

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

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

RECEIVED

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-015- 42887	Pool Code 3250	Pool Name Atoka; Glorieta Yeso
Property Code 38909	Property Name SHERMAN 4 FEE	Well Number 8H
OGRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3341'

Surface Location

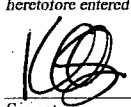
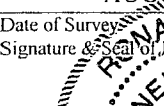
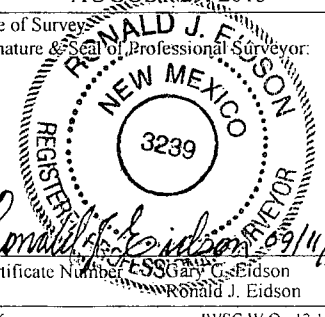
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
P	4	19-S	26-E		330	SOUTH	270	EAST	EDDY

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
1	4	19-S	26-E		330	NORTH	330	EAST	EDDY

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
159.03			

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

4 3 2 1 39.07 AC. 39.06 AC. 39.04 AC. 39.03 AC. GEODETIC COORDINATES NAD 27 NME SURFACE LOCATION Y=612336.8 N X=485981.2 E LAT.=32.683405° N LONG.=104.378897° W BOTTOM HOLE LOCATION Y=616933.8 N X=485921.2 E CORNER COORDINATES TABLE <table border="1"> <tr> <td>A</td> <td>Y=617257.6 N, X=484933.0 E</td> </tr> <tr> <td>B</td> <td>Y=617265.8 N, X=486252.9 E</td> </tr> <tr> <td>C</td> <td>Y=612008.6 N, X=486253.0 E</td> </tr> <tr> <td>D</td> <td>Y=612000.1 N, X=484939.5 E</td> </tr> </table> Estimated Completed Interval: 744 FSL + 330 FEL Project Area Producing Area GRID AZ = 359°15'02" HORIZ. DIST. = 4598.6' 330' B.H. 330' 270' S.L. 330'	A	Y=617257.6 N, X=484933.0 E	B	Y=617265.8 N, X=486252.9 E	C	Y=612008.6 N, X=486253.0 E	D	Y=612000.1 N, X=484939.5 E	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 12-30-14 Date Kelly J. Holly Printed Name kholly@concho.com E-mail Address SURVEYOR CERTIFICATION I hereby certify that the well location shown on this plat was plotted from field notes of actual surveys made by me or under my supervision, and that the same is true and correct to the best of my belief. AUGUST 29, 2013 Date of Survey  Signature & Seal of Professional Surveyor  Certificate Number 12641 Ronald J. Eidson 3239 ACK JWSC W.O.: 13.11.0971
A	Y=617257.6 N, X=484933.0 E								
B	Y=617265.8 N, X=486252.9 E								
C	Y=612008.6 N, X=486253.0 E								
D	Y=612000.1 N, X=484939.5 E								



COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#8H

WB1

Plan: Plan #1 12-16-14

Surface: 330' FSL, 270' FEL, Sec 4, T19S, R26E, Unit P

PP: 744' FSL, 330' FEL, Sec 4, T19S, R26E, Unit P

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

Standard Planning Report

16 December, 2014



PHOENIX
TECHNOLOGY SERVICES



Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3359'00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27/NME)	MD Reference:	KB @ 3359'00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1, 12-16-14		

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	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	#8H		
Well Position	+N-S	185.00 usft	Northing:
	+E-W	768.80 usft	Easting:
Position Uncertainty	0.00 usft	Wellhead Elevation:	
		Latitude:	32° 41' 0.25786 N
		Longitude:	104° 22' 44.03000 W
		Ground Level:	3,341.00 usft

Wellbore	WB1		
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Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
			(°)	(°)	(nT)
	IGRF2010_14	12/16/2014	7.56	60.39	48,454

Design	Plan #1, 12-16-14		
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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	359.25

Plan Sections										
Measured Depth	Inclination	Azimuth	Vertical Depth	+N/S	+E/W	Dogleg Rate	Build Rate	Turn Rate	TFO	Target
(usft)	(°)	(°)	(usft)	(usft)	(usft)	(°/100usft)	(°/100usft)	(°/100usft)	(°)	
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2,700.50	0.00	0.00	2,700.50	0.00	0.00	0.00	0.00	0.00	0.00	
3,522.32	90.40	352.00	3,221.36	519.40	-73.00	11.00	11.00	0.00	352.00	
3,804.83	90.40	0.48	3,219.39	801.05	-91.52	3.00	0.00	3.00	89.98	
7,601.01	90.40	0.48	3,193.00	4,597.00	-60.00	0.00	0.00	0.00	0.00	PBHL-Sherman 4 Fee



Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3359.00usft (Silver Oak 3)
Project:	Eddy County, NM (NAD27 NME)	MD Reference:	KB @ 3359.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 12-16-14		

