24.88	10.19	104.78	-88.94	4,643.18	3,771.07	3,737.01	34.06	110.707			
5,700.00	4,942.26	4,900.00	4,898.36	27.36	10.19	104.78	-88.94	4,643.18	3,671.11	3,634.64	36.47	100.660			
5,800.00	4,940.52	4,900.00	4,898.36	29.90	10.19	104.78	-88.94	4,643.18	3,571.15	3,532.23	38.92	91.747			
5,900.00	4,938.77	4,900.00	4,898.36	32.46	10.19	104.78	-88.94	4,643.18	3,471.20	3,429.79	41.41	83.820			
6,000.00	4,937.03	4,900.00	4,898.36	35.06	10.19	104.78	-88.94	4,643.18	3,371.25	3,327.32	43.93	76.743			

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #1 - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 usft
Survey Program: 100-MWD												Offset Well Error:	0.00 usft
Reference	Offset	Semi-Major Axis		Distance		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footface (ft)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
6,100.00	4,935.28	4,900.00	4,898.36	37.68	10.19	104.78	-88.94	4,643.18	3,271.30	3,224.83	46.47	70.400	
6,200.00	4,933.53	4,900.00	4,898.36	40.32	10.19	104.78	-88.94	4,643.18	3,171.35	3,122.33	49.02	64.690	
6,300.00	4,931.79	4,900.00	4,898.36	42.97	10.19	104.78	-88.94	4,643.18	3,071.41	3,019.82	51.59	59.530	
6,400.00	4,930.04	4,900.00	4,898.36	45.63	10.19	104.78	-88.94	4,643.18	2,971.47	2,917.30	54.18	54.848	
6,500.00	4,928.30	4,900.00	4,898.36	48.31	10.19	104.78	-88.94	4,643.18	2,871.54	2,814.77	56.77	50.583	
6,600.00	4,926.55	4,900.00	4,898.36	50.99	10.19	104.78	-88.94	4,643.18	2,771.61	2,712.24	59.37	46.684	
6,700.00	4,924.81	4,900.00	4,898.36	53.68	10.19	104.78	-88.94	4,643.18	2,671.69	2,609.71	61.98	43.107	
6,800.00	4,923.06	4,900.00	4,898.36	56.38	10.19	104.78	-88.94	4,643.18	2,571.77	2,507.18	64.59	39.815	
6,900.00	4,921.32	4,900.00	4,898.36	59.08	10.19	104.78	-88.94	4,643.18	2,471.86	2,404.65	67.21	36.777	
7,000.00	4,919.57	4,900.00	4,898.36	61.78	10.19	104.78	-88.94	4,643.18	2,371.96	2,302.12	69.84	33.965	
7,100.00	4,917.83	4,900.00	4,898.36	64.49	10.19	104.78	-88.94	4,643.18	2,272.06	2,199.60	72.46	31.354	
7,200.00	4,916.08	4,900.00	4,898.36	67.21	10.19	104.78	-88.94	4,643.18	2,172.18	2,097.08	75.10	28.925	
7,300.00	4,914.34	4,900.00	4,898.36	69.93	10.19	104.78	-88.94	4,643.18	2,072.30	1,994.57	77.73	26.660	
7,400.00	4,912.59	4,900.00	4,898.36	72.65	10.19	104.78	-88.94	4,643.18	1,972.44	1,892.07	80.37	24.543	
7,500.00	4,910.85	4,900.00	4,898.36	75.37	10.19	104.78	-88.94	4,643.18	1,872.59	1,789.59	83.01	22.559	
7,600.00	4,909.10	4,900.00	4,898.36	78.09	10.19	104.78	-88.94	4,643.18	1,772.76	1,687.11	85.65	20.698	
7,700.00	4,907.36	4,900.00	4,898.36	80.82	10.19	104.78	-88.94	4,643.18	1,672.95	1,584.66	88.29	18.948	
7,800.00	4,905.61	4,900.00	4,898.36	83.55	10.19	104.78	-88.94	4,643.18	1,573.17	1,482.23	90.94	17.299	
7,900.00	4,903.87	4,900.00	4,898.36	86.28	10.19	104.78	-88.94	4,643.18	1,473.41	1,379.83	93.59	15.744	
8,000.00	4,902.12	4,900.00	4,898.36	89.01	10.19	104.78	-88.94	4,643.18	1,373.69	1,277.46	96.24	14.274	
8,100.00	4,900.38	4,900.00	4,898.36	91.74	10.19	104.78	-88.94	4,643.18	1,274.02	1,175.13	98.89	12.884	
8,200.00	4,898.63	4,900.00	4,898.36	94.48	10.19	104.78	-88.94	4,643.18	1,174.40	1,072.86	101.54	11.566	
8,300.00	4,896.88	4,900.00	4,898.36	97.21	10.19	104.78	-88.94	4,643.18	1,074.85	970.66	104.19	10.316	
8,400.00	4,895.14	4,900.00	4,898.36	99.95	10.19	104.78	-88.94	4,643.18	975.39	868.54	106.84	9.129	
8,500.00	4,893.39	4,900.00	4,898.36	102.69	10.19	104.78	-88.94	4,643.18	876.05	766.55	109.50	8.001	
8,600.00	4,891.65	4,897.77	4,896.12	105.43	10.18	103.62	-88.86	4,643.23	776.89	664.22	112.67	6.895	
8,700.00	4,889.90	4,894.03	4,892.39	108.17	10.17	101.66	-88.72	4,643.30	677.94	561.81	116.14	5.837	
8,800.00	4,888.16	4,890.29	4,888.66	110.91	10.17	99.66	-88.58	4,643.37	579.34	459.81	119.53	4.847	
8,900.00	4,886.41	4,886.56	4,884.92	113.65	10.16	97.63	-88.43	4,643.45	481.28	358.46	122.82	3.919	
9,000.00	4,884.67	4,882.82	4,881.19	116.39	10.15	95.58	-88.29	4,643.52	384.20	258.19	126.00	3.049	
9,100.00	4,882.92	4,879.08	4,877.46	119.13	10.14	93.50	-88.15	4,643.60	289.05	160.00	129.05	2.240	
9,200.00	4,881.18	4,875.34	4,873.72	121.87	10.14	91.42	-88.01	4,643.67	198.66	66.70	131.97	1.505	
9,300.00	4,879.43	4,871.61	4,869.99	124.62	10.13	89.32	-87.87	4,643.74	123.91	-10.81	134.72	0.920 Level 1	
9,370.73	4,878.20	4,868.96	4,867.35	126.56	10.12	87.83	-87.77	4,643.80	101.78	-34.79	136.57	0.745 Level 1, CC, ES, SF	
9,391.97	4,877.83	4,868.17	4,866.55	127.14	10.12	87.38	-87.74	4,643.81	103.97	-33.13	137.10	0.758 Level 1	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well-McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T1N7S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T1N7S-R30E - McIntyre DK Federal #11 - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 usft
Survey Program: 460-INC-TREND												Offset Well Error:	0.00 usft
Reference		Offset		Semi-Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footface (ft)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	0.00	0.00	0.00	0.00	92.70	-126.80	2,685.21	2,688.20				
100.00	100.00	98.53	98.53	0.10	1.41	92.71	-127.31	2,685.21	2,688.23	2,686.82	1.41	1,908.162	
200.00	200.00	198.89	198.89	0.32	2.84	92.72	-127.54	2,685.21	2,688.24	2,685.27	2.97	905.153	
300.00	300.00	299.25	299.25	0.55	4.27	92.72	-127.48	2,685.21	2,688.23	2,683.70	4.53	593.302	
400.00	400.00	399.60	399.60	0.77	5.70	92.71	-127.14	2,685.21	2,688.22	2,682.13	6.09	441.277	
479.86	479.86	478.61	478.60	0.95	7.05	92.70	-126.84	2,685.21	2,688.20	2,680.69	7.51	357.976	
500.00	500.00	498.78	498.76	1.00	7.58	92.71	-126.88	2,685.21	2,688.21	2,680.18	8.02	334.985	
600.00	600.00	598.88	598.86	1.22	10.20	92.71	-127.03	2,685.21	2,688.21	2,677.63	10.58	254.006	
700.00	700.00	698.97	698.95	1.45	12.82	92.71	-127.11	2,685.21	2,688.22	2,675.08	13.14	204.558	
800.00	800.00	799.06	799.04	1.67	15.44	92.71	-127.12	2,685.21	2,688.22	2,672.52	15.70	171.226	
900.00	900.00	899.15	899.13	1.89	18.06	92.71	-127.06	2,685.21	2,688.21	2,669.96	18.26	147.235	
1,000.00	1,000.00	999.24	999.21	2.12	20.68	92.71	-126.92	2,685.21	2,688.21	2,667.39	20.82	129.141	
1,100.00	1,100.00	1,099.09	1,099.00	2.34	23.22	92.70	-126.80	2,685.21	2,688.20	2,664.95	23.25	115.616	
1,200.00	1,200.00	1,199.09	1,199.00	2.57	25.65	92.70	-126.80	2,685.21	2,688.20	2,662.70	25.51	105.391	
1,300.00	1,300.00	1,299.10	1,299.00	2.79	28.08	92.70	-126.80	2,685.21	2,688.20	2,660.44	27.76	96.827	
1,400.00	1,400.00	1,399.10	1,399.00	3.02	30.51	92.70	-126.80	2,685.21	2,688.20	2,658.18	30.02	89.551	
1,500.00	1,500.00	1,499.11	1,499.00	3.24	32.94	92.70	-126.80	2,685.21	2,688.20	2,655.93	32.27	83.292	
1,600.00	1,600.00	1,599.16	1,599.00	3.47	35.38	92.70	-126.80	2,685.21	2,688.20	2,653.67	34.53	77.857	
1,700.00	1,700.00	1,699.17	1,699.00	3.69	37.81	92.70	-126.80	2,685.21	2,688.20	2,651.43	36.78	73.096	
1,800.00	1,800.00	1,799.17	1,799.00	3.92	40.25	92.70	-126.80	2,685.21	2,688.20	2,649.18	39.02	68.884	
1,900.00	1,900.00	1,899.18	1,899.00	4.14	42.68	92.70	-126.80	2,685.21	2,688.20	2,646.93	41.27	65.131	
2,000.00	2,000.00	1,999.18	1,999.00	4.37	45.12	92.70	-126.80	2,685.21	2,688.20	2,644.68	43.52	61.766	
2,100.00	2,100.00	2,099.87	2,099.63	4.59	47.35	92.70	-126.48	2,685.21	2,688.19	2,642.49	45.70	58.827	
2,200.00	2,200.00	2,199.53	2,199.29	4.82	49.39	92.69	-126.10	2,685.21	2,688.17	2,640.39	47.78	56.260	
2,290.20	2,290.20	2,289.43	2,289.19	5.02	51.23	92.69	-126.00	2,685.21	2,688.16	2,638.50	49.66	54.129	
2,300.00	2,300.00	2,299.20	2,298.96	5.04	51.43	92.69	-126.00	2,685.21	2,688.16	2,638.30	49.87	53.908	
2,400.00	2,400.00	2,398.88	2,398.64	5.27	53.47	92.69	-126.16	2,685.21	2,688.17	2,636.22	51.95	51.744	
2,500.00	2,500.00	2,498.58	2,498.32	5.49	55.51	92.70	-126.58	2,685.21	2,688.19	2,634.15	54.04	49.747	
2,600.00	2,600.00	2,599.27	2,599.00	5.72	57.44	92.70	-126.80	2,685.21	2,688.20	2,632.04	56.17	47.862	
2,700.00	2,700.00	2,699.27	2,699.00	5.94	59.28	92.70	-126.80	2,685.21	2,688.20	2,629.91	58.30	46.113	
2,800.00	2,800.00	2,799.27	2,799.00	6.17	61.12	92.70	-126.80	2,685.21	2,688.20	2,627.78	60.43	44.487	
2,900.00	2,900.00	2,898.92	2,898.65	6.39	63.22	92.71	-127.12	2,685.21	2,688.22	2,625.54	62.68	42.890	
3,000.00	3,000.00	2,999.14	2,998.87	6.61	65.36	92.71	-127.31	2,685.21	2,688.23	2,623.27	64.96	41.386	
3,100.00	3,100.00	3,099.36	3,099.09	6.84	67.51	92.71	-127.33	2,685.21	2,688.23	2,620.99	67.23	39.984	
3,200.00	3,200.00	3,199.58	3,199.31	7.06	69.65	92.71	-127.17	2,685.21	2,688.22	2,618.71	69.51	38.674	
3,300.00	3,300.00	3,299.79	3,299.52	7.29	71.79	92.70	-126.84	2,685.21	2,688.20	2,616.42	71.79	37.446	
3,340.53	3,340.53	3,339.82	3,339.53	7.38	72.70	92.70	-126.80	2,685.21	2,688.20	2,615.50	72.70	36.978	
3,400.00	3,400.00	3,399.29	3,399.00	7.51	74.06	92.70	-126.80	2,685.21	2,688.20	2,614.16	74.05	36.304	
3,500.00	3,500.00	3,499.29	3,499.00	7.74	76.34	92.70	-126.80	2,685.21	2,688.20	2,611.89	76.32	35.225	
3,600.00	3,600.00	3,599.30	3,599.00	7.96	78.63	92.70	-126.80	2,685.21	2,688.20	2,609.62	78.58	34.208	
3,700.00	3,700.00	3,699.30	3,699.00	8.19	80.92	92.70	-126.80	2,685.21	2,688.20	2,607.35	80.85	33.248	
3,800.00	3,800.00	3,799.30	3,799.00	8.41	83.21	92.70	-126.80	2,685.21	2,688.20	2,605.08	83.12	32.340	
3,900.00	3,900.00	3,899.34	3,899.00	8.64	85.49	92.70	-126.80	2,685.21	2,688.20	2,602.82	85.38	31.484	
4,000.00	4,000.00	3,999.34	3,999.00	8.86	87.76	92.70	-126.80	2,685.21	2,688.20	2,600.56	87.64	30.674	
4,100.00	4,100.00	4,099.34	4,099.00	9.09	90.04	92.70	-126.80	2,685.21	2,688.20	2,598.31	89.89	29.904	
4,200.00	4,200.00	4,199.34	4,199.00	9.31	92.31	92.70	-126.80	2,685.21	2,688.20	2,596.05	92.15	29.172	
4,300.00	4,300.00	4,299.35	4,299.00	9.54	94.59	92.70	-126.80	2,685.21	2,688.20	2,593.80	94.40	28.475	
4,400.00	4,400.00	4,399.38	4,399.00	9.76	96.73	92.70	-126.80	2,685.21	2,688.20	2,591.60	96.60	27.829	
4,429.21	4,429.21	4,428.59	4,428.21	9.83	97.33	92.70	-126.80	2,685.21	2,688.20	2,590.97	97.23	27.647	
4,450.00	4,449.99	4,449.37	4,448.99	9.87	97.76	2.88	-126.80	2,685.21	2,687.79	2,580.27	107.52	24.998	
4,500.00	4,499.78	4,499.16	4,498.78	9.97	98.78	2.91	-126.80	2,685.21	2,683.41	2,575.67	107.73	24.908	
4,550.00	4,548.92	4,548.30	4,547.92	10.08	99.78	2.97	-126.80	2,685.21	2,674.28	2,567.35	106.93	25.010	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation

Company:	COC Operating, LLC	Local Co-ordinate Reference:	Well McIntyre/DK/Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre/DK/Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre/DK/Federal #16H - Wellbore #1 - Wellbore #1													Offset Site Error:
Survey Program: 450 INC TREND													Offset Well Error:
Reference	Offset	Semi-Major Axis		Distance		Warning		Offset Wellbore Centre		Between Centres	Between Ellipses	Minimum Separation	Separation Factor
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footface (ft)		N-S (usft)	E-W (usft)	(usft)	(usft)	(usft)	
4,600.00	4,596.96	4,596.34	4,595.96	10.19	100.77	3.07		-126.80	2,685.21	2,660.49	2,555.40	105.09	25.317
4,650.00	4,643.45	4,642.83	4,642.45	10.31	101.72	3.21		-126.80	2,685.21	2,642.16	2,539.95	102.21	25.851
4,700.00	4,687.97	4,687.35	4,686.97	10.46	102.63	3.40		-126.80	2,685.21	2,619.47	2,521.17	98.30	26.648
4,750.00	4,730.10	4,729.49	4,729.10	10.64	103.50	3.65		-126.80	2,685.21	2,592.63	2,499.24	93.39	27.761
4,800.00	4,769.47	4,742.00	4,741.61	10.87	103.76	3.95		-126.80	2,685.21	2,562.01	2,474.91	87.11	29.413
4,850.00	4,805.70	4,742.00	4,741.61	11.17	103.76	4.31		-126.80	2,685.21	2,528.28	2,448.42	79.86	31.657
4,900.00	4,838.47	4,742.00	4,741.61	11.54	103.76	4.78		-126.80	2,685.21	2,491.65	2,419.68	71.97	34.619
4,950.00	4,867.46	4,742.00	4,741.61	12.02	103.76	5.40		-126.80	2,685.21	2,452.34	2,388.78	63.56	38.584
5,000.00	4,892.43	4,742.00	4,741.61	12.59	103.76	6.25		-126.80	2,685.21	2,410.58	2,355.78	54.81	43.983
5,050.00	4,913.12	4,742.00	4,741.61	13.27	103.76	7.46		-126.80	2,685.21	2,366.65	2,320.60	46.05	51.391
5,100.00	4,929.37	4,742.00	4,741.61	14.05	103.76	9.29		-126.80	2,685.21	2,320.84	2,282.77	38.07	60.969
5,150.00	4,941.00	4,742.00	4,741.61	14.92	103.76	12.36		-126.80	2,685.21	2,273.46	2,240.41	33.06	68.777
5,200.00	4,947.93	4,742.00	4,741.61	15.86	103.76	18.40		-126.80	2,685.21	2,224.88	2,187.90	36.98	60.172
5,250.00	4,950.07	4,742.00	4,741.61	16.86	103.76	34.44		-126.80	2,685.21	2,175.46	2,113.08	62.38	34.874
5,256.48	4,950.00	4,742.00	4,741.61	17.00	103.76	38.46		-126.80	2,685.21	2,169.01	2,100.43	68.58	31.626
5,300.00	4,949.24	4,742.00	4,741.61	17.91	103.76	38.46		-126.80	2,685.21	2,125.72	2,056.55	69.17	30.732
5,400.00	4,947.50	4,742.00	4,741.61	20.13	103.76	38.46		-126.80	2,685.21	2,026.26	1,955.67	70.60	28.702
5,500.00	4,945.75	4,742.00	4,741.61	22.46	103.76	38.46		-126.80	2,685.21	1,926.87	1,854.76	72.11	26.722
5,600.00	4,944.01	4,742.00	4,741.61	24.88	103.76	38.46		-126.80	2,685.21	1,827.54	1,753.86	73.68	24.805
5,700.00	4,942.26	4,742.00	4,741.61	27.36	103.76	38.46		-126.80	2,685.21	1,728.28	1,652.99	75.29	22.955
5,800.00	4,940.52	4,742.00	4,741.61	29.90	103.76	38.46		-126.80	2,685.21	1,629.12	1,552.18	76.94	21.174
5,900.00	4,938.77	4,742.00	4,741.61	32.46	103.76	38.46		-126.80	2,685.21	1,530.07	1,451.46	78.61	19.464
6,000.00	4,937.03	4,742.00	4,741.61	35.06	103.76	38.46		-126.80	2,685.21	1,431.15	1,350.84	80.30	17.822
6,100.00	4,935.28	4,742.00	4,741.61	37.68	103.76	38.46		-126.80	2,685.21	1,332.39	1,250.38	82.01	16.246
6,200.00	4,933.53	4,742.00	4,741.61	40.32	103.76	38.46		-126.80	2,685.21	1,233.83	1,150.09	83.73	14.735
6,300.00	4,931.79	4,742.00	4,741.61	42.97	103.76	38.46		-126.80	2,685.21	1,135.52	1,050.05	85.46	13.286
6,400.00	4,930.04	4,742.00	4,741.61	45.63	103.76	38.46		-126.80	2,685.21	1,037.53	950.33	87.20	11.898
6,500.00	4,928.30	4,742.00	4,741.61	48.31	103.76	38.46		-126.80	2,685.21	939.97	851.02	88.95	10.567
6,600.00	4,926.55	4,742.00	4,741.61	50.99	103.76	38.46		-126.80	2,685.21	842.99	752.28	90.71	9.294
6,700.00	4,924.81	4,742.00	4,741.61	53.68	103.76	38.46		-126.80	2,685.21	746.79	654.33	92.46	8.077
6,800.00	4,923.06	4,742.00	4,741.61	56.38	103.76	38.46		-126.80	2,685.21	651.75	557.52	94.23	6.917
6,900.00	4,921.32	4,742.00	4,741.61	59.08	103.76	38.46		-126.80	2,685.21	558.43	462.44	95.99	5.817
7,000.00	4,919.57	4,742.00	4,741.61	61.78	103.76	38.46		-126.80	2,685.21	467.89	370.13	97.76	4.786
7,100.00	4,917.83	4,742.00	4,741.61	64.49	103.76	38.46		-126.80	2,685.21	382.09	282.56	99.54	3.839
7,200.00	4,916.08	4,742.00	4,741.61	67.21	103.76	38.46		-126.80	2,685.21	305.07	203.76	101.31	3.011
7,300.00	4,914.34	4,742.00	4,741.61	69.93	103.76	38.46		-126.80	2,685.21	245.24	142.15	103.09	2.379
7,400.00	4,912.59	4,742.00	4,741.61	72.65	103.76	38.46		-126.80	2,685.21	217.30	112.43	104.87	2.072
7,414.63	4,912.34	4,742.00	4,741.61	73.04	103.76	38.46		-126.80	2,685.21	216.80	111.67	105.13	2.062 CC, ES, SF
7,500.00	4,910.85	4,742.00	4,741.61	75.37	103.76	38.46		-126.80	2,685.21	233.01	126.36	106.65	2.185
7,600.00	4,909.10	4,742.00	4,741.61	78.09	103.76	38.46		-126.80	2,685.21	285.25	176.81	108.43	2.631
7,700.00	4,907.36	4,742.00	4,741.61	80.82	103.76	38.46		-126.80	2,685.21	358.38	248.17	110.22	3.252
7,800.00	4,905.61	4,742.00	4,741.61	83.55	103.76	38.46		-126.80	2,685.21	442.17	330.17	112.00	3.948
7,900.00	4,903.87	4,742.00	4,741.61	86.28	103.76	38.46		-126.80	2,685.21	531.59	417.80	113.79	4.672
8,000.00	4,902.12	4,742.00	4,741.61	89.01	103.76	38.46		-126.80	2,685.21	624.23	508.65	115.58	5.401
8,100.00	4,900.38	4,742.00	4,741.61	91.74	103.76	38.46		-126.80	2,685.21	718.84	601.48	117.37	6.125
8,200.00	4,898.63	4,742.00	4,741.61	94.48	103.76	38.46		-126.80	2,685.21	814.75	695.59	119.16	6.838
8,300.00	4,896.88	4,742.00	4,741.61	97.21	103.76	38.46		-126.80	2,685.21	911.53	790.58	120.95	7.537
8,400.00	4,895.14	4,742.00	4,741.61	99.95	103.76	38.46		-126.80	2,685.21	1,008.94	886.20	122.74	8.220
8,500.00	4,893.39	4,742.00	4,741.61	102.69	103.76	38.46		-126.80	2,685.21	1,106.81	982.28	124.53	8.888
8,600.00	4,891.65	4,742.00	4,741.61	105.43	103.76	38.46		-126.80	2,685.21	1,205.03	1,078.71	126.32	9.539
8,700.00	4,889.90	4,742.00	4,741.61	108.17	103.76	38.46		-126.80	2,685.21	1,303.53	1,175.41	128.12	10.175
8,800.00	4,888.16	4,742.00	4,741.61	110.91	103.76	38.46		-126.80	2,685.21	1,402.23	1,272.32	129.91	10.794

