

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
1330 S. St. Francis Dr., Santa Fe, NM 87505
Phone: (505) 476-3460 Fax: (505) 476-3462

State of New Mexico **NM OIL CONSERVATION**
Energy, Minerals & Natural Resources Department **ARTESIA DISTRICT**
OIL CONSERVATION DIVISION NOV 05 2014
1220 South St. Francis Dr.
Santa Fe, NM 87505

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

RECEIVED

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number 30-015-42782		2 Pool Code 96836		3 Pool Name Red Lake; Glorieta Yeso Northeast	
4 Property Code 313860		5 Property Name HALBERD 27 STATE			6 Well Number 3H
7 GRID NO. 229137		8 Operator Name COG OPERATING, LLC			9 Elevation 3610'
10 Surface Location					
11L or lot no. H	Section 27	Township 17-S	Range 28-E	Lot Idn 2090	Feet from the North/South line NORTH
				Feet from the East/West line 45	County EDDY
11 Bottom Hole Location If Different From Surface					
12L or lot no. E	Section 27	Township 17-S	Range 28-E	Lot Idn 2310	Feet from the North/South line NORTH
				Feet from the East/West line 330	County EDDY
12 Dedicated Acres 160		13 Joint or Infill		14 Consolidation Code	
				15 Order No.	

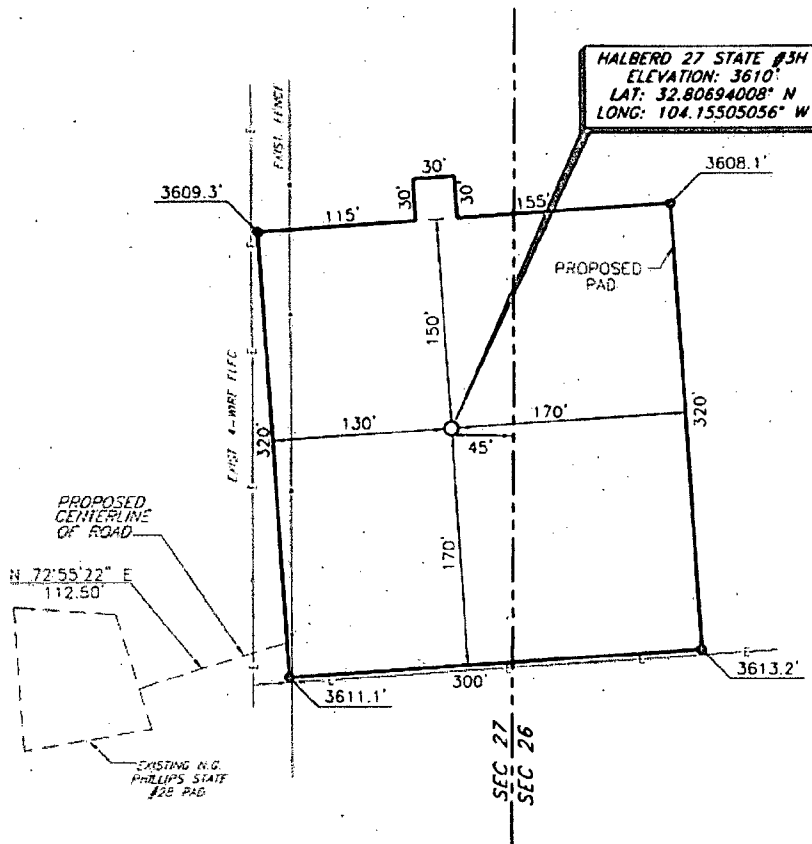
No allowable will be assigned to this completion until all interest have been consolidated or a non-standard unit has been approved by the division.

16 GEODETIC DATA NAD 27 GRID - NM EAST SURFACE LOCATION N 657322.0 - E 554777.3 PRODUCING AREA LAT: 32.20694005° N LONG: 104.15505056° W BOTTOM LOCATION N 657322.0 - E 549922.6 CORNER DATA NAD 27 GRID - NM EAST A: BRASS CAP 1941 N 654171.7 - E 549562.6 B: BRASS CAP 1941 N 656782.8 - E 549589.7 C: BRASS CAP 1941 N 659394.4 - E 549615.6 D: BRASS CAP 1941 N 659403.5 - E 552227.1 E: BRASS CAP 1941 N 659411.7 - E 554838.6 F: BRASS CAP 1941 N 656823.2 - E 554818.4 G: BRASS CAP 1941 N 654234.8 - E 554798.0 H: BRASS CAP 1941 N 654203.5 - E 552180.8		17 OPERATOR CERTIFICATION I hereby certify that the information contained herein is true and complete to the best of my knowledge and belief, and that this organization either owns a working interest or undivided 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 a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling order as required by the division. Signature: <i>[Signature]</i> Date: 10-30-14 Printed Name: Kelly J. Holly Email Address: kholly@concho.com 18 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. Date of Survey: 4-10-14 Signature and Seal of Professional Surveyor: <i>[Signature]</i> 11398 Certificate Number Revised: 4-24-14
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RRC - Firm No.: TX 10193838 NM 4655451 - Job No.: LS140137A

COG OPERATING, LLC

Halberd 27 State #3H
(2090' FNL & 45' FEL)
Section 27, T17S, R28E,
N. M. P. M., Eddy Co., New Mexico



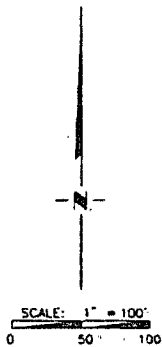
DIRECTIONS TO LOCATION

From the intersection of U. S. Hwy 82 and
HWY 360, head East on U. S. Hwy 82 approx.
0.6 mile to a lease road;

Turn left on lease road and go North approx.
0.5 mile to a lease road;

Turn right and head Northeast approx. 330
feet to the N. G. Phillips State #28 pad;

Location is approx. 317 feet Northeast of the
existing COG pumping unit.



BEARINGS ARE GRID NAD 27
NM EAST
DISTANCES ARE HORZ. GROUND

Firm No.: TX 10193838 NM 4555451

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1	Name	4/24/14
NO.	REVISION	DATE
JOB NO.:	LS140137	
DWG. NO.:	140137PAD	

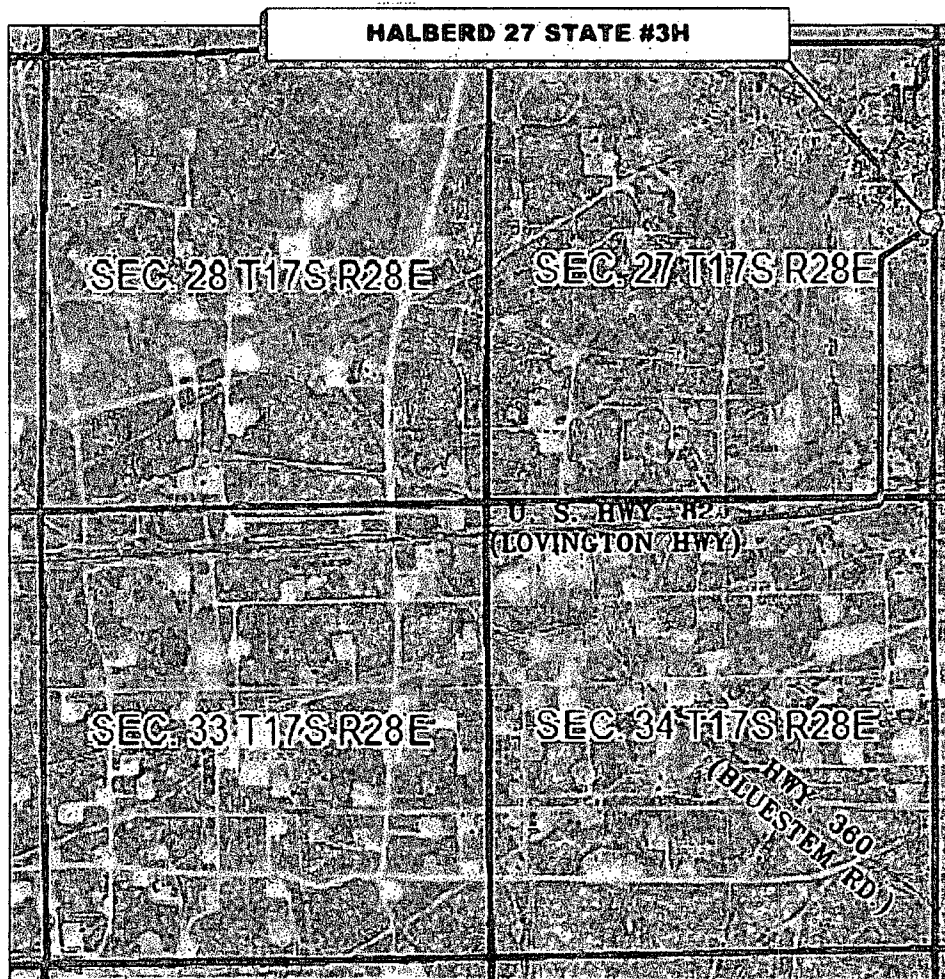
RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 100'
DATE: 4-10-14
SURVEYED BY: GB/SM
DRAWN BY: JF
APPROVED BY: LWB
SHEET : 1 OF 1

VICINITY MAP

NOT TO SCALE



SECTION 27, TWP. 17 SOUTH, RGE. 28 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO

OPERATOR: COG Operating, LLC
LEASE: Halberd 27 State
WELL NO.: 3H

LOCATION: 2090' FNL & 45' FEL
ELEVATION: 3610'

Firm No.: TX 10193938 NM 4655451

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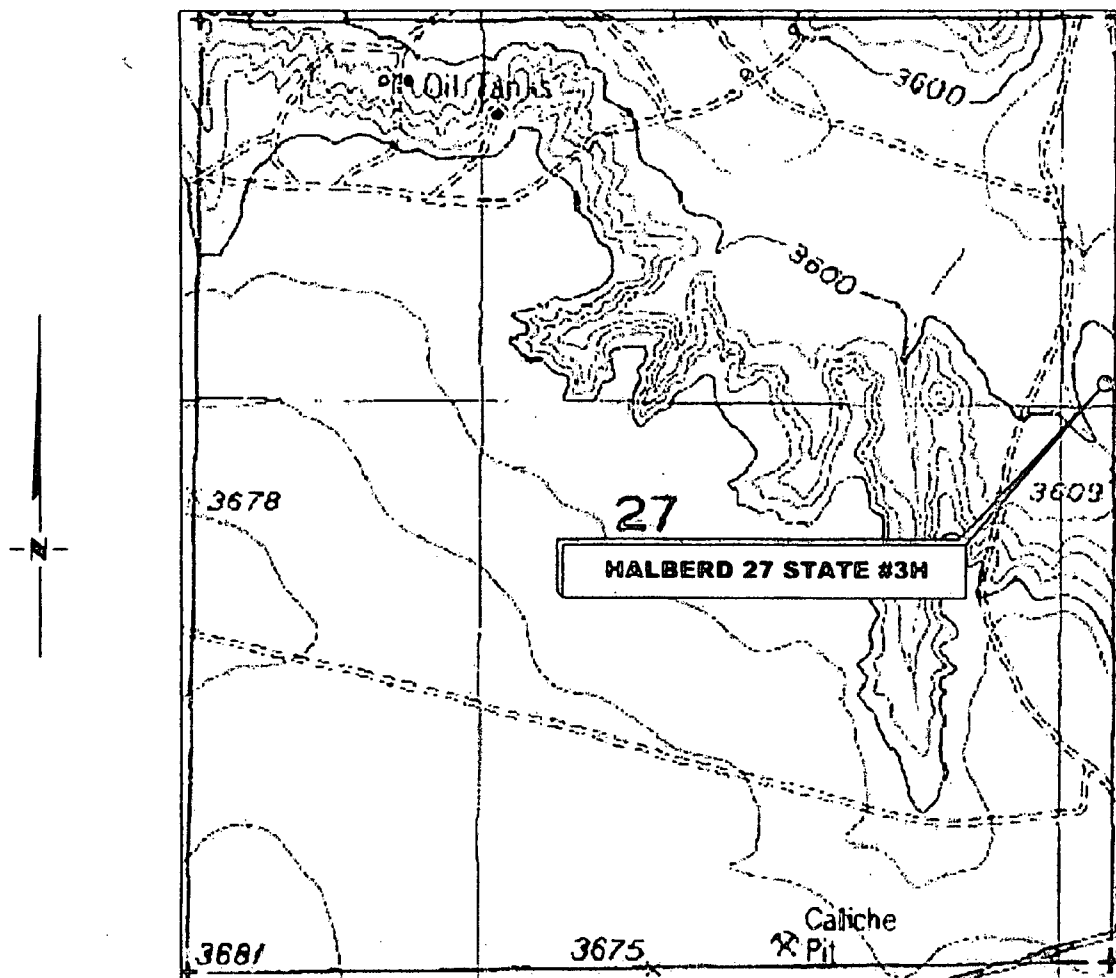
1	Name	4/24/14
NO.	REVISION	DATE
JOB NO.: LS140137		
DWG. NO.: 140137VM		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: NOT TO SCALE
DATE: 4-10-14
SURVEYED BY: GB/SM
DRAWN BY: JF
APPROVED BY: LWB
SHEET : 1 OF 1

