

NM OIL CONSERVATION ARTESIA DISTRICT

DISTRICT I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-0720

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

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

DISTRICT IV
1220 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico **AUG 18 2015**
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 South St. Francis Dr.
Santa Fe, New Mexico 87505

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015-43289	Pool Code 3250	Pool Name Atoka; Glorieta Vaso
Property Code 38909	Property Name SHERMAN 4 FEE	Well Number 15H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3379'

Surface Location

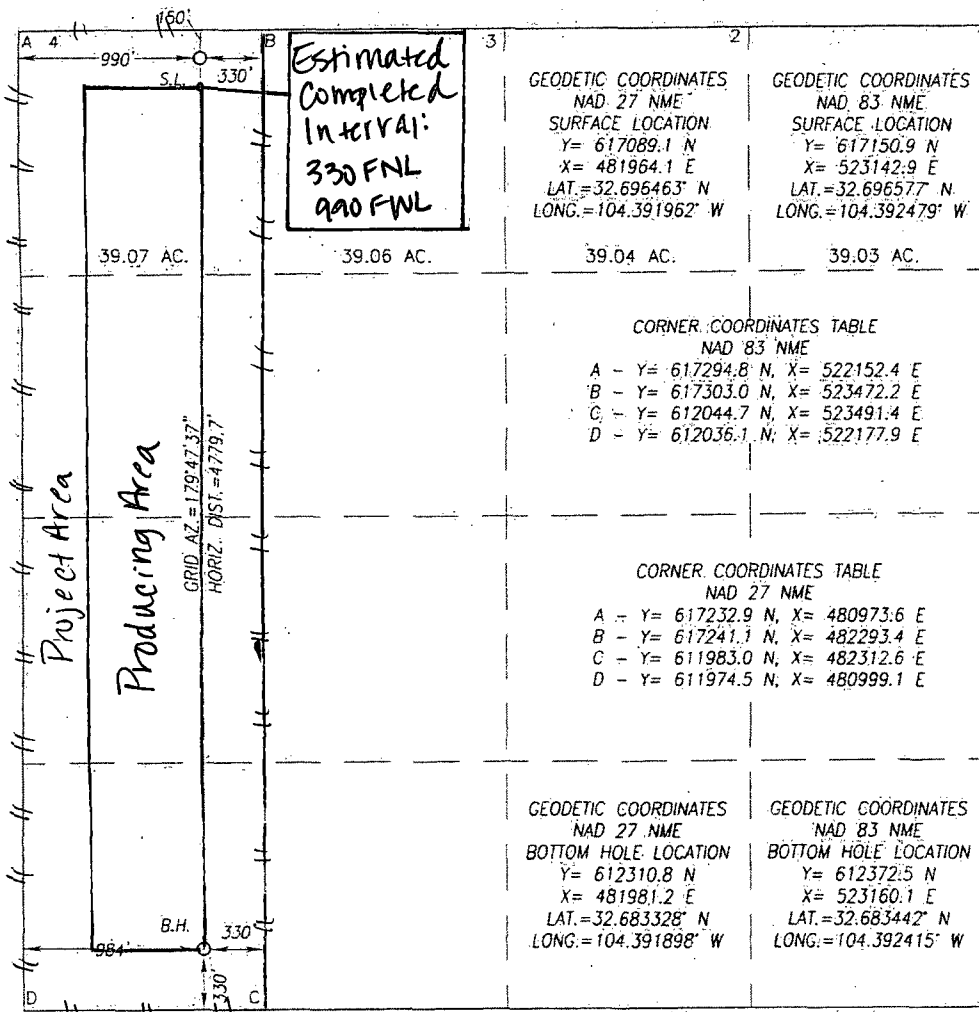
UE or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
4	4	19-S	26-E		150	NORTH	990	WEST	EDDY

Bottom Hole Location If Different From Surface

UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	4	19-S	26-E		330	SOUTH	984	WEST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
159.06			

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.


Signature

8-13-15
Date

Kelly J. Holly
Title

kholly@concho.com
E-mail Address

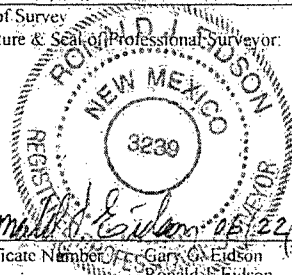
SURVEYOR CERTIFICATION

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.

JUNE 11, 2015

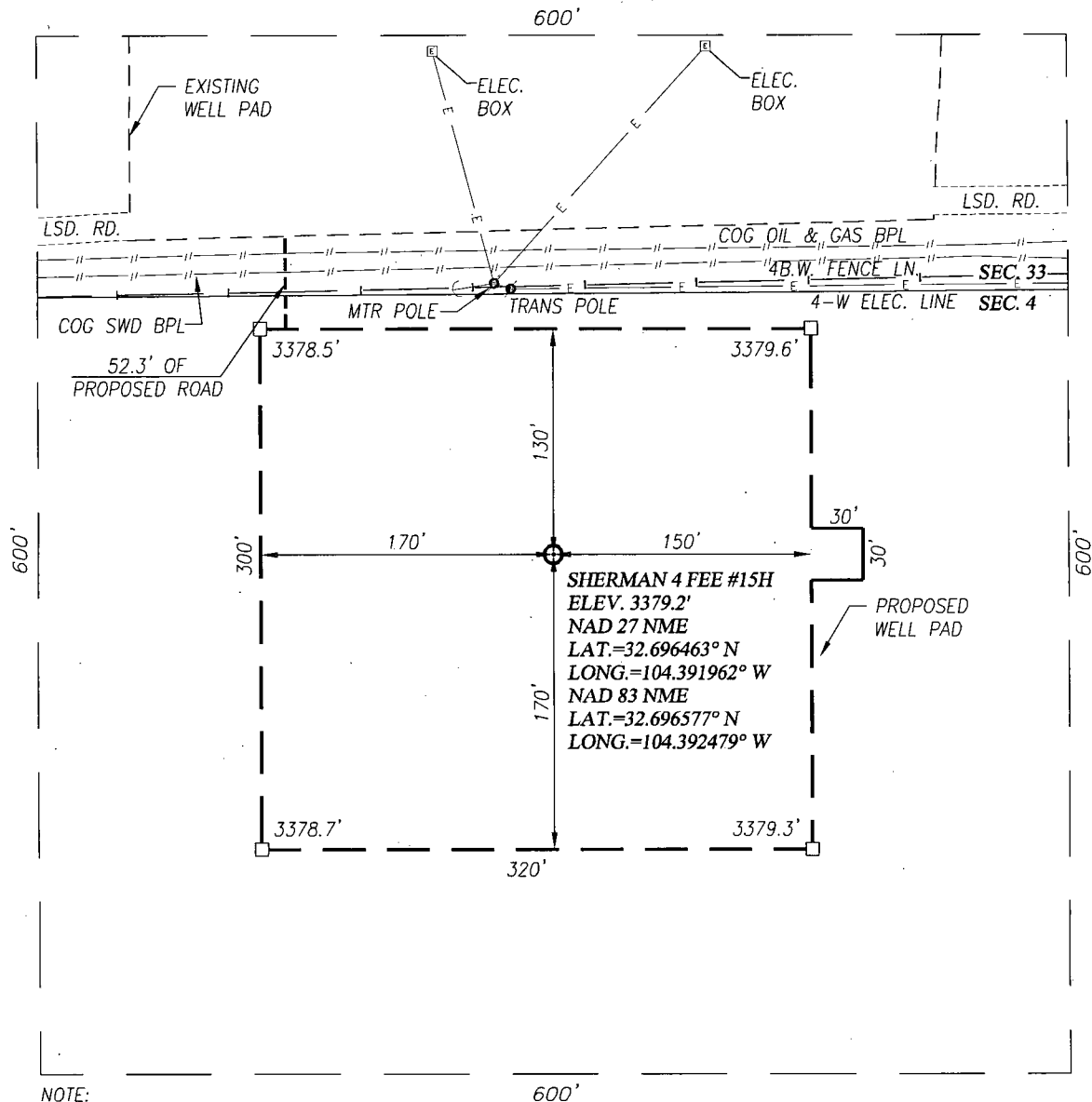
Date of Survey

Signature & Seal of Professional Surveyor:


Ronald E. Eidson
Certificate Number 3239
LSL JWSC W.O. 15101.0631

8/20/15
800

WELL SITE PLAN

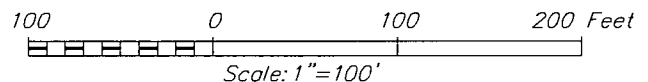


NOTE:

1) SEE "TOPOGRAPHICAL AND ACCESS ROAD MAP" FOR PROPOSED ROAD LOCATION.

DIRECTIONS TO THIS LOCATION:

FROM THE INTERSECTION OF U.S. HWY 285 (7 RIVERS & CO. RD. 38 (KINCAID RANCH), GO EAST ON CO. RD. 38 APPROX. 0.6 MILES TO CALICHE LEASE ROAD. TURN RIGHT AND GO SOUTH APPROX. 0.1 MILE; TURN RIGHT AND GO WEST APPROX. 723 FEET TO A TANK BATTERY; TURN LEFT AND GO SOUTH APPROX. 223 FEET; TURN RIGHT AND GO WEST APPROX. 224 FEET; TURN LEFT AND GO SOUTH APPROX. 0.7 MILES; TURN RIGHT AND GO WEST APPROX. 309 FEET; TURN LEFT AND GO SOUTH APPROX. 524 FEET. FROM THE SOUTHWEST CORNER OF THE TARPAN 33 FEE #3H WELL PAD GO WEST 702 FEET TO PROPOSED ROAD. TURN LEFT AND GO SOUTH 52 FEET TO THIS LOCATION.



COG OPERATING, LLC

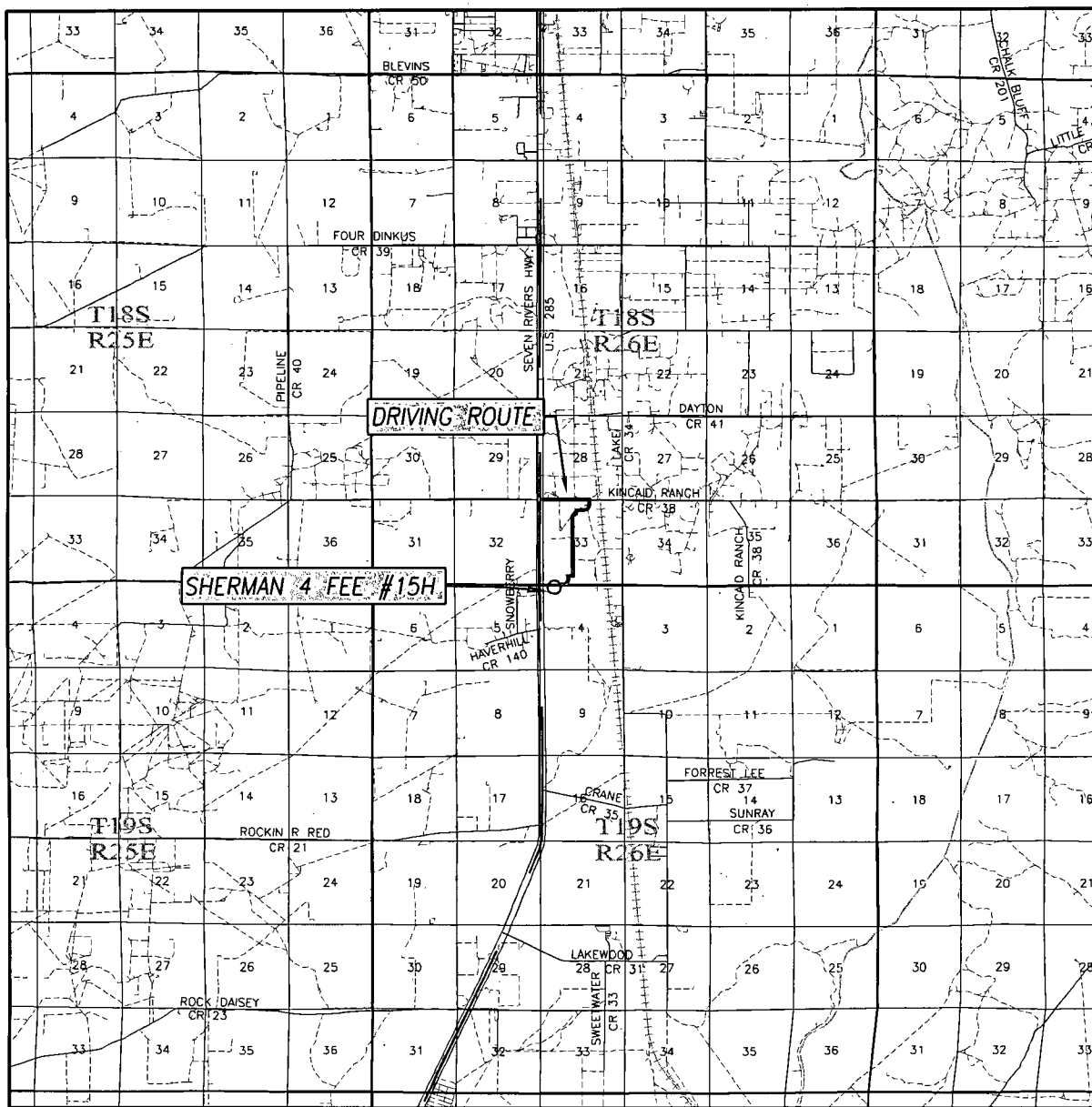
SHERMAN 4 FEE #15H WELL
LOCATED 150 FEET FROM THE NORTH LINE
AND 990 FEET FROM THE WEST LINE OF SECTION 4,
TOWNSHIP 19 SOUTH, RANGE 26 EAST, N.M.P.M.,
EDDY COUNTY, NEW MEXICO