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well: McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00usft	Output errors are at:	2'00' sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #16H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00usft
Survey Program: 460-INC-TREND												Offset Well Error:	0.00usft
Reference		Offset		Semi Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,900.00	4,886.41	4,742.00	4,741.61	113.65	103.76	38.46	-126.80	2,685.21	1,501.11	1,369.40	131.70	11.398	
9,000.00	4,884.67	4,742.00	4,741.61	116.39	103.76	38.46	-126.80	2,685.21	1,600.13	1,466.53	133.50	11.986	
9,100.00	4,882.92	4,742.00	4,741.61	119.13	103.76	38.46	-126.80	2,685.21	1,699.26	1,563.96	135.29	12.560	
9,200.00	4,881.18	4,742.00	4,741.61	121.87	103.76	38.46	-126.80	2,685.21	1,798.49	1,661.40	137.09	13.119	
9,300.00	4,879.43	4,742.00	4,741.61	124.62	103.76	38.46	-126.80	2,685.21	1,897.79	1,758.91	138.89	13.664	
9,391.97	4,877.83	4,742.00	4,741.61	127.14	103.76	38.46	-126.80	2,685.21	1,989.19	1,848.65	140.54	14.154	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #7 - Wellbore #1 - Wellbore #1														Offset Site Error
Survey Program: 100MWD														Offset Well Error
Reference	Offset	Semi-Major Axis		Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Toolface (°)	N/S (usft)	E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor		
0.00	0.00	0.00	0.00	0.00	0.00	161.40	-134.80	45.37	142.41					
100.00	100.00	93.68	93.68	0.10	0.10	161.40	-134.53	45.26	141.94	141.75	0.19	733.498		
200.00	200.00	193.89	193.89	0.32	0.31	161.43	-133.88	44.97	141.23	140.60	0.63	222.440		
300.00	300.00	293.98	293.97	0.55	0.53	161.45	-133.13	44.66	140.43	139.35	1.08	130.605		
400.00	400.00	393.81	393.80	0.77	0.73	161.47	-132.41	44.37	139.65	138.15	1.50	93.047		
500.00	500.00	493.42	493.41	1.00	0.93	161.50	-131.88	44.12	139.07	137.14	1.92	72.329		
575.40	575.40	568.21	568.20	1.17	1.08	161.46	-131.68	44.17	138.90	136.65	2.25	61.860		
600.00	600.00	592.60	592.59	1.22	1.13	161.42	-131.67	44.26	138.91	135.56	2.35	59.095		
700.00	700.00	692.63	692.61	1.45	1.34	161.11	-131.59	45.03	139.08	136.29	2.79	49.903		
800.00	800.00	792.58	792.56	1.67	1.56	160.48	-131.23	46.51	139.23	136.00	3.23	43.139		
900.00	900.00	892.58	892.53	1.89	1.78	159.55	-130.63	48.72	139.41	135.74	3.67	37.982		
1,000.00	1,000.00	992.46	992.37	2.12	1.99	158.51	-129.95	51.17	139.66	135.56	4.10	34.032		
1,100.00	1,100.00	1,092.67	1,092.57	2.34	2.19	157.65	-129.40	53.21	139.91	135.38	4.53	30.888		
1,200.00	1,200.00	1,193.60	1,193.48	2.57	2.40	157.08	-128.73	54.43	139.77	134.81	4.96	28.177		
1,300.00	1,300.00	1,294.02	1,293.90	2.79	2.61	156.73	-127.79	54.97	139.12	133.73	5.39	25.792		
1,400.00	1,400.00	1,393.89	1,393.76	3.02	2.82	156.48	-126.87	55.21	138.37	132.54	5.83	23.744		
1,500.00	1,500.00	1,493.47	1,493.33	3.24	3.02	156.31	-126.21	55.37	137.82	131.56	6.26	22.014		
1,600.00	1,600.00	1,593.55	1,593.42	3.47	3.23	156.21	-125.74	55.42	137.42	130.72	6.70	20.520		
1,700.00	1,700.00	1,693.58	1,693.45	3.69	3.45	156.16	-125.27	55.34	136.95	129.82	7.13	19.199		
1,800.00	1,800.00	1,793.84	1,793.70	3.92	3.66	156.11	-124.70	55.24	136.39	128.82	7.57	18.017		
1,900.00	1,900.00	1,893.55	1,893.41	4.14	3.87	155.98	-124.06	55.28	135.82	127.82	8.00	16.973		
2,000.00	2,000.00	1,993.71	1,993.57	4.37	4.08	155.83	-123.45	55.41	135.32	126.88	8.44	16.040		
2,100.00	2,100.00	2,093.28	2,093.14	4.59	4.28	155.63	-122.88	55.66	134.90	126.03	8.87	15.209		
2,200.00	2,200.00	2,192.95	2,192.81	4.82	4.49	155.30	-122.44	56.32	134.77	125.47	9.30	14.490		
2,202.35	2,202.35	2,195.29	2,195.15	4.82	4.50	155.29	-122.43	56.34	134.77	125.46	9.31	14.475		
2,300.00	2,300.00	2,292.73	2,292.58	5.04	4.70	154.98	-122.20	57.03	134.85	125.12	9.73	13.853		
2,400.00	2,400.00	2,392.48	2,392.33	5.27	4.91	154.71	-122.16	57.71	135.11	124.94	10.17	13.286		
2,500.00	2,500.00	2,492.77	2,492.61	5.49	5.12	154.41	-122.09	58.46	135.36	124.76	10.60	12.767		
2,600.00	2,600.00	2,592.68	2,592.52	5.72	5.33	154.09	-121.90	59.22	135.52	124.49	11.04	12.280		
2,700.00	2,700.00	2,692.29	2,692.13	5.94	5.54	153.81	-121.91	59.96	135.86	124.39	11.47	11.844		
2,800.00	2,800.00	2,792.56	2,792.40	6.17	5.75	153.65	-122.12	60.48	136.28	124.37	11.91	11.445		
2,900.00	2,900.00	2,892.25	2,892.09	6.39	5.96	153.60	-122.41	60.77	136.67	124.33	12.34	11.073		
3,000.00	3,000.00	2,992.70	2,992.54	6.61	6.17	153.57	-122.72	61.00	137.05	124.27	12.78	10.725		
3,100.00	3,100.00	3,093.02	3,092.86	6.84	6.38	153.57	-122.79	61.02	137.12	123.90	13.21	10.378		
3,153.60	3,153.60	3,146.56	3,146.40	6.96	6.49	153.59	-122.79	60.98	137.10	123.65	13.44	10.197		
3,200.00	3,200.00	3,192.88	3,192.72	7.06	6.59	153.59	-122.80	60.98	137.11	123.47	13.65	10.048		
3,300.00	3,300.00	3,293.27	3,293.11	7.29	6.80	153.54	-122.69	61.07	137.04	122.97	14.08	9.734		
3,395.33	3,395.33	3,388.30	3,388.13	7.50	6.99	153.36	-122.39	61.39	136.92	122.43	14.49	9.449		
3,400.00	3,400.00	3,392.95	3,392.78	7.51	7.00	153.35	-122.37	61.42	136.92	122.41	14.51	9.436		
3,500.00	3,500.00	3,492.69	3,492.53	7.74	7.21	153.11	-122.22	61.97	137.03	122.08	14.94	9.169		
3,600.00	3,600.00	3,592.31	3,592.14	7.96	7.42	152.92	-122.30	62.54	137.36	121.99	15.38	8.932		
3,700.00	3,700.00	3,692.95	3,692.78	8.19	7.63	152.67	-122.28	63.19	137.64	121.83	15.81	8.704		
3,800.00	3,800.00	3,792.48	3,792.31	8.41	7.84	152.45	-122.17	63.73	137.79	121.55	16.25	8.481		
3,900.00	3,900.00	3,893.24	3,893.07	8.64	8.05	152.27	-122.07	64.17	137.91	121.23	16.68	8.266		
4,000.00	4,000.00	3,993.88	3,993.71	8.86	8.26	151.97	-121.35	64.61	137.48	120.36	17.12	8.031		
4,089.94	4,089.94	4,082.92	4,082.74	9.06	8.45	151.59	-120.63	65.25	137.15	119.64	17.51	7.834		
4,100.00	4,100.00	4,092.87	4,092.69	9.09	8.47	151.56	-120.60	65.32	137.16	119.61	17.55	7.815		
4,200.00	4,200.00	4,192.32	4,192.13	9.31	8.68	151.30	-120.56	66.02	137.45	119.47	17.98	7.643		
4,300.00	4,300.00	4,292.06	4,291.87	9.54	8.89	151.05	-120.79	66.81	138.04	119.62	18.42	7.494		
4,400.00	4,400.00	4,391.08	4,390.89	9.76	9.10	150.88	-121.46	67.65	139.04	120.19	18.85	7.374		
4,429.21	4,429.21	4,419.91	4,419.71	9.83	9.16	150.87	-121.82	67.89	139.48	120.50	18.98	7.348		
4,450.00	4,449.99	4,440.40	4,440.20	9.87	9.21	61.16	-122.12	68.08	139.64	120.57	19.07	7.321		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre/DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre/DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design Sec 17-T17S-R30E - McIntyre/DK Federal #7 - Wellbore #1 - Wellbore #1														Offset Site Error:	0.00 usft
Survey Program: 100-MWD														Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
4,500.00	4,499.78	4,489.51	4,489.30	9.97	9.31	62.82	-123.03	68.59	138.63	119.38	19.25	7.202			
4,550.00	4,548.92	4,538.04	4,537.81	10.08	9.41	66.42	-124.16	69.18	135.98	116.57	19.42	7.003			
4,600.00	4,596.96	4,585.58	4,585.33	10.19	9.52	71.95	-125.47	69.88	132.51	112.89	19.61	6.756			
4,650.00	4,643.45	4,632.12	4,631.84	10.31	9.61	79.38	-126.92	70.65	129.48	109.61	19.87	6.516			
4,688.00	4,677.49	4,666.35	4,666.05	10.42	9.69	86.03	-128.01	71.18	128.53	108.43	20.10	6.395 CC, ES			
4,700.00	4,687.97	4,676.89	4,676.58	10.46	9.71	88.25	-128.35	71.33	128.65	108.48	20.16	6.380 SF			
4,750.00	4,730.10	4,719.47	4,719.14	10.64	9.80	97.69	-129.72	71.93	132.21	111.82	20.39	6.484			
4,800.00	4,769.47	4,759.50	4,759.14	10.87	9.88	106.63	-130.93	72.47	142.03	121.58	20.45	6.945			
4,850.00	4,805.70	4,796.40	4,796.03	11.17	9.96	114.15	-131.97	72.96	159.03	138.70	20.33	7.822			
4,900.00	4,838.47	4,829.81	4,829.42	11.54	10.03	119.82	-132.87	73.39	183.06	162.93	20.12	9.098			
4,950.00	4,867.46	4,859.50	4,859.10	12.02	10.09	123.54	-133.64	73.79	213.24	193.28	19.96	10.684			
5,000.00	4,892.43	4,885.22	4,884.80	12.59	10.14	125.28	-134.29	74.15	248.48	228.48	20.00	12.422			
5,050.00	4,913.12	4,906.60	4,906.18	13.27	10.19	124.91	-134.83	74.46	287.77	267.34	20.43	14.084			
5,100.00	4,929.37	4,923.36	4,922.94	14.05	10.22	122.05	-135.25	74.70	330.21	308.79	21.43	15.412			
5,150.00	4,941.00	4,935.56	4,935.12	14.92	10.25	116.02	-135.57	74.87	375.03	351.92	23.10	16.232			
5,200.00	4,947.93	4,943.08	4,942.65	15.86	10.26	105.68	-135.76	74.98	421.52	396.20	25.32	16.648			
5,250.00	4,950.07	4,945.89	4,945.45	16.86	10.27	90.14	-135.84	75.02	469.04	441.91	27.13	17.288			
5,256.48	4,950.00	4,945.90	4,945.46	17.00	10.27	87.78	-135.84	75.02	475.25	448.01	27.24	17.444			
5,300.00	4,949.24	4,945.74	4,945.30	17.91	10.27	87.71	-135.83	75.02	517.09	488.94	28.16	18.365			
5,400.00	4,947.50	4,945.38	4,944.94	20.13	10.27	87.55	-135.82	75.01	614.13	583.77	30.37	20.225			
5,500.00	4,945.75	4,945.01	4,944.57	22.46	10.27	87.40	-135.81	75.01	711.99	679.29	32.69	21.778			
5,600.00	4,944.01	4,944.65	4,944.21	24.88	10.27	87.25	-135.80	75.00	810.37	775.26	35.11	23.083			
5,700.00	4,942.26	4,944.28	4,943.84	27.36	10.27	87.09	-135.79	75.00	909.10	871.52	37.58	24.189			
5,800.00	4,940.52	4,943.92	4,943.48	29.90	10.26	86.94	-135.78	74.99	1,008.08	967.98	40.11	25.136			
5,900.00	4,938.77	4,943.56	4,943.12	32.46	10.26	86.79	-135.77	74.99	1,107.25	1,064.58	42.66	25.953			
6,000.00	4,937.03	4,943.20	4,942.76	35.06	10.26	86.64	-135.77	74.98	1,206.55	1,161.30	45.25	26.665			
6,100.00	4,935.28	4,942.84	4,942.40	37.68	10.26	86.49	-135.76	74.98	1,305.96	1,258.10	47.86	27.290			
6,200.00	4,933.53	4,942.48	4,942.05	40.32	10.26	86.34	-135.75	74.97	1,405.45	1,354.97	50.48	27.842			
6,300.00	4,931.79	4,942.13	4,941.69	42.97	10.26	86.19	-135.74	74.97	1,505.01	1,451.90	53.12	28.334			
6,400.00	4,930.04	4,941.77	4,941.33	45.63	10.26	86.04	-135.73	74.96	1,604.63	1,548.86	55.76	28.775			
6,500.00	4,928.30	4,941.42	4,940.98	48.31	10.26	85.89	-135.72	74.96	1,704.29	1,645.87	58.42	29.172			
6,600.00	4,926.55	4,941.06	4,940.63	50.99	10.26	85.74	-135.71	74.95	1,803.98	1,742.90	61.09	29.532			
6,700.00	4,924.81	4,940.71	4,940.27	53.68	10.26	85.59	-135.70	74.95	1,903.71	1,839.96	63.76	29.859			
6,800.00	4,923.06	4,940.36	4,939.92	56.38	10.26	85.45	-135.69	74.94	2,003.47	1,937.04	66.43	30.158			
6,900.00	4,921.32	4,940.01	4,939.57	59.08	10.26	85.30	-135.68	74.94	2,103.25	2,034.14	69.11	30.433			
7,000.00	4,919.57	4,939.66	4,939.23	61.78	10.26	85.15	-135.67	74.93	2,203.05	2,131.25	71.79	30.686			
7,100.00	4,917.83	4,939.31	4,938.88	64.49	10.25	85.01	-135.66	74.93	2,302.86	2,228.39	74.48	30.919			
7,200.00	4,916.08	4,938.97	4,938.53	67.21	10.25	84.86	-135.65	74.92	2,402.70	2,325.53	77.17	31.136			
7,300.00	4,914.34	4,938.62	4,938.19	69.93	10.25	84.72	-135.65	74.92	2,502.54	2,422.69	79.86	31.338			
7,400.00	4,912.59	4,938.28	4,937.84	72.65	10.25	84.57	-135.64	74.91	2,602.40	2,519.85	82.55	31.527			
7,500.00	4,910.85	4,937.93	4,937.50	75.37	10.25	84.43	-135.63	74.91	2,702.27	2,617.03	85.24	31.703			
7,600.00	4,909.10	4,937.59	4,937.16	78.09	10.25	84.29	-135.62	74.90	2,802.14	2,714.21	87.93	31.868			
7,700.00	4,907.36	4,937.25	4,936.81	80.82	10.25	84.14	-135.61	74.90	2,902.03	2,811.41	90.62	32.024			
7,800.00	4,905.61	4,936.91	4,936.47	83.55	10.25	84.00	-135.60	74.89	3,001.92	2,908.61	93.31	32.171			
7,900.00	4,903.87	4,936.57	4,936.14	86.28	10.25	83.86	-135.59	74.89	3,101.82	3,005.82	96.00	32.309			
8,000.00	4,902.12	4,936.23	4,935.80	89.01	10.25	83.72	-135.58	74.88	3,201.73	3,103.03	98.70	32.440			
8,100.00	4,900.38	4,935.89	4,935.46	91.74	10.25	83.58	-135.57	74.88	3,301.64	3,200.25	101.39	32.565			
8,200.00	4,898.63	4,935.56	4,935.12	94.48	10.25	83.44	-135.57	74.87	3,401.56	3,297.48	104.08	32.683			
8,300.00	4,896.88	4,935.22	4,934.79	97.21	10.25	83.30	-135.56	74.87	3,501.48	3,394.71	106.77	32.795			
8,400.00	4,895.14	4,934.89	4,934.46	99.95	10.25	83.16	-135.55	74.87	3,601.40	3,491.95	109.46	32.903			
8,500.00	4,893.39	4,934.56	4,934.12	102.69	10.24	83.02	-135.54	74.86	3,701.33	3,589.19	112.14	33.005			
8,600.00	4,891.65	4,934.22	4,933.79	105.43	10.24	82.88	-135.53	74.86	3,801.27	3,686.44	114.83	33.103			