LOCATION VERIFICATION MAP



SECTION 27, TWP. 17 SOUTH, RGE. 28 EAST,
N. M. P. M., EDDY COUNTY, NEW MEXICO

OPERATOR: COG Operating, LLC
LEASE: Halberd 27 State
WELL NO.: 3H
ELEVATION: 3610'

LOCATION: 2090' FSL & 45' FEL
CONTOUR INTERVAL: 10'
USGS TOPO. SOURCE MAP:
Red Lake, NM (P.E. 1985)

Firm No.: TX 10153638 NM 4655451

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1	NAME	4/24/14
NO.	REVISION	DATE
JOB NO.: LS140137		
DWG. NO.: 140137LVM		

RRC

308 W. BROADWAY ST., HOBBS, NM 88240 (575) 964-8200

SCALE: 1" = 1000'
DATE: 4-10-14
SURVEYED BY: GB/SM
DRAWN BY: JF
APPROVED BY: LWB
SHEET : 1 OF 1



COG Operating LLC

Eddy County, NM (NAD27 NME)

Halberd 27 State

#3H

WB1

Plan: Plan #1 09-08-14

Surface: 2090' FNL, 45' FEL, Sec 27, T17S, R28E, Unit H

PP: 2104' FNL, 330' FEL, Sec 27, T17S, R28E, Unit H

BHL: 2310' FNL, 330' FWL, Sec 27, T17S, R28E, Unit E

Standard Planning Report

08 September, 2014





Phoenix Technology Services
Planning Report



Database:	GCR DB	Local Co-ordinate Reference:	Well #3H
Company:	COG Operating LLC	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site:	Halberd 27 State	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 09-08-14		

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:	Halberd 27 State				
Site Position:		Northing:	657,322.00 usft	Latitude:	32° 48' 24.98418 N
From:	Map	Easting:	554,777.30 usft	Longitude:	104° 9' 18.18172 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	-0.10

Well	#3H					
Well Position	+N/-S	0.00 usft	Northing:	657,322.00 usft	Latitude:	32° 48' 24.98418 N
	+E/-W	0.00 usft	Easting:	554,777.30 usft	Longitude:	104° 9' 18.18172 W
Position Uncertainty		0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,610.00 usft

Wellbore						WB1					
Magnetics											
Model Name				Sample Date		Declination		Dip Angle		Field Strength	
						(°)		(°)		(nT)	
IGRF2010_14				09/08/14		7.50		60.54		48,578	

Design					Plan #1 09-08-14				
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		267.22	

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	
3,290.32	0.00	0.00	3,290.32	0.00	0.00	0.00	0.00	0.00	0.00	
4,122.13	91.50	267.22	3,811.01	-25.92	-533.88	11.00	11.00	0.00	267.22	
8,449.53	91.50	267.22	3,697.73	-235.70	-4,854.70	0.00	0.00	0.00	0.00	BHL-Halberd 27 St #3

Planned Survey										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,290.32	0.00	0.00	3,290.32	0.00	0.00	0.00	0.00	0.00	0.00	
4,119.96	91.26	267.22	3,811.06	-25.81	-531.71	532.33	11.00	11.00	0.00	
TL 3825' TVD @ 0 VZ, 91.5° Inc.										
4,122.13	91.50	267.22	3,811.01	-25.92	-533.88	534.51	11.00	11.00	0.00	
8,449.53	91.50	267.22	3,697.73	-235.70	-4,854.70	4,860.42	0.00	0.00	0.00	



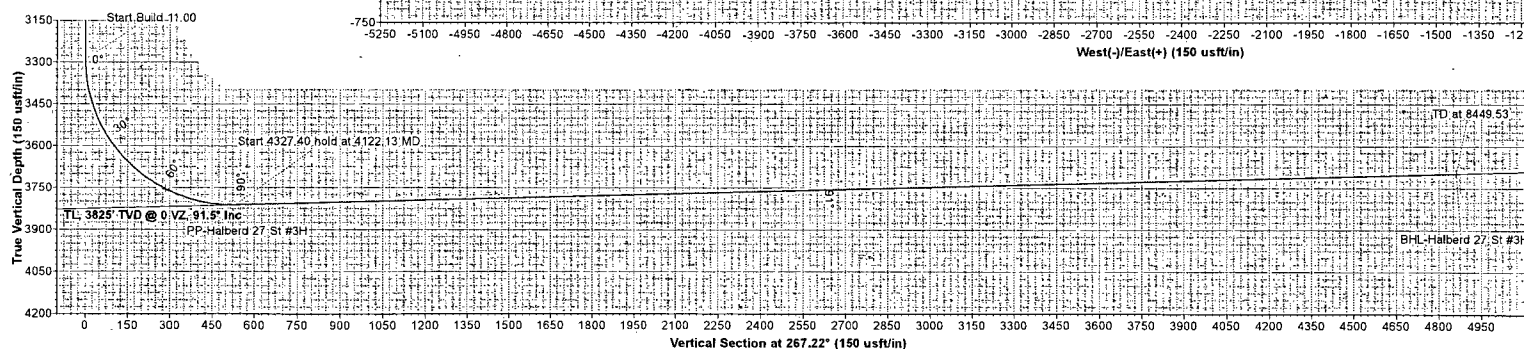
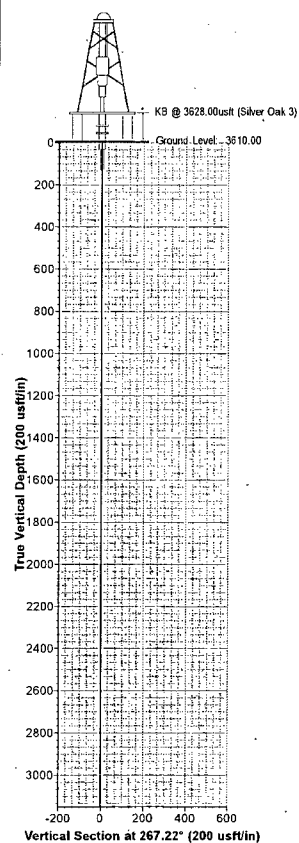
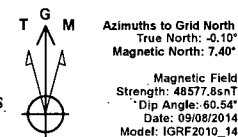
Phoenix Technology Services
Planning Report



Database:	GCR.DB	Local Co-ordinate Reference:	Well #3H
Company:	COG Operating LLC	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27/NME)	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site:	Halberd 27 State	North Reference:	Grid
Well:	#3H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1-09-08-14		

Design Targets									
Target Name	hit/miss target	Dip Angle	Dip Dir	TVD	+N-S	+E-W	Northing	Easting	
Shape		(°)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)	Latitude Longitude
BHL-Halberd 27 St #3H	- plan hits target center	0.00	0.00	3,697.73	-235.70	-4,854.70	657,086.30,	549,922.60	32° 48' 22.72923 N 104° 10' 15.06762 W
	- Point								
PP-Halberd 27 St #3H	- plan misses target center by 15.40usft at 3879.49usft MD (3761.65 TVD, -14.51 N, -298.82 E)	0.00	0.01	3,754.89	-13.84	-285.00	657,308.17	554,492.30	32° 48' 24.85200 N 104° 9' 21.52128 W
	- Point								

Formations						
Measured Depth	Vertical Depth	Name	Lithology	Dip	Dip Direction	
(usft)	(usft)			(°)	(°)	
4,119.96	3,811.06	TL, 3825' TVD @ 0 VZ, 91.5° Inc		-1.50	267.22	



WELL DETAILS

			Ground Level	3610.00		
+N-S	+E-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	657322.00	554777.30	32° 48' 24.98418 N	104° 9' 18.18172 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	3290.32	0.00	0.00	3290.32	0.00	0.00	0.00	0.00	0.00		
3	4122.13	91.50	267.22	3811.01	-25.92	-533.88	11.00	267.22	534.51		
4	8448.53	91.50	267.22	3697.73	-235.70	-485.70	0.00	0.00	4860.42	BHL-Halberd 27 St #3H	

DESIGN TARGET DETAILS

Name	TVD	+/-NAS	+E/W	Northing	Easting	Latitude	Longitude	Shape
BHL-Halberd 27 St 3H	3697.73	-235.70	-4854.70	657086.30	549922.60	32° 48' 22.72923 N	104° 10' 15.06762 W	Point
	- plan hits target center							
PP-Halberd 27 St 3H	3754.89	-13.84	-285.00	657308.16	554492.30	32° 48' 24.85200 N	104° 9' 21.51228 W	Point
	- plan hits target center							

FORMATION TOP DETAILS

TVDPATH	MDPATH	FORMATION	DIPANGLE	DIPDIR
3811.06	4119.96	TL, 3825' TVD @ 0 VZ, 91.5° Inc	-1.50	267.22

LEGEND

- _____#28, WB1, Inc Surveys V0
 _____#31, WB1, Inc Surveys V0
 _____#4, WB1, Inc Surveys V0
 _____#30, WB1, Inc Surveys V0
 _____Plan #1 09-08-14

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

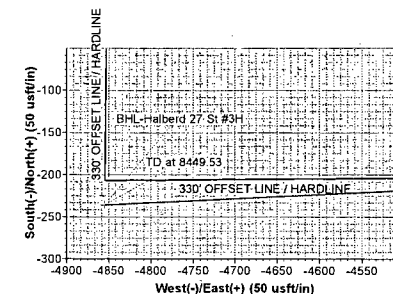
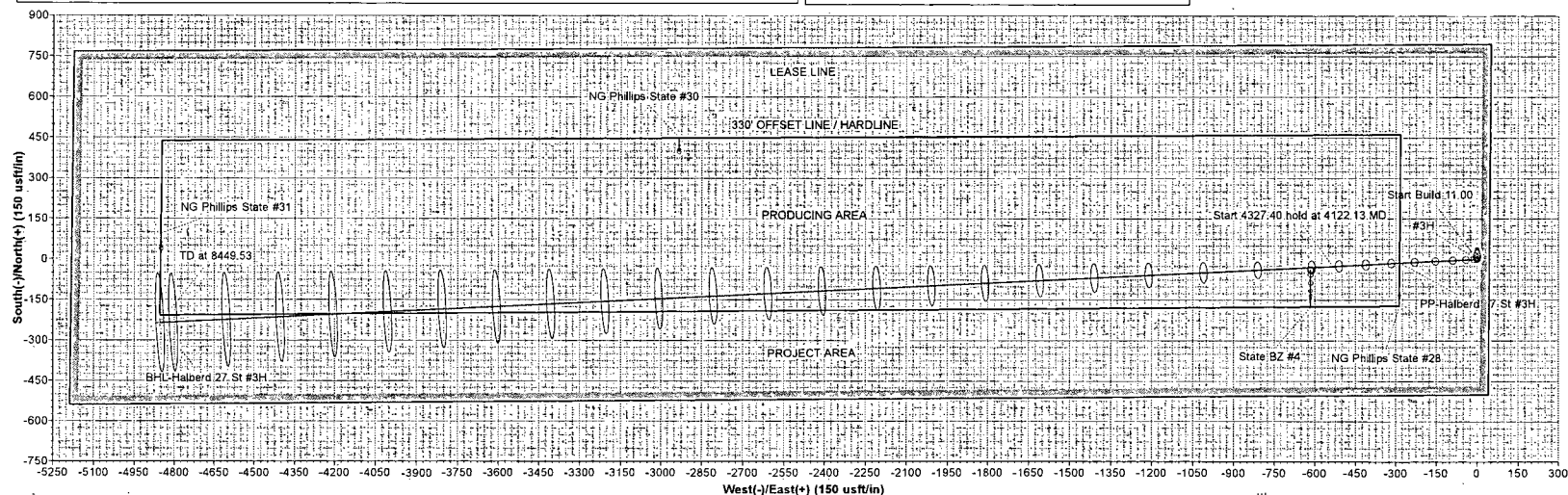
. Local Origin: Well #3H, Grid North

