

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

OCD Hobbs

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		5. Lease Serial No. NMNM120908
2. Name of Operator COG PRODUCTION LLC		6. If Indian, Allottee or Tribe Name
3a. Address 2208 W MAIN STREET ARTESIA, NM 88210		7. If Unit or CA/Agreement, Name and/or No.
3b. Phone No. (include area code) Ph: 575-748-6955		8. Well Name and No. WINDWARD FEDERAL 3H
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 30 T24S R32E NWNE 190FNL 2100FEL 32.194974 N Lat, 103.711542 W Lon		9. API Well No. 30-025-41413-00-X1
		10. Field and Pool, or Exploratory WC-025 G06 S253206M
		11. County or Parish, and State LEA COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other Change to Original APD
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG PRODUCTION LLC respectfully requests the following changes to the original APD:

Intermediate: Set approved casing @4650' to insure casing seat is into Lamar limestone top @ 4631'.

Production: Drill 8 3/4" vertical, curve & lateral to 20,431' MD/10,627' TVD (see directional plan & anti-collision). Run 5 1/2" 17# P-110 BTC csg to TD. Cmt in 1 stage with:
Lead: 1150 sx Tuned Light H + Salt + Gilsonite + CF + CFR-3 @ 10.4 ppg/3.08 yield
Tail: 2500 sx 50:50:2 H + Salt + GasStop + CFR-3 @ 14.4 ppg/1.25 yield
35% excess on OH

Original COAs plus COAs from EC#245094 SW/Stand.

14. I hereby certify that the foregoing is true and correct.		Electronic Submission #263549 verified by the BLM Well Information System For COG PRODUCTION LLC, sent to the Hobbs Committed to AFMSS for processing by JENNIFER MASON on 09/15/2014 (14JAM0092SE)	
Name (Printed/Typed)	MELANIE J PARKER	Title	REGULATORY ANALYST
Signature	(Electronic Submission)	Date	09/15/2014
THIS SPACE FOR FEDERAL OR STATE OFFICE USE			
Approved By		Title	
Conditions of approval, if any, are attached. Approval of this notice 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.		Office	

APPROVED

BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

SEP 19 2014



COG Production LLC

Lea County, NM
Windward Federal
#3H

OH

Plan: Design #1

Standard Planning Report

02 September, 2014



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #3H
Company:	COG Production LLC	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site:	Windward Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

Project	Lea County, NM		
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	Windward Federal		
Site Position:	Map	Northing:	435,194.10 usft
From:		Easting:	690,707.10 usft
Position Uncertainty:	3.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 11' 41.866 N
		Longitude:	103° 43' 0.609 W
		Grid Convergence:	0.33 °

Well	#3H		
Well Position	+N/-S	13.4 usft	Northing:
	+E/-W	1,637.6 usft	Easting:
Position Uncertainty	3.0 usft	Wellhead Elevation:	Ground Level:
			3,551.9 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	IGRF200510	7/15/2013	7.39
			Dip Angle
			(°)
			60.11
			Field Strength
			(nT)
			48,419

Design	Design #1		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.0
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(usft)	(usft)	(usft)
	0.0	0.0	0.0
			Direction
			(°)
			177.21

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)	(°)	
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,055.0	0.00	0.00	10,055.0	0.0	0.0	0.00	0.00	0.00	0.00	
10,956.6	90.15	177.21	10,628.0	-573.8	28.0	10.00	10.00	0.00	177.21	
20,431.3	90.15	177.21	10,603.2	-10,037.3	489.1	0.00	0.00	0.00	0.00	PBHL(Windward#3H)