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T1-S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T1-S-R30E - McIntyre DK Federal #7 - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00 usft
Survey Program: 100 MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi-Major Axis		Distance							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N/S (usft)	Offset Wellbore Centre E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,700.00	4,889.90	4,933.89	4,933.46	108.17	10.24	82.74	-135.52	74.85	3,901.20	3,783.69	117.52	33.197	
8,800.00	4,888.16	4,933.56	4,933.13	110.91	10.24	82.60	-135.51	74.85	4,001.14	3,880.94	120.20	33.287	
8,900.00	4,886.41	4,933.23	4,932.80	113.65	10.24	82.47	-135.51	74.84	4,101.09	3,978.20	122.88	33.374	
9,000.00	4,884.67	4,932.91	4,932.47	116.39	10.24	82.33	-135.50	74.84	4,201.03	4,075.47	125.56	33.457	
9,100.00	4,882.92	4,932.58	4,932.15	119.13	10.24	82.19	-135.49	74.83	4,300.98	4,172.74	128.24	33.538	
9,200.00	4,881.18	4,932.25	4,931.82	121.87	10.24	82.06	-135.48	74.83	4,400.93	4,270.01	130.92	33.615	
9,300.00	4,879.43	4,931.93	4,931.50	124.62	10.24	81.92	-135.47	74.82	4,500.88	4,367.28	133.60	33.690	
9,391.97	4,877.83	4,931.63	4,931.20	127.14	10.24	81.80	-135.46	74.82	4,592.81	4,456.75	136.06	33.756	



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660'00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660'00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2:00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #8 - Wellbore #1 - Wellbore #1													Offset Site Error:
Survey Program: 100 MWD													Offset Well Error:
Reference													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Semi Major Axis (usft)	Highside Footface (ft)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor
0.00	0.00	0.00	0.00	0.00	0.00	95.47		-130.80	1,365.37	1,371.66			
100.00	100.00	93.90	93.90	0.10	0.11	95.48		-130.86	1,365.21	1,371.48	1,371.28	0.20	6,780.981
185.26	185.26	174.76	174.76	0.29	0.27	95.48		-130.91	1,365.06	1,371.32	1,370.77	0.55	2,477.143
200.00	200.00	188.63	188.63	0.32	0.29	95.48		-130.90	1,365.06	1,371.33	1,370.71	0.62	2,229.583
300.00	300.00	289.78	289.78	0.55	0.50	95.47		-130.80	1,365.13	1,371.38	1,370.33	1.05	1,305.532
400.00	400.00	391.76	391.76	0.77	0.73	95.47		-130.65	1,365.05	1,371.29	1,369.79	1.50	916.169
500.00	500.00	493.40	493.40	1.00	0.95	95.46		-130.45	1,364.84	1,371.06	1,369.11	1.95	704.505
600.00	600.00	593.01	593.01	1.22	1.16	95.45		-130.20	1,364.58	1,370.79	1,368.40	2.38	575.348
700.00	700.00	689.96	689.96	1.45	1.36	95.44		-129.97	1,364.46	1,370.63	1,367.83	2.80	489.286
713.63	713.63	703.13	703.13	1.48	1.38	95.44		-129.95	1,364.46	1,370.63	1,367.77	2.86	479.542
800.00	800.00	786.34	786.34	1.67	1.55	95.43		-129.80	1,364.57	1,370.73	1,367.51	3.22	425.732
900.00	900.00	872.67	872.67	1.89	1.73	95.42		-129.64	1,365.16	1,371.41	1,367.79	3.62	378.569
1,000.00	1,000.00	967.38	967.38	2.12	1.93	95.41		-129.53	1,366.64	1,372.95	1,368.90	4.05	339.234
1,100.00	1,100.00	1,070.99	1,070.99	2.34	2.15	95.40		-129.35	1,368.25	1,374.48	1,369.99	4.49	306.017
1,200.00	1,200.00	1,172.21	1,172.17	2.57	2.36	95.39		-129.16	1,369.55	1,375.74	1,370.81	4.93	279.073
1,300.00	1,300.00	1,280.28	1,280.24	2.79	2.59	95.37		-128.88	1,370.71	1,376.79	1,371.41	5.38	255.789
1,400.00	1,400.00	1,388.23	1,388.19	3.02	2.81	95.36		-128.57	1,371.14	1,377.15	1,371.32	5.83	236.111
1,500.00	1,500.00	1,488.74	1,488.70	3.24	3.02	95.35		-128.43	1,371.20	1,377.20	1,370.93	6.27	219.718
1,600.00	1,600.00	1,590.74	1,590.69	3.47	3.24	95.35		-128.32	1,371.21	1,377.20	1,370.49	6.71	205.360
1,700.00	1,700.00	1,694.02	1,693.97	3.69	3.46	95.34		-128.22	1,371.01	1,377.00	1,369.85	7.15	192.635
1,800.00	1,800.00	1,791.02	1,790.97	3.92	3.66	95.34		-128.02	1,370.80	1,376.77	1,369.19	7.58	181.691
1,900.00	1,900.00	1,893.65	1,893.60	4.14	3.87	95.33		-127.81	1,370.63	1,376.58	1,368.57	8.02	171.725
2,000.00	2,000.00	1,994.54	1,994.49	4.37	4.08	95.32		-127.71	1,370.30	1,376.25	1,367.80	8.45	162.853
2,100.00	2,100.00	2,094.14	2,094.09	4.59	4.29	95.32		-127.61	1,369.96	1,375.90	1,367.01	8.88	154.875
2,200.00	2,200.00	2,192.28	2,192.23	4.82	4.50	95.32		-127.45	1,369.71	1,375.63	1,366.31	9.31	147.687
2,300.00	2,300.00	2,293.68	2,293.63	5.04	4.71	95.30		-127.16	1,369.49	1,375.39	1,365.64	9.75	141.012
2,400.00	2,400.00	2,392.28	2,392.22	5.27	4.92	95.29		-126.68	1,369.28	1,375.13	1,364.94	10.19	134.960
2,500.00	2,500.00	2,494.28	2,494.22	5.49	5.14	95.26		-126.08	1,369.07	1,374.87	1,364.24	-10.63	129.344
2,600.00	2,600.00	2,594.03	2,593.98	5.72	5.35	95.24		-125.50	1,368.78	1,374.53	1,363.47	11.06	124.226
2,700.00	2,700.00	2,692.11	2,692.05	5.94	5.56	95.21		-124.87	1,368.59	1,374.27	1,362.78	11.50	119.533
2,800.00	2,800.00	2,792.81	2,792.75	6.17	5.77	95.18		-124.17	1,368.44	1,374.07	1,362.14	11.93	115.140
2,900.00	2,900.00	2,893.68	2,893.61	6.39	5.98	95.16		-123.44	1,368.24	1,373.80	1,361.43	12.37	111.030
3,000.00	3,000.00	2,991.87	2,991.81	6.61	6.19	95.13		-122.75	1,368.06	1,373.56	1,360.76	12.80	107.283
3,100.00	3,100.00	3,090.12	3,090.05	6.84	6.39	95.10		-122.20	1,368.01	1,373.46	1,360.23	13.23	103.834
3,130.31	3,130.31	3,119.88	3,119.81	6.91	6.45	95.10		-122.06	1,368.02	1,373.45	1,360.10	13.36	102.828
3,200.00	3,200.00	3,188.26	3,188.19	7.06	6.59	95.08		-121.71	1,368.08	1,373.49	1,359.83	13.66	100.583
3,300.00	3,300.00	3,289.63	3,289.56	7.29	6.81	95.06		-121.04	1,368.20	1,373.55	1,359.45	14.10	97.446
3,400.00	3,400.00	3,390.17	3,390.10	7.51	7.02	95.02		-120.20	1,368.25	1,373.52	1,358.98	14.54	94.489
3,500.00	3,500.00	3,492.07	3,491.99	7.74	7.24	94.99		-119.38	1,368.21	1,373.41	1,358.43	14.98	91.711
3,600.00	3,600.00	3,594.32	3,594.24	7.96	7.45	94.96		-118.60	1,368.01	1,373.15	1,357.73	15.41	89.084
3,700.00	3,700.00	3,695.98	3,695.90	8.19	7.67	94.92		-117.81	1,367.66	1,372.74	1,356.89	15.85	86.594
3,800.00	3,800.00	3,794.89	3,794.80	8.41	7.87	94.89		-117.08	1,367.30	1,372.31	1,356.03	16.28	84.280
3,900.00	3,900.00	3,893.57	3,893.48	8.64	8.08	94.87		-116.42	1,367.02	1,371.97	1,355.26	16.71	82.102
3,988.75	3,988.75	3,978.34	3,978.25	8.84	8.25	94.85		-115.96	1,366.93	1,371.84	1,354.75	17.08	80.298
4,000.00	4,000.00	3,989.06	3,988.97	8.86	8.27	94.85		-115.90	1,366.93	1,371.84	1,354.71	17.13	80.076
4,100.00	4,100.00	4,089.75	4,089.66	9.09	8.48	94.82		-115.36	1,367.02	1,371.88	1,354.31	17.57	78.101
4,200.00	4,200.00	4,189.76	4,189.67	9.31	8.69	94.80		-114.79	1,367.05	1,371.86	1,353.86	18.00	76.213
4,225.63	4,225.63	4,215.23	4,215.13	9.37	8.74	94.79		-114.61	1,367.06	1,371.86	1,353.74	18.11	75.746
4,300.00	4,300.00	4,288.85	4,288.75	9.54	8.90	94.77		-114.15	1,367.12	1,371.88	1,353.44	18.43	74.428
4,400.00	4,400.00	4,389.48	4,389.38	9.76	9.11	94.75		-113.51	1,367.21	1,371.91	1,353.05	18.87	72.713
4,429.21	4,429.21	4,419.01	4,418.91	9.83	9.17	94.74		-113.30	1,367.23	1,371.91	1,352.92	19.00	72.225
4,450.00	4,449.99	4,440.05	4,439.95	9.87	9.22	4.91		-113.16	1,367.23	1,371.50	1,352.42	19.07	71.905

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #8 - Wellbore #1 - Wellbore #1														Offset Site Error:	0.00 usft
Survey Program: 100MWD														Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance									
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footcandle (°)	Offset Wellbore Centre (N/S)	Offset Wellbore Centre (E/W)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
4,500.00	4,499.78	4,490.44	4,490.34	9.97	9.32	4.95	-112.86	1,367.23	1,367.10	1,347.95	19.14	71.413			
4,550.00	4,548.92	4,540.06	4,539.96	10.08	9.42	5.07	-112.60	1,367.20	1,357.94	1,338.88	19.06	71.233			
4,600.00	4,596.96	4,588.53	4,588.42	10.19	9.53	5.25	-112.32	1,367.16	1,344.12	1,325.29	18.83	71.368			
4,650.00	4,643.45	4,634.98	4,634.87	10.31	9.62	5.51	-112.05	1,367.12	1,325.78	1,307.32	18.46	71.829			
4,700.00	4,687.97	4,679.31	4,679.21	10.46	9.72	5.88	-111.81	1,367.08	1,303.08	1,285.14	17.94	72.624			
4,750.00	4,730.10	4,720.24	4,720.14	10.64	9.80	6.37	-111.61	1,367.05	1,276.26	1,258.96	17.30	73.772			
4,800.00	4,769.47	4,757.60	4,757.49	10.87	9.88	7.01	-111.51	1,367.07	1,245.61	1,229.06	16.55	75.270			
4,850.00	4,805.70	4,792.07	4,791.97	11.17	9.95	7.88	-111.50	1,367.14	1,211.41	1,195.69	15.72	77.068			
4,900.00	4,838.47	4,825.03	4,824.93	11.54	10.02	9.06	-111.55	1,367.23	1,173.94	1,159.08	14.86	79.023			
4,950.00	4,867.46	4,854.70	4,854.60	12.02	10.08	10.72	-111.61	1,367.29	1,133.50	1,119.47	14.03	80.817			
5,000.00	4,892.43	4,880.22	4,880.11	12.59	10.13	13.10	-111.68	1,367.33	1,090.48	1,077.13	13.35	81.686			
5,050.00	4,913.12	4,901.29	4,901.19	13.27	10.17	16.72	-111.76	1,367.36	1,045.29	1,032.22	13.07	79.989			
5,100.00	4,929.37	4,917.28	4,917.17	14.05	10.21	22.60	-111.81	1,367.37	998.35	984.68	13.67	73.020			
5,150.00	4,941.00	4,928.77	4,928.67	14.92	10.23	33.21	-111.84	1,367.39	950.11	933.93	16.18	58.720			
5,200.00	4,947.93	4,935.66	4,935.56	15.86	10.25	54.39	-111.86	1,367.40	901.01	879.07	21.94	41.060			
5,250.00	4,950.07	4,937.87	4,937.76	16.86	10.25	91.19	-111.87	1,367.41	851.52	824.42	27.11	31.414			
5,256.48	4,950.00	4,937.81	4,937.70	17.00	10.25	96.30	-111.86	1,367.41	845.10	817.99	27.11	31.172			
5,300.00	4,949.24	4,937.14	4,937.03	17.91	10.25	95.98	-111.86	1,367.41	802.02	773.99	28.03	28.610			
5,400.00	4,947.50	4,935.59	4,935.49	20.13	10.25	95.22	-111.86	1,367.40	703.23	672.97	30.27	23.235			
5,500.00	4,945.75	4,934.04	4,933.94	22.46	10.24	94.46	-111.86	1,367.40	604.84	572.22	32.62	18.543			
5,600.00	4,944.01	4,932.48	4,932.38	24.88	10.24	93.69	-111.85	1,367.40	507.07	472.01	35.06	14.464			
5,700.00	4,942.26	4,930.92	4,930.81	27.36	10.24	92.92	-111.85	1,367.40	410.37	372.81	37.56	10.926			
5,800.00	4,940.52	4,929.35	4,929.24	29.90	10.23	92.15	-111.84	1,367.39	315.72	275.62	40.10	7.873			
5,900.00	4,938.77	4,927.76	4,927.66	32.46	10.23	91.37	-111.84	1,367.39	225.72	183.04	42.68	5.289			
6,000.00	4,937.03	4,926.18	4,926.07	35.06	10.23	90.58	-111.84	1,367.39	149.06	103.78	45.28	3.292			
6,093.70	4,935.39	4,924.68	4,924.57	37.51	10.22	89.84	-111.83	1,367.39	115.94	68.20	47.73	2.429 CC, ES			
6,100.00	4,935.28	4,924.58	4,924.47	37.68	10.22	89.79	-111.83	1,367.39	116.11	68.21	47.90	2.424 SF			
6,200.00	4,933.53	4,922.98	4,922.87	40.32	10.22	89.00	-111.83	1,367.38	157.28	106.76	50.52	3.113			
6,300.00	4,931.79	4,921.36	4,921.26	42.97	10.22	88.21	-111.82	1,367.38	236.62	183.47	53.15	4.452			
6,400.00	4,930.04	4,919.74	4,919.64	45.63	10.21	87.41	-111.82	1,367.38	327.47	271.69	55.78	5.870			
6,500.00	4,928.30	4,918.12	4,918.01	48.31	10.21	86.60	-111.81	1,367.38	422.47	364.06	58.41	7.233			
6,600.00	4,926.55	4,916.48	4,916.38	50.99	10.21	85.80	-111.81	1,367.37	519.34	458.31	61.03	8.509			
6,700.00	4,924.81	4,914.84	4,914.73	53.68	10.20	84.99	-111.80	1,367.37	617.21	553.56	63.64	9.698			
6,800.00	4,923.06	4,913.19	4,913.08	56.38	10.20	84.18	-111.80	1,367.37	715.66	649.42	66.25	10.803			
6,900.00	4,921.32	4,911.53	4,911.42	59.08	10.20	83.37	-111.79	1,367.37	814.49	745.66	68.83	11.833			
7,000.00	4,919.57	4,909.86	4,909.76	61.78	10.19	82.56	-111.79	1,367.37	913.57	842.17	71.40	12.795			
7,100.00	4,917.83	4,908.19	4,908.08	64.49	10.19	81.75	-111.78	1,367.36	1,012.83	938.87	73.95	13.695			
7,200.00	4,916.08	4,906.50	4,906.40	67.21	10.18	80.93	-111.78	1,367.36	1,112.22	1,035.73	76.48	14.542			
7,300.00	4,914.34	4,904.81	4,904.70	69.93	10.18	80.12	-111.77	1,367.36	1,211.70	1,132.71	78.99	15.339			
7,400.00	4,912.59	4,903.11	4,903.00	72.65	10.18	79.30	-111.76	1,367.36	1,311.27	1,229.79	81.48	16.094			
7,500.00	4,910.85	4,901.40	4,901.29	75.37	10.17	78.49	-111.76	1,367.36	1,410.89	1,326.95	83.94	16.809			
7,600.00	4,909.10	4,900.00	4,899.89	78.09	10.17	77.83	-111.75	1,367.35	1,510.56	1,424.14	86.41	17.481			
7,700.00	4,907.36	4,898.11	4,898.00	80.82	10.17	76.94	-111.75	1,367.35	1,610.27	1,521.47	88.79	18.135			
7,800.00	4,905.61	4,896.52	4,896.41	83.55	10.16	76.19	-111.74	1,367.35	1,710.01	1,618.82	91.19	18.752			
7,900.00	4,903.87	4,894.94	4,894.83	86.28	10.16	75.45	-111.73	1,367.35	1,809.78	1,716.21	93.57	19.342			
8,000.00	4,902.12	4,893.36	4,893.25	89.01	10.16	74.73	-111.73	1,367.35	1,909.57	1,813.66	95.91	19.909			
8,100.00	4,900.38	4,891.79	4,891.68	91.74	10.15	74.00	-111.72	1,367.35	2,009.38	1,911.15	98.23	20.455			
8,200.00	4,898.63	4,890.22	4,890.12	94.48	10.15	73.29	-111.72	1,367.34	2,109.21	2,008.68	100.53	20.981			
8,300.00	4,896.88	4,888.66	4,888.56	97.21	10.15	72.59	-111.71	1,367.34	2,209.05	2,106.26	102.80	21.489			
8,400.00	4,895.14	4,887.11	4,887.00	99.95	10.14	71.89	-111.71	1,367.34	2,308.91	2,203.87	105.04	21.982			
8,500.00	4,893.39	4,885.56	4,885.46	102.69	10.14	71.20	-111.70	1,367.34	2,408.77	2,301.52	107.25	22.460			
8,600.00	4,891.65	4,884.02	4,883.91	105.43	10.14	70.52	-111.70	1,367.34	2,508.65	2,399.22	109.43	22.924			

CC - Min centre to center distance or covergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well: McIntyre-DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00usft	North Reference:	Grid
Reference Well:	McIntyre-DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDM0BBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre-DK Federal #8 - Wellbore #1 - Wellbore #1												Offset Site Error:	0.00usft
Survey Program: 100-MWD												Offset Well Error:	0.00usft
Reference: Offset Semi-Major Axis Distance													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footface (ft)	Offset Wellbore Centre N/S (usft)	Offset Wellbore Centre E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
8,700.00	4,889.90	4,882.48	4,882.38	108.17	10.13	69.84	-111.69	1,367.34	2,608.53	2,496.94	111.59	23.376	
8,800.00	4,888.16	4,880.95	4,880.85	110.91	10.13	69.18	-111.69	1,367.33	2,708.43	2,594.71	113.72	23.817	
8,900.00	4,886.41	4,879.43	4,879.32	113.65	10.13	68.52	-111.68	1,367.33	2,808.32	2,692.50	115.82	24.248	
9,000.00	4,884.67	4,877.91	4,877.80	116.39	10.13	67.87	-111.68	1,367.33	2,908.23	2,790.34	117.89	24.669	
9,100.00	4,882.92	4,876.40	4,876.29	119.13	10.12	67.23	-111.67	1,367.33	3,008.14	2,888.20	119.94	25.081	
9,200.00	4,881.18	4,874.89	4,874.78	121.87	10.12	66.60	-111.67	1,367.32	3,108.05	2,986.10	121.95	25.486	
9,300.00	4,879.43	4,873.39	4,873.28	124.62	10.12	65.98	-111.66	1,367.32	3,207.97	3,084.03	123.94	25.883	
9,391.97	4,877.83	4,872.01	4,871.90	127.14	10.11	65.41	-111.66	1,367.32	3,299.88	3,174.13	125.75	26.243	

