

Submit 1 Copy To Appropriate District Office
 District I -- (575) 393-6161
 1625 N. French Dr., Hobbs, NM 88240
 District II -- (575) 748-1283
 811 S. First St., Artesia, NM 88210
 District III -- (505) 334-6178
 1000 Rio Brazos Rd., Aztec, NM 87410
 District IV -- (505) 476-3460
 1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico
 Energy, Minerals and Natural Resources

Form C-103
 Revised August 1, 2011

OIL CONSERVATION DIVISION
 1220 South St. Francis Dr.
 Santa Fe, NM 87505

WELL API NO. 30-015-42887
5. Indicate Type of Lease STATE <input type="checkbox"/> FEE <input checked="" type="checkbox"/>
6. State Oil & Gas Lease No.
7. Lease Name or Unit Agreement Name Sherman 4 Fee
8. Well Number 8H
9. OGRID Number 229137
10. Pool name or Wildcat Atoka; Glorieta Yeso 3250

SUNDRY NOTICES AND REPORTS ON WELLS
 (DO NOT USE THIS FORM FOR PROPOSALS TO DRILL OR TO DEEPEN OR PLUG BACK TO A DIFFERENT RESERVOIR. USE "APPLICATION FOR PERMIT" (FORM C-101) FOR SUCH PROPOSALS.)

1. Type of Well: Oil Well Gas Well Other

2. Name of Operator
COG Operating LLC

3. Address of Operator
One Concho Center - 600 W Illinois Ave Midland, TX 79701

4. Well Location
 Unit/Letter **P** **330** feet from the **SOUTH** line and **270** feet from the **EAST** line
 Section **4** Township **19S** Range **26E** NMPM County **EDDY**

11. Elevation (Show whether DR, RKB, RT, GR, etc.)
3338'

12. Check Appropriate Box to Indicate Nature of Notice, Report or Other Data

NOTICE OF INTENTION TO:	SUBSEQUENT REPORT OF:
PERFORM REMEDIAL WORK <input type="checkbox"/>	REMEDIAL WORK <input type="checkbox"/>
TEMPORARILY ABANDON <input type="checkbox"/>	ALTERING CASING <input type="checkbox"/>
PULL OR ALTER CASING <input type="checkbox"/>	COMMENCE DRILLING OPNS. <input type="checkbox"/>
DOWNHOLE COMMINGLE <input type="checkbox"/>	CASING/CEMENT JOB <input type="checkbox"/>
OTHER: Chg SHL <input checked="" type="checkbox"/>	OTHER: <input type="checkbox"/>

13. Describe proposed or completed operations. (Clearly state all pertinent details, and give pertinent dates, including estimated date of starting any proposed work). SEE RULE 19.15.7.14 NMAC. For Multiple Completions: Attach wellbore diagram of proposed completion or recompletion.

COG Operating LLC submitted APD for this well at this location:
 SHL: 330' FSL & 270' FEL, Unit P, Sec 4, T19S, R26E
 BHL: 330' FNL & 330' FEL, Unit A, Sec 4, T19S, R26E


COG Operating LLC respectfully requests permission to change the SHL:
 SHL: 150' FNL & 180' FEL, Unit A, Sec 9, T19S, R26E
 BHL: 330' FNL & 330' FEL, Lot 1, Sec 4, T19S, R26E

NM OIL CONSERVATION
 ARTESIA DISTRICT
 FEB 17 2015
 RECEIVED

A revised C-102 and directional plan are attached for your review.

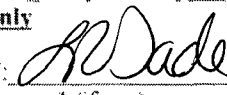
Spud Date: Rig Release Date:

I hereby certify that the information above is true and complete to the best of my knowledge and belief.

SIGNATURE  TITLE **Permitting Tech** DATE **2/16/2015**

Type or print name **Kelly J. Holly** E-mail address: **kholly@concho.com** PHONE: **432-685-4384**

For State Use Only

APPROVED BY:  TITLE **Dr. R. Spewak** DATE **2/17/2015**

Conditions of Approval (if any):

DISTRICT I
1623 N. French Dr., Hobbs, NM 88240
Phone: (575) 907-6161 Fax: (575) 393-0720

DISTRICT II
811 S. First St., Artesia, NM 88210
Phone: (575) 746-1283 Fax: (575) 748-9720

DISTRICT III
1000 Rio Brazos Road, Aztec, NM 87410
Phone: (505) 334-6178 Fax: (505) 334-6170

DISTRICT IV
1238 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

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

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

DAMENED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

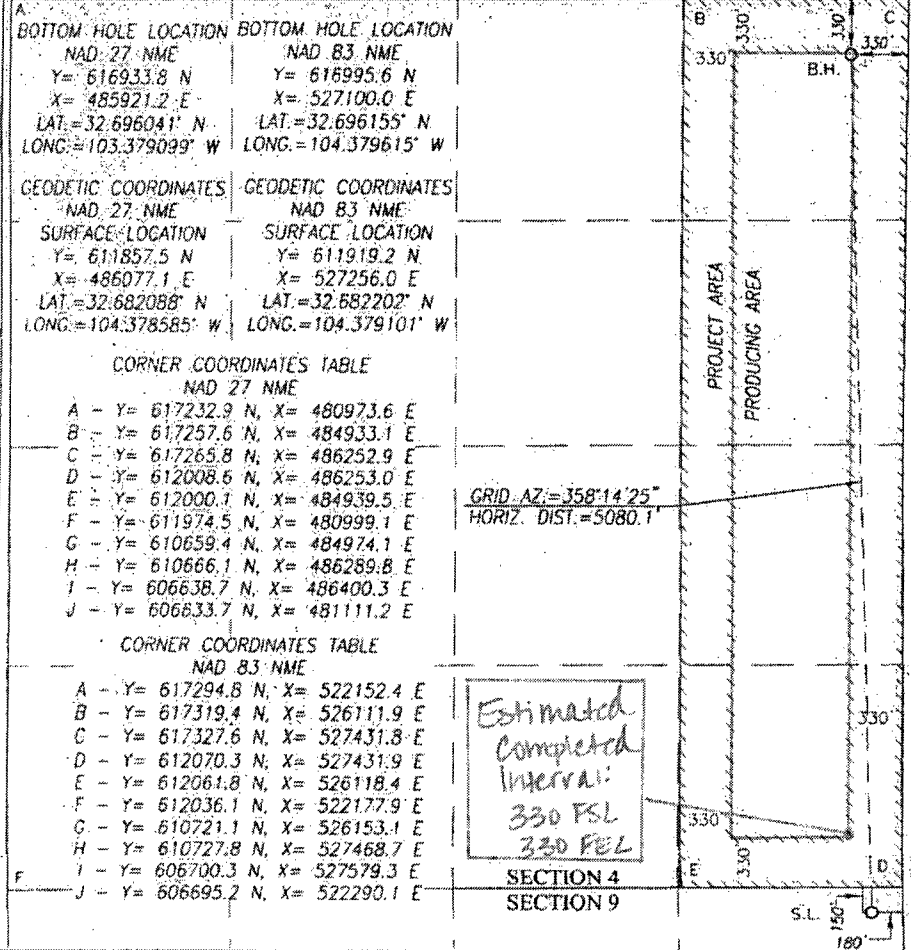
API Number 30-015-42887	Pool Code 3250	Pool Name Atoka; Clarieta Veso
Property Code 38909	Property Name SHERMAN 4 FEE	Well Number 8H
CGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3338'

Surface Location									
UL or lot No. A	Section 9	Township 19-S	Range 26-E	Lot Idn	Feet from the 150	North/South line NORTH	Feet from the 180	East/West line EAST	County EDDY

Bottom Hole Location if Different From Surface									
UL or lot No. A	Section 4	Township 19-S	Range 26-E	Lot Idn	Feet from the 330	North/South line NORTH	Feet from the 330	East/West line EAST	County EDDY

Dedicated Acres 159.03	Joint or Infill	Consolidation Code	Order No
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NO ALLOWABLE WILL BE ASSIGNED TO THIS COMPLETION UNTIL ALL INTERESTS HAVE BEEN CONSOLIDATED OR A NON-STANDARD UNIT HAS BEEN APPROVED BY THE DIVISION



OPERATOR CERTIFICATION
I hereby certify that the information herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or unleased mineral interest in the land including the proposed bottom hole location or has a right to drill this well at this location pursuant to a contract with an owner of such mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order heretofore entered by the division.

Kelly J. Holly
Signature
2-16-15
Date

Kelly J. Holly
Printed Name

kholly@concho.com
E-mail Address

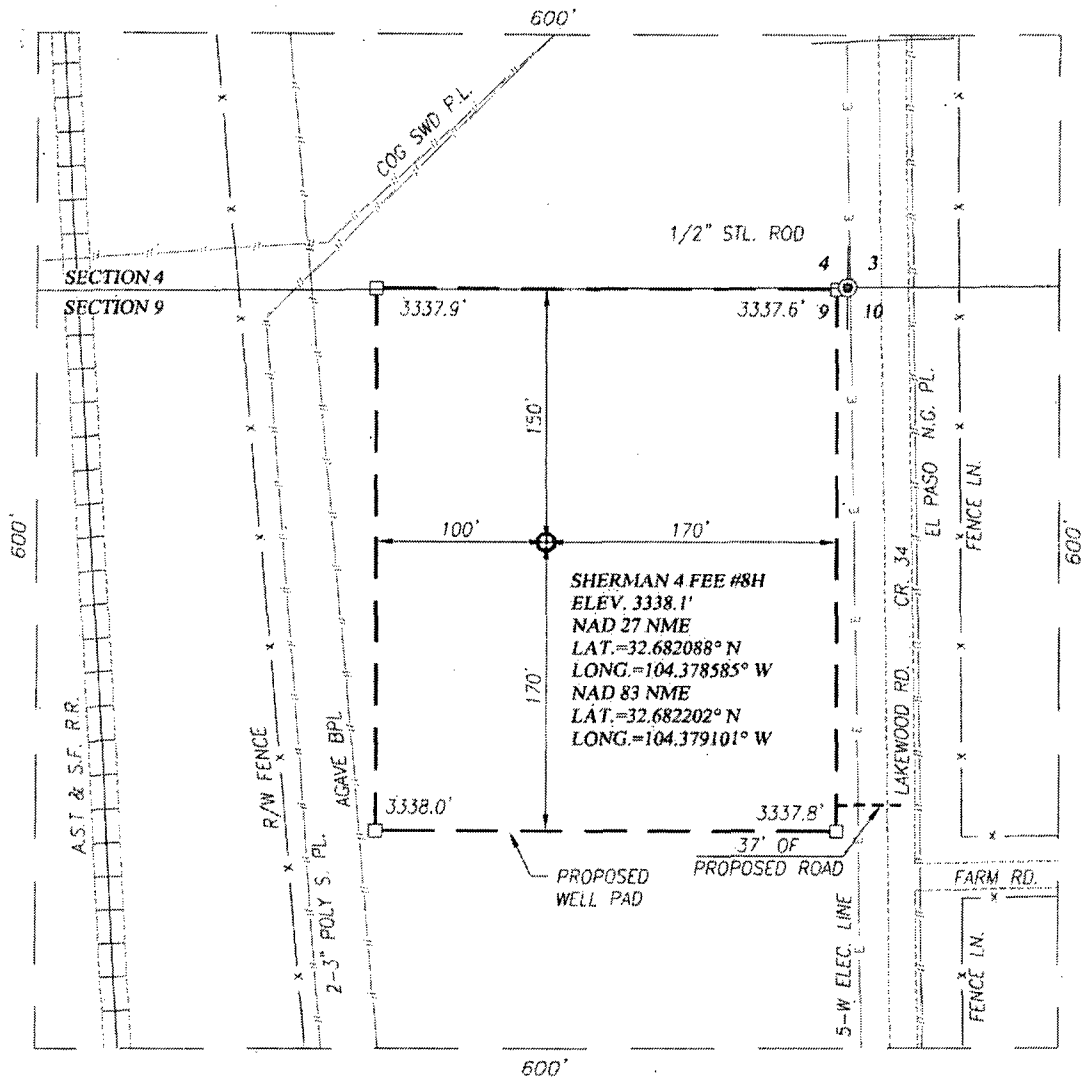
SURVEYOR CERTIFICATION
I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief.

JANUARY 29, 2015
Date of Survey

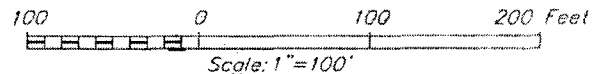
Ronald J. Edson
Signature & Seal of Professional Surveyor

Ronald J. Edson
Certificate Number: Gary G. Edson 112641
Ronald J. Edson 3239

LSL
JWSC W.O. 15.11.0086



NOTE:
 1) SEE "LOCATION VERIFICATION MAP"
 FOR PROPOSED ROAD LOCATION.



DIRECTIONS TO SHERMAN 4 FEE #8H:
 FROM THE INTERSECTION OF U.S. HWY 285 (7-RIVERS) AND
 CO. RD. 38 (KINCAID RANCH) GO EAST ON CO. RD. 38
 APPROX. 1.0 MILE TURN RIGHT AND GO SOUTH APPROX. 2.0
 MILES THE WELL LOCATION STAKE IS 200' WEST.

COG OPERATING, LLC

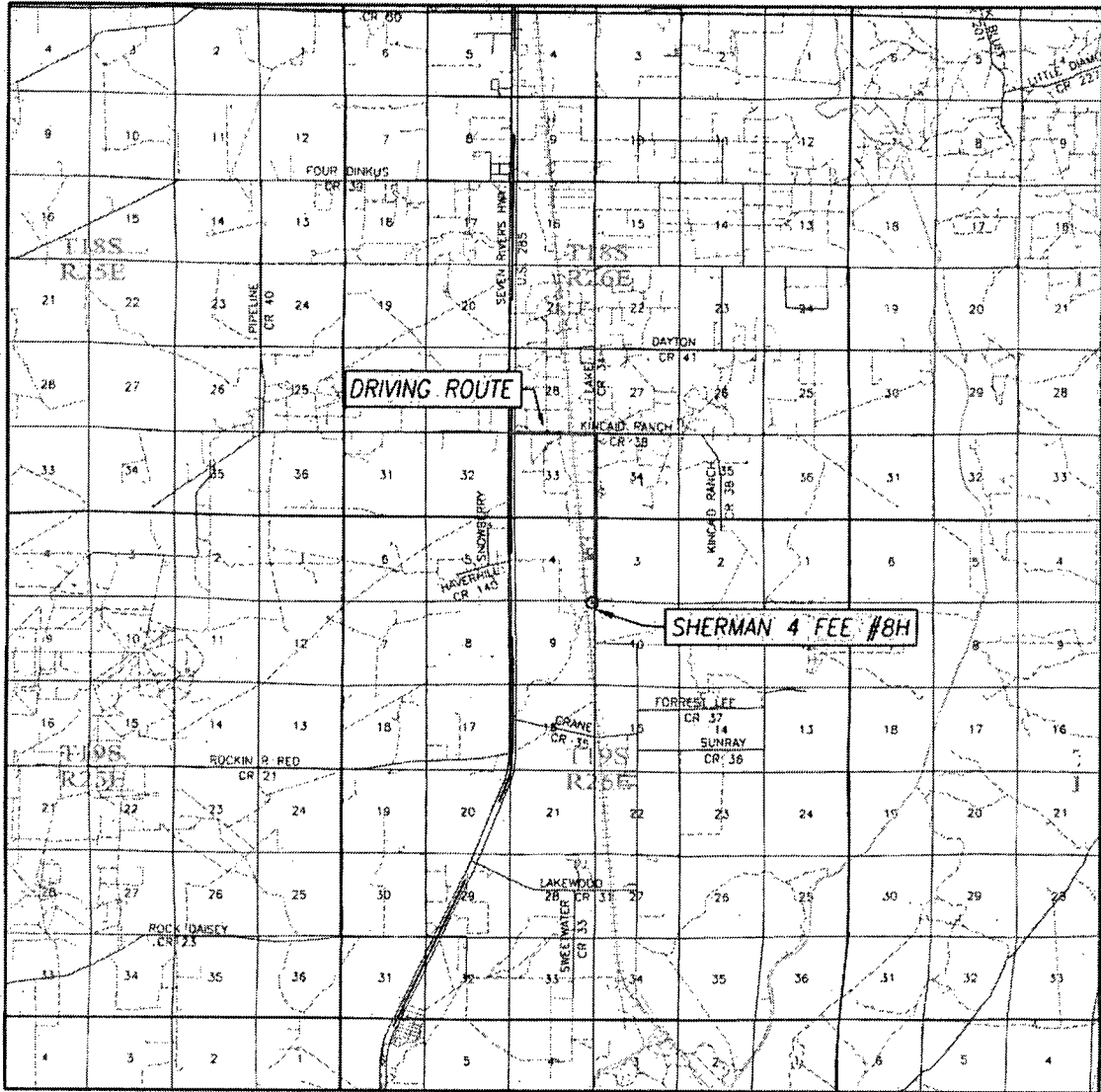
SHERMAN 4 FEE #8H WELL
 LOCATED 150 FEET FROM THE NORTH LINE
 AND 180 FEET FROM THE EAST LINE OF SECTION 9,
 TOWNSHIP 19 SOUTH, RANGE 26 EAST, N.M.P.M.,
 EDDY COUNTY, NEW MEXICO

Survey Date: 1/29/15	CAD Date: 2/3/15	Drawn By: LSL
W.O. No.: 15110086	Rev.:	Rel. W.D.:

Sheet 1 of 1


PROVIDING SURVEYING SERVICES
 SINCE 1946
JOHN WEST SURVEYING COMPANY
 412 N. DAL PASO HOBBS, N.M. 88240
 (575) 393-3117 www.jwsc.biz
 TBPL5# 10021000

VICINITY MAP



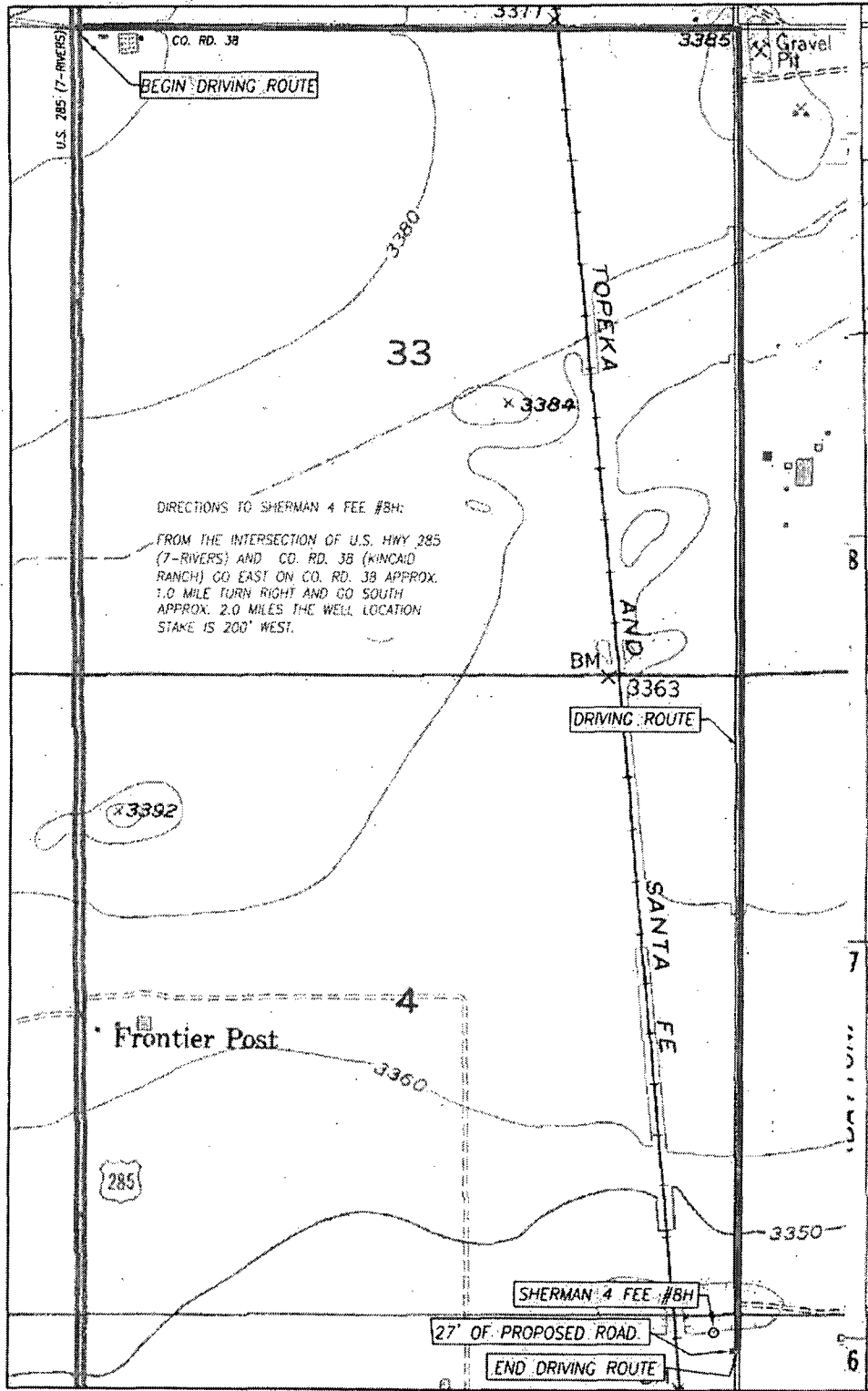
SCALE: 1" = 2 MILES
 DRIVING ROUTE: SEE LOCATION VERIFICATION MAP

SEC. 9 TWP. 19-S RGE. 26-E
 SURVEY N.M.P.M.
 COUNTY EDDY STATE NEW MEXICO
 DESCRIPTION 150' FNL & 180' FEL
 ELEVATION 3338'
 OPERATOR COG OPERATING, LLC
 LEASE SHERMAN 4 FEE



PROVIDING SURVEYING SERVICES
 SINCE 1946
JOHN WEST SURVEYING COMPANY
 412 N. DAL PASO · HOBBS, N.M. 88240
 (575) 393-3117 · www.jwsc.biz
 TBPLS# 10021000

LOCATION VERIFICATION MAP



DIRECTIONS TO SHERMAN 4 FEE #BH:
 FROM THE INTERSECTION OF U.S. HWY 285
 (7-RIVERS) AND CO. RD. 38 (KINCAID
 RANCH) GO EAST ON CO. RD. 38 APPROX.
 1.0 MILE TURN RIGHT AND GO SOUTH
 APPROX. 2.0 MILES THE WELL LOCATION
 STAKE IS 200' WEST.

SEC. 9 TWP. 19-S RGE. 26-E
 COUNTY EDDY STATE NEW MEXICO
 DESCRIPTION 150' FNL & 180' FEL
 ELEVATION 3338'
 OPERATOR CDC OPERATING, LLC
 LEASE SHERMAN 4 FEE
 U.S.G.S. TOPOGRAPHIC MAP
 DAYTON, N.M. SURVEY N.M.P.M.

SCALE: 1" = 1000'

CONTOUR INTERVAL:
 DAYTON, N.M. - 10'

PROVIDING SURVEYING SERVICES
SINCE 1946

JOHN WEST SURVEYING COMPANY

412 N. DAL PASO HOBBS, N.M. 88240
(575) 393-3117 www.jwsc.biz
TBPLS# 10022000



Project: Eddy County, NM (NAD27 NME)
 Site: Sherman 4 Fee
 Well: #8H
 Wellbore: WB1
 Design: Plan #4 02-12-15
 Rig: Silver Oak 3



G T M
 Azimuths to Grid North
 True North: 0.02°
 Magnetic North: 7.53°
 Magnetic Field
 Strength: 48364.2snT
 Dip Angle: 60.38°
 Date: 2/12/2015
 Model: IGRF2015

WELL DETAILS						
-N/S	-E/W	Northing	Ground Level	3338.00	Latitude	Longitude
0.00	0.00	611857.50	486077.10		32° 40' 55.51528 N	104° 22' 42.90551 W

SECTION DETAILS											
Sec	MD	Inc	Azi	TVD	-N/S	-E/W	Dleg	TFace	VSec	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2	2701.00	0.00	0.00	2701.00	0.00	0.00	0.00	0.60	0.00		KOP, Begin 11°/100' Build
3	3522.82	90.40	342.15	3221.86	499.28	-180.73	11.00	342.15	503.96		LP, Begin 3°/100' Turn
4	4164.38	90.40	1.40	3217.35	1131.23	-252.14	3.00	89.84	1138.43		Hold 90.4° Inc
5	8110.73	90.40	1.40	3190.01	5076.30	-155.90	0.00	0.00	5078.69		PBHL-Sherman 4 Fee #8H v4 TD at 8110.73' MD

DESIGN TARGET DETAILS								
Name	TVD	-N/S	-E/W	Northing	Easting	Latitude	Longitude	Shape
PEHL-Sherman 4 Fee #8H v4	3190.01	5076.30	-155.90	618933.86	485921.20	32° 41' 45.74785 N	104° 22' 44.75524 W	Point
- plan hits target center								
PP-Sherman 4 Fee #8H v3	3221.57	479.00	-154.25	612336.50	485922.85	32° 41' 0.25464 N	104° 22' 44.71275 W	Point
- plan hits target center								

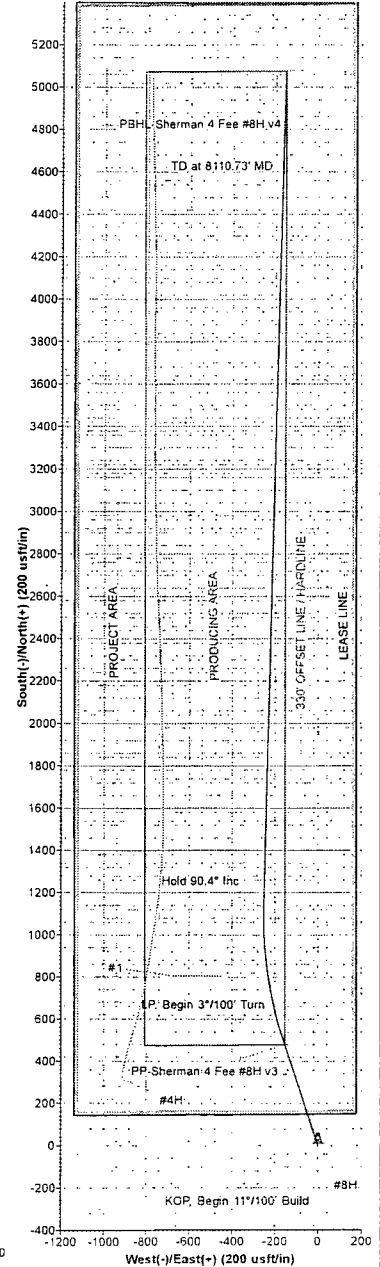
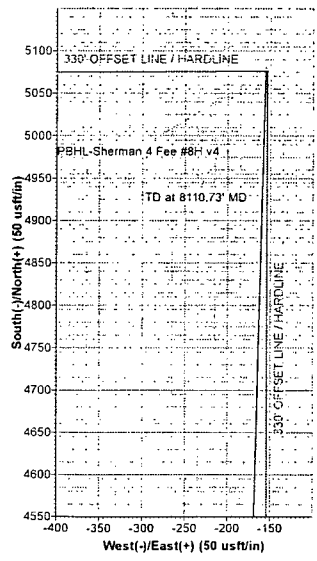
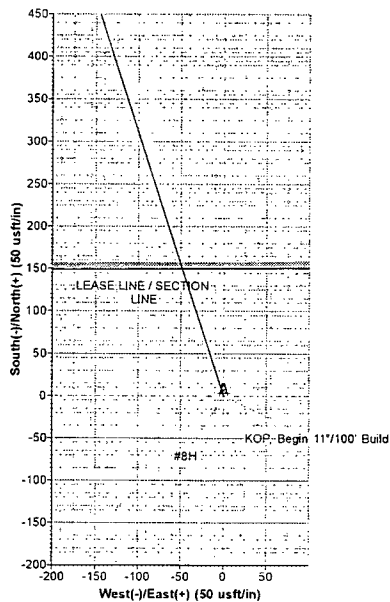
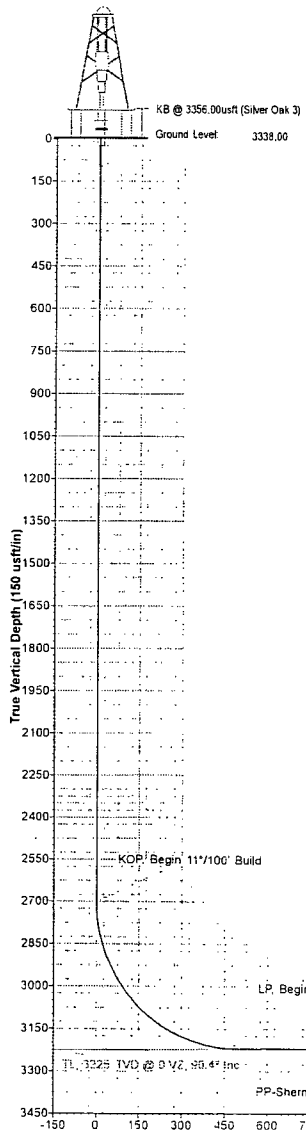
LEGEND	
—	#1, WB1, Inc Surveys V0
—	#4H, WB1/ Job #1310484, Surveys (JW 4) V0
—	Plan #4 02-12-15

Map System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone Name: New Mexico East 3001
 Local Origin: Well #8H, Grid North
 Latitude: 32° 40' 55.51528 N
 Longitude: 104° 22' 42.90551 W
 Grid East: 486077.10
 Grid North: 611857.50
 Scale Factor: 1.000

Geomagnetic Model: IGRF2015
 Sample Date: 12-Feb-15
 Magnetic Declination: 7.51°
 Dip Angle from Horizontal: 60.38°
 Magnetic Field Strength: 48364

To convert a Magnetic Direction to a Grid Direction, Add 7.53°
 To convert a Magnetic Direction to a True Direction, Add 7.61° East
 To convert a True Direction to a Grid Direction, Add 0.02°

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DipDir
3221.54	3500.50	FL 3225' TVD @ 0 VZ, 90.4° Inc	-0.30	351.81





COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#8H

WB1

Plan: Plan #4 02-12-15

Surface: 150' FNL, 180' FEL, Sec 9, T19S, R26E, Unit I

PP: 330' FSL, 330' FEL, Sec 4, T19S, R26E, Unit P

BHL: 330' FNL, 330' FEL, Sec 4, T19S, R26E, Unit I

Standard Planning Report

12 February, 2015





Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #4 02-12-15		

Project	Eddy County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sherman 4 Fee				
Site Position:	Northing:	612,151.80 usft	Latitude:	32° 40' 58.42381 N	
From: Map	Easting:	485,212.40 usft	Longitude:	104° 22' 53.02452 W	
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.03 °

Well	#8H					
Well Position	+N/-S	-294.30 usft	Northing:	611,857.50 usft	Latitude:	32° 40' 55.51528 N
	+E/-W	864.70 usft	Easting:	486,077.10 usft	Longitude:	104° 22' 42.90551 W
Position Uncertainty	0.00 usft	Wellhead Elevation:		Ground Level:	3,338.00 usft	

Wellbore	WB1				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	IGRF2015	2/12/2015	(°)	(°)	(nT)
			7.61	60.38	48,364

Design	Plan #4 02-12-15			
Audit Notes:				
Version:	Phase:	PLAN	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	358.24

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,701.00	0.00	0.00	2,701.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,522.82	90.40	342.15	3,221.86	499.26	-160.78	11.00	11.00	0.00	342.15	
4,164.38	90.40	1.40	3,217.35	1,131.23	-252.14	3.00	0.00	3.00	89.94	
8,110.73	90.40	1.40	3,190.01	5,076.30	-155.90	0.00	0.00	0.00	0.00	0.00. PBHL-Sherman 4 Fee



Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #4 02-12-15		

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,701.00	0.00	0.00	2,701.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP: Begin 11°/100' Build										
2,800.00	10.89	342.15	2,799.41	8.93	-2.88	9.01	11.00	11.00	0.00	0.00
2,900.00	21.89	342.15	2,895.19	35.75	-11.51	36.08	11.00	11.00	0.00	0.00
3,000.00	32.89	342.15	2,983.85	79.47	-25.59	80.22	11.00	11.00	0.00	0.00
3,100.00	43.89	342.15	3,062.11	138.49	-44.60	139.79	11.00	11.00	0.00	0.00
3,200.00	54.89	342.15	3,127.10	210.64	-67.83	212.62	11.00	11.00	0.00	0.00
3,300.00	65.89	342.15	3,176.43	293.27	-94.44	296.03	11.00	11.00	0.00	0.00
3,400.00	76.89	342.15	3,208.30	383.34	-123.45	386.95	11.00	11.00	0.00	0.00
3,500.00	87.89	342.15	3,221.52	477.54	-153.78	482.04	11.00	11.00	0.00	0.00
3,500.50	87.95	342.15	3,221.54	478.02	-153.94	482.52	11.00	11.00	0.00	0.00
TL: 3225' TVD @ 0°VZ, 90.4° Inc										
3,522.82	90.40	342.15	3,221.86	499.26	-160.78	503.96	11.00	11.00	0.00	0.00
LP: Begin 3°/100' Turn										
3,600.00	90.40	344.47	3,221.32	573.18	-182.94	578.53	3.00	0.00	3.00	3.00
3,700.00	90.40	347.47	3,220.61	670.18	-207.19	676.23	3.00	0.00	3.00	3.00
3,800.00	90.40	350.47	3,219.91	768.32	-226.33	774.91	3.00	0.00	3.00	3.00
3,900.00	90.40	353.47	3,219.20	867.32	-240.30	874.29	3.00	0.00	3.00	3.00
4,000.00	90.40	356.47	3,218.50	966.93	-249.07	974.12	3.00	0.00	3.00	3.00
4,100.00	90.40	359.47	3,217.80	1,066.85	-252.62	1,074.10	3.00	0.00	3.00	3.00
4,164.38	90.40	1.40	3,217.35	1,131.22	-252.14	1,138.43	3.00	0.00	3.00	3.00
Hold 90.4° Inc										
4,200.00	90.40	1.40	3,217.11	1,166.83	-251.27	1,173.99	0.00	0.00	0.00	0.00
4,300.00	90.40	1.40	3,216.41	1,266.80	-248.83	1,273.84	0.00	0.00	0.00	0.00
4,400.00	90.40	1.40	3,215.72	1,366.77	-246.39	1,373.69	0.00	0.00	0.00	0.00
4,500.00	90.40	1.40	3,215.03	1,466.73	-243.95	1,473.53	0.00	0.00	0.00	0.00
4,600.00	90.40	1.40	3,214.34	1,566.70	-241.52	1,573.38	0.00	0.00	0.00	0.00
4,700.00	90.40	1.40	3,213.64	1,666.67	-239.08	1,673.22	0.00	0.00	0.00	0.00
4,800.00	90.40	1.40	3,212.95	1,766.64	-236.64	1,773.07	0.00	0.00	0.00	0.00
4,900.00	90.40	1.40	3,212.26	1,866.61	-234.20	1,872.92	0.00	0.00	0.00	0.00
5,000.00	90.40	1.40	3,211.56	1,966.57	-231.76	1,972.76	0.00	0.00	0.00	0.00
5,100.00	90.40	1.40	3,210.87	2,066.54	-229.32	2,072.61	0.00	0.00	0.00	0.00
5,200.00	90.40	1.40	3,210.18	2,166.51	-226.88	2,172.45	0.00	0.00	0.00	0.00
5,300.00	90.40	1.40	3,209.49	2,266.48	-224.44	2,272.30	0.00	0.00	0.00	0.00
5,400.00	90.40	1.40	3,208.79	2,366.44	-222.01	2,372.14	0.00	0.00	0.00	0.00
5,500.00	90.40	1.40	3,208.10	2,466.41	-219.57	2,471.99	0.00	0.00	0.00	0.00
5,600.00	90.40	1.40	3,207.41	2,566.38	-217.13	2,571.84	0.00	0.00	0.00	0.00
5,700.00	90.40	1.40	3,206.71	2,666.35	-214.69	2,671.68	0.00	0.00	0.00	0.00
5,800.00	90.40	1.40	3,206.02	2,766.32	-212.25	2,771.53	0.00	0.00	0.00	0.00
5,900.00	90.40	1.40	3,205.33	2,866.28	-209.81	2,871.37	0.00	0.00	0.00	0.00
6,000.00	90.40	1.40	3,204.63	2,966.25	-207.37	2,971.22	0.00	0.00	0.00	0.00
6,100.00	90.40	1.40	3,203.94	3,066.22	-204.94	3,071.07	0.00	0.00	0.00	0.00
6,200.00	90.40	1.40	3,203.25	3,166.19	-202.50	3,170.91	0.00	0.00	0.00	0.00
6,300.00	90.40	1.40	3,202.56	3,266.16	-200.06	3,270.76	0.00	0.00	0.00	0.00
6,400.00	90.40	1.40	3,201.86	3,366.12	-197.62	3,370.60	0.00	0.00	0.00	0.00
6,500.00	90.40	1.40	3,201.17	3,466.09	-195.18	3,470.45	0.00	0.00	0.00	0.00
6,600.00	90.40	1.40	3,200.48	3,566.06	-192.74	3,570.30	0.00	0.00	0.00	0.00
6,700.00	90.40	1.40	3,199.78	3,666.03	-190.30	3,670.14	0.00	0.00	0.00	0.00
6,800.00	90.40	1.40	3,199.09	3,765.99	-187.86	3,769.99	0.00	0.00	0.00	0.00
6,900.00	90.40	1.40	3,198.40	3,865.96	-185.43	3,869.83	0.00	0.00	0.00	0.00
7,000.00	90.40	1.40	3,197.71	3,965.93	-182.99	3,969.68	0.00	0.00	0.00	0.00
7,100.00	90.40	1.40	3,197.01	4,065.90	-180.55	4,069.52	0.00	0.00	0.00	0.00
7,200.00	90.40	1.40	3,196.32	4,165.87	-178.11	4,169.37	0.00	0.00	0.00	0.00

Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27, NME)	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #4.02-12-15		

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)	
7,300.00	90.40	1.40	3,195.63	4,265.83	-175.67	4,269.22	0.00	0.00	0.00	
7,400.00	90.40	1.40	3,194.93	4,365.80	-173.23	4,369.06	0.00	0.00	0.00	
7,500.00	90.40	1.40	3,194.24	4,465.77	-170.79	4,468.91	0.00	0.00	0.00	
7,600.00	90.40	1.40	3,193.55	4,565.74	-168.36	4,568.75	0.00	0.00	0.00	
7,700.00	90.40	1.40	3,192.86	4,665.71	-165.92	4,668.60	0.00	0.00	0.00	
7,800.00	90.40	1.40	3,192.16	4,765.67	-163.48	4,768.45	0.00	0.00	0.00	
7,900.00	90.40	1.40	3,191.47	4,865.64	-161.04	4,868.29	0.00	0.00	0.00	
8,000.00	90.40	1.40	3,190.78	4,965.61	-158.60	4,968.14	0.00	0.00	0.00	
8,100.00	90.40	1.40	3,190.08	5,065.58	-156.16	5,067.98	0.00	0.00	0.00	
8,110.73	90.40	1.40	3,190.01	5,076.30	-155.90	5,078.69	0.00	0.00	0.00	
TD at 8110.73' MD										

Design Targets										
Target Name	hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL-Sherman 4 Fee #	- plan hits target center	0.00	360.00	3,190.01	5,076.30	-155.90	616,933.80	485,921.20	32° 41' 45.74786 N	104° 22' 44.75524 W
	- Point									
PP-Sherman 4 Fee #8H	- plan hits target center	0.00	0.00	3,221.57	479.00	-154.25	612,336.50	485,922.85	32° 41' 0.25464 N	104° 22' 44.71275 W
	- Point									

Formations						
Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)	
3,500.50	3,221.54	TL, 3225' TVD @ 0 VZ, 90.4° Inc		-0.40	351.01	

Plan Annotations					
Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment	
2,701.00	2,701.00	0.00	0.00	KOP, Begin 11°/100' Build	
3,522.82	3,221.86	499.26	-160.78	LP, Begin 3°/100' Turn	
4,164.38	3,217.35	1,131.22	-252.14	Hold 90.4° Inc	
8,110.73	3,190.01	5,076.30	-155.90	TD at 8110.73' MD	



COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#8H

WB1

Plan #4 02-12-15

Anticollision Report

12 February, 2015



PHOENIX
TECHNOLOGY SERVICES



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1	Database:	Compass 5000.GCR
Reference Design:	Plan #4 02-12-15	Offset TVD Reference:	Offset Datum

Reference	Plan #4:02-12-15		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	Stations	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 9,999.98 usft	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 2/12/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	8,110.73	Plan #4 02-12-15 (WB1)	PHX+MWD+IGRF	PHX+MWD+IGRF v3:standard declination

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Summary						
Offset Well - Wellbore - Design						
Ivey.BFV						
#1 - WB1 - Inc Surveys	3,883.95	3,219.30	375.53	345.25	12.400	CC, ES
#1 - WB1 - Inc Surveys	4,000.00	3,218.18	396.40	363.90	12.196	SF
Sherman 4 Fee						
#4H - WB1/ Job #1310484 - Surveys (JW 4)	4,491.09	4,058.78	487.30	430.94	8.646	CC
#4H - WB1/ Job #1310484 - Surveys (JW 4)	4,800.00	4,353.87	495.69	428.51	7.378	ES
#4H - WB1/ Job #1310484 - Surveys (JW 4)	8,110.73	7,644.00	650.93	459.66	3.403	SF

Offset Design													Offset Site Error:	0.00 usft
Survey Program: 230-MWD													Offset Well Error:	0.00 usft
Reference	Offset		Semi Major Axis			Distance				Separation		Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	0.00	0.00	0.00	0.00	-39.92	805.61	-674.11	1,050.51					
100.00	100.00	92.55	92.55	0.15	0.10	-39.91	805.61	-673.87	1,050.30	1,050.05	0.25	4,173.027		
200.00	200.00	196.53	196.53	0.51	0.22	-39.88	805.61	-673.01	1,049.77	1,049.04	0.73	1,442.818		
300.00	300.00	297.81	297.79	0.86	0.41	-39.82	805.61	-671.72	1,048.95	1,047.67	1.28	821.453		
400.00	400.00	397.80	397.78	1.22	0.64	-39.77	805.61	-670.41	1,048.11	1,046.25	1.86	563.143		
500.00	500.00	499.80	499.77	1.58	0.87	-39.71	805.61	-669.02	1,047.25	1,044.79	2.45	427.284		
600.00	600.00	606.11	606.05	1.94	1.11	-39.61	805.61	-666.81	1,045.92	1,042.86	3.05	342.796		
700.00	700.00	711.53	711.42	2.30	1.35	-39.48	805.61	-663.58	1,043.96	1,040.31	3.65	286.132		
800.00	800.00	806.45	806.30	2.66	1.54	-39.36	805.61	-660.80	1,042.10	1,037.90	4.20	248.184		
900.00	900.00	906.41	906.24	3.01	1.75	-39.25	805.61	-658.18	1,040.44	1,035.68	4.76	218.516		
1,000.00	1,000.00	1,003.56	1,003.35	3.37	1.95	-39.15	805.61	-655.86	1,038.93	1,033.61	5.32	195.290		
1,100.00	1,100.00	1,104.64	1,104.41	3.73	2.16	-39.05	805.61	-653.56	1,037.49	1,031.60	5.89	176.182		
1,200.00	1,200.00	1,205.72	1,205.46	4.09	2.37	-38.95	805.61	-651.09	1,035.96	1,029.50	6.46	160.424		
1,300.00	1,300.00	1,304.30	1,304.00	4.45	2.57	-38.84	805.61	-648.61	1,034.37	1,027.35	7.02	147.315		
1,400.00	1,400.00	1,400.01	1,399.69	4.81	2.77	-38.76	805.61	-646.71	1,033.13	1,025.55	7.58	136.303		
1,500.00	1,500.00	1,498.21	1,497.89	5.17	2.96	-38.70	805.61	-645.32	1,032.24	1,024.10	8.14	126.766		
1,600.00	1,600.00	1,599.11	1,598.78	5.52	3.19	-38.63	805.61	-643.86	1,031.34	1,022.63	8.71	118.385		
1,700.00	1,700.00	1,700.02	1,699.67	5.88	3.40	-38.56	805.61	-642.25	1,030.35	1,021.07	9.28	111.022		
1,800.00	1,800.00	1,800.80	1,800.44	6.24	3.61	-38.49	805.61	-640.51	1,029.27	1,019.42	9.85	104.443		
1,900.00	1,900.00	1,901.41	1,901.03	6.60	3.84	-38.41	805.61	-638.67	1,028.13	1,017.69	10.44	98.505		
2,000.00	2,000.00	2,002.02	2,001.62	6.96	4.06	-38.32	805.61	-636.72	1,026.93	1,015.91	11.02	93.189		

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



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD27-NME)	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Gnd
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #4 02-12-15	Offset TVD Reference:	Offset Datum

Offset Design													Offset Site Error:	0.00 usft		
Survey Program: 230-MWD													Offset Well Error:	0.00 usft		
Reference													Distance		Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor				
2,100.00	2,100.00	2,102.63	2,102.21	7.32	4.29	-38.23	805.61	-634.68	1,025.67	1,014.07	11.60	88.402				
2,200.00	2,200.00	2,203.23	2,202.78	7.67	4.51	-38.14	805.61	-632.54	1,024.36	1,012.17	12.18	84.068				
2,300.00	2,300.00	2,302.66	2,302.19	8.03	4.72	-38.04	805.61	-630.41	1,023.04	1,010.29	12.75	80.229				
2,400.00	2,400.00	2,402.06	2,401.58	8.39	4.93	-37.95	805.61	-628.38	1,021.78	1,008.46	13.32	76.723				
2,500.00	2,500.00	2,501.47	2,500.96	8.75	5.13	-37.87	805.61	-626.43	1,020.58	1,006.69	13.88	73.508				
2,600.00	2,600.00	2,600.88	2,600.36	9.11	5.34	-37.79	805.61	-624.58	1,019.43	1,004.98	14.45	70.548				
2,701.00	2,701.00	2,701.66	2,701.13	9.47	5.55	-37.71	805.61	-622.79	1,018.33	1,003.31	15.02	67.784				
2,750.00	2,749.93	2,751.16	2,750.61	9.65	5.66	-19.96	805.61	-621.88	1,015.62	1,000.31	15.30	66.366				
2,800.00	2,799.41	2,801.17	2,800.62	9.83	5.76	-20.34	805.61	-620.92	1,008.38	992.79	15.59	64.677				
2,850.00	2,847.98	2,850.23	2,849.67	10.01	5.87	-21.00	805.61	-619.92	996.70	980.83	15.88	62.781				
2,900.00	2,895.19	2,897.89	2,897.31	10.19	5.97	-21.98	805.61	-618.92	980.72	964.56	16.16	60.701				
2,950.00	2,940.62	2,943.69	2,943.11	10.39	6.08	-23.33	805.61	-617.91	960.59	944.14	16.45	58.394				
3,000.00	2,983.85	2,987.22	2,986.62	10.61	6.15	-25.14	805.61	-616.91	936.55	919.79	16.77	55.858				
3,050.00	3,024.47	3,028.07	3,027.46	10.87	6.24	-27.49	805.61	-615.94	908.87	891.76	17.11	53.106				
3,100.00	3,062.11	3,065.87	3,065.25	11.18	6.32	-30.53	805.61	-615.02	877.86	860.35	17.50	50.151				
3,150.00	3,096.42	3,100.27	3,099.63	11.56	6.39	-34.43	805.61	-614.16	843.88	825.93	17.95	47.019				
3,200.00	3,127.10	3,130.94	3,130.30	12.00	6.46	-39.39	805.61	-613.37	807.34	788.89	18.45	43.749				
3,250.00	3,153.85	3,157.61	3,156.96	12.52	6.51	-45.60	805.61	-612.67	768.70	749.67	19.03	40.388				
3,300.00	3,176.43	3,180.03	3,179.38	13.12	6.57	-53.18	805.61	-612.07	728.44	708.76	19.68	37.006				
3,350.00	3,194.64	3,198.01	3,197.35	13.80	6.61	-61.98	805.61	-611.58	687.11	666.71	20.41	33.670				
3,400.00	3,208.30	3,211.39	3,210.72	14.56	6.64	-71.50	805.61	-611.21	645.30	624.11	21.19	30.446				
3,450.00	3,217.28	3,220.03	3,219.36	15.38	6.65	-80.91	805.61	-610.98	603.63	581.59	22.04	27.391				
3,500.00	3,221.52	3,223.87	3,223.20	16.26	6.66	-89.32	805.61	-610.87	562.78	539.86	22.92	24.551				
3,522.82	3,221.86	3,224.02	3,223.35	16.67	6.66	-92.65	805.61	-610.87	544.60	521.26	23.34	23.335				
3,600.00	3,221.32	3,222.86	3,222.18	18.12	6.66	-92.33	805.61	-610.90	487.15	462.36	24.78	19.657				
3,700.00	3,220.61	3,221.47	3,220.80	20.05	6.66	-92.00	805.61	-610.94	426.00	399.29	26.71	15.949				
3,800.00	3,219.91	3,220.23	3,219.55	22.00	6.66	-91.74	805.61	-610.97	386.59	357.94	28.66	13.489				
3,883.95	3,219.32	3,219.30	3,218.62	23.63	6.65	-91.57	805.61	-611.00	375.53	345.25	30.29	12.400	CC, ES			
3,900.00	3,219.20	3,219.13	3,218.46	23.94	6.65	-91.54	805.61	-611.00	375.94	345.34	30.60	12.287				
4,000.00	3,218.50	3,218.18	3,217.50	25.85	6.65	-91.39	805.61	-611.03	396.40	363.90	32.50	12.196	SF			
4,100.00	3,217.80	3,217.37	3,216.70	27.72	6.65	-91.29	805.61	-611.05	443.63	409.27	34.37	12.909				
4,164.38	3,217.35	3,216.94	3,216.27	28.89	6.65	-91.24	805.61	-611.06	484.71	449.17	35.54	13.638				
4,200.00	3,217.11	3,216.71	3,216.04	29.54	6.65	-91.20	805.61	-611.07	509.93	473.74	36.19	14.091				
4,300.00	3,216.41	3,216.08	3,215.41	31.38	6.65	-91.10	805.61	-611.08	585.53	548.50	38.03	15.424				
4,400.00	3,215.72	3,215.45	3,214.78	33.25	6.64	-91.00	805.61	-611.10	669.33	629.43	39.90	16.776				
4,500.00	3,215.03	3,214.83	3,214.15	35.16	6.64	-90.90	805.61	-611.12	756.30	714.50	41.80	18.094				
4,600.00	3,214.34	3,214.20	3,213.52	37.08	6.64	-90.79	805.61	-611.14	846.16	802.43	43.72	19.353				
4,700.00	3,213.64	3,213.57	3,212.89	39.03	6.64	-90.69	805.61	-611.15	938.06	892.40	45.67	20.541				
4,800.00	3,212.95	3,212.94	3,212.27	40.99	6.64	-90.59	805.61	-611.17	1,031.48	983.85	47.63	21.657				
4,900.00	3,212.26	3,212.31	3,211.64	42.97	6.64	-90.48	805.61	-611.19	1,126.03	1,076.42	49.60	22.700				
5,000.00	3,211.56	3,211.68	3,211.01	44.96	6.64	-90.38	805.61	-611.21	1,221.44	1,169.85	51.59	23.674				
5,100.00	3,210.87	3,211.05	3,210.38	46.96	6.63	-90.28	805.61	-611.22	1,317.54	1,263.94	53.59	24.584				
5,200.00	3,210.18	3,210.42	3,209.75	48.97	6.63	-90.18	805.61	-611.24	1,414.17	1,358.57	55.60	25.433				
5,300.00	3,209.49	3,209.79	3,209.12	50.99	6.63	-90.07	805.61	-611.26	1,511.24	1,453.62	57.62	26.226				
5,400.00	3,208.79	3,209.16	3,208.49	53.02	6.63	-89.97	805.61	-611.28	1,608.68	1,549.03	59.65	26.969				
5,500.00	3,208.10	3,208.53	3,207.86	55.05	6.63	-89.87	805.61	-611.29	1,706.41	1,644.72	61.68	27.664				
5,600.00	3,207.41	3,207.90	3,207.23	57.10	6.63	-89.76	805.61	-611.31	1,804.38	1,740.66	63.72	28.316				
5,700.00	3,206.71	3,207.27	3,206.60	59.14	6.63	-89.66	805.61	-611.33	1,902.57	1,836.80	65.77	28.928				
5,800.00	3,206.02	3,206.64	3,205.97	61.19	6.62	-89.56	805.61	-611.34	2,000.94	1,933.12	67.82	29.504				
5,900.00	3,205.33	3,206.00	3,205.34	63.25	6.62	-89.46	805.61	-611.36	2,099.46	2,029.58	69.87	30.046				
6,000.00	3,204.63	3,205.37	3,204.71	65.31	6.62	-89.35	805.61	-611.38	2,198.11	2,126.18	71.93	30.558				
6,100.00	3,203.94	3,204.74	3,204.08	67.37	6.62	-89.25	805.61	-611.40	2,296.88	2,222.89	74.00	31.041				

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



Anticollision Report



Company: COG Operating LLC	Local Co-ordinate Reference: Well #8H
Project: Eddy County -NM (NAD27 NME)	TVD Reference: KB @ 3356.00usft (Silver Oak 3)
Reference Site: Sherman 4 Fee	MD Reference: KB @ 3356.00usft (Silver Oak 3)
Site Error: 0.00 usft	North Reference: Grid
Reference Well: #8H	Survey Calculation Method: Minimum Curvature
Well Error: 0.00 usft	Output errors are at: 2:00:sigma
Reference Wellbore: WB1	Database: Compass 5000 GCR
Reference Design: Plan #4 02-12-15	Offset-TVD Reference: Offset Datum

Offset Design Ivey BFV - #1 - WB1 - Inc Surveys													Offset Site Error:	0.00 usft
Survey Program: 230-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
6,200.00	3,203.25	3,204.11	3,203.45	69.44	6.62	-89.15	805.61	-611.41	2,395.76	2,319.70	76.06	31.498		
6,300.00	3,202.56	3,203.48	3,202.82	71.51	6.62	-89.05	805.61	-611.43	2,494.72	2,416.59	78.13	31.930		
6,400.00	3,201.86	3,202.85	3,202.18	73.59	6.62	-88.94	805.61	-611.45	2,593.76	2,513.56	80.20	32.340		
6,500.00	3,201.17	3,202.22	3,201.55	75.66	6.61	-88.84	805.61	-611.47	2,692.87	2,610.60	82.28	32.730		
6,600.00	3,200.48	3,201.59	3,200.92	77.74	6.61	-88.74	805.61	-611.48	2,792.05	2,707.70	84.35	33.100		
6,700.00	3,199.78	3,200.96	3,200.29	79.82	6.61	-88.63	805.61	-611.50	2,891.28	2,804.85	86.43	33.452		
6,800.00	3,199.09	3,200.33	3,199.66	81.90	6.61	-88.53	805.61	-611.52	2,990.56	2,902.05	88.51	33.787		
6,900.00	3,198.40	3,199.70	3,199.03	83.99	6.61	-88.43	805.61	-611.53	3,089.89	2,999.30	90.59	34.107		
7,000.00	3,197.71	3,199.07	3,198.40	86.07	6.61	-88.33	805.61	-611.55	3,189.26	3,096.59	92.68	34.412		
7,100.00	3,197.01	3,198.44	3,197.77	88.16	6.61	-88.22	805.61	-611.57	3,288.67	3,193.91	94.77	34.703		
7,200.00	3,196.32	3,197.80	3,197.14	90.25	6.60	-88.12	805.61	-611.59	3,388.12	3,291.27	96.85	34.982		
7,300.00	3,195.63	3,197.17	3,196.51	92.34	6.60	-88.02	805.61	-611.60	3,487.59	3,388.65	98.94	35.249		
7,400.00	3,194.93	3,196.54	3,195.88	94.43	6.60	-87.92	805.61	-611.62	3,587.10	3,486.07	101.03	35.505		
7,500.00	3,194.24	3,195.91	3,195.25	96.52	6.60	-87.81	805.61	-611.64	3,686.63	3,583.51	103.12	35.750		
7,600.00	3,193.55	3,195.28	3,194.61	98.62	6.60	-87.71	805.61	-611.65	3,786.19	3,680.97	105.22	35.985		
7,700.00	3,192.86	3,194.65	3,193.98	100.71	6.60	-87.61	805.61	-611.67	3,885.76	3,778.45	107.31	36.211		
7,800.00	3,192.16	3,194.02	3,193.35	102.81	6.60	-87.50	805.61	-611.69	3,985.36	3,875.96	109.40	36.428		
7,900.00	3,191.47	3,193.38	3,192.72	104.90	6.59	-87.40	805.61	-611.71	4,084.98	3,973.48	111.50	36.637		
8,000.00	3,190.78	3,192.75	3,192.09	107.00	6.59	-87.30	805.61	-611.72	4,184.62	4,071.02	113.59	36.838		
8,100.00	3,190.08	3,192.12	3,191.46	109.10	6.59	-87.20	805.61	-611.74	4,284.27	4,168.58	115.69	37.032		
8,110.73	3,190.01	3,192.05	3,191.39	109.32	6.59	-87.19	805.61	-611.74	4,294.96	4,179.05	115.92	37.052		

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



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2:00 sigma
Reference Wellbore	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #4.02-12-15	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4.Fee - #4H - WB1/Job #1310484 - Surveys (JW 4)													Offset Site Error:	0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3, 2521-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.00	0.00	0.00	0.00	0.00	0.00	-71.20	294.30	-864.70	913.42					
100.00	100.00	92.11	92.11	0.15	0.08	-71.19	294.64	-864.84	913.67	913.45	0.22	4,069.766		
200.00	200.00	188.53	188.52	0.51	0.25	-71.15	295.40	-865.34	914.41	913.65	0.75	1,211.749		
300.00	300.00	285.44	285.43	0.86	0.43	-71.12	296.29	-866.16	915.51	914.21	1.29	707.196		
400.00	400.00	380.78	380.75	1.22	0.61	-71.06	297.54	-867.24	917.01	915.18	1.83	500.433		
500.00	500.00	477.63	477.58	1.58	0.79	-71.00	299.11	-868.71	918.97	916.60	2.37	387.239		
600.00	600.00	580.70	580.63	1.94	0.99	-70.95	300.62	-870.39	920.99	918.07	2.92	314.914		
700.00	700.00	682.39	682.30	2.30	1.17	-70.93	301.37	-871.91	922.64	919.17	3.47	265.785		
800.00	800.00	779.51	779.40	2.66	1.35	-70.95	301.71	-873.55	924.36	920.35	4.01	230.572		
900.00	900.00	881.13	881.01	3.01	1.54	-70.97	301.90	-875.51	926.23	921.68	4.55	203.409		
1,000.00	1,000.00	977.68	977.53	3.37	1.72	-71.02	301.77	-877.44	928.08	922.99	5.09	182.379		
1,100.00	1,100.00	1,082.01	1,081.84	3.73	1.91	-71.06	301.91	-879.57	930.06	924.42	5.64	164.890		
1,200.00	1,200.00	1,181.67	1,181.49	4.09	2.09	-71.07	302.21	-881.13	931.64	925.46	6.18	150.629		
1,300.00	1,300.00	1,280.09	1,279.89	4.45	2.28	-71.07	302.69	-882.78	933.39	926.67	6.73	138.732		
1,400.00	1,400.00	1,380.32	1,380.11	4.81	2.47	-71.08	303.20	-884.56	935.23	927.96	7.27	128.569		
1,500.00	1,500.00	1,476.82	1,476.59	5.17	2.65	-71.10	303.47	-886.45	937.18	929.37	7.81	119.949		
1,600.00	1,600.00	1,576.01	1,575.76	5.52	2.83	-71.11	304.05	-888.63	939.45	931.09	8.36	112.404		
1,700.00	1,700.00	1,674.04	1,673.76	5.88	3.02	-71.11	304.87	-890.77	941.78	932.88	8.90	105.812		
1,800.00	1,800.00	1,775.03	1,774.71	6.24	3.21	-71.08	306.01	-893.01	944.25	934.80	9.45	99.932		
1,900.00	1,900.00	1,873.01	1,872.67	6.60	3.39	-71.08	306.89	-895.20	946.66	936.67	9.99	94.745		
2,000.00	2,000.00	1,973.38	1,973.00	6.96	3.58	-71.08	307.74	-897.67	949.26	938.72	10.54	90.072		
2,100.00	2,100.00	2,071.71	2,071.30	7.32	3.77	-71.08	308.46	-900.09	951.83	940.75	11.08	85.888		
2,200.00	2,200.00	2,172.92	2,172.47	7.67	3.96	-71.09	309.19	-902.73	954.53	942.89	11.63	82.068		
2,300.00	2,300.00	2,275.16	2,274.68	8.03	4.15	-71.10	309.83	-905.15	956.97	944.79	12.18	78.560		
2,400.00	2,400.00	2,371.94	2,371.43	8.39	4.33	-71.12	310.35	-907.46	959.40	946.68	12.72	75.415		
2,500.00	2,500.00	2,469.69	2,469.14	8.75	4.50	-71.16	310.64	-910.28	962.22	948.98	13.25	72.634		
2,600.00	2,600.00	2,570.47	2,569.88	9.11	4.55	-71.16	311.60	-913.01	965.10	951.45	13.66	70.664		
2,701.00	2,701.00	2,662.83	2,661.72	9.47	4.56	-70.76	318.80	-913.58	968.28	954.25	14.03	68.991		
2,750.00	2,749.93	2,703.34	2,701.95	9.65	4.58	-52.59	325.03	-913.15	968.92	954.69	14.22	68.120		
2,800.00	2,799.41	2,743.05	2,740.57	9.83	4.60	-52.47	334.09	-912.05	967.19	952.76	14.43	67.039		
2,850.00	2,847.98	2,779.53	2,775.00	10.01	4.63	-52.52	345.97	-910.16	963.16	948.52	14.64	65.776		
2,900.00	2,895.19	2,814.95	2,807.30	10.19	4.68	-52.74	360.28	-907.78	956.99	942.11	14.87	64.337		
2,950.00	2,940.62	2,860.47	2,847.63	10.39	4.78	-53.14	381.08	-904.26	948.52	933.35	15.17	62.535		
3,000.00	2,983.85	2,916.08	2,893.94	10.61	4.97	-53.62	411.11	-897.80	937.17	921.59	15.58	60.140		
3,050.00	3,024.47	2,969.20	2,934.89	10.87	5.24	-54.31	443.78	-889.15	922.60	906.49	16.11	57.256		
3,100.00	3,062.11	3,007.01	2,961.88	11.18	5.49	-55.43	469.26	-881.98	905.58	888.90	16.67	54.316		
3,150.00	3,096.42	3,041.45	2,984.44	11.56	5.76	-56.84	494.29	-874.94	886.65	869.34	17.31	51.211		
3,200.00	3,127.10	3,075.37	3,004.74	12.00	6.07	-58.50	520.45	-867.60	865.94	847.88	18.06	47.939		
3,250.00	3,153.85	3,121.09	3,029.32	12.52	6.54	-60.32	557.46	-856.88	843.29	824.23	19.06	44.242		
3,300.00	3,176.43	3,153.67	3,044.86	13.12	6.92	-62.64	584.88	-848.61	818.75	798.71	20.04	40.853		
3,350.00	3,194.64	3,175.00	3,054.02	13.80	7.18	-65.38	603.37	-843.23	793.17	772.18	20.98	37.798		
3,400.00	3,208.30	3,206.00	3,066.08	14.56	7.58	-68.39	630.96	-835.87	766.97	744.83	22.14	34.641		
3,450.00	3,217.28	3,222.72	3,072.00	15.38	7.81	-71.70	646.16	-832.19	740.33	717.14	23.19	31.924		
3,500.00	3,221.52	3,248.26	3,080.16	16.26	8.16	-75.30	669.77	-826.86	713.53	689.11	24.42	29.219		
3,522.82	3,221.86	3,261.46	3,084.05	16.67	8.35	-77.06	682.09	-824.20	701.24	676.21	25.02	28.024		
3,600.00	3,221.32	3,310.92	3,096.55	18.12	9.08	-78.09	728.93	-814.43	661.71	634.51	27.20	24.327		
3,700.00	3,220.61	3,375.81	3,107.35	20.05	10.09	-78.93	791.74	-802.38	617.41	587.27	30.14	20.485		
3,800.00	3,219.91	3,456.00	3,113.78	22.00	11.38	-79.28	870.45	-788.59	580.70	547.31	33.39	17.394		
3,900.00	3,219.20	3,540.64	3,115.72	23.94	12.76	-79.20	953.96	-774.96	550.88	514.17	36.70	15.009		
4,000.00	3,218.50	3,634.20	3,117.39	25.85	14.28	-79.11	1,046.40	-760.63	526.91	486.78	40.13	13.131		
4,100.00	3,217.80	3,725.99	3,118.67	27.72	15.81	-79.04	1,137.17	-747.06	508.58	465.06	43.53	11.685		
4,164.38	3,217.35	3,777.78	3,119.43	28.89	16.67	-79.07	1,188.55	-740.55	500.84	455.27	45.56	10.992		

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



Anticollision Report



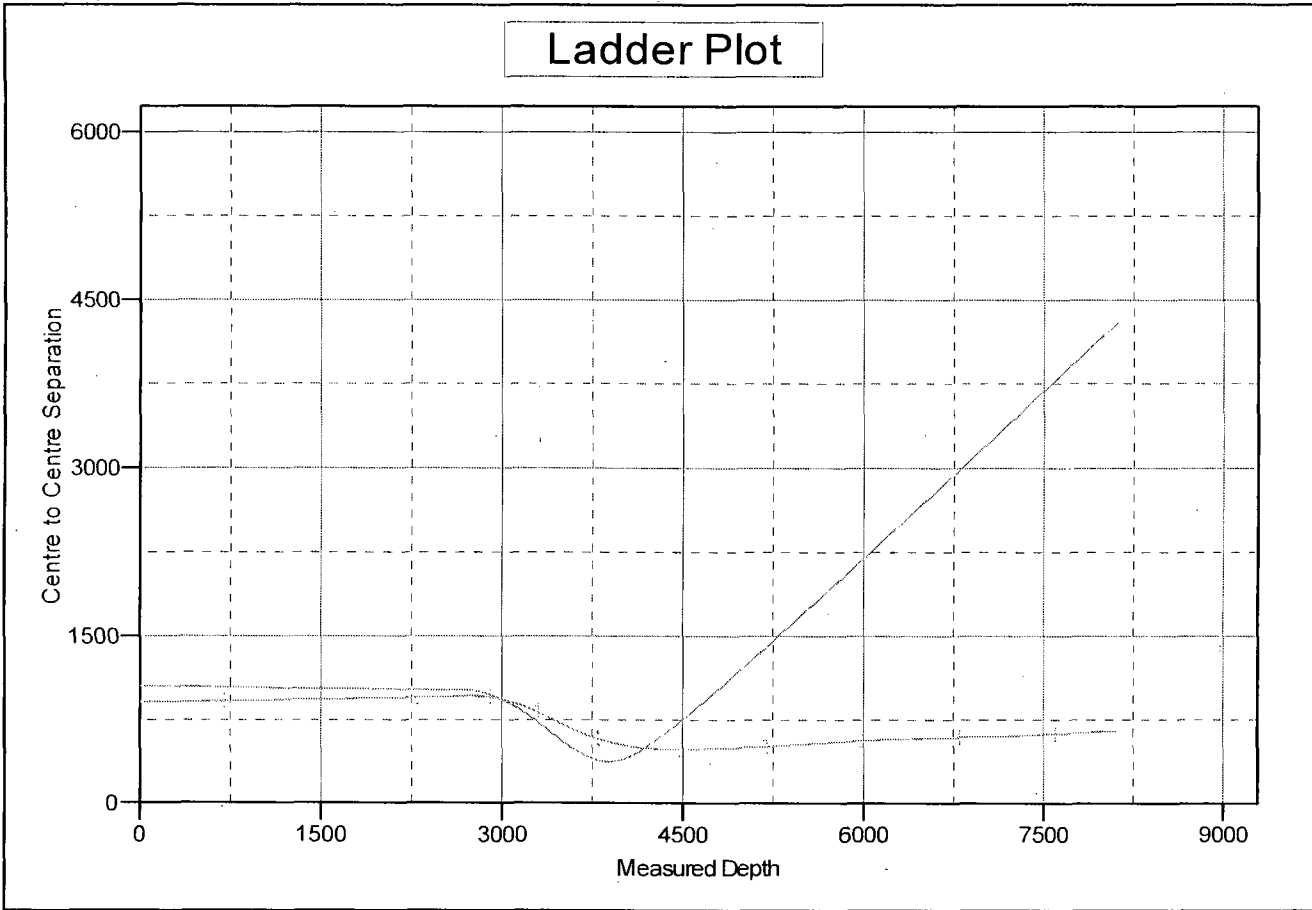
Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM, (NAD27, NME)	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #4 02-12-15	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4 Fee - #4H - WB1/Job #1310484 - Surveys (JW 4)													Offset Site Error:	0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3; 2521-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
4,200.00	3,217.11	3,800.00	3,119.81	29.54	17.04	-79.08	1,210.63	-738.14	497.85	451.27	46.58	10.689		
4,300.00	3,216.41	3,893.00	3,121.27	31.38	18.55	-79.20	1,303.28	-730.28	491.55	441.61	49.93	9.845		
4,400.00	3,215.72	3,977.67	3,122.12	33.25	19.98	-79.31	1,387.82	-725.67	488.22	434.99	53.23	9.172		
4,491.09	3,215.09	4,058.78	3,121.68	34.99	21.38	-79.31	1,468.88	-722.88	487.30	430.94	56.36	8.646	CC	
4,500.00	3,215.03	4,066.74	3,121.51	35.16	21.52	-79.29	1,476.83	-722.68	487.31	430.64	56.67	8.599		
4,600.00	3,214.34	4,152.93	3,119.09	37.08	23.01	-79.11	1,562.98	-721.59	488.88	428.78	60.09	8.135		
4,700.00	3,213.64	4,250.28	3,115.99	39.03	24.59	-78.90	1,660.28	-722.32	492.46	428.84	63.62	7.741		
4,800.00	3,212.95	4,353.87	3,112.70	40.99	26.19	-78.67	1,763.81	-722.69	495.69	428.51	67.18	7.378	ES	
4,900.00	3,212.26	4,443.10	3,110.03	42.97	27.63	-78.51	1,853.00	-723.55	499.49	428.90	70.59	7.076		
5,000.00	3,211.56	4,545.19	3,107.86	44.96	29.26	-78.45	1,955.04	-725.89	504.42	430.21	74.22	6.797		
5,100.00	3,210.87	4,641.00	3,105.21	46.96	30.86	-78.33	2,050.78	-727.98	509.36	431.54	77.82	6.546		
5,200.00	3,210.18	4,743.00	3,101.86	48.97	32.56	-78.15	2,152.70	-730.19	514.39	432.86	81.53	6.309		
5,300.00	3,209.49	4,831.96	3,099.39	50.99	34.03	-78.07	2,241.58	-733.11	520.41	435.39	85.02	6.121		
5,400.00	3,208.79	4,934.32	3,096.97	53.02	35.70	-78.03	2,343.82	-737.28	527.13	438.41	88.72	5.941		
5,500.00	3,208.10	5,030.00	3,094.48	55.05	37.32	-77.99	2,439.38	-741.45	534.16	441.78	92.38	5.782		
5,600.00	3,207.41	5,129.24	3,091.38	57.10	39.00	-77.89	2,538.46	-746.12	541.65	445.55	96.10	5.636		
5,700.00	3,206.71	5,232.86	3,089.00	59.14	40.70	-77.88	2,641.95	-750.75	548.74	448.90	99.85	5.496		
5,800.00	3,206.02	5,337.80	3,084.99	61.19	42.46	-77.67	2,746.76	-753.96	554.76	451.11	103.65	5.352		
5,900.00	3,205.33	5,435.88	3,081.16	63.25	44.10	-77.47	2,844.72	-756.87	560.73	453.39	107.35	5.224		
6,000.00	3,204.63	5,536.18	3,077.68	65.31	45.77	-77.32	2,944.92	-760.02	566.78	455.70	111.08	5.102		
6,100.00	3,203.94	5,640.78	3,074.47	67.37	47.52	-77.20	3,049.42	-763.08	572.54	457.64	114.90	4.983		
6,200.00	3,203.25	5,744.59	3,070.46	69.44	49.27	-76.97	3,153.14	-764.73	577.17	458.45	118.72	4.862		
6,300.00	3,202.56	5,849.34	3,067.16	71.51	51.04	-76.81	3,257.83	-766.08	581.36	458.80	122.56	4.744		
6,400.00	3,201.86	5,956.73	3,064.45	73.59	52.86	-76.69	3,365.18	-766.33	584.38	457.93	126.45	4.621		
6,500.00	3,201.17	6,052.73	3,062.19	75.66	54.52	-76.59	3,461.15	-766.21	587.02	456.83	130.18	4.509		
6,600.00	3,200.48	6,149.38	3,059.47	77.74	56.19	-76.46	3,557.76	-766.68	590.36	456.43	133.93	4.408		
6,700.00	3,199.78	6,252.15	3,057.32	79.82	57.95	-76.39	3,660.51	-767.39	593.73	455.96	137.77	4.310		
6,800.00	3,199.09	6,351.67	3,054.37	81.90	59.66	-76.24	3,759.98	-767.71	596.94	455.38	141.56	4.217		
6,900.00	3,198.40	6,455.12	3,050.64	83.99	61.44	-76.02	3,863.36	-767.53	599.84	454.42	145.42	4.125		
7,000.00	3,197.71	6,560.54	3,047.33	86.07	63.24	-75.83	3,968.73	-766.89	602.22	452.91	149.31	4.033		
7,100.00	3,197.01	6,661.89	3,043.72	88.16	64.98	-75.57	4,070.00	-764.83	603.32	450.18	153.14	3.940		
7,200.00	3,196.32	6,749.66	3,040.37	90.25	66.49	-75.35	4,157.70	-764.26	605.83	449.09	156.74	3.865		
7,300.00	3,195.63	6,840.13	3,038.09	92.34	68.06	-75.28	4,248.12	-765.82	610.31	449.91	160.40	3.805		
7,400.00	3,194.93	6,938.74	3,035.43	94.43	69.77	-75.23	4,346.66	-768.29	615.60	451.40	164.20	3.749		
7,500.00	3,194.24	7,039.94	3,032.03	96.52	71.52	-75.10	4,447.78	-770.50	620.74	452.70	168.04	3.694		
7,600.00	3,193.55	7,140.49	3,028.57	98.62	73.24	-74.96	4,548.25	-772.55	625.78	453.92	171.86	3.641		
7,700.00	3,192.86	7,239.04	3,025.17	100.71	74.94	-74.82	4,646.73	-774.52	630.78	455.13	175.65	3.591		
7,800.00	3,192.16	7,340.85	3,023.86	102.81	76.69	-74.89	4,748.29	-777.33	635.96	456.46	179.50	3.543		
7,900.00	3,191.47	7,439.02	3,022.74	104.90	78.39	-74.97	4,846.82	-779.80	640.85	457.56	183.30	3.496		
8,000.00	3,190.78	7,542.29	3,020.38	107.00	80.18	-74.94	4,949.83	-782.21	645.87	458.69	187.19	3.450		
8,100.00	3,190.08	7,642.99	3,017.93	109.10	81.93	-74.89	5,050.48	-783.97	650.38	459.35	191.03	3.405		
8,110.73	3,190.01	7,644.00	3,017.90	109.32	81.95	-74.89	5,051.49	-783.99	650.93	459.66	191.27	3.403	SF	

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

Company:	COG Operating,LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2:00 sigma
Reference Wellbore	WB1	Database:	Compass 5000.GCR
Reference Design:	Plan #4 02-12-15	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3356.00usft (Silver Oak 3) Coordinates are relative to: #8H
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Central Meridian is 104° 19' 60.00000 W Grid Convergence at Surface is: -0.02°

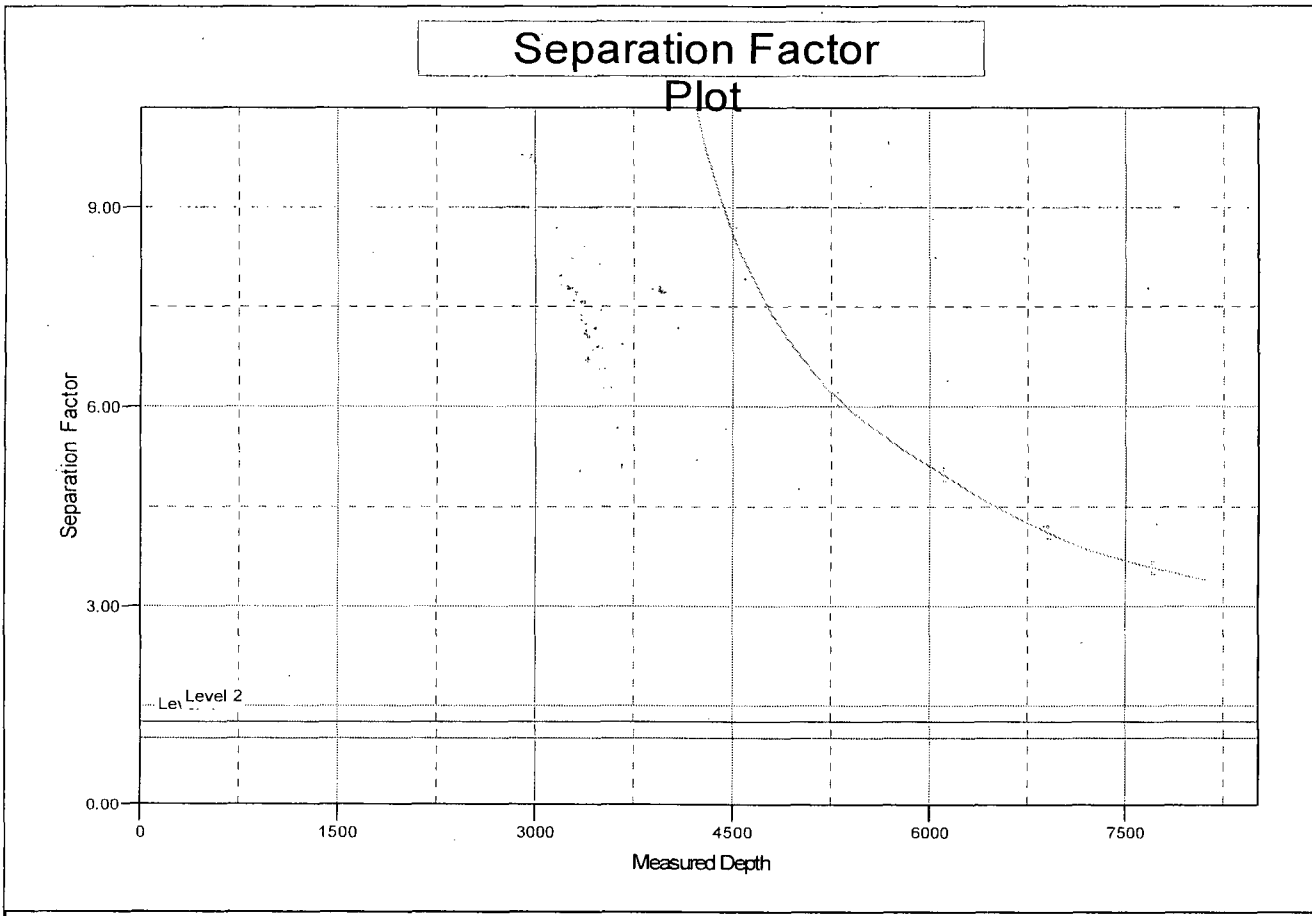


LEGEND

- ◆ #1, WB1, Inc Surveys V0
- ◆ #4H, WB1/Job#1310484, Surveys (JV4) V0.

Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3356.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3356.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #4 02-12-15	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3356.00usft (Silver Oak 3) Coordinates are relative to: #8H
 Offset Depths are relative to Offset Datum Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
 Central Meridian is 104° 19' 60.00000 W Grid Convergence at Surface is: -0.02°



LEGEND

#1, WB1, IncSurveys V0	#4H, WB1/Job #1310484, Surveys (JW4) V0
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