Latitude: 32° 48' 24.98418 N
Longitude: 104° 9' 18.18172 W

Grid East: 554777.30
Grid North: 657322.00
Scale Factor: 1.000

Geomagnetic Model: IGRF2010_14
Sample Date: 08-Sep-14
Magnetic Declination: 7.50°
Dip Angle from Horizontal: 60.54°
Magnetic Field Strength: 48578

To convert a Magnetic Direction to a Grid Direction, Add 7.41°
 To convert a Magnetic Direction to a True Direction, Add 7.50° East
 To convert a True Direction to a Grid Direction, Subtract 0.10°





COG Operating LLC

Eddy County, NM (NAD27 NME)

Halberd 27 State

#3H

WB1

Plan #1 09-08-14

Anticollision Report

08 September, 2014



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR DB
Reference Design:	Plan #1-09-08-14	Offset TVD Reference:	Offset Datum

Reference	Plan #1-09-08-14		
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 10,000.00 usft	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 09/08/14		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name Description
0.00	8,449.53	Plan #1 09-08-14 (WB1)	PHX+MWD+IGRF PHX+MWD+IGRF v3: standard declination

Summary						
Site Name	Reference Measured Depth (usft)	Offset Measured Depth (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Separation Factor	Warning
NG Phillips State						
#28 - WB1 - Inc Surveys	2,459.21	2,498.33	315.73	302.12	23.186	CC, ES
#28 - WB1 - Inc Surveys	2,500.00	2,500.00	317.70	303.94	23.077	SF
#30 - WB1 - Inc Surveys	6,503.39	3,583.00	562.52	446.26	4.838	CC, ES
#30 - WB1 - Inc Surveys	6,600.00	3,583.00	570.75	450.83	4.759	SF
#31 - WB1 - Inc Surveys	8,433.24	3,720.00	273.42	83.28	1.438	Level 3, CC
#31 - WB1 - Inc Surveys	8,449.53	3,720.00	273.90	83.15	1.436	Level 3, ES, SF
State BZ						
#4 - WB1 - Inc Surveys	4,208.91	3,794.27	85.60	53.88	2.699	CC, ES, SF

Offset Design NG Phillips State - #28 - WB1 - Inc Surveys												
Survey Program: 500-MWD												
Offset Site Error: 0.00 usft												
Offset Well Error: 0.00 usft												
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Separation Factor		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)	Factor
0.00	0.00	35.46	35.46	0.00	0.04	-120.96	-171.88	-286.48	334.09			
100.00	100.00	135.91	135.91	0.15	0.13	-120.93	-171.66	-286.48	333.98	333.70	0.28	1,187.021
200.00	200.00	236.36	236.36	0.51	0.23	-120.86	-171.17	-286.48	333.73	332.99	0.74	451.501
300.00	300.00	336.81	336.80	0.86	0.33	-120.75	-170.42	-286.48	333.34	332.15	1.20	278.496
400.00	400.00	437.25	437.24	1.22	0.43	-120.60	-169.40	-286.48	332.83	331.17	1.65	201.137
500.00	500.00	537.57	537.56	1.58	0.58	-120.41	-168.13	-286.48	332.18	330.02	2.16	153.796
600.00	600.00	637.71	637.68	1.94	0.80	-120.20	-166.74	-286.48	331.48	328.74	2.74	120.804
700.00	700.00	737.84	737.81	2.30	1.03	-119.98	-165.27	-286.48	330.75	327.42	3.33	99.380
800.00	800.00	837.98	837.93	2.66	1.26	-119.74	-163.71	-286.48	329.97	326.06	3.91	84.323
900.00	900.00	938.11	938.04	3.01	1.48	-119.50	-162.06	-286.48	329.15	324.66	4.50	73.185
1,000.00	1,000.00	1,038.18	1,038.10	3.37	1.71	-119.23	-160.33	-286.48	328.31	323.23	5.08	64.602
1,100.00	1,100.00	1,138.16	1,138.07	3.73	1.93	-118.97	-158.58	-286.48	327.46	321.79	5.67	57.789
1,200.00	1,200.00	1,238.15	1,238.04	4.09	2.16	-118.70	-156.84	-286.48	326.62	320.37	6.25	52.251
1,300.00	1,300.00	1,338.13	1,338.01	4.45	2.39	-118.43	-155.09	-286.48	325.78	318.95	6.84	47.662
1,400.00	1,400.00	1,438.12	1,437.98	4.81	2.61	-118.16	-153.35	-286.48	324.95	317.53	7.42	43.796
1,500.00	1,500.00	1,538.10	1,537.85	5.17	2.84	-117.89	-151.60	-286.48	324.13	316.13	8.00	40.495
1,600.00	1,600.00	1,638.09	1,637.92	5.52	3.06	-117.61	-149.86	-286.48	323.32	314.73	8.59	37.645
1,700.00	1,700.00	1,738.07	1,737.89	5.88	3.29	-117.34	-148.11	-286.48	322.52	313.34	9.17	35.159
1,800.00	1,800.00	1,838.06	1,837.85	6.24	3.52	-117.06	-146.37	-286.48	321.72	311.96	9.76	32.971

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



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WVB1	Database:	GCR/DB
Reference Design:	Plan #1-09-08-14	Offset TVD Reference:	Offset Datum

Offset Design NG Phillips State - #28 - WB1 - Inc Surveys													Offset Site Error: 0.00 usft	
Survey Program: 500-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 Tooface (°)	Offset Wellbore Centre +N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,900.00	1,900.00	1,938.04	1,937.82	6.60	3.74	-116.79	-144.62	-286.48	320.93	310.59	10.34	31.031		
2,000.00	2,000.00	2,038.12	2,037.89	6.96	3.97	-116.50	-142.86	-286.48	320.14	309.21	10.93	29.298		
2,100.00	2,100.00	2,138.35	2,138.10	7.32	4.20	-116.20	-140.96	-286.48	319.30	307.78	11.51	27.734		
2,200.00	2,200.00	2,238.57	2,238.30	7.67	4.42	-115.88	-138.88	-286.48	318.39	306.29	12.10	26.315		
2,300.00	2,300.00	2,338.79	2,338.49	8.03	4.65	-115.50	-136.63	-286.48	317.41	304.73	12.68	25.023		
2,400.00	2,400.00	2,439.00	2,438.67	8.39	4.88	-115.10	-134.20	-286.48	316.38	303.11	13.27	23.840		
2,459.21	2,459.21	2,498.33	2,497.98	8.60	5.01	-114.85	-132.68	-286.48	315.73	302.12	13.62	23.186 CC, ES		
2,500.00	2,500.00	2,500.00	2,499.65	8.75	5.02	-114.84	-132.63	-286.48	317.70	303.94	13.77	23.077 SF		
2,600.00	2,600.00	2,500.00	2,499.65	9.11	5.02	-114.84	-132.63	-286.48	343.61	329.48	14.13	24.325		
2,700.00	2,700.00	2,500.00	2,499.65	9.47	5.02	-114.84	-132.63	-286.48	393.95	379.46	14.48	27.198		
2,800.00	2,800.00	2,500.00	2,499.65	9.83	5.02	-114.84	-132.63	-286.48	460.79	445.94	14.84	31.044		
2,900.00	2,900.00	2,500.00	2,499.65	10.18	5.02	-114.84	-132.63	-286.48	538.01	522.81	15.20	35.392		
3,000.00	3,000.00	2,500.00	2,499.65	10.54	5.02	-114.84	-132.63	-286.48	621.76	606.20	15.56	39.959		
3,100.00	3,100.00	2,500.00	2,499.65	10.90	5.02	-114.84	-132.63	-286.48	709.73	693.81	15.92	44.586		
3,200.00	3,200.00	2,500.00	2,499.65	11.26	5.02	-114.84	-132.63	-286.48	800.52	784.25	16.28	49.182		
3,290.32	3,290.32	2,500.00	2,499.65	11.58	5.02	-114.84	-132.63	-286.48	884.24	867.64	16.60	53.266		
3,300.00	3,300.00	2,500.00	2,499.65	11.62	5.02	-21.06	-132.63	-286.48	893.26	876.63	16.63	53.700		
3,350.00	3,349.87	2,500.00	2,499.65	11.79	5.02	-16.97	-132.63	-286.48	939.05	922.25	16.80	55.880		
3,400.00	3,399.19	2,500.00	2,499.65	11.96	5.02	-14.15	-132.63	-286.48	983.35	966.38	16.98	57.922		
3,450.00	3,447.51	2,500.00	2,499.65	12.14	5.02	-12.11	-132.63	-286.48	1,025.98	1,008.83	17.15	59.809		
3,500.00	3,494.38	2,500.00	2,499.65	12.33	5.02	-10.59	-132.63	-286.48	1,066.77	1,049.42	17.34	61.510		
3,550.00	3,539.38	2,500.00	2,499.65	12.54	5.02	-9.41	-132.63	-286.48	1,105.56	1,088.00	17.55	62.979		
3,600.00	3,582.07	2,500.00	2,499.65	12.79	5.02	-8.49	-132.63	-286.48	1,142.21	1,124.41	17.80	64.155		
3,650.00	3,622.09	2,500.00	2,499.65	13.10	5.02	-7.75	-132.63	-286.48	1,176.62	1,158.50	18.11	64.960		
3,700.00	3,659.05	2,500.00	2,499.65	13.49	5.02	-7.16	-132.63	-286.48	1,208.65	1,190.15	18.51	65.315		
3,750.00	3,692.61	2,500.00	2,499.65	13.99	5.02	-6.67	-132.63	-286.48	1,238.22	1,219.22	19.01	65.149		
3,800.00	3,722.47	2,500.00	2,499.65	14.62	5.02	-6.27	-132.63	-286.48	1,265.23	1,245.60	19.64	64.428		
3,850.00	3,748.35	2,500.00	2,499.65	15.40	5.02	-5.95	-132.63	-286.48	1,289.61	1,269.19	20.42	63.160		
3,900.00	3,770.01	2,500.00	2,499.65	16.34	5.02	-5.68	-132.63	-286.48	1,311.28	1,289.92	21.35	61.407		
3,950.00	3,787.26	2,500.00	2,499.65	17.42	5.02	-5.46	-132.63	-286.48	1,330.17	1,307.73	22.44	59.272		
4,000.00	3,799.93	2,500.00	2,499.65	18.65	5.02	-5.29	-132.63	-286.48	1,346.24	1,322.57	23.67	56.878		
4,050.00	3,807.91	2,500.00	2,499.65	20.00	5.02	-5.15	-132.63	-286.48	1,359.43	1,334.42	25.01	54.347		
4,100.00	3,811.12	2,500.00	2,499.65	21.43	5.02	-5.05	-132.63	-286.48	1,369.72	1,343.27	26.45	51.787		
4,122.13	3,811.01	2,500.00	2,499.65	22.09	5.02	-5.01	-132.63	-286.48	1,373.34	1,346.24	27.11	50.665		
4,200.00	3,808.97	2,500.00	2,499.65	24.49	5.02	-5.01	-132.63	-286.48	1,387.19	1,357.68	29.51	47.006		
4,300.00	3,806.35	2,500.00	2,499.65	27.75	5.02	-5.01	-132.63	-286.48	1,411.10	1,378.33	32.76	43.070		
4,400.00	3,803.73	2,500.00	2,499.65	31.13	5.02	-5.01	-132.63	-286.48	1,441.56	1,405.41	36.15	39.883		
4,500.00	3,801.12	2,500.00	2,499.65	34.60	5.02	-5.01	-132.63	-286.48	1,478.17	1,438.55	39.62	37.309		
4,600.00	3,798.50	2,500.00	2,499.65	38.14	5.02	-5.01	-132.63	-286.48	1,520.48	1,477.32	43.16	35.228		
4,700.00	3,795.88	2,500.00	2,499.65	41.74	5.02	-5.01	-132.63	-286.48	1,568.04	1,521.29	46.75	33.539		
4,800.00	3,793.26	2,500.00	2,499.65	45.37	5.02	-5.01	-132.63	-286.48	1,620.39	1,570.00	50.38	32.161		
4,900.00	3,790.65	2,500.00	2,499.65	49.03	5.02	-5.01	-132.63	-286.48	1,677.06	1,623.02	54.04	31.032		
5,000.00	3,788.03	2,500.00	2,499.65	52.71	5.02	-5.01	-132.63	-286.48	1,737.65	1,679.93	57.73	30.101		
5,100.00	3,785.41	2,500.00	2,499.65	56.41	5.02	-5.01	-132.63	-286.48	1,801.76	1,740.33	61.43	29.331		
5,200.00	3,782.79	2,500.00	2,499.65	60.13	5.02	-5.01	-132.63	-286.48	1,869.02	1,803.87	65.15	28.690		
5,300.00	3,780.18	2,500.00	2,499.65	63.86	5.02	-5.01	-132.63	-286.48	1,939.10	1,870.22	68.88	28.153		
5,400.00	3,777.56	2,500.00	2,499.65	67.60	5.02	-5.01	-132.63	-286.48	2,011.72	1,939.10	72.62	27.703		
5,500.00	3,774.94	2,500.00	2,499.65	71.35	5.02	-5.01	-132.63	-286.48	2,086.60	2,010.23	76.37	27.323		
5,600.00	3,772.32	2,500.00	2,499.65	75.11	5.02	-5.01	-132.63	-286.48	2,163.51	2,083.39	80.12	27.002		
5,700.00	3,769.70	2,500.00	2,499.65	78.87	5.02	-5.01	-132.63	-286.48	2,242.25	2,158.36	83.89	26.729		
5,800.00	3,767.09	2,500.00	2,499.65	82.64	5.02	-5.01	-132.63	-286.48	2,322.62	2,234.96	87.66	26.497		
5,900.00	3,764.47	2,500.00	2,499.65	86.41	5.02	-5.01	-132.63	-286.48	2,404.47	2,313.04	91.43	26.298		

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



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County - NM (NAD27-NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27, State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR DB
Reference Design:	Plan #1 09-08-14	Offset TVD Reference:	Offset Datum

Offset Design NG Phillips State - #28 - WB1 - Inc Surveys														Offset Site Error:
Survey Program: 500-MWD														0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Between	Between	Minimum	Separation	Factor	Warning	
Depth	Depth	Depth	Depth	(usft)	(usft)	Tooface	+N-S	+E-W	Centres	Ellipses	Separation			
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)			
6,000.00	3,761.85	2,500.00	2,499.65	90.19	5.02	-5.01	-132.63	-286.48	2,487.64	2,392.43	95.21	26.128		
6,100.00	3,759.23	2,500.00	2,499.65	93.98	5.02	-5.01	-132.63	-286.48	2,572.01	2,473.02	98.99	25.982		
6,200.00	3,756.62	2,500.00	2,499.65	97.76	5.02	-5.01	-132.63	-286.48	2,657.47	2,554.69	102.78	25.856		
6,300.00	3,754.00	2,500.00	2,499.65	101.55	5.02	-5.01	-132.63	-286.48	2,743.91	2,637.34	106.57	25.748		
6,400.00	3,751.38	2,500.00	2,499.65	105.34	5.02	-5.01	-132.63	-286.48	2,831.24	2,720.88	110.36	25.655		
6,500.00	3,748.76	2,500.00	2,499.65	109.14	5.02	-5.01	-132.63	-286.48	2,919.39	2,805.23	114.15	25.574		
6,600.00	3,746.15	2,500.00	2,499.65	112.93	5.02	-5.01	-132.63	-286.48	3,008.27	2,890.32	117.95	25.505		
6,700.00	3,743.53	2,500.00	2,499.65	116.73	5.02	-5.01	-132.63	-286.48	3,097.84	2,976.09	121.75	25.445		
6,800.00	3,740.91	2,500.00	2,499.65	120.53	5.02	-5.01	-132.63	-286.48	3,188.02	3,062.48	125.55	25.393		
6,900.00	3,738.29	2,500.00	2,499.65	124.33	5.02	-5.01	-132.63	-286.48	3,278.78	3,149.43	129.35	25.349		
7,000.00	3,735.67	2,500.00	2,499.65	128.13	5.02	-5.01	-132.63	-286.48	3,370.05	3,238.91	133.15	25.310		
7,100.00	3,733.06	2,500.00	2,499.65	131.94	5.02	-5.01	-132.63	-286.48	3,461.81	3,324.86	136.95	25.277		
7,200.00	3,730.44	2,500.00	2,499.65	135.74	5.02	-5.01	-132.63	-286.48	3,554.02	3,413.26	140.76	25.249		
7,300.00	3,727.82	2,500.00	2,499.65	139.55	5.02	-5.01	-132.63	-286.48	3,646.63	3,502.07	144.56	25.225		
7,400.00	3,725.20	2,500.00	2,499.65	143.35	5.02	-5.01	-132.63	-286.48	3,739.63	3,591.26	148.37	25.205		
7,500.00	3,722.59	2,500.00	2,499.65	147.16	5.02	-5.01	-132.63	-286.48	3,832.98	3,680.80	152.18	25.187		
7,600.00	3,719.97	2,500.00	2,499.65	150.97	5.02	-5.01	-132.63	-286.48	3,926.66	3,770.67	155.99	25.173		
7,700.00	3,717.35	2,500.00	2,499.65	154.78	5.02	-5.01	-132.63	-286.48	4,020.64	3,860.84	159.80	25.161		
7,800.00	3,714.73	2,500.00	2,499.65	158.59	5.02	-5.01	-132.63	-286.48	4,114.90	3,951.29	163.61	25.151		
7,900.00	3,712.12	2,500.00	2,499.65	162.40	5.02	-5.01	-132.63	-286.48	4,209.43	4,042.01	167.42	25.143		
8,000.00	3,709.50	2,500.00	2,499.65	166.21	5.02	-5.01	-132.63	-286.48	4,304.21	4,132.97	171.23	25.137		
8,100.00	3,706.88	2,500.00	2,499.65	170.03	5.02	-5.01	-132.63	-286.48	4,399.21	4,224.17	175.04	25.132		
8,200.00	3,704.26	2,500.00	2,499.65	173.84	5.02	-5.01	-132.63	-286.48	4,494.44	4,315.58	178.86	25.129		
8,300.00	3,701.64	2,500.00	2,499.65	177.65	5.02	-5.01	-132.63	-286.48	4,589.87	4,407.20	182.67	25.127		
8,400.00	3,699.03	2,500.00	2,499.65	181.47	5.02	-5.01	-132.63	-286.48	4,685.48	4,499.00	186.48	25.125		
8,449.53	3,697.73	2,500.00	2,499.65	183.36	5.02	-5.01	-132.63	-286.48	4,732.91	4,544.54	188.37	25.125		



Phoenix Technology Services
Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR DB
Reference Design:	Plan #1 09-08-14	Offset TVD Reference:	Offset Datum

Offset Design NG Phillips State - #30 - WB1 - Inc Surveys												Offset Site Error:
Survey Program: 570 MWD												0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning		Offset Well Error:		0.00 usft
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)	Factor
0.00	0.00	0.00	0.00	0.00	0.00	-81.29	449.55	-2,933.48	2,967.74			
100.00	100.00	95.31	95.31	0.15	0.11	-81.29	449.42	-2,933.48	2,967.71	2,967.46	0.26	N/A
200.00	200.00	196.71	196.70	0.51	0.22	-81.30	448.96	-2,933.48	2,967.64	2,966.91	0.73	4,074.072
300.00	300.00	298.10	298.09	0.86	0.34	-81.31	448.19	-2,933.48	2,967.53	2,966.33	1.20	2,469.398
400.00	400.00	399.48	399.47	1.22	0.46	-81.33	447.11	-2,933.48	2,967.37	2,965.69	1.68	1,768.873
500.00	500.00	500.86	500.84	1.58	0.57	-81.36	445.71	-2,933.48	2,967.16	2,965.01	2.15	1,379.129
600.00	600.00	601.66	601.63	1.94	0.71	-81.39	444.03	-2,933.48	2,966.91	2,964.26	2.65	1,118.028
700.00	700.00	701.27	701.22	2.30	0.92	-81.42	442.36	-2,933.48	2,966.66	2,963.44	3.22	922.277
800.00	800.00	800.87	800.81	2.66	1.12	-81.45	440.78	-2,933.48	2,966.42	2,962.64	3.78	784.842
900.00	900.00	900.48	900.41	3.01	1.33	-81.48	439.29	-2,933.48	2,966.20	2,961.86	4.34	683.043
1,000.00	1,000.00	1,000.09	1,000.01	3.37	1.53	-81.51	437.87	-2,933.48	2,965.99	2,961.08	4.91	604.612
1,100.00	1,100.00	1,099.90	1,099.81	3.73	1.74	-81.54	436.54	-2,933.48	2,965.79	2,960.32	5.47	542.179
1,200.00	1,200.00	1,200.26	1,200.16	4.09	1.95	-81.56	435.16	-2,933.48	2,965.59	2,959.55	6.04	491.066
1,300.00	1,300.00	1,300.62	1,300.51	4.45	2.16	-81.59	433.70	-2,933.48	2,965.38	2,958.77	6.61	448.753
1,400.00	1,400.00	1,400.97	1,400.85	4.81	2.37	-81.62	432.15	-2,933.48	2,965.15	2,957.98	7.18	413.148
1,500.00	1,500.00	1,501.32	1,501.19	5.17	2.58	-81.65	430.52	-2,933.48	2,964.92	2,957.17	7.75	382.771
1,600.00	1,600.00	1,601.64	1,601.48	5.52	2.79	-81.68	428.81	-2,933.48	2,964.67	2,956.35	8.32	356.508
1,700.00	1,700.00	1,701.62	1,701.45	5.88	3.01	-81.72	427.06	-2,933.48	2,964.42	2,955.52	8.90	333.256
1,800.00	1,800.00	1,801.60	1,801.42	6.24	3.23	-81.75	425.32	-2,933.48	2,964.17	2,954.69	9.47	312.849
1,900.00	1,900.00	1,901.59	1,901.39	6.60	3.45	-81.78	423.57	-2,933.48	2,963.92	2,953.86	10.05	294.794
2,000.00	2,000.00	2,001.57	2,001.36	6.96	3.68	-81.82	421.83	-2,933.48	2,963.67	2,953.03	10.63	278.707
2,100.00	2,100.00	2,101.00	2,100.77	7.32	3.90	-81.85	420.09	-2,933.48	2,963.42	2,952.21	11.21	264.311
2,200.00	2,200.00	2,201.13	2,200.89	7.67	4.10	-81.88	418.39	-2,933.48	2,963.18	2,951.40	11.78	251.562
2,300.00	2,300.00	2,300.71	2,300.46	8.03	4.31	-81.91	416.80	-2,933.48	2,962.95	2,950.61	12.35	240.009
2,400.00	2,400.00	2,400.29	2,400.02	8.39	4.52	-81.94	415.31	-2,933.48	2,962.74	2,949.83	12.91	229.469
2,500.00	2,500.00	2,499.87	2,499.60	8.75	4.73	-81.97	413.91	-2,933.48	2,962.55	2,949.07	13.48	219.816
2,600.00	2,600.00	2,599.89	2,599.60	9.11	4.94	-81.99	412.58	-2,933.48	2,962.36	2,948.32	14.04	210.921
2,700.00	2,700.00	2,700.24	2,699.94	9.47	5.15	-82.02	411.17	-2,933.48	2,962.17	2,947.55	14.61	202.701
2,800.00	2,800.00	2,800.58	2,800.28	9.83	5.36	-82.05	409.68	-2,933.48	2,961.96	2,946.78	15.18	195.097
2,900.00	2,900.00	2,900.93	2,900.61	10.18	5.57	-82.08	408.10	-2,933.48	2,961.74	2,945.99	15.75	188.040
3,000.00	3,000.00	3,001.27	3,000.94	10.54	5.78	-82.11	406.43	-2,933.48	2,961.51	2,945.19	16.32	181.475
3,100.00	3,100.00	3,101.23	3,100.88	10.90	5.99	-82.15	404.71	-2,933.48	2,961.28	2,944.39	16.89	175.357
3,200.00	3,200.00	3,200.89	3,200.53	11.26	6.20	-82.18	403.05	-2,933.48	2,961.05	2,943.60	17.45	169.641
3,290.32	3,290.32	3,290.90	3,290.53	11.58	6.38	-82.20	401.63	-2,933.48	2,960.86	2,942.89	17.97	164.790
3,300.00	3,300.00	3,300.55	3,300.18	11.62	6.40	10.58	401.48	-2,933.48	2,960.75	2,942.73	18.02	164.290
3,350.00	3,349.87	3,350.25	3,349.87	11.79	6.51	10.64	400.72	-2,933.48	2,957.38	2,939.08	18.30	161.638
3,400.00	3,399.19	3,399.41	3,399.03	11.96	6.61	10.82	400.00	-2,933.48	2,949.32	2,930.75	18.57	158.805
3,450.00	3,447.51	3,447.58	3,447.19	12.14	6.71	11.13	399.31	-2,933.48	2,936.67	2,917.82	18.85	155.790
3,500.00	3,494.38	3,494.31	3,493.92	12.33	6.81	11.58	398.65	-2,933.48	2,919.52	2,900.39	19.14	152.560
3,550.00	3,539.38	3,539.17	3,538.77	12.54	6.91	12.19	398.04	-2,933.48	2,898.05	2,878.61	19.44	149.059
3,600.00	3,582.07	3,581.74	3,581.34	12.79	6.99	13.01	397.48	-2,933.48	2,872.45	2,852.67	19.78	145.210
3,650.00	3,622.09	3,583.00	3,582.60	13.10	7.00	13.94	397.46	-2,933.48	2,843.23	2,823.14	20.09	141.504
3,700.00	3,659.05	3,583.00	3,582.60	13.49	7.00	15.11	397.46	-2,933.48	2,810.89	2,790.40	20.49	137.216
3,750.00	3,692.61	3,583.00	3,582.60	13.99	7.00	16.60	397.46	-2,933.48	2,775.62	2,754.63	20.99	132.260
3,800.00	3,722.47	3,583.00	3,582.60	14.62	7.00	18.54	397.46	-2,933.48	2,737.64	2,716.02	21.62	126.636
3,850.00	3,748.35	3,583.00	3,582.60	15.40	7.00	21.11	397.46	-2,933.48	2,697.19	2,674.79	22.40	120.420
3,900.00	3,770.01	3,583.00	3,582.60	16.34	7.00	24.61	397.46	-2,933.48	2,654.55	2,631.22	23.33	113.764
3,950.00	3,787.26	3,583.00	3,582.60	17.42	7.00	29.52	397.46	-2,933.48	2,610.00	2,585.58	24.42	106.872
4,000.00	3,799.93	3,583.00	3,582.60	18.65	7.00	36.71	397.46	-2,933.48	2,563.88	2,538.23	25.65	99.960
4,050.00	3,807.91	3,583.00	3,582.60	20.00	7.00	47.61	397.46	-2,933.48	2,516.52	2,489.53	26.99	93.225
4,100.00	3,811.12	3,583.00	3,582.60	21.43	7.00	64.12	397.46	-2,933.48	2,468.31	2,439.88	28.43	86.824
4,122.13	3,811.01	3,583.00	3,582.60	22.09	7.00	73.46	397.46	-2,933.48	2,446.80	2,417.71	29.09	84.121

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



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR DB
Reference Design:	Plan #1 09-08-14	Offset TVD Reference:	Offset Datum

Offset Design NG Phillips State - #30 - WB1 - Inc Surveys														Offset Site Error:	0.00 usft
Survey Program: 570-MWD														Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum Separation		Warning							
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor			
4,200.00	3,808.97	3,583.00	3,582.60	24.49	7.00	73.46	397.46	-2,933.48	2,371.09	2,339.60	31.49	75.294			
4,300.00	3,806.35	3,583.00	3,582.60	27.75	7.00	73.46	397.46	-2,933.48	2,274.07	2,239.32	34.74	65.454			
4,400.00	3,803.73	3,583.00	3,582.60	31.13	7.00	73.46	397.46	-2,933.48	2,177.31	2,139.19	38.13	57.110			
4,500.00	3,801.12	3,583.00	3,582.60	34.60	7.00	73.46	397.46	-2,933.48	2,080.87	2,039.27	41.60	50.021			
4,600.00	3,798.50	3,583.00	3,582.60	38.14	7.00	73.46	397.46	-2,933.48	1,984.78	1,939.64	45.14	43.968			
4,700.00	3,795.88	3,583.00	3,582.60	41.74	7.00	73.46	397.46	-2,933.48	1,889.09	1,840.36	48.73	38.764			
4,800.00	3,793.26	3,583.00	3,582.60	45.37	7.00	73.46	397.46	-2,933.48	1,793.87	1,741.51	52.36	34.258			
4,900.00	3,790.65	3,583.00	3,582.60	49.03	7.00	73.46	397.46	-2,933.48	1,699.21	1,643.18	56.02	30.330			
5,000.00	3,788.03	3,583.00	3,582.60	52.71	7.00	73.46	397.46	-2,933.48	1,605.19	1,545.48	59.71	26.885			
5,100.00	3,785.41	3,583.00	3,582.60	56.41	7.00	73.46	397.46	-2,933.48	1,511.93	1,448.53	63.41	23.844			
5,200.00	3,782.79	3,583.00	3,582.60	60.13	7.00	73.46	397.46	-2,933.48	1,419.60	1,352.47	67.13	21.148			
5,300.00	3,780.18	3,583.00	3,582.60	63.86	7.00	73.46	397.46	-2,933.48	1,328.38	1,257.52	70.86	18.747			
5,400.00	3,777.56	3,583.00	3,582.60	67.60	7.00	73.46	397.46	-2,933.48	1,238.51	1,163.91	74.60	16.603			
5,500.00	3,774.94	3,583.00	3,582.60	71.35	7.00	73.46	397.46	-2,933.48	1,150.32	1,071.97	78.35	14.682			
5,600.00	3,772.32	3,583.00	3,582.60	75.11	7.00	73.46	397.46	-2,933.48	1,064.21	982.11	82.10	12.962			
5,700.00	3,769.70	3,583.00	3,582.60	78.87	7.00	73.46	397.46	-2,933.48	980.75	894.88	85.87	11.422			
5,800.00	3,767.09	3,583.00	3,582.60	82.64	7.00	73.46	397.46	-2,933.48	900.65	811.02	89.64	10.048			
5,900.00	3,764.47	3,583.00	3,582.60	86.41	7.00	73.46	397.46	-2,933.48	824.93	731.52	93.41	8.831			
6,000.00	3,761.85	3,583.00	3,582.60	90.19	7.00	73.46	397.46	-2,933.48	754.87	657.68	97.19	7.767			
6,100.00	3,759.23	3,583.00	3,582.60	93.98	7.00	73.46	397.46	-2,933.48	692.21	591.24	100.97	6.855			
6,200.00	3,756.62	3,583.00	3,582.60	97.76	7.00	73.46	397.46	-2,933.48	639.12	534.36	104.76	6.101			
6,300.00	3,754.00	3,583.00	3,582.60	101.55	7.00	73.46	397.46	-2,933.48	598.16	489.61	108.55	5.511			
6,400.00	3,751.38	3,583.00	3,582.60	105.34	7.00	73.46	397.46	-2,933.48	571.94	459.60	112.34	5.091			
6,500.00	3,748.76	3,583.00	3,582.60	109.14	7.00	73.46	397.46	-2,933.48	562.53	446.40	116.13	4.844			
6,503.39	3,748.67	3,583.00	3,582.60	109.26	7.00	73.46	397.46	-2,933.48	562.52	446.26	116.26	4.838 CC, ES			
6,600.00	3,746.15	3,583.00	3,582.60	112.93	7.00	73.46	397.46	-2,933.48	570.75	450.83	119.93	4.759 SF			
6,700.00	3,743.53	3,583.00	3,582.60	116.73	7.00	73.46	397.46	-2,933.48	595.89	472.16	123.73	4.816			
6,800.00	3,740.91	3,583.00	3,582.60	120.53	7.00	73.46	397.46	-2,933.48	635.93	508.40	127.53	4.987			
6,900.00	3,738.29	3,583.00	3,582.60	124.33	7.00	73.46	397.46	-2,933.48	688.28	556.95	131.33	5.241			
7,000.00	3,735.67	3,583.00	3,582.60	128.13	7.00	73.46	397.46	-2,933.48	750.36	615.23	135.13	5.553			
7,100.00	3,733.06	3,583.00	3,582.60	131.94	7.00	73.46	397.46	-2,933.48	819.98	681.05	138.93	5.902			
7,200.00	3,730.44	3,583.00	3,582.60	135.74	7.00	73.46	397.46	-2,933.48	895.37	752.63	142.74	6.273			
7,300.00	3,727.82	3,583.00	3,582.60	139.55	7.00	73.46	397.46	-2,933.48	975.20	828.65	146.54	6.655			
7,400.00	3,725.20	3,583.00	3,582.60	143.35	7.00	73.46	397.46	-2,933.48	1,058.46	908.11	150.35	7.040			
7,500.00	3,722.59	3,583.00	3,582.60	147.16	7.00	73.46	397.46	-2,933.48	1,144.40	990.24	154.16	7.423			
7,600.00	3,719.97	3,583.00	3,582.60	150.97	7.00	73.46	397.46	-2,933.48	1,232.47	1,074.50	157.97	7.802			
7,700.00	3,717.35	3,583.00	3,582.60	154.78	7.00	73.46	397.46	-2,933.48	1,322.23	1,160.45	161.78	8.173			
7,800.00	3,714.73	3,583.00	3,582.60	158.59	7.00	73.46	397.46	-2,933.48	1,413.37	1,247.78	165.59	8.535			
7,900.00	3,712.12	3,583.00	3,582.60	162.40	7.00	73.46	397.46	-2,933.48	1,505.63	1,336.24	169.40	8.888			
8,000.00	3,709.50	3,583.00	3,582.60	166.21	7.00	73.46	397.46	-2,933.48	1,598.83	1,425.62	173.21	9.231			
8,100.00	3,706.88	3,583.00	3,582.60	170.03	7.00	73.46	397.46	-2,933.48	1,692.80	1,515.78	177.02	9.563			
8,200.00	3,704.26	3,583.00	3,582.60	173.84	7.00	73.46	397.46	-2,933.48	1,787.43	1,606.59	180.84	9.884			
8,300.00	3,701.64	3,583.00	3,582.60	177.65	7.00	73.46	397.46	-2,933.48	1,882.61	1,697.96	184.65	10.196			
8,400.00	3,699.03	3,583.00	3,582.60	181.47	7.00	73.46	397.46	-2,933.48	1,978.27	1,789.80	188.46	10.497			
8,449.53	3,697.73	3,583.00	3,582.60	183.36	7.00	73.46	397.46	-2,933.48	2,025.80	1,835.45	190.35	10.642			



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00'usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00'usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR-DB
Reference Design:	Plan #1 09-08-14	Offset TVD Reference:	Offset Datum

Offset Design: NG Phillips State - #31 - WB1 - Inc Surveys												Offset Site Error:	0.00 usft
Survey Program: 524-MWD												Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	35.44	35.44	0.00	0.04	-88.90	93.44	-4,851.31	4,852.21				
100.00	100.00	135.83	135.83	0.15	0.15	-88.90	93.09	-4,851.31	4,852.20	4,851.90	0.30	N/A	
200.00	200.00	236.21	236.21	0.51	0.27	-88.91	92.31	-4,851.31	4,852.19	4,851.41	0.77	6,267.483	
300.00	300.00	336.59	336.58	0.86	0.39	-88.92	91.11	-4,851.31	4,852.17	4,850.92	1.25	3,882.184	
400.00	400.00	436.95	436.93	1.22	0.50	-88.94	89.50	-4,851.31	4,852.14	4,850.41	1.72	2,815.531	
500.00	500.00	537.24	537.20	1.58	0.63	-88.97	87.47	-4,851.31	4,852.10	4,849.89	2.21	2,196.581	
600.00	600.00	637.15	637.08	1.94	0.83	-88.99	85.34	-4,851.31	4,852.06	4,849.29	2.77	1,749.266	
700.00	700.00	737.05	736.96	2.30	1.04	-89.02	83.30	-4,851.31	4,852.02	4,848.89	3.34	1,453.305	
800.00	800.00	836.96	836.86	2.66	1.25	-89.04	81.35	-4,851.31	4,851.99	4,848.09	3.90	1,242.995	
900.00	900.00	936.88	936.75	3.01	1.45	-89.06	79.48	-4,851.31	4,851.96	4,847.49	4.47	1,085.858	
1,000.00	1,000.00	1,036.80	1,036.66	3.37	1.66	-89.08	77.70	-4,851.31	4,851.93	4,846.90	5.03	963.929	
1,100.00	1,100.00	1,136.78	1,136.63	3.73	1.87	-89.10	75.96	-4,851.31	4,851.90	4,846.30	5.60	866.072	
1,200.00	1,200.00	1,236.77	1,236.60	4.09	2.08	-89.12	74.21	-4,851.31	4,851.88	4,845.71	6.17	786.251	
1,300.00	1,300.00	1,336.75	1,336.56	4.45	2.29	-89.14	72.47	-4,851.31	4,851.85	4,845.11	6.74	719.901	
1,400.00	1,400.00	1,436.74	1,436.53	4.81	2.50	-89.16	70.72	-4,851.31	4,851.83	4,844.52	7.31	663.878	
1,500.00	1,500.00	1,536.72	1,536.50	5.17	2.71	-89.19	68.98	-4,851.31	4,851.80	4,843.92	7.88	615.944	
1,600.00	1,600.00	1,636.65	1,636.42	5.52	2.92	-89.21	67.27	-4,851.31	4,851.78	4,843.33	8.45	574.460	
1,700.00	1,700.00	1,736.58	1,736.34	5.88	3.13	-89.22	65.65	-4,851.31	4,851.75	4,842.74	9.01	538.211	
1,800.00	1,800.00	1,836.51	1,836.26	6.24	3.34	-89.24	64.12	-4,851.31	4,851.73	4,842.15	9.58	506.265	
1,900.00	1,900.00	1,936.45	1,936.18	6.60	3.55	-89.26	62.67	-4,851.31	4,851.71	4,841.56	10.15	477.898	
2,000.00	2,000.00	2,036.39	2,036.11	6.96	3.76	-89.28	61.30	-4,851.31	4,851.70	4,840.98	10.72	452.542	
2,100.00	2,100.00	2,136.37	2,136.09	7.32	3.97	-89.29	59.99	-4,851.31	4,851.68	4,840.39	11.29	429.745	
2,200.00	2,200.00	2,236.36	2,236.07	7.67	4.18	-89.31	58.68	-4,851.31	4,851.66	4,839.81	11.86	409.137	
2,300.00	2,300.00	2,336.35	2,336.05	8.03	4.39	-89.32	57.37	-4,851.31	4,851.65	4,839.22	12.43	390.414	
2,400.00	2,400.00	2,436.34	2,436.03	8.39	4.60	-89.34	56.06	-4,851.31	4,851.63	4,838.64	13.00	373.330	
2,500.00	2,500.00	2,536.34	2,536.02	8.75	4.81	-89.35	54.76	-4,851.31	4,851.62	4,838.05	13.56	357.678	
2,600.00	2,600.00	2,636.33	2,636.00	9.11	5.03	-89.37	53.45	-4,851.31	4,851.60	4,837.47	14.14	343.176	
2,700.00	2,700.00	2,736.32	2,735.98	9.47	5.25	-89.38	52.14	-4,851.31	4,851.59	4,836.88	14.71	329.763	
2,800.00	2,800.00	2,836.31	2,835.97	9.83	5.46	-89.40	50.83	-4,851.31	4,851.58	4,836.29	15.29	317.359	
2,900.00	2,900.00	2,936.30	2,935.95	10.18	5.68	-89.42	49.52	-4,851.31	4,851.56	4,835.70	15.86	305.854	
3,000.00	3,000.00	3,036.29	3,035.93	10.54	5.89	-89.43	48.21	-4,851.31	4,851.55	4,835.11	16.44	295.154	
3,100.00	3,100.00	3,136.30	3,135.93	10.90	6.11	-89.45	46.89	-4,851.31	4,851.54	4,834.52	17.01	285.134	
3,200.00	3,200.00	3,236.33	3,235.95	11.26	6.33	-89.46	45.50	-4,851.31	4,851.52	4,833.93	17.59	275.748	
3,290.32	3,290.32	3,326.66	3,326.27	11.58	6.53	-89.48	44.19	-4,851.31	4,851.51	4,833.39	18.12	267.786	
3,300.00	3,300.00	3,336.35	3,335.95	11.62	6.56	3.30	44.05	-4,851.31	4,851.42	4,833.25	18.17	266.968	
3,350.00	3,349.87	3,386.23	3,385.83	11.79	6.67	3.32	43.30	-4,851.31	4,848.09	4,829.84	18.45	262.730	
3,400.00	3,399.19	3,435.56	3,435.16	11.96	6.77	3.36	42.54	-4,851.31	4,840.01	4,821.27	18.73	258.352	
3,450.00	3,447.51	3,483.90	3,483.49	12.14	6.88	3.45	41.78	-4,851.31	4,827.24	4,808.23	19.02	253.828	
3,500.00	3,494.38	3,530.79	3,530.38	12.33	6.98	3.58	41.03	-4,851.31	4,809.91	4,790.60	19.31	249.090	
3,550.00	3,539.38	3,575.81	3,575.39	12.54	7.08	3.75	40.30	-4,851.31	4,788.18	4,768.56	19.62	244.040	
3,600.00	3,582.07	3,618.54	3,618.11	12.79	7.18	3.99	39.59	-4,851.31	4,762.24	4,742.27	19.96	238.536	
3,650.00	3,622.09	3,658.58	3,658.15	13.10	7.27	4.30	38.91	-4,851.31	4,732.33	4,711.97	20.36	232.414	
3,700.00	3,659.05	3,695.57	3,695.14	13.49	7.35	4.72	38.27	-4,851.31	4,698.73	4,677.90	20.84	225.515	
3,750.00	3,692.61	3,720.00	3,719.56	13.99	7.40	5.27	37.85	-4,851.31	4,661.76	4,640.37	21.39	217.939	
3,800.00	3,722.47	3,720.00	3,719.56	14.62	7.40	5.98	37.85	-4,851.31	4,621.90	4,599.88	22.02	209.872	
3,850.00	3,748.35	3,720.00	3,719.56	15.40	7.40	6.97	37.85	-4,851.31	4,579.51	4,556.71	22.80	200.833	
3,900.00	3,770.01	3,720.00	3,719.56	16.34	7.40	8.43	37.85	-4,851.31	4,534.91	4,511.17	23.74	191.040	
3,950.00	3,787.26	3,720.00	3,719.56	17.42	7.40	10.74	37.85	-4,851.31	4,488.46	4,463.63	24.83	180.797	
4,000.00	3,799.93	3,720.00	3,719.56	18.65	7.40	14.86	37.85	-4,851.31	4,440.52	4,414.47	26.05	170.440	
4,050.00	3,807.91	3,720.00	3,719.56	20.00	7.40	23.98	37.85	-4,851.31	4,391.51	4,364.11	27.40	160.283	
4,100.00	3,811.12	3,720.00	3,719.56	21.43	7.40	54.12	37.85	-4,851.31	4,341.85	4,313.01	28.83	150.585	
4,122.13	3,811.01	3,720.00	3,719.56	22.09	7.40	87.09	37.85	-4,851.31	4,319.76	4,290.27	29.49	146.478	

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



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1	Database:	GCR-DB
Reference Design:	Plan #1 09-08-14	Offset/TVD Reference:	Offset Datum

Offset Design NG Phillips State #31 WB1 Inc Surveys												Offset Site Error:	0.00 usft
Survey Program: 524-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)			
4,200.00	3,808.97	3,720.00	3,719.56	24.49	7.40	87.09	37.85	-4,851.31	4,242.06	4,210.16	31.90	133.000	
4,300.00	3,806.35	3,720.00	3,719.56	27.75	7.40	87.09	37.85	-4,851.31	4,142.27	4,107.12	35.15	117.856	
4,400.00	3,803.73	3,720.00	3,719.56	31.13	7.40	87.09	37.85	-4,851.31	4,042.49	4,003.96	38.53	104.920	
4,500.00	3,801.12	3,720.00	3,719.56	34.60	7.40	87.09	37.85	-4,851.31	3,942.73	3,900.72	42.00	93.865	
4,600.00	3,798.50	3,720.00	3,719.56	38.14	7.40	87.09	37.85	-4,851.31	3,842.97	3,797.43	45.55	84.376	
4,700.00	3,795.88	3,720.00	3,719.56	41.74	7.40	87.09	37.85	-4,851.31	3,743.24	3,694.10	49.14	76.178	
4,800.00	3,793.26	3,720.00	3,719.56	45.37	7.40	87.09	37.85	-4,851.31	3,643.51	3,590.74	52.77	69.048	
4,900.00	3,790.65	3,720.00	3,719.56	49.03	7.40	87.09	37.85	-4,851.31	3,543.80	3,487.37	56.43	62.803	
5,000.00	3,788.03	3,720.00	3,719.56	52.71	7.40	87.09	37.85	-4,851.31	3,444.11	3,384.00	60.11	57.296	
5,100.00	3,785.41	3,720.00	3,719.56	56.41	7.40	87.09	37.85	-4,851.31	3,344.43	3,280.62	63.81	52.410	
5,200.00	3,782.79	3,720.00	3,719.56	60.13	7.40	87.09	37.85	-4,851.31	3,244.78	3,177.25	67.53	48.049	
5,300.00	3,780.18	3,720.00	3,719.56	63.86	7.40	87.09	37.85	-4,851.31	3,145.14	3,073.88	71.26	44.136	
5,400.00	3,777.56	3,720.00	3,719.56	67.60	7.40	87.09	37.85	-4,851.31	3,045.53	2,970.53	75.00	40.606	
5,500.00	3,774.94	3,720.00	3,719.56	71.35	7.40	87.09	37.85	-4,851.31	2,945.95	2,867.20	78.75	37.408	
5,600.00	3,772.32	3,720.00	3,719.56	75.11	7.40	87.09	37.85	-4,851.31	2,846.40	2,763.89	82.51	34.498	
5,700.00	3,769.70	3,720.00	3,719.56	78.87	7.40	87.09	37.85	-4,851.31	2,746.88	2,660.61	86.27	31.840	
5,800.00	3,767.09	3,720.00	3,719.56	82.64	7.40	87.09	37.85	-4,851.31	2,647.39	2,557.35	90.04	29.402	
5,900.00	3,764.47	3,720.00	3,719.56	86.41	7.40	87.09	37.85	-4,851.31	2,547.95	2,454.13	93.82	27.159	
6,000.00	3,761.85	3,720.00	3,719.56	90.19	7.40	87.09	37.85	-4,851.31	2,448.55	2,350.95	97.60	25.089	
6,100.00	3,759.23	3,720.00	3,719.56	93.98	7.40	87.09	37.85	-4,851.31	2,349.20	2,247.82	101.38	23.173	
6,200.00	3,756.62	3,720.00	3,719.56	97.76	7.40	87.09	37.85	-4,851.31	2,249.91	2,144.75	105.16	21.394	
6,300.00	3,754.00	3,720.00	3,719.56	101.55	7.40	87.09	37.85	-4,851.31	2,150.69	2,041.73	108.95	19.740	
6,400.00	3,751.38	3,720.00	3,719.56	105.34	7.40	87.09	37.85	-4,851.31	2,051.54	1,938.79	112.74	18.197	
6,500.00	3,748.76	3,720.00	3,719.56	109.14	7.40	87.09	37.85	-4,851.31	1,952.47	1,835.94	116.54	16.754	
6,600.00	3,746.15	3,720.00	3,719.56	112.93	7.40	87.09	37.85	-4,851.31	1,853.51	1,733.18	120.33	15.403	
6,700.00	3,743.53	3,720.00	3,719.56	116.73	7.40	87.09	37.85	-4,851.31	1,754.67	1,630.54	124.13	14.136	
6,800.00	3,740.91	3,720.00	3,719.56	120.53	7.40	87.09	37.85	-4,851.31	1,655.96	1,528.03	127.93	12.944	
6,900.00	3,738.29	3,720.00	3,719.56	124.33	7.40	87.09	37.85	-4,851.31	1,557.42	1,425.69	131.73	11.823	
7,000.00	3,735.67	3,720.00	3,719.56	128.13	7.40	87.09	37.85	-4,851.31	1,459.08	1,323.55	135.53	10.765	
7,100.00	3,733.06	3,720.00	3,719.56	131.94	7.40	87.09	37.85	-4,851.31	1,360.98	1,221.65	139.34	9.768	
7,200.00	3,730.44	3,720.00	3,719.56	135.74	7.40	87.09	37.85	-4,851.31	1,263.18	1,120.04	143.14	8.825	
7,300.00	3,727.82	3,720.00	3,719.56	139.55	7.40	87.09	37.85	-4,851.31	1,165.75	1,018.81	146.95	7.933	
7,400.00	3,725.20	3,720.00	3,719.56	143.35	7.40	87.09	37.85	-4,851.31	1,068.80	918.04	150.76	7.090	
7,500.00	3,722.59	3,720.00	3,719.56	147.16	7.40	87.09	37.85	-4,851.31	972.46	817.90	154.56	6.292	
7,600.00	3,719.97	3,720.00	3,719.56	150.97	7.40	87.09	37.85	-4,851.31	876.95	718.58	158.37	5.537	
7,700.00	3,717.35	3,720.00	3,719.56	154.78	7.40	87.09	37.85	-4,851.31	782.55	620.37	162.18	4.825	
7,800.00	3,714.73	3,720.00	3,719.56	158.59	7.40	87.09	37.85	-4,851.31	689.74	523.75	165.99	4.155	
7,900.00	3,712.12	3,720.00	3,719.56	162.40	7.40	87.09	37.85	-4,851.31	599.25	429.44	169.80	3.529	
8,000.00	3,709.50	3,720.00	3,719.56	166.21	7.40	87.09	37.85	-4,851.31	512.30	338.68	173.62	2.951	
8,100.00	3,706.88	3,720.00	3,719.56	170.03	7.40	87.09	37.85	-4,851.31	431.05	253.62	177.43	2.429	
8,200.00	3,704.26	3,720.00	3,719.56	173.84	7.40	87.09	37.85	-4,851.31	359.38	178.14	181.24	1.983	
8,300.00	3,701.64	3,720.00	3,719.56	177.65	7.40	87.09	37.85	-4,851.31	304.15	119.10	185.05	1.644	
8,400.00	3,699.03	3,720.00	3,719.56	181.47	7.40	87.09	37.85	-4,851.31	275.43	86.56	188.87	1.458 Level 3	
8,433.24	3,698.16	3,720.00	3,719.56	182.73	7.40	87.09	37.85	-4,851.31	273.42	83.28	190.14	1.438 Level 3, CC	
8,449.53	3,697.73	3,720.00	3,719.56	183.36	7.40	87.09	37.85	-4,851.31	273.90	83.15	190.76	1.436 Level 3, ES, SF	



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberg 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2'00 sigma
Reference Wellbore	WB1	Database:	GCR DB
Reference Design:	Plan #1-09-08-14	Offset TVD Reference:	Offset Datum

Offset Design State.BZ #4 WB1 Inc Surveys												Offset Site Error	0.00 usft
Survey Program: 1287-MWD												Offset Well Error	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
0.00	0.00	0.00	0.00	0.00	0.00	-105.90	-175.64	-616.52	641.30				
100.00	100.00	82.20	82.20	0.15	0.09	-105.90	-175.59	-616.52	641.04	640.80	0.24	2,872.211	
200.00	200.00	182.43	182.43	0.51	0.21	-105.88	-175.41	-616.52	640.99	640.28	0.71	900.985	
300.00	300.00	282.67	282.67	0.86	0.32	-105.85	-175.10	-616.52	640.90	639.72	1.18	541.774	
400.00	400.00	382.91	382.91	1.22	0.43	-105.82	-174.64	-616.52	640.78	639.13	1.65	387.293	
500.00	500.00	483.14	483.14	1.58	0.55	-105.77	-174.05	-616.52	640.62	638.49	2.13	301.320	
600.00	600.00	583.38	583.37	1.94	0.66	-105.70	-173.33	-616.52	640.42	637.83	2.60	246.546	
700.00	700.00	683.61	683.60	2.30	0.77	-105.63	-172.47	-616.52	640.19	637.12	3.07	208.494	
800.00	800.00	783.84	783.82	2.66	0.89	-105.54	-171.47	-616.52	639.92	636.38	3.54	180.653	
900.00	900.00	884.06	884.04	3.01	1.00	-105.44	-170.34	-616.52	639.62	635.61	4.01	159.347	
1,000.00	1,000.00	984.29	984.26	3.37	1.11	-105.34	-169.07	-616.52	639.29	634.80	4.49	142.515	
1,100.00	1,100.00	1,084.51	1,084.47	3.73	1.23	-105.21	-167.66	-616.52	638.92	633.96	4.96	128.879	
1,200.00	1,200.00	1,184.72	1,184.67	4.09	1.34	-105.08	-166.12	-616.52	638.51	633.09	5.43	117.607	
1,300.00	1,300.00	1,284.93	1,284.87	4.45	1.45	-104.93	-164.44	-616.52	638.08	632.18	5.90	108.132	
1,400.00	1,400.00	1,384.92	1,384.84	4.81	1.68	-104.78	-162.70	-616.52	637.63	631.15	6.48	98.353	
1,500.00	1,500.00	1,484.90	1,484.81	5.17	1.90	-104.63	-160.95	-616.52	637.19	630.12	7.07	90.157	
1,600.00	1,600.00	1,584.89	1,584.78	5.52	2.13	-104.48	-159.21	-616.52	636.75	629.10	7.65	83.213	
1,700.00	1,700.00	1,684.87	1,684.75	5.88	2.35	-104.33	-157.46	-616.52	636.32	628.08	8.24	77.255	
1,800.00	1,800.00	1,784.86	1,784.72	6.24	2.58	-104.17	-155.72	-616.52	635.89	627.07	8.82	72.088	
1,900.00	1,900.00	1,884.84	1,884.69	6.60	2.81	-104.02	-153.97	-616.52	635.46	626.06	9.41	67.563	
2,000.00	2,000.00	1,984.83	1,984.66	6.96	3.03	-103.87	-152.23	-616.52	635.04	625.05	9.99	63.568	
2,100.00	2,100.00	2,084.80	2,084.61	7.32	3.26	-103.72	-150.48	-616.52	634.63	624.05	10.57	60.028	
2,200.00	2,200.00	2,184.65	2,184.45	7.67	3.46	-103.57	-148.79	-616.52	634.23	623.10	11.13	56.978	
2,300.00	2,300.00	2,284.51	2,284.29	8.03	3.66	-103.43	-147.19	-616.52	633.85	622.16	11.69	54.223	
2,400.00	2,400.00	2,384.37	2,384.14	8.39	3.86	-103.29	-145.68	-616.52	633.50	621.25	12.25	51.720	
2,500.00	2,500.00	2,484.23	2,483.99	8.75	4.06	-103.17	-144.26	-616.52	633.18	620.37	12.81	49.438	
2,600.00	2,600.00	2,584.16	2,583.91	9.11	4.26	-103.05	-142.92	-616.52	632.87	619.51	13.37	47.346	
2,700.00	2,700.00	2,684.35	2,684.10	9.47	4.46	-102.93	-141.50	-616.52	632.56	618.63	13.93	45.409	
2,800.00	2,800.00	2,784.54	2,784.28	9.83	4.67	-102.79	-139.95	-616.52	632.21	617.72	14.49	43.621	
2,900.00	2,900.00	2,884.73	2,884.45	10.18	4.88	-102.64	-138.25	-616.52	631.84	616.78	15.06	41.956	
3,000.00	3,000.00	2,984.91	2,984.61	10.54	5.10	-102.48	-136.40	-616.52	631.44	615.79	15.64	40.364	
3,100.00	3,100.00	3,085.08	3,084.77	10.90	5.33	-102.30	-134.41	-616.52	631.01	614.78	16.23	38.886	
3,200.00	3,200.00	3,185.25	3,184.91	11.26	5.55	-102.11	-132.28	-616.52	630.56	613.75	16.81	37.508	
3,290.32	3,290.32	3,275.72	3,275.35	11.58	5.76	-101.93	-130.23	-616.52	630.13	612.79	17.34	36.340	
3,300.00	3,300.00	3,285.42	3,285.05	11.62	5.78	-9.13	-130.01	-616.52	630.00	612.60	17.40	36.216	
3,350.00	3,349.87	3,335.36	3,334.98	11.79	5.89	-9.14	-128.82	-616.52	626.47	608.79	17.68	35.436	
3,400.00	3,399.19	3,384.75	3,384.36	11.96	6.00	-9.29	-127.60	-616.52	618.23	600.27	17.96	34.416	
3,450.00	3,447.51	3,433.13	3,432.72	12.14	6.11	-9.61	-126.38	-616.52	605.36	587.11	18.25	33.171	
3,500.00	3,494.38	3,480.06	3,479.63	12.33	6.22	-10.13	-125.16	-616.52	587.98	569.44	18.54	31.706	
3,550.00	3,539.38	3,525.15	3,524.71	12.54	6.32	-10.87	-123.95	-616.52	566.25	547.39	18.86	30.026	
3,600.00	3,582.07	3,567.93	3,567.47	12.79	6.42	-11.92	-122.74	-616.52	540.39	521.18	19.21	28.136	
3,650.00	3,622.09	3,608.01	3,607.53	13.10	6.51	-13.37	-121.57	-616.52	510.64	491.04	19.61	26.044	
3,700.00	3,659.05	3,645.01	3,644.52	13.49	6.60	-15.39	-120.45	-616.52	477.31	457.23	20.08	23.767	
3,750.00	3,692.61	3,678.60	3,678.09	13.99	6.67	-18.22	-119.41	-616.52	440.74	420.08	20.66	21.332	
3,800.00	3,722.47	3,708.47	3,707.94	14.62	6.74	-22.29	-118.45	-616.52	401.32	379.96	21.36	18.788	
3,850.00	3,748.35	3,734.34	3,733.80	15.40	6.80	-28.25	-117.61	-616.52	359.49	337.29	22.20	16.193	
3,900.00	3,770.01	3,755.98	3,755.42	16.34	6.85	-37.02	-116.88	-616.52	315.77	292.58	23.18	13.619	
3,950.00	3,787.26	3,773.18	3,772.62	17.42	6.89	-49.50	-116.30	-616.52	270.76	246.45	24.31	11.137	
4,000.00	3,799.93	3,785.79	3,785.23	18.65	6.92	-65.10	-115.87	-616.52	225.28	199.71	25.57	8.811	
4,050.00	3,807.91	3,793.70	3,793.13	20.00	6.93	-80.31	-115.60	-616.52	180.51	153.58	26.93	6.702	
4,100.00	3,811.12	3,796.84	3,796.26	21.43	6.94	-90.92	-115.49	-616.52	138.56	110.19	28.37	4.883	
4,122.13	3,811.01	3,796.69	3,796.12	22.09	6.94	-93.60	-115.49	-616.52	121.91	92.88	29.03	4.200	

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



Phoenix Technology Services
Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	WVB1	Database:	GCR-DB
Reference Design:	Plan #1 09-08-14	Offset TVD Reference:	Offset Datum

Offset Design State BZ - #4 - WVB1 - Inc Surveys													Offset Site Error:
Survey Program: 1287-MWD													40.00 usft
Reference		Offset		Semi Major Axis		Distance		Offset Wellbore Centre		Between Centres		Minimum Separation	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)		+N/S (usft)	+E/W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)	Factor
4,200.00	3,808.97	3,794.52	3,793.94	24.49	6.94	-92.15		-115.57	-616.52	86.07	54.64	31.43	2.738
4,208.91	3,808.74	3,794.27	3,793.70	24.78	6.94	-91.98		-115.58	-616.52	85.60	53.88	31.72	2.699 CC, ES, SF
4,300.00	3,806.35	3,791.73	3,791.16	27.75	6.93	-90.28		-115.67	-616.52	124.92	90.24	34.68	3.803
4,400.00	3,803.73	3,788.94	3,788.37	31.13	6.92	-88.42		-115.76	-616.52	209.25	171.20	38.05	5.499
4,500.00	3,801.12	3,786.15	3,785.58	34.60	6.92	-86.57		-115.86	-616.52	303.24	261.72	41.52	7.303
4,600.00	3,798.50	3,783.36	3,782.80	38.14	6.91	-84.72		-115.95	-616.52	400.13	355.07	45.06	8.881
4,700.00	3,795.88	3,780.58	3,780.01	41.74	6.90	-82.90		-116.05	-616.52	498.24	449.60	48.64	10.243
4,800.00	3,793.26	3,777.79	3,777.23	45.37	6.90	-81.09		-116.14	-616.52	596.96	544.69	52.26	11.422
4,900.00	3,790.65	3,775.00	3,774.44	49.03	6.89	-79.30		-116.24	-616.52	696.03	640.12	55.92	12.447
5,000.00	3,788.03	3,772.22	3,771.66	52.71	6.89	-77.54		-116.33	-616.52	795.33	735.74	59.59	13.346
5,100.00	3,785.41	3,769.43	3,768.88	56.41	6.88	-75.81		-116.43	-616.52	894.78	831.49	63.29	14.138
5,200.00	3,782.79	3,766.65	3,766.09	60.13	6.87	-74.10		-116.52	-616.52	994.33	927.32	67.00	14.840
5,300.00	3,780.18	3,763.87	3,763.31	63.86	6.87	-72.43		-116.62	-616.52	1,093.95	1,023.22	70.73	15.468
5,400.00	3,777.56	3,761.09	3,760.53	67.60	6.86	-70.80		-116.71	-616.52	1,193.63	1,119.17	74.46	16.031
5,500.00	3,774.94	3,758.30	3,757.75	71.35	6.85	-69.20		-116.81	-616.52	1,293.35	1,215.15	78.20	16.538
5,600.00	3,772.32	3,755.52	3,754.97	75.11	6.85	-67.63		-116.90	-616.52	1,393.11	1,311.16	81.95	16.999
5,700.00	3,769.70	3,752.74	3,752.19	78.87	6.84	-66.11		-116.99	-616.52	1,492.90	1,407.18	85.71	17.418
5,800.00	3,767.09	3,749.96	3,749.42	82.64	6.83	-64.62		-117.09	-616.52	1,592.70	1,503.23	89.48	17.801
5,900.00	3,764.47	3,747.19	3,746.64	86.41	6.83	-63.17		-117.18	-616.52	1,692.53	1,599.29	93.24	18.152
6,000.00	3,761.85	3,744.41	3,743.86	90.19	6.82	-61.76		-117.27	-616.52	1,792.37	1,695.35	97.02	18.475
6,100.00	3,759.23	3,741.63	3,741.09	93.98	6.82	-60.39		-117.36	-616.52	1,892.22	1,791.43	100.79	18.774
6,200.00	3,756.62	3,738.85	3,738.31	97.76	6.81	-59.06		-117.46	-616.52	1,992.09	1,887.52	104.57	19.050
6,300.00	3,754.00	3,736.08	3,735.54	101.55	6.80	-57.77		-117.55	-616.52	2,091.96	1,983.61	108.35	19.307
6,400.00	3,751.38	3,733.30	3,732.76	105.34	6.80	-56.52		-117.64	-616.52	2,191.84	2,079.70	112.14	19.546
6,500.00	3,748.76	3,730.53	3,729.99	109.14	6.79	-55.30		-117.73	-616.52	2,291.73	2,175.80	115.93	19.769
6,600.00	3,746.15	3,727.75	3,727.22	112.93	6.78	-54.12		-117.82	-616.52	2,391.62	2,271.91	119.72	19.978
6,700.00	3,743.53	3,724.98	3,724.45	116.73	6.78	-52.98		-117.91	-616.52	2,491.52	2,368.02	123.51	20.173
6,800.00	3,740.91	3,722.21	3,721.67	120.53	6.77	-51.88		-118.00	-616.52	2,591.43	2,464.13	127.30	20.357
6,900.00	3,738.29	3,719.44	3,718.90	124.33	6.76	-50.81		-118.10	-616.52	2,691.34	2,560.24	131.09	20.530
7,000.00	3,735.67	3,716.66	3,716.13	128.13	6.76	-49.77		-118.19	-616.52	2,791.25	2,656.36	134.89	20.693
7,100.00	3,733.06	3,713.89	3,713.36	131.94	6.75	-48.77		-118.28	-616.52	2,891.17	2,752.48	138.69	20.847
7,200.00	3,730.44	3,711.12	3,710.60	135.74	6.75	-47.80		-118.37	-616.52	2,991.09	2,848.60	142.49	20.992
7,300.00	3,727.82	3,708.35	3,707.83	139.55	6.74	-46.85		-118.46	-616.52	3,091.01	2,944.72	146.29	21.130
7,400.00	3,725.20	3,705.59	3,705.06	143.35	6.73	-45.94		-118.55	-616.52	3,190.93	3,040.85	150.09	21.260
7,500.00	3,722.59	3,702.82	3,702.30	147.16	6.73	-45.06		-118.63	-616.52	3,290.86	3,136.97	153.89	21.385
7,600.00	3,719.97	3,700.05	3,699.53	150.97	6.72	-44.21		-118.72	-616.52	3,390.79	3,233.10	157.69	21.503
7,700.00	3,717.35	3,697.29	3,696.77	154.78	6.71	-43.38		-118.81	-616.52	3,490.72	3,329.22	161.50	21.615
7,800.00	3,714.73	3,694.52	3,694.00	158.59	6.71	-42.58		-118.90	-616.52	3,590.65	3,425.35	165.30	21.722
7,900.00	3,712.12	3,691.75	3,691.24	162.40	6.70	-41.81		-118.99	-616.52	3,690.58	3,521.48	169.10	21.824
8,000.00	3,709.50	3,688.99	3,688.47	166.21	6.70	-41.06		-119.08	-616.52	3,790.52	3,617.61	172.91	21.922
8,100.00	3,706.88	3,686.23	3,685.71	170.03	6.69	-40.33		-119.17	-616.52	3,890.46	3,713.74	176.72	22.015
8,200.00	3,704.26	3,683.46	3,682.95	173.84	6.68	-39.63		-119.25	-616.52	3,990.39	3,809.87	180.52	22.105
8,300.00	3,701.64	3,680.70	3,680.19	177.65	6.68	-38.94		-119.34	-616.52	4,090.33	3,906.00	184.33	22.190
8,400.00	3,699.03	3,677.94	3,677.43	181.47	6.67	-38.28		-119.43	-616.52	4,190.27	4,002.14	188.14	22.272
8,449.53	3,697.73	3,676.57	3,676.06	183.36	6.67	-37.96		-119.47	-616.52	4,239.77	4,049.75	190.02	22.312

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



Phoenix Technology Services
Anticollision Report

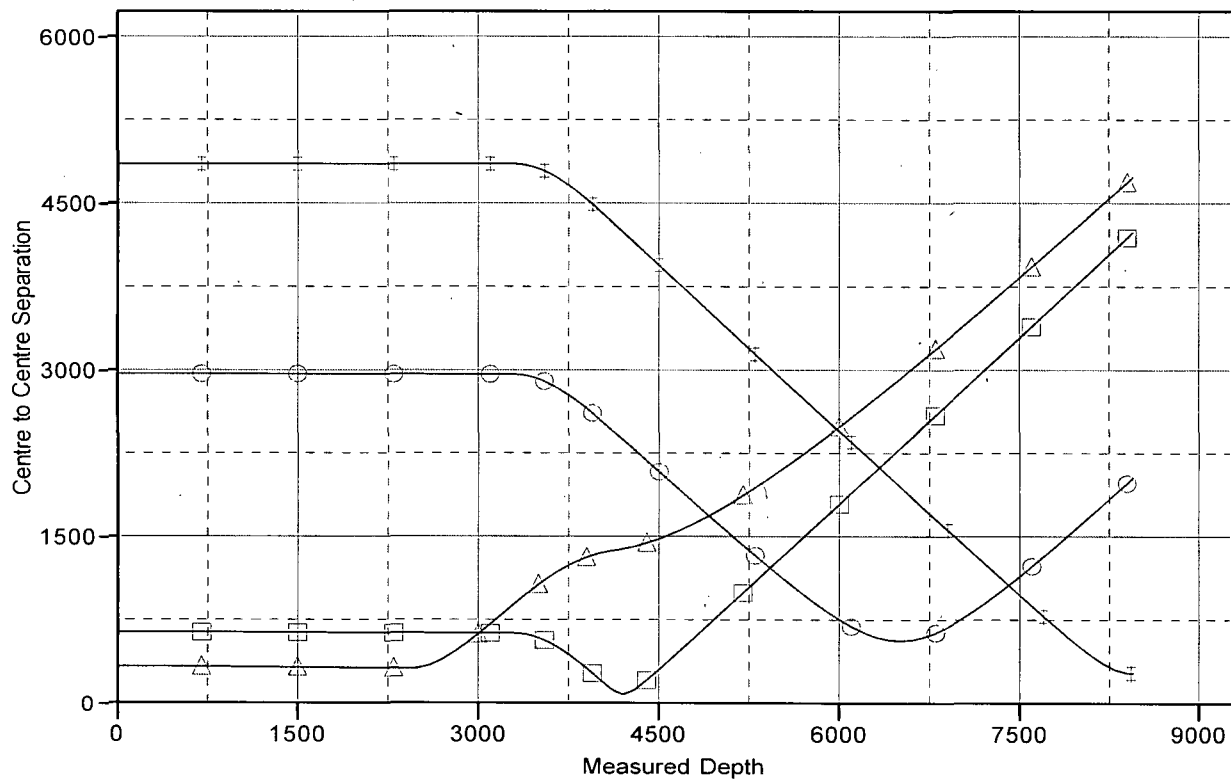


Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #3H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberd 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR DB
Reference Design:	Plan #1 09-08-14	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3628.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #3H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 3001
Grid Convergence at Surface is: 0.10°

Ladder Plot



LEGEND

- ▲ #28, WB1, Inc Surveys V0
- #4, WB1, Inc Surveys V0
- ◆ #31, WB1, Inc Surveys V0
- #30, WB1, Inc Surveys V0



Phoenix Technology Services
Anticollision Report



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Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3628.00usft (Silver Oak 3)
Reference Site:	Halberg 27 State	MD Reference:	KB @ 3628.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#3H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	GCR DB
Reference Design:	Plan #1.09-08-14	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3628.00usft (Silver Oak 3)

Offset Depths are relative to Offset Datum

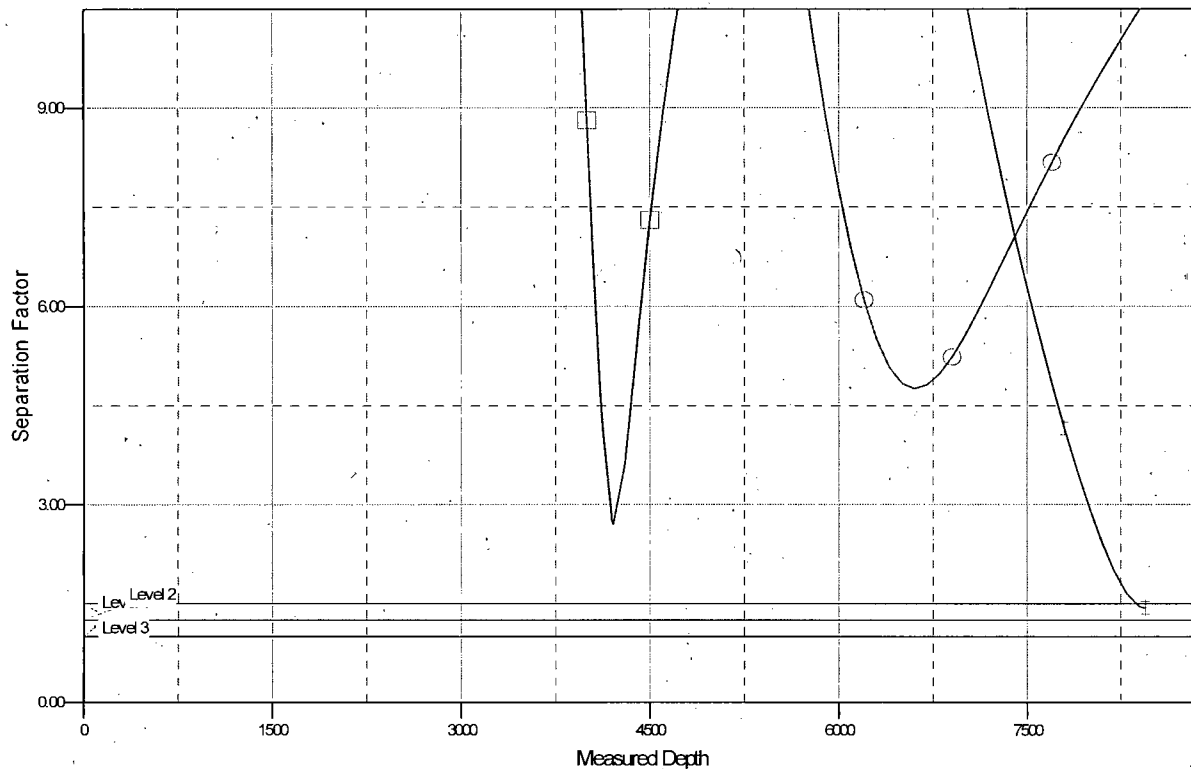
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #3H

Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 3001

Grid Convergence at Surface is: 0.10°

Separation Factor Plot



LEGEND

- △ #28, WB1, Inc Surveys V0
- #4, WB1, Inc Surveys V0
- ⊕ #31, WB1, Inc Surveys V0
- #30, WB1, Inc Surveys V0