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17 T17S R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Offset Design: Sec 17 T17S R30E - McIntyre DK Federal #9 - Wellbore #1 - Wellbore #1													Offset Site Error:	0.00 usft
Survey Program: 462 INC TREND													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N/S (usft)	E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	91.76	-122.80	4,005.20	4,007.08					
100.00	100.00	95.78	95.77	0.10	1.83	91.78	-124.12	4,005.20	4,007.12	4,005.75	1.37	2,919.663		
200.00	200.00	196.73	196.72	0.32	3.76	91.78	-124.77	4,005.20	4,007.14	4,004.20	2.94	1,362.219		
300.00	300.00	297.64	297.63	0.55	5.69	91.78	-124.65	4,005.20	4,007.14	4,002.63	4.51	888.454		
400.00	400.00	398.50	398.50	0.77	7.62	91.77	-123.75	4,005.20	4,007.11	4,001.03	6.08	659.269		
500.00	500.00	497.54	497.44	1.00	9.89	91.75	-122.66	4,005.20	4,007.08	3,999.29	7.79	514.373		
600.00	600.00	597.31	597.19	1.22	12.88	91.75	-122.39	4,005.20	4,007.07	3,997.25	9.82	408.207		
688.29	688.29	685.41	685.27	1.42	15.51	91.75	-122.31	4,005.20	4,007.07	3,995.46	11.61	345.278		
700.00	700.00	697.10	696.96	1.45	15.86	91.75	-122.31	4,005.20	4,007.07	3,995.22	11.84	338.357		
800.00	800.00	796.90	796.74	1.67	18.85	91.75	-122.43	4,005.20	4,007.07	3,993.20	13.87	288.912		
900.00	900.00	896.73	896.55	1.89	21.84	91.76	-122.75	4,005.20	4,007.08	3,991.18	15.90	252.069		
1,000.00	1,000.00	997.48	997.17	2.12	24.79	91.75	-122.64	4,005.20	4,007.08	3,988.73	18.35	218.370		
1,100.00	1,100.00	1,097.38	1,097.06	2.34	27.70	91.75	-122.55	4,005.20	4,007.07	3,986.23	20.84	192.272		
1,159.62	1,159.62	1,156.94	1,156.61	2.48	29.44	91.75	-122.53	4,005.20	4,007.07	3,984.75	22.33	179.482		
1,200.00	1,200.00	1,197.29	1,196.95	2.57	30.62	91.75	-122.54	4,005.20	4,007.07	3,983.74	23.33	171.744		
1,300.00	1,300.00	1,297.20	1,296.86	2.79	33.54	91.75	-122.62	4,005.20	4,007.08	3,981.25	25.82	155.176		
1,400.00	1,400.00	1,397.12	1,396.77	3.02	36.45	91.76	-122.78	4,005.20	4,007.08	3,978.77	28.31	141.523		
1,500.00	1,500.00	1,498.10	1,497.65	3.24	38.77	91.75	-122.14	4,005.20	4,007.06	3,976.37	30.69	130.572		
1,600.00	1,600.00	1,597.68	1,597.22	3.47	41.01	91.74	-121.77	4,005.20	4,007.05	3,974.03	33.02	121.347		
1,655.02	1,655.02	1,652.47	1,652.01	3.59	42.24	91.74	-121.72	4,005.20	4,007.05	3,972.74	34.31	116.806		
1,700.00	1,700.00	1,697.27	1,696.80	3.69	43.24	91.74	-121.76	4,005.20	4,007.05	3,971.70	35.35	113.339		
1,800.00	1,800.00	1,796.87	1,796.40	3.92	45.48	91.75	-122.09	4,005.20	4,007.06	3,969.37	37.69	106.321		
1,900.00	1,900.00	1,896.48	1,896.00	4.14	47.71	91.76	-122.77	4,005.20	4,007.08	3,967.06	40.02	100.121		
2,000.00	2,000.00	1,897.34	1,896.84	4.37	49.55	91.76	-122.97	4,005.20	4,007.09	3,964.91	42.18	95.008		
2,100.00	2,100.00	2,097.44	2,096.95	4.59	51.36	91.76	-123.06	4,005.20	4,007.09	3,962.78	44.31	90.435		
2,200.00	2,200.00	2,197.55	2,197.05	4.82	53.16	91.76	-123.06	4,005.20	4,007.09	3,960.65	46.44	86.283		
2,300.00	2,300.00	2,297.66	2,297.16	5.04	54.97	91.76	-122.97	4,005.20	4,007.09	3,958.51	48.57	82.495		
2,379.85	2,379.85	2,377.59	2,377.09	5.22	56.41	91.76	-122.84	4,005.20	4,007.08	3,956.81	50.28	79.701		
2,400.00	2,400.00	2,397.00	2,396.49	5.27	56.76	91.76	-122.80	4,005.20	4,007.08	3,956.39	50.69	79.049		
2,500.00	2,500.00	2,496.89	2,496.38	5.49	59.25	91.77	-123.50	4,005.20	4,007.10	3,954.11	52.99	75.614		
2,600.00	2,600.00	2,597.33	2,596.81	5.72	61.75	91.77	-123.84	4,005.20	4,007.11	3,951.81	55.31	72.451		
2,700.00	2,700.00	2,697.75	2,697.24	5.94	64.24	91.77	-123.84	4,005.20	4,007.11	3,949.49	57.62	69.542		
2,800.00	2,800.00	2,798.15	2,797.64	6.17	66.74	91.77	-123.47	4,005.20	4,007.10	3,947.17	59.93	66.859		
2,900.00	2,900.00	2,897.59	2,897.00	6.39	69.23	91.76	-122.80	4,005.20	4,007.08	3,944.86	62.23	64.396		
3,000.00	3,000.00	2,997.60	2,997.00	6.61	72.11	91.76	-122.80	4,005.20	4,007.08	3,942.57	64.51	62.116		
3,100.00	3,100.00	3,097.61	3,097.00	6.84	74.99	91.76	-122.80	4,005.20	4,007.08	3,940.29	66.79	59.992		
3,200.00	3,200.00	3,197.62	3,197.00	7.06	77.87	91.76	-122.80	4,005.20	4,007.08	3,938.00	69.08	58.008		
3,300.00	3,300.00	3,297.63	3,297.00	7.29	80.75	91.76	-122.80	4,005.20	4,007.08	3,935.72	71.36	56.151		
3,361.48	3,361.48	3,359.12	3,358.48	7.43	82.53	91.76	-122.80	4,005.20	4,007.08	3,934.32	72.77	55.068		
3,400.00	3,400.00	3,397.50	3,396.74	7.51	83.64	91.76	-122.81	4,005.20	4,007.08	3,933.44	73.64	54.413		
3,500.00	3,500.00	3,497.63	3,496.85	7.74	86.63	91.76	-122.98	4,005.20	4,007.09	3,931.17	75.92	52.782		
3,600.00	3,600.00	3,597.75	3,596.96	7.96	89.62	91.76	-123.07	4,005.20	4,007.09	3,928.90	78.19	51.247		
3,700.00	3,700.00	3,697.86	3,697.06	8.19	92.62	91.76	-123.06	4,005.20	4,007.09	3,926.62	80.47	49.798		
3,800.00	3,800.00	3,797.96	3,797.16	8.41	95.61	91.76	-122.97	4,005.20	4,007.09	3,924.35	82.74	48.429		
3,900.00	3,900.00	3,898.75	3,897.78	8.64	98.60	91.76	-122.76	4,005.20	4,007.08	3,922.06	85.02	47.129		
4,000.00	4,000.00	3,998.41	3,997.44	8.86	101.30	91.75	-122.26	4,005.20	4,007.07	3,919.87	87.19	45.957		
4,100.00	4,100.00	4,098.10	4,097.12	9.09	103.99	91.74	-122.01	4,005.20	4,007.06	3,917.70	89.36	44.842		
4,144.40	4,144.40	4,142.38	4,141.38	9.19	105.19	91.74	-121.98	4,005.20	4,007.06	3,916.73	90.32	44.363		
4,200.00	4,200.00	4,197.82	4,196.81	9.31	106.69	91.75	-122.02	4,005.20	4,007.06	3,915.53	91.53	43.779		
4,300.00	4,300.00	4,297.55	4,296.53	9.54	109.38	91.75	-122.30	4,005.20	4,007.07	3,913.37	93.70	42.765		
4,400.00	4,400.00	4,398.11	4,397.00	9.76	112.08	91.76	-122.80	4,005.20	4,007.08	3,911.20	95.89	41.790		
4,429.21	4,429.21	4,427.32	4,426.21	9.83	112.78	91.76	-122.80	4,005.20	4,007.08	3,910.56	96.52	41.513		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	Well @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	Well @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset-TVD Reference:	Offset Datum

Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #9 - Wellbore #1 - (Wellbore #1)													Offset Site Error:	0.00 usft
Survey Program: 462 INC-TREND													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance								Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footcandle (ft)	Offset Wellbore Centre N/S (usft)	E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,450.00	4,449.99	4,448.11	4,446.99	9.87	113.27	1.93	-122.80	4,005.20	4,006.67	3,883.64	123.03	32.568		
4,500.00	4,499.78	4,497.90	4,496.78	9.97	114.46	1.95	-122.80	4,005.20	4,002.28	3,879.01	123.27	32.467		
4,550.00	4,548.92	4,547.04	4,545.92	10.08	115.63	1.99	-122.80	4,005.20	3,993.15	3,870.80	122.35	32.637		
4,600.00	4,596.96	4,595.07	4,593.96	10.19	116.78	2.05	-122.80	4,005.20	3,979.35	3,859.11	120.24	33.096		
4,650.00	4,643.45	4,641.57	4,640.45	10.31	117.89	2.14	-122.80	4,005.20	3,961.01	3,844.08	116.93	33.875		
4,700.00	4,687.97	4,686.09	4,684.97	10.46	118.95	2.26	-122.80	4,005.20	3,938.30	3,825.87	112.43	35.028		
4,750.00	4,730.10	4,728.23	4,727.10	10.64	119.96	2.42	-122.80	4,005.20	3,911.44	3,804.66	106.78	36.631		
4,800.00	4,769.47	4,767.60	4,766.47	10.87	120.89	2.63	-122.80	4,005.20	3,880.66	3,780.65	100.01	38.804		
4,850.00	4,805.70	4,803.83	4,802.70	11.17	121.76	2.91	-122.80	4,005.20	3,846.25	3,754.07	92.19	41.723		
4,900.00	4,838.47	4,836.64	4,835.47	11.54	122.56	3.28	-122.80	4,005.20	3,808.53	3,725.12	83.42	45.657		
4,950.00	4,867.46	4,865.64	4,864.46	12.02	123.28	3.79	-122.80	4,005.20	3,767.85	3,694.05	73.80	51.057		
5,000.00	4,892.43	4,890.60	4,889.43	12.59	123.90	4.53	-122.80	4,005.20	3,724.58	3,661.09	63.49	58.665		
5,050.00	4,913.12	4,911.30	4,910.12	13.27	124.41	5.66	-122.80	4,005.20	3,679.11	3,626.34	52.77	69.719		
5,100.00	4,929.37	4,927.54	4,926.37	14.05	124.81	7.58	-122.80	4,005.20	3,631.88	3,589.56	42.32	85.816		
5,150.00	4,941.00	4,939.18	4,938.00	14.92	125.10	11.45	-122.80	4,005.20	3,583.31	3,548.42	34.89	102.704		
5,200.00	4,947.93	4,946.11	4,944.93	15.86	125.27	22.79	-122.80	4,005.20	3,533.84	3,488.71	45.13	78.302		
5,250.00	4,950.07	4,948.25	4,947.07	16.86	125.32	97.37	-122.80	4,005.20	3,483.94	3,370.70	113.24	30.766		
5,256.48	4,950.00	4,948.18	4,947.00	17.00	125.32	114.22	-122.80	4,005.20	3,477.47	3,372.43	105.03	33.109		
5,300.00	4,949.24	4,947.42	4,946.24	17.91	125.30	113.95	-122.80	4,005.20	3,433.99	3,327.93	106.06	32.377		
5,400.00	4,947.50	4,945.68	4,944.50	20.13	125.26	113.33	-122.80	4,005.20	3,334.08	3,225.54	108.54	30.717		
5,500.00	4,945.75	4,943.93	4,942.75	22.46	125.21	112.70	-122.80	4,005.20	3,234.18	3,123.04	111.14	29.100		
5,600.00	4,944.01	4,942.19	4,941.01	24.88	125.17	112.07	-122.80	4,005.20	3,134.29	3,020.46	113.83	27.534		
5,700.00	4,942.26	4,940.44	4,939.26	27.36	125.13	111.43	-122.80	4,005.20	3,034.40	2,917.80	116.59	26.025		
5,800.00	4,940.52	4,938.69	4,937.52	29.90	125.09	110.78	-122.80	4,005.20	2,934.52	2,815.11	119.41	24.575		
5,900.00	4,938.77	4,936.95	4,935.77	32.46	125.04	110.13	-122.80	4,005.20	2,834.64	2,712.37	122.27	23.184		
6,000.00	4,937.03	4,935.20	4,934.03	35.06	125.00	109.47	-122.80	4,005.20	2,734.77	2,609.62	125.16	21.851		
6,100.00	4,935.28	4,933.46	4,932.28	37.68	124.96	108.81	-122.80	4,005.20	2,634.91	2,506.84	128.08	20.573		
6,200.00	4,933.53	4,931.71	4,930.53	40.32	124.91	108.14	-122.80	4,005.20	2,535.07	2,404.05	131.02	19.349		
6,300.00	4,931.79	4,929.97	4,928.79	42.97	124.87	107.47	-122.80	4,005.20	2,435.23	2,301.25	133.98	18.176		
6,400.00	4,930.04	4,928.22	4,927.04	45.63	124.83	106.79	-122.80	4,005.20	2,335.40	2,198.45	136.95	17.053		
6,500.00	4,928.30	4,926.48	4,925.30	48.31	124.78	106.11	-122.80	4,005.20	2,235.59	2,095.66	139.94	15.976		
6,600.00	4,926.55	4,924.73	4,923.55	50.99	124.74	105.43	-122.80	4,005.20	2,135.80	1,992.87	142.93	14.943		
6,700.00	4,924.81	4,922.99	4,921.81	53.68	124.70	104.73	-122.80	4,005.20	2,036.02	1,890.09	145.93	13.952		
6,800.00	4,923.06	4,921.24	4,920.06	56.38	124.65	104.04	-122.80	4,005.20	1,936.27	1,787.34	148.93	13.001		
6,900.00	4,921.32	4,919.50	4,918.32	59.08	124.61	103.34	-122.80	4,005.20	1,836.54	1,684.60	151.94	12.088		
7,000.00	4,919.57	4,917.75	4,916.57	61.78	124.57	102.63	-122.80	4,005.20	1,736.84	1,581.90	154.94	11.210		
7,100.00	4,917.83	4,916.01	4,914.83	64.49	124.52	101.93	-122.80	4,005.20	1,637.18	1,479.24	157.94	10.366		
7,200.00	4,916.08	4,914.26	4,913.08	67.21	124.48	101.21	-122.80	4,005.20	1,537.55	1,376.62	160.93	9.554		
7,300.00	4,914.34	4,912.51	4,911.34	69.93	124.44	100.50	-122.80	4,005.20	1,437.98	1,274.06	163.92	8.773		
7,400.00	4,912.59	4,910.77	4,909.59	72.65	124.40	99.78	-122.80	4,005.20	1,338.47	1,171.58	166.89	8.020		
7,500.00	4,910.85	4,909.02	4,907.85	75.37	124.35	99.06	-122.80	4,005.20	1,239.03	1,069.18	169.86	7.295		
7,600.00	4,909.10	4,907.28	4,906.10	78.09	124.31	98.33	-122.80	4,005.20	1,139.69	966.88	172.81	6.595		
7,700.00	4,907.36	4,905.53	4,904.36	80.82	124.27	97.61	-122.80	4,005.20	1,040.48	864.73	175.75	5.920		
7,800.00	4,905.61	4,903.79	4,902.61	83.55	124.22	96.88	-122.80	4,005.20	941.43	762.75	178.67	5.269		
7,900.00	4,903.87	4,902.04	4,900.87	86.28	124.18	96.15	-122.80	4,005.20	842.59	661.02	181.58	4.640		
8,000.00	4,902.12	4,900.30	4,899.12	89.01	124.14	95.41	-122.80	4,005.20	744.07	559.61	184.46	4.034		
8,100.00	4,900.38	4,898.55	4,897.38	91.74	124.09	94.68	-122.80	4,005.20	645.99	458.57	187.32	3.449		
8,200.00	4,898.63	4,896.81	4,895.63	94.48	124.05	93.94	-122.80	4,005.20	548.61	358.45	190.16	2.885		
8,300.00	4,896.88	4,895.06	4,893.88	97.21	124.01	93.20	-122.80	4,005.20	452.36	259.38	192.98	2.344		
8,400.00	4,895.14	4,893.32	4,892.14	99.95	123.96	92.46	-122.80	4,005.20	358.16	162.39	195.76	1.830		
8,500.00	4,893.39	4,891.57	4,890.39	102.69	123.92	91.72	-122.80	4,005.20	268.18	69.66	198.53	1.351 Level 3		
8,600.00	4,891.65	4,889.83	4,888.65	105.43	123.88	90.98	-122.80	4,005.20	188.57	-12.69	201.26	0.937 Level 1		

CC - Min centre to center distance or convergent point, SF - min separation factor, ES - min ellipse separation



Archer
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17-T17S-R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

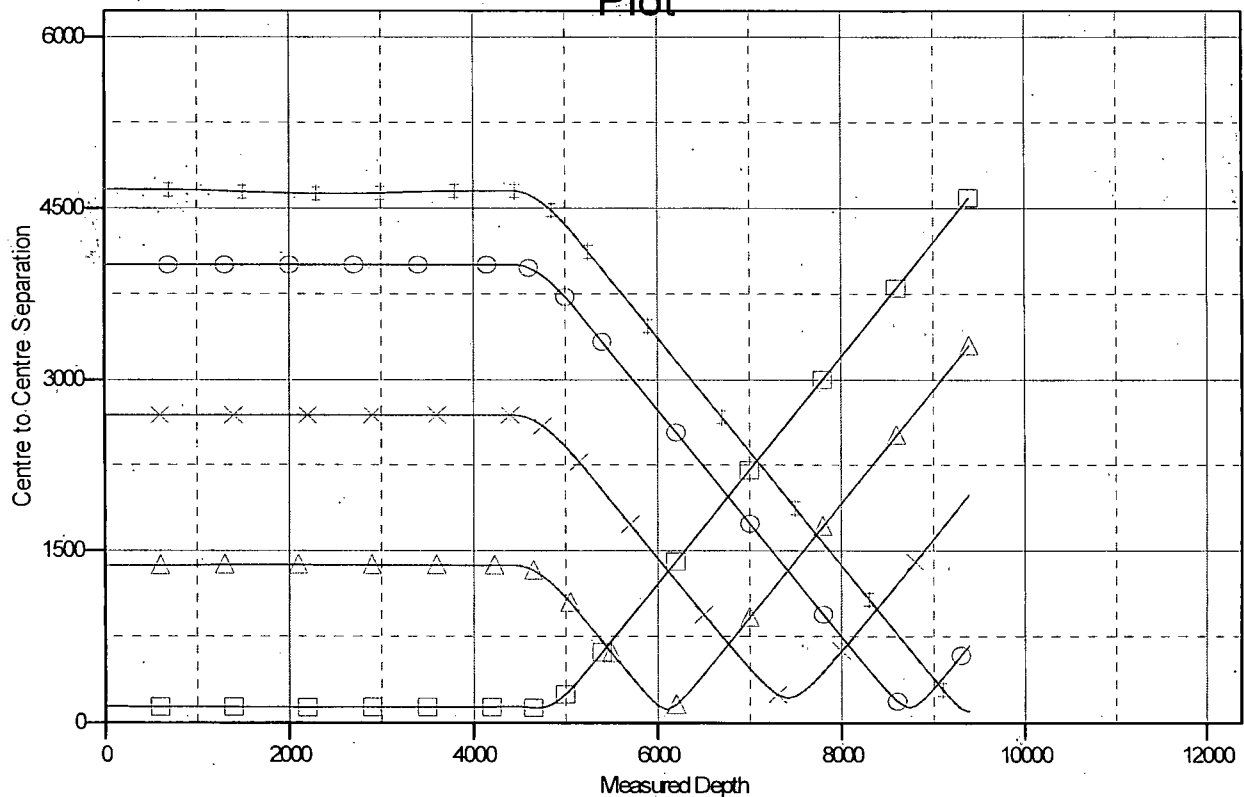
Offset Design: Sec 17-T17S-R30E - McIntyre DK Federal #9 - Wellbore #1 - Wellbore #1													Offset Site Error: 0.00 usft	
Survey Program: 462 INC TREND													Offset Well Error: 0.00 usft	
Reference														
Semi-Major Axis														
Distance														
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore N/S (usft)	Offset Wellbore Centre E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
8,700.00	4,889.90	4,888.08	4,886.90	108.17	123.84	90.24	-122.80	4,005.20	138.53	-65.43	203.96	0.679	Level 1	
8,731.86	4,889.35	4,887.52	4,886.35	109.04	123.82	90.00	-122.80	4,005.20	134.82	-69.99	204.81	0.658	Level 1, CC, ES, SF	
8,800.00	4,888.16	4,886.33	4,885.16	110.91	123.79	89.49	-122.80	4,005.20	151.05	-55.57	206.63	0.731	Level 1	
8,900.00	4,886.41	4,884.59	4,883.41	113.65	123.75	88.75	-122.80	4,005.20	215.49	6.23	209.26	1.030	Level 2	
9,000.00	4,884.67	4,882.84	4,881.67	116.39	123.71	88.01	-122.80	4,005.20	300.09	88.22	211.87	1.416	Level 3	
9,100.00	4,882.92	4,881.10	4,879.92	119.13	123.66	87.27	-122.80	4,005.20	391.99	177.56	214.43	1.828		
9,200.00	4,881.18	4,879.35	4,878.18	121.87	123.62	86.53	-122.80	4,005.20	487.09	270.13	216.96	2.245		
9,300.00	4,879.43	4,877.61	4,876.43	124.62	123.58	85.79	-122.80	4,005.20	583.83	364.38	219.45	2.660		
9,391.97	4,877.83	4,876.00	4,874.83	127.14	123.54	85.12	-122.80	4,005.20	673.64	451.93	221.71	3.038		