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Site:	Windward Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.00	0.00	100.0	0.0	0.0	0.0	0.00	0.00	0.00
200.0	0.00	0.00	200.0	0.0	0.0	0.0	0.00	0.00	0.00
300.0	0.00	0.00	300.0	0.0	0.0	0.0	0.00	0.00	0.00
400.0	0.00	0.00	400.0	0.0	0.0	0.0	0.00	0.00	0.00
500.0	0.00	0.00	500.0	0.0	0.0	0.0	0.00	0.00	0.00
600.0	0.00	0.00	600.0	0.0	0.0	0.0	0.00	0.00	0.00
700.0	0.00	0.00	700.0	0.0	0.0	0.0	0.00	0.00	0.00
800.0	0.00	0.00	800.0	0.0	0.0	0.0	0.00	0.00	0.00
900.0	0.00	0.00	900.0	0.0	0.0	0.0	0.00	0.00	0.00
1,000.0	0.00	0.00	1,000.0	0.0	0.0	0.0	0.00	0.00	0.00
1,100.0	0.00	0.00	1,100.0	0.0	0.0	0.0	0.00	0.00	0.00
1,200.0	0.00	0.00	1,200.0	0.0	0.0	0.0	0.00	0.00	0.00
1,300.0	0.00	0.00	1,300.0	0.0	0.0	0.0	0.00	0.00	0.00
1,400.0	0.00	0.00	1,400.0	0.0	0.0	0.0	0.00	0.00	0.00
1,500.0	0.00	0.00	1,500.0	0.0	0.0	0.0	0.00	0.00	0.00
1,600.0	0.00	0.00	1,600.0	0.0	0.0	0.0	0.00	0.00	0.00
1,700.0	0.00	0.00	1,700.0	0.0	0.0	0.0	0.00	0.00	0.00
1,800.0	0.00	0.00	1,800.0	0.0	0.0	0.0	0.00	0.00	0.00
1,900.0	0.00	0.00	1,900.0	0.0	0.0	0.0	0.00	0.00	0.00
2,000.0	0.00	0.00	2,000.0	0.0	0.0	0.0	0.00	0.00	0.00
2,100.0	0.00	0.00	2,100.0	0.0	0.0	0.0	0.00	0.00	0.00
2,200.0	0.00	0.00	2,200.0	0.0	0.0	0.0	0.00	0.00	0.00
2,300.0	0.00	0.00	2,300.0	0.0	0.0	0.0	0.00	0.00	0.00
2,400.0	0.00	0.00	2,400.0	0.0	0.0	0.0	0.00	0.00	0.00
2,500.0	0.00	0.00	2,500.0	0.0	0.0	0.0	0.00	0.00	0.00
2,600.0	0.00	0.00	2,600.0	0.0	0.0	0.0	0.00	0.00	0.00
2,700.0	0.00	0.00	2,700.0	0.0	0.0	0.0	0.00	0.00	0.00
2,800.0	0.00	0.00	2,800.0	0.0	0.0	0.0	0.00	0.00	0.00
2,900.0	0.00	0.00	2,900.0	0.0	0.0	0.0	0.00	0.00	0.00
3,000.0	0.00	0.00	3,000.0	0.0	0.0	0.0	0.00	0.00	0.00
3,100.0	0.00	0.00	3,100.0	0.0	0.0	0.0	0.00	0.00	0.00
3,200.0	0.00	0.00	3,200.0	0.0	0.0	0.0	0.00	0.00	0.00
3,300.0	0.00	0.00	3,300.0	0.0	0.0	0.0	0.00	0.00	0.00
3,400.0	0.00	0.00	3,400.0	0.0	0.0	0.0	0.00	0.00	0.00
3,500.0	0.00	0.00	3,500.0	0.0	0.0	0.0	0.00	0.00	0.00
3,600.0	0.00	0.00	3,600.0	0.0	0.0	0.0	0.00	0.00	0.00
3,700.0	0.00	0.00	3,700.0	0.0	0.0	0.0	0.00	0.00	0.00
3,800.0	0.00	0.00	3,800.0	0.0	0.0	0.0	0.00	0.00	0.00
3,900.0	0.00	0.00	3,900.0	0.0	0.0	0.0	0.00	0.00	0.00
4,000.0	0.00	0.00	4,000.0	0.0	0.0	0.0	0.00	0.00	0.00
4,100.0	0.00	0.00	4,100.0	0.0	0.0	0.0	0.00	0.00	0.00
4,200.0	0.00	0.00	4,200.0	0.0	0.0	0.0	0.00	0.00	0.00
4,300.0	0.00	0.00	4,300.0	0.0	0.0	0.0	0.00	0.00	0.00
4,400.0	0.00	0.00	4,400.0	0.0	0.0	0.0	0.00	0.00	0.00
4,500.0	0.00	0.00	4,500.0	0.0	0.0	0.0	0.00	0.00	0.00
4,600.0	0.00	0.00	4,600.0	0.0	0.0	0.0	0.00	0.00	0.00
4,700.0	0.00	0.00	4,700.0	0.0	0.0	0.0	0.00	0.00	0.00
4,800.0	0.00	0.00	4,800.0	0.0	0.0	0.0	0.00	0.00	0.00
4,900.0	0.00	0.00	4,900.0	0.0	0.0	0.0	0.00	0.00	0.00
5,000.0	0.00	0.00	5,000.0	0.0	0.0	0.0	0.00	0.00	0.00
5,100.0	0.00	0.00	5,100.0	0.0	0.0	0.0	0.00	0.00	0.00
5,200.0	0.00	0.00	5,200.0	0.0	0.0	0.0	0.00	0.00	0.00
5,300.0	0.00	0.00	5,300.0	0.0	0.0	0.0	0.00	0.00	0.00



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Wellbore:	OH		
Design:	Design #1		

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)	
5,400.0	0.00	0.00	5,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,500.0	0.00	0.00	5,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,600.0	0.00	0.00	5,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,700.0	0.00	0.00	5,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,800.0	0.00	0.00	5,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
5,900.0	0.00	0.00	5,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,000.0	0.00	0.00	6,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,100.0	0.00	0.00	6,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,200.0	0.00	0.00	6,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,300.0	0.00	0.00	6,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,400.0	0.00	0.00	6,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,500.0	0.00	0.00	6,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,600.0	0.00	0.00	6,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,700.0	0.00	0.00	6,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,800.0	0.00	0.00	6,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
6,900.0	0.00	0.00	6,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,000.0	0.00	0.00	7,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,100.0	0.00	0.00	7,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,200.0	0.00	0.00	7,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,300.0	0.00	0.00	7,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,400.0	0.00	0.00	7,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,500.0	0.00	0.00	7,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,600.0	0.00	0.00	7,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,700.0	0.00	0.00	7,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,800.0	0.00	0.00	7,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
7,900.0	0.00	0.00	7,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,000.0	0.00	0.00	8,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,100.0	0.00	0.00	8,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,200.0	0.00	0.00	8,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,300.0	0.00	0.00	8,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,400.0	0.00	0.00	8,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,500.0	0.00	0.00	8,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,600.0	0.00	0.00	8,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,700.0	0.00	0.00	8,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,800.0	0.00	0.00	8,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
8,900.0	0.00	0.00	8,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,000.0	0.00	0.00	9,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,100.0	0.00	0.00	9,100.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,200.0	0.00	0.00	9,200.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,300.0	0.00	0.00	9,300.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,400.0	0.00	0.00	9,400.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,500.0	0.00	0.00	9,500.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,600.0	0.00	0.00	9,600.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,700.0	0.00	0.00	9,700.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,800.0	0.00	0.00	9,800.0	0.0	0.0	0.0	0.00	0.00	0.00	
9,900.0	0.00	0.00	9,900.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,000.0	0.00	0.00	10,000.0	0.0	0.0	0.0	0.00	0.00	0.00	
10,055.0	0.00	0.00	10,055.0	0.0	0.0	0.0	0.00	0.00	0.00	
KOP - 10055.0 MD, 0.00° INC, 0.00° AZI										
10,100.0	4.50	177.21	10,100.0	-1.8	0.1	1.8	10.00	10.00	0.00	
10,150.0	9.50	177.21	10,149.6	-7.8	0.4	7.9	10.00	10.00	0.00	
10,200.0	14.50	177.21	10,198.5	-18.2	0.9	18.2	10.00	10.00	0.00	
10,250.0	19.50	177.21	10,246.3	-32.8	1.6	32.9	10.00	10.00	0.00	