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

Survey Date: 6/11/15	CAD Date: 6/19/15	Drawn By: LSL
W.O. No.: 15110631	Rev: .	Rel. W.O.:
		Sheet 1 of 1

VICINITY MAP



SCALE: 1" = 2 MILES
DRIVING ROUTE: SEE TOPOGRAPHICAL AND ACCESS ROAD MAP

SEC. 4 TWP. 19-S RGE. 26-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 150' FNL & 990' FWL

ELEVATION 3379'

OPERATOR COG OPERATING, LLC

LEASE SHERMAN 4 FEE

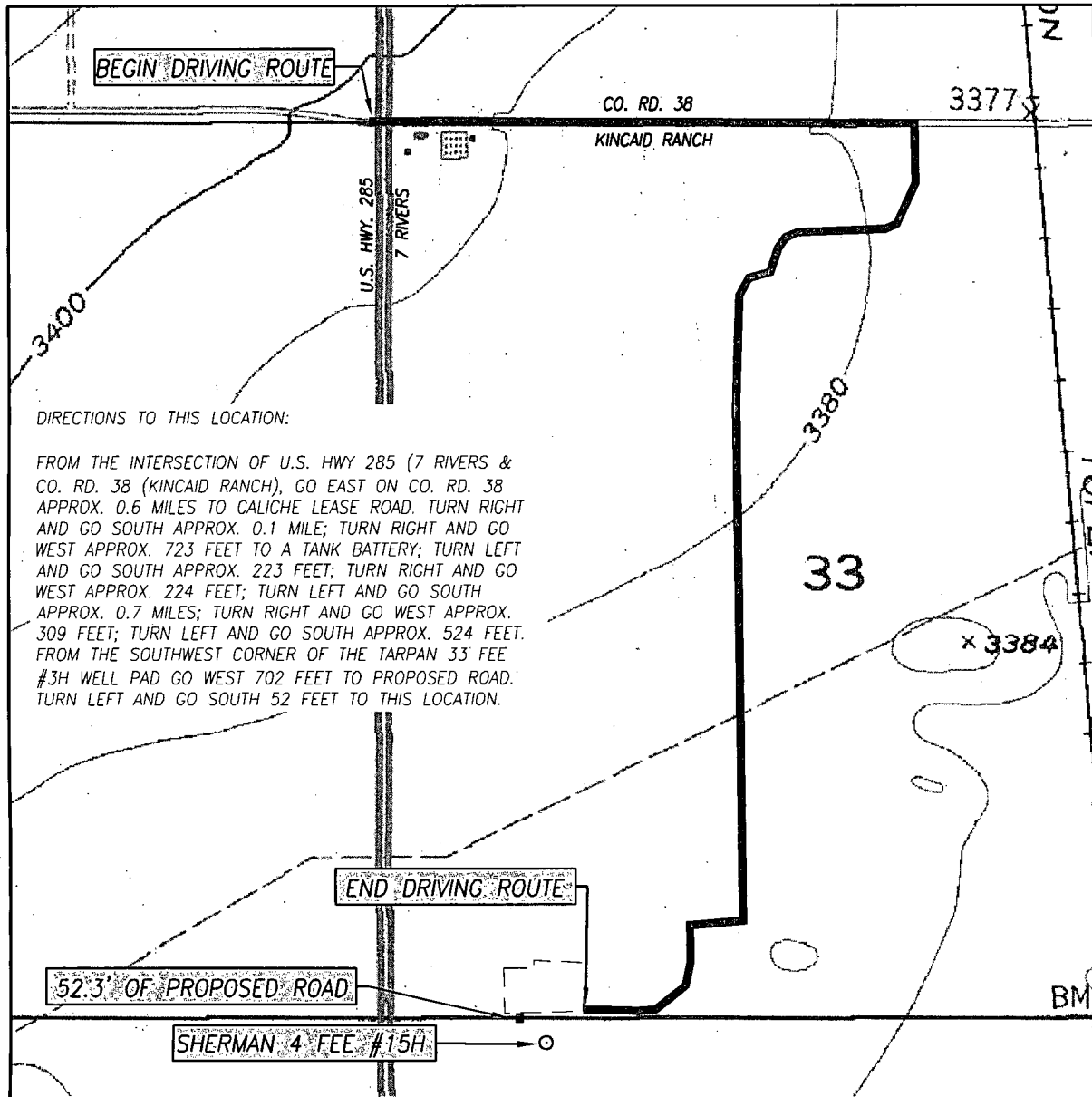


PROVIDING SURVEYING SERVICES
SINCE 1946

JOHN WEST SURVEYING COMPANY

412 N. DAL PASO HOBBS, N.M. 88240
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TBPLS# 10021000

TOPOGRAPHICAL AND ACCESS ROAD MAP



SCALE: 1" = 1000'

CONTOUR INTERVAL:
DAYTON, N.M. - 10'
LAKE McMILLAN NORTH, N.M. - 10'

SEC. 4 TWP. 19-S RGE. 26-E

SURVEY N.M.P.M.

COUNTY EDDY STATE NEW MEXICO

DESCRIPTION 150' FNL & 990' FWL

ELEVATION 3379'

OPERATOR COG OPERATING, LLC

LEASE SHERMAN 4 FEE

U.S.G.S. TOPOGRAPHIC MAP
DAYTON, N.M.



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



COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#15H

OH

Plan: Plan #1 08-11-15

Surface: 150' FNL, 990' FWL, Sec 4, T19S, R26E, Lot #4

PP: 330' FNL, 990' FWL, Sec 4, T19S, R26E, Lot #4

BHL: 330' FSL, 984' FWL, Sec 4, T19S, R26E, Unit M

Standard Planning Report

12 August, 2015



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services LP
Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #15H
Company:	COG Operating LLC	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 08-11-15		

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

Well	#15H		
Well Position	+N-S	4,937.30 usft	Northing:
	+E-W	-3,248.30 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	
		Latitude:	32° 41' 47.26538 N
		Longitude:	104° 23' 31.06365 W
		Ground Level:	3,379.00 usft

Wellbore	OH		
Magnetics	Model Name	Sample Date	Declination
			(°)
	HDGM	8/12/2015	7.60
			Dip Angle
			(°)
			Field Strength
			(nT)
			60.57
			48,421

Design	Plan #1 08-11-15		
Audit Notes:			
Version:	Phase:	PLAN	Tie On Depth:
			0.00
Vertical Section:	Depth From (TVD)	+N-S	+E-W
	(usft)	(usft)	(usft)
	0.00	0.00	0.00
			Direction
			(°)
			179.79

Plan Sections										
Measured	Inclination	Azimuth	Vertical	+N-S	+E-W	Dogleg	Build	Turn	TFO	Target
Depth	(°)	(°)	Depth	(usft)	(usft)	Rate	Rate	Rate	(°)	
(usft)			(usft)			(°/100usft)	(°/100usft)	(°/100usft)		
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,582.35	0.00	0.00	2,582.35	0.00	0.00	0.00	0.00	0.00	0.00	
3,402.35	90.20	179.79	3,103.22	-522.69	1.87	11.00	11.00	21.93	179.79	
7,658.02	90.20	179.79	3,088.33	-4,778.30	17.10	0.00	0.00	0.00	0.00	BHL(Sherman 4 Fee



Phoenix Technology Services LP

Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #15H
Company:	COG Operating LLC	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27, NME)	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 08-11-15		

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
2,582.35	0.00	0.00	2,582.35	0.00	0.00	0.00	0.00	0.00	0.00
KOP Begin 11°/100' Build									
2,600.00	1.94	179.79	2,600.00	-0.30	0.00	0.30	11.00	11.00	0.00
2,700.00	12.94	179.79	2,699.00	-13.23	0.05	13.23	11.00	11.00	0.00
2,800.00	23.94	179.79	2,793.72	-44.82	0.16	44.82	11.00	11.00	0.00
2,900.00	34.94	179.79	2,880.67	-93.89	0.34	93.89	11.00	11.00	0.00
3,000.00	45.94	179.79	2,956.66	-158.66	0.57	158.66	11.00	11.00	0.00
3,028.91	49.12	179.79	2,976.18	-179.98	0.64	179.98	11.00	11.00	0.00
PP(Sherman 4 Fee #15H)									
3,100.00	56.94	179.79	3,018.90	-236.74	0.85	236.74	11.00	11.00	0.00
3,200.00	67.94	179.79	3,065.09	-325.25	1.16	325.26	11.00	11.00	0.00
3,300.00	78.94	179.79	3,093.55	-420.96	1.51	420.96	11.00	11.00	0.00
3,395.73	89.47	179.79	3,103.20	-516.06	1.85	516.07	11.00	11.00	0.00
TL 3105' TVD @ 0°VZ, 90.2° Inc									
3,400.00	89.94	179.79	3,103.22	-520.34	1.86	520.34	11.00	11.00	0.00
3,402.35	90.20	179.79	3,103.22	-522.69	1.87	522.69	11.00	11.00	0.00
LP Hold 90.2° Inc, 179.79° Azm									
3,500.00	90.20	179.79	3,102.88	-620.33	2.22	620.34	0.00	0.00	0.00
3,600.00	90.20	179.79	3,102.53	-720.33	2.58	720.34	0.00	0.00	0.00
3,700.00	90.20	179.79	3,102.18	-820.33	2.94	820.34	0.00	0.00	0.00
3,800.00	90.20	179.79	3,101.83	-920.33	3.29	920.34	0.00	0.00	0.00
3,900.00	90.20	179.79	3,101.48	-1,020.33	3.65	1,020.34	0.00	0.00	0.00
4,000.00	90.20	179.79	3,101.13	-1,120.33	4.01	1,120.34	0.00	0.00	0.00
4,100.00	90.20	179.79	3,100.78	-1,220.33	4.37	1,220.33	0.00	0.00	0.00
4,200.00	90.20	179.79	3,100.43	-1,320.33	4.73	1,320.33	0.00	0.00	0.00
4,300.00	90.20	179.79	3,100.08	-1,420.32	5.08	1,420.33	0.00	0.00	0.00
4,400.00	90.20	179.79	3,099.73	-1,520.32	5.44	1,520.33	0.00	0.00	0.00
4,500.00	90.20	179.79	3,099.38	-1,620.32	5.80	1,620.33	0.00	0.00	0.00
4,600.00	90.20	179.79	3,099.03	-1,720.32	6.16	1,720.33	0.00	0.00	0.00
4,700.00	90.20	179.79	3,098.68	-1,820.32	6.51	1,820.33	0.00	0.00	0.00
4,800.00	90.20	179.79	3,098.33	-1,920.32	6.87	1,920.33	0.00	0.00	0.00
4,900.00	90.20	179.79	3,097.98	-2,020.32	7.23	2,020.33	0.00	0.00	0.00
5,000.00	90.20	179.79	3,097.63	-2,120.32	7.59	2,120.33	0.00	0.00	0.00
5,100.00	90.20	179.79	3,097.28	-2,220.31	7.95	2,220.33	0.00	0.00	0.00
5,200.00	90.20	179.79	3,096.93	-2,320.31	8.30	2,320.33	0.00	0.00	0.00
5,300.00	90.20	179.79	3,096.58	-2,420.31	8.66	2,420.33	0.00	0.00	0.00
5,400.00	90.20	179.79	3,096.23	-2,520.31	9.02	2,520.33	0.00	0.00	0.00
5,500.00	90.20	179.79	3,095.88	-2,620.31	9.38	2,620.33	0.00	0.00	0.00
5,600.00	90.20	179.79	3,095.53	-2,720.31	9.74	2,720.33	0.00	0.00	0.00
5,700.00	90.20	179.79	3,095.18	-2,820.31	10.09	2,820.32	0.00	0.00	0.00
5,800.00	90.20	179.79	3,094.83	-2,920.31	10.45	2,920.32	0.00	0.00	0.00
5,900.00	90.20	179.79	3,094.48	-3,020.30	10.81	3,020.32	0.00	0.00	0.00
6,000.00	90.20	179.79	3,094.13	-3,120.30	11.17	3,120.32	0.00	0.00	0.00
6,100.00	90.20	179.79	3,093.78	-3,220.30	11.52	3,220.32	0.00	0.00	0.00
6,200.00	90.20	179.79	3,093.43	-3,320.30	11.88	3,320.32	0.00	0.00	0.00
6,300.00	90.20	179.79	3,093.08	-3,420.30	12.24	3,420.32	0.00	0.00	0.00
6,400.00	90.20	179.79	3,092.73	-3,520.30	12.60	3,520.32	0.00	0.00	0.00
6,500.00	90.20	179.79	3,092.38	-3,620.30	12.96	3,620.32	0.00	0.00	0.00
6,600.00	90.20	179.79	3,092.03	-3,720.30	13.31	3,720.32	0.00	0.00	0.00
6,700.00	90.20	179.79	3,091.68	-3,820.29	13.67	3,820.32	0.00	0.00	0.00
6,800.00	90.20	179.79	3,091.33	-3,920.29	14.03	3,920.32	0.00	0.00	0.00
6,900.00	90.20	179.79	3,090.98	-4,020.29	14.39	4,020.32	0.00	0.00	0.00
7,000.00	90.20	179.79	3,090.63	-4,120.29	14.75	4,120.32	0.00	0.00	0.00