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec.17T17SR30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey/Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset/TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 3660.00usft (Original Well E
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to McIntyre DK Federal #16H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.18°

Ladder Plot



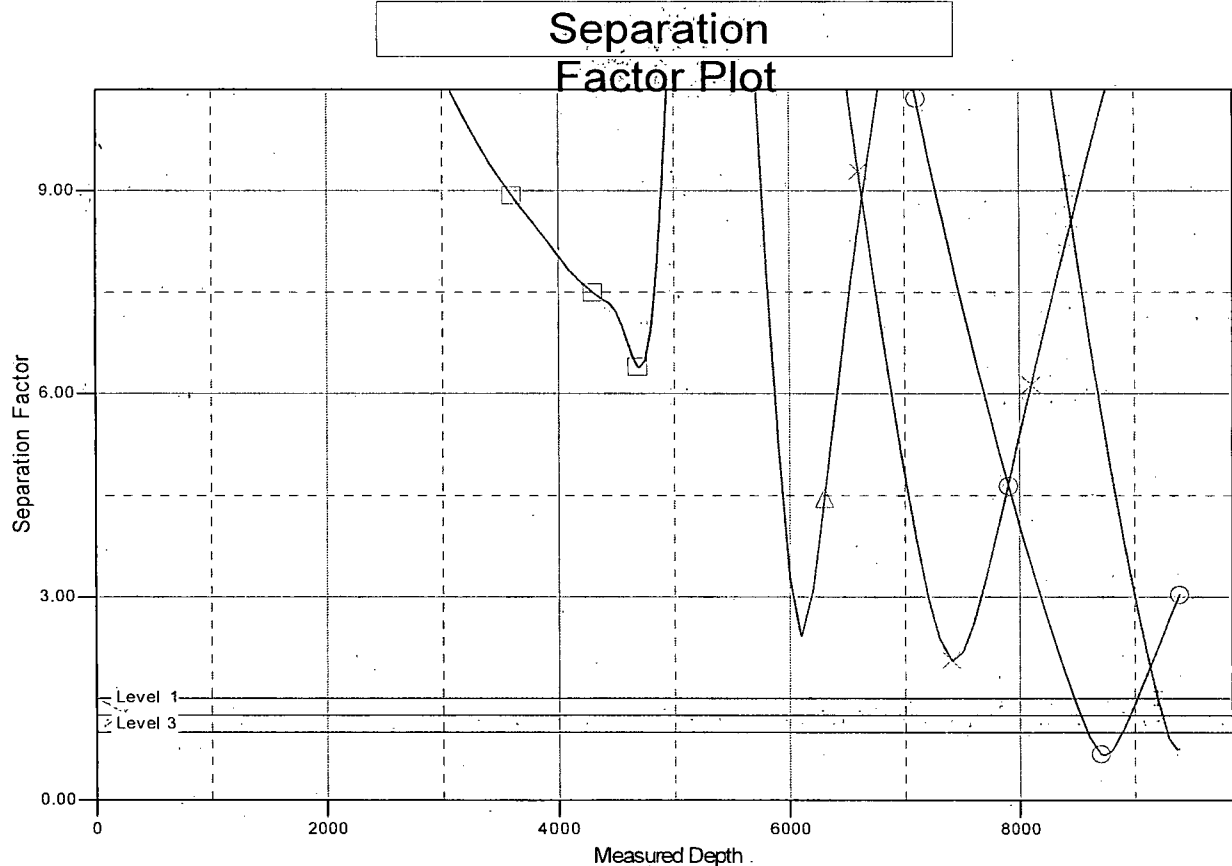
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McIntyre DK Federal #1, Wellbore #1, Wellbore #1 V0 McIntyre DK Federal #7, Wellbore #1, Wellbore #1 V0 McIntyre DK Federal #9, Wellbore #1, Wellbore #1 V0
McIntyre DK Federal #11, Wellbore #1, Wellbore #1 V0 McIntyre DK Federal #8, Wellbore #1, Wellbore #1 V0

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well McIntyre DK Federal #16H
Project:	Eddy County (NM27E)	TVD Reference:	WELL @ 3660.00usft (Original Well Elev)
Reference Site:	Sec 17 T17S R30E	MD Reference:	WELL @ 3660.00usft (Original Well Elev)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	McIntyre DK Federal #16H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	200 sigma
Reference Wellbore:	Wellbore #1	Database:	EDMDBBW
Reference Design:	Design #3	Offset TVD Reference:	Offset Datum

Reference Depths are relative to WELL @ 3660.00usft (Original Well E
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000"W

Coordinates are relative to: McIntyre DK Federal #16H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.18°



LEGEND

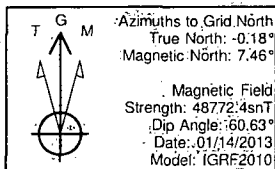
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Intyre DK Federal #11, Wellbore #1, Wellbore #1 V0 McIntyre DK Federal #8, Wellbore #1, Wellbore #1 V0



Project: Eddy County(NM27E)
 Site: Sec.17-T17S-R30E
 Well: McIntyre DK Federal #16H
 Wellbore: Wellbore #1
 Design: Design #3
 Lat: 32° 49' 42.428 N
 Long: 104° 0' 4.724 W
 GL: 3646.00
 KB: WELL @ 3660.00usft (Original Well Elev)

SECTION DETAILS

MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSeet	Annotation
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4429.21	0.00	0.00	4429.21	0.00	0.00	0.00	0.00	0.00	KOP - Build 11°/100'
5256.48	91.00	89.83	4950.00	1.59	529.96	11.00	89.83	529.96	EOC - Hold to TD
9391.97	91.00	89.83	4877.83	14.00	4664.80	0.00	0.00	4664.82	TD at 9391.97.



WELL DETAILS: McIntyre DK Federal #16H

+N/-S	+E/-W	Northing	Ground Level	Easting	Latitude	Longitude	Slot
0.00	0.00	665262.200	3646.00	601988.900	32° 49' 42.428 N	104° 0' 4.724 W	

PROJECT DETAILS: Eddy County(NM27E)

Geodetic System: US State Plane 1927 (Exact solution)
 Datum: NAD:1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone: New Mexico East 3001

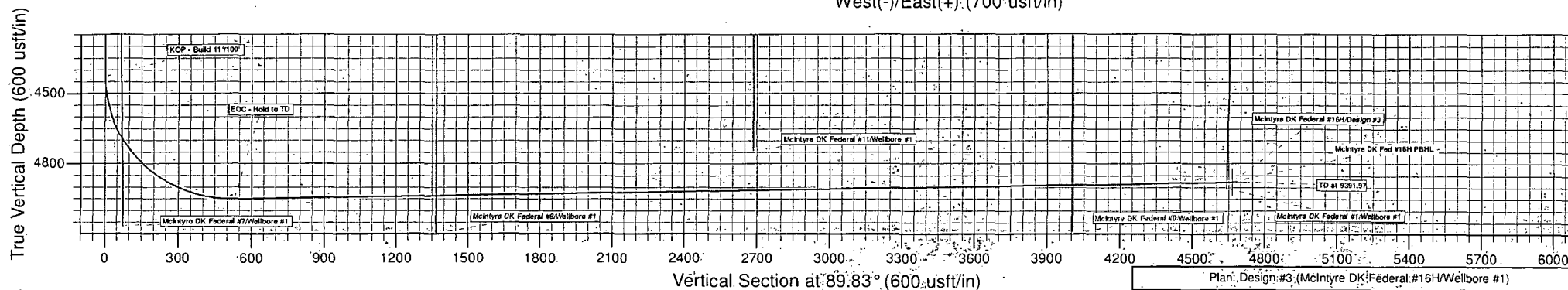
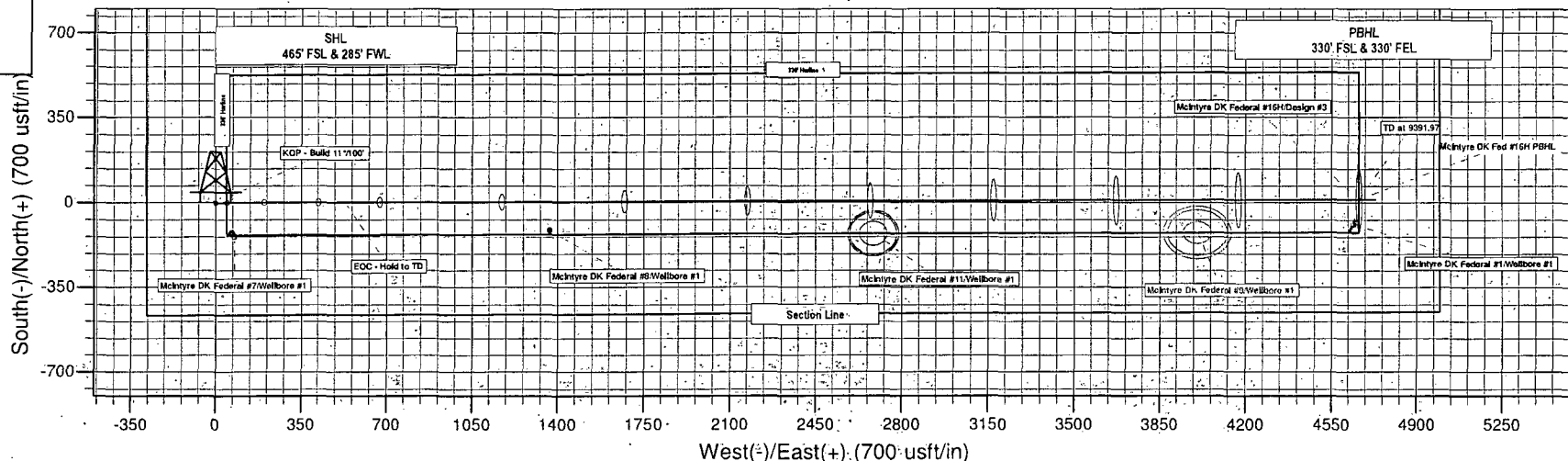
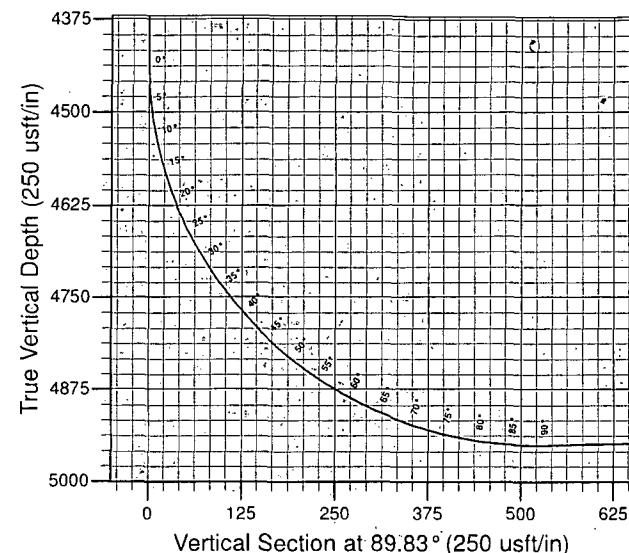
System Datum: Mean Sea Level

SITE DETAILS: Sec.17-T17S-R30E

Site Centre Latitude: 32° 49' 42.428 N
 Longitude: 104° 0' 4.724 W
 Positional Uncertainty: 0.00
 Convergence: 0.18
 Local North: Grid

WELLBORE TARGET DETAILS (LAT/LONG)

Name	TVD	+N/-S	+E/-W	Latitude	Longitude	Shape
McIntyre DK Fed #16H PBHL	4877.83	14.00	4664.80	32° 49' 42.418 N	103° 59' 10.054 W	Point



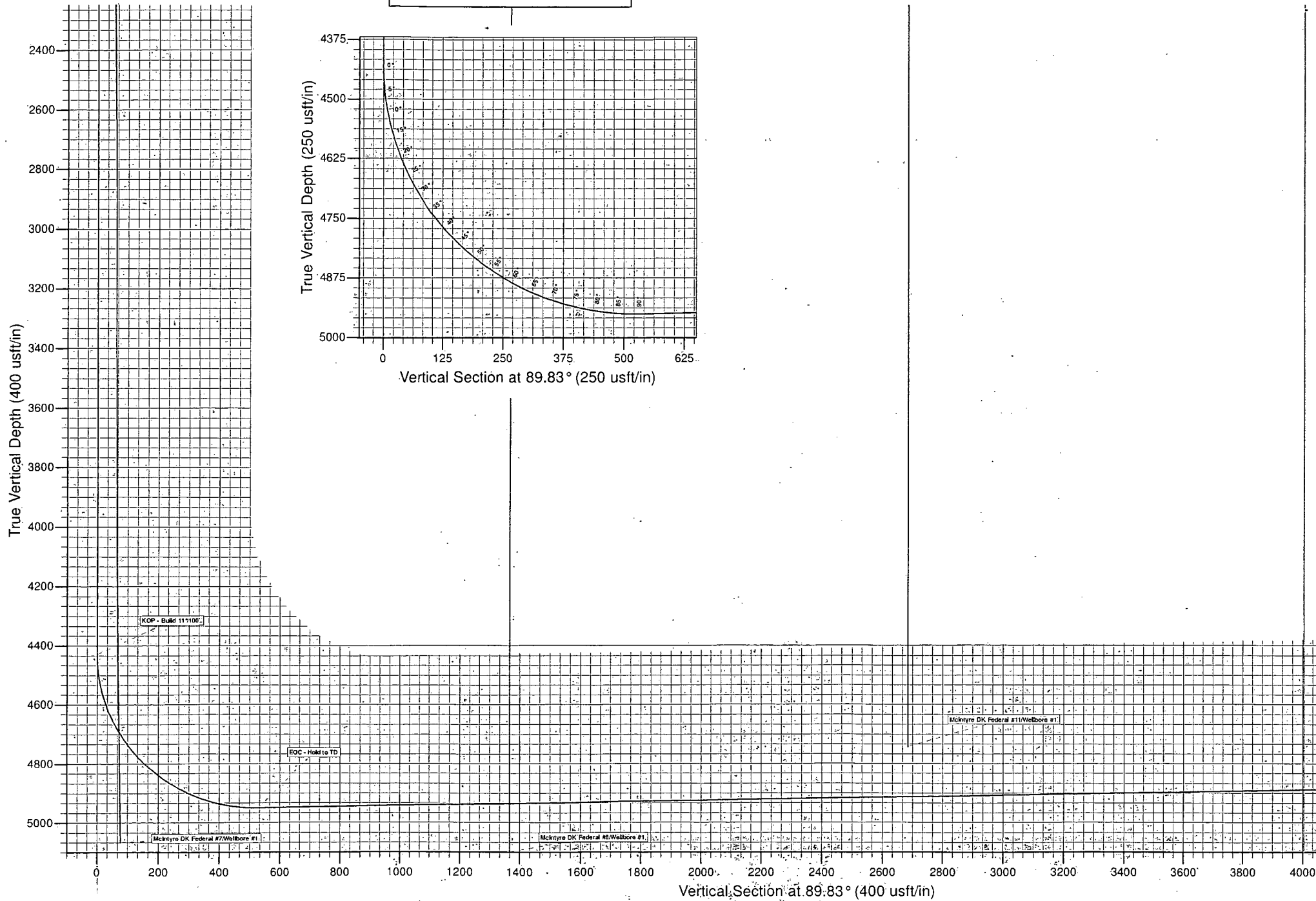
Plan: Design #3 (McIntyre DK Federal #16H Wellbore #1)

Created By: Lando Hiller Date: 15:10, January 25 2013



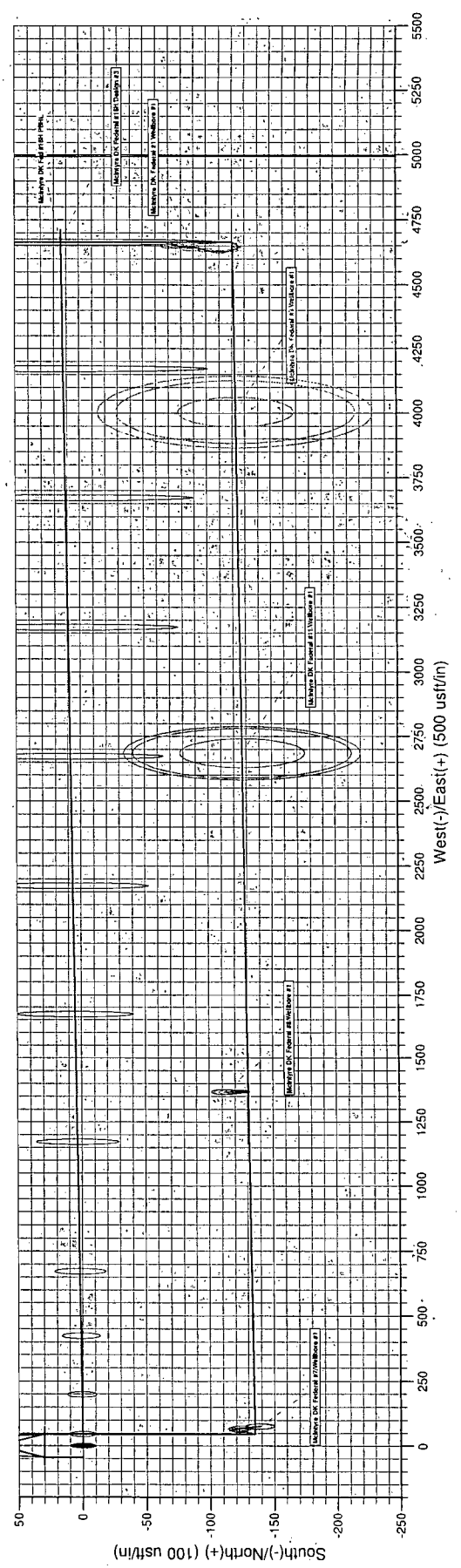
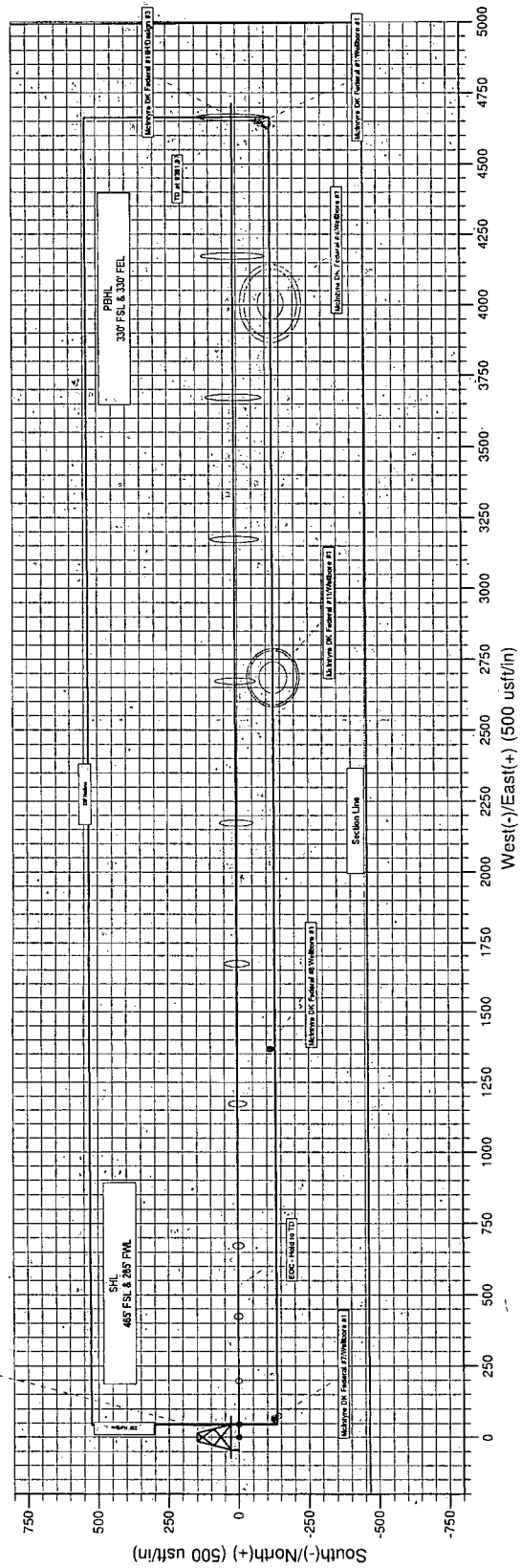
Archer

