

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENTFORM 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.*5. Lease Serial No.
NMNM114970
6. If Indian, Allottee or Tribe Name**SUBMIT IN TRIPLICATE - Other instructions on reverse side.**

7. If Unit or CA/Agreement, Name and/or No.

1. Type of Well

☒ Oil Well ☐ Gas Well ☐ Other8. Well Name and No.
SCREECH OWL FEDERAL 1H

2. Name of Operator

COG OPERATING LLC

Contact: MAYTE X REYES

E-Mail: mreyes1@concho.com.

9. API Well No.
30-015-42825

3a. Address

2208 WEST MAIN STREET
ARTESIA, NM 88210

3b. Phone No. (include area code)

Ph: 575-748-6945

10. Field and Pool, or Exploratory
WELCH; BONE SPRING

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)

Sec 19 T26S R27E NWNW 50FNL 660FWL

11. County or Parish, and State

EDDY 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 Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original APD
	☐ 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 Operating LLC, respectfully requests approval for the following changes to the original approved APD.

Drilling program and directional plan attached.

**SEE ATTACHED FOR
CONDITIONS OF APPROVAL****NM OIL CONSERVATION**
ARTESIA DISTRICT

JUN 22 2015

Accepted for record
NMOCD

RECEIVED

RD 6/23/2015

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #305179 verified by the BLM Well Information System
For COG OPERATING LLC, sent to the Carlsbad
Committed to AFMSS for processing by JENNIFER SANCHEZ on 06/17/2015 ()

Name (Printed/Typed) MAYTE X REYES

Title REGULATORY ANALYST

Signature (Electronic Submission)

Date 06/16/2015

APPROVED**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

BUREAU OF LAND MANAGEMENT
CARLSBAD FIELD OFFICE

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

**** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ** OPERATOR-SUBMITTED ****

COG Operating LLC, Screech Owl Federal 1H

COG, Operating, LLC respectfully requests the following modifications to the approved drilling plan based on recently drilled offsets.

Geologic Formations

TVD of target	7501'	Pilot hole depth	NA
MD at TD:	17606'	Deepest expected fresh water:	50'

Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.
	From	To				
8.75"	0'	17606'	5-1/2"	17	P110	BTC

Cementing Program

Casing	# Sks	Wt. lb/gal	Yld ft ³ /sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Inter.	425	13.5	1.75	9.2	13	Lead: Class C + 4% Gel + 1% CaCl ₂
	200	14.8	1.34	6.4	6	Tail: Class C + 1% CaCl ₂
Prod.	770	10.3	3.52	21.3	75	Lead: Halliburton Tuned Lite w/ 2# kolseal, 1.5# salt, 1/4# D-Air 5000, 1/8# PEF, etc
	2525	14.4	1.25	5.7	22	Tail: 50:50:2 H blend (FR, Retarder, FL adds as necessary)

Casing String	TOC	% Excess
Intermediate	0'	67%
Production	0'	34%

Pilot hole depth: NA

KOP: 7024'

Sol

Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
	Are anchors required by manufacturer? No.

COG Operating LLC, Screech Owl Federal 1H

Is this a walking operation? No.

Will be pre-setting casing? No.

Will well be hydraulically fractured? Yes.

Attachments

- Revised Directional Plan
- Flex hose certification



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 19, T26S, R27E

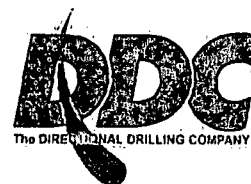
Screech Owl Federal #1H

Wellbore #1

Plan: Design #1

DDC Well Planning Report

16 June, 2015





HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site:	Sec 19, T26S, R27E	North Reference:	Grid
Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
Design:	Design #1		

Project	Eddy County, NM (NAD 27)		
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 19, T26S, R27E		
Site Position:		Northing:	376,291.20 usft
From:	Map	Easting:	534,736.30 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 2' 4.162 N
		Longitude:	104° 13' 16.453 W
		Grid Convergence:	0.06 °

Well:	Screech Owl Federal #1H		
Well Position	+N/-S	156.2 usft	Northing:
	+E/-W	-4,320.9 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 2' 5.750 N
		Longitude:	104° 14' 6.649 W
		Ground Level:	3,343.0 usft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	IGRF2015	6/16/2015	(°)
			7.46
			Dip Angle
			(°)
			59.80
			Field Strength
			(nT)
			47,959

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
			(°)
			180.72

Plan Sections										
Measured	Inclination	Azimuth	Vertical			Dogleg	Build	Turn		
Depth	(°)	(°)	Depth	+N/-S	+E/-W	Rate	Rate	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	
7,023.6	0.00	0.00	7,023.6	0.0	0.0	0.00	0.00	0.00	0.00	
7,779.9	90.76	180.72	7,501.0	-483.7	-6.0	12.00	12.00	-23.70	180.72	
17,606.1	90.76	180.72	7,371.0	-10,308.3	-128.8	0.00	0.00	0.00	0.00	PBHL Screech Owl F



HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well: Screech Owl Federal #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Project:	Eddy County, NM (NAD-27)	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site:	Sec 19, T26S, R27E	North Reference:	Grid
Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
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)
KOP 12°/100'									
7,023.6	0.00	0.00	7,023.6	0.0	0.0	0.0	0.00	0.00	0.00
7,100.0	9.17	180.72	7,099.7	-6.1	-0.1	6.1	12.00	12.00	0.00
7,200.0	21.17	180.72	7,196.0	-32.2	-0.4	32.2	12.00	12.00	0.00
SBSG sand									
7,255.3	27.80	180.72	7,246.3	-55.1	-0.7	55.1	12.00	12.00	0.00
7,300.0	33.17	180.72	7,284.8	-77.8	-1.0	77.8	12.00	12.00	0.00
7,400.0	45.17	180.72	7,362.2	-140.8	-1.8	140.8	12.00	12.00	0.00
7,500.0	57.17	180.72	7,424.8	-218.6	-2.7	218.6	12.00	12.00	0.00
7,600.0	69.17	180.72	7,469.9	-307.6	-3.8	307.7	12.00	12.00	0.00
7,700.0	81.17	180.72	7,495.4	-404.1	-5.0	404.2	12.00	12.00	0.00
End of Curve / 90.76° Inc / 180.72° Azm / 7501' TVD									
7,779.9	90.76	180.72	7,501.0	-483.7	-6.0	483.8	12.00	12.00	0.00
7,800.0	90.76	180.72	7,500.8	-503.8	-6.3	503.9	0.00	0.00	0.00
7,900.0	90.76	180.72	7,499.4	-603.8	-7.5	603.9	0.00	0.00	0.00
8,000.0	90.76	180.72	7,498.1	-703.8	-8.8	703.8	0.00	0.00	0.00
8,100.0	90.76	180.72	7,496.8	-803.8	-10.0	803.8	0.00	0.00	0.00
8,200.0	90.76	180.72	7,495.5	-903.8	-11.3	903.8	0.00	0.00	0.00
8,300.0	90.76	180.72	7,494.1	-1,003.7	-12.5	1,003.8	0.00	0.00	0.00
8,400.0	90.76	180.72	7,492.8	-1,103.7	-13.8	1,103.8	0.00	0.00	0.00
8,500.0	90.76	180.72	7,491.5	-1,203.7	-15.0	1,203.8	0.00	0.00	0.00
8,600.0	90.76	180.72	7,490.2	-1,303.7	-16.3	1,303.8	0.00	0.00	0.00
8,700.0	90.76	180.72	7,488.8	-1,403.7	-17.5	1,403.8	0.00	0.00	0.00
8,800.0	90.76	180.72	7,487.5	-1,503.7	-18.8	1,503.8	0.00	0.00	0.00
8,900.0	90.76	180.72	7,486.2	-1,603.6	-20.0	1,603.8	0.00	0.00	0.00
9,000.0	90.76	180.72	7,484.9	-1,703.6	-21.3	1,703.8	0.00	0.00	0.00
9,100.0	90.76	180.72	7,483.6	-1,803.6	-22.5	1,803.7	0.00	0.00	0.00
9,200.0	90.76	180.72	7,482.2	-1,903.6	-23.8	1,903.7	0.00	0.00	0.00
9,300.0	90.76	180.72	7,480.9	-2,003.6	-25.0	2,003.7	0.00	0.00	0.00
9,400.0	90.76	180.72	7,479.6	-2,103.6	-26.3	2,103.7	0.00	0.00	0.00
9,500.0	90.76	180.72	7,478.3	-2,203.5	-27.5	2,203.7	0.00	0.00	0.00
9,600.0	90.76	180.72	7,476.9	-2,303.5	-28.8	2,303.7	0.00	0.00	0.00
9,700.0	90.76	180.72	7,475.6	-2,403.5	-30.0	2,403.7	0.00	0.00	0.00
9,800.0	90.76	180.72	7,474.3	-2,503.5	-31.3	2,503.7	0.00	0.00	0.00
9,900.0	90.76	180.72	7,473.0	-2,603.5	-32.5	2,603.7	0.00	0.00	0.00
10,000.0	90.76	180.72	7,471.6	-2,703.5	-33.8	2,703.7	0.00	0.00	0.00
10,100.0	90.76	180.72	7,470.3	-2,803.4	-35.0	2,803.7	0.00	0.00	0.00
10,200.0	90.76	180.72	7,469.0	-2,903.4	-36.3	2,903.7	0.00	0.00	0.00
10,300.0	90.76	180.72	7,467.7	-3,003.4	-37.5	3,003.6	0.00	0.00	0.00
10,400.0	90.76	180.72	7,466.4	-3,103.4	-38.8	3,103.6	0.00	0.00	0.00
10,500.0	90.76	180.72	7,465.0	-3,203.4	-40.0	3,203.6	0.00	0.00	0.00
10,600.0	90.76	180.72	7,463.7	-3,303.4	-41.3	3,303.6	0.00	0.00	0.00
10,700.0	90.76	180.72	7,462.4	-3,403.3	-42.5	3,403.6	0.00	0.00	0.00
10,800.0	90.76	180.72	7,461.1	-3,503.3	-43.8	3,503.6	0.00	0.00	0.00
10,900.0	90.76	180.72	7,459.7	-3,603.3	-45.0	3,603.6	0.00	0.00	0.00
11,000.0	90.76	180.72	7,458.4	-3,703.3	-46.3	3,703.6	0.00	0.00	0.00
11,100.0	90.76	180.72	7,457.1	-3,803.3	-47.5	3,803.6	0.00	0.00	0.00
11,200.0	90.76	180.72	7,455.8	-3,903.3	-48.8	3,903.6	0.00	0.00	0.00
11,300.0	90.76	180.72	7,454.4	-4,003.2	-50.0	4,003.6	0.00	0.00	0.00
11,400.0	90.76	180.72	7,453.1	-4,103.2	-51.3	4,103.5	0.00	0.00	0.00
11,500.0	90.76	180.72	7,451.8	-4,203.2	-52.5	4,203.5	0.00	0.00	0.00
11,600.0	90.76	180.72	7,450.5	-4,303.2	-53.8	4,303.5	0.00	0.00	0.00
11,700.0	90.76	180.72	7,449.2	-4,403.2	-55.0	4,403.5	0.00	0.00	0.00



HP
Well Planning Report



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Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
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)
11,800.0	90.76	180.72	7,447.8	-4,503.2	-56.3	4,503.5	0.00	0.00	0.00
11,900.0	90.76	180.72	7,446.5	-4,603.1	-57.5	4,603.5	0.00	0.00	0.00
12,000.0	90.76	180.72	7,445.2	-4,703.1	-58.8	4,703.5	0.00	0.00	0.00
12,100.0	90.76	180.72	7,443.9	-4,803.1	-60.0	4,803.5	0.00	0.00	0.00
12,200.0	90.76	180.72	7,442.5	-4,903.1	-61.3	4,903.5	0.00	0.00	0.00
12,300.0	90.76	180.72	7,441.2	-5,003.1	-62.5	5,003.5	0.00	0.00	0.00
12,400.0	90.76	180.72	7,439.9	-5,103.1	-63.8	5,103.5	0.00	0.00	0.00
12,500.0	90.76	180.72	7,438.6	-5,203.0	-65.0	5,203.5	0.00	0.00	0.00
12,600.0	90.76	180.72	7,437.2	-5,303.0	-66.3	5,303.4	0.00	0.00	0.00
12,700.0	90.76	180.72	7,435.9	-5,403.0	-67.5	5,403.4	0.00	0.00	0.00
12,800.0	90.76	180.72	7,434.6	-5,503.0	-68.8	5,503.4	0.00	0.00	0.00
12,900.0	90.76	180.72	7,433.3	-5,603.0	-70.0	5,603.4	0.00	0.00	0.00
13,000.0	90.76	180.72	7,431.9	-5,703.0	-71.3	5,703.4	0.00	0.00	0.00
13,100.0	90.76	180.72	7,430.6	-5,802.9	-72.5	5,803.4	0.00	0.00	0.00
13,200.0	90.76	180.72	7,429.3	-5,902.9	-73.8	5,903.4	0.00	0.00	0.00
13,300.0	90.76	180.72	7,428.0	-6,002.9	-75.0	6,003.4	0.00	0.00	0.00
13,400.0	90.76	180.72	7,426.7	-6,102.9	-76.3	6,103.4	0.00	0.00	0.00
13,500.0	90.76	180.72	7,425.3	-6,202.9	-77.5	6,203.4	0.00	0.00	0.00
13,600.0	90.76	180.72	7,424.0	-6,302.9	-78.8	6,303.4	0.00	0.00	0.00
13,700.0	90.76	180.72	7,422.7	-6,402.8	-80.0	6,403.3	0.00	0.00	0.00
13,800.0	90.76	180.72	7,421.4	-6,502.8	-81.3	6,503.3	0.00	0.00	0.00
13,900.0	90.76	180.72	7,420.0	-6,602.8	-82.5	6,603.3	0.00	0.00	0.00
14,000.0	90.76	180.72	7,418.7	-6,702.8	-83.8	6,703.3	0.00	0.00	0.00
14,100.0	90.76	180.72	7,417.4	-6,802.8	-85.0	6,803.3	0.00	0.00	0.00
14,200.0	90.76	180.72	7,416.1	-6,902.8	-86.2	6,903.3	0.00	0.00	0.00
14,300.0	90.76	180.72	7,414.7	-7,002.7	-87.5	7,003.3	0.00	0.00	0.00
14,400.0	90.76	180.72	7,413.4	-7,102.7	-88.7	7,103.3	0.00	0.00	0.00
14,500.0	90.76	180.72	7,412.1	-7,202.7	-90.0	7,203.3	0.00	0.00	0.00
14,600.0	90.76	180.72	7,410.8	-7,302.7	-91.2	7,303.3	0.00	0.00	0.00
14,700.0	90.76	180.72	7,409.5	-7,402.7	-92.5	7,403.3	0.00	0.00	0.00
14,800.0	90.76	180.72	7,408.1	-7,502.7	-93.7	7,503.2	0.00	0.00	0.00
14,900.0	90.76	180.72	7,406.8	-7,602.6	-95.0	7,603.2	0.00	0.00	0.00
15,000.0	90.76	180.72	7,405.5	-7,702.6	-96.2	7,703.2	0.00	0.00	0.00
15,100.0	90.76	180.72	7,404.2	-7,802.6	-97.5	7,803.2	0.00	0.00	0.00
15,200.0	90.76	180.72	7,402.8	-7,902.6	-98.7	7,903.2	0.00	0.00	0.00
15,300.0	90.76	180.72	7,401.5	-8,002.6	-100.0	8,003.2	0.00	0.00	0.00
15,400.0	90.76	180.72	7,400.2	-8,102.6	-101.2	8,103.2	0.00	0.00	0.00
15,500.0	90.76	180.72	7,398.9	-8,202.5	-102.5	8,203.2	0.00	0.00	0.00
15,600.0	90.76	180.72	7,397.5	-8,302.5	-103.7	8,303.2	0.00	0.00	0.00
15,700.0	90.76	180.72	7,396.2	-8,402.5	-105.0	8,403.2	0.00	0.00	0.00
15,800.0	90.76	180.72	7,394.9	-8,502.5	-106.2	8,503.2	0.00	0.00	0.00
15,900.0	90.76	180.72	7,393.6	-8,602.5	-107.5	8,603.2	0.00	0.00	0.00
16,000.0	90.76	180.72	7,392.3	-8,702.5	-108.7	8,703.1	0.00	0.00	0.00
16,100.0	90.76	180.72	7,390.9	-8,802.4	-110.0	8,803.1	0.00	0.00	0.00
16,200.0	90.76	180.72	7,389.6	-8,902.4	-111.2	8,903.1	0.00	0.00	0.00
16,300.0	90.76	180.72	7,388.3	-9,002.4	-112.5	9,003.1	0.00	0.00	0.00
16,400.0	90.76	180.72	7,387.0	-9,102.4	-113.7	9,103.1	0.00	0.00	0.00
16,500.0	90.76	180.72	7,385.6	-9,202.4	-115.0	9,203.1	0.00	0.00	0.00
16,600.0	90.76	180.72	7,384.3	-9,302.4	-116.2	9,303.1	0.00	0.00	0.00
16,700.0	90.76	180.72	7,383.0	-9,402.3	-117.5	9,403.1	0.00	0.00	0.00
16,800.0	90.76	180.72	7,381.7	-9,502.3	-118.7	9,503.1	0.00	0.00	0.00
16,900.0	90.76	180.72	7,380.3	-9,602.3	-120.0	9,603.1	0.00	0.00	0.00
17,000.0	90.76	180.72	7,379.0	-9,702.3	-121.2	9,703.1	0.00	0.00	0.00
17,100.0	90.76	180.72	7,377.7	-9,802.3	-122.5	9,803.0	0.00	0.00	0.00