Phoenix Technology Services LP
Planning Report



Database:	Compass 5000 GGR	Local Co-ordinate Reference:	Well #15H
Company:	COG Operating LLC	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Project:	Eddy County NM (NAD27 NME)	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#15H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan #1 08-11-15		

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)
7,100.00	90.20	179.79	3,090.28	-4,220.29	15.10	4,220.32	0.00	0.00	0.00
7,200.00	90.20	179.79	3,089.93	-4,320.29	15.46	4,320.32	0.00	0.00	0.00
7,300.00	90.20	179.79	3,089.58	-4,420.29	15.82	4,420.32	0.00	0.00	0.00
7,400.00	90.20	179.79	3,089.23	-4,520.29	16.18	4,520.31	0.00	0.00	0.00
7,500.00	90.20	179.79	3,088.88	-4,620.28	16.53	4,620.31	0.00	0.00	0.00
7,600.00	90.20	179.79	3,088.53	-4,720.28	16.89	4,720.31	0.00	0.00	0.00
7,658.02	90.20	179.79	3,088.33	-4,778.30	17.10	4,778.33	0.00	0.00	0.00
TD at 7658.02' MD BHL(Sherman 4 Fee #15H)									

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									
PP(Sherman 4 Fee #15H)	0.00	0.00	2,976.20	-180.00	0.64	616,909.10	481,964.74	32° 41' 45.48417 N	104° 23' 31.05495 W
- plan hits target center									
- Point									
BHL(Sherman 4 Fee #15H)	0.00	360.00	3,088.33	-4,778.30	17.10	612,310.80	481,981.20	32° 40' 59.98115 N	104° 23' 30.83267 W
- plan hits target center									
- Point									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
3,395.73	3,103.20	TL, 3105' TVD @ 0 VZ, 90.2° Inc		-0.20	179.77

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
2,582.35	2,582.35	0.00	0.00	KOP, Begin 11°/100' Build
3,402.35	3,103.22	-522.69	1.87	LP, Hold 90.2° Inc, 179.79° Azm
7,658.02	3,088.33	-4,778.30	17.10	TD at 7658.02' MD



Project: Eddy County, NM (NAD27 NME)
Site: Sherman 4 Fee
Well: #15H
Wellbore: OH
Design: Plan #1 08-11-15
Rig: Silver Oak 3



PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: 0.03°
Magnetic North: 7.63°
Magnetic Field
Strength: 48420.8nT
Dip Angle: 60.57°
Date: 8/12/2015
Model: HDGM

WELL DETAILS

+N-S	+E-W	Northing	Ground Level	Easting	Latitude	Longitude
0.00	0.00	617089.10	3379.00	481964.10	32° 41' 47.26537 N	104° 23' 31.06365 W

SECTION DETAILS

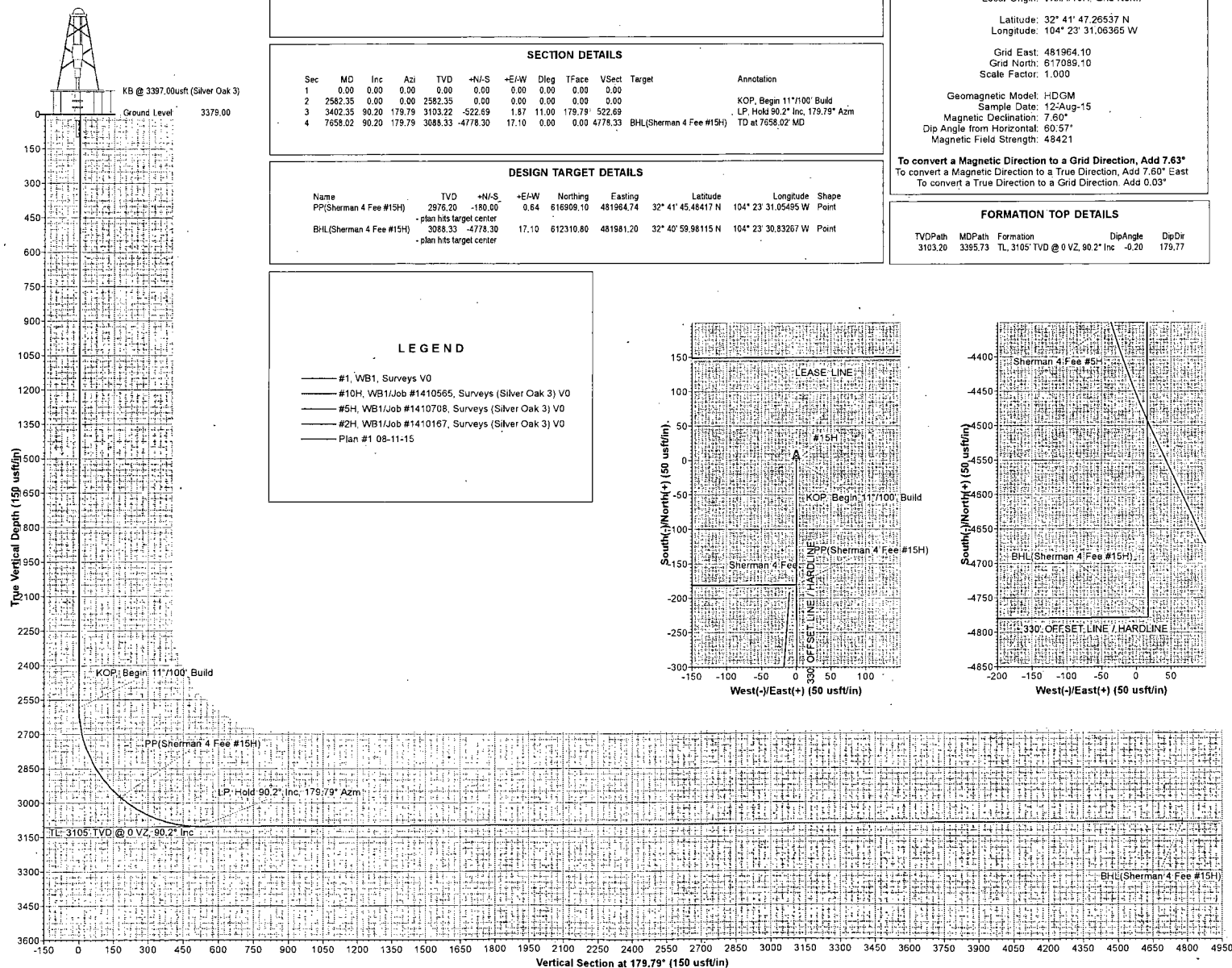
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSecl	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		KOP, Begin 11°/100' Build
2	2582.35	0.00	0.00	2582.35	0.00	0.00	0.00	0.00	0.00		LP, Hold 90.2° Inc, 179.79° Azm
3	3402.35	90.20	179.79	3103.22	-522.69	1.87	11.00	179.79	522.69		TD at 7658.02 MD
4	7658.02	90.20	179.79	3088.33	-4778.30	17.10	0.00	0.00	4778.33	BHL(Sherman 4 Fee #15H)	

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Northing	Easting	Latitude	Longitude	Shape
PP(Sherman 4 Fee #15H)	2976.20	-180.00	0.64	616909.10	481964.74	32° 41' 45.48417 N	104° 23' 31.05495 W	Point
								- plan hits target center
BHL(Sherman 4 Fee #15H)	3088.33	-4778.30		612310.80	481981.20	32° 40' 59.98115 N	104° 23' 30.83267 W	Point
								- plan hits target center

LEGEND

- #1, WB1, Surveys V0
- #10H, WB1/Job #1410565, Surveys (Silver Oak 3) V0
- #5H, WB1/Job #1410708, Surveys (Silver Oak 3) V0
- #2H, WB1/Job #1410167, Surveys (Silver Oak 3) V0
- Plan #1 08-11-15



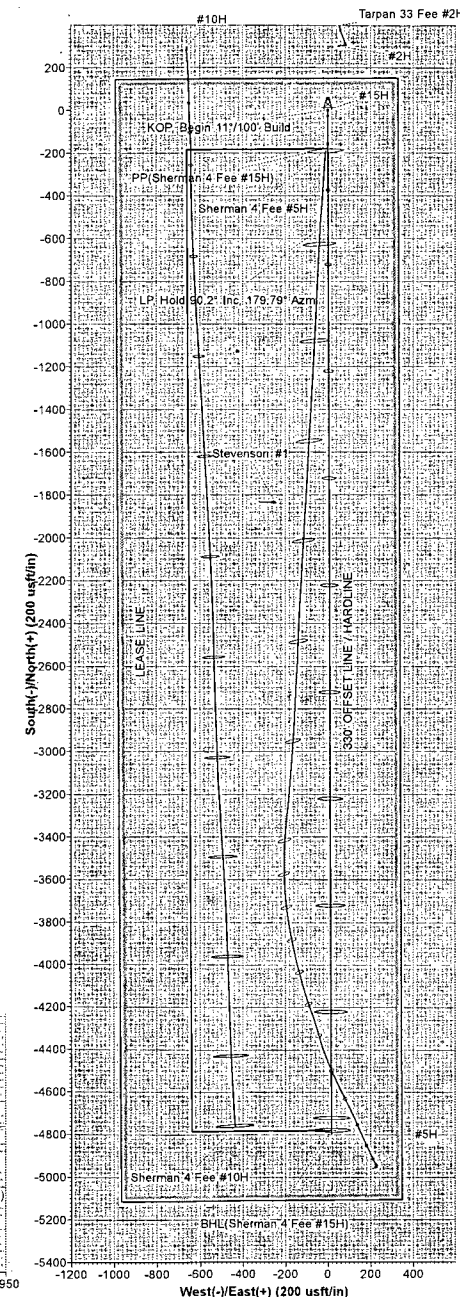
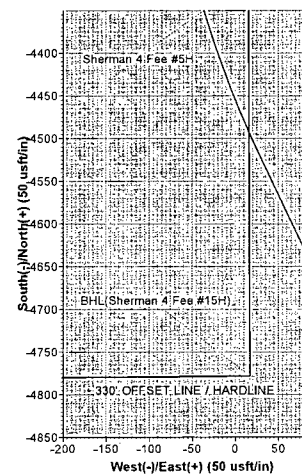
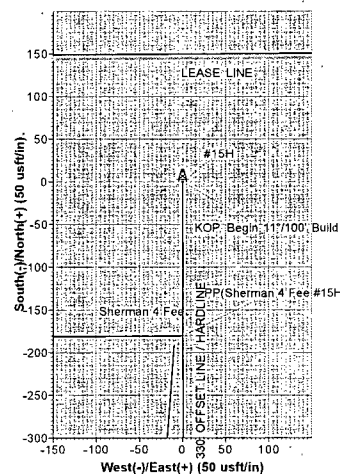
Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well #15H, Grid North
Latitude: 32° 41' 47.26537 N
Longitude: 104° 23' 31.06365 W
Grid East: 481964.10
Grid North: 617089.10
Scale Factor: 1.000