Project: Eddy County(NM27E)
Site: Sec.17-T17S-R30E
Well: McIntyre DK Federal #16H
Wellbore: Wellbore #1
Design: Design #3
Lat: 32° 49' 42.428 N
Long: 104° 0' 4.724 W
GL: 3646.00
KB: WELL @ 3660.00usft (Original Well Elev)

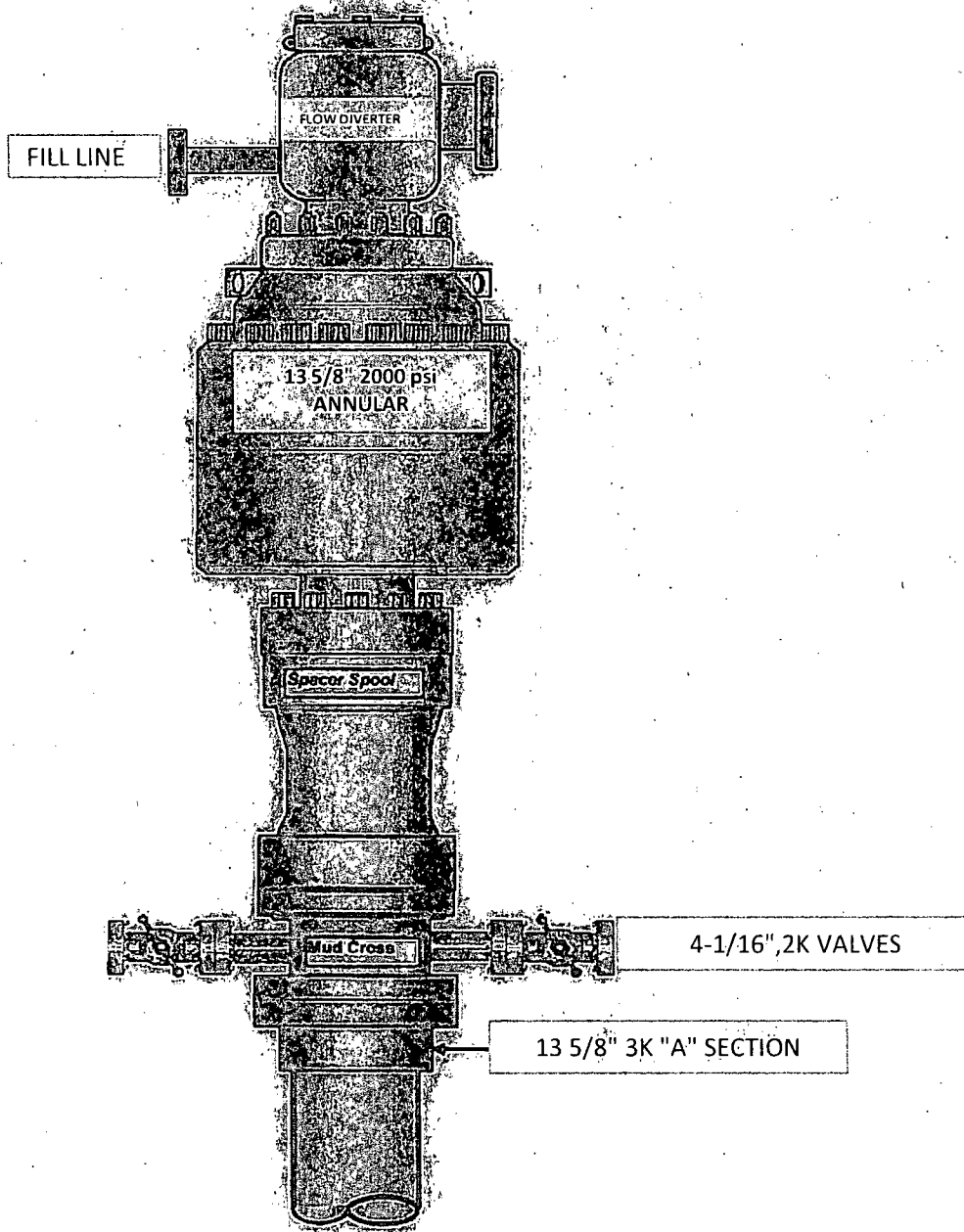


Project: Eddy County (M27E)
 Site: Sec. 7, T15-R06E-16H
 Well: Wellbore #1
 Design: Design #1
 Lat: 32° 49' 42.52" N
 Long: 102° 34' 32.12" W
 KB: WELL @ 3660.00ust (Original Well Elev)

Plan: Design #3 (McIntyre Dk Federal #16H Wellbore #1)
 Created By: Dusty Moyer
 Date: 15:11, January 25 2013



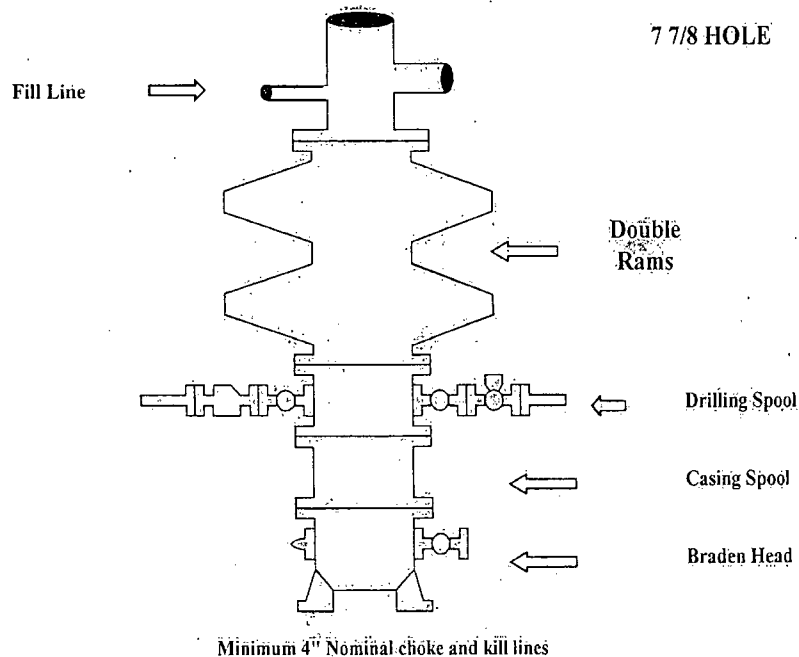
13 5/8" 2K ANNULAR



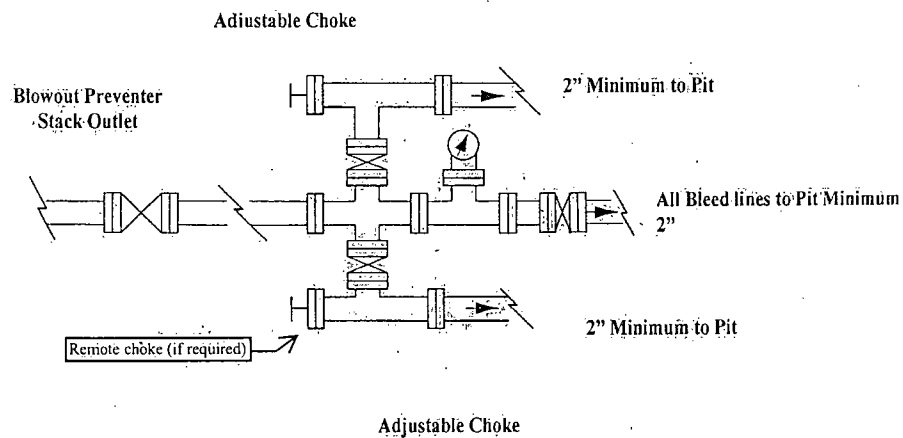
COG Operating LLC

Exhibit #9

BOPE and Choke Schematic



Choke Manifold Requirement (2000 psi WP)
No Annular Required

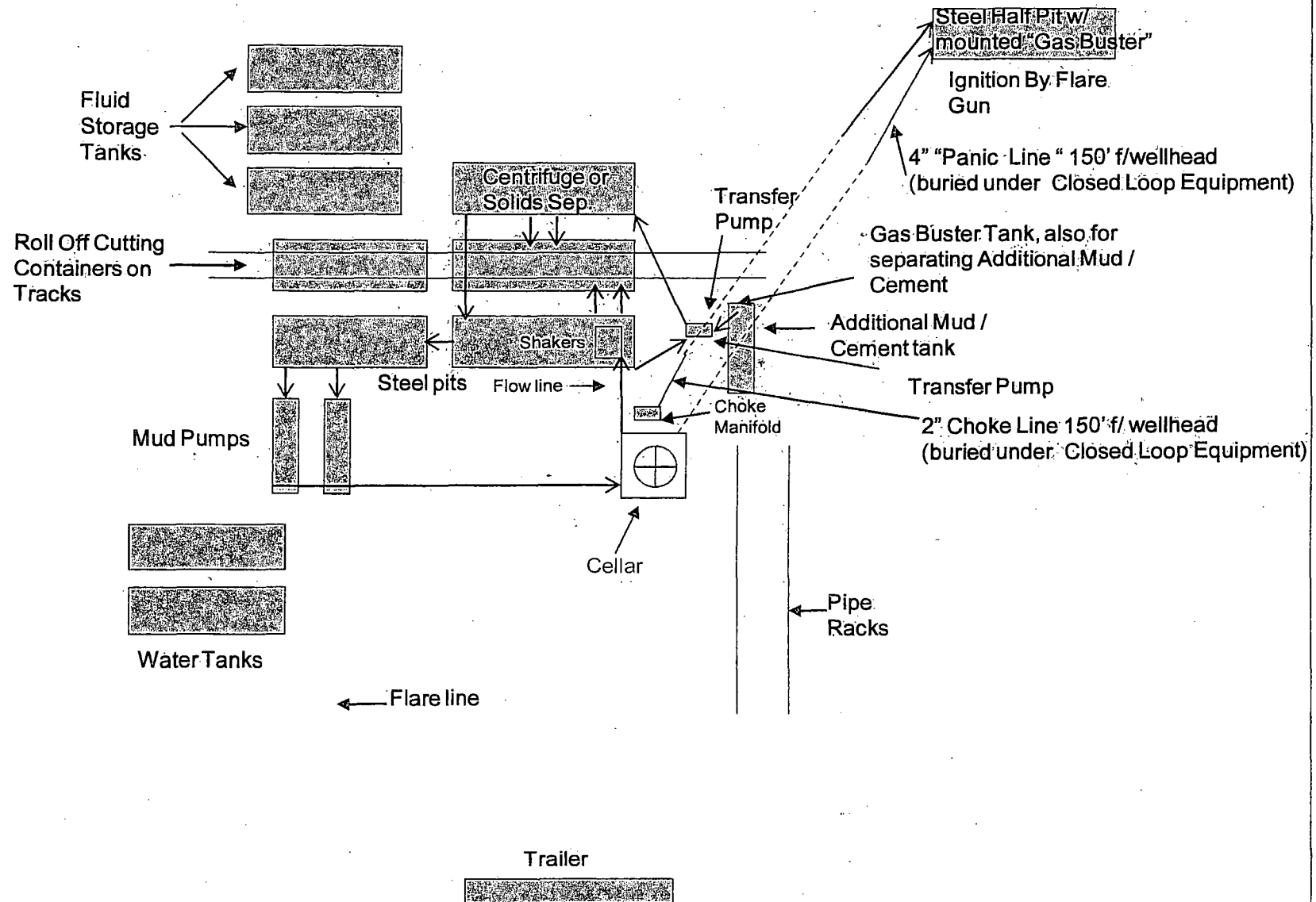


NOTES REGARDING THE BLOWOUT PREVENTERS**Master Drilling Plan
Eddy County, New Mexico**

1. Drilling nipple to be so constructed that it can be removed without use of a welder through rotary table opening, with minimum I.D. equal to preventer bore.
2. Wear ring to be properly installed in head.
3. Blow out preventer and all fittings must be in good condition, 2000 psi WP minimum.
4. All fittings to be flanged.
5. Safety valve must be available on rig floor at all times with proper connections, valve to be full 2000 psi WP minimum.
6. All choke and fill lines to be securely anchored especially ends of choke lines.
7. Equipment through which bit must pass shall be at least as large as the diameter of the casing being drilled through.
8. Kelly cock on Kelly.
9. Extension wrenches and hands wheels to be properly installed.
10. Blow out preventer control to be located as close to driller's position as feasible.
11. Blow out preventer closing equipment to include minimum 40-gallon accumulator, two independent sources of pump power on each closing unit installation all API specifications.

COG Operating LLC

Closed Loop Equipment Diagram



Closed Loop Operation & Maintenance Procedure

All drilling fluid circulated over shaker(s) with cuttings discharged into roll off container.

Fluid and fines below shaker(s) are circulated with transfer pump through centrifuge(s) or solids separator with cuttings and fines discharged into roll off container.

Fluid is continuously re-circulated through equipment with polymer added to aid separation of cutting fines.

Roll off containers are lined and de-watered with fluids re-circulated into system.

Additional tank is used to capture unused drilling fluid or cement returns from casing jobs.

This equipment will be maintained 24 hrs./day by solids control personnel and or rig crews that stay on location.

Cuttings will be hauled to either:

CRI (permit number R9166)

or

GMI (permit number 711-019-001)

dependent upon which rig is available to drill this well.

COG Operating LLC

Hydrogen Sulfide Drilling Operation Plan

I. HYDROGEN SULFIDE TRAINING

All personnel, whether regularly assigned, contracted, or employed on an unscheduled basis, will receive training from a qualified instructor in the following areas prior to commencing drilling operations on this well:

1. The hazards and characteristics of hydrogen sulfide (H₂S)
2. The proper use and maintenance of personal protective equipment and life support systems.
3. The proper use of H₂S detectors, alarms, warning systems, briefing areas, evacuation procedures, and prevailing winds.
4. The proper techniques for first aid and rescue procedures.

In addition, supervisory personnel will be trained in the following areas:

1. The effects of H₂S on metal components. If high tensile tubular are to be used, personnel will be trained in their special maintenance requirements.
2. Corrective action and shut-in procedures when drilling or reworking a well and blowout prevention and well control procedures.
3. The contents and requirements of the H₂S Drilling Operations Plan and Public Protection Plan.

There will be an initial training session just prior to encountering a known or probable H₂S zone (within 3 days or 500 feet) and weekly H₂S and well control drills for all personnel in each crew. The initial training session shall include a review of the site specific H₂S Drilling Operations Plan and the Public Protection Plan. **The concentrations of H₂S of wells in this area from surface to TD are low enough that a contingency plan is not required.**

II. H2S SAFETY EQUIPMENT AND SYSTEMS

Note: All H2S safety equipment and systems will be installed, tested, and operational when drilling reaches a depth of 500 feet above, or three days prior to penetrating the first zone containing or reasonable expected to contain H2S.

1. Well Control Equipment:

- A. Flare line.
- B. Choke manifold with minimum of one remotely operated choke.
- C. Closed Loop Blow Down Tank
- D. Blind rams and pipe rams to accommodate all pipe sizes with properly sized closing unit.
- E. Auxiliary equipment may include if applicable: annular preventer & rotating head.

2. Protective equipment for essential personnel:

- A. SCBA (Self contained breathing apparatus) 30-minute units located in the doghouse and at briefing areas, as indicated on well site diagram.

3. H2S detection and monitoring equipment:

- A. Portable H2S monitors positioned on location for best coverage and response. These units have warning lights and audible sirens when H2S levels of 20 PPM are reached.

4. Visual warning systems:

- A. Wind direction indicators as shown on well site diagram.
- B. Caution/Danger signs (Exhibit #7) shall be posted on roads providing direct access to location. Signs will be painted a high visibility yellow with black lettering of sufficient size to be readable at a reasonable distance from the immediate location. Bilingual signs will be used, when appropriate. See example attached.

5. Mud program:

- A. The mud program has been designed to minimize the volume of H2S circulated to surface. Proper mud weight, safe drilling practices, and the use of H2S scavengers will minimize hazards when penetrating H2S bearing zones.
-

6. Metallurgy:

- A. All drill strings, casings, tubing, wellhead, blowout preventer, drilling spool, kill lines, choke manifold and lines, and valves shall be suitable for H₂S service.
- B. All elastomers used for packing and seals shall be H₂S trim.

7. Communication:

- A. Radio communications in company vehicles including cellular telephone and 2-way radio.
- B. Land line (telephone) communication at Office.

8. Well testing:

- A. Drill stem testing will be performed with a minimum number of personnel in the immediate vicinity, which are necessary to safely and adequately conduct the test. The drill stem testing will be conducted during daylight hours and formation fluids will not be flowed to the surface. All drill-stem-testing operations conducted in an H₂S environment will use the closed chamber method of testing.
- B. There will be no drill stem testing.