HP
Well Planning Report



Database:	Compass	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Company:	COG Operating, LLC	TVD Reference:	Well @ 3369.0usft (Scandriil Freedom)
Project:	Eddy County, NM (NAD 27)	MD Reference:	Well @ 3369.0usft (Scandriil Freedom)
Site:	Sec 19, T26S, R27E	North Reference:	Grid
Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Wellbore:	Wellbore #1		
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)
17,200.0	90.76	180.72	7,376.4	-9,902.3	-123.7	9,903.0	0.00	0.00	0.00
17,300.0	90.76	180.72	7,375.1	-10,002.3	-125.0	10,003.0	0.00	0.00	0.00
17,400.0	90.76	180.72	7,373.7	-10,102.2	-126.2	10,103.0	0.00	0.00	0.00
17,500.0	90.76	180.72	7,372.4	-10,202.2	-127.5	10,203.0	0.00	0.00	0.00
17,600.0	90.76	180.72	7,371.1	-10,302.2	-128.7	10,303.0	0.00	0.00	0.00
PBHL @ 17606' MD / 7371' TVD									
17,606.1	90.76	180.72	7,371.0	-10,308.3	-128.8	10,309.1	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									
PBHL Screech Owl Fed	0.00	0.00	7,371.0	-10,308.3	-128.8	366,139.10	530,286.60	32° 0' 23.733 N	104° 14' 8.254 W
- plan hits target center									
- Point									

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
351.0	351.0	TOS		-0.76	180.72	
1,824.0	1,824.0	BOS (Fletcher)		-0.76	180.72	
2,007.0	2,007.0	LMAR (Top Delaware)		-0.76	180.72	
2,047.0	2,047.0	BLCN		-0.76	180.72	
2,911.0	2,911.0	CYCN		-0.76	180.72	
4,028.0	4,028.0	BYCN		-0.76	180.72	
5,606.0	5,606.0	Bone Sprg (BSGL)		-0.76	180.72	
5,746.0	5,746.0	U Avalon Sh		-0.76	180.72	
6,105.0	6,105.0	L Avalon Sh		-0.76	180.72	
6,543.0	6,543.0	FBSG_sand		-0.76	180.72	
7,255.3	7,246.3	SBSG_sand		-0.76	180.72	

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
7,023.6	7,023.6	0.0	0.0	KOP 12°/100'
7,779.9	7,501.0	-483.7	-6.0	End of Curve / 90.76° Inc / 180.72° Azm / 7501' TVD
17,606.1	7,371.0	-10,308.3	-128.8	PBHL @ 17606' MD / 7371' TVD



COG Operating, LLC

Eddy County, NM (NAD 27)

Sec 19, T26S, R27E

Screech Owl Federal #1H

Wellbore #1

Design #1

DDC Anticollision Report

16 June, 2015



Company:	COG Operating, LLC.	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandrift Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandrift Freedom)
Site Error:	0.0 usft.	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
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:	ISCSWA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 10,000.0 usft	Error Surface:	Elliptical Conic
Warning Levels Evaluated at:	2.00 Sigma		

Survey Tool Program		Date	6/16/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
0.0	17,606.1	Design #1 (Wellbore #1)	MWD default	MWD - Standard	

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 19, T26S, R27E						
Asio Otus Federal #3H - Wellbore #1 - Wellbore #1	0.0	0.0	893.9			
Asio Otus Federal #3H - Wellbore #1 - Wellbore #1	5,300.0	5,186.0	951.3	928.8	42.287	SF
Screech Owl Federal #4H - Wellbore #1 - Wellbore #1	7,605.9	7,407.0	4,272.4	4,249.1	183.238	CC
Screech Owl Federal #4H - Wellbore #1 - Wellbore #1	17,400.0	17,069.7	4,466.6	4,111.6	12.581	ES
Screech Owl Federal #4H - Wellbore #1 - Wellbore #1	17,606.1	17,212.1	4,474.3	4,113.1	12.386	SF
Screech Owl Federal Com #2H - Wellbore #1 - Wellbore	650.4	648.4	884.7	882.1	342.050	CC
Screech Owl Federal Com #2H - Wellbore #1 - Wellbore	6,500.0	6,493.0	887.5	859.4	31.649	ES
Screech Owl Federal Com #2H - Wellbore #1 - Wellbore	17,606.1	17,409.7	1,480.7	1,112.2	4.019	SF

Offset Design										Sec. 19, T26S, R27E - Asio Otus Federal #3H - Wellbore #1 - Wellbore #1										Offset Site Error		0.0 usft	
Survey Program: 100-MWD default																				Offset Well Error		0.0 usft	
Reference		Offset		Semi Major Axis		Offset		Distance		Separation		Warning											
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Between	Between	Between	Ellipses	Factor	Warning										
Depth	Depth	Depth	Depth	Depth	Depth	To Surface	N-S	E-W	Centres	Centres	Centres												
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(")	(usft)	(usft)	(usft)	(usft)	(usft)												
0.0	0.0	0.0	0.0	0.0	0.0	83.76	97.1	888.6	893.9														
100.0	100.0	92.4	92.4	0.1	0.1	83.76	97.2	888.8	894.1	894.0		5,572.771											
200.0	200.0	187.4	187.4	0.3	0.3	83.75	97.5	889.6	894.9	894.3		1,522.831											
300.0	300.0	288.0	288.0	0.5	0.5	83.74	97.7	890.6	896.0	895.0		876.481											
400.0	400.0	380.4	380.4	0.8	0.7	83.76	97.5	891.9	897.4	895.9		622.390											
500.0	500.0	476.5	476.5	1.0	0.9	83.81	97.0	894.0	899.5	897.6		478.786											
600.0	600.0	586.3	586.2	1.2	1.1	83.90	95.8	896.2	901.4	899.1		385.931											
700.0	700.0	682.1	682.0	1.4	1.3	84.01	94.2	897.7	902.7	899.9		326.754											
800.0	800.0	782.0	781.9	1.7	1.5	84.15	92.2	899.6	904.4	901.2		283.042											
900.0	900.0	886.5	886.3	1.9	1.8	84.28	90.3	901.3	905.9	902.3		249.594											
1,000.0	1,000.0	977.2	977.0	2.1	1.9	84.40	88.6	902.9	907.5	903.4		224.377											
1,100.0	1,100.0	1,066.9	1,066.6	2.3	2.1	84.52	87.0	905.6	910.3	905.8		203.967											
1,200.0	1,200.0	1,159.9	1,159.5	2.6	2.4	84.61	85.8	909.2	914.1	909.2		186.995											
1,300.0	1,300.0	1,252.8	1,252.4	2.8	2.6	84.67	85.3	913.4	918.5	913.2		172.884											
1,400.0	1,400.0	1,350.1	1,349.5	3.0	2.8	84.70	85.2	918.5	923.6	917.9		160.811											
1,500.0	1,500.0	1,449.6	1,448.9	3.2	3.0	84.72	85.3	923.5	928.7	922.5		150.360											
1,600.0	1,600.0	1,558.6	1,557.8	3.5	3.2	84.75	85.4	929.0	933.8	927.1		140.844											
1,700.0	1,700.0	1,672.9	1,672.0	3.7	3.5	84.74	85.9	932.8	937.0	929.9		132.192											
1,800.0	1,800.0	1,776.0	1,775.1	3.9	3.7	84.63	87.9	935.1	939.5	931.9		124.852											
1,900.0	1,900.0	1,886.8	1,885.8	4.1	3.9	84.49	90.4	936.9	941.3	933.4		118.014											

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H:
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19 T26S R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design												Offset Site Error
Sec 19 T26S R27E Asio Otus Federal #3H Wellbore #1 Wellbore #1												0.0 usft
Survey Program: 100-MWD default												Offset Well Error
												0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N/S (usft)	Offset Wellbore Centre E/W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
2,000.0	2,000.0	1,990.4	1,989.4	4.4	4.1	84.40	92.0	937.7	942.3	933.9	111.999	
2,100.0	2,100.0	2,092.5	2,091.5	4.6	4.3	84.32	93.4	938.3	943.0	934.1	106.570	
2,200.0	2,200.0	2,191.4	2,190.4	4.8	4.5	84.27	94.2	938.9	943.6	934.3	101.686	
2,300.0	2,300.0	2,293.5	2,292.5	5.0	4.8	84.22	95.1	939.4	944.2	934.5	97.168	
2,400.0	2,400.0	2,393.1	2,392.1	5.3	5.0	84.17	96.0	939.8	944.7	934.5	93.088	
2,500.0	2,500.0	2,494.1	2,493.1	5.5	5.2	84.13	96.7	940.2	945.2	934.6	89.309	
2,600.0	2,600.0	2,594.5	2,593.5	5.7	5.4	84.09	97.4	940.5	945.6	934.5	85.831	
2,700.0	2,700.0	2,697.8	2,696.8	5.9	5.6	84.05	98.1	940.7	945.8	934.3	82.552	
2,800.0	2,800.0	2,800.0	2,799.0	6.2	5.8	84.02	98.5	940.5	945.6	933.7	79.504	
2,900.0	2,900.0	2,899.1	2,898.0	6.4	6.0	84.00	98.9	940.2	945.4	933.1	76.705	
3,000.0	3,000.0	3,000.0	2,999.0	6.6	6.2	83.98	99.1	940.1	945.3	932.5	74.074	
3,100.0	3,100.0	3,098.4	3,097.4	6.8	6.4	83.98	99.2	939.9	945.1	931.9	71.647	
3,200.0	3,200.0	3,201.4	3,200.4	7.1	6.6	83.98	99.2	939.7	944.9	931.3	69.318	
3,300.0	3,300.0	3,300.0	3,299.0	7.3	6.8	83.98	99.1	939.4	944.7	930.6	67.175	
3,400.0	3,400.0	3,402.3	3,401.2	7.5	7.0	83.97	99.2	939.1	944.3	929.8	65.123	
3,500.0	3,500.0	3,505.2	3,504.2	7.7	7.3	83.98	99.0	938.5	943.7	928.8	63.163	
3,600.0	3,600.0	3,608.1	3,607.1	7.9	7.5	83.99	98.8	937.6	942.8	927.4	61.294	
3,700.0	3,700.0	3,708.7	3,707.6	8.2	7.7	84.01	98.3	936.5	941.7	925.9	59.535	
3,800.0	3,800.0	3,804.9	3,803.9	8.4	7.9	84.05	97.5	935.7	940.8	924.5	57.915	
3,900.0	3,900.0	3,901.5	3,900.4	8.6	8.1	84.11	96.5	935.2	940.2	923.5	56.402	
4,000.0	4,000.0	4,001.5	4,000.4	8.8	8.3	84.15	95.8	935.0	939.9	922.8	54.954	
4,100.0	4,100.0	4,103.7	4,102.7	9.1	8.5	84.20	94.9	934.5	939.4	921.8	53.551	
4,200.0	4,200.0	4,200.0	4,198.9	9.3	8.7	84.27	93.7	934.1	938.8	920.9	52.251	
4,292.4	4,292.4	4,290.5	4,289.4	9.5	8.9	84.33	92.7	934.0	938.6	920.3	51.111	
4,300.0	4,300.0	4,297.7	4,296.7	9.5	8.9	84.33	92.7	934.1	938.6	920.2	51.022	
4,400.0	4,400.0	4,399.0	4,397.9	9.7	9.1	84.39	91.7	934.1	938.6	919.8	49.838	
4,500.0	4,500.0	4,501.4	4,500.3	10.0	9.3	84.47	90.5	934.0	938.4	919.1	48.690	
4,600.0	4,600.0	4,604.1	4,602.9	10.2	9.5	84.57	88.8	933.7	937.9	918.2	47.577	
4,700.0	4,700.0	4,706.7	4,705.6	10.4	9.8	84.69	86.7	933.0	937.1	916.9	46.495	
4,800.0	4,800.0	4,800.0	4,798.8	10.6	10.0	84.83	84.3	932.7	936.5	916.0	45.515	
4,900.0	4,900.0	4,909.2	4,908.0	10.9	10.2	85.02	81.2	932.2	935.8	914.7	44.494	
5,000.0	5,000.0	5,004.9	5,003.6	11.1	10.4	85.18	78.5	931.4	934.7	913.3	43.561	
5,018.4	5,018.4	5,016.7	5,015.4	11.1	10.4	85.19	78.4	931.4	934.7	913.1	43.425	
5,100.0	5,100.0	5,060.0	5,058.7	11.3	10.5	85.07	80.3	931.9	936.1	914.3	42.950	
5,200.0	5,200.0	5,131.5	5,128.9	11.5	10.6	84.32	92.9	934.5	941.6	919.4	42.483	
5,300.0	5,300.0	5,186.0	5,180.7	11.8	10.7	83.33	109.7	937.8	951.3	928.8	42.287 SF	
5,400.0	5,400.0	5,235.1	5,225.5	12.0	10.9	82.22	128.8	942.5	966.6	943.8	42.331	
5,500.0	5,500.0	5,297.8	5,280.2	12.2	11.0	80.49	159.0	949.0	986.3	963.1	42.469	
5,600.0	5,600.0	5,345.0	5,319.3	12.4	11.2	79.04	184.8	954.4	1,011.0	987.4	42.857	
5,700.0	5,700.0	5,393.3	5,367.7	12.7	11.4	77.48	213.4	960.8	1,041.1	1,017.1	43.418	
5,800.0	5,800.0	5,428.7	5,385.7	12.9	11.5	76.38	234.2	966.7	1,076.4	1,052.1	44.241	
5,900.0	5,900.0	5,458.7	5,408.6	13.1	11.6	75.45	252.5	972.8	1,117.4	1,092.7	45.289	
6,000.0	6,000.0	5,487.7	5,429.7	13.3	11.8	74.51	271.4	979.1	1,163.7	1,138.6	46.507	
6,100.0	6,100.0	5,504.0	5,441.1	13.6	11.9	73.97	282.4	982.9	1,214.9	1,189.6	47.987	
6,200.0	6,200.0	5,535.0	5,461.7	13.8	12.0	72.92	304.4	990.4	1,270.5	1,244.8	49.462	
6,300.0	6,300.0	5,556.4	5,475.0	14.0	12.2	72.17	320.2	995.8	1,330.4	1,304.4	51.135	
6,400.0	6,400.0	5,567.0	5,481.3	14.2	12.2	71.80	328.3	998.6	1,394.0	1,367.8	53.020	
6,500.0	6,500.0	5,599.0	5,499.4	14.5	12.5	70.67	353.3	1,007.0	1,460.9	1,434.2	54.754	
6,600.0	6,600.0	5,599.0	5,499.4	14.7	12.5	70.67	353.3	1,007.0	1,530.9	1,504.0	56.900	
6,700.0	6,700.0	5,628.0	5,514.2	14.9	12.7	69.63	376.9	1,015.0	1,603.5	1,576.2	58.771	
6,800.0	6,800.0	5,630.0	5,515.2	15.1	12.7	69.56	378.6	1,015.6	1,678.6	1,651.1	60.996	
6,900.0	6,900.0	5,648.2	5,523.7	15.4	12.8	68.90	393.9	1,020.6	1,755.8	1,727.9	63.056	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandrift Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandrift Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E, Asio Otus Federal #3H, Wellbore #1, Wellbore #1												Offset Site Error:
Survey Program: 100-MWD default												Offset Well Error:
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning:
7,000.0	7,000.0	5,662.0	5,529.7	15.6	13.0	68.40	405.7	1,024.4	1,834.9	1,806.8	65.202	
7,023.6	7,023.6	5,662.0	5,529.7	15.6	13.0	68.40	405.7	1,024.4	1,853.9	1,825.7	65.750	
7,025.0	7,025.0	5,662.0	5,529.7	15.6	13.0	-112.11	405.7	1,024.4	1,855.0	1,827.1	66.498	
7,050.0	7,050.0	5,662.0	5,529.7	15.7	13.0	-108.18	405.7	1,024.4	1,875.3	1,847.3	66.904	
7,075.0	7,074.9	5,662.0	5,529.7	15.7	13.0	-103.94	405.7	1,024.4	1,896.0	1,867.8	67.301	
7,100.0	7,099.7	5,662.0	5,529.7	15.8	13.0	-99.44	405.7	1,024.4	1,916.9	1,888.6	67.684	
7,125.0	7,124.2	5,662.0	5,529.7	15.8	13.0	-94.72	405.7	1,024.4	1,938.1	1,909.6	68.066	
7,150.0	7,148.5	5,662.0	5,529.7	15.9	13.0	-89.84	405.7	1,024.4	1,959.4	1,930.8	68.477	
7,175.0	7,172.5	5,662.0	5,529.7	15.9	13.0	-84.89	405.7	1,024.4	1,980.7	1,952.0	68.960	
7,200.0	7,196.0	5,662.0	5,529.7	15.9	13.0	-79.96	405.7	1,024.4	2,002.2	1,973.4	69.570	
7,225.0	7,219.1	5,662.0	5,529.7	16.0	13.0	-75.14	405.7	1,024.4	2,023.5	1,994.8	70.359	
7,250.0	7,241.6	5,662.0	5,529.7	16.0	13.0	-70.49	405.7	1,024.4	2,044.8	2,016.2	71.375	
7,275.0	7,263.5	5,662.0	5,529.7	16.1	13.0	-66.08	405.7	1,024.4	2,065.9	2,037.5	72.656	
7,300.0	7,284.8	5,662.0	5,529.7	16.1	13.0	-61.95	405.7	1,024.4	2,086.9	2,058.8	74.231	
7,325.0	7,305.4	5,662.0	5,529.7	16.2	13.0	-58.11	405.7	1,024.4	2,107.6	2,079.9	76.118	
7,350.0	7,325.2	5,662.0	5,529.7	16.2	13.0	-54.59	405.7	1,024.4	2,128.0	2,100.8	78.334	
7,375.0	7,344.1	5,662.0	5,529.7	16.3	13.0	-51.38	405.7	1,024.4	2,148.0	2,121.5	80.889	
7,400.0	7,362.2	5,662.0	5,529.7	16.3	13.0	-48.46	405.7	1,024.4	2,167.7	2,141.8	83.794	
7,425.0	7,379.4	5,662.0	5,529.7	16.4	13.0	-45.81	405.7	1,024.4	2,186.9	2,161.8	87.059	
7,450.0	7,395.5	5,662.0	5,529.7	16.5	13.0	-43.42	405.7	1,024.4	2,205.7	2,181.3	90.694	
7,475.0	7,410.7	5,662.0	5,529.7	16.6	13.0	-41.26	405.7	1,024.4	2,223.9	2,200.4	94.708	
7,500.0	7,424.8	5,662.0	5,529.7	16.7	13.0	-39.32	405.7	1,024.4	2,241.6	2,219.0	99.108	
7,525.0	7,437.8	5,662.0	5,529.7	16.8	13.0	-37.57	405.7	1,024.4	2,258.7	2,237.0	103.893	
7,550.0	7,449.7	5,662.0	5,529.7	16.9	13.0	-35.99	405.7	1,024.4	2,275.2	2,254.4	109.051	
7,575.0	7,460.4	5,662.0	5,529.7	17.1	13.0	-34.57	405.7	1,024.4	2,291.1	2,271.1	114.554	
7,600.0	7,469.9	5,646.8	5,523.1	17.2	12.8	-33.00	392.7	1,020.3	2,306.0	2,287.0	121.463	
7,625.0	7,478.1	5,643.7	5,521.7	17.3	12.8	-31.82	390.0	1,019.4	2,320.3	2,302.2	127.790	
7,650.0	7,485.2	5,630.0	5,515.2	17.5	12.7	-30.58	378.6	1,015.6	2,334.0	2,316.8	135.170	
7,675.0	7,490.9	5,630.0	5,515.2	17.7	12.7	-29.69	378.6	1,015.6	2,346.8	2,330.2	141.276	
7,700.0	7,495.4	5,630.0	5,515.2	17.8	12.7	-28.89	378.6	1,015.6	2,358.7	2,342.7	146.995	
7,725.0	7,498.6	5,630.0	5,515.2	18.0	12.7	-28.18	378.6	1,015.6	2,369.9	2,354.3	152.027	
7,750.0	7,500.5	5,628.0	5,514.2	18.2	12.7	-27.52	376.9	1,015.0	2,380.2	2,364.9	156.270	
7,775.0	7,501.1	5,628.0	5,514.2	18.4	12.7	-26.96	376.9	1,015.0	2,389.6	2,374.6	159.019	
7,779.9	7,501.0	5,628.0	5,514.2	18.5	12.7	-26.85	376.9	1,015.0	2,391.4	2,376.4	159.389	
7,800.0	7,500.8	5,628.0	5,514.2	18.6	12.7	-26.85	376.9	1,015.0	2,396.6	2,383.5	158.716	
7,900.0	7,499.4	5,599.0	5,499.4	19.5	12.5	-26.51	353.3	1,007.0	2,435.9	2,420.5	157.951	
8,000.0	7,498.1	5,599.0	5,499.4	20.6	12.5	-26.51	353.3	1,007.0	2,476.4	2,460.3	153.942	
8,100.0	7,496.8	5,567.0	5,481.3	21.7	12.2	-26.13	328.3	998.6	2,519.7	2,503.2	152.695	
8,200.0	7,495.5	5,567.0	5,481.3	23.0	12.2	-26.13	328.3	998.6	2,565.6	2,548.3	148.553	
8,300.0	7,494.1	5,550.3	5,471.3	24.3	12.1	-25.92	315.6	994.3	2,614.2	2,596.3	145.892	
8,400.0	7,492.8	5,535.0	5,461.7	25.6	12.0	-25.73	304.4	990.4	2,665.4	2,646.8	143.234	
8,500.0	7,491.5	5,535.0	5,461.7	27.1	12.0	-25.73	304.4	990.4	2,719.0	2,699.6	139.645	
8,600.0	7,490.2	5,504.0	5,441.1	28.5	11.9	-25.35	282.4	982.9	2,775.0	2,754.9	138.368	
8,700.0	7,488.8	5,504.0	5,441.1	30.0	11.9	-25.35	282.4	982.9	2,832.8	2,811.8	135.207	
8,800.0	7,487.5	5,504.0	5,441.1	31.6	11.9	-25.35	282.4	982.9	2,892.9	2,871.0	132.322	
8,900.0	7,486.2	5,472.0	5,418.5	33.1	11.7	-24.95	261.1	975.6	2,954.9	2,932.5	131.486	
9,000.0	7,484.9	5,472.0	5,418.5	34.7	11.7	-24.95	261.1	975.6	3,018.5	2,995.1	128.987	
9,100.0	7,483.6	5,472.0	5,418.5	36.3	11.7	-24.95	261.1	975.6	3,084.1	3,059.7	126.711	
9,200.0	7,482.2	5,455.6	5,406.3	38.0	11.6	-24.75	250.6	972.1	3,151.1	3,126.0	125.436	
9,300.0	7,480.9	5,440.0	5,394.4	39.6	11.5	-24.56	241.0	968.9	3,219.8	3,193.9	124.253	
9,400.0	7,479.6	5,440.0	5,394.4	41.3	11.5	-24.56	241.0	968.9	3,289.8	3,262.9	122.459	
9,500.0	7,478.3	5,440.0	5,394.4	42.9	11.5	-24.56	241.0	968.9	3,361.3	3,333.5	120.822	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset-TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E, Asio Otus Federal #3H, Wellbore #1 - Wellbore #1												Offset Site Error:
Survey Program: 100-MWD default												0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
9,600.0	7,476.9	5,408.0	5,369.3	44.6	11.4	-24.19	222.0	963.1	3,433.9	3,405.4	120.645	
9,700.0	7,475.6	5,377.0	5,344.8	46.3	11.3	-23.85	203.7	958.5	3,507.5	3,478.3	120.395	
9,800.0	7,474.3	5,358.4	5,330.0	48.0	11.2	-23.66	192.6	956.1	3,581.7	3,551.8	119.702	
9,900.0	7,473.0	5,345.0	5,319.3	49.7	11.2	-23.52	184.8	954.4	3,657.0	3,626.3	118.900	
10,000.0	7,471.6	5,345.0	5,319.3	51.5	11.2	-23.52	184.8	954.4	3,733.4	3,701.7	117.721	
10,100.0	7,470.3	5,329.2	5,306.4	53.2	11.1	-23.36	175.8	952.5	3,810.6	3,778.1	117.147	
10,200.0	7,469.0	5,313.0	5,293.0	54.9	11.1	-23.19	167.0	950.7	3,888.9	3,855.5	116.648	
10,300.0	7,467.7	5,313.0	5,293.0	56.7	11.1	-23.19	167.0	950.7	3,967.9	3,933.6	115.695	
10,400.0	7,466.4	5,313.0	5,293.0	58.4	11.1	-23.19	167.0	950.7	4,047.8	4,012.6	114.814	
10,500.0	7,465.0	5,297.0	5,279.5	60.1	11.0	-23.03	158.5	948.9	4,128.4	4,092.3	114.470	
10,600.0	7,463.7	5,282.0	5,266.7	61.9	11.0	-22.89	150.9	947.4	4,209.8	4,172.9	114.140	
10,700.0	7,462.4	5,282.0	5,266.7	63.7	11.0	-22.89	150.9	947.4	4,291.9	4,254.0	113.418	
10,800.0	7,461.1	5,282.0	5,266.7	65.4	11.0	-22.89	150.9	947.4	4,374.6	4,335.8	112.747	
10,900.0	7,459.7	5,282.0	5,266.7	67.2	11.0	-22.89	150.9	947.4	4,458.1	4,418.4	112.123	
11,000.0	7,458.4	5,250.0	5,238.8	68.9	10.9	-22.57	135.5	944.1	4,542.1	4,501.7	112.417	
11,100.0	7,457.1	5,250.0	5,238.8	70.7	10.9	-22.57	135.5	944.1	4,626.5	4,585.1	111.858	
11,200.0	7,455.8	5,250.0	5,238.8	72.5	10.9	-22.57	135.5	944.1	4,711.6	4,669.2	111.336	
11,300.0	7,454.4	5,250.0	5,238.8	74.3	10.9	-22.57	135.5	944.1	4,797.2	4,753.9	110.849	
11,400.0	7,453.1	5,250.0	5,238.8	76.0	10.9	-22.57	135.5	944.1	4,883.4	4,839.1	110.393	
11,500.0	7,451.8	5,250.0	5,238.8	77.8	10.9	-22.57	135.5	944.1	4,970.1	4,924.9	109.966	
11,600.0	7,450.5	5,232.6	5,223.4	79.6	10.9	-22.39	127.8	942.3	5,056.9	5,011.0	110.011	
11,700.0	7,449.2	5,218.0	5,210.1	81.4	10.8	-22.25	121.7	940.8	5,144.5	5,097.8	110.010	
11,800.0	7,447.8	5,218.0	5,210.1	83.1	10.8	-22.25	121.7	940.8	5,232.4	5,184.6	109.646	
11,900.0	7,446.5	5,218.0	5,210.1	84.9	10.8	-22.25	121.7	940.8	5,320.6	5,271.9	109.304	
12,000.0	7,445.2	5,218.0	5,210.1	86.7	10.8	-22.25	121.7	940.8	5,409.3	5,359.7	108.983	
12,100.0	7,443.9	5,218.0	5,210.1	88.5	10.8	-22.25	121.7	940.8	5,498.3	5,447.8	108.680	
12,200.0	7,442.5	5,218.0	5,210.1	90.3	10.8	-22.25	121.7	940.8	5,587.8	5,536.2	108.396	
12,300.0	7,441.2	5,218.0	5,210.1	92.1	10.8	-22.25	121.7	940.8	5,677.6	5,625.0	108.127	
12,400.0	7,439.9	5,202.0	5,195.5	93.9	10.8	-22.09	115.5	939.2	5,767.4	5,714.2	108.258	
12,500.0	7,438.6	5,186.0	5,180.7	95.7	10.7	-21.94	109.7	937.8	5,857.9	5,803.9	108.395	
12,600.0	7,437.2	5,186.0	5,180.7	97.4	10.7	-21.94	109.7	937.8	5,948.4	5,893.4	108.161	
12,700.0	7,435.9	5,186.0	5,180.7	99.2	10.7	-21.94	109.7	937.8	6,039.3	5,983.3	107.939	
12,800.0	7,434.6	5,186.0	5,180.7	101.0	10.7	-21.94	109.7	937.8	6,130.4	6,073.5	107.730	
12,900.0	7,433.3	5,186.0	5,180.7	102.8	10.7	-21.94	109.7	937.8	6,221.8	6,163.9	107.532	
13,000.0	7,431.9	5,186.0	5,180.7	104.6	10.7	-21.94	109.7	937.8	6,313.4	6,254.6	107.344	
13,100.0	7,430.6	5,186.0	5,180.7	106.4	10.7	-21.94	109.7	937.8	6,405.3	6,345.6	107.166	
13,200.0	7,429.3	5,186.0	5,180.7	108.2	10.7	-21.94	109.7	937.8	6,497.5	6,436.8	106.997	
13,300.0	7,428.0	5,186.0	5,180.7	110.0	10.7	-21.94	109.7	937.8	6,589.9	6,528.2	106.836	
13,400.0	7,426.7	5,186.0	5,180.7	111.8	10.7	-21.94	109.7	937.8	6,682.4	6,619.8	106.684	
13,500.0	7,425.3	5,169.9	5,165.6	113.6	10.7	-21.78	104.2	936.6	6,775.0	6,711.6	106.888	
13,600.0	7,424.0	5,155.0	5,151.5	115.4	10.7	-21.65	99.5	935.7	6,868.1	6,803.9	107.068	
13,700.0	7,422.7	5,155.0	5,151.5	117.2	10.7	-21.65	99.5	935.7	6,961.1	6,896.0	106.932	
13,800.0	7,421.4	5,155.0	5,151.5	119.0	10.7	-21.65	99.5	935.7	7,054.3	6,988.3	106.803	
13,900.0	7,420.0	5,155.0	5,151.5	120.8	10.7	-21.65	99.5	935.7	7,147.8	7,080.8	106.680	
14,000.0	7,418.7	5,155.0	5,151.5	122.6	10.7	-21.65	99.5	935.7	7,241.4	7,173.4	106.563	
14,100.0	7,417.4	5,155.0	5,151.5	124.4	10.7	-21.65	99.5	935.7	7,335.1	7,266.2	106.451	
14,200.0	7,416.1	5,155.0	5,151.5	126.2	10.7	-21.65	99.5	935.7	7,429.1	7,359.2	106.344	
14,300.0	7,414.7	5,155.0	5,151.5	128.0	10.7	-21.65	99.5	935.7	7,523.1	7,452.3	106.242	
14,400.0	7,413.4	5,155.0	5,151.5	129.8	10.7	-21.65	99.5	935.7	7,617.4	7,545.6	106.145	
14,500.0	7,412.1	5,155.0	5,151.5	131.6	10.7	-21.65	99.5	935.7	7,711.8	7,639.0	106.052	
14,600.0	7,410.8	5,155.0	5,151.5	133.4	10.7	-21.65	99.5	935.7	7,806.3	7,732.6	105.964	
14,700.0	7,409.5	5,155.0	5,151.5	135.2	10.7	-21.65	99.5	935.7	7,900.9	7,826.3	105.879	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E - Asio Otus Federal #3H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 usft
Survey Program: 100-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning	
14,800.0	7,408.1	5,155.0	5,151.5	137.1	10.7	-21.65	99.5	935.7	7,995.7	7,920.2	105.798		
14,900.0	7,406.8	5,155.0	5,151.5	138.9	10.7	-21.65	99.5	935.7	8,090.6	8,014.1	105.721		
15,000.0	7,405.5	5,155.0	5,151.5	140.7	10.7	-21.65	99.5	935.7	8,185.7	8,108.2	105.646		
15,100.0	7,404.2	5,138.5	5,135.7	142.5	10.7	-21.50	94.8	934.8	8,280.5	8,202.3	105.899		
15,200.0	7,402.8	5,123.0	5,120.7	144.3	10.6	-21.36	90.8	934.1	8,375.9	8,297.0	106.136		
15,300.0	7,401.5	5,123.0	5,120.7	146.1	10.6	-21.36	90.8	934.1	8,471.2	8,391.3	106.068		
15,400.0	7,400.2	5,123.0	5,120.7	147.9	10.6	-21.36	90.8	934.1	8,566.6	8,485.8	106.003		
15,500.0	7,398.9	5,123.0	5,120.7	149.7	10.6	-21.36	90.8	934.1	8,662.1	8,580.3	105.940		
15,600.0	7,397.5	5,123.0	5,120.7	151.5	10.6	-21.36	90.8	934.1	8,757.6	8,674.9	105.881		
15,700.0	7,396.2	5,123.0	5,120.7	153.3	10.6	-21.36	90.8	934.1	8,853.3	8,769.7	105.823		
15,800.0	7,394.9	5,123.0	5,120.7	155.1	10.6	-21.36	90.8	934.1	8,949.1	8,864.5	105.768		
15,900.0	7,393.6	5,123.0	5,120.7	156.9	10.6	-21.36	90.8	934.1	9,045.0	8,959.4	105.715		
16,000.0	7,392.3	5,123.0	5,120.7	158.7	10.6	-21.36	90.8	934.1	9,140.9	9,054.4	105.664		
16,100.0	7,390.9	5,123.0	5,120.7	160.6	10.6	-21.36	90.8	934.1	9,237.0	9,149.5	105.616		
16,200.0	7,389.6	5,123.0	5,120.7	162.4	10.6	-21.36	90.8	934.1	9,333.1	9,244.7	105.569		
16,300.0	7,388.3	5,123.0	5,120.7	164.2	10.6	-21.36	90.8	934.1	9,429.3	9,339.9	105.524		
16,400.0	7,387.0	5,123.0	5,120.7	166.0	10.6	-21.36	90.8	934.1	9,525.6	9,435.2	105.480		
16,500.0	7,385.6	5,123.0	5,120.7	167.8	10.6	-21.36	90.8	934.1	9,621.9	9,530.7	105.439		
16,600.0	7,384.3	5,123.0	5,120.7	169.6	10.6	-21.36	90.8	934.1	9,718.3	9,626.1	105.399		
16,700.0	7,383.0	5,123.0	5,120.7	171.4	10.6	-21.36	90.8	934.1	9,814.8	9,721.7	105.360		
16,800.0	7,381.7	5,123.0	5,120.7	173.2	10.6	-21.36	90.8	934.1	9,911.4	9,817.3	105.323		



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E - Screech Owl Federal #4H - Wellbore #1 - Wellbore #1											Offset Site Error:	0.0 usft
Survey Program: 100-Grid gyro 5775-MWD default											Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Seini Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N/S (usft)	E/W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	92.07	-156.2	4,320.9	4,323.8			
100.0	100.0	71.3	71.3	0.1	0.0	92.07	-156.2	4,320.9	4,323.7	4,323.6	N/A	
200.0	200.0	149.8	149.8	0.3	0.1	92.07	-156.4	4,321.1	4,324.0	4,323.6	N/A	
300.0	300.0	200.0	200.0	0.5	0.1	92.08	-156.7	4,321.4	4,324.9	4,324.3	6,928.818	
400.0	400.0	277.1	277.1	0.8	0.1	92.09	-157.6	4,322.7	4,326.6	4,325.7	4,856.328	
500.0	500.0	369.7	369.7	1.0	0.2	92.11	-159.6	4,324.9	4,329.0	4,327.9	3,705.700	
600.0	600.0	506.5	506.4	1.2	0.3	92.16	-163.0	4,327.5	4,331.1	4,329.7	2,949.938	
700.0	700.0	710.6	710.4	1.4	0.4	92.15	-162.5	4,327.6	4,330.8	4,329.0	2,412.789	
800.0	800.0	807.9	807.8	1.7	0.4	92.16	-163.3	4,326.7	4,329.9	4,327.9	2,089.345	
900.0	900.0	900.0	899.8	1.9	0.5	92.19	-165.6	4,326.0	4,329.2	4,326.9	1,842.899	
1,000.0	1,000.0	973.7	973.5	2.1	0.5	92.22	-167.6	4,325.7	4,329.0	4,326.3	1,655.597	
1,001.9	1,001.9	975.1	974.9	2.1	0.5	92.22	-167.7	4,325.7	4,329.0	4,326.3	1,652.374	
1,100.0	1,100.0	1,047.2	1,047.0	2.3	0.6	92.24	-169.3	4,325.9	4,329.2	4,326.4	1,503.099	
1,200.0	1,200.0	1,120.4	1,120.1	2.6	0.6	92.26	-170.8	4,326.5	4,330.2	4,327.0	1,376.754	
1,300.0	1,300.0	1,200.0	1,199.7	2.8	0.6	92.28	-172.2	4,327.6	4,331.7	4,328.3	1,269.166	
1,400.0	1,400.0	1,359.7	1,359.4	3.0	0.7	92.31	-174.3	4,328.7	4,332.3	4,328.5	1,163.834	
1,500.0	1,500.0	1,444.6	1,444.3	3.2	0.8	92.31	-174.6	4,329.1	4,332.7	4,328.7	1,085.693	
1,600.0	1,600.0	1,500.0	1,499.7	3.5	0.8	92.31	-174.6	4,329.6	4,333.7	4,329.5	1,021.208	
1,700.0	1,700.0	1,576.1	1,575.7	3.7	0.8	92.31	-174.6	4,330.8	4,335.4	4,330.9	961.693	
1,800.0	1,800.0	1,664.3	1,664.0	3.9	0.9	92.31	-174.9	4,333.0	4,337.9	4,333.1	907.712	
1,900.0	1,900.0	1,836.0	1,835.6	4.1	1.0	92.31	-174.8	4,335.9	4,339.6	4,334.5	852.297	
2,000.0	2,000.0	2,006.9	2,006.5	4.4	1.1	92.30	-174.4	4,336.4	4,340.1	4,334.7	803.070	
2,100.0	2,100.0	2,125.1	2,124.8	4.6	1.1	92.30	-174.3	4,335.2	4,339.0	4,333.4	762.588	
2,200.0	2,200.0	2,232.3	2,231.9	4.8	1.2	92.30	-174.4	4,333.9	4,337.8	4,331.8	726.596	
2,300.0	2,300.0	2,333.6	2,333.2	5.0	1.2	92.30	-174.1	4,332.4	4,336.4	4,330.1	694.161	
2,400.0	2,400.0	2,426.0	2,425.6	5.3	1.3	92.30	-174.0	4,331.3	4,335.1	4,328.6	664.936	
2,500.0	2,500.0	2,528.7	2,528.3	5.5	1.3	92.30	-174.1	4,330.0	4,333.8	4,327.0	637.552	
2,600.0	2,600.0	2,627.3	2,626.9	5.7	1.4	92.30	-173.9	4,328.7	4,332.6	4,325.5	612.522	
2,700.0	2,700.0	2,729.6	2,729.2	5.9	1.4	92.30	-173.7	4,327.5	4,331.3	4,324.0	589.203	
2,800.0	2,800.0	2,840.7	2,840.3	6.2	1.5	92.30	-173.5	4,325.9	4,329.9	4,322.3	567.221	
2,900.0	2,900.0	2,941.2	2,940.8	6.4	1.5	92.29	-173.3	4,324.3	4,328.3	4,320.4	547.159	
3,000.0	3,000.0	3,034.3	3,033.9	6.6	1.6	92.29	-173.2	4,322.9	4,326.8	4,318.6	528.715	
3,100.0	3,100.0	3,130.0	3,129.5	6.8	1.6	92.29	-173.0	4,321.6	4,325.4	4,317.0	511.393	
3,200.0	3,200.0	3,224.5	3,224.1	7.1	1.7	92.29	-172.9	4,320.5	4,324.2	4,315.5	495.204	
3,300.0	3,300.0	3,327.8	3,327.3	7.3	1.7	92.29	-172.7	4,319.2	4,323.0	4,314.0	479.770	
3,400.0	3,400.0	3,432.9	3,432.4	7.5	1.8	92.29	-172.5	4,317.8	4,321.6	4,312.3	465.177	
3,500.0	3,500.0	3,523.1	3,522.6	7.7	1.8	92.29	-172.6	4,316.7	4,320.4	4,310.8	451.818	
3,600.0	3,600.0	3,626.0	3,625.5	7.9	1.9	92.29	-172.6	4,315.5	4,319.3	4,309.4	438.916	
3,700.0	3,700.0	3,737.4	3,736.9	8.2	1.9	92.29	-172.7	4,313.9	4,317.9	4,307.8	426.506	
3,800.0	3,800.0	3,838.8	3,838.2	8.4	2.0	92.29	-172.6	4,312.4	4,316.4	4,306.0	414.969	
3,900.0	3,900.0	3,944.6	3,944.0	8.6	2.1	92.30	-173.0	4,310.8	4,314.8	4,304.2	403.931	
4,000.0	4,000.0	4,037.6	4,037.0	8.8	2.1	92.30	-173.4	4,309.2	4,313.1	4,302.2	393.685	
4,100.0	4,100.0	4,110.5	4,109.9	9.1	2.1	92.31	-173.7	4,308.3	4,312.0	4,300.8	384.353	
4,200.0	4,200.0	4,205.2	4,204.6	9.3	2.2	92.31	-174.0	4,307.6	4,311.2	4,299.7	375.104	
4,300.0	4,300.0	4,310.9	4,310.3	9.5	2.3	92.32	-174.4	4,306.7	4,310.4	4,298.6	366.105	
4,400.0	4,400.0	4,404.8	4,404.2	9.7	2.3	92.32	-174.7	4,305.9	4,309.6	4,297.6	357.711	
4,500.0	4,500.0	4,506.0	4,505.4	10.0	2.4	92.33	-175.1	4,305.2	4,308.9	4,296.5	349.585	
4,600.0	4,600.0	4,602.2	4,601.6	10.2	2.4	92.33	-175.5	4,304.5	4,308.2	4,295.6	341.891	
4,700.0	4,700.0	4,714.7	4,714.1	10.4	2.5	92.34	-176.1	4,303.5	4,307.3	4,294.5	334.289	
4,800.0	4,800.0	4,822.9	4,822.3	10.6	2.5	92.36	-177.0	4,302.3	4,306.3	4,293.1	327.048	
4,900.0	4,900.0	4,920.8	4,920.2	10.9	2.6	92.37	-177.8	4,301.2	4,305.2	4,291.7	320.238	
5,000.0	5,000.0	5,024.7	5,024.1	11.1	2.6	92.38	-178.8	4,300.0	4,304.0	4,290.2	313.620	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well: Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E - Screech Owl Federal #4H - Wellbore #1 - Wellbore #1												Offset Site Error:
Survey Program: 100-Good gyro, 5775-MWD default												0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
5,100.0	5,100.0	5,118.3	5,117.7	11.3	2.7	92.40	-179.8	4,298.9	4,302.9	4,288.9	307.394	
5,200.0	5,200.0	5,233.6	5,233.0	11.5	2.7	92.41	-181.0	4,297.4	4,301.6	4,287.4	301.156	
5,300.0	5,300.0	5,341.0	5,340.4	11.8	2.8	92.42	-181.3	4,295.8	4,300.2	4,285.6	295.245	
5,400.0	5,400.0	5,440.5	5,439.9	12.0	2.9	92.42	-181.3	4,294.2	4,298.5	4,283.7	289.624	
5,500.0	5,500.0	5,535.6	5,534.9	12.2	2.9	92.43	-181.9	4,292.8	4,297.1	4,282.0	284.258	
5,600.0	5,600.0	5,654.8	5,654.1	12.4	3.0	92.44	-183.0	4,290.8	4,295.5	4,280.1	278.838	
5,700.0	5,700.0	5,775.0	5,774.2	12.7	3.0	92.45	-183.3	4,287.6	4,292.8	4,277.1	274.458	
5,800.0	5,800.0	5,866.2	5,865.4	12.9	3.0	92.45	-183.1	4,285.1	4,290.0	4,274.1	270.054	
5,900.0	5,900.0	5,964.0	5,963.2	13.1	3.0	92.44	-182.4	4,283.7	4,288.5	4,272.4	265.841	
6,000.0	6,000.0	6,016.7	6,015.8	13.3	3.1	92.43	-181.8	4,283.3	4,287.3	4,271.0	261.705	
6,100.0	6,100.0	6,145.1	6,144.3	13.6	3.1	92.41	-180.6	4,281.6	4,286.0	4,269.3	257.115	
6,200.0	6,200.0	6,260.3	6,259.5	13.8	3.2	92.41	-179.8	4,279.5	4,284.2	4,267.2	252.331	
6,300.0	6,300.0	6,342.0	6,341.1	14.0	3.3	92.41	-179.7	4,277.8	4,282.1	4,264.8	248.037	
6,400.0	6,400.0	6,433.6	6,432.7	14.2	3.3	92.41	-179.9	4,276.1	4,280.3	4,262.7	243.551	
6,500.0	6,500.0	6,531.0	6,530.1	14.5	3.4	92.41	-180.2	4,275.2	4,279.3	4,261.4	239.196	
6,600.0	6,600.0	6,597.9	6,597.0	14.7	3.5	92.42	-180.7	4,274.8	4,278.7	4,260.5	235.212	
6,700.0	6,700.0	6,703.5	6,702.6	14.9	3.6	92.44	-181.8	4,274.1	4,278.1	4,259.5	230.812	
6,800.0	6,800.0	6,832.4	6,831.5	15.1	3.8	92.46	-183.6	4,272.7	4,277.1	4,258.1	225.972	
6,900.0	6,900.0	6,923.8	6,922.8	15.4	3.9	92.49	-185.4	4,271.2	4,275.5	4,256.3	221.823	
6,991.4	6,991.4	6,966.0	6,964.9	15.6	4.0	92.53	-188.8	4,270.9	4,275.0	4,255.5	218.774	
7,000.0	7,000.0	6,966.0	6,964.9	15.6	4.0	92.53	-188.8	4,270.9	4,275.0	4,255.5	218.557	
7,023.6	7,023.6	6,975.6	6,974.4	15.6	4.0	92.55	-190.1	4,270.8	4,275.1	4,255.5	217.805	
7,025.0	7,025.0	6,976.2	6,975.0	15.6	4.0	-88.16	-190.2	4,270.8	4,275.1	4,255.4	216.972	
7,050.0	7,050.0	6,986.7	6,985.4	15.7	4.0	-88.13	-191.8	4,270.8	4,275.3	4,255.5	216.352	
7,075.0	7,074.9	7,064.4	7,060.7	15.7	4.2	-87.96	-210.5	4,270.1	4,275.2	4,255.3	214.348	
7,100.0	7,099.7	7,090.9	7,085.6	15.8	4.2	-87.91	-219.6	4,269.6	4,275.0	4,255.0	213.243	
7,125.0	7,124.2	7,092.0	7,086.6	15.8	4.2	-87.93	-220.0	4,269.6	4,274.8	4,254.8	212.795	
7,150.0	7,148.5	7,110.3	7,103.5	15.9	4.3	-87.90	-227.0	4,269.2	4,274.7	4,254.5	211.831	
7,175.0	7,172.5	7,124.0	7,116.0	15.9	4.3	-87.90	-232.7	4,269.0	4,274.5	4,254.3	211.021	
7,200.0	7,196.0	7,124.0	7,116.0	15.9	4.3	-87.90	-232.7	4,269.0	4,274.5	4,254.2	210.624	
7,221.9	7,216.3	7,134.8	7,125.7	16.0	4.3	-87.90	-237.4	4,268.9	4,274.4	4,254.1	209.889	
7,225.0	7,219.1	7,135.7	7,126.5	16.0	4.3	-87.90	-237.8	4,268.9	4,274.4	4,254.1	209.804	
7,250.0	7,241.6	7,143.3	7,133.3	16.0	4.4	-87.89	-241.2	4,268.9	4,274.5	4,254.0	209.130	
7,275.0	7,263.5	7,155.0	7,143.6	16.1	4.4	-87.88	-246.7	4,268.9	4,274.6	4,254.1	208.302	
7,300.0	7,284.8	7,155.0	7,143.6	16.1	4.4	-87.87	-246.7	4,268.9	4,274.7	4,254.2	207.871	
7,325.0	7,305.4	7,167.9	7,154.8	16.2	4.5	-87.86	-253.0	4,268.9	4,274.9	4,254.2	206.868	
7,350.0	7,325.2	7,187.0	7,171.2	16.2	4.5	-87.86	-262.9	4,269.1	4,275.2	4,254.4	205.580	
7,375.0	7,344.1	7,270.7	7,239.6	16.3	5.0	-87.97	-311.2	4,268.6	4,275.0	4,253.6	200.475	
7,400.0	7,362.2	7,325.7	7,281.3	16.3	5.4	-88.04	-347.0	4,267.7	4,274.7	4,252.9	196.151	
7,425.0	7,379.4	7,353.0	7,300.8	16.4	5.6	-88.11	-366.0	4,267.0	4,274.3	4,252.2	193.478	
7,450.0	7,395.5	7,375.0	7,315.9	16.5	5.8	-88.18	-382.0	4,266.4	4,273.8	4,251.4	191.078	
7,475.0	7,410.7	7,375.0	7,315.9	16.6	5.8	-88.24	-382.0	4,266.4	4,273.4	4,250.9	190.379	
7,500.0	7,424.8	7,375.0	7,315.9	16.7	5.8	-88.28	-382.0	4,266.4	4,273.0	4,250.5	189.625	
7,525.0	7,437.8	7,375.0	7,315.9	16.8	5.8	-88.30	-382.0	4,266.4	4,272.8	4,250.2	188.814	
7,550.0	7,449.7	7,391.3	7,326.7	16.9	6.0	-88.37	-394.2	4,266.1	4,272.5	4,249.6	186.603	
7,561.7	7,454.8	7,393.1	7,327.9	17.0	6.0	-88.39	-395.6	4,266.1	4,272.4	4,249.5	186.078	
7,575.0	7,460.4	7,407.0	7,336.9	17.1	6.1	-88.45	-406.1	4,266.1	4,272.5	4,249.3	184.428	
7,600.0	7,469.9	7,407.0	7,336.9	17.2	6.1	-88.46	-406.1	4,266.1	4,272.4	4,249.1	183.455	
7,605.9	7,471.9	7,407.0	7,336.9	17.2	6.1	-88.46	-406.1	4,266.1	4,272.4	4,249.1	183.238	CC
7,625.0	7,478.1	7,407.0	7,336.9	17.3	6.1	-88.45	-406.1	4,266.1	4,272.4	4,249.0	182.364	
7,650.0	7,485.2	7,407.0	7,336.9	17.5	6.1	-88.44	-406.1	4,266.1	4,272.6	4,249.0	181.161	
7,675.0	7,490.9	7,416.6	7,343.0	17.7	6.2	-88.47	-413.5	4,266.2	4,272.8	4,248.9	179.153	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well: Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD/Reference:	Offset Datum

Offset Design: Sec. 19, T26S, R27E - Screech Owl Federal #4H - Wellbore #1 - Wellbore #1													Offset Site Error	0.0 usft
Survey Program: 100-Good gyro: 5775-MWD default													Offset Well Error	0.0 usft
Reference	Vertical	Measured	Offset	Vertical	Semi-Major Axis	Offset	Highside	Offset Wellbore Centre	Distance	Distance	Separation	Warning		
Measured	Depth	Depth	Depth	Depth	Reference	Depth	Toolface	N/S	E/W	Centres	Ellipses	Factor		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)			
7,700.0	7,495.4	7,426.5	7,349.2	17.8	6.3	-88.49	-421.3	4,266.3	4,273.1	4,248.9	177.095			
7,725.0	7,498.6	7,438.0	7,356.2	18.0	6.4	-88.53	-430.4	4,266.5	4,273.4	4,249.0	174.904			
7,750.0	7,500.5	7,438.0	7,356.2	18.2	6.4	-88.48	-430.4	4,266.5	4,273.9	4,249.2	173.557			
7,775.0	7,501.1	7,450.9	7,363.8	18.4	6.6	-88.52	-440.8	4,266.8	4,274.3	4,249.4	171.165			
7,779.9	7,501.0	7,452.2	7,364.6	18.5	6.6	-88.52	-441.9	4,266.8	4,274.4	4,249.4	170.788			
7,800.0	7,500.8	7,457.8	7,367.8	18.6	6.7	-88.56	-446.4	4,266.9	4,274.9	4,249.7	169.235			
7,900.0	7,499.4	7,493.0	7,387.0	19.5	7.1	-88.82	-475.9	4,268.0	4,278.3	4,251.7	160.826			
8,000.0	7,498.1	7,596.0	7,431.8	20.6	8.5	-89.44	-568.4	4,271.7	4,282.8	4,253.8	147.518			
8,100.0	7,496.8	7,772.1	7,479.8	21.7	11.2	-90.11	-737.5	4,275.6	4,286.2	4,253.3	130.306			
8,200.0	7,495.5	7,833.3	7,489.6	23.0	12.2	-90.25	-797.9	4,276.8	4,289.4	4,254.3	122.093			
8,300.0	7,494.1	7,985.0	7,497.5	24.3	14.7	-90.39	-949.2	4,279.7	4,292.7	4,253.7	110.038			
8,400.0	7,492.8	8,061.1	7,496.1	25.6	16.0	-90.38	-1,025.3	4,280.9	4,295.5	4,253.9	103.213			
8,500.0	7,491.5	8,133.6	7,495.2	27.1	17.1	-90.38	-1,097.8	4,282.4	4,298.9	4,254.7	97.297			
8,600.0	7,490.2	8,197.0	7,493.8	28.5	18.1	-90.37	-1,161.2	4,284.3	4,303.0	4,256.4	92.224			
8,700.0	7,488.8	8,288.0	7,491.8	30.0	19.6	-90.36	-1,252.1	4,287.4	4,307.8	4,258.1	86.792			
8,800.0	7,487.5	8,358.5	7,491.1	31.6	20.7	-90.37	-1,322.5	4,290.2	4,312.9	4,260.7	82.552			
8,900.0	7,486.2	8,430.7	7,491.0	33.1	21.8	-90.38	-1,394.7	4,293.5	4,318.7	4,263.7	78.602			
9,000.0	7,484.9	8,508.0	7,491.3	34.7	23.1	-90.39	-1,471.8	4,297.5	4,325.1	4,267.3	74.834			
9,100.0	7,483.6	8,711.9	7,490.8	36.3	26.5	-90.42	-1,675.6	4,306.4	4,330.9	4,268.0	68.803			
9,200.0	7,482.2	8,947.0	7,489.2	38.0	30.5	-90.44	-1,910.6	4,310.4	4,334.3	4,265.7	63.159			
9,300.0	7,480.9	9,029.1	7,489.3	39.6	31.9	-90.46	-1,992.7	4,310.3	4,335.5	4,263.8	60.499			
9,400.0	7,479.6	9,124.5	7,489.5	41.3	33.5	-90.48	-2,088.1	4,310.6	4,337.1	4,262.2	57.873			
9,500.0	7,478.3	9,224.7	7,490.3	42.9	35.2	-90.50	-2,188.3	4,311.0	4,338.7	4,260.4	55.397			
9,600.0	7,476.9	9,408.6	7,490.0	44.6	38.3	-90.53	-2,372.1	4,309.1	4,338.7	4,255.4	52.127			
9,700.0	7,475.6	9,515.0	7,489.4	46.3	40.2	-90.54	-2,478.5	4,307.1	4,337.9	4,251.2	50.010			
9,800.0	7,474.3	9,609.0	7,488.9	48.0	41.7	-90.55	-2,572.5	4,305.5	4,337.5	4,247.5	48.175			
9,900.0	7,473.0	9,766.4	7,487.9	49.7	44.4	-90.57	-2,729.9	4,302.5	4,337.1	4,242.6	45.911			
10,000.0	7,471.6	9,868.0	7,488.0	51.5	46.2	-90.56	-2,831.4	4,299.4	4,335.2	4,237.3	44.265			
10,100.0	7,470.3	9,961.6	7,483.7	53.2	47.8	-90.55	-2,924.9	4,296.7	4,333.7	4,232.4	42.801			
10,200.0	7,469.0	10,024.3	7,483.5	54.9	48.8	-90.55	-2,987.6	4,295.2	4,332.4	4,228.4	41.659			
10,260.1	7,468.2	10,054.9	7,483.7	56.0	49.3	-90.56	-3,018.2	4,294.7	4,332.2	4,226.7	41.065			
10,300.0	7,467.7	10,081.0	7,484.1	56.7	49.8	-90.57	-3,044.3	4,294.4	4,332.3	4,225.7	40.628			
10,400.0	7,466.4	10,132.8	7,484.8	58.4	50.6	-90.59	-3,096.1	4,294.3	4,333.3	4,224.1	39.671			
10,500.0	7,465.0	10,198.8	7,484.9	60.1	51.8	-90.60	-3,162.1	4,294.7	4,335.2	4,223.1	38.673			
10,600.0	7,463.7	10,293.0	7,483.8	61.9	53.4	-90.60	-3,256.3	4,295.7	4,337.5	4,222.0	37.552			
10,700.0	7,462.4	10,391.8	7,484.3	63.7	55.1	-90.63	-3,355.0	4,296.6	4,339.7	4,220.7	36.479			
10,800.0	7,461.1	10,452.4	7,484.7	65.4	56.2	-90.64	-3,415.7	4,297.6	4,342.5	4,220.8	35.670			
10,900.0	7,459.7	10,543.9	7,485.1	67.2	57.7	-90.66	-3,507.2	4,299.7	4,346.1	4,221.0	34.745			
11,000.0	7,458.4	10,700.8	7,487.7	68.9	60.4	-90.73	-3,664.0	4,301.6	4,348.4	4,218.8	33.559			
11,100.0	7,457.1	10,768.4	7,488.6	70.7	61.6	-90.75	-3,731.6	4,302.5	4,351.0	4,218.5	32.837			
11,200.0	7,455.8	10,859.6	7,489.0	72.5	63.2	-90.77	-3,822.8	4,304.1	4,354.1	4,218.2	32.042			
11,300.0	7,454.4	10,980.9	7,487.5	74.3	65.3	-90.77	-3,944.1	4,306.1	4,356.9	4,217.1	31.160			
11,400.0	7,453.1	11,108.8	7,484.8	76.0	67.5	-90.76	-4,071.9	4,307.5	4,359.3	4,215.4	30.307			
11,500.0	7,451.8	11,304.0	7,480.9	77.8	70.9	-90.74	-4,267.1	4,307.4	4,360.8	4,211.7	29.259			
11,600.0	7,450.5	11,398.0	7,479.9	79.6	72.5	-90.74	-4,361.1	4,306.1	4,360.6	4,208.2	28.615			
11,604.4	7,450.4	11,398.0	7,479.9	79.7	72.5	-90.74	-4,361.1	4,306.1	4,360.6	4,208.2	28.613			
11,700.0	7,449.2	11,481.3	7,478.8	81.4	73.9	-90.74	-4,444.4	4,305.2	4,360.8	4,205.2	28.030			
11,800.0	7,447.8	11,572.9	7,476.5	83.1	75.4	-90.73	-4,535.9	4,304.5	4,361.2	4,202.3	27.443			
11,900.0	7,446.5	11,733.8	7,475.1	84.9	78.2	-90.74	-4,696.8	4,301.7	4,360.6	4,197.1	26.675			
12,000.0	7,445.2	11,806.2	7,474.6	86.7	79.4	-90.74	-4,769.2	4,300.3	4,359.9	4,193.5	26.187			
12,030.1	7,444.8	11,825.5	7,474.4	87.3	79.8	-90.74	-4,788.5	4,300.1	4,359.9	4,192.6	26.058			
12,100.0	7,443.9	11,871.9	7,473.6	88.5	80.6	-90.74	-4,834.8	4,299.6	4,360.1	4,190.7	25.737			

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E - Screech Owl Federal #4H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 usft
Survey Program: 100-Grid gyro, 15775-MWD default												Offset Well Error:	0.0 usft
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning		
12,200.0	7,442.5	11,982.2	7,472.2	90.3	82.5	-90.74	-4,945.2	4,298.7	4,360.6	4,187.4	25.191		
12,300.0	7,441.2	12,150.0	7,469.3	92.1	85.4	-90.73	-5,112.9	4,296.0	4,360.3	4,182.5	24.522		
12,400.0	7,439.9	12,244.0	7,467.8	93.9	87.0	-90.73	-5,206.8	4,293.7	4,359.1	4,177.9	24.055		
12,500.0	7,438.6	12,339.0	7,467.1	95.7	88.6	-90.74	-5,301.8	4,291.4	4,357.9	4,173.3	23.603		
12,600.0	7,437.2	12,433.0	7,469.2	97.4	90.2	-90.78	-5,395.8	4,289.4	4,357.0	4,169.0	23.178		
12,665.5	7,436.4	12,462.4	7,470.3	98.6	90.7	-90.80	-5,425.1	4,288.9	4,356.8	4,167.2	22.979		
12,700.0	7,435.9	12,488.4	7,471.3	99.2	91.1	-90.82	-5,451.1	4,288.6	4,356.8	4,166.2	22.850		
12,800.0	7,434.6	12,553.9	7,473.9	101.0	92.2	-90.86	-5,516.5	4,288.0	4,357.3	4,163.8	22.514		
12,900.0	7,433.3	12,621.0	7,476.8	102.8	93.3	-90.91	-5,583.6	4,288.2	4,358.8	4,162.4	22.189		
13,000.0	7,431.9	12,674.1	7,478.9	104.6	94.3	-90.95	-5,636.6	4,288.8	4,361.2	4,162.1	21.901		
13,100.0	7,430.6	12,739.1	7,480.7	106.4	95.4	-90.99	-5,701.6	4,290.0	4,364.4	4,162.4	21.602		
13,200.0	7,429.3	12,809.0	7,482.4	108.2	96.6	-91.02	-5,771.5	4,292.0	4,368.5	4,163.4	21.304		
13,300.0	7,428.0	12,940.8	7,484.3	110.0	98.9	-91.07	-5,903.2	4,295.2	4,372.2	4,163.0	20.903		
13,400.0	7,426.7	13,023.2	7,484.2	111.8	100.3	-91.08	-5,985.6	4,297.4	4,376.0	4,163.6	20.602		
13,500.0	7,425.3	13,150.3	7,481.9	113.6	102.6	-91.07	-6,112.6	4,300.5	4,379.7	4,163.2	20.232		
13,600.0	7,424.0	13,238.8	7,478.5	115.4	104.1	-91.04	-6,201.0	4,302.3	4,383.0	4,163.2	19.938		
13,700.0	7,422.7	13,389.5	7,474.1	117.2	106.7	-91.01	-6,351.6	4,305.5	4,386.5	4,162.2	19.556		
13,800.0	7,421.4	13,493.7	7,474.6	119.0	108.5	-91.03	-6,455.8	4,306.5	4,388.8	4,160.9	19.258		
13,900.0	7,420.0	13,576.7	7,474.7	120.8	109.9	-91.04	-6,538.8	4,307.7	4,391.4	4,160.2	18.999		
14,000.0	7,418.7	13,708.0	7,473.5	122.6	112.2	-91.05	-6,670.1	4,309.0	4,393.6	4,158.4	18.676		
14,100.0	7,417.4	13,807.4	7,471.3	124.4	114.0	-91.04	-6,769.5	4,309.7	4,395.6	4,156.8	18.407		
14,200.0	7,416.1	13,890.1	7,469.0	126.2	115.4	-91.02	-6,852.2	4,310.5	4,397.8	4,155.7	18.167		
14,300.0	7,414.7	14,019.3	7,465.0	128.0	117.7	-90.99	-6,981.2	4,312.1	4,400.3	4,154.1	17.875		
14,400.0	7,413.4	14,098.9	7,463.9	129.8	119.0	-90.99	-7,060.9	4,312.5	4,402.2	4,152.9	17.657		
14,500.0	7,412.1	14,172.6	7,463.7	131.6	120.3	-91.00	-7,134.5	4,313.5	4,404.7	4,152.3	17.454		
14,600.0	7,410.8	14,345.9	7,462.8	133.4	123.3	-91.02	-7,307.8	4,315.2	4,407.2	4,150.0	17.133		
14,700.0	7,409.5	14,444.7	7,462.8	135.2	125.0	-91.04	-7,406.6	4,315.0	4,408.2	4,147.5	16.907		
14,800.0	7,408.1	14,526.1	7,462.3	137.1	126.4	-91.04	-7,488.0	4,315.2	4,409.7	4,145.7	16.707		
14,900.0	7,406.8	14,615.8	7,461.3	138.9	128.0	-91.05	-7,577.7	4,315.5	4,411.3	4,144.0	16.502		
15,000.0	7,405.5	14,691.0	7,461.5	140.7	129.3	-91.06	-7,652.9	4,316.3	4,413.6	4,143.2	16.322		
15,100.0	7,404.2	14,770.8	7,462.2	142.5	130.6	-91.08	-7,732.7	4,317.6	4,416.4	4,142.8	16.143		
15,200.0	7,402.8	14,859.6	7,462.3	144.3	132.2	-91.10	-7,821.5	4,319.1	4,419.4	4,142.4	15.958		
15,300.0	7,401.5	14,988.4	7,460.6	146.1	134.5	-91.10	-7,950.2	4,321.1	4,422.2	4,141.2	15.735		
15,400.0	7,400.2	15,082.9	7,459.2	147.9	136.1	-91.10	-8,044.7	4,322.3	4,424.7	4,140.2	15.554		
15,500.0	7,398.9	15,162.0	7,457.9	149.7	137.4	-91.09	-8,123.8	4,323.5	4,427.6	4,139.9	15.393		
15,600.0	7,397.5	15,256.0	7,456.9	151.5	139.1	-91.09	-8,217.8	4,325.3	4,430.7	4,139.7	15.222		
15,700.0	7,396.2	15,318.8	7,457.2	153.3	140.1	-91.11	-8,280.6	4,326.8	4,434.3	4,140.4	15.087		
15,800.0	7,394.9	15,410.5	7,458.0	155.1	141.7	-91.13	-8,372.2	4,329.6	4,438.6	4,141.3	14.930		
15,900.0	7,393.6	15,529.1	7,459.5	156.9	143.7	-91.17	-8,490.8	4,332.8	4,442.6	4,141.5	14.752		
16,000.0	7,392.3	15,607.6	7,461.0	158.7	145.0	-91.20	-8,569.2	4,334.8	4,446.6	4,142.3	14.613		
16,100.0	7,390.9	15,805.0	7,464.3	160.6	148.4	-91.28	-8,766.6	4,337.7	4,449.0	4,139.4	14.371		
16,200.0	7,389.6	15,925.4	7,464.8	162.4	150.5	-91.30	-8,887.0	4,338.4	4,450.9	4,137.4	14.197		
16,300.0	7,388.3	16,043.1	7,464.2	164.2	152.6	-91.32	-9,004.6	4,338.8	4,452.5	4,135.1	14.029		
16,400.0	7,387.0	16,150.3	7,463.0	166.0	154.4	-91.32	-9,111.9	4,338.4	4,453.3	4,132.2	13.871		
16,500.0	7,385.6	16,243.2	7,460.8	167.8	156.0	-91.30	-9,204.7	4,338.5	4,454.6	4,130.2	13.728		
16,600.0	7,384.3	16,342.3	7,458.2	169.6	157.8	-91.29	-9,303.8	4,338.3	4,455.7	4,127.7	13.583		
16,700.0	7,383.0	16,450.2	7,454.9	171.4	159.6	-91.26	-9,411.6	4,338.5	4,457.1	4,125.3	13.436		
16,800.0	7,381.7	16,539.0	7,452.2	173.2	161.2	-91.24	-9,500.4	4,338.3	4,458.1	4,123.1	13.306		
16,900.0	7,380.3	16,673.7	7,449.9	175.0	163.4	-91.24	-9,635.0	4,338.2	4,459.3	4,120.2	13.148		
17,000.0	7,379.0	16,761.0	7,449.4	176.8	164.9	-91.25	-9,722.4	4,337.5	4,459.8	4,117.4	13.024		
17,100.0	7,377.7	16,836.4	7,449.3	178.7	166.2	-91.26	-9,797.8	4,337.2	4,460.8	4,115.3	12.910		
17,200.0	7,376.4	16,926.2	7,448.8	180.5	167.8	-91.26	-9,887.6	4,337.5	4,462.4	4,113.5	12.790		

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well, Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandill Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandill Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design	Sec 19, T26S, R27E- Screech Owl Federal #4H- Wellbore #1- Wellbore #1										Offset Site Error:	0.0 usft
Survey Program:	100- Good gyro: 57.75; MWD default										Offset Well Error:	0.0 usft
Reference:	Vertical	Measured	Vertical	Measured	Semi Major Axis	Offset	Highside	Offset Wellbore Centre	Distance	Between	Separation	Warning
Depth	Depth	Depth	Depth	Depth	Reference	Offset	Toolface	N/S	E/W	Centres	Ellipses	Factor
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	
17,300.0	7,375.1	17,004.5	7,447.8	182.3	169.1	-91.27	-9,965.8	4,337.9	4,464.2	4,112.1	12.680	
17,400.0	7,373.7	17,069.7	7,446.4	184.1	170.3	-91.26	-10,031.0	4,338.7	4,466.6	4,111.6	12.581 ES	
17,500.0	7,372.4	17,138.0	7,444.6	185.9	171.5	-91.24	-10,099.3	4,340.2	4,470.0	4,112.0	12.485	
17,606.1	7,371.0	17,212.1	7,442.1	187.8	172.8	-91.22	-10,173.3	4,342.4	4,474.3	4,113.1	12.386 SF	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandrell Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandrell Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E - Screech Owl Federal Com #2H - Wellbore #1 - Wellbore #1												Offset Site Error:
Survey Program: 123-MWD default												Offset Well Error:
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Small Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
0.0	0.0	0.0	0.0	0.0	0.0	90.18	-2.8	890.0	890.0			
100.0	100.0	99.5	99.5	0.1	0.1	90.19	-3.0	889.9	889.9	889.7	5,183.318	
200.0	200.0	202.7	202.7	0.3	0.3	90.22	-3.4	889.4	889.4	888.8	1,493.376	
300.0	300.0	306.1	306.1	0.5	0.5	90.25	-3.9	888.5	888.6	887.5	845.152	
400.0	400.0	408.4	408.4	0.8	0.7	90.33	-5.1	887.3	887.4	885.9	589.612	
500.0	500.0	509.4	509.3	1.0	1.0	90.45	-6.9	885.9	886.1	884.1	452.944	
600.0	600.0	603.1	603.1	1.2	1.2	90.59	-9.1	884.8	884.9	882.5	371.753	
650.4	650.4	648.4	648.3	1.3	1.3	90.65	-10.1	884.6	884.7	882.1	342.050	CC
700.0	700.0	697.0	696.9	1.4	1.4	90.72	-11.1	884.7	884.8	882.0	316.273	
800.0	800.0	777.6	777.5	1.7	1.5	90.84	-13.0	885.8	886.1	882.9	278.200	
900.0	900.0	862.1	861.9	1.9	1.7	90.99	-15.4	888.4	889.2	885.6	248.338	
1,000.0	1,000.0	963.2	962.9	2.1	1.9	91.21	-18.8	892.4	893.3	889.3	222.163	
1,100.0	1,100.0	1,082.2	1,081.7	2.3	2.2	91.45	-22.7	895.7	896.1	891.6	199.125	
1,200.0	1,200.0	1,198.9	1,198.4	2.6	2.4	91.62	-25.3	896.3	896.6	891.7	180.448	
1,300.0	1,300.0	1,299.5	1,299.0	2.8	2.6	91.63	-25.5	896.0	896.4	891.0	166.152	
1,355.1	1,355.1	1,352.6	1,352.1	2.9	2.7	91.61	-25.2	895.9	896.3	890.6	159.396	
1,400.0	1,400.0	1,393.6	1,393.1	3.0	2.8	91.59	-24.9	896.0	896.4	890.6	154.416	
1,500.0	1,500.0	1,483.4	1,482.9	3.2	3.0	91.53	-24.0	896.9	897.3	891.1	144.509	
1,600.0	1,600.0	1,573.0	1,572.5	3.5	3.2	91.49	-23.4	898.9	899.5	892.9	135.929	
1,700.0	1,700.0	1,664.4	1,663.8	3.7	3.4	91.46	-23.0	901.8	902.7	895.7	128.364	
1,800.0	1,800.0	1,773.1	1,772.4	3.9	3.6	91.52	-24.1	905.7	906.4	898.9	121.031	
1,900.0	1,900.0	1,911.9	1,911.2	4.1	3.9	91.72	-27.3	906.5	907.1	899.0	113.232	
2,000.0	2,000.0	2,011.6	2,010.8	4.4	4.1	91.86	-29.4	904.4	905.0	896.6	107.153	
2,082.2	2,082.2	2,080.0	2,079.2	4.5	4.2	91.95	-30.7	903.9	904.4	895.6	103.071	
2,100.0	2,100.0	2,096.3	2,095.6	4.6	4.3	91.97	-31.0	903.9	904.4	895.6	102.207	
2,200.0	2,200.0	2,193.9	2,193.1	4.8	4.5	92.09	-33.0	904.1	904.7	895.5	97.496	
2,300.0	2,300.0	2,292.5	2,291.7	5.0	4.7	92.21	-34.9	904.6	905.3	895.6	93.214	
2,400.0	2,400.0	2,394.3	2,393.5	5.3	4.9	92.32	-36.7	905.0	905.8	895.6	89.243	
2,500.0	2,500.0	2,495.0	2,494.2	5.5	5.1	92.43	-38.5	905.3	906.1	895.5	85.591	
2,600.0	2,600.0	2,594.0	2,593.1	5.7	5.3	92.55	-40.3	905.6	906.5	895.4	82.245	
2,700.0	2,700.0	2,693.5	2,692.6	5.9	5.5	92.68	-42.4	905.9	906.9	895.5	79.149	
2,800.0	2,800.0	2,793.7	2,792.8	6.2	5.8	92.81	-44.4	906.3	907.4	895.5	76.266	
2,900.0	2,900.0	2,895.6	2,894.7	6.4	6.0	92.94	-46.5	906.6	907.8	895.5	73.564	
3,000.0	3,000.0	2,998.7	2,997.8	6.6	6.2	93.06	-48.5	906.6	907.9	895.1	71.013	
3,100.0	3,100.0	3,099.1	3,098.2	6.8	6.4	93.19	-50.5	906.4	907.8	894.5	68.640	
3,200.0	3,200.0	3,198.7	3,197.7	7.1	6.6	93.32	-52.6	906.1	907.7	894.0	66.430	
3,300.0	3,300.0	3,299.5	3,298.4	7.3	6.8	93.47	-54.9	905.9	907.5	893.4	64.350	
3,400.0	3,400.0	3,400.4	3,399.4	7.5	7.0	93.60	-57.0	905.5	907.3	892.8	62.389	
3,500.0	3,500.0	3,498.7	3,497.6	7.7	7.3	93.73	-59.0	905.2	907.2	892.2	60.583	
3,536.9	3,536.9	3,535.0	3,533.9	7.8	7.3	93.78	-59.8	905.2	907.2	892.0	59.946	
3,600.0	3,600.0	3,597.2	3,596.1	7.9	7.5	93.86	-61.1	905.1	907.2	891.8	58.888	
3,700.0	3,700.0	3,698.1	3,697.0	8.2	7.7	93.99	-63.2	905.0	907.2	891.4	57.261	
3,800.0	3,800.0	3,798.9	3,797.7	8.4	7.9	94.13	-65.3	904.8	907.2	890.9	55.717	
3,900.0	3,900.0	3,898.7	3,897.5	8.6	8.1	94.26	-67.3	904.6	907.1	890.4	54.262	
4,000.0	4,000.0	3,998.8	3,997.6	8.8	8.3	94.38	-69.2	904.4	907.1	889.9	52.879	
4,100.0	4,100.0	4,099.8	4,098.7	9.1	8.5	94.50	-71.2	904.1	906.9	889.4	51.555	
4,200.0	4,200.0	4,200.9	4,199.7	9.3	8.7	94.62	-73.0	903.8	906.7	888.7	50.287	
4,300.0	4,300.0	4,301.9	4,300.7	9.5	9.0	94.72	-74.5	903.3	906.4	887.9	49.072	
4,400.0	4,400.0	4,401.8	4,400.6	9.7	9.2	94.79	-75.7	902.7	905.9	887.0	47.918	
4,500.0	4,500.0	4,500.8	4,499.6	10.0	9.4	94.88	-77.1	902.3	905.6	886.2	46.828	
4,600.0	4,600.0	4,601.2	4,599.9	10.2	9.6	94.99	-78.8	901.9	905.3	885.5	45.777	
4,700.0	4,700.0	4,702.3	4,701.1	10.4	9.8	95.11	-80.6	901.3	904.9	884.7	44.760	

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design														Offset Site Error:	0.0 usft
Sec 19, T26S, R27E - Screech Owl Federal Com #2H - Wellbore #1 - Wellbore #1														Offset Well Error:	0.0 usft
Survey Program: 123-MWD default															
Measured Depth (usft)	Reference Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis Reference (usft)	Semi Major Axis Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N/S (usft)	Offset Wellbore Centre E/W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning			
4,800.0	4,800.0	4,805.2	4,803.9	10.6	10.0	95.23	-82.5	900.5	904.3	883.7	43.764				
4,900.0	4,900.0	4,908.6	4,907.3	10.9	10.2	95.36	-84.3	899.4	903.4	882.3	42.788				
5,000.0	5,000.0	5,009.6	5,008.3	11.1	10.5	95.49	-86.3	898.0	902.2	880.6	41.851				
5,100.0	5,100.0	5,110.4	5,109.1	11.3	10.7	95.64	-88.5	896.4	900.9	878.9	40.949				
5,200.0	5,200.0	5,211.6	5,210.2	11.5	10.9	95.75	-90.1	894.9	899.5	877.0	40.087				
5,300.0	5,300.0	5,312.1	5,310.7	11.8	11.1	95.78	-90.5	893.3	898.0	875.1	39.258				
5,400.0	5,400.0	5,410.4	5,409.0	12.0	11.3	95.79	-90.5	891.9	896.5	873.2	38.480				
5,500.0	5,500.0	5,510.4	5,509.0	12.2	11.5	95.81	-90.6	890.6	895.3	871.5	37.729				
5,600.0	5,600.0	5,614.5	5,613.0	12.4	11.7	95.87	-91.4	888.9	893.7	869.5	36.972				
5,700.0	5,700.0	5,712.2	5,710.7	12.7	11.9	95.98	-92.9	886.9	891.8	867.2	36.251				
5,800.0	5,800.0	5,802.9	5,801.4	12.9	12.1	96.05	-93.9	885.9	890.8	865.8	35.610				
5,900.0	5,900.0	5,900.0	5,898.5	13.1	12.3	96.09	-94.6	885.7	890.7	865.3	35.006				
6,000.0	6,000.0	6,001.4	5,999.9	13.3	12.5	96.15	-95.4	885.2	890.3	864.5	34.399				
6,100.0	6,100.0	6,104.0	6,102.4	13.6	12.8	96.23	-96.6	884.7	890.0	863.7	33.809				
6,200.0	6,200.0	6,210.7	6,209.2	13.8	13.0	96.34	-98.2	883.5	889.0	862.2	33.198				
6,300.0	6,300.0	6,303.4	6,301.9	14.0	13.2	96.43	-99.5	882.3	887.9	860.7	32.642				
6,400.0	6,400.0	6,402.5	6,401.0	14.2	13.4	96.46	-99.8	881.9	887.5	859.9	32.124				
6,455.9	6,455.9	6,454.5	6,452.9	14.4	13.5	96.46	-99.9	881.7	887.4	859.5	31.848				
6,500.0	6,500.0	6,493.0	6,491.5	14.5	13.6	96.49	-100.3	881.8	887.5	859.4	31.649 ES				
6,600.0	6,600.0	6,583.0	6,581.4	14.7	13.8	96.58	-101.9	882.7	888.7	860.3	31.233				
6,700.0	6,700.0	6,681.9	6,680.3	14.9	14.0	96.66	-103.2	884.5	890.7	861.8	30.837				
6,800.0	6,800.0	6,787.1	6,785.5	15.1	14.2	96.68	-103.8	886.1	892.3	863.0	30.426				
6,900.0	6,900.0	6,882.9	6,881.3	15.4	14.4	96.68	-103.9	886.9	893.1	863.3	30.018				
7,000.0	7,000.0	6,945.0	6,943.3	15.6	14.5	96.83	-106.6	889.2	897.2	867.1	29.797				
7,023.6	7,023.6	6,945.0	6,943.3	15.6	14.5	96.83	-106.6	889.2	898.9	868.8	29.802				
7,025.0	7,025.0	6,945.0	6,943.3	15.6	14.5	-83.87	-106.6	889.2	899.0	868.9	29.794				
7,050.0	7,050.0	6,961.3	6,959.5	15.7	14.6	-83.55	-107.9	890.4	901.1	870.9	29.789				
7,075.0	7,074.9	6,976.0	6,974.0	15.7	14.6	-83.25	-109.6	891.8	903.6	873.2	29.802				
7,100.0	7,099.7	6,976.0	6,974.0	15.8	14.6	-82.93	-109.6	891.8	906.2	875.9	29.856				
7,125.0	7,124.2	6,988.9	6,986.7	15.8	14.6	-82.62	-111.4	893.4	909.2	878.8	29.892				
7,150.0	7,148.5	7,008.0	7,005.3	15.9	14.7	-82.36	-114.6	896.2	912.6	882.1	29.929				
7,175.0	7,172.5	7,008.0	7,005.3	15.9	14.7	-81.96	-114.6	896.2	915.9	885.4	30.009				
7,200.0	7,196.0	7,017.0	7,014.0	15.9	14.7	-81.61	-116.3	897.7	919.6	889.0	30.083				
7,225.0	7,219.1	7,027.4	7,024.0	16.0	14.7	-81.28	-118.4	899.6	923.5	892.9	30.162				
7,250.0	7,241.6	7,039.0	7,035.1	16.0	14.7	-80.96	-121.1	901.8	927.7	897.0	30.245				
7,275.0	7,263.5	7,051.7	7,047.1	16.1	14.8	-80.66	-124.3	904.4	931.9	901.2	30.329				
7,300.0	7,284.8	7,071.0	7,065.2	16.1	14.8	-80.49	-129.7	908.4	936.3	905.5	30.397				
7,325.0	7,305.4	7,083.9	7,077.1	16.2	14.9	-80.22	-133.6	911.2	940.6	909.8	30.480				
7,350.0	7,325.2	7,103.3	7,094.9	16.2	14.9	-80.09	-140.2	915.3	945.0	914.0	30.538				
7,375.0	7,344.1	7,125.0	7,114.5	16.3	15.0	-80.04	-148.2	919.9	949.2	918.2	30.576				
7,400.0	7,362.2	7,142.6	7,130.2	16.3	15.0	-79.92	-155.3	923.6	953.4	922.2	30.619				
7,425.0	7,379.4	7,157.2	7,143.1	16.4	15.1	-79.76	-161.6	926.7	957.6	926.4	30.668				
7,450.0	7,395.5	7,171.8	7,155.7	16.5	15.1	-79.60	-168.1	929.9	961.8	930.5	30.710				
7,475.0	7,410.7	7,186.2	7,167.9	16.6	15.2	-79.46	-174.9	933.2	966.2	934.8	30.746				
7,500.0	7,424.8	7,200.9	7,180.3	16.7	15.3	-79.33	-182.1	936.6	970.6	939.0	30.773				
7,525.0	7,437.8	7,216.3	7,193.1	16.8	15.3	-79.25	-190.0	940.2	975.0	943.3	30.784				
7,550.0	7,449.7	7,237.8	7,210.5	16.9	15.4	-79.36	-201.4	945.4	979.5	947.6	30.747				
7,575.0	7,460.4	7,269.3	7,235.9	17.1	15.5	-79.84	-218.8	952.6	983.6	951.5	30.618				
7,600.0	7,469.9	7,289.6	7,251.8	17.2	15.6	-80.00	-230.5	957.1	987.7	955.3	30.536				
7,625.0	7,478.1	7,301.9	7,261.3	17.3	15.7	-79.91	-237.7	959.8	991.8	959.3	30.494				
7,650.0	7,485.2	7,313.3	7,270.0	17.5	15.7	-79.80	-244.6	962.5	996.1	963.4	30.452				
7,675.0	7,490.9	7,325.5	7,279.2	17.7	15.8	-79.72	-252.2	965.4	1,000.5	967.6	30.397				

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Sec 19, T26S, R27E - Screech Owl Federal Com #2H - Wellbore #1 - Wellbore #1												Offset Site Error:	0.0 usft
Survey Program: 123-MWD default												Offset Well Error:	0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Footface (ft)	Offset Wellbore Centre N/S (usft)	E/W (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning	
7,700.0	7,495.4	7,340.6	7,290.2	17.8	15.9	-79.73	-261.8	969.1	1,005.0	971.8	30.311		
7,725.0	7,498.6	7,356.5	7,301.4	18.0	16.0	-79.78	-272.3	972.9	1,009.6	976.2	30.211		
7,750.0	7,500.5	7,374.9	7,314.1	18.2	16.1	-79.93	-284.9	977.5	1,014.3	980.6	30.078		
7,775.0	7,501.1	7,393.2	7,326.4	18.4	16.2	-80.09	-297.7	982.0	1,019.0	984.9	29.936		
7,779.9	7,501.0	7,396.8	7,328.8	18.5	16.2	-80.12	-300.2	982.9	1,019.9	985.8	29.906		
7,800.0	7,500.8	7,411.6	7,338.5	18.6	16.3	-80.71	-310.7	986.5	1,023.8	989.4	29.752		
7,900.0	7,499.4	7,587.0	7,444.9	19.5	17.6	-86.99	-446.0	1,018.7	1,039.6	1,002.6	28.118		
8,000.0	7,498.1	7,777.0	7,506.0	20.6	19.5	-90.53	-622.7	1,043.9	1,055.9	1,015.8	26.379		
8,100.0	7,496.8	7,937.3	7,513.9	21.7	21.3	-91.06	-782.5	1,051.3	1,061.7	1,018.6	24.633		
8,200.0	7,495.5	8,036.7	7,513.5	23.0	22.6	-91.11	-881.8	1,053.0	1,064.7	1,019.1	23.356		
8,300.0	7,494.1	8,123.1	7,512.2	24.3	23.7	-91.09	-968.2	1,055.3	1,068.7	1,020.7	22.266		
8,400.0	7,492.8	8,224.3	7,510.3	25.6	25.0	-91.06	-1,069.3	1,059.1	1,073.7	1,023.0	21.178		
8,500.0	7,491.5	8,333.3	7,507.0	27.1	26.5	-90.96	-1,178.2	1,062.0	1,077.5	1,023.8	20.081		
8,600.0	7,490.2	8,441.9	7,503.6	28.5	28.0	-90.85	-1,286.7	1,064.2	1,080.8	1,024.1	19.077		
8,700.0	7,488.8	8,537.1	7,504.9	30.0	29.3	-90.98	-1,381.9	1,065.8	1,083.8	1,024.3	18.223		
8,800.0	7,487.5	8,628.5	7,505.3	31.6	30.6	-91.06	-1,473.3	1,068.0	1,087.4	1,025.0	17.433		
8,900.0	7,486.2	8,719.7	7,503.6	33.1	32.1	-91.03	-1,564.4	1,071.0	1,091.9	1,026.5	16.702		
9,000.0	7,484.9	8,807.4	7,501.4	34.7	33.4	-90.98	-1,652.0	1,074.6	1,097.3	1,029.0	16.064		
9,100.0	7,483.6	8,916.6	7,501.5	36.3	35.0	-91.05	-1,761.1	1,079.6	1,103.1	1,031.6	15.423		
9,200.0	7,482.2	9,005.6	7,502.6	38.0	36.3	-91.16	-1,850.0	1,083.3	1,108.6	1,034.1	14.878		
9,300.0	7,480.9	9,108.3	7,502.9	39.6	37.9	-91.24	-1,952.6	1,088.3	1,114.7	1,036.9	14.322		
9,400.0	7,479.6	9,205.7	7,501.1	41.3	39.6	-91.21	-2,049.9	1,092.8	1,120.7	1,039.5	13.814		
9,500.0	7,478.3	9,304.8	7,498.7	42.9	41.1	-91.15	-2,148.8	1,097.7	1,126.8	1,042.4	13.351		
9,600.0	7,476.9	9,420.0	7,498.4	44.6	42.9	-91.20	-2,263.9	1,102.3	1,132.0	1,044.1	12.881		
9,700.0	7,475.6	9,513.6	7,497.5	46.3	44.4	-91.21	-2,357.5	1,105.9	1,137.1	1,046.0	12.482		
9,800.0	7,474.3	9,617.6	7,496.2	48.0	46.1	-91.22	-2,461.4	1,109.9	1,142.2	1,047.7	12.085		
9,900.0	7,473.0	9,717.0	7,494.1	49.7	47.7	-91.17	-2,560.6	1,113.6	1,147.2	1,049.4	11.722		
10,000.0	7,471.6	9,808.2	7,492.9	51.5	49.2	-91.16	-2,651.8	1,117.2	1,152.3	1,051.3	11.401		
10,100.0	7,470.3	9,909.6	7,492.8	53.2	50.8	-91.22	-2,753.0	1,122.6	1,159.0	1,054.6	11.097		
10,200.0	7,469.0	10,059.5	7,495.1	54.9	53.2	-91.42	-2,902.9	1,124.8	1,161.4	1,052.8	10.688		
10,300.0	7,467.7	10,143.0	7,494.8	56.7	54.6	-91.47	-2,986.4	1,125.4	1,163.4	1,051.6	10.406		
10,400.0	7,466.4	10,229.7	7,493.0	58.4	56.1	-91.43	-3,073.1	1,127.2	1,166.8	1,051.7	10.143		
10,500.0	7,465.0	10,311.9	7,490.3	60.1	57.5	-91.34	-3,155.1	1,130.0	1,171.3	1,053.2	9.913		
10,600.0	7,463.7	10,401.9	7,488.3	61.9	59.0	-91.30	-3,245.0	1,134.3	1,177.3	1,055.9	9.698		
10,700.0	7,462.4	10,534.0	7,487.3	63.7	61.1	-91.32	-3,377.0	1,139.6	1,182.7	1,057.3	9.434		
10,800.0	7,461.1	10,609.5	7,486.0	65.4	62.4	-91.31	-3,452.5	1,142.0	1,187.2	1,058.8	9.247		
10,900.0	7,459.7	10,713.9	7,483.9	67.2	64.1	-91.27	-3,556.7	1,146.6	1,192.9	1,060.9	9.041		
11,000.0	7,458.4	10,816.3	7,483.7	68.9	65.8	-91.32	-3,659.1	1,150.5	1,197.9	1,062.5	8.847		
11,100.0	7,457.1	10,945.1	7,484.1	70.7	68.0	-91.41	-3,787.8	1,153.6	1,201.6	1,062.2	8.623		
11,200.0	7,455.8	11,058.7	7,480.7	72.5	69.9	-91.32	-3,901.4	1,154.3	1,203.4	1,060.4	8.412		
11,300.0	7,454.4	11,168.1	7,476.6	74.3	71.7	-91.19	-4,010.6	1,154.2	1,204.5	1,057.8	8.211		
11,400.0	7,453.1	11,257.4	7,472.2	76.0	73.2	-91.04	-4,099.9	1,154.0	1,205.4	1,055.5	8.038		
11,500.0	7,451.8	11,383.0	7,468.8	77.8	75.3	-90.95	-4,225.4	1,153.7	1,206.5	1,052.7	7.843		
11,600.0	7,450.5	11,477.0	7,465.8	79.6	76.9	-90.87	-4,319.3	1,152.2	1,206.2	1,049.0	7.673		
11,600.8	7,450.5	11,477.0	7,465.8	79.6	76.9	-90.87	-4,319.3	1,152.2	1,206.2	1,049.0	7.675		
11,700.0	7,449.2	11,551.4	7,462.0	81.4	78.1	-90.74	-4,393.7	1,152.0	1,207.2	1,047.0	7.533		
11,800.0	7,447.8	11,635.6	7,459.0	83.1	79.5	-90.65	-4,477.8	1,153.4	1,210.0	1,046.6	7.403		
11,900.0	7,446.5	11,724.6	7,459.1	84.9	81.0	-90.71	-4,566.7	1,155.7	1,213.9	1,047.1	7.281		
12,000.0	7,445.2	11,817.9	7,459.9	86.7	82.6	-90.80	-4,660.0	1,158.8	1,218.4	1,048.4	7.165		
12,100.0	7,443.9	11,906.5	7,460.7	88.5	84.1	-90.89	-4,748.5	1,162.2	1,223.6	1,050.3	7.058		
12,200.0	7,442.5	11,994.6	7,461.7	90.3	85.6	-90.98	-4,836.5	1,166.6	1,229.9	1,053.2	6.962		
12,300.0	7,441.2	12,107.8	7,462.5	92.1	87.5	-91.08	-4,949.5	1,172.6	1,236.5	1,056.1	6.853		

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



HP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Offset Design: Sec 19, T26S, R27E, Screech Owl Federal Com #2H, Wellbore #1, Wellbore #1												Offset Site Error:
Survey Program: 123-MWD default												0.0 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Vertical Depth (usft)	Semi Major Axis Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	E-W (usft)	Distance Between Centres (usft)	Between Ellipses (usft)	Separation Factor	Warning
12,400.0	7,439.9	12,230.1	7,463.6	93.9	89.6	-91.21	-5,071.8	1,176.3	1,240.7	1,056.4	6.731	
12,500.0	7,438.6	12,331.2	7,464.2	95.7	91.3	-91.29	-5,172.8	1,178.8	1,244.5	1,056.6	6.625	
12,600.0	7,437.2	12,416.5	7,463.1	97.4	92.8	-91.29	-5,258.1	1,181.2	1,248.6	1,057.5	6.534	
12,700.0	7,435.9	12,513.0	7,460.8	99.2	94.4	-91.24	-5,354.5	1,185.1	1,253.9	1,059.3	6.443	
12,800.0	7,434.6	12,603.6	7,458.1	101.0	96.0	-91.16	-5,445.0	1,188.9	1,259.2	1,061.3	6.361	
12,900.0	7,433.3	12,699.9	7,456.3	102.8	97.6	-91.13	-5,541.2	1,193.6	1,265.4	1,064.0	6.282	
13,000.0	7,431.9	12,823.0	7,454.0	104.6	99.8	-91.10	-5,664.1	1,198.7	1,270.8	1,065.5	6.188	
13,100.0	7,430.6	12,917.0	7,453.8	106.4	101.4	-91.14	-5,758.1	1,201.9	1,275.5	1,066.7	6.109	
13,200.0	7,429.3	13,001.1	7,453.3	108.2	102.8	-91.16	-5,842.1	1,205.6	1,281.1	1,069.0	6.041	
13,300.0	7,428.0	13,113.1	7,452.0	110.0	104.8	-91.17	-5,953.9	1,210.5	1,286.7	1,070.9	5.962	
13,400.0	7,426.7	13,211.8	7,451.7	111.8	106.4	-91.20	-6,052.6	1,214.3	1,291.8	1,072.5	5.890	
13,500.0	7,425.3	13,307.7	7,452.3	113.6	108.0	-91.29	-6,148.4	1,218.1	1,297.1	1,074.4	5.823	
13,600.0	7,424.0	13,405.8	7,452.3	115.4	109.7	-91.34	-6,246.4	1,222.3	1,302.6	1,076.4	5.757	
13,700.0	7,422.7	13,496.8	7,451.3	117.2	111.3	-91.34	-6,337.3	1,226.6	1,308.6	1,079.0	5.698	
13,800.0	7,421.4	13,600.3	7,451.7	119.0	113.1	-91.41	-6,440.6	1,231.7	1,314.8	1,081.6	5.637	
13,900.0	7,420.0	13,722.6	7,452.5	120.8	115.2	-91.51	-6,562.9	1,236.7	1,320.3	1,083.1	5.567	
14,000.0	7,418.7	13,846.3	7,451.1	122.6	117.3	-91.51	-6,686.5	1,239.2	1,323.5	1,082.3	5.488	
14,100.0	7,417.4	13,945.6	7,446.9	124.4	119.0	-91.39	-6,785.8	1,240.4	1,325.9	1,081.3	5.420	
14,200.0	7,416.1	14,045.5	7,442.8	126.2	120.7	-91.26	-6,885.5	1,241.8	1,328.5	1,080.3	5.353	
14,300.0	7,414.7	14,156.8	7,440.0	128.0	122.6	-91.20	-6,996.8	1,242.8	1,330.6	1,078.7	5.282	
14,400.0	7,413.4	14,257.2	7,439.6	129.8	124.3	-91.24	-7,097.1	1,243.1	1,332.2	1,076.8	5.216	
14,500.0	7,412.1	14,346.1	7,439.4	131.6	125.8	-91.28	-7,186.1	1,244.0	1,334.4	1,075.7	5.157	
14,600.0	7,410.8	14,442.4	7,439.0	133.4	127.5	-91.32	-7,282.4	1,245.3	1,337.0	1,074.8	5.099	
14,700.0	7,409.5	14,535.0	7,438.3	135.2	129.1	-91.34	-7,374.9	1,247.0	1,340.1	1,074.5	5.045	
14,800.0	7,408.1	14,632.6	7,437.0	137.1	130.8	-91.34	-7,472.5	1,249.0	1,343.5	1,074.3	4.991	
14,900.0	7,406.8	14,722.7	7,435.2	138.9	132.4	-91.31	-7,562.6	1,251.5	1,347.4	1,074.9	4.944	
15,000.0	7,405.5	14,816.6	7,433.1	140.7	134.0	-91.27	-7,656.4	1,254.5	1,351.9	1,075.9	4.898	
15,100.0	7,404.2	14,904.8	7,432.4	142.5	135.5	-91.28	-7,744.6	1,257.9	1,357.0	1,077.7	4.858	
15,200.0	7,402.8	14,989.0	7,432.6	144.3	137.0	-91.33	-7,828.6	1,261.8	1,363.0	1,080.4	4.823	
15,300.0	7,401.5	15,083.0	7,432.5	146.1	138.6	-91.37	-7,922.5	1,267.2	1,369.9	1,083.9	4.789	
15,400.0	7,400.2	15,161.5	7,431.7	147.9	140.0	-91.37	-8,000.7	1,272.5	1,378.0	1,088.7	4.764	
15,500.0	7,398.9	15,308.0	7,428.9	149.7	142.5	-91.33	-8,147.0	1,281.1	1,385.1	1,091.4	4.716	
15,600.0	7,397.5	15,429.5	7,425.8	151.5	144.6	-91.26	-8,268.4	1,285.1	1,389.6	1,092.0	4.669	
15,700.0	7,396.2	15,545.6	7,424.8	153.3	146.6	-91.28	-8,384.5	1,287.2	1,392.7	1,091.3	4.621	
15,800.0	7,394.9	15,647.0	7,423.9	155.1	148.3	-91.30	-8,485.9	1,288.4	1,395.2	1,090.2	4.575	
15,900.0	7,393.6	15,743.0	7,422.6	156.9	150.0	-91.29	-8,581.8	1,289.7	1,397.7	1,089.3	4.532	
16,000.0	7,392.3	15,839.7	7,421.4	158.7	151.6	-91.29	-8,678.5	1,291.2	1,400.5	1,088.6	4.490	
16,100.0	7,390.9	15,939.9	7,419.6	160.6	153.4	-91.27	-8,778.7	1,293.0	1,403.5	1,088.0	4.449	
16,200.0	7,389.6	16,037.2	7,416.8	162.4	155.1	-91.21	-8,876.0	1,294.7	1,406.5	1,087.5	4.409	
16,300.0	7,388.3	16,119.0	7,414.7	164.2	156.5	-91.16	-8,957.7	1,296.8	1,410.3	1,088.1	4.377	
16,400.0	7,387.0	16,205.8	7,413.5	166.0	158.0	-91.16	-9,044.4	1,300.1	1,415.3	1,089.8	4.348	
16,500.0	7,385.6	16,300.2	7,412.9	167.8	159.6	-91.18	-9,138.7	1,304.1	1,420.9	1,091.9	4.319	
16,600.0	7,384.3	16,395.2	7,411.4	169.6	161.3	-91.16	-9,233.6	1,308.6	1,426.8	1,094.3	4.291	
16,700.0	7,383.0	16,500.7	7,409.3	171.4	163.1	-91.13	-9,338.9	1,313.6	1,432.7	1,096.6	4.262	
16,800.0	7,381.7	16,611.8	7,407.0	173.2	165.0	-91.09	-9,450.0	1,317.8	1,437.8	1,097.9	4.230	
16,900.0	7,380.3	16,693.6	7,406.1	175.0	166.4	-91.10	-9,531.7	1,321.4	1,443.4	1,100.2	4.207	
17,000.0	7,379.0	16,790.6	7,405.5	176.8	168.1	-91.12	-9,628.6	1,326.2	1,449.6	1,103.0	4.182	
17,100.0	7,377.7	16,888.6	7,403.9	178.7	169.8	-91.10	-9,726.4	1,331.4	1,456.1	1,105.9	4.158	
17,200.0	7,376.4	17,003.3	7,402.7	180.5	171.8	-91.11	-9,841.0	1,336.8	1,462.1	1,108.1	4.130	
17,300.0	7,375.1	17,122.6	7,403.2	182.3	173.8	-91.19	-9,960.2	1,341.1	1,467.0	1,109.1	4.099	
17,400.0	7,373.7	17,220.0	7,403.0	184.1	175.5	-91.23	-10,057.5	1,343.7	1,471.0	1,109.6	4.070	
17,500.0	7,372.4	17,316.2	7,402.4	185.9	177.1	-91.25	-10,153.7	1,346.9	1,475.5	1,110.6	4.044	

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



HP
Anticollision Report



Company:	COG Operating, LLC.	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandrell Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandrell Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

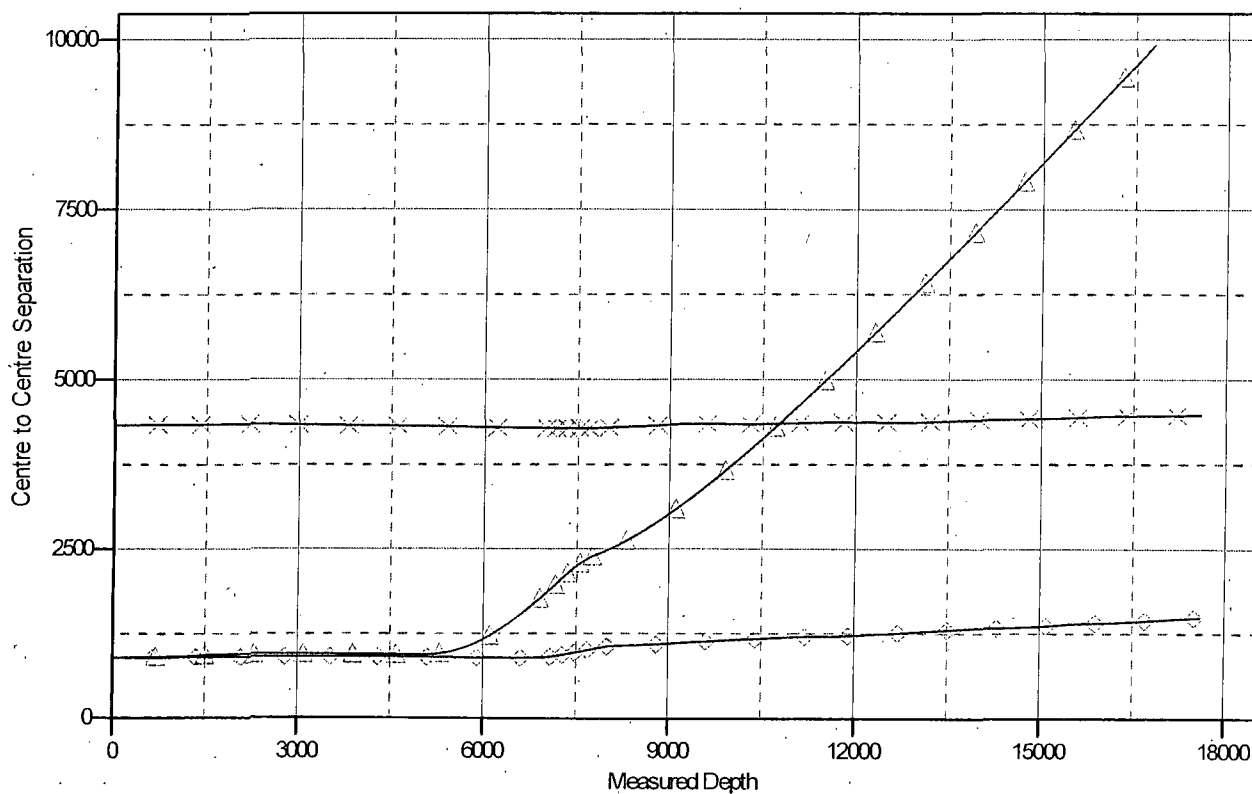
Offset Design	Sec 19, T26S, R27E - Screech Owl Federal Com #2H - Wellbore #1 - Wellbore #1										Offset Site Error:	0.0 usft
Survey Program:	123-MWD default										Offset Well Error:	0.0 usft
Reference	Vertical	Offset	Vertical	Semi Major Axis	Reference	Offset	Highside	Offset Wellbore Centre	Distance	Distance	Separation	Warning
Measured	Depth	Measured	Depth	Reference	Offset	Toolface	IN/S	ELW	Between	Between	Factor	
Depth	Depth	Depth	Depth	(usft)	(usft)	(°)	(usft)	(usft)	Centres	Ellipses		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)				(usft)	(usft)		
17,606.1	7,371.0	17,409.7	7,400.6	187.8	178.8	-91.22	-10,247.1	1,350.3	1,480.7	1,112.2	4.019 SF	

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandril Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandril Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

Reference Depths are relative to Well @ 3369.0usft (Scandril Freedom)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Screech Owl Federal #1H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.05°

Ladder Plot



LEGEND

Screech Owl Federal #3H, Wellbore #1, Wellbore #1 V0



Screech Owl Federal #4H, Wellbore #1, Wellbore #1 V0

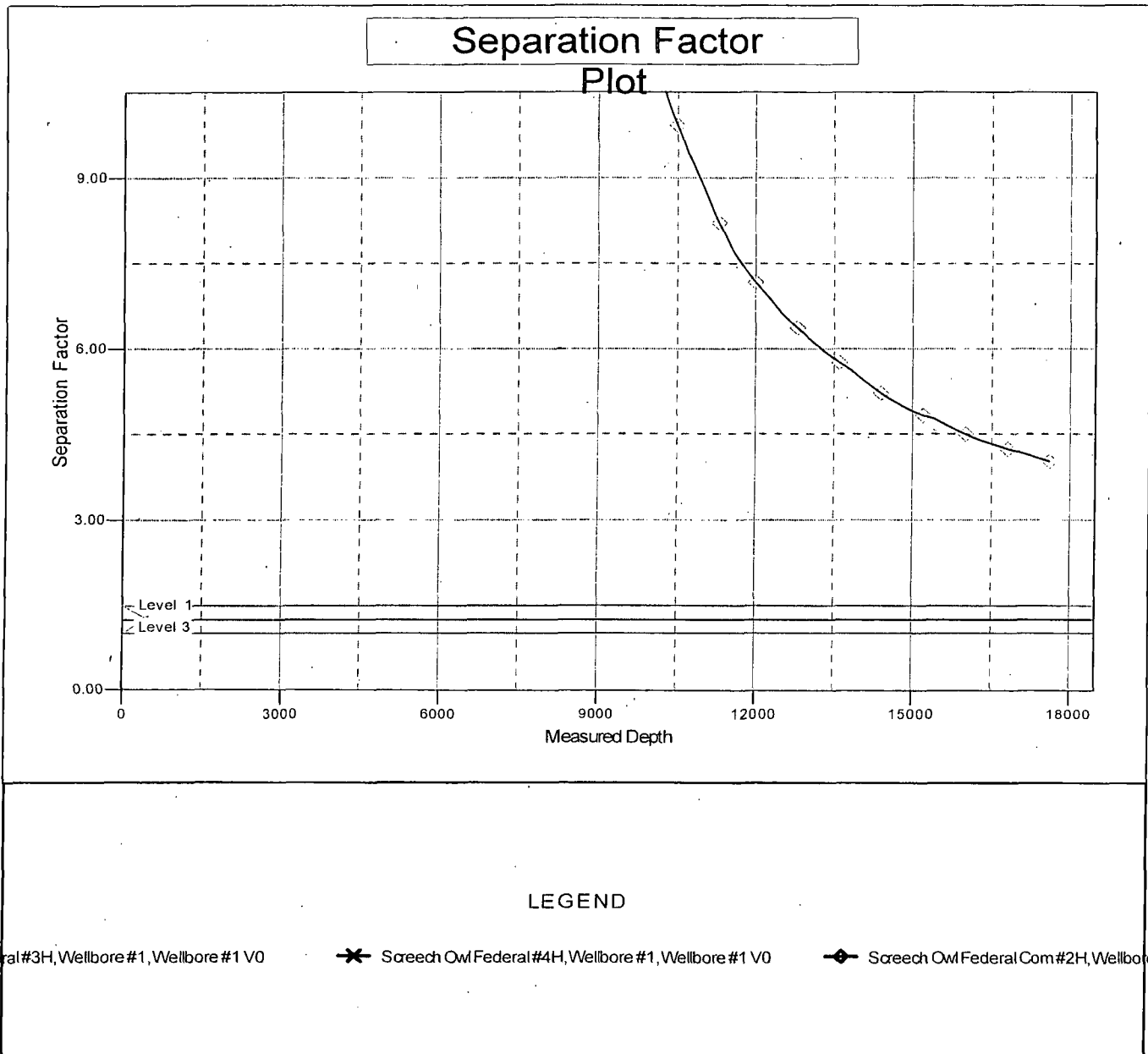


Screech Owl Federal Com #2H, Wellbore #1

Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Screech Owl Federal #1H
Project:	Eddy County, NM (NAD 27)	TVD Reference:	Well @ 3369.0usft (Scandrill Freedom)
Reference Site:	Sec 19, T26S, R27E	MD Reference:	Well @ 3369.0usft (Scandrill Freedom)
Site Error:	0.0 usft	North Reference:	Grid
Reference Well:	Screech Owl Federal #1H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.0 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	Wellbore #1	Database:	Compass
Reference Design:	Design #1	Offset TVD Reference:	Offset Datum

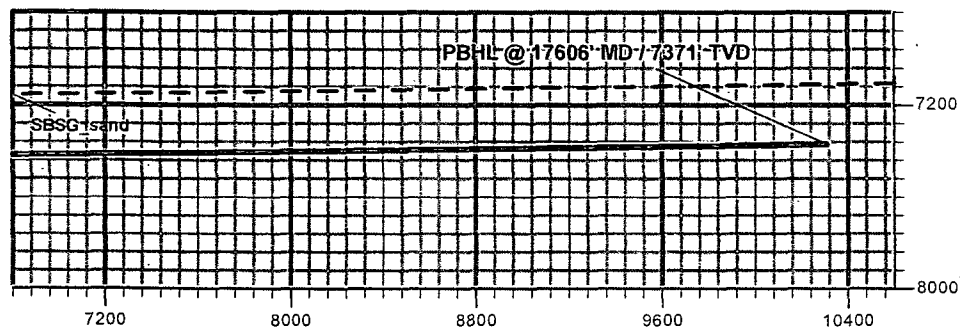
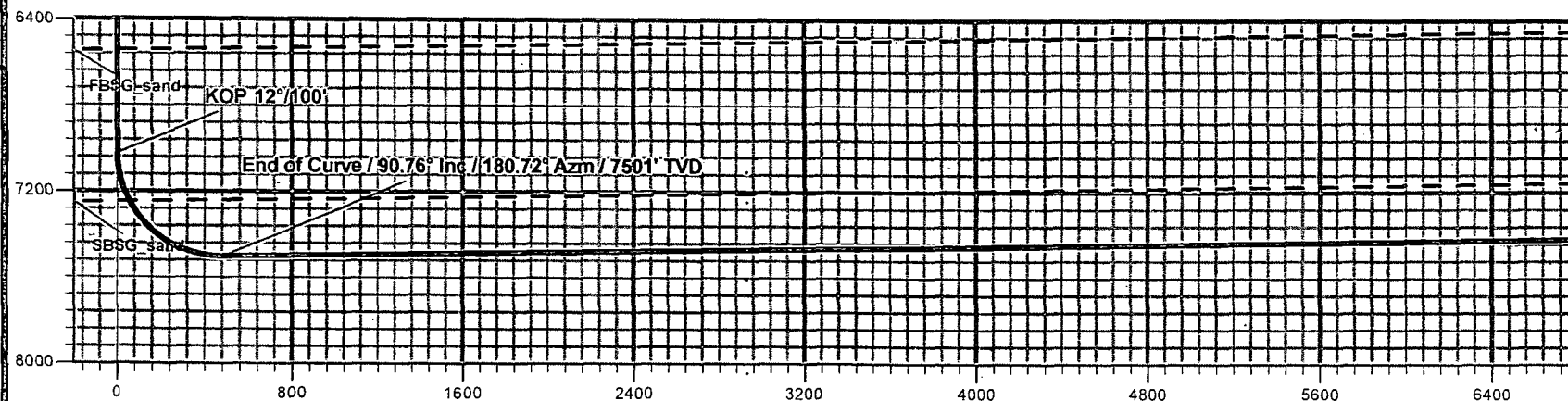
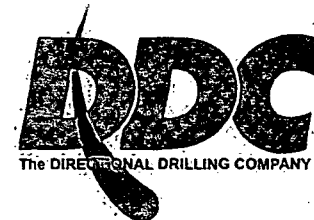
Reference Depths are relative to Well @ 3369.0usft (Scandrill Freedom)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 20' 0.000 W

Coordinates are relative to: Screech Owl Federal #1H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.05°



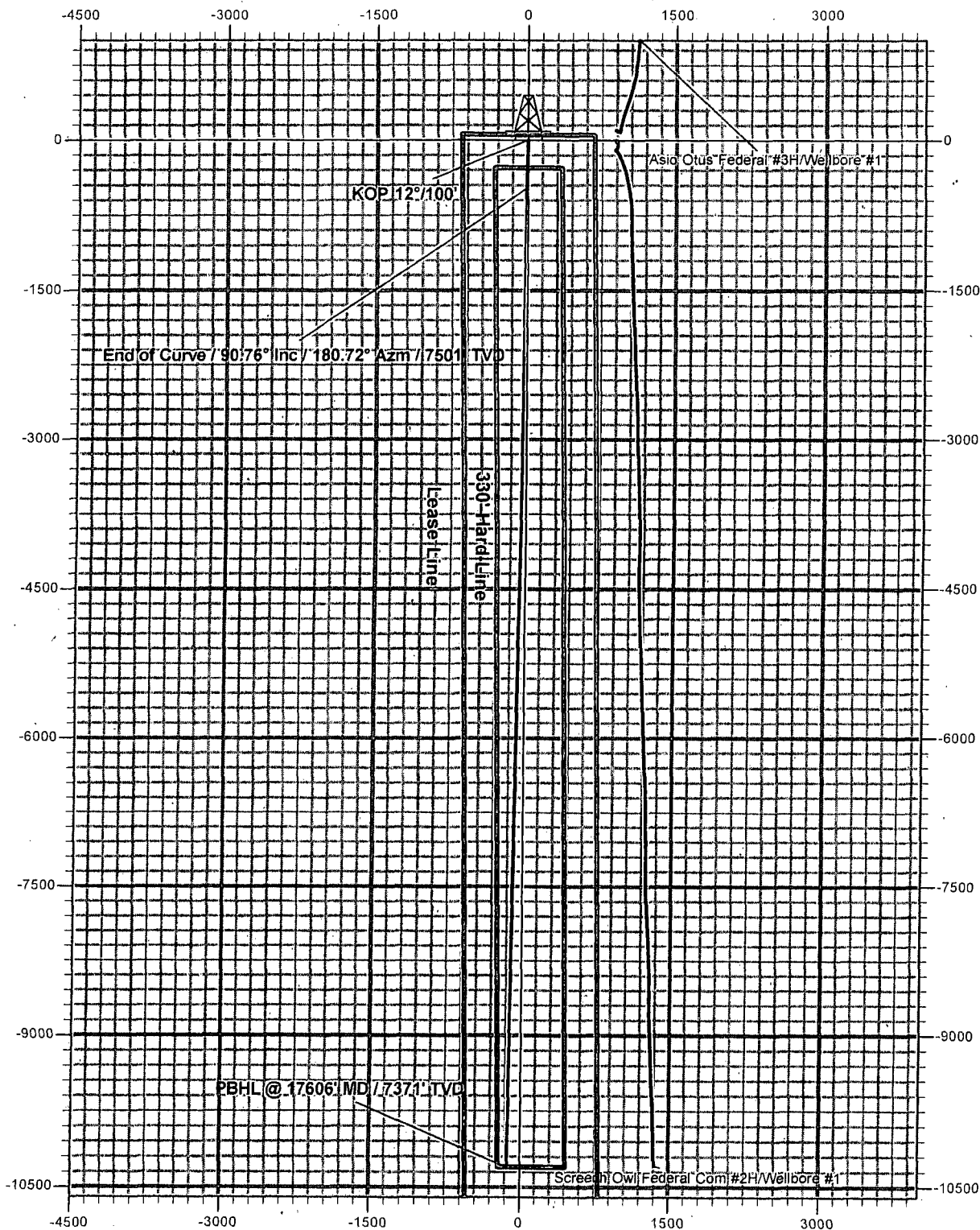
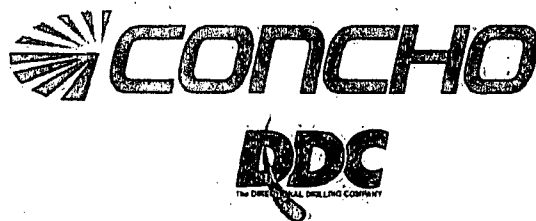


Eddy County, NM (NAD 27)
Sec 19, T26S, R27E
Screech Owl Federal #1H
Design #1



Vertical Section at 180.72° (800 usft/in)

Eddy County, NM (NAD 27)
Sec 19, T26S, R27E
Screech Owl Federal #1H
Design #1



**PECOS DISTRICT
CONDITIONS OF APPROVAL**

OPERATOR'S NAME:	COG Operating LLC
LEASE NO.:	NMM-114970
WELL NAME & NO.:	Screech Owl Federal 1H
SURFACE HOLE FOOTAGE:	0050' FNL & 0660' FWL
BOTTOM HOLE FOOTAGE:	0330' FSL & 0420' FWL Sec. 30, T. 26 S., R 27 E.
LOCATION:	Section 19, T. 26 S., R 27 E., NMPM
COUNTY:	Eddy County, New Mexico

The original COAs still stand with the following drilling modifications:

I. 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. **Although there are no measured amounts of Hydrogen Sulfide reported, it is always a potential hazard. Operator has stated that they will have monitoring equipment in place prior to drilling out the surface shoe. If Hydrogen Sulfide is encountered, 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 or are Non-API. 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.). The initial wellhead installed on the well will remain on the well with spools used as needed.

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

Wait on cement (WOC) for Water Basin:

After cementing but before commencing any tests, the casing string shall stand cemented under pressure until both of the following conditions have been met: 1) cement reaches a minimum compressive strength of 500 psi at the shoe, 2) until cement has been in place at least **8 hours**. WOC time will be recorded in the driller's log. 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.

High Cave/Karst

Possibility of water flows in the Salado and Castile.

Possibility of lost circulation in the Salado, Rustler, and Delaware.

A MINIMUM OF TWO CASING STRINGS CEMENTED TO SURFACE IS REQUIRED IN HIGH CAVE/KARST AREAS. THE CEMENT MUST BE IN A SOLID SHEATH. THEREFORE, ONE INCH OPERATIONS ARE NOT SUFFICIENT TO PROTECT CAVE KARST RESOURCES. A CASING DESIGN THAT HAS A ONE INCH JOB PERFORMED DOES NOT COUNT AS A SOLID SHEATH. IF THE PRIMARY CEMENT JOB ON THE SURFACE CASING DOES NOT CIRCULATE, THEN THE NEXT TWO CASING STRINGS MUST BE CEMENTED TO SURFACE.

1. The **13-3/8** inch surface casing shall be set at approximately **350** feet (a minimum of 25 feet into the Rustler Anhydrite and above the salt) and cemented to the surface. **If salt is encountered, set casing at least 25 feet above the salt.**
 - 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 **2025** feet (Basal anhydrite of the Castile formation or Lamar Limestone), is:
☒ Cement to surface. If cement does not circulate see B.1.a, c-d above. **Wait on cement (WOC) time for a primary cement job is to include the lead cement slurry due to cave/karst.**

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 **5-1/2** inch production casing is:
☒ Cement to surface as proposed by operator. 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. Variance approved to use flex line from BOP to choke manifold. Check condition of flexible line from BOP to choke manifold, replace if exterior is damaged or if line fails test. Line to be as straight as possible with no hard bends and is to be anchored according to Manufacturer's requirements. The flexible hose can be exchanged with a hose of equal size and equal or greater pressure rating. **Anchor requirements, specification sheet and hydrostatic pressure test certification matching the hose in service, to be onsite for review. These documents shall be posted in the company man's trailer and on the rig floor.** If the BLM inspector questions the straightness of the hose, a BLM engineer will be contacted and will review in the field or via picture supplied by inspector to determine if changes are required (operator shall expect delays if this occurs).
3. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the surface casing shoe shall be **2000 (2M)** psi.
 - a. **For surface casing only:** If the BOP/BOPE is to be tested against casing, the wait on cement (WOC) time for that casing is to be met (see WOC statement at start of casing section). Independent service company required.
4. Minimum working pressure of the blowout preventer (BOP) and related equipment (BOPE) required for drilling below the **9-5/8** intermediate casing shoe shall be **3000 (3M)** psi.
5. 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**. The operator also has the option of utilizing an independent tester to test without a plug (i.e. against the casing) pursuant to Onshore Order 2 with the pressure not to exceed 70% of the burst rating for the casing. Any test against the casing must meet the WOC time for water basin (18 hours) or potash (24 hours) or 500 pounds compressive strength, whichever is greater, prior to initiating the test (see casing segment as lead cement may be critical item).
- 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. If a twelve hour or twenty-four hour chart is used, tester shall make a notation that it is run with a two 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 061715