Geomagnetic Model: HDGM
Sample Date: 12-Aug-15
Magnetic Declination: 7.60°
Dip Angle from Horizontal: 60.57°
Magnetic Field Strength: 48421

To convert a Magnetic Direction to a Grid Direction, Add 7.63°
To convert a Magnetic Direction to a True Direction, Add 7.60° East
To convert a True Direction to a Grid Direction, Add 0.03°

FORMATION TOP DETAILS

TVDPath	MDPath	Formation	DipAngle	DipDir
3103.20	3395.73	TL, 3105° TVD @ 0 VZ, 90.2° Inc	-0.20	179.77





COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#15H

OH

Plan #1 08-11-15

Anticollision Report

12 August, 2015



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services LP

Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 08-11-15	Offset TVD Reference:	Offset Datum

Reference	Plan #1 08-11-15		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 99,999,999.00 us	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date 8/12/2015		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	7,657.67	Plan #1 08-11-15 (OH)	MWD	MWD - Standard

Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
Offset Well - Wellbore - Design						
Sherman 4 Fee						
#10H - WB1/Job #1410565 - Surveys (Silver Oak 3)	7,635.89	7,890.00	454.76	278.62	2.582 CC, ES	
#10H - WB1/Job #1410565 - Surveys (Silver Oak 3)	7,658.02	7,890.00	455.30	278.85	2.580 SF	
#5H - WB1/Job #1410708 - Surveys (Silver Oak 3)	7,658.02	3,075.48	266.01	171.83	2.824 CC, ES, SF	
Stevenson						
#1 - WB1 - Surveys	4,710.84	3,059.79	259.41	219.27	6.462 CC, ES, SF	
Tarpan 33 Fee						
#2H - WB1/Job #1410167 - Surveys (Silver Oak 3)	0.00	0.00	304.27			
#2H - WB1/Job #1410167 - Surveys (Silver Oak 3)	2,600.00	2,562.94	325.03	314.91	32.124 SF	

Offset Design										Sherman 4 Fee - #10H- WB1/Job #1410565- Surveys(Silver Oak3)		Offset Site Error:		0.00 usft	
Survey Program:										100-NS-GYRO-MS-2431-MWD		Offset Well Error:		0.00 usft	
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	Offset Wellbore Centre +E/W (usft)	Distance		Minimum Separation (usft)	Separation Factor	Warning		
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)				Between Centres (usft)	Between Ellipses (usft)					
0.00	0.00	0.00	0.00	0.00	0.00	-65.88	295.90	-660.80	724.04						
100.00	100.00	93.48	93.48	0.09	0.10	-65.87	296.04	-660.85	724.13	723.93	0.19	3,733.502			
200.00	200.00	193.80	193.80	0.32	0.36	-65.85	296.31	-660.94	724.32	723.65	0.67	1,073.431			
300.00	300.00	294.44	294.44	0.54	0.62	-65.84	296.49	-660.99	724.44	723.28	1.17	621.687			
400.00	400.00	395.81	395.81	0.77	0.86	-65.82	296.71	-660.88	724.43	722.80	1.63	444.385			
500.00	500.00	495.49	495.48	0.99	0.99	-65.81	296.84	-660.72	724.34	722.36	1.98	365.921			
600.00	600.00	596.92	596.92	1.22	1.12	-65.80	296.86	-660.53	724.18	721.84	2.33	310.160			
700.00	700.00	695.41	695.41	1.44	1.34	-65.79	296.95	-660.31	724.01	721.22	2.78	259.986			
800.00	800.00	797.82	797.82	1.67	1.56	-65.78	296.92	-660.08	723.80	720.57	3.23	224.211			
900.00	900.00	895.97	895.97	1.89	1.78	-65.76	297.01	-659.75	723.53	719.86	3.67	197.124			
1,000.00	1,000.00	997.19	997.19	2.12	1.96	-65.76	297.01	-659.52	723.32	719.24	4.08	177.363			
1,100.00	1,100.00	1,097.86	1,097.86	2.34	2.10	-65.78	296.63	-659.31	722.97	718.53	4.44	162.855			
1,200.00	1,200.00	1,198.08	1,198.08	2.56	2.30	-65.78	296.43	-658.95	722.56	717.69	4.86	148.533			
1,300.00	1,300.00	1,296.17	1,296.17	2.79	2.48	-65.78	296.25	-658.71	722.26	717.00	5.27	137.152			
1,400.00	1,400.00	1,397.89	1,397.88	3.01	2.63	-65.82	295.77	-658.62	721.99	716.35	5.64	127.966			
1,500.00	1,500.00	1,495.62	1,495.61	3.24	2.80	-65.84	295.43	-658.51	721.74	715.70	6.04	119.434			
1,600.00	1,600.00	1,596.71	1,596.70	3.46	3.00	-65.85	295.22	-658.44	721.60	715.13	6.46	111.645			
1,700.00	1,700.00	1,697.13	1,697.12	3.69	3.22	-65.85	295.11	-658.19	721.33	714.42	6.90	104.481			

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 08-11-15	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4 Fee #10H - WB1/Job #1410565 - Surveys (Silver Oak 3)												Offset Site Error:	0.00 usft
Survey Program: 100-NS-GYRO-MS-2481-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi-Major Axis		Highside Toolface (°)	Distance		Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		Offset Wellbore Centre +N-S (usft)	+E-W (usft)					
1,800.00	1,800.00	1,795.99	1,795.98	3.91	3.45	-65.84	295.17	-657.93	721.11	713.74	7.37	97.900	
1,850.44	1,850.44	1,845.45	1,845.44	4.03	3.53	-65.84	295.15	-657.90	721.07	713.52	7.56	95.400	
1,900.00	1,900.00	1,894.02	1,894.01	4.14	3.61	-65.84	295.16	-657.94	721.11	713.36	7.74	93.115	
2,000.00	2,000.00	1,992.23	1,992.22	4.36	3.68	-65.84	295.23	-658.18	721.37	713.33	8.05	89.656	
2,100.00	2,100.00	2,093.48	2,093.47	4.59	3.79	-65.83	295.46	-658.43	721.69	713.30	8.38	86.102	
2,200.00	2,200.00	2,192.99	2,192.98	4.81	3.92	-65.82	295.69	-658.59	721.92	713.19	8.73	82.671	
2,300.00	2,300.00	2,292.89	2,292.88	5.04	4.04	-65.82	295.85	-658.83	722.21	713.13	9.08	79.536	
2,400.00	2,400.00	2,394.45	2,394.43	5.26	4.19	-65.81	295.99	-658.99	722.41	712.95	9.45	76.418	
2,500.00	2,500.00	2,494.24	2,494.23	5.49	4.27	-65.81	296.08	-659.21	722.65	712.89	9.76	74.054	
2,600.00	2,600.00	2,746.15	2,736.97	5.71	4.46	-110.46	237.60	-657.33	713.33	703.17	10.16	70.188	
2,700.00	2,699.00	2,886.37	2,856.34	5.89	4.99	108.03	164.70	-651.92	695.04	684.16	10.88	63.888	
2,800.00	2,793.72	2,999.80	2,940.98	6.10	5.81	106.03	89.41	-649.80	680.92	669.00	11.92	57.142	
2,900.00	2,880.67	3,153.65	3,030.11	6.38	7.54	102.05	-35.43	-647.41	668.46	654.54	13.92	48.025	
3,000.00	2,956.66	3,282.81	3,073.31	6.89	9.44	98.02	-156.55	-641.84	653.83	637.49	16.34	40.025	
3,100.00	3,018.90	3,366.58	3,083.86	7.67	10.81	95.20	-239.54	-639.87	644.53	626.05	18.48	34.885	
3,200.00	3,065.09	3,461.04	3,085.26	8.72	12.37	91.87	-333.97	-638.95	640.67	619.58	21.09	30.378	
3,300.00	3,093.55	3,561.65	3,084.37	10.01	13.96	89.44	-434.56	-637.36	639.02	615.05	23.97	26.663	
3,399.99	3,103.22	3,670.33	3,084.00	11.46	15.67	88.72	-543.19	-634.14	636.57	609.45	27.12	23.468	
3,500.00	3,102.88	3,773.04	3,084.47	13.00	17.30	88.79	-645.82	-630.11	632.99	602.69	30.30	20.889	
3,600.00	3,102.53	3,877.72	3,085.19	14.62	19.01	88.88	-750.40	-625.66	629.08	595.45	33.62	18.711	
3,700.00	3,102.18	3,980.37	3,086.01	16.28	20.74	88.98	-852.92	-620.45	624.33	587.32	37.02	16.866	
3,800.00	3,101.83	4,085.55	3,087.18	17.97	22.55	89.12	-957.92	-614.58	619.09	578.57	40.52	15.278	
3,900.00	3,101.48	4,185.00	3,088.32	19.69	24.28	89.25	-1,057.19	-608.60	613.41	569.44	43.97	13.950	
4,000.00	3,101.13	4,284.40	3,088.62	21.43	26.02	89.30	-1,156.41	-602.70	607.83	560.38	47.45	12.811	
4,100.00	3,100.78	4,384.79	3,088.26	23.19	27.79	89.30	-1,256.61	-596.65	602.16	551.18	50.98	11.812	
4,200.00	3,100.43	4,481.65	3,087.16	24.95	29.51	89.22	-1,353.31	-591.06	596.76	542.30	54.46	10.958	
4,300.00	3,100.08	4,580.40	3,085.27	26.73	31.24	89.06	-1,451.89	-585.67	591.68	533.71	57.97	10.207	
4,400.00	3,099.73	4,680.15	3,083.62	28.51	32.92	88.92	-1,551.49	-580.39	586.76	525.33	61.43	9.551	
4,500.00	3,099.38	4,781.24	3,083.25	30.30	34.60	88.91	-1,652.42	-574.84	581.63	516.73	64.90	8.962	
4,600.00	3,099.03	4,880.06	3,083.41	32.10	36.25	88.95	-1,751.10	-569.48	576.55	508.21	68.35	8.436	
4,700.00	3,098.68	4,980.37	3,083.79	33.90	37.94	89.02	-1,851.27	-564.16	571.60	499.77	71.83	7.957	
4,800.00	3,098.33	5,080.70	3,084.55	35.70	39.68	89.12	-1,951.44	-558.63	566.42	491.05	75.38	7.515	
4,900.00	3,097.98	5,177.78	3,085.06	37.51	41.38	89.20	-2,048.39	-553.48	561.47	482.58	78.88	7.118	
5,000.00	3,097.63	5,277.39	3,085.56	39.32	43.11	89.28	-2,147.88	-548.66	556.98	474.55	82.43	6.757	
5,100.00	3,097.28	5,372.78	3,086.38	41.13	44.77	89.40	-2,243.16	-544.15	552.60	466.70	85.90	6.433	
5,200.00	3,096.93	5,466.91	3,086.59	42.94	46.42	89.45	-2,337.23	-540.81	549.40	460.04	89.36	6.148	
5,300.00	3,096.58	5,563.27	3,086.14	44.76	48.12	89.43	-2,433.55	-538.19	547.04	454.16	92.88	5.890	
5,400.00	3,096.23	5,660.97	3,085.14	46.58	49.83	89.36	-2,531.22	-536.04	545.20	448.79	96.41	5.655	
5,500.00	3,095.88	5,767.11	3,084.76	48.40	51.68	89.36	-2,637.32	-533.50	543.18	443.11	100.07	5.428	
5,600.00	3,095.53	5,873.78	3,086.11	50.22	53.54	89.54	-2,743.91	-529.49	539.76	436.01	103.75	5.202	
5,700.00	3,095.18	5,971.71	3,087.11	52.04	55.27	89.68	-2,841.76	-525.40	535.93	428.62	107.31	4.994	
5,800.00	3,094.83	6,069.61	3,087.05	53.86	57.01	89.71	-2,939.58	-521.66	532.47	421.60	110.87	4.803	
5,900.00	3,094.48	6,168.22	3,086.24	55.69	58.76	89.66	-3,038.13	-518.34	529.46	415.01	114.45	4.626	
6,000.00	3,094.13	6,277.08	3,085.86	57.51	60.69	89.65	-3,146.88	-513.52	525.37	407.17	118.20	4.445	
6,100.00	3,093.78	6,379.37	3,085.87	59.34	62.50	89.69	-3,249.03	-508.27	520.59	398.76	121.83	4.273	
6,200.00	3,093.43	6,482.73	3,086.02	61.16	64.32	89.74	-3,352.20	-502.02	514.89	389.42	125.48	4.104	
6,300.00	3,093.08	6,583.60	3,086.17	62.99	66.08	89.80	-3,452.88	-495.76	509.05	379.98	129.07	3.944	
6,400.00	3,092.73	6,681.35	3,086.25	64.82	67.78	89.84	-3,550.43	-489.51	503.01	370.42	132.59	3.794	
6,500.00	3,092.38	6,777.49	3,086.43	66.64	69.46	89.90	-3,646.42	-484.17	497.81	361.71	136.10	3.658	
6,600.00	3,092.03	6,873.03	3,086.06	68.47	71.15	89.90	-3,741.84	-479.52	493.30	353.68	139.62	3.533	
6,700.00	3,091.68	6,967.73	3,085.13	70.30	72.84	89.82	-3,836.47	-475.88	489.82	346.68	143.14	3.422	
6,800.00	3,091.33	7,066.01	3,083.22	72.13	74.57	89.64	-3,934.69	-472.91	487.17	340.47	146.70	3.321	

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



Phoenix Technology Services LP
Anticollision Report



Company:	GOG Operating LLC	Local Co-ordinate Reference:	Well: #15H
Project:	Eddy County, NM (NAD27-NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1-08-11-15	Offset TVD Reference:	Offset Datum

Offset Design: Sherman 4 Fee - #10H - WB1/Job #1410565 - Surveys (Silver Oak 3)												Offset Site Error:	0.00 usft
Survey Program: 100-NS-GYRO-MS 2481-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)			
6,900.00	3,090.98	7,167.32	3,081.44	73.96	76.31	89.47	-4,035.94	-469.80	484.46	334.19	150.27	3.224	
7,000.00	3,090.63	7,268.44	3,080.38	75.79	78.05	89.38	-4,136.99	-466.39	481.46	327.62	153.84	3.130	
7,100.00	3,090.28	7,366.94	3,080.68	77.62	79.73	89.45	-4,235.43	-463.10	478.47	321.12	157.35	3.041	
7,200.00	3,089.93	7,471.80	3,081.51	79.45	81.54	89.59	-4,340.22	-459.26	475.15	314.16	160.99	2.951	
7,300.00	3,089.58	7,572.31	3,082.66	81.28	83.28	89.77	-4,440.63	-455.04	471.30	306.74	164.56	2.864	
7,400.00	3,089.23	7,676.36	3,083.83	83.11	85.09	89.96	-4,544.56	-450.06	466.86	298.66	168.20	2.776	
7,500.00	3,088.88	7,779.00	3,085.34	84.94	86.90	90.19	-4,647.03	-444.42	461.73	289.89	171.84	2.687	
7,600.00	3,088.53	7,880.22	3,087.23	86.77	88.69	90.48	-4,748.05	-438.32	456.07	280.61	175.47	2.599	
7,635.89	3,088.41	7,890.00	3,087.42	87.28	88.86	90.51	-4,757.81	-437.72	454.76	278.62	176.14	2.582 CC, ES	
7,658.02	3,088.33	7,890.00	3,087.42	87.58	88.86	90.51	-4,757.81	-437.72	455.30	278.85	176.45	2.580 SF	

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4/ Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1-08-11-15	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4/ Fee #5H - WB1/ Job #1410708 - Surveys (Silver Oak 3)														Offset Site Error:	0.00 usft
Survey Program: 100-NS-GYRO-MS-2969-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	Offset		+N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)					
0.00	0.00	8,216.75	3,610.12	0.00	83.52	-177.14	-190.75	-9.52	3,644.13						
100.00	100.00	8,216.75	3,610.12	0.09	83.52	-177.14	-190.75	-9.52	3,544.27	3,460.66	83.61	42.390			
200.00	200.00	8,216.75	3,610.12	0.32	83.52	-177.14	-190.75	-9.52	3,444.42	3,360.59	83.84	41.085			
300.00	300.00	8,216.75	3,610.12	0.54	83.52	-177.14	-190.75	-9.52	3,344.58	3,260.52	84.06	39.787			
400.00	400.00	8,216.75	3,610.12	0.77	83.52	-177.14	-190.75	-9.52	3,244.75	3,160.46	84.29	38.497			
500.00	500.00	8,216.75	3,610.12	0.99	83.52	-177.14	-190.75	-9.52	3,144.93	3,060.42	84.51	37.213			
600.00	600.00	8,216.75	3,610.12	1.22	83.52	-177.14	-190.75	-9.52	3,045.12	2,960.38	84.74	35.937			
700.00	700.00	8,216.75	3,610.12	1.44	83.52	-177.14	-190.75	-9.52	2,945.32	2,860.36	84.96	34.667			
800.00	800.00	8,216.75	3,610.12	1.67	83.52	-177.14	-190.75	-9.52	2,845.54	2,760.35	85.19	33.404			
900.00	900.00	8,216.75	3,610.12	1.89	83.52	-177.14	-190.75	-9.52	2,745.77	2,660.36	85.41	32.148			
1,000.00	1,000.00	8,216.75	3,610.12	2.12	83.52	-177.14	-190.75	-9.52	2,646.03	2,560.39	85.63	30.899			
1,100.00	1,100.00	8,216.75	3,610.12	2.34	83.52	-177.14	-190.75	-9.52	2,546.30	2,460.44	85.86	29.656			
1,200.00	1,200.00	8,216.75	3,610.12	2.56	83.52	-177.14	-190.75	-9.52	2,446.59	2,360.50	86.08	28.421			
1,300.00	1,300.00	8,216.75	3,610.12	2.79	83.52	-177.14	-190.75	-9.52	2,346.91	2,260.60	86.31	27.192			
1,400.00	1,400.00	8,216.75	3,610.12	3.01	83.52	-177.14	-190.75	-9.52	2,247.25	2,160.72	86.53	25.970			
1,500.00	1,500.00	8,216.75	3,610.12	3.24	83.52	-177.14	-190.75	-9.52	2,147.63	2,060.87	86.76	24.754			
1,600.00	1,600.00	8,216.75	3,610.12	3.46	83.52	-177.14	-190.75	-9.52	2,048.05	1,961.06	86.98	23.545			
1,700.00	1,700.00	8,216.75	3,610.12	3.69	83.52	-177.14	-190.75	-9.52	1,948.51	1,861.30	87.21	22.343			
1,800.00	1,800.00	8,216.75	3,610.12	3.91	83.52	-177.14	-190.75	-9.52	1,849.01	1,761.58	87.43	21.148			
1,900.00	1,900.00	8,216.75	3,610.12	4.14	83.52	-177.14	-190.75	-9.52	1,749.58	1,661.92	87.66	19.959			
2,000.00	2,000.00	8,216.75	3,610.12	4.36	83.52	-177.14	-190.75	-9.52	1,650.21	1,562.33	87.88	18.777			
2,100.00	2,100.00	8,216.75	3,610.12	4.59	83.52	-177.14	-190.75	-9.52	1,550.93	1,462.82	88.11	17.603			
2,200.00	2,200.00	8,216.75	3,610.12	4.81	83.52	-177.14	-190.75	-9.52	1,451.74	1,363.41	88.33	16.435			
2,300.00	2,300.00	8,216.75	3,610.12	5.04	83.52	-177.14	-190.75	-9.52	1,352.67	1,264.12	88.56	15.275			
2,400.00	2,400.00	8,216.75	3,610.12	5.26	83.52	-177.14	-190.75	-9.52	1,253.76	1,164.97	88.78	14.122			
2,500.00	2,500.00	8,216.75	3,610.12	5.49	83.52	-177.14	-190.75	-9.52	1,155.02	1,066.02	89.01	12.977			
2,600.00	2,600.00	8,216.75	3,610.12	5.71	83.52	3.76	-190.75	-9.52	1,056.48	967.25	89.23	11.840			
2,700.00	2,699.00	8,216.75	3,610.12	5.89	83.52	164.81	-190.75	-9.52	956.78	867.37	89.41	10.701			
2,800.00	2,793.72	8,216.75	3,610.12	6.10	83.52	177.22	-190.75	-9.52	857.96	768.34	89.62	9.573			
2,900.00	2,880.67	8,216.75	3,610.12	6.38	83.52	178.35	-190.75	-9.52	764.67	674.77	89.90	8.506			
3,000.00	2,956.66	8,216.75	3,610.12	6.89	83.52	178.75	-190.75	-9.52	683.29	592.88	90.41	7.558			
3,100.00	3,018.90	8,143.72	3,606.70	7.67	82.30	178.21	-263.51	-14.73	617.57	527.61	89.97	6.864			
3,200.00	3,065.09	8,062.00	3,603.57	8.72	80.95	177.60	-344.97	-20.49	568.23	478.56	89.68	6.336			
3,300.00	3,093.55	7,982.63	3,601.96	10.01	79.65	177.02	-424.14	-25.91	538.11	448.45	89.66	6.002			
3,399.99	3,103.22	7,886.64	3,601.48	11.46	78.06	176.28	-519.91	-32.40	528.38	438.86	89.52	5.902			
3,400.05	3,103.22	7,886.58	3,601.48	11.46	78.06	176.28	-519.97	-32.40	528.38	438.86	89.52	5.902			
3,500.00	3,102.88	7,789.66	3,601.42	13.00	76.42	175.60	-616.70	-38.42	529.12	439.69	89.42	5.917			
3,600.00	3,102.53	7,685.88	3,601.35	14.62	74.66	174.95	-720.32	-44.10	529.88	440.61	89.27	5.936			
3,700.00	3,102.18	7,586.41	3,600.93	16.28	73.01	174.35	-819.66	-49.24	530.32	441.04	89.28	5.940			
3,800.00	3,101.83	7,488.11	3,600.79	17.97	71.35	173.84	-917.86	-53.70	531.03	441.71	89.32	5.945			
3,900.00	3,101.48	7,387.76	3,600.68	19.69	69.68	173.30	-1,018.10	-58.37	531.83	442.47	89.37	5.951			
4,000.00	3,101.13	7,289.56	3,600.66	21.43	68.07	172.77	-1,116.19	-63.06	532.79	443.29	89.50	5.953			
4,100.00	3,100.78	7,191.55	3,600.96	23.19	66.46	172.18	-1,214.05	-68.37	534.20	444.55	89.65	5.959			
4,200.00	3,100.43	7,093.35	3,601.49	24.95	64.87	171.58	-1,312.10	-73.78	535.91	446.09	89.82	5.967			
4,300.00	3,100.08	7,002.32	3,602.57	26.73	63.38	170.99	-1,402.95	-79.20	538.41	448.30	90.11	5.975			
4,400.00	3,099.73	6,911.30	3,605.80	28.51	61.86	170.48	-1,493.78	-84.35	543.20	452.83	90.37	6.011			
4,500.00	3,099.38	6,811.87	3,609.81	30.30	60.20	169.95	-1,592.97	-89.86	548.53	458.03	90.50	6.061			
4,600.00	3,099.03	6,711.21	3,613.92	32.10	58.50	169.44	-1,693.40	-95.27	553.92	463.33	90.59	6.114			
4,700.00	3,098.68	6,606.03	3,617.54	33.90	56.71	168.85	-1,798.33	-101.48	558.84	468.23	90.61	6.168			
4,800.00	3,098.33	6,498.41	3,619.87	35.70	54.90	168.25	-1,905.75	-107.69	562.53	471.93	90.60	6.209			
4,900.00	3,097.98	6,394.40	3,621.03	37.51	53.15	167.70	-2,009.61	-113.19	565.14	474.48	90.66	6.234			
5,000.00	3,097.63	6,294.16	3,621.65	39.32	51.48	167.11	-2,109.67	-119.05	567.43	476.63	90.80	6.249			

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County, NM (NAD27-NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 08-11-15	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4 Fee - #5H - WB1/Job #1410708 - Surveys (Silver Oak 3)													Offset Site Error:	0.00 usft
Survey Program: 100-NS-GYRO-MS-2969-MWD													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	Offset Wellbore Centre +E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	3,097.28	6,194.74	3,622.17	41.13	49.85	166.50	-2,208.91	-125.11	569.76	478.79	90.98	6.263		
5,200.00	3,096.93	6,098.18	3,623.19	42.94	48.28	165.97	-2,305.31	-130.49	572.54	481.32	91.22	6.276		
5,300.00	3,096.58	5,997.32	3,624.70	44.76	46.61	165.52	-2,406.05	-135.21	575.57	484.20	91.37	6.299		
5,400.00	3,096.23	5,894.29	3,625.81	46.58	44.92	165.10	-2,508.98	-139.59	578.13	486.62	91.50	6.318		
5,500.00	3,095.88	5,795.51	3,626.68	48.40	43.34	164.67	-2,607.65	-144.14	580.61	488.87	91.74	6.329		
5,600.00	3,095.53	5,695.57	3,627.65	50.22	41.73	164.19	-2,707.46	-149.14	583.32	491.38	91.95	6.344		
5,700.00	3,095.18	5,593.90	3,628.23	52.04	40.11	163.68	-2,808.99	-154.53	585.78	493.63	92.15	6.357		
5,800.00	3,094.83	5,494.71	3,628.47	53.86	38.56	163.10	-2,907.99	-160.53	588.18	495.75	92.43	6.364		
5,900.00	3,094.48	5,393.12	3,628.68	55.69	36.97	162.48	-3,009.37	-167.06	590.72	498.06	92.65	6.376		
6,000.00	3,094.13	5,289.47	3,628.08	57.51	35.38	161.78	-3,112.78	-174.11	592.70	499.81	92.89	6.381		
6,100.00	3,093.78	5,190.95	3,626.63	59.34	33.92	160.95	-3,210.93	-182.48	594.48	501.22	93.26	6.374		
6,200.00	3,093.43	5,088.89	3,624.52	61.16	32.41	159.91	-3,312.43	-193.02	596.45	502.88	93.57	6.374		
6,300.00	3,093.08	4,973.75	3,621.01	62.99	30.67	158.88	-3,427.08	-202.87	597.07	503.41	93.66	6.375		
6,373.66	3,092.82	4,904.07	3,619.16	64.33	29.62	158.59	-3,496.68	-205.21	596.49	502.54	93.95	6.349		
6,400.00	3,092.73	4,883.47	3,619.08	64.82	29.31	158.56	-3,517.28	-205.45	596.63	502.50	94.12	6.339		
6,500.00	3,092.38	4,785.29	3,620.96	66.64	27.76	158.76	-3,615.41	-203.80	598.25	503.84	94.40	6.337		
6,600.00	3,092.03	4,671.61	3,624.08	68.47	25.87	159.73	-3,728.60	-193.88	598.14	503.80	94.35	6.340		
6,700.00	3,091.68	4,540.44	3,625.59	70.30	23.58	161.67	-3,858.00	-172.70	594.16	500.28	93.88	6.329		
6,800.00	3,091.33	4,444.12	3,625.55	72.13	21.93	163.42	-3,952.40	-153.62	588.52	494.46	94.06	6.257		
6,900.00	3,090.98	4,349.54	3,627.22	73.96	20.32	165.57	-4,044.21	-130.98	584.12	489.84	94.28	6.196		
7,000.00	3,090.63	4,247.26	3,629.90	75.79	18.53	168.25	-4,142.66	-103.44	580.86	486.54	94.32	6.158		
7,100.00	3,090.28	4,138.73	3,631.26	77.62	16.57	171.68	-4,245.29	-68.19	576.58	482.39	94.19	6.121		
7,200.00	3,089.93	4,049.04	3,632.24	79.45	15.03	174.28	-4,330.96	-41.71	574.26	479.78	94.48	6.078		
7,300.00	3,089.58	3,942.96	3,642.42	81.28	8.65	169.16	-4,689.36	109.19	559.72	469.79	89.93	6.224		
7,400.00	3,089.23	3,126.00	3,125.52	83.11	6.61	-107.95	-4,937.58	223.68	470.59	380.87	89.72	5.245		
7,500.00	3,088.88	3,098.10	3,097.81	84.94	6.60	-100.66	-4,940.55	225.16	384.10	292.56	91.54	4.196		
7,600.00	3,088.53	3,082.05	3,081.82	86.77	6.60	-96.33	-4,941.83	225.77	305.30	211.93	93.37	3.270		
7,658.02	3,088.33	3,075.48	3,075.28	87.58	6.60	-94.54	-4,942.26	225.96	266.01	171.83	94.18	2.824 CC, ES, SF		

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1-08-11-15	Offset TVD Reference:	Offset Datum

Stevenson - #1 - WB1 - Surveys												Offset Site Error:	0.00 usft
Survey Program: 541-MWD												Offset Well Error:	0.00 usft
Reference													
Offset				Semi Major Axis				Distance					
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+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	-170.06	-1,832.10	-321.10	1,860.50				
100.00	100.00	58.76	58.76	0.09	0.07	-170.06	-1,832.10	-321.03	1,860.01	1,859.85	0.16	N/A	
200.00	200.00	160.07	160.07	0.32	0.18	-170.07	-1,832.10	-320.58	1,859.94	1,859.44	0.50	3,727.348	
300.00	300.00	261.37	261.37	0.54	0.30	-170.10	-1,832.10	-319.72	1,859.79	1,858.95	0.84	2,217.021	
400.00	400.00	362.67	362.66	0.77	0.41	-170.14	-1,832.10	-318.45	1,859.58	1,858.40	1.18	1,577.608	
500.00	500.00	463.95	463.93	0.99	0.53	-170.19	-1,832.10	-316.76	1,859.29	1,857.77	1.52	1,222.851	
600.00	600.00	565.00	564.95	1.22	0.67	-170.25	-1,832.10	-314.67	1,858.94	1,857.05	1.89	984.620	
700.00	700.00	665.31	665.23	1.44	0.90	-170.32	-1,832.10	-312.40	1,858.56	1,856.22	2.34	793.491	
800.00	800.00	765.61	765.51	1.67	1.13	-170.40	-1,832.10	-310.03	1,858.16	1,855.37	2.80	664.454	
900.00	900.00	865.91	865.78	1.89	1.36	-170.47	-1,832.10	-307.55	1,857.75	1,854.50	3.25	571.479	
1,000.00	1,000.00	966.19	966.02	2.12	1.59	-170.55	-1,832.10	-304.96	1,857.32	1,853.62	3.71	501.271	
1,100.00	1,100.00	1,066.39	1,066.19	2.34	1.82	-170.63	-1,832.10	-302.29	1,856.89	1,852.73	4.16	446.288	
1,200.00	1,200.00	1,166.59	1,166.35	2.56	2.05	-170.71	-1,832.10	-299.53	1,856.44	1,851.83	4.62	402.155	
1,300.00	1,300.00	1,266.78	1,266.50	2.79	2.28	-170.80	-1,832.10	-296.70	1,855.99	1,850.92	5.07	365.948	
1,400.00	1,400.00	1,366.97	1,366.65	3.01	2.51	-170.89	-1,832.10	-293.79	1,855.53	1,850.00	5.53	335.707	
1,500.00	1,500.00	1,467.15	1,466.79	3.24	2.74	-170.98	-1,832.10	-290.81	1,855.06	1,849.07	5.98	310.071	
1,600.00	1,600.00	1,567.35	1,566.93	3.46	2.98	-171.07	-1,832.10	-287.74	1,854.58	1,848.14	6.44	288.017	
1,700.00	1,700.00	1,667.55	1,667.09	3.69	3.21	-171.17	-1,832.10	-284.59	1,854.09	1,847.20	6.90	268.852	
1,800.00	1,800.00	1,767.75	1,767.23	3.91	3.44	-171.27	-1,832.10	-281.35	1,853.60	1,846.25	7.35	252.069	
1,900.00	1,900.00	1,867.94	1,867.37	4.14	3.67	-171.37	-1,832.10	-278.02	1,853.10	1,845.29	7.81	237.250	
2,000.00	2,000.00	1,968.12	1,967.50	4.36	3.91	-171.48	-1,832.10	-274.60	1,852.59	1,844.32	8.27	224.070	
2,100.00	2,100.00	2,067.61	2,066.92	4.59	4.12	-171.58	-1,832.10	-271.19	1,852.08	1,843.38	8.71	212.741	
2,200.00	2,200.00	2,166.68	2,165.94	4.81	4.32	-171.67	-1,832.10	-268.10	1,851.63	1,842.50	9.13	202.771	
2,300.00	2,300.00	2,265.76	2,264.99	5.04	4.52	-171.76	-1,832.10	-265.33	1,851.23	1,841.67	9.56	193.694	
2,400.00	2,400.00	2,364.86	2,364.06	5.26	4.72	-171.83	-1,832.10	-262.88	1,850.87	1,840.89	9.98	185.396	
2,500.00	2,500.00	2,463.98	2,463.15	5.49	4.92	-171.90	-1,832.10	-260.76	1,850.57	1,840.16	10.41	177.780	
2,600.00	2,600.00	2,563.21	2,562.37	5.71	5.12	8.26	-1,832.10	-258.96	1,850.02	1,839.20	10.83	170.900	
2,700.00	2,699.00	2,661.73	2,660.88	5.89	5.30	8.48	-1,832.10	-257.39	1,837.00	1,825.81	11.19	164.130	
2,800.00	2,793.72	2,755.99	2,755.13	6.10	5.48	9.15	-1,832.10	-256.05	1,805.56	1,793.98	11.58	155.949	
2,900.00	2,880.67	2,842.53	2,841.65	6.38	5.64	10.42	-1,832.10	-254.97	1,756.86	1,744.84	12.01	146.228	
3,000.00	2,956.66	2,918.15	2,917.28	6.89	5.78	12.65	-1,832.10	-254.14	1,692.72	1,680.05	12.67	133.638	
3,100.00	3,018.90	2,980.09	2,979.21	7.67	5.89	16.68	-1,832.10	-253.54	1,615.52	1,601.96	13.56	119.148	
3,200.00	3,065.09	3,026.20	3,025.31	8.72	5.98	24.74	-1,832.10	-253.14	1,528.16	1,513.45	14.70	103.934	
3,300.00	3,093.55	3,054.65	3,053.77	10.01	6.04	44.04	-1,832.10	-252.89	1,433.89	1,417.84	16.05	89.345	
3,399.99	3,103.22	3,064.33	3,063.44	11.46	6.06	90.19	-1,832.10	-252.80	1,336.26	1,318.75	17.52	76.283	
3,500.00	3,102.88	3,063.99	3,063.10	13.00	6.06	91.43	-1,832.10	-252.81	1,238.31	1,219.25	19.06	64.965	
3,600.00	3,102.53	3,063.64	3,062.75	14.62	6.06	91.35	-1,832.10	-252.81	1,140.73	1,120.05	20.67	55.179	
3,700.00	3,102.18	3,063.29	3,062.41	16.28	6.06	91.27	-1,832.10	-252.81	1,043.59	1,021.26	22.33	46.729	
3,800.00	3,101.83	3,062.95	3,062.06	17.97	6.06	91.20	-1,832.10	-252.82	947.06	923.03	24.03	39.417	
3,900.00	3,101.48	3,062.60	3,061.71	19.69	6.06	91.12	-1,832.10	-252.82	851.32	825.58	25.75	33.066	
4,000.00	3,101.13	3,062.25	3,061.37	21.43	6.06	91.04	-1,832.10	-252.82	756.69	729.21	27.49	27.531	
4,100.00	3,100.78	3,061.91	3,061.02	23.19	6.05	90.97	-1,832.10	-252.83	663.64	634.40	29.24	22.697	
4,200.00	3,100.43	3,061.56	3,060.67	24.95	6.05	90.89	-1,832.10	-252.83	572.93	541.93	31.01	18.478	
4,300.00	3,100.08	3,061.21	3,060.33	26.73	6.05	90.81	-1,832.10	-252.83	485.88	453.10	32.78	14.822	
4,400.00	3,099.73	3,060.87	3,059.98	28.51	6.05	90.74	-1,832.10	-252.83	404.87	370.30	34.56	11.714	
4,500.00	3,099.38	3,060.52	3,059.63	30.30	6.05	90.66	-1,832.10	-252.84	334.29	297.93	36.35	9.195	
4,600.00	3,099.03	3,060.17	3,059.29	32.10	6.05	90.58	-1,832.10	-252.84	282.10	243.95	38.15	7.395	
4,700.00	3,098.68	3,059.83	3,058.94	33.90	6.05	90.51	-1,832.10	-252.84	259.63	219.69	39.95	6.499	
4,710.84	3,098.64	3,059.79	3,058.90	34.09	6.05	90.50	-1,832.10	-252.84	259.41	219.27	40.14	6.462 CC, ES, SF	
4,800.00	3,098.33	3,059.48	3,058.59	35.70	6.05	90.43	-1,832.10	-252.85	274.30	232.55	41.75	6.570	
4,900.00	3,097.98	3,059.13	3,058.25	37.51	6.05	90.36	-1,832.10	-252.85	321.05	277.49	43.56	7.371	
5,000.00	3,097.63	3,058.79	3,057.90	39.32	6.05	90.28	-1,832.10	-252.85	388.46	343.10	45.37	8.563	

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0:00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0:00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1 08-11-15	Offset TVD Reference:	Offset Datum

Offset Design Stevenson - #1 - WB1 - Surveys													Offset Site Error:	0.00 usft
Survey Program: 541-MWD													Offset Well Error:	0.00 usft
Reference	Measured	Vertical	Measured	Vertical	Semi Major Axis	Offset	Highside	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning	
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	Reference (usft)	Offset (usft)	Toolface (°)	N-S (usft)	E-W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)		
5,100.00	3,097.28	3,058.44	3,057.55	41.13	6.05	90.20	-1,832.10	-252.86	467.69	420.51	47.18	9.913		
5,200.00	3,096.93	3,058.09	3,057.21	42.94	6.05	90.13	-1,832.10	-252.86	553.68	504.69	48.99	11.302		
5,300.00	3,096.58	3,057.75	3,056.86	44.76	6.05	90.05	-1,832.10	-252.86	643.73	592.93	50.81	12.670		
5,400.00	3,096.23	3,057.40	3,056.51	46.58	6.05	89.97	-1,832.10	-252.86	736.36	683.73	52.62	13.993		
5,500.00	3,095.88	3,057.05	3,056.17	48.40	6.04	89.90	-1,832.10	-252.87	830.69	776.25	54.44	15.258		
5,600.00	3,095.53	3,056.70	3,055.82	50.22	6.04	89.82	-1,832.10	-252.87	926.22	869.96	56.26	16.463		
5,700.00	3,095.18	3,056.36	3,055.47	52.04	6.04	89.74	-1,832.10	-252.87	1,022.60	964.52	58.08	17.606		
5,800.00	3,094.83	3,056.01	3,055.13	53.86	6.04	89.67	-1,832.10	-252.88	1,119.62	1,059.71	59.90	18.690		
5,900.00	3,094.48	3,055.66	3,054.78	55.69	6.04	89.59	-1,832.10	-252.88	1,217.11	1,155.39	61.73	19.718		
6,000.00	3,094.13	3,055.32	3,054.43	57.51	6.04	89.51	-1,832.10	-252.88	1,314.99	1,251.44	63.55	20.692		
6,100.00	3,093.78	3,054.97	3,054.09	59.34	6.04	89.44	-1,832.10	-252.89	1,413.16	1,347.78	65.38	21.616		
6,200.00	3,093.43	3,054.62	3,053.74	61.16	6.04	89.36	-1,832.10	-252.89	1,511.57	1,444.37	67.20	22.493		
6,300.00	3,093.08	3,054.28	3,053.39	62.99	6.04	89.28	-1,832.10	-252.89	1,610.18	1,541.15	69.03	23.327		
6,400.00	3,092.73	3,053.93	3,053.05	64.82	6.04	89.21	-1,832.10	-252.89	1,708.95	1,638.10	70.85	24.120		
6,500.00	3,092.38	3,053.58	3,052.70	66.64	6.04	89.13	-1,832.10	-252.90	1,807.85	1,735.17	72.68	24.874		
6,600.00	3,092.03	3,053.24	3,052.35	68.47	6.04	89.05	-1,832.10	-252.90	1,906.87	1,832.36	74.51	25.593		
6,700.00	3,091.68	3,052.89	3,052.01	70.30	6.04	88.98	-1,832.10	-252.90	2,005.99	1,929.65	76.34	26.278		
6,800.00	3,091.33	3,052.54	3,051.66	72.13	6.04	88.90	-1,832.10	-252.91	2,105.19	2,027.02	78.16	26.933		
6,900.00	3,090.98	3,052.20	3,051.31	73.96	6.03	88.82	-1,832.10	-252.91	2,204.46	2,124.47	79.99	27.558		
7,000.00	3,090.63	3,051.85	3,050.97	75.79	6.03	88.75	-1,832.10	-252.91	2,303.79	2,221.97	81.82	28.156		
7,100.00	3,090.28	3,051.50	3,050.62	77.62	6.03	88.67	-1,832.10	-252.92	2,403.18	2,319.53	83.65	28.728		
7,200.00	3,089.93	3,051.16	3,050.27	79.45	6.03	88.59	-1,832.10	-252.92	2,502.62	2,417.14	85.48	29.277		
7,300.00	3,089.58	3,050.81	3,049.93	81.28	6.03	88.52	-1,832.10	-252.92	2,602.10	2,514.79	87.31	29.802		
7,400.00	3,089.23	3,050.46	3,049.58	83.11	6.03	88.44	-1,832.10	-252.93	2,701.62	2,612.48	89.14	30.307		
7,500.00	3,088.88	3,050.12	3,049.23	84.94	6.03	88.37	-1,832.10	-252.93	2,801.18	2,710.20	90.97	30.791		
7,600.00	3,088.53	3,049.77	3,048.89	86.77	6.03	88.29	-1,832.10	-252.93	2,900.76	2,807.96	92.80	31.257		
7,658.02	3,088.33	3,049.57	3,048.69	87.58	6.03	88.24	-1,832.10	-252.93	2,958.55	2,864.94	93.61	31.604		



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County NM (NAD27-NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1-08-11-15	Offset-TVD Reference:	Offset Datum

Tarpan 33 Fee - #2H - WB1/Job #1410167 - Surveys (Silver Oak 3)													Offset Site Error:	0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3.2451-MWD													Offset Well Error:	0.00 usft
Reference														
Measured		Vertical		Measured		Vertical		Reference		Offset		Semi Major Axis		Warning
Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	Depth	
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	
Distance														
Between		Between		Between		Between		Between		Between		Between		Warning
Centres	Centres	Ellipses	Ellipses	Minimum	Minimum	Separation	Separation	Factor	Factor	Factor	Factor	Factor	Factor	
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	9.27	300.30	49.00	304.27			
100.00	100.00	94.78	94.78	0.09	0.08	9.26	300.96	49.06	304.96	304.79	0.17	1,801.593		
200.00	200.00	195.59	195.58	0.32	0.26	9.26	302.24	49.29	306.25	305.68	0.58	531.012		
300.00	300.00	295.23	295.21	0.54	0.45	9.31	303.35	49.71	307.42	306.43	0.99	311.475		
400.00	400.00	396.28	396.26	0.77	0.63	9.39	304.34	50.35	308.49	307.09	1.40	220.418		
500.00	500.00	497.04	497.01	0.99	0.82	9.56	304.95	51.35	309.25	307.45	1.81	170.965		
600.00	600.00	596.07	596.02	1.22	1.00	9.89	305.42	53.27	310.05	307.83	2.21	140.047		
700.00	700.00	695.61	695.50	1.44	1.18	10.44	305.92	56.38	311.09	308.47	2.62	118.695		
800.00	800.00	797.13	796.97	1.67	1.37	11.04	306.22	59.72	311.99	308.96	3.03	102.919		
900.00	900.00	897.59	897.39	1.89	1.55	11.55	306.23	62.61	312.57	309.13	3.44	90.863		
1,000.00	1,000.00	997.99	997.75	2.12	1.73	12.02	306.16	65.20	313.03	309.18	3.85	81.322		
1,100.00	1,100.00	1,098.23	1,097.97	2.34	1.92	12.43	306.05	67.44	313.39	309.13	4.26	73.588		
1,200.00	1,200.00	1,197.88	1,197.60	2.56	2.10	12.78	306.00	69.41	313.78	309.11	4.67	67.218		
1,300.00	1,300.00	1,297.47	1,297.17	2.79	2.29	13.08	306.13	71.15	314.29	309.21	5.08	61.886		
1,400.00	1,400.00	1,397.28	1,396.97	3.01	2.48	13.35	306.39	72.70	314.90	309.41	5.49	57.357		
1,500.00	1,500.00	1,497.67	1,497.36	3.24	2.66	13.60	306.64	74.17	315.49	309.59	5.90	53.445		
1,600.00	1,600.00	1,598.94	1,598.61	3.46	2.85	13.82	306.67	75.45	315.82	309.50	6.32	49.999		
1,700.00	1,700.00	1,698.06	1,697.73	3.69	3.04	14.05	306.62	76.73	316.08	309.35	6.73	46.995		
1,800.00	1,800.00	1,798.05	1,797.71	3.91	3.22	14.29	306.69	78.11	316.48	309.35	7.14	44.340		
1,900.00	1,900.00	1,897.85	1,897.50	4.14	3.41	14.51	306.82	79.38	316.92	309.38	7.55	41.979		
2,000.00	2,000.00	1,998.14	1,997.78	4.36	3.60	14.69	306.97	80.50	317.36	309.39	7.96	39.857		
2,100.00	2,100.00	2,097.43	2,097.06	4.59	3.79	14.86	307.21	81.52	317.85	309.48	8.37	37.959		
2,200.00	2,200.00	2,198.07	2,197.70	4.81	3.98	15.03	307.48	82.54	318.36	309.58	8.79	36.230		
2,300.00	2,300.00	2,298.14	2,297.77	5.04	4.16	15.16	307.67	83.34	318.76	309.56	9.20	34.648		
2,400.00	2,400.00	2,398.39	2,398.01	5.26	4.35	15.24	307.89	83.86	319.11	309.49	9.61	33.196		
2,500.00	2,500.00	2,497.39	2,497.02	5.49	4.40	15.33	308.00	84.46	319.37	309.48	9.89	32.290		
2,600.00	2,600.00	2,562.94	2,562.39	5.71	4.41	-164.75	311.68	83.49	325.03	314.91	10.12	32.124 SF		
2,700.00	2,699.00	2,618.13	2,616.36	5.89	4.43	-165.35	322.29	79.48	354.33	344.01	10.32	34.331		
2,800.00	2,793.72	2,661.53	2,657.36	6.10	4.46	-165.47	335.58	74.62	410.57	400.01	10.56	38.862		
2,900.00	2,880.67	2,700.00	2,692.36	6.38	4.51	-164.66	350.58	69.21	487.22	476.33	10.89	44.726		
3,000.00	2,956.66	2,715.98	2,706.55	6.89	4.55	-159.28	357.50	66.73	576.94	565.50	11.44	50.435		
3,100.00	3,018.90	2,732.00	2,720.54	7.67	4.58	-140.34	364.84	64.04	674.02	661.77	12.25	55.017		
3,200.00	3,065.09	2,732.00	2,720.54	8.72	4.58	-47.76	364.84	64.04	773.44	760.14	13.30	58.133		
3,300.00	3,093.55	2,717.37	2,707.78	10.01	4.55	-16.54	358.12	66.50	871.35	856.79	14.56	59.842		
3,399.99	3,103.22	2,700.00	2,692.36	11.46	4.51	-9.78	350.58	69.21	964.88	948.91	15.97	60.409		
3,500.00	3,102.88	2,688.66	2,682.16	13.00	4.50	-9.67	345.91	70.86	1,055.70	1,038.19	17.50	60.324		
3,600.00	3,102.53	2,669.00	2,664.25	14.62	4.47	-9.63	338.30	73.62	1,147.59	1,128.50	19.08	60.131		
3,700.00	3,102.18	2,669.00	2,664.25	16.28	4.47	-9.63	338.30	73.62	1,240.29	1,219.55	20.75	59.787		
3,800.00	3,101.83	2,655.23	2,651.51	17.97	4.46	-9.58	333.39	75.42	1,333.76	1,311.33	22.43	59.471		
3,900.00	3,101.48	2,638.00	2,635.33	19.69	4.44	-9.50	327.84	77.45	1,428.07	1,403.94	24.13	59.180		
4,000.00	3,101.13	2,638.00	2,635.33	21.43	4.44	-9.50	327.84	77.45	1,522.71	1,496.84	25.87	58.858		
4,100.00	3,100.78	2,638.00	2,635.33	23.19	4.44	-9.50	327.84	77.45	1,617.99	1,590.36	27.63	58.569		
4,200.00	3,100.43	2,638.00	2,635.33	24.95	4.44	-9.50	327.84	77.45	1,713.81	1,684.42	29.39	58.308		
4,300.00	3,100.08	2,622.69	2,620.74	26.73	4.43	-9.40	323.48	79.04	1,809.73	1,778.57	31.16	58.079		
4,400.00	3,099.73	2,607.00	2,605.61	28.51	4.42	-9.28	319.58	80.48	1,906.32	1,873.38	32.94	57.881		
4,500.00	3,099.38	2,607.00	2,605.61	30.30	4.42	-9.28	319.58	80.48	2,002.90	1,968.18	34.73	57.678		
4,600.00	3,099.03	2,607.00	2,605.61	32.10	4.42	-9.28	319.58	80.48	2,099.81	2,063.29	36.52	57.496		
4,700.00	3,098.68	2,607.00	2,605.61	33.90	4.42	-9.28	319.58	80.48	2,196.99	2,158.67	38.32	57.332		
4,800.00	3,098.33	2,607.00	2,605.61	35.70	4.42	-9.28	319.58	80.48	2,294.42	2,254.29	40.12	57.183		
4,900.00	3,097.98	2,607.00	2,605.61	37.51	4.42	-9.28	319.58	80.48	2,392.05	2,350.12	41.93	57.047		
5,000.00	3,097.63	2,607.00	2,605.61	39.32	4.42	-9.28	319.58	80.48	2,489.88	2,446.14	43.74	56.923		
5,100.00	3,097.28	2,592.55	2,591.54	41.13	4.42	-9.15	316.50	81.63	2,587.59	2,542.04	45.55	56.809		

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County NM, (NAD27 NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1.08-11-15	Offset TVD Reference:	Offset Datum

Tarpan 33 Fee - #2H - WB1/Job #1410167 - Surveys (Silver Oak 3)												Offset Site Error:	0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3/2451-MWD												Offset Well Error:	0.00 usft
Reference: Offset: Semi Major Axis													
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	Warning
5,200.00	3,096.93	2,589.81	2,588.86	42.94	4.42	-9.13	315.97	81.84	2,685.61	2,638.25	47.36	56.704	
5,300.00	3,096.58	2,576.00	2,575.30	44.76	4.41	-9.00	313.56	82.77	2,783.93	2,734.75	49.17	56.614	
5,400.00	3,096.23	2,576.00	2,575.30	46.58	4.41	-9.00	313.56	82.77	2,882.12	2,831.12	50.99	56.521	
5,500.00	3,095.88	2,576.00	2,575.30	48.40	4.41	-9.00	313.56	82.77	2,980.43	2,927.62	52.81	56.436	
5,600.00	3,095.53	2,576.00	2,575.30	50.22	4.41	-9.00	313.56	82.77	3,078.85	3,024.21	54.63	56.357	
5,700.00	3,095.18	2,576.00	2,575.30	52.04	4.41	-9.00	313.56	82.77	3,177.36	3,120.91	56.45	56.283	
5,800.00	3,094.83	2,576.00	2,575.30	53.86	4.41	-9.00	313.56	82.77	3,275.97	3,217.70	58.28	56.215	
5,900.00	3,094.48	2,576.00	2,575.30	55.69	4.41	-9.00	313.56	82.77	3,374.66	3,314.56	60.10	56.151	
6,000.00	3,094.13	2,576.00	2,575.30	57.51	4.41	-9.00	313.56	82.77	3,473.43	3,411.50	61.92	56.092	
6,100.00	3,093.78	2,576.00	2,575.30	59.34	4.41	-9.00	313.56	82.77	3,572.26	3,508.51	63.75	56.036	
6,200.00	3,093.43	2,576.00	2,575.30	61.16	4.41	-9.00	313.56	82.77	3,671.16	3,605.58	65.58	55.984	
6,300.00	3,093.08	2,576.00	2,575.30	62.99	4.41	-9.00	313.56	82.77	3,770.11	3,702.71	67.40	55.935	
6,400.00	3,092.73	2,576.00	2,575.30	64.82	4.41	-9.00	313.56	82.77	3,869.12	3,799.89	69.23	55.889	
6,500.00	3,092.38	2,576.00	2,575.30	66.64	4.41	-9.00	313.56	82.77	3,968.18	3,897.12	71.06	55.845	
6,600.00	3,092.03	2,576.00	2,575.30	68.47	4.41	-9.00	313.56	82.77	4,067.28	3,994.40	72.89	55.804	
6,700.00	3,091.68	2,576.00	2,575.30	70.30	4.41	-9.00	313.56	82.77	4,166.43	4,091.72	74.71	55.765	
6,800.00	3,091.33	2,561.11	2,560.58	72.13	4.41	-8.84	311.45	83.58	4,265.34	4,188.80	76.54	55.727	
6,900.00	3,090.98	2,559.92	2,559.40	73.96	4.41	-8.83	311.31	83.63	4,364.52	4,286.15	78.37	55.691	
7,000.00	3,090.63	2,545.00	2,544.57	75.79	4.41	-8.65	309.73	84.16	4,463.97	4,383.77	80.20	55.662	
7,100.00	3,090.28	2,545.00	2,544.57	77.62	4.41	-8.65	309.73	84.16	4,563.18	4,481.15	82.03	55.630	
7,200.00	3,089.93	2,545.00	2,544.57	79.45	4.41	-8.65	309.73	84.16	4,662.42	4,578.56	83.86	55.599	
7,300.00	3,089.58	2,545.00	2,544.57	81.28	4.41	-8.65	309.73	84.16	4,761.69	4,676.00	85.69	55.570	
7,400.00	3,089.23	2,545.00	2,544.57	83.11	4.41	-8.65	309.73	84.16	4,860.99	4,773.48	87.52	55.542	
7,500.00	3,088.88	2,545.00	2,544.57	84.94	4.41	-8.65	309.73	84.16	4,960.33	4,870.97	89.35	55.515	
7,600.00	3,088.53	2,545.00	2,544.57	86.77	4.41	-8.65	309.73	84.16	5,059.68	4,968.50	91.18	55.489	
7,658.02	3,088.33	2,545.00	2,544.57	87.58	4.41	-8.65	309.73	84.16	5,117.34	5,025.35	91.99	55.628	

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



Phoenix Technology Services LP
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well: #15H
Project:	Eddy County, NM (NAD27-NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1108-11-15	Offset-TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3397.00usft (Silver Oak 3)

Offset Depths are relative to Offset Datum

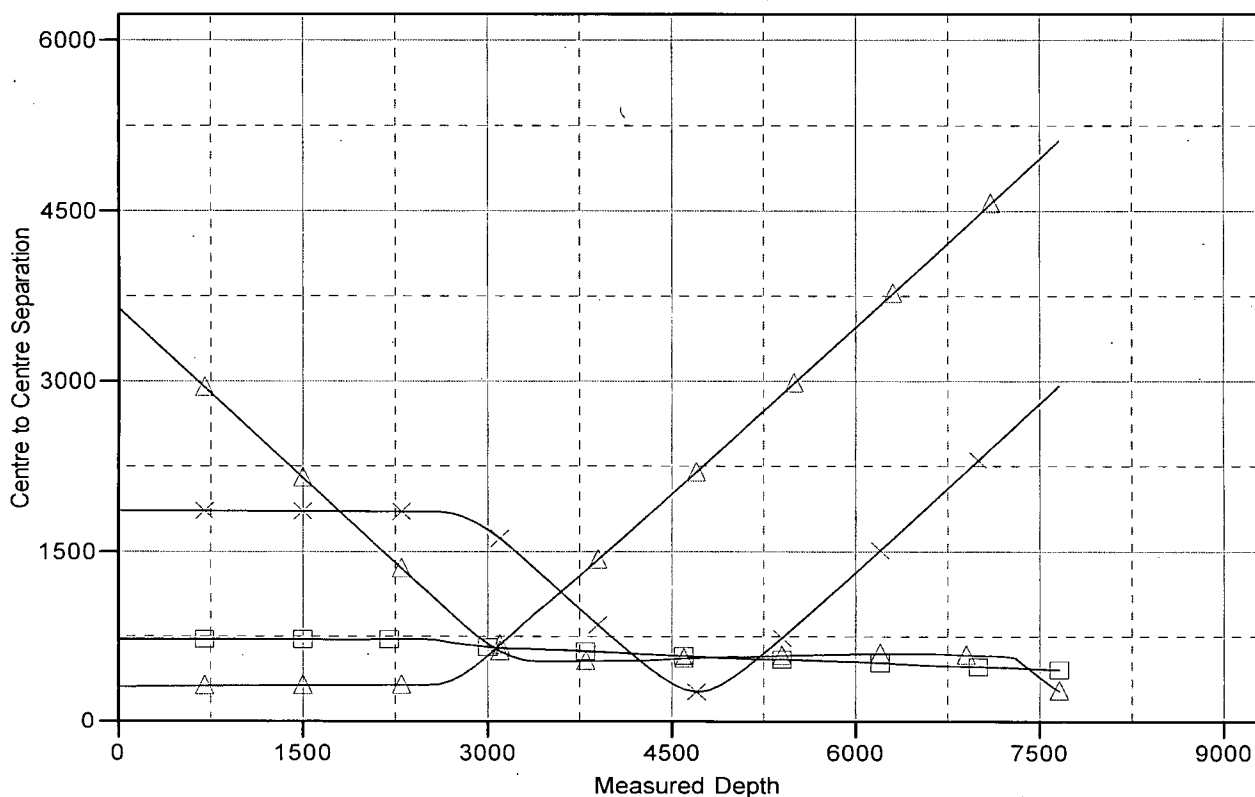
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #15H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30

Grid Convergence at Surface is: -0.03°

Ladder Plot



LEGEND

#1, WB1, Surveys V0

#10H, WB1/Job #1410565, Surveys (Silver Oak 3) V0

▲ #5H, WB1/Job #1410708, Surveys (Silver Oak 3) V0

▲ #2H, WB1/Job #1410167, Surveys (Silver Oak 3) V0



Phoenix Technology Services LP
Anticollision Report

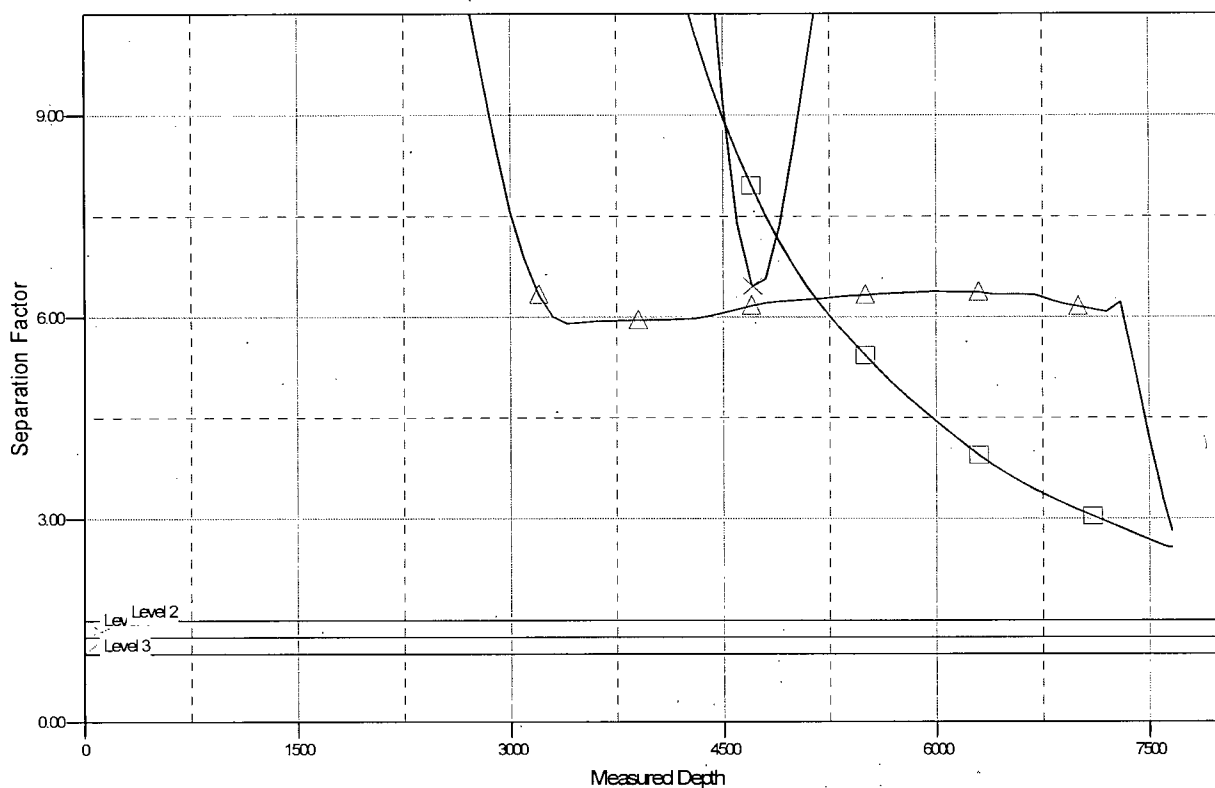


Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #15H
Project:	Eddy County, NM (NAD27, NME)	TVD Reference:	KB @ 3397.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3397.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#15H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	OH	Database:	Compass 5000 GCR
Reference Design:	Plan #1-08-11-15	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3397.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #15H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: -0.03°

Separation Factor Plot



LEGEND

#1, WB1, Surveys V0
#10H, WB1/Job #1410565, Surveys (Silver Oak 3) V0
#5H, WB1/Job #1410708, Surveys (Silver Oak 3) V0
#2H, WB1/Job #1410167, Surveys (Silver Oak 3) V0