EXHIBIT #7

WARNING
YOU ARE ENTERING AN H₂S
AUTHORIZED PERSONNEL ONLY

- 1. BEARDS OR CONTACT LENSES NOT ALLOWED
- 2. HARD HATS REQUIRED
- 3. SMOKING IN DESIGNATED AREAS ONLY
- 4. BE WIND CONSCIOUS AT ALL TIMES
- 5. CHECK WITH COG OPERATING FOREMAN AT

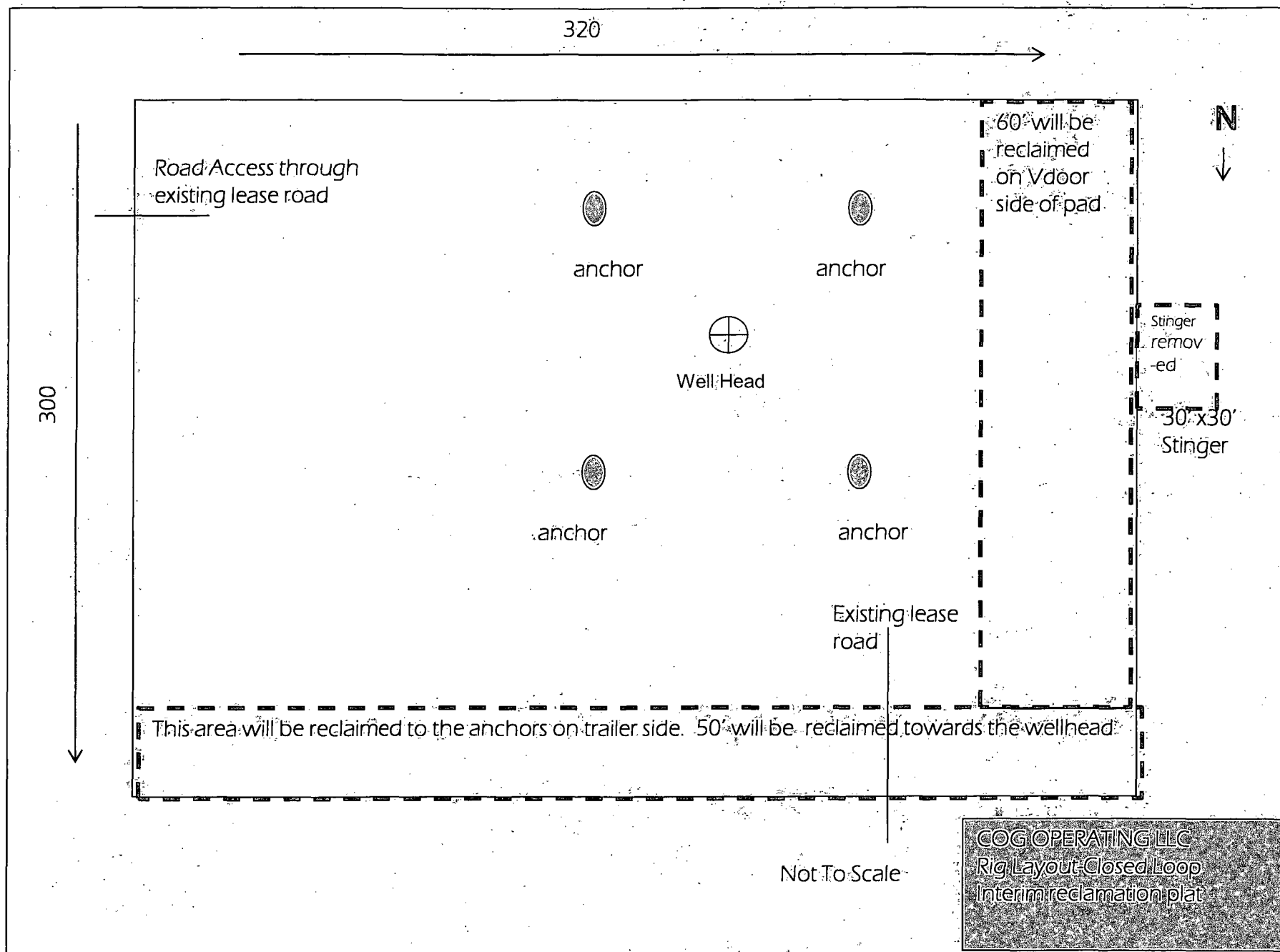
COG OPERATING LLC
1-432-683-7443
1-575-746-2010

EDDY COUNTY EMERGENCY NUMBERS

ARTESIA FIRE DEPT. 575-746-5050
ARTESIA POLICE DEPT. 575-746-5000
EDDY CO. SHERIFF DEPT. 575-746-9888

LEA COUNTY EMERGENCY NUMBERS

HOBBS FIRE DEPT. 575-397-9308
HOBBS POLICE DEPT. 575-397-9285
LEA CO. SHERIFF DEPT. 575-396-1196



Surface Use & Operating Plan

McIntyre DK Federal 16H

- Surface Tenant: Bogle Farms, Lewis Derrick, P O Box 441, Artesia, NM 88211.
- New Road: approx. 0'
- Flow Line: approx. 0.5 mile
- Facilities: McIntyre DK Federal Tank Battery

Well Site Information

V Door: West

Topsoil: North

Interim Reclamation: North/West

Notes

-well moved 140' to avoid existing well

Onsite: 9/9/2011

Tanner Nygren (BLM), Caden Jameson (COG), Gary Box (J.W.S)

SURFACE USE AND OPERATING PLAN

1. Existing & Proposed Access Roads

- A. The well site survey and elevation plat for the proposed well is attached with this application. It was staked by John West Engineering, Hobbs, NM.
- B. All roads to the location are shown in the Vicinity Map. The existing lease roads are illustrated and are adequate for travel during drilling and production operations. Upgrading existing roads prior to drilling the well will be done where necessary. The road route to the well site is depicted in Exhibit #2. The road highlighted in Exhibit #2 will be used to access the well.
- C. Directions to location: See exhibit #2.
- D. Routine grading and maintenance of existing roads will be conducted as necessary to maintain their condition as long as any operations continue on this lease. Roads will be maintained according to specifications in section 2A of this Surface Use and Operating Plan.

2. Proposed Access Road:

The Elevation Plat shows that 0' of new access road will be required for this location. If any road is required it will be constructed as follows:

- A. The maximum width of the running surface will be 14'. The road will be crowned, ditched and constructed of 6" rolled and compacted caliche. Ditches will be at 3:1 slope and 4 feet wide. Water will be diverted where necessary to avoid ponding, prevent erosion, maintain good drainage, and to be consistent with local drainage patterns.
- B. The average grade will be less than 1%.
- C. No turnouts are planned.
- D. No culverts, cattle guard, gates, low water crossings or fence cuts are necessary.
- E. Surfacing material will consist of native caliche. Caliche will be obtained from the actual well site if available. If not available onsite, caliche will be hauled from the nearest BLM approved caliche pit.

3. Location of Existing Well:

The 1-mile Map shows all existing wells within a one-mile radius of this well.

As shown on this plat there are numerous wells producing from the San Andres and Yeso formations.

4. Location of Existing and/or Proposed Facilities:

- A. COG Operating LLC does operate a production facility on this lease.
- B. If the well is productive, contemplated facilities will be as follows:
 - 1) Production will be sent to the McIntyre DK Federal Tank Battery located in the SE/4 of SW/4 of Section 17, T17S, R30E. The facility location is shown in Exhibit #1.
 - 2) The tank battery and facilities including all flow lines and piping will be installed according to API specifications.
 - 3) Any additional caliche will be obtained from the actual well site. If caliche does not exist or is not plentiful from the well site, the caliche will be hauled from a BLM approved caliche pit. Any additional construction materials will be purchased from contractors.
 - 4) Proposed flow lines, will follow an archaeologically approved route to the McIntyre DK Federal Tank Battery located in the SE/4 of SW/4 of Section 17, T17S, R30E. The flowline will be SDR 7 3" poly line laid on the surface and will be approximately 0.5 miles in length. See Exhibit #1.
 - 5) It will be necessary to run electric power if this well is productive. Power will be provided by CVE and they will submit a separate plan and ROW for service to the well location.
 - 6) If the well is productive, rehabilitation plans will include the following:
 - The original topsoil from the well site will be returned to the location, and the site will be re-contoured as close as possible to the original site.

5. Location and Type of Water Supply:

The well will be drilled with combination brine and fresh water mud system as outlined in the drilling program. The water will be obtained from commercial water stations in the area and hauled to location by transport truck over the existing and proposed access roads shown in Exhibit #1. If a commercial fresh water source is nearby, fast line may be laid along existing road ROW's and fresh water pumped to the well. No water well will be drilled on the location.

6. Source of Construction Materials and Location "Turn-Over" Procedure:

Obtaining caliche: The primary way of obtaining caliche to build locations and roads will be by "turning over" the location. This means, caliche will be obtained from the actual well sight. A caliche permit will be obtained from BLM prior to pushing up any caliche. 2400 cu. Yards is max amount of caliche needed for pad and roads. Amount will vary for each pad. The procedure below has been approved by BLM personnel:

- A. The top 6 inches of topsoil is pushed off and stockpiled along the side of the location.
- B. An approximate 120' X 120' area is used within the proposed well site to remove caliche.
- C. Subsoil is removed and piled alongside the 120' by 120' area within the pad site.
- D. When caliche is found, material will be stock-piled within the pad site to build the location and road.
- E. Then subsoil is pushed back in the hole and caliche is spread accordingly across entire location and road.
- F. Once well is drilled, the stock piled top soil will be used for interim reclamation and spread along areas where caliche is picked up and the location size is reduced. Neither caliche nor subsoil will be stock piled outside of the well pad. Topsoil will be stockpiled along the edge of the pad as depicted in attached plat.

In the event that no caliche is found onsite, caliche will be hauled in from a BLM approved caliche pit.

7. Methods of Handling Water Disposal:

- A. The well will be drilled utilizing a closed loop mud system. Drill cuttings will be held in roll-off style mud boxes and taken to an NMOCD approved disposal site.
- B. Drilling fluids will be contained in steel mud pits.
- C. Water produced from the well during completion will be held temporarily in steel tanks and then taken to an NMOCD approved commercial disposal facility.
- D. Garbage and trash produced during drilling or completion operations will be collected in a trash bin and hauled to an approved landfill. No toxic waste or hazardous chemicals will be produced by this operation.
- E. Human waste and grey water will need to be properly contained and disposed of. Proper disposal and elimination of waste and grey water may include but are not limited to portable septic systems and/or portable waste gathering systems (i.e. portable toilets).
- F. After the rig is moved out and the well is either completed or abandoned, all waste materials will be cleaned up within 30 days. In the event of a dry hole only a dry hole marker will remain.

8. Ancillary Facilities:

No airstrip, campsite or other facilities will be built as a result of the operation on this well.

9. Well Site Layout:

- A. The drill pad layout, with elevations staked by John West Engineering, is shown in the Elevation Plat. Dimensions of the pad and pits are shown on the Rig Layout. V door direction is West. Topsoil, if available, will be stockpiled per BLM specifications. Because the pad is almost level no major cuts will be required.
- B. The Rig Layout Closed-Loop exhibit shows the proposed orientation of closed loop system and access road. No permanent living facilities are planned, but a temporary foreman/toolpusher's trailer will be on location during the drilling operations.

10. Plans for Restoration of the Surface:

- A. Interim Reclamation will take place after the well has been completed. The pad will be downsized by reclaiming the areas not needed for production operations. The portions of the pad that are not needed for production operations will be re-contoured to its original state as much as possible. The caliche that is removed will be reused to either build another pad site or for road repairs within the lease. The stockpiled topsoil will then be spread out reclaimed area and reseeded with a BLM approved seed mixture. In the event that the well must be worked over or maintained, it may be necessary to drive, park, and/or operate machinery on reclaimed land. This area will be repaired or reclaimed after work is complete.
- B. Final Reclamation: Upon plugging and abandoning the well all caliche for well pad and lease road will be removed and surface will be recontoured to reflect its surroundings as much as possible. Caliche will be recycled for road repair or reused for another well pad within the lease. If any topsoil remains, it will be spread out and the area will be reseeded with a BLM approved mixture and re-vegetated as per BLM orders.

11. Surface Ownership:

- A. The surface is owned by the U.S. Government and is administered by the Bureau of Land Management. The surface is multiple uses with the primary uses of the region for grazing of livestock and the production of oil and gas.
- B. The surface tenant is Bogle Farms, Lewis Derrick, P.O. Box 441, Artesia, NM 88211.
- C. The proposed road routes and surface location will be restored as directed by the BLM

12. Other Information:

- A. The area around the well site is grassland and the topsoil is sandy. The vegetation is moderately sparse with native prairie grasses, some mesquite and shinnery oak. No wildlife was observed but it is likely that mule deer, rabbits, coyotes and rodents traverse the area.
- B. There is no permanent or live water in the immediate area.
- C. There are no dwellings within 2 miles of this location.
- D. If needed, a Cultural Resources Examination is being prepared by Southern New Mexico Archaeological Services, Inc. P.O. Box 1, Bent New Mexico, 88314, phone # 505-671-4797 and the results will be forwarded to your office in the near future. Otherwise, **COG will be participating in the Permian Basin MOA Program.**

13. Bond Coverage:

Bond Coverage is Nationwide Bond # 000215

14. Lessee's and Operator's Representative:

The COG Operating, LLC representative responsible for assuring compliance with the surface use plan is as follows:

Jim Evans

Ray Peterson

Drilling Superintendent

Drilling Manager

COG Operating LLC

COG Operating LLC

One Concho Center

One Concho Center

600 W Illinois Ave

600 W Illinois Ave

Midland, TX 79701

Midland, TX 79701

Phone (432) 685-4304 (office)

Phone (432) 685-4304 (office)

(432) 221-0346 (business)

(432) 818-2254 (business)

PECOS DISTRICT CONDITIONS OF APPROVAL

OPERATOR'S NAME:	COG Operating LLC
LEASE NO.:	NMNM-86025
WELL NAME & NO.:	McIntyre DK Federal 16H
SURFACE HOLE FOOTAGE:	0465' FSL & 0285' FWL
BOTTOM HOLE FOOTAGE:	0465' FSL & 0330' FEL
LOCATION:	Section 17, T. 17 S., R 30 E., NMPM
COUNTY:	Eddy County, New Mexico

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Standard Conditions of Approval (COA) apply to this APD. If any deviations to these standards exist or special COAs are required, the section with the deviation or requirement will be checked below.

- ☐ **General Provisions**
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- ☐ **Noxious Weeds**
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I. GENERAL PROVISIONS

The approval of the Application For Permit To Drill (APD) is in compliance with all applicable laws and regulations: 43 Code of Federal Regulations 3160, the lease terms, Onshore Oil and Gas Orders, Notices To Lessees, New Mexico Oil Conservation Division (NMOCD) Rules, National Historical Preservation Act As Amended, and instructions and orders of the Authorized Officer. Any request for a variance shall be submitted to the Authorized Officer on Form 3160-5, Sundry Notices and Report on Wells.

II. PERMIT EXPIRATION

If the permit terminates prior to drilling and drilling cannot be commenced within 60 days after expiration, an operator is required to submit Form 3160-5, Sundry Notices and Reports on Wells, requesting surface reclamation requirements for any surface disturbance. However, if the operator will be able to initiate drilling within 60 days after the expiration of the permit, the operator must have set the conductor pipe in order to allow for an extension of 60 days beyond the expiration date of the APD. (Filing of a Sundry Notice is required for this 60 day extension.)

III. ARCHAEOLOGICAL, PALEONTOLOGY & HISTORICAL SITES

Any cultural and/or paleontological resource discovered by the operator or by any person working on the operator's behalf shall immediately report such findings to the Authorized Officer. The operator is fully accountable for the actions of their contractors and subcontractors. The operator shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the Authorized Officer. An evaluation of the discovery shall be made by the Authorized Officer to determine the appropriate actions that shall be required to prevent the loss of significant cultural or scientific values of the discovery. The operator shall be held responsible for the cost of the proper mitigation measures that the Authorized Officer assesses after consultation with the operator on the evaluation and decisions of the discovery. Any unauthorized collection or disturbance of cultural or paleontological resources may result in a shutdown order by the Authorized Officer.

IV. NOXIOUS WEEDS

The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, pads, associated pipeline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

V. SPECIAL REQUIREMENT(S)

Timing Limitation Stipulation / Condition of Approval for lesser prairie-chicken:

Oil and gas activities including 3-D geophysical exploration, and drilling will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities, pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Additionally, no new drilling will be allowed within up to 200 meters of leks known at the time of permitting. Normal vehicle use on existing roads will not be restricted. Exhaust noise from pump jack engines must be muffled or otherwise controlled so as not to exceed 75 db measured at 30 feet from the source of the noise.

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well. For more installation details, contact the Carlsbad Field Office at 575-234-5972.

VI. CONSTRUCTION

A. NOTIFICATION

The BLM shall administer compliance and monitor construction of the access road and well pad. Notify the Carlsbad Field Office at (575) 234-5909 at least 3 working days prior to commencing construction of the access road and/or well pad.

When construction operations are being conducted on this well, the operator shall have the approved APD and Conditions of Approval (COA) on the well site and they shall be made available upon request by the Authorized Officer.

B. TOPSOIL

The operator shall stockpile the topsoil in a low profile manner in order to prevent wind/water erosion of the topsoil. The topsoil to be stripped is approximately 6 inches in depth. The topsoil will be used for interim and final reclamation.

C. CLOSED LOOP SYSTEM

Tanks are required for drilling operations: No Pits.

The operator shall properly dispose of drilling contents at an authorized disposal site.

D. FEDERAL MINERAL MATERIALS PIT

Payment shall be made to the BLM prior to removal of any federal mineral materials. Call the Carlsbad Field Office at (575) 234-5972.

E. WELL PAD SURFACING

Surfacing of the well pad is not required.

If the operator elects to surface the well pad, the surfacing material may be required to be removed at the time of reclamation.

The well pad shall be constructed in a manner which creates the smallest possible surface disturbance, consistent with safety and operational needs.

F. ON LEASE ACCESS ROADS

Road Width

The access road shall have a driving surface that creates the smallest possible surface disturbance and does not exceed fourteen (14) feet in width. The maximum width of surface disturbance, when constructing the access road, shall not exceed twenty-five (25) feet.

Surfacing

Surfacing material is not required on the new access road driving surface. If the operator elects to surface the new access road or pad, the surfacing material may be required to be removed at the time of reclamation.

Where possible, no improvements should be made on the unsurfaced access road other than to remove vegetation as necessary, road irregularities, safety issues, or to fill low areas that may sustain standing water.

The Authorized Officer reserves the right to require surfacing of any portion of the access road at any time deemed necessary. Surfacing may be required in the event the road deteriorates, erodes, road traffic increases, or it is determined to be beneficial for future field development. The surfacing depth and type of material will be determined at the time of notification.

Crowning

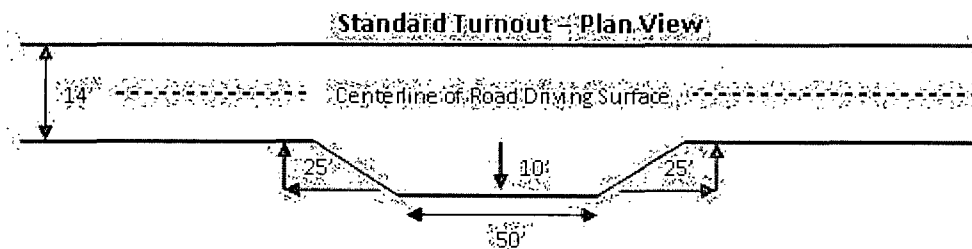
Crowning shall be done on the access road driving surface. The road crown shall have a grade of approximately 2% (i.e., a 1" crown on a 14' wide road). The road shall conform to Figure 1; cross section and plans for typical road construction.

Ditching

Ditching shall be required on both sides of the road.

Turnouts

Vehicle turnouts shall be constructed on the road. Turnouts shall be intervisible with interval spacing distance less than 1000 feet. Turnouts shall be constructed on all blind curves. Turnouts shall conform to the following diagram:

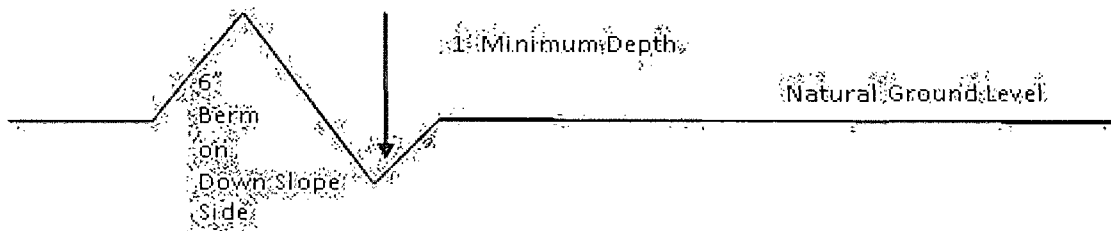


Drainage

Drainage control systems shall be constructed on the entire length of road (e.g. ditches, sidehill out sloping and insloping, lead-off ditches, culvert installation, and low water crossings).

A typical lead-off ditch has a minimum depth of 1 foot below and a berm of 6 inches above natural ground level. The berm shall be on the down-slope side of the lead-off ditch.

Cross Section of a Typical Lead-off Ditch



All lead-off ditches shall be graded to drain water with a 1 percent minimum to 3 percent maximum ditch slope. The spacing interval are variable for lead-off ditches and shall be determined according to the formula for spacing intervals of lead-off ditches, but may be amended depending upon existing soil types and centerline road slope (in %);

Formula for Spacing Interval of Lead-off Ditches

Example - On a 4% road slope that is 400 feet long, the water flow shall drain water into a lead-off ditch. Spacing interval shall be determined by the following formula:

$$400 \text{ foot road with } 4\% \text{ road slope: } \frac{400'}{4\%} + 100' = 200' \text{ lead-off ditch interval}$$

Culvert Installations

Appropriately sized culvert(s) shall be installed at the deep waterway channel flow crossing.

Cattleguards

An appropriately sized cattleguard(s) sufficient to carry out the project shall be installed and maintained at fence crossing(s).

Any existing cattleguard(s) on the access road shall be repaired or replaced if they are damaged or have deteriorated beyond practical use. The operator shall be responsible for the condition of the existing cattleguard(s) that are in place and are utilized during lease operations.

A gate shall be constructed and fastened securely to H-braces.