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
2,700.50	0.00	0.00	2,700.50	0.00	0.00	0.00	0.00	0.00	0.00
KOP Begin 11°/100° Build									
2,800.00	10.95	352.00	2,799.40	9.38	-1.32	9.40	11.00	11.00	0.00
2,900.00	21.95	352.00	2,895.16	37.37	-5.25	37.44	11.00	11.00	0.00
3,000.00	32.95	352.00	2,983.77	82.94	-11.66	83.09	11.00	11.00	0.00
3,100.00	43.95	352.00	3,061.97	144.42	-20.30	144.67	11.00	11.00	0.00
3,200.00	54.95	352.00	3,126.89	219.54	-30.85	219.93	11.00	11.00	0.00
3,300.00	65.95	352.00	3,176.14	305.55	-42.94	306.09	11.00	11.00	0.00
3,400.00	76.95	352.00	3,207.91	399.29	-56.12	399.99	11.00	11.00	0.00
3,415.43	78.64	352.00	3,211.17	414.22	-58.22	414.95	11.00	11.00	0.00
PP Sherman 4 Fee #8H									
3,500.00	87.95	352.00	3,221.04	497.31	-69.89	498.18	11.00	11.00	0.00
3,522.32	90.40	352.00	3,221.36	519.40	-73.00	520.31	11.00	11.00	0.00
LP Begin 3°/100° Turn									
3,600.00	90.40	354.33	3,220.82	596.53	-82.24	597.55	3.00	0.00	3.00
3,700.00	90.40	357.33	3,220.12	696.25	-89.51	697.36	3.00	0.00	3.00
3,800.00	90.40	0.33	3,219.42	796.21	-91.55	797.34	3.00	0.00	3.00
3,804.83	90.40	0.48	3,219.39	801.04	-91.52	802.17	3.00	0.00	3.00
Hold 90.4° Inc 0.48° Azm									
3,900.00	90.40	0.48	3,218.73	896.21	-90.73	897.31	0.00	0.00	0.00
4,000.00	90.40	0.48	3,218.03	996.20	-89.90	997.29	0.00	0.00	0.00
4,100.00	90.40	0.48	3,217.33	1,096.19	-89.07	1,097.26	0.00	0.00	0.00
4,200.00	90.40	0.48	3,216.64	1,196.19	-88.24	1,197.24	0.00	0.00	0.00
4,263.77	90.40	0.48	3,216.20	1,259.96	-87.71	1,260.99	0.00	0.00	0.00
TL 3225° TVD @ 0.0° VZ 90.4° Inc									
4,300.00	90.40	0.48	3,215.94	1,296.18	-87.41	1,297.21	0.00	0.00	0.00
4,400.00	90.40	0.48	3,215.25	1,396.18	-86.58	1,397.19	0.00	0.00	0.00
4,500.00	90.40	0.48	3,214.55	1,496.17	-85.75	1,497.16	0.00	0.00	0.00
4,600.00	90.40	0.48	3,213.86	1,596.17	-84.92	1,597.14	0.00	0.00	0.00
4,700.00	90.40	0.48	3,213.16	1,696.16	-84.09	1,697.11	0.00	0.00	0.00
4,800.00	90.40	0.48	3,212.47	1,796.15	-83.25	1,797.09	0.00	0.00	0.00
4,900.00	90.40	0.48	3,211.77	1,896.15	-82.42	1,897.06	0.00	0.00	0.00
5,000.00	90.40	0.48	3,211.08	1,996.14	-81.59	1,997.04	0.00	0.00	0.00
5,100.00	90.40	0.48	3,210.38	2,096.14	-80.76	2,097.01	0.00	0.00	0.00
5,200.00	90.40	0.48	3,209.69	2,196.13	-79.93	2,196.99	0.00	0.00	0.00
5,300.00	90.40	0.48	3,208.99	2,296.12	-79.10	2,296.96	0.00	0.00	0.00
5,400.00	90.40	0.48	3,208.30	2,396.12	-78.27	2,396.94	0.00	0.00	0.00
5,500.00	90.40	0.48	3,207.60	2,496.11	-77.44	2,496.91	0.00	0.00	0.00
5,600.00	90.40	0.48	3,206.91	2,596.11	-76.61	2,596.89	0.00	0.00	0.00
5,700.00	90.40	0.48	3,206.21	2,696.10	-75.78	2,696.86	0.00	0.00	0.00
5,800.00	90.40	0.48	3,205.52	2,796.09	-74.95	2,796.83	0.00	0.00	0.00
5,900.00	90.40	0.48	3,204.82	2,896.09	-74.12	2,896.81	0.00	0.00	0.00
6,000.00	90.40	0.48	3,204.13	2,996.08	-73.29	2,996.78	0.00	0.00	0.00
6,100.00	90.40	0.48	3,203.43	3,096.08	-72.46	3,096.76	0.00	0.00	0.00
6,200.00	90.40	0.48	3,202.74	3,196.07	-71.63	3,196.73	0.00	0.00	0.00
6,300.00	90.40	0.48	3,202.04	3,296.07	-70.80	3,296.71	0.00	0.00	0.00
6,400.00	90.40	0.48	3,201.35	3,396.06	-69.97	3,396.68	0.00	0.00	0.00
6,500.00	90.40	0.48	3,200.65	3,496.05	-69.14	3,496.66	0.00	0.00	0.00
6,600.00	90.40	0.48	3,199.96	3,596.05	-68.31	3,596.63	0.00	0.00	0.00
6,700.00	90.40	0.48	3,199.26	3,696.04	-67.48	3,696.61	0.00	0.00	0.00
6,800.00	90.40	0.48	3,198.57	3,796.04	-66.65	3,796.58	0.00	0.00	0.00
6,900.00	90.40	0.48	3,197.87	3,896.03	-65.82	3,896.56	0.00	0.00	0.00
7,000.00	90.40	0.48	3,197.18	3,996.02	-64.99	3,996.53	0.00	0.00	0.00



Planning Report



Database:	Compass 5000 GCR	Local Co-ordinate Reference:	Well #8H
Company:	COG Operating LLC	TVD Reference:	KB @ 3359.00usft (Silver Oak 3)
Project:	Eddy County NM (NAD27 NME)	MD Reference:	KB @ 3359.00usft (Silver Oak 3)
Site:	Sherman 4 Fee	North Reference:	Grid
Well:	#8H	Survey Calculation Method:	Minimum Curvature
Wellbore:	WB1		
Design:	Plan #1 12-16-14		

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	90.40	0.48	3,196.48	4,096.02	-64.16	4,096.51	0.00	0.00	0.00
7,200.00	90.40	0.48	3,195.79	4,196.01	-63.33	4,196.48	0.00	0.00	0.00
7,300.00	90.40	0.48	3,195.09	4,296.01	-62.50	4,296.46	0.00	0.00	0.00
7,400.00	90.40	0.48	3,194.40	4,396.00	-61.67	4,396.43	0.00	0.00	0.00
7,500.00	90.40	0.48	3,193.70	4,496.00	-60.84	4,496.41	0.00	0.00	0.00
7,600.00	90.40	0.48	3,193.01	4,595.99	-60.01	4,596.38	0.00	0.00	0.00
7,601.01	90.40	0.48	3,193.00	4,597.00	-60.00	4,597.39	0.00	0.00	0.00
TD at 7601.01 MD - PBHL-Sherman 4 Fee #8H									

Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
PBHL-Sherman 4 Fee.#	0.00	360.00	3,193.00	4,597.00	-60.00	616,933.80	485,921.20	32° 41' 45.74786 N	104° 22' 44.75524 W
- plan hits target center									
- Point									
PP-Sherman 4 Fee #8H	0.00	360.00	3,211.18	414.25	-58.22	612,751.05	485,922.98	32° 41' 4.35688 N	104° 22' 44.71329 W
- plan hits target center									
- Point									

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,263.77	3,216.20	TL, 3225' TVD @ 0 VZ, 90.4° Inc		-0.40	359.25

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Comment
2,700.50	2,700.50	0.00	0.00	KOP, Begin 11°/100' Build
3,522.32	3,221.36	519.40	-73.00	LP, Begin 3°/100' Turn
3,804.83	3,219.39	801.04	-91.52	Hold 90.4° Inc, 0.48° Azm
7,601.01	3,193.00	4,597.00	-60.00	TD at 7601.01' MD



Project: Eddy County, NM (NAD27 NME)
Site: Sherman 4 Fee
Well: #8H
Wellbore: WB1
Design: Plan #1 12-16-14
Rig: Silver Oak 3



PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: 0.03°
Magnetic North: 7.59°
Magnetic Field
Strength: 48454.1nT
Dip Angle: 60.39°
Date: 12/16/2014
Model: IGRF2010_14

WELL DETAILS

+N-S	+E-W	Nothing	Ground Level	3341.00	Latitude	Longitude
0.00	0.00	812336.80	Easting	485981.20	32° 41' 0.25786 N	104° 22' 44.03000 W

SECTION DETAILS

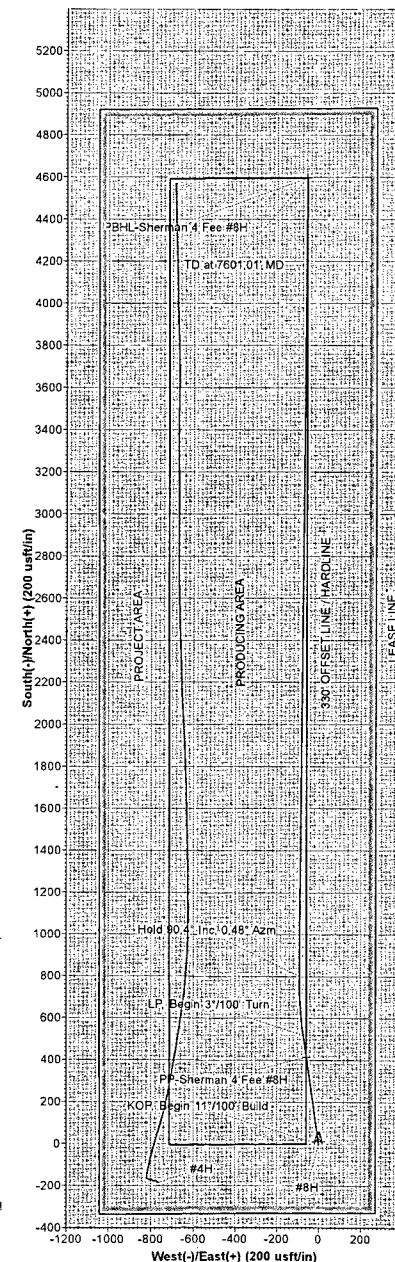
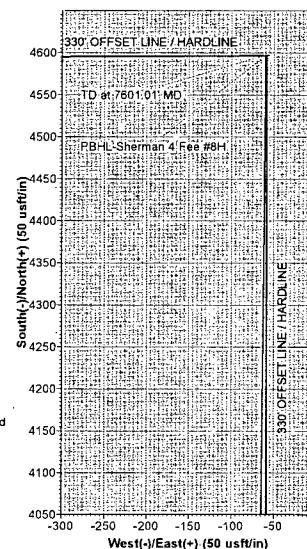
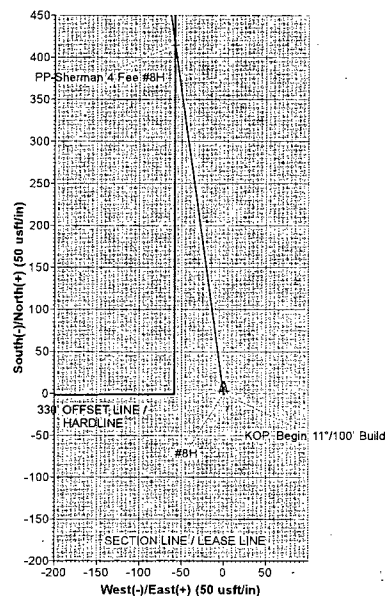
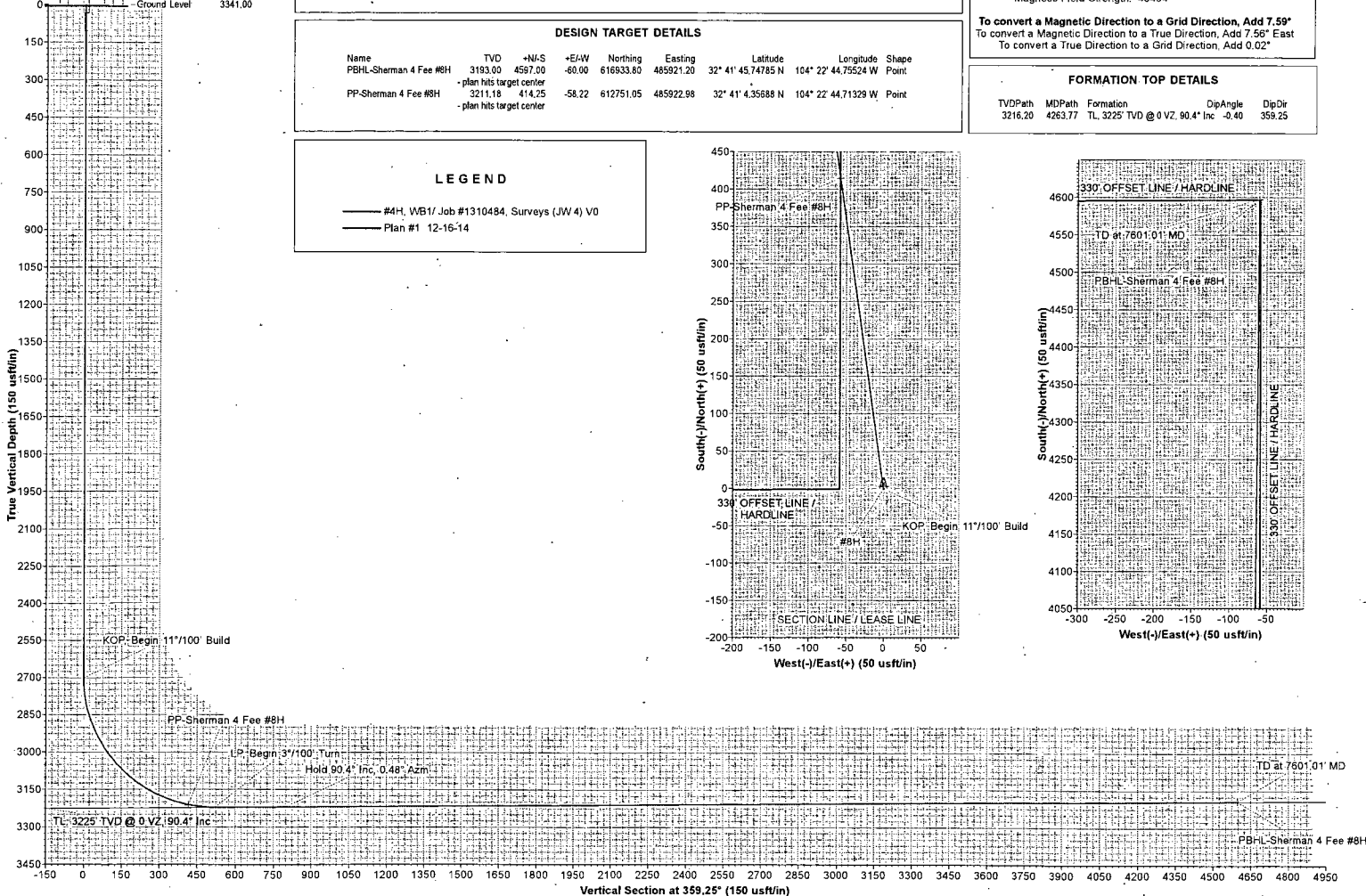
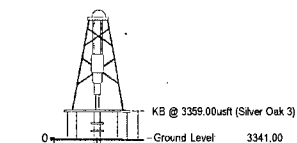
Sec	MD	Inc	Azi	TVD	+N-S	+E-W	Dleg	TFace	VSec	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2700.50	0.00	0.00	2700.50	0.00	0.00	0.00	0.00	0.00	0.00	KOP_Beg 11°/100' Build
3	3522.32	90.40	352.00	3221.36	519.40	-73.00	11.00	352.00	520.31		LP_Beg 3°/100' Turn
4	3804.83	90.40	0.48	3219.39	801.05	-91.52	3.00	89.98	802.17		Hold 90.4° Inc. 0.48° Azm
5	7601.01	90.40	0.48	3193.00	4597.00	-60.00	0.00	0.00	4597.39	PBHL-Sherman 4 Fee #8H	TD at 7601.01' MD

DESIGN TARGET DETAILS

Name	TVD	+N-S	+E-W	Nothing	Easting	Latitude	Longitude	Shape
PBHL-Sherman 4 Fee #8H	3193.00	4597.00	-80.00	616933.80	485921.20	32° 41' 45.74785 N	104° 22' 44.75524 W	Point
PP-Sherman 4 Fee #8H	3211.18	414.25	-58.22	612751.05	485922.98	32° 41' 4.35688 N	104° 22' 44.71329 W	Point

LEGEND

— #4H, WB1/ Job #1310484, Surveys (JW 4) V0
— Plan #1 12-16-14



Created By: Julio Pina Date: 10:54, December 16 2014



COG Operating LLC

Eddy County, NM (NAD27 NME)

Sherman 4 Fee

#8H

WB1

Plan #1 12-16-14

Anticollision Report

16 December, 2014



PHOENIX
TECHNOLOGY SERVICES



Anticollision Report



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County - NM (NAD27 - NME)	TVD Reference:	KB @ 3359.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3359.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #1 12-16-14	Offset TVD Reference:	Offset Datum

Reference	Plan #1 12-16-14		
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 9,999.98 usft	Error Surface:	Circular Conic
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program		Date: 12/16/2014		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	7,601.01	Plan #1 12-16-14 (WB1)	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						
#4H - WB1/ Job #1310484 - Surveys (JW 4)	4,042.78	4,112.03	544.11	501.75	12.845	CC
#4H - WB1/ Job #1310484 - Surveys (JW 4)	7,601.01	7,644.00	650.93	485.07	3.925	ES
#4H - WB1/ Job #1310484 - Surveys (JW 4)	7,601.51	7,644.00	650.95	485.09	3.925	SF

Offset Design Sherman 4 Fee - #4H - WB1/ Job #1310484 - Surveys (JW 4)												Offset Site Error: 0.00 usft	
Survey Program: 100-VES-ISCWSA-GYRO-312521-MWD												Offset Well Error: 0.00 usft	
Reference		Offset		Semi Major Axis			Distance						
Measured Depth	Vertical Depth	Measured Depth	Vertical Depth	Reference	Offset	Highside Toolface	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor	Warning	
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	+N/-S (usft)	+E/-W (usft)	(usft)	(usft)	(usft)		
0.00	0.00	0.00	0.00	0.00	0.00	-103.53	-185.00	-768.80	790.77				
100.00	100.00	92.95	92.95	0.09	0.08	-103.50	-184.65	-768.95	790.81	790.64	0.17	4,641.179	
200.00	200.00	189.86	189.85	0.32	0.25	-103.44	-183.89	-769.45	791.13	790.56	0.57	1,391.477	
300.00	300.00	288.68	288.67	0.54	0.44	-103.36	-182.97	-770.29	791.74	790.76	0.98	809.209	
400.00	400.00	386.17	386.14	0.77	0.62	-103.25	-181.67	-771.42	792.56	791.17	1.39	571.567	
500.00	500.00	484.18	484.13	0.99	0.80	-103.11	-180.08	-772.92	793.68	791.89	1.80	441.961	
600.00	600.00	584.34	584.26	1.22	0.99	-102.99	-178.64	-774.55	794.94	792.73	2.21	360.024	
700.00	700.00	682.90	682.81	1.44	1.17	-102.91	-177.93	-776.02	796.24	793.62	2.62	304.454	
800.00	800.00	780.10	780.00	1.67	1.35	-102.86	-177.58	-777.66	797.81	794.79	3.02	264.234	
900.00	900.00	879.29	879.17	1.89	1.54	-102.82	-177.40	-779.57	799.64	796.21	3.43	233.422	
1,000.00	1,000.00	976.88	976.73	2.12	1.71	-102.80	-177.54	-781.52	801.62	797.79	3.83	209.347	
1,100.00	1,100.00	1,081.68	1,081.51	2.34	1.91	-102.75	-177.39	-783.66	803.59	799.34	4.25	189.168	
1,200.00	1,200.00	1,182.00	1,181.82	2.56	2.10	-102.71	-177.09	-785.23	805.04	800.38	4.66	172.755	
1,300.00	1,300.00	1,281.77	1,281.58	2.79	2.28	-102.65	-176.60	-786.91	806.58	801.51	5.07	159.029	
1,400.00	1,400.00	1,380.28	1,380.07	3.01	2.47	-102.59	-176.10	-788.66	808.20	802.72	5.48	147.453	
1,500.00	1,500.00	1,478.02	1,477.79	3.24	2.65	-102.54	-175.82	-790.58	810.05	804.16	5.89	137.561	
1,600.00	1,600.00	1,578.27	1,578.01	3.46	2.84	-102.46	-175.24	-792.78	812.07	805.77	6.30	128.868	
1,700.00	1,700.00	1,678.48	1,678.20	3.69	3.03	-102.37	-174.38	-794.97	814.02	807.30	6.71	121.228	
1,800.00	1,800.00	1,778.78	1,778.47	3.91	3.21	-102.26	-173.25	-797.19	815.95	808.82	7.13	114.468	
1,900.00	1,900.00	1,878.48	1,876.13	4.14	3.40	-102.17	-172.38	-799.39	817.95	810.42	7.54	108.530	
2,000.00	2,000.00	1,976.37	1,975.99	4.36	3.59	-102.08	-171.54	-801.85	820.19	812.24	7.95	103.178	
2,100.00	2,100.00	2,074.71	2,074.31	4.59	3.77	-101.99	-170.82	-804.27	822.45	814.09	8.36	98.392	
2,200.00	2,200.00	2,175.55	2,175.10	4.81	3.96	-101.90	-170.09	-806.89	824.84	816.07	8.77	94.019	
2,300.00	2,300.00	2,277.21	2,276.74	5.04	4.15	-101.83	-169.46	-809.30	827.03	817.84	9.19	90.002	

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



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3359.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3359.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore:	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #1 12-16-14	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4 Fee - #4H - WB1 / Job #1310484 - Surveys (JW 4)													Offset Site Error:	0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3/2521-MWD													Offset Well Error:	0.00 usft
Reference	Offset	Semi Major Axis		Distance		Minimum		Separation		Warning				
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Between	Between	Minimum	Separation			
Depth	Depth	Depth	Depth	Depth	Depth	Toolface	+N-S	+E-W	Centres	Ellipses	Separation	Factor		
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(°)	(usft)	(usft)	(usft)	(usft)	(usft)			
2,400.00	2,400.00	2,373.63	2,373.13	5.26	4.33	-101.76	-168.94	-811.60	829.26	819.66	9.59	86.429		
2,500.00	2,500.00	2,470.43	2,469.88	5.49	4.50	-101.70	-168.66	-814.40	832.03	822.04	9.98	83.331		
2,600.00	2,600.00	2,595.75	2,595.13	5.71	4.55	-101.51	-166.52	-817.46	834.25	823.99	10.26	81.288		
2,700.50	2,700.50	2,822.72	2,814.28	5.94	4.70	-98.11	-115.66	-811.34	828.25	817.61	10.63	77.882		
2,750.00	2,749.93	3,053.44	2,991.83	6.05	5.86	-82.16	24.08	-776.48	815.08	803.17	11.91	68.432		
2,800.00	2,799.40	3,148.85	3,042.67	6.17	6.86	-78.80	101.46	-753.95	798.16	785.13	13.03	61.234		
2,850.00	2,847.96	3,181.27	3,056.56	6.30	7.26	-78.89	129.59	-745.78	780.77	767.21	13.56	57.577		
2,900.00	2,895.16	3,206.00	3,066.08	6.43	7.58	-79.36	151.66	-739.97	764.31	750.31	14.01	54.566		
2,950.00	2,940.57	3,230.95	3,074.74	6.56	7.92	-79.73	174.42	-734.54	748.88	734.40	14.47	51.737		
3,000.00	2,983.77	3,261.92	3,084.18	6.71	8.35	-79.71	203.22	-728.21	734.32	719.26	15.07	48.742		
3,050.00	3,024.36	3,300.00	3,094.10	6.93	8.91	-79.30	239.20	-720.67	720.36	704.53	15.84	45.482		
3,100.00	3,061.97	3,333.73	3,101.04	7.19	9.43	-79.10	271.56	-714.16	706.86	690.24	16.62	42.529		
3,150.00	3,096.25	3,366.82	3,106.18	7.52	9.94	-78.92	303.67	-708.08	693.94	676.47	17.47	39.727		
3,200.00	3,126.89	3,401.95	3,110.22	7.92	10.50	-78.68	338.02	-701.96	681.57	663.14	18.42	36.992		
3,250.00	3,153.60	3,441.96	3,113.16	8.39	11.15	-78.29	377.32	-695.07	669.36	649.82	19.54	34.257		
3,300.00	3,176.14	3,479.10	3,114.49	8.92	11.76	-78.14	413.91	-688.86	657.31	636.62	20.68	31.778		
3,350.00	3,194.30	3,518.00	3,115.29	9.52	12.40	-78.12	452.30	-682.62	645.29	623.37	21.92	29.444		
3,400.00	3,207.91	3,564.19	3,116.16	10.17	13.14	-78.22	497.92	-675.40	632.92	609.61	23.31	27.151		
3,450.00	3,216.85	3,609.29	3,116.97	10.87	13.86	-78.77	542.48	-668.49	620.01	595.27	24.73	25.066		
3,500.00	3,221.04	3,655.69	3,117.73	11.61	14.64	-79.77	588.35	-661.51	606.44	580.19	26.24	23.107		
3,522.32	3,221.36	3,676.50	3,118.03	11.95	14.98	-80.38	608.92	-658.40	600.15	573.22	26.93	22.285		
3,600.00	3,220.82	3,741.08	3,118.88	13.10	16.06	-80.31	672.83	-649.13	579.99	550.84	29.16	19.893		
3,700.00	3,220.12	3,819.29	3,120.14	14.57	17.35	-80.32	750.52	-640.33	561.41	529.49	31.92	17.587		
3,804.83	3,219.39	3,905.40	3,121.43	16.17	18.76	-80.40	836.35	-633.58	550.94	516.01	34.93	15.773		
3,900.00	3,218.73	3,987.00	3,122.17	17.68	20.13	-80.47	917.84	-629.38	546.64	508.82	37.82	14.455		
4,000.00	3,218.03	4,080.00	3,121.20	19.34	21.75	-80.40	1,010.78	-626.46	544.39	503.31	41.08	13.251		
4,042.78	3,217.73	4,112.03	3,120.32	20.06	22.30	-80.33	1,042.79	-625.91	544.11	501.75	42.36	12.845 CC		
4,100.00	3,217.33	4,160.26	3,118.86	21.02	23.14	-80.21	1,091.00	-625.72	544.58	500.43	44.16	12.332		
4,200.00	3,216.64	4,258.81	3,115.73	22.73	24.73	-79.99	1,189.50	-626.48	546.58	499.13	47.46	11.518		
4,300.00	3,215.94	4,361.00	3,112.45	24.45	26.30	-79.75	1,291.64	-626.78	548.13	497.38	50.75	10.800		
4,400.00	3,215.25	4,454.00	3,109.77	26.19	27.80	-79.57	1,384.59	-627.92	550.53	496.54	53.99	10.197		
4,500.00	3,214.55	4,552.99	3,107.71	27.94	29.39	-79.49	1,483.53	-630.14	553.81	496.48	57.32	9.661		
4,600.00	3,213.86	4,648.84	3,104.92	29.70	30.99	-79.33	1,579.31	-632.27	557.20	496.52	60.68	9.182		
4,700.00	3,213.16	4,749.98	3,101.65	31.46	32.68	-79.13	1,680.37	-634.44	560.60	496.46	64.14	8.740		
4,800.00	3,212.47	4,839.27	3,099.20	33.24	34.15	-79.02	1,769.58	-637.52	565.18	497.79	67.39	8.387		
4,900.00	3,211.77	4,941.26	3,096.84	35.02	35.82	-78.95	1,871.46	-641.66	570.28	499.45	70.83	8.051		
5,000.00	3,211.08	5,035.64	3,094.28	36.80	37.42	-78.86	1,965.71	-645.81	575.80	501.58	74.22	7.758		
5,100.00	3,210.38	5,136.62	3,091.18	38.59	39.12	-78.74	2,066.53	-650.56	581.69	503.97	77.71	7.485		
5,200.00	3,209.69	5,241.05	3,088.79	40.38	40.84	-78.68	2,170.83	-655.18	587.15	505.93	81.22	7.229		
5,300.00	3,208.99	5,345.67	3,084.65	42.18	42.59	-78.43	2,275.32	-658.27	591.50	506.73	84.77	6.978		
5,400.00	3,208.30	5,443.90	3,080.87	43.98	44.23	-78.21	2,373.43	-661.23	595.90	507.69	88.21	6.756		
5,500.00	3,207.60	5,544.34	3,077.43	45.78	45.91	-78.03	2,473.77	-664.38	600.34	508.66	91.68	6.548		
5,600.00	3,206.91	5,650.10	3,074.13	47.58	47.68	-77.87	2,579.43	-667.37	604.44	509.18	95.26	6.345		
5,700.00	3,206.21	5,753.37	3,070.16	49.39	49.42	-77.62	2,682.61	-668.97	607.42	508.61	98.81	6.147		
5,800.00	3,205.52	5,859.03	3,066.87	51.19	51.21	-77.43	2,788.21	-670.25	609.95	507.55	102.40	5.956		
5,900.00	3,204.82	5,965.00	3,064.30	53.00	53.00	-77.28	2,894.15	-670.40	611.27	505.26	106.01	5.766		
6,000.00	3,204.13	6,061.55	3,061.92	54.81	54.67	-77.14	2,990.67	-670.33	612.40	502.91	109.49	5.593		
6,100.00	3,203.43	6,158.61	3,059.24	56.62	56.35	-76.99	3,087.69	-670.86	614.21	501.23	112.98	5.437		
6,200.00	3,202.74	6,261.30	3,057.14	58.44	58.11	-76.89	3,190.36	-671.54	615.96	499.42	116.54	5.285		
6,300.00	3,202.04	6,361.39	3,054.00	60.25	59.83	-76.69	3,290.40	-671.82	617.60	497.52	120.08	5.143		
6,400.00	3,201.35	6,464.78	3,050.32	62.06	61.60	-76.44	3,393.71	-671.59	618.86	495.19	123.67	5.004		
6,500.00	3,200.65	6,571.54	3,046.97	63.88	63.43	-76.21	3,500.43	-670.84	619.57	492.26	127.31	4.867		

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



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD27 NME)	TVD Reference:	KB @ 3359.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3359.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at	2.00 sigma
Reference Wellbore	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #1 12-16-14	Offset TVD Reference:	Offset Datum

Offset Design Sherman 4 Fee - #4H - WB1 / Job #1310484 - Surveys (JW 4)												Offset Site Error:	0.00 usft
Survey Program: 100-VEG-ISCWSA-GYRO-3/2521-MWD												Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis		Distance							
Measured	Vertical	Measured	Vertical	Reference	Offset	Highside	Offset Wellbore Centre	Between	Between	Minimum	Separation	Warning	
Depth (usft)	Depth (usft)	Depth (usft)	Depth (usft)	(usft)	(usft)	Toothface (ft)	+N-S (usft)	+E-W (usft)	Centres (usft)	Ellipses (usft)	Separation (usft)		
6,593.76	3,200.00	6,664.95	3,043.60	65.58	65.03	-75.94	3,593.75	-668.88	619.08	488.47	130.61	4.740	
6,600.00	3,199.96	6,670.42	3,043.39	65.70	65.12	-75.92	3,599.22	-668.79	619.08	488.26	130.82	4.732	
6,700.00	3,199.26	6,757.85	3,040.11	67.51	66.63	-75.69	3,686.58	-668.41	620.21	486.07	134.14	4.623	
6,800.00	3,198.57	6,849.01	3,037.88	69.33	68.21	-75.61	3,777.69	-670.14	623.26	485.72	137.54	4.531	
6,900.00	3,197.87	6,948.19	3,035.13	71.15	69.93	-75.50	3,876.81	-672.62	627.01	485.93	141.08	4.444	
7,000.00	3,197.18	7,049.31	3,031.71	72.97	71.68	-75.33	3,977.84	-674.80	630.57	485.93	144.64	4.359	
7,100.00	3,196.48	7,150.01	3,028.22	74.79	73.41	-75.15	4,078.46	-676.83	634.04	485.85	148.19	4.278	
7,200.00	3,195.79	7,248.19	3,024.97	76.61	75.10	-74.99	4,176.57	-678.85	637.50	485.80	151.70	4.202	
7,300.00	3,195.09	7,350.58	3,023.77	78.43	76.86	-75.03	4,278.91	-681.68	641.10	485.81	155.29	4.128	
7,400.00	3,194.40	7,448.23	3,022.56	80.25	78.55	-75.06	4,376.52	-684.14	644.48	485.67	158.80	4.058	
7,500.00	3,193.70	7,552.50	3,020.14	82.07	80.36	-74.99	4,480.73	-686.49	647.88	485.45	162.43	3.989	
7,601.01	3,193.00	7,644.00	3,017.90	83.91	81.95	-74.91	4,572.19	-688.09	650.93	485.07	165.85	3.925 ES	
7,601.51	3,193.00	7,644.00	3,017.90	83.92	81.95	-74.91	4,572.19	-688.09	650.95	485.09	165.86	3.925 SF	



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County, NM (NAD27/NME)	TVD Reference:	KB @ 3359.00usft (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3359.00usft (Silver Oak 3)
Site Error:	0.00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0.00 usft	Output errors are at:	2.00 sigma
Reference Wellbore:	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #1 12-16-14	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3359.00usft (Silver Oak 3)

Coordinates are relative to: #8H

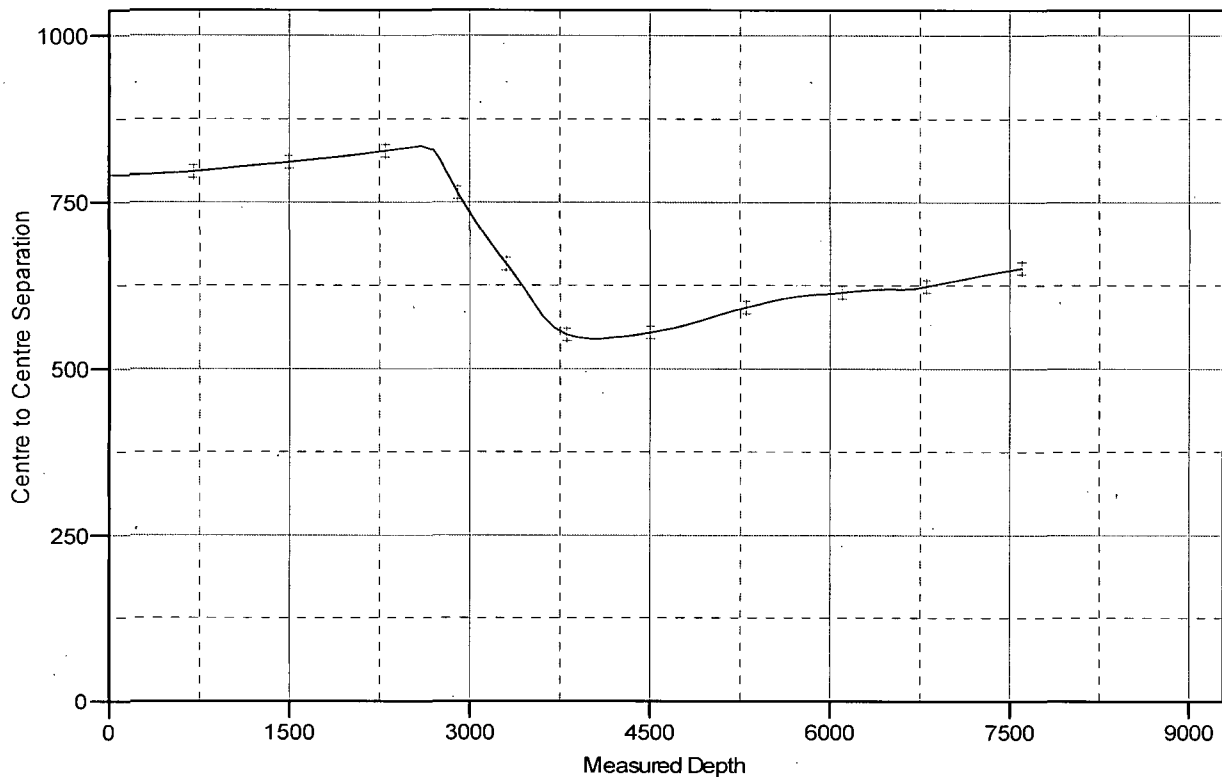
Offset Depths are relative to Offset Datum

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

Central Meridian is 104° 19' 60.00000 W

Grid Convergence at Surface is: -0.02°

Ladder Plot



LEGEND

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



Anticollision Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well #8H
Project:	Eddy County NM (NAD27 NME)	TVD Reference:	KB @ 3359'00usft. (Silver Oak 3)
Reference Site:	Sherman 4 Fee	MD Reference:	KB @ 3359'00usft. (Silver Oak 3)
Site Error:	0'00 usft	North Reference:	Grid
Reference Well:	#8H	Survey Calculation Method:	Minimum Curvature
Well Error:	0'00 usft	Output errors are at	2'00 sigma
Reference Wellbore	WB1	Database:	Compass 5000 GCR
Reference Design:	Plan #1 12-16-14	Offset TVD Reference:	Offset Datum

Reference Depths are relative to KB @ 3359.00usft (Silver Oak 3)

Offset Depths are relative to Offset Datum