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Wellbore:	OH		
Design:	Design #1		

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)	
10,300.0	24.50	177.21	10,292.6	-51.5	2.5	51.6	10.00	10.00	0.00	
10,350.0	29.50	177.21	10,337.1	-74.2	3.6	74.3	10.00	10.00	0.00	
10,400.0	34.50	177.21	10,379.5	-100.6	4.9	100.8	10.00	10.00	0.00	
10,450.0	39.50	177.21	10,419.5	-130.7	6.4	130.8	10.00	10.00	0.00	
10,500.0	44.50	177.21	10,456.6	-164.1	8.0	164.3	10.00	10.00	0.00	
10,550.0	49.50	177.21	10,490.7	-200.6	9.8	200.8	10.00	10.00	0.00	
10,600.0	54.50	177.21	10,521.5	-239.9	11.7	240.2	10.00	10.00	0.00	
10,650.0	59.50	177.21	10,548.7	-281.8	13.7	282.1	10.00	10.00	0.00	
10,700.0	64.50	177.21	10,572.2	-325.9	15.9	326.3	10.00	10.00	0.00	
10,750.0	69.49	177.21	10,591.7	-371.8	18.1	372.3	10.00	10.00	0.00	
10,800.0	74.49	177.21	10,607.1	-419.3	20.4	419.8	10.00	10.00	0.00	
10,850.0	79.49	177.21	10,618.4	-468.0	22.8	468.5	10.00	10.00	0.00	
10,900.0	84.49	177.21	10,625.4	-517.4	25.2	518.0	10.00	10.00	0.00	
10,950.0	89.49	177.21	10,628.0	-567.3	27.6	567.9	10.00	10.00	0.00	
10,956.6	90.15	177.21	10,628.0	-573.8	28.0	574.5	10.00	10.00	0.00	
EOC- 10956.6 'MD', 90.15° INC, 177.21° AZI										
11,000.0	90.15	177.21	10,627.9	-617.2	30.1	617.9	0.00	0.00	0.00	
11,100.0	90.15	177.21	10,627.6	-717.1	34.9	717.9	0.00	0.00	0.00	
11,200.0	90.15	177.21	10,627.4	-817.0	39.8	817.9	0.00	0.00	0.00	
11,300.0	90.15	177.21	10,627.1	-916.8	44.7	917.9	0.00	0.00	0.00	
11,400.0	90.15	177.21	10,626.8	-1,016.7	49.5	1,017.9	0.00	0.00	0.00	
11,500.0	90.15	177.21	10,626.6	-1,116.6	54.4	1,117.9	0.00	0.00	0.00	
11,600.0	90.15	177.21	10,626.3	-1,216.5	59.3	1,217.9	0.00	0.00	0.00	
11,700.0	90.15	177.21	10,626.1	-1,316.4	64.2	1,317.9	0.00	0.00	0.00	
11,800.0	90.15	177.21	10,625.8	-1,416.2	69.0	1,417.9	0.00	0.00	0.00	
11,900.0	90.15	177.21	10,625.5	-1,516.1	73.9	1,517.9	0.00	0.00	0.00	
12,000.0	90.15	177.21	10,625.3	-1,616.0	78.8	1,617.9	0.00	0.00	0.00	
12,100.0	90.15	177.21	10,625.0	-1,715.9	83.6	1,717.9	0.00	0.00	0.00	
12,162.9	90.15	177.21	10,624.8	-1,778.8	86.7	1,780.9	0.00	0.00	0.00	
Paduca #1										
12,200.0	90.15	177.21	10,624.7	-1,815.8	88.5	1,817.9	0.00	0.00	0.00	
12,300.0	90.15	177.21	10,624.5	-1,915.7	93.4	1,917.9	0.00	0.00	0.00	
12,400.0	90.15	177.21	10,624.2	-2,015.5	98.2	2,017.9	0.00	0.00	0.00	
12,500.0	90.15	177.21	10,624.0	-2,115.4	103.1	2,117.9	0.00	0.00	0.00	
12,600.0	90.15	177.21	10,623.7	-2,215.3	108.0	2,217.9	0.00	0.00	0.00	
12,700.0	90.15	177.21	10,623.4	-2,315.2	112.8	2,317.9	0.00	0.00	0.00	
12,800.0	90.15	177.21	10,623.2	-2,415.1	117.7	2,417.9	0.00	0.00	0.00	
12,900.0	90.15	177.21	10,622.9	-2,514.9	122.6	2,517.9	0.00	0.00	0.00	
13,000.0	90.15	177.21	10,622.7	-2,614.8	127.4	2,617.9	0.00	0.00	0.00	
13,100.0	90.15	177.21	10,622.4	-2,714.7	132.3	2,717.9	0.00	0.00	0.00	
13,200.0	90.15	177.21	10,622.1	-2,814.6	137.2	2,817.9	0.00	0.00	0.00	
13,300.0	90.15	177.21	10,621.9	-2,914.5	142.0	2,917.9	0.00	0.00	0.00	
13,400.0	90.15	177.21	10,621.6	-3,014.3	146.9	3,017.9	0.00	0.00	0.00	
13,500.0	90.15	177.21	10,621.3	-3,114.2	151.8	3,117.9	0.00	0.00	0.00	
13,600.0	90.15	177.21	10,621.1	-3,214.1	156.6	3,217.9	0.00	0.00	0.00	
13,700.0	90.15	177.21	10,620.8	-3,314.0	161.5	3,317.9	0.00	0.00	0.00	
13,800.0	90.15	177.21	10,620.6	-3,413.9	166.4	3,417.9	0.00	0.00	0.00	
13,900.0	90.15	177.21	10,620.3	-3,513.8	171.2	3,517.9	0.00	0.00	0.00	
14,000.0	90.15	177.21	10,620.0	-3,613.6	176.1	3,617.9	0.00	0.00	0.00	
14,100.0	90.15	177.21	10,619.8	-3,713.5	181.0	3,717.9	0.00	0.00	0.00	
14,200.0	90.15	177.21	10,619.5	-3,813.4	185.8	3,817.9	0.00	0.00	0.00	
14,300.0	90.15	177.21	10,619.2	-3,913.3	190.7	3,917.9	0.00	0.00	0.00	
14,400.0	90.15	177.21	10,619.0	-4,013.2	195.6	4,017.9	0.00	0.00	0.00	
14,500.0	90.15	177.21	10,618.7	-4,113.0	200.4	4,117.9	0.00	0.00	0.00	



Wellplanning
Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #3H
Company:	COG Production LLC	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site:	Windward Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

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)
14,600.0	90.15	177.21	10,618.5	-4,212.9	205.3	4,217.9	0.00	0.00	0.00
14,700.0	90.15	177.21	10,618.2	-4,312.8	210.2	4,317.9	0.00	0.00	0.00
14,800.0	90.15	177.21	10,617.9	-4,412.7	215.0	4,417.9	0.00	0.00	0.00
14,900.0	90.15	177.21	10,617.7	-4,512.6	219.9	4,517.9	0.00	0.00	0.00
15,000.0	90.15	177.21	10,617.4	-4,612.4	224.8	4,617.9	0.00	0.00	0.00
15,100.0	90.15	177.21	10,617.2	-4,712.3	229.6	4,717.9	0.00	0.00	0.00
15,200.0	90.15	177.21	10,616.9	-4,812.2	234.5	4,817.9	0.00	0.00	0.00
15,300.0	90.15	177.21	10,616.6	-4,912.1	239.4	4,917.9	0.00	0.00	0.00
15,400.0	90.15	177.21	10,616.4	-5,012.0	244.2	5,017.9	0.00	0.00	0.00
15,500.0	90.15	177.21	10,616.1	-5,111.9	249.1	5,117.9	0.00	0.00	0.00
15,600.0	90.15	177.21	10,615.8	-5,211.7	254.0	5,217.9	0.00	0.00	0.00
15,700.0	90.15	177.21	10,615.6	-5,311.6	258.9	5,317.9	0.00	0.00	0.00
15,800.0	90.15	177.21	10,615.3	-5,411.5	263.7	5,417.9	0.00	0.00	0.00
15,900.0	90.15	177.21	10,615.1	-5,511.4	268.6	5,517.9	0.00	0.00	0.00
16,000.0	90.15	177.21	10,614.8	-5,611.3	273.5	5,617.9	0.00	0.00	0.00
16,100.0	90.15	177.21	10,614.5	-5,711.1	278.3	5,717.9	0.00	0.00	0.00
16,200.0	90.15	177.21	10,614.3	-5,811.0	283.2	5,817.9	0.00	0.00	0.00
16,300.0	90.15	177.21	10,614.0	-5,910.9	288.1	5,917.9	0.00	0.00	0.00
16,400.0	90.15	177.21	10,613.7	-6,010.8	292.9	6,017.9	0.00	0.00	0.00
16,500.0	90.15	177.21	10,613.5	-6,110.7	297.8	6,117.9	0.00	0.00	0.00
16,600.0	90.15	177.21	10,613.2	-6,210.5	302.7	6,217.9	0.00	0.00	0.00
16,700.0	90.15	177.21	10,613.0	-6,310.4	307.5	6,317.9	0.00	0.00	0.00
16,800.0	90.15	177.21	10,612.7	-6,410.3	312.4	6,417.9	0.00	0.00	0.00
16,900.0	90.15	177.21	10,612.4	-6,510.2	317.3	6,517.9	0.00	0.00	0.00
17,000.0	90.15	177.21	10,612.2	-6,610.1	322.1	6,617.9	0.00	0.00	0.00
17,100.0	90.15	177.21	10,611.9	-6,709.9	327.0	6,717.9	0.00	0.00	0.00
17,200.0	90.15	177.21	10,611.7	-6,809.8	331.9	6,817.9	0.00	0.00	0.00
17,300.0	90.15	177.21	10,611.4	-6,909.7	336.7	6,917.9	0.00	0.00	0.00
17,400.0	90.15	177.21	10,611.1	-7,009.6	341.6	7,017.9	0.00	0.00	0.00
17,500.0	90.15	177.21	10,610.9	-7,109.5	346.5	7,117.9	0.00	0.00	0.00
17,600.0	90.15	177.21	10,610.6	-7,209.4	351.3	7,217.9	0.00	0.00	0.00
17,700.0	90.15	177.21	10,610.3	-7,309.2	356.2	7,317.9	0.00	0.00	0.00
17,800.0	90.15	177.21	10,610.1	-7,409.1	361.1	7,417.9	0.00	0.00	0.00
17,900.0	90.15	177.21	10,609.8	-7,509.0	365.9	7,517.9	0.00	0.00	0.00
18,000.0	90.15	177.21	10,609.6	-7,608.9	370.8	7,617.9	0.00	0.00	0.00
18,100.0	90.15	177.21	10,609.3	-7,708.8	375.7	7,717.9	0.00	0.00	0.00
18,200.0	90.15	177.21	10,609.0	-7,808.6	380.5	7,817.9	0.00	0.00	0.00
18,300.0	90.15	177.21	10,608.8	-7,908.5	385.4	7,917.9	0.00	0.00	0.00
18,400.0	90.15	177.21	10,608.5	-8,008.4	390.3	8,017.9	0.00	0.00	0.00
18,500.0	90.15	177.21	10,608.3	-8,108.3	395.1	8,117.9	0.00	0.00	0.00
18,600.0	90.15	177.21	10,608.0	-8,208.2	400.0	8,217.9	0.00	0.00	0.00
18,700.0	90.15	177.21	10,607.7	-8,308.0	404.9	8,317.9	0.00	0.00	0.00
18,800.0	90.15	177.21	10,607.5	-8,407.9	409.7	8,417.9	0.00	0.00	0.00
18,900.0	90.15	177.21	10,607.2	-8,507.8	414.6	8,517.9	0.00	0.00	0.00
19,000.0	90.15	177.21	10,606.9	-8,607.7	419.5	8,617.9	0.00	0.00	0.00
19,100.0	90.15	177.21	10,606.7	-8,707.6	424.3	8,717.9	0.00	0.00	0.00
19,200.0	90.15	177.21	10,606.4	-8,807.5	429.2	8,817.9	0.00	0.00	0.00
19,300.0	90.15	177.21	10,606.2	-8,907.3	434.1	8,917.9	0.00	0.00	0.00
19,400.0	90.15	177.21	10,605.9	-9,007.2	439.0	9,017.9	0.00	0.00	0.00
19,500.0	90.15	177.21	10,605.6	-9,107.1	443.8	9,117.9	0.00	0.00	0.00
19,600.0	90.15	177.21	10,605.4	-9,207.0	448.7	9,217.9	0.00	0.00	0.00
19,700.0	90.15	177.21	10,605.1	-9,306.9	453.6	9,317.9	0.00	0.00	0.00
19,800.0	90.15	177.21	10,604.8	-9,406.7	458.4	9,417.9	0.00	0.00	0.00
19,900.0	90.15	177.21	10,604.6	-9,506.6	463.3	9,517.9	0.00	0.00	0.00



Wellplanning Planning Report

Database:	EDM 5000.1 Single User Db	Local Co-ordinate Reference:	Well #3H
Company:	COG Production LLC	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Project:	Lea County, NM	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site:	Windward Federal	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Design #1		

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)	
20,000.0	90.15	177.21	10,604.3	-9,606.5	468.2	9,617.9	0.00	0.00	0.00	
20,100.0	90.15	177.21	10,604.1	-9,706.4	473.0	9,717.9	0.00	0.00	0.00	
20,200.0	90.15	177.21	10,603.8	-9,806.3	477.9	9,817.9	0.00	0.00	0.00	
20,300.0	90.15	177.21	10,603.5	-9,906.1	482.8	9,917.9	0.00	0.00	0.00	
20,400.0	90.15	177.21	10,603.3	-10,006.0	487.6	10,017.9	0.00	0.00	0.00	
20,431.3	90.15	177.21	10,603.2	-10,037.3	489.1	10,049.2	0.00	0.00	0.00	
TD at 20431.3 - PBHL(Windward#3H)										

Design Targets										
Target Name	hit/miss target	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL(Windward#3H)		0.00	0.00	10,603.0	-10,037.3	488.3	425,170.20	692,833.00	32° 10' 2.550 N	103° 42' 36.545 W
- plan misses target center by 0.9usft at 20431.3usft MD (10603.2 TVD, -10037.3 N, 489.1 E)										
- Point										
Paduca #1		0.00	0.00	15,531.0	-1,790.0	120.0	433,417.50	692,464.70	32° 11' 24.185 N	103° 42' 40.275 W
- plan misses target center by 4906.3usft at 12162.9usft MD (10624.8 TVD, -1778.8 N, 86.7 E)										
- Circle (radius 410.0)										

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates			
		+N/-S (usft)	+E/-W (usft)	Comment	
10,055.0	10,055.0	0.0	0.0	KOP - 10055.0 MD, 0.00° INC, 0.00° AZI	
10,956.6	10,628.0	-573.8	28.0	EOC- 10956.6 MD, 90.15° INC, 177.21° AZI	
20,431.3	10,603.2	-10,037.3	489.1	TD at 20431.3	

COG Production LLC

**Lea County, NM
Windward Federal
#3H**

**OH
Design #1**

Anticollision Report

02 September, 2014

Anticollision Report

Company:	COG Production LLC	Local/Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Reference Site:	Windward Federal	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site Error:	3.0 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Reference:	Design #1		
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 separation factor of 10.00	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool/Program		Date: 9/2/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.0	20,431.3	Design #1 (OH)	MWD	MWD - Standard

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
King Tut Federal						
#3H - OH - OH	2,966.6	2,966.3	89.6	75.1	6.214	CC
#3H - OH - OH	8,069.7	8,072.3	103.3	67.9	2.917	ES
#3H - OH - OH	8,100.0	8,101.0	103.6	68.1	2.916	SF
Paduca Federal						
#1 - OH - TOTCO	11,894.3	10,602.6	46.4	-12.2	0.792	Level 1, CC, ES, SF

Offset Design: King Tut Federal - #3H - OH - OH											Offset Site Error:	2.0 usft
Survey Program: 196-MWD											Offset Well Error:	2.0 usft
Reference		Offset		Semi Major Axis		Distance						
Measured Depth	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning
(usft)	Depth	Depth	Depth	(usft)	(usft)	Toolface	+N/-S	+E/-W	Centres	Ellipses	Separation	Factor
	(usft)	(usft)	(usft)			(°)	(usft)	(usft)	(usft)	(usft)	(usft)	
1,600.0	1,600.0	1,599.7	1,599.7	5.5	4.2	-89.54	0.8	-96.6	96.6	86.9	9.68	9.979
1,700.0	1,700.0	1,700.1	1,700.1	5.6	4.4	-89.49	0.9	-96.1	96.1	86.1	9.98	9.625
1,800.0	1,800.0	1,800.2	1,800.2	5.8	4.5	-89.29	1.2	-95.3	95.3	85.0	10.29	9.263
1,900.0	1,900.0	1,900.5	1,900.5	5.9	4.7	-88.75	2.1	-94.3	94.3	83.7	10.61	8.886
2,000.0	2,000.0	2,000.0	1,999.9	6.1	4.9	-87.90	3.4	-93.2	93.2	82.3	10.94	8.519
2,025.6	2,025.6	2,025.1	2,025.0	6.1	4.9	-87.66	3.8	-93.1	93.2	82.1	11.03	8.447
2,100.0	2,100.0	2,098.6	2,098.6	6.2	5.0	-86.88	5.1	-93.5	93.6	82.4	11.28	8.304
2,200.0	2,200.0	2,199.1	2,199.0	6.4	5.2	-85.41	7.6	-94.1	94.4	82.8	11.62	8.122
2,300.0	2,300.0	2,299.8	2,299.6	6.6	5.4	-83.46	10.8	-93.8	94.4	82.4	11.97	7.883
2,400.0	2,400.0	2,399.9	2,399.7	6.7	5.6	-81.99	13.1	-93.2	94.1	81.8	12.33	7.632
2,500.0	2,500.0	2,500.1	2,499.9	6.9	5.8	-80.52	15.4	-92.4	93.7	81.0	12.69	7.385
2,600.0	2,600.0	2,600.7	2,600.4	7.1	6.0	-78.79	18.1	-91.2	92.9	79.9	13.06	7.118
2,700.0	2,700.0	2,700.3	2,700.1	7.3	6.1	-77.98	19.1	-89.8	91.9	78.4	13.42	6.844
2,800.0	2,800.0	2,800.7	2,800.4	7.5	6.3	-77.56	19.6	-89.0	91.1	77.3	13.79	6.608
2,900.0	2,900.0	2,900.6	2,900.3	7.7	6.5	-77.11	20.1	-87.7	90.0	75.8	14.17	6.352
2,966.6	2,966.6	2,966.3	2,966.0	7.8	6.6	-77.13	19.9	-87.3	89.6	75.1	14.41	6.214 CC
3,000.0	3,000.0	2,999.1	2,998.8	7.8	6.7	-77.33	19.7	-87.5	89.7	75.1	14.54	6.169
3,100.0	3,100.0	3,098.7	3,098.4	8.0	6.9	-78.28	18.4	-88.8	90.7	75.7	14.91	6.080
3,200.0	3,200.0	3,199.1	3,198.8	8.2	7.1	-78.76	17.8	-89.8	91.5	76.3	15.29	5.985
3,300.0	3,300.0	3,299.4	3,299.0	8.4	7.3	-78.50	18.3	-90.2	92.0	76.4	15.68	5.869
3,400.0	3,400.0	3,398.1	3,397.8	8.6	7.5	-78.65	18.3	-91.3	93.1	77.1	16.07	5.797

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

Anticollision Report

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Reference Site:	Windward Federal	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site Error:	3.0 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	EDM 5000:1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design King Tut Federal - #3H - OH - OH													Offset Site Error:	2.0 usft
Survey Program: 198-MWD													Offset Well Error:	2.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference Depth (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	Warning	
3,500.0	3,500.0	3,498.0	3,497.6	8.8	7.6	-79.02	18.1	-93.2	94.9	78.5	16.45	5.770		
3,600.0	3,600.0	3,598.1	3,597.7	9.0	7.8	-79.05	18.4	-95.0	96.7	79.9	16.85	5.741		
3,700.0	3,700.0	3,698.1	3,697.7	9.2	8.0	-78.84	19.1	-96.6	98.5	81.3	17.24	5.713		
3,800.0	3,800.0	3,798.5	3,798.1	9.4	8.2	-79.51	18.2	-98.3	100.0	82.3	17.84	5.667		
3,900.0	3,900.0	3,898.9	3,898.4	9.6	8.4	-80.96	15.9	-100.0	101.2	83.2	18.04	5.612		
4,000.0	4,000.0	3,999.5	3,999.0	9.8	8.6	-82.18	13.9	-100.8	101.8	83.3	18.44	5.519		
4,100.0	4,100.0	4,100.0	4,099.5	10.0	8.8	-83.14	12.2	-101.2	102.0	83.1	18.84	5.412		
4,200.0	4,200.0	4,201.3	4,200.8	10.2	9.0	-84.00	10.6	-100.7	101.3	82.0	19.25	5.262		
4,300.0	4,300.0	4,302.2	4,301.7	10.4	9.2	-85.47	7.8	-99.0	99.4	79.7	19.66	5.055		
4,400.0	4,400.0	4,401.2	4,400.6	10.6	9.4	-87.62	4.0	-97.3	97.3	77.3	20.06	4.854		
4,500.0	4,500.0	4,500.5	4,499.8	10.8	9.6	-89.81	0.3	-96.7	96.7	76.2	20.46	4.725		
4,600.0	4,600.0	4,600.5	4,599.8	11.0	9.8	-91.97	-3.3	-96.2	96.3	75.4	20.87	4.613		
4,646.5	4,646.5	4,646.7	4,645.9	11.1	9.9	-92.91	-4.9	-96.0	96.1	75.1	21.06	4.566		
4,700.0	4,700.0	4,699.6	4,698.8	11.2	10.0	-93.60	-6.1	-96.1	96.3	75.0	21.27	4.527		
4,800.0	4,800.0	4,799.5	4,798.7	11.5	10.2	-94.26	-7.2	-96.8	97.1	75.4	21.69	4.476		
4,900.0	4,900.0	4,899.2	4,898.4	11.7	10.4	-94.88	-8.3	-97.6	98.0	75.9	22.09	4.433		
5,000.0	5,000.0	4,999.1	4,998.3	11.9	10.6	-95.74	-9.9	-98.5	99.0	76.5	22.50	4.401		
5,100.0	5,100.0	5,098.5	5,097.7	12.1	10.8	-96.06	-10.6	-99.9	100.5	77.6	22.91	4.385		
5,200.0	5,200.0	5,198.5	5,197.6	12.3	11.0	-95.57	-9.9	-101.7	102.2	78.9	23.33	4.381		
5,300.0	5,300.0	5,298.5	5,297.6	12.5	11.2	-94.79	-8.7	-103.5	103.9	80.2	23.74	4.376		
5,400.0	5,400.0	5,398.4	5,397.5	12.7	11.4	-94.14	-7.6	-105.4	105.7	81.5	24.16	4.374		
5,500.0	5,500.0	5,498.5	5,497.6	12.9	11.6	-93.63	-6.8	-107.2	107.4	82.8	24.57	4.371		
5,600.0	5,600.0	5,598.8	5,597.6	13.1	11.8	-93.15	-6.0	-108.9	109.1	84.1	24.98	4.366		
5,700.0	5,700.0	5,698.8	5,697.8	13.4	12.0	-92.53	-4.9	-110.5	110.6	85.2	25.40	4.353		
5,800.0	5,800.0	5,798.7	5,797.7	13.6	12.3	-91.90	-3.7	-112.0	112.0	86.2	25.82	4.339		
5,900.0	5,900.0	5,900.2	5,899.2	13.8	12.5	-91.34	-2.6	-113.2	113.2	87.0	26.24	4.315		
6,000.0	6,000.0	6,001.2	6,000.2	14.0	12.7	-90.85	-1.7	-112.6	112.6	85.9	26.66	4.223		
6,100.0	6,100.0	6,101.5	6,100.5	14.2	12.9	-90.52	-1.0	-111.8	111.9	84.8	27.08	4.131		
6,200.0	6,200.0	6,201.1	6,200.1	14.4	13.1	-90.24	-0.5	-110.9	110.9	83.4	27.50	4.034		
6,290.2	6,290.2	6,290.7	6,289.6	14.6	13.3	-89.90	0.2	-110.6	110.6	82.8	27.87	3.969		
6,300.0	6,300.0	6,300.4	6,299.3	14.6	13.3	-89.85	0.3	-110.6	110.6	82.7	27.91	3.963		
6,400.0	6,400.0	6,400.3	6,399.3	14.9	13.5	-89.41	1.1	-110.8	110.8	82.4	28.33	3.910		
6,500.0	6,500.0	6,500.4	6,499.3	15.1	13.7	-89.00	1.9	-110.8	110.8	82.1	28.75	3.855		
6,600.0	6,600.0	6,600.2	6,599.1	15.3	13.9	-88.65	2.6	-111.0	111.0	81.8	29.17	3.805		
6,700.0	6,700.0	6,700.6	6,699.5	15.5	14.1	-88.40	3.1	-111.0	111.1	81.5	29.59	3.754		
6,800.0	6,800.0	6,800.6	6,799.6	15.7	14.3	-88.29	3.3	-110.9	111.0	81.0	30.02	3.698		
6,900.0	6,900.0	6,901.1	6,900.0	15.9	14.5	-88.26	3.4	-110.6	110.6	80.2	30.44	3.634		
7,000.0	7,000.0	7,001.4	7,000.4	16.2	14.7	-88.21	3.4	-109.8	109.9	79.0	30.86	3.560		
7,100.0	7,100.0	7,101.4	7,100.4	16.4	14.9	-88.22	3.4	-108.8	108.9	77.6	31.29	3.481		
7,200.0	7,200.0	7,201.0	7,199.9	16.6	15.1	-88.23	3.3	-108.2	108.3	76.5	31.71	3.414		
7,300.0	7,300.0	7,300.8	7,299.7	16.8	15.3	-88.13	3.5	-107.8	107.8	75.7	32.13	3.356		
7,400.0	7,400.0	7,400.6	7,399.6	17.0	15.5	-88.10	3.6	-107.6	107.7	75.2	32.55	3.309		
7,500.0	7,500.0	7,500.9	7,499.8	17.2	15.7	-88.12	3.5	-107.3	107.4	74.4	32.98	3.257		
7,600.0	7,600.0	7,600.6	7,599.6	17.5	15.9	-88.27	3.2	-107.0	107.0	73.6	33.40	3.204		
7,631.8	7,631.8	7,632.2	7,631.2	17.5	16.0	-88.35	3.1	-107.0	107.0	73.5	33.54	3.191		
7,700.0	7,700.0	7,700.3	7,699.2	17.7	16.1	-88.55	2.7	-107.0	107.1	73.3	33.82	3.166		
7,800.0	7,800.0	7,800.2	7,799.2	17.9	16.4	-88.89	2.1	-107.3	107.3	73.1	34.25	3.134		
7,900.0	7,900.0	7,901.4	7,900.3	18.1	16.6	-89.62	0.7	-107.2	107.2	72.6	34.68	3.093		
8,000.0	8,000.0	8,004.8	8,003.1	18.3	16.8	-95.11	-9.3	-104.3	104.8	69.7	35.11	2.985		
8,069.7	8,069.7	8,072.3	8,069.1	18.5	16.9	-102.67	-22.7	-100.8	103.3	67.9	35.40	2.917 ES		
8,100.0	8,100.0	8,101.0	8,096.8	18.6	17.0	-106.96	-30.2	-99.1	103.6	68.1	35.53	2.916 SF		
8,200.0	8,200.0	8,187.5	8,177.3	18.8	17.2	-123.30	-61.3	-93.3	113.8	77.8	35.95	3.166		

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

Anticollision Report

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Reference Site:	Windward Federal	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site Error:	3.0 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: King Tut Federal - #3H - OH - OH													Offset Site Error: 2.0 usft
Survey Program: 198-MWD													Offset Well Error: 2.0 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		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	
8,300.0	8,300.0	8,266.0	8,245.5	19.0	17.4	-138.52	-99.5	-88.0	143.3	107.0	36.34	3.943	
8,400.0	8,400.0	8,321.9	8,290.3	19.2	17.5	-147.31	-132.8	-85.2	191.8	155.1	36.69	5.228	
8,500.0	8,500.0	8,370.1	8,325.2	19.4	17.7	-153.07	-165.9	-84.3	254.9	217.9	37.00	6.889	
8,600.0	8,600.0	8,414.9	8,354.7	19.6	17.9	-157.18	-199.6	-84.0	326.8	289.5	37.30	8.763	

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

Anticollision Report

Company:	COG Production LLC	Local Co-ordinate Reference:	Well #3H
Project:	Lea County, NM	TVD Reference:	WELL @ 3581.9usft (Original Well Elev)
Reference Site:	Windward Federal	MD Reference:	WELL @ 3581.9usft (Original Well Elev)
Site Error:	3.0 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	3.0' usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	EDM 5000.1 Single User Db
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Paduca Federal - #1 - OH - TOTCO												Offset Site Error:	0.0 usft
Survey Program: 285-MWD												Offset Well Error:	0.0 usft
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference	Offset	High/Low Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
11,400.0	10,626.8	10,621.1	10,615.8	29.9	22.5	-111.63	-1,507.5	120.0	496.1	446.2	49.93	9.936	
11,500.0	10,626.6	10,617.4	10,612.0	31.0	22.5	-107.54	-1,507.6	120.0	396.7	344.9	51.86	7.649	
11,600.0	10,626.3	10,613.7	10,608.3	32.3	22.5	-103.25	-1,507.8	120.0	297.7	243.9	53.77	5.537	
11,700.0	10,626.1	10,609.9	10,604.5	33.5	22.5	-98.80	-1,507.9	120.0	199.6	144.0	55.58	3.592	
11,800.0	10,625.8	10,606.2	10,600.8	34.9	22.5	-94.25	-1,508.0	120.0	105.0	47.8	57.24	1.835	
11,894.3	10,625.5	10,602.6	10,597.3	36.1	22.5	-89.90	-1,508.2	120.0	46.4	-12.2	58.64	0.792 Level 1, CC, ES, SF	
11,900.0	10,625.5	10,602.4	10,597.1	36.2	22.5	-89.64	-1,508.2	120.0	46.8	-11.9	58.71	0.797 Level 1	
12,000.0	10,625.3	10,598.7	10,593.3	37.6	22.5	-85.03	-1,508.3	120.0	115.4	55.5	59.96	1.925	
12,100.0	10,625.0	10,594.9	10,589.6	39.1	22.5	-80.49	-1,508.4	120.0	210.8	149.8	60.96	3.458	
12,200.0	10,624.7	10,591.2	10,585.8	40.6	22.5	-76.06	-1,508.6	120.0	309.0	247.3	61.71	5.008	
12,300.0	10,624.5	10,587.4	10,582.1	42.1	22.5	-71.79	-1,508.7	120.0	408.1	345.9	62.22	6.559	
12,400.0	10,624.2	10,583.7	10,578.3	43.6	22.4	-67.72	-1,508.8	120.0	507.5	445.0	62.53	8.116	
12,500.0	10,624.0	10,579.9	10,574.6	45.1	22.4	-63.87	-1,508.9	120.0	607.1	544.4	62.66	9.688	

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