Fence Requirement

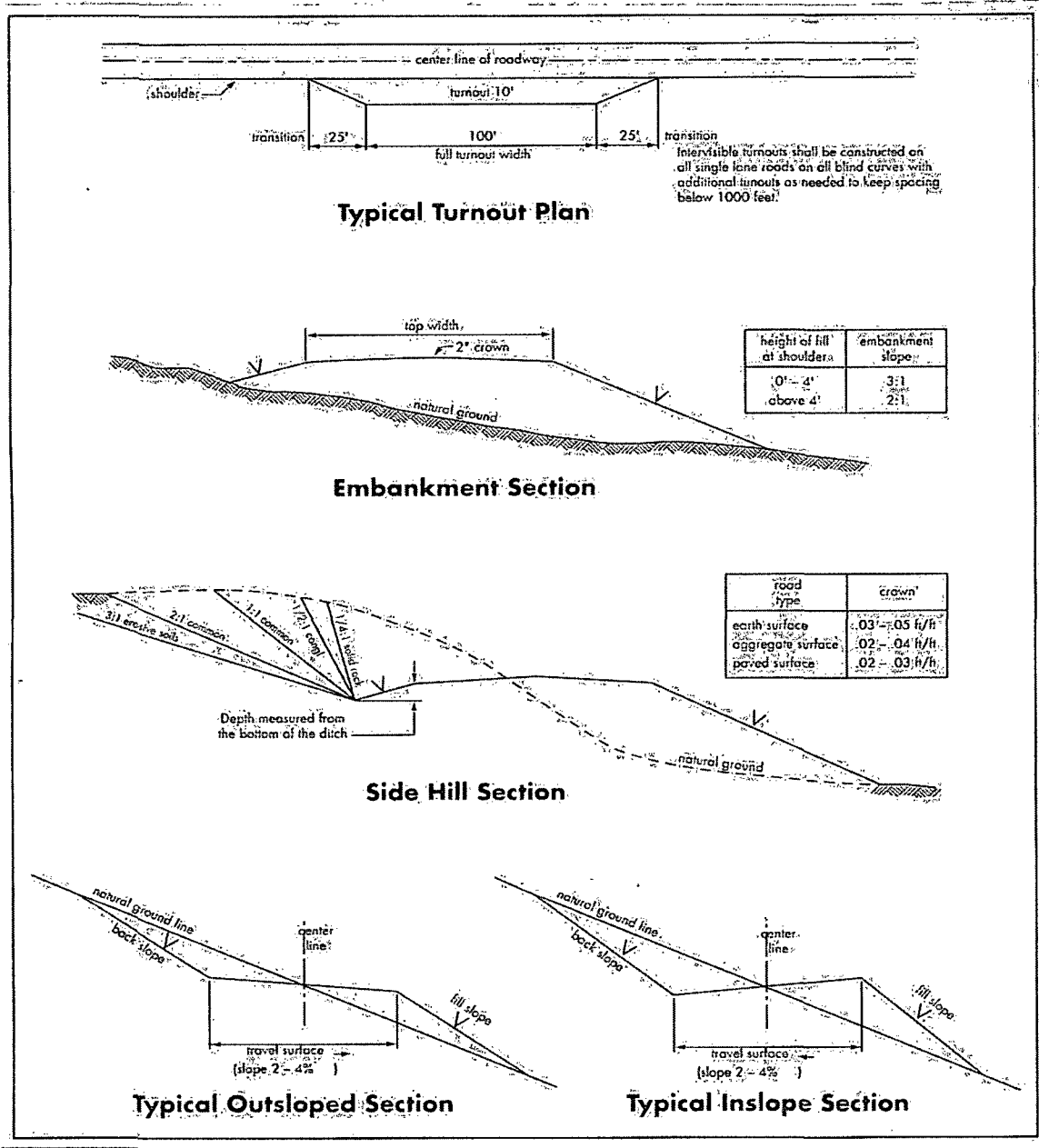
Where entry is required across a fence line, the fence shall be braced and tied off on both sides of the passageway prior to cutting.

The operator shall notify the private surface landowner or the grazing allotment holder prior to crossing any fence(s).

Public Access

Public access on this road shall not be restricted by the operator without specific written approval granted by the Authorized Officer.

Figure 1 – Cross Sections and Plans For Typical Road Sections



VII. DRILLING

A. DRILLING OPERATIONS REQUIREMENTS

The BLM is to be notified in advance for a representative to witness:

- a. Spudding well (minimum of 24 hours)
- b. Setting and/or Cementing of all casing strings (minimum of 4 hours)
- c. BOPE tests (minimum of 4 hours)

☒ **Eddy County**

Call the Carlsbad Field Office, 620 East Greene St., Carlsbad, NM 88220,
(575) 361-2822

- 1. A Hydrogen Sulfide (H₂S) Drilling Plan shall be activated 500 feet prior to drilling into the **Grayburg** formation. **As a result, the Hydrogen Sulfide area must meet Onshore Order 6 requirements, which includes equipment and personnel/public protection items. If Hydrogen Sulfide is encountered, please provide measured values and formations to the BLM.**
- 2. Unless the production casing has been run and cemented or the well has been properly plugged, the drilling rig shall not be removed from over the hole without prior approval. **If the drilling rig is removed without approval – an Incident of Non-Compliance will be written and will be a “Major” violation.**
- 3. Floor controls are required for 3M or Greater systems. These controls will be on the rig floor, unobstructed, readily accessible to the driller and will be operational at all times during drilling and/or completion activities. Rig floor is defined as the area immediately around the rotary table; the area immediately above the substructure on which the draw works is located, this does not include the dog house or stairway area.
- 4. **The record of the drilling rate along with the GR/N well log run from TD to surface (horizontal well – vertical portion of hole) shall be submitted to the BLM office as well as all other logs run on the borehole 30 days from completion. If available, a digital copy of the logs is to be submitted in addition to the paper copies. The Rustler top and top and bottom of Salt are to be recorded on the Completion Report.**

B. CASING

Changes to the approved APD casing program need prior approval if the items substituted are of lesser grade or different casing size. The Operator can exchange the components of the proposal with that of superior strength (i.e. changing from J-55 to N-80, or from 36# to 40#). Changes to the approved cement program need prior approval if the altered cement plan has less volume or strength or if the changes are substantial (i.e. Multistage tool, ECP, etc.).

Centralizers required on surface casing per Onshore Order 2.III.B.1.f.

Wait on cement (WOC) time prior to drilling out for a primary cement job will be a minimum 18 hours for a water basin, 24 hours in the potash area, or 500 pounds compressive strength, whichever is greater for all casing strings. DURING THIS WOC TIME, NO DRILL PIPE, ETC. SHALL BE RUN IN THE HOLE. Provide compressive strengths including hours to reach required 500 pounds compressive strength prior to cementing each casing string. See individual casing strings for details regarding lead cement slurry requirements.

No pea gravel permitted for remedial or fall back remedial without prior authorization from the BLM engineer.

**Possibility of water and brine flows in the Artesia and Salado Groups.
Possibility of lost circulation in the Grayburg and San Andres formations.**

1. The **13-3/8** inch surface casing shall be set at approximately **275** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface.
 - a. If cement does not circulate to the surface, the appropriate BLM office shall be notified and a temperature survey utilizing an electronic type temperature survey with surface log readout will be used or a cement bond log shall be run to verify the top of the cement. Temperature survey will be run a minimum of six hours after pumping cement and ideally between 8-10 hours after completing the cement job.
 - b. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry.**
 - c. Wait on cement (WOC) time for a remedial job will be a minimum of 4 hours after bringing cement to surface or 500 pounds compressive strength, whichever is greater.
 - d. If cement falls back, remedial cementing will be done prior to drilling out that string.

2. The minimum required fill of cement behind the **9-5/8** inch intermediate casing, which shall be set at approximately **1100** feet, is:

Option one:

- ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

Option two:

Operator has proposed DV tool at depth of 325', but will adjust cement proportionately if moved. DV tool shall be set a minimum of 50' below previous shoe and a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depth cannot be set in this range. If an ECP is used, it is to be set a minimum of 50' below the shoe to provide cement across the shoe. If it cannot be set below the shoe, a CBL shall be run to verify cement coverage.

- a. First stage to DV tool:

- ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

- b. Second stage above DV tool:

- ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

Centralizers required on horizontal leg, must be type for horizontal service and a minimum of one every other joint.

3. The minimum required fill of cement behind the **7 X 5-1/2** inch **tapered** production casing is:

Option one:

- ☒ Cement to surface. If cement does not circulate see B.1.a, c-d above.

Option two:

Operator has proposed two DV tools at depths of 4429' and 1210', but will adjust cement proportionately if moved. DV tool at 1210' shall be set a minimum of 50' below previous shoe. DV tool at 4429' shall be set a minimum of 200' above current shoe. Operator shall submit sundry if DV tool depths cannot be set in this range.

a. First stage to DV tool:

- ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office before proceeding with second stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

b. Second stage above DV tool:

- ☒ Cement to 2nd DV tool @ 1210'. If cement does not circulate, contact the appropriate BLM office before proceeding with third stage cement job. Operator should have plans as to how they will achieve circulation on the next stage.

c. Third stage above DV tool:

- ☒ Cement to circulate. If cement does not circulate, contact the appropriate BLM office.

4. If hardband drill pipe is rotated inside casing, returns will be monitored for metal. If metal is found in samples, drill pipe will be pulled and rubber protectors which have a larger diameter than the tool joints of the drill pipe will be installed prior to continuing drilling operations.

C. PRESSURE CONTROL

1. All blowout preventer (BOP) and related equipment (BOPE) shall comply with well control requirements as described in Onshore Oil and Gas Order No. 2 and API RP 53 Sec. 17.
2. **In the case where the only BOP installed is an annular preventer, it shall be tested to a minimum of 2000 psi (which may require upgrading to 3M or 5M annular).**

3. The appropriate BLM office shall be notified a minimum of 4 hours in advance for a representative to witness the tests.
 - a. In a water basin, for all casing strings utilizing slips, these are to be set as soon as the crew and rig are ready and any fallback cement remediation has been done. The casing cut-off and BOP installation can be initiated four hours after installing the slips, which will be approximately six hours after bumping the plug. For those casing strings not using slips, the minimum wait time before cut-off is eight hours after bumping the plug. BOP/BOPE testing can begin after cut-off or once cement reaches 500 psi compressive strength (including lead when specified), whichever is greater. However, if the float does not hold, cut-off cannot be initiated until cement reaches 500 psi compressive strength (including lead when specified).
 - b. The tests shall be done by an independent service company utilizing a test plug **not a cup or J-packer**.
 - c. The test shall be run on a 5000 psi chart for a 2-3M BOP/BOP, on a 10000 psi chart for a 5M BOP/BOPE and on a 15000 psi chart for a 10M BOP/BOPE. If a linear chart is used, it shall be a one hour chart. A circular chart shall have a maximum 2 hour clock.
 - d. The results of the test shall be reported to the appropriate BLM office.
 - e. All tests are required to be recorded on a calibrated test chart. **A copy of the BOP/BOPE test chart and a copy of independent service company test will be submitted to the appropriate BLM office.**
 - f. The BOP/BOPE test shall include a low pressure test from 250 to 300 psi. The test will be held for a minimum of 10 minutes if test is done with a test plug and 30 minutes without a test plug. This test shall be performed prior to the test at full stack pressure.

D. DRILL STEM TEST

If drill stem tests are performed, Onshore Order 2.III.D shall be followed.

E. WASTE MATERIAL AND FLUIDS

All waste (i.e. drilling fluids, trash, salts, chemicals, sewage, gray water, etc.) created as a result of drilling operations and completion operations shall be safely contained and disposed of properly at a waste disposal facility. No waste material or fluid shall be disposed of on the well location or surrounding area.

Porto-johns and trash containers will be on-location during fracturing operations or any other crew-intensive operations.

JAM 040913

VIII. PRODUCTION (POST DRILLING)

A. WELL STRUCTURES & FACILITIES

Placement of Production Facilities

Production facilities should be placed on the well pad to allow for maximum interim recontouring and revegetation of the well location.

Containment Structures

The containment structure shall be constructed to hold the capacity of the entire contents of the largest tank, plus 24 hour production, unless more stringent protective requirements are deemed necessary by the Authorized Officer.

Painting Requirement

All above-ground structures including meter housing that are not subject to safety requirements shall be painted a flat non-reflective paint color, Shale Green from the BLM Standard Environmental Color Chart (CC-001: June 2008).

B. PIPELINES

The holder shall indemnify the United States against any liability for damage to life or property arising from the occupancy or use of public lands under this grant.

2. The holder shall comply with all applicable Federal laws and regulations existing or hereafter enacted or promulgated. In any event, the holder shall comply with the Toxic Substances Control Act of 1976 as amended, 15 USC 2601 et seq. (1982) with regards to any toxic substances that are used, generated by or stored on the right-of-way or on facilities authorized under this right-of-way grant. (See 40 CFR, Part 702-799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1-761.193.) Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR, Part 117 shall be reported as required by the Comprehensive Environmental Response, Compensation, and Liability Act, section 102b. A copy of any report required or requested by any Federal agency or State government as a result of a reportable release or spill of any toxic substances shall be furnished to the authorized officer concurrent with the filing of the reports to the involved Federal agency or State government.

3. The holder agrees to indemnify the United States against any liability arising from the release of any hazardous substance or hazardous waste (as these terms are defined in the Comprehensive Environmental Response, Compensation and Liability Act of 1980, 42 U.S.C. 9601, et seq. or the Resource Conservation and Recovery Act, 42 U.S.C. 6901, et seq.) on the Right-of-Way (unless the release or threatened release is wholly unrelated to activity of the Right-of-Way holder's activity on the Right-of-Way), or resulting from the activity of the Right-of-Way holder on the Right-of-Way. This agreement applies without regard to whether a release is caused by the holder, its agent, or unrelated third parties.

4. The holder shall be liable for damage or injury to the United States to the extent provided by 43 CFR Sec. 2883.1-4. The holder shall be held to a standard of strict liability for damage or injury to the United States resulting from pipe rupture, fire, or spills caused or substantially aggravated by any of the following within the right-of-way or permit area:

- a. Activities of the holder including, but not limited to construction, operation, maintenance, and termination of the facility.
- b. Activities of other parties including, but not limited to:
 - (1) Land clearing.
 - (2) Earth-disturbing and earth-moving work.
 - (3) Blasting.
 - (4) Vandalism and sabotage.
- c. Acts of God.

The maximum limitation for such strict liability damages shall not exceed one million dollars (\$1,000,000) for any one event, and any liability in excess of such amount shall be determined by the ordinary rules of negligence of the jurisdiction in which the damage or injury occurred.

This section shall not impose strict liability for damage or injury resulting primarily from an act of war or from the negligent acts or omissions of the United States.

5. If, during any phase of the construction, operation, maintenance, or termination of the pipeline, any oil, salt water, or other pollutant should be discharged from the pipeline system, impacting Federal lands, the control and total removal, disposal, and cleaning up of such oil, salt water, or other pollutant, wherever found, shall be the responsibility of the holder, regardless of fault. Upon failure of the holder to control, dispose of, or clean up such discharge on or affecting Federal lands, or to repair all damages resulting therefrom, on the Federal lands, the Authorized Officer may take such measures as he deems necessary to control and clean up the discharge and restore the area, including, where appropriate, the aquatic environment and fish and wildlife habitats, at the full expense of the holder. Such action by the Authorized Officer shall not relieve the holder of any responsibility as provided herein.

6. All construction and maintenance activity will be confined to the authorized right-of-way width of 20 feet. If the pipeline route follows an existing road or buried pipeline right-of-way, the surface pipeline must be installed no farther than 10 feet from the edge of the road or buried pipeline right-of-way. If existing surface pipelines prevent this distance, the proposed surface pipeline must be installed immediately adjacent to the outer surface pipeline. All construction and maintenance activity will be confined to existing roads or right-of-ways.

7. No blading or clearing of any vegetation will be allowed unless approved in writing by the Authorized Officer.

8. The holder shall install the pipeline on the surface in such a manner that will minimize suspension of the pipeline across low areas in the terrain. In hummocky or dune areas, the pipeline will be "snaked" around hummocks and dunes rather than suspended across these features.

9. The pipeline shall be buried with a minimum of 24 inches under all roads, "two-tracks," and trails. Burial of the pipe will continue for 20 feet on each side of each crossing. The condition of the road, upon completion of construction, shall be returned to at least its former state with no bumps or dips remaining in the road surface.

10. The holder shall minimize disturbance to existing fences and other improvements on public lands. The holder is required to promptly repair improvements to at least their former state. Functional use of these improvements will be maintained at all times. The holder will contact the owner of any improvements prior to disturbing them. When necessary to pass through a fence line, the fence shall be braced on both sides of the passageway prior to cutting of the fence. No permanent gates will be allowed unless approved by the Authorized Officer.

11. In those areas where erosion control structures are required to stabilize soil conditions, the holder will install such structures as are suitable for the specific soil conditions being encountered and which are in accordance with sound resource management practices.

12. Excluding the pipe, all above-ground structures not subject to safety requirement shall be painted by the holder to blend with the natural color of the landscape. The paint used shall be a color which simulates "Standard Environmental Colors" – **Shale Green**, Munsell Soil Color No. 5Y 4/2; designated by the Rocky Mountain Five State Interagency Committee.

13. The pipeline will be identified by signs at the point of origin and completion of the right-of-way and at all road crossings. At a minimum, signs will state the holder's name, BLM serial number, and the product being transported. Signs will be maintained in a legible condition for the life of the pipeline.

14. The holder shall not use the pipeline route as a road for purposes other than routine maintenance as determined necessary by the Authorized Officer in consultation with the holder. The holder will take whatever steps are necessary to ensure that the pipeline route is not used as a roadway.

15. Any cultural and/or paleontological resource (historic or prehistoric site or object) discovered by the holder, or any person working on his behalf, on public or Federal land shall be immediately reported to the authorized officer. Holder shall suspend all operations in the immediate area of such discovery until written authorization to proceed is issued by the authorized officer. An evaluation of the discovery will be made by the authorized officer to determine appropriate cultural or scientific values. The holder will be responsible for the cost of evaluation and any decision as to proper mitigation.

measures will be made by the authorized officer after consulting with the holder.

16. The operator shall be held responsible if noxious weeds become established within the areas of operations. Weed control shall be required on the disturbed land where noxious weeds exist, which includes the roads, powerline corridor, and adjacent land affected by the establishment of weeds due to this action. The operator shall consult with the Authorized Officer for acceptable weed control methods, which include following EPA and BLM requirements and policies.

17. Special Stipulations:

- a. Surface pipelines must be smaller than 4 inches and a working pressure below 125 psi.
- b. **Lesser Prairie-Chicken:** Oil and gas activities will not be allowed in lesser prairie-chicken habitat during the period from March 1st through June 15th annually. During that period, other activities that produce noise or involve human activity, such as the maintenance of oil and gas facilities and pipeline, road, and well pad construction, will be allowed except between 3:00 am and 9:00 am. The 3:00 am to 9:00 am restriction will not apply to normal, around-the-clock operations, such as venting, flaring, or pumping, which do not require a human presence during this period. Normal vehicle use on existing roads will not be restricted.

IX. INTERIM RECLAMATION

During the life of the development, all disturbed areas not needed for active support of production operations should undergo interim reclamation in order to minimize the environmental impacts of development on other resources and uses.

Within six (6) months of well completion, operators should work with BLM surface management specialists (Jim Amos: 575-234-5909) to devise the best strategies to reduce the size of the location. Interim reclamation should allow for remedial well operations, as well as safe and efficient removal of oil and gas.

During reclamation, the removal of caliche is important to increasing the success of revegetating the site. Removed caliche that is free of contaminants may be used for road repairs, fire walls or for building other roads and locations. In order to operate the well or complete workover operations, it may be necessary to drive, park and operate on restored interim vegetation within the previously disturbed area. Disturbing revegetated areas for production or workover operations will be allowed. If there is significant disturbance and loss of vegetation, the area will need to be revegetated. Communicate with the appropriate BLM office for any exceptions/exemptions if needed.

All disturbed areas after they have been satisfactorily prepared need to be reseeded with the seed mixture provided below.

Upon completion of interim reclamation, the operator shall submit a Sundry Notices and Reports on Wells, Subsequent Report of Reclamation (Form 3160-5).

X. FINAL ABANDONMENT & RECLAMATION

At final abandonment, well locations, production facilities, and access roads must undergo "final" reclamation so that the character and productivity of the land are restored.

Earthwork for final reclamation must be completed within six (6) months of well plugging. All pads, pits, facility locations and roads must be reclaimed to a satisfactory revegetated, safe, and stable condition, unless an agreement is made with the landowner or BLM to keep the road and/or pad intact.

After all disturbed areas have been satisfactorily prepared, these areas need to be revegetated with the seed mixture provided below. Seeding should be accomplished by drilling on the contour whenever practical or by other approved methods. Seeding may need to be repeated until revegetation is successful, as determined by the BLM.

Operators shall contact a BLM surface protection specialist prior to surface abandonment operations for site specific objectives (Jim Amos: 575-234-5909).

Ground-level Abandoned Well Marker to avoid raptor perching: Upon the plugging and subsequent abandonment of the well, the well marker will be installed at ground level on a plate containing the pertinent information for the plugged well.

Seed Mixture 2, for Sandy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law (s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (smaller/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

<u>Species</u>	<u>lb/acre</u>
Sand dropseed (<i>Sporobolus cryptandrus</i>)	1.0
Sand love grass (<i>Eragrostis trichodes</i>)	1.0
Plains bristlegrass (<i>Setaria macrostachya</i>)	2.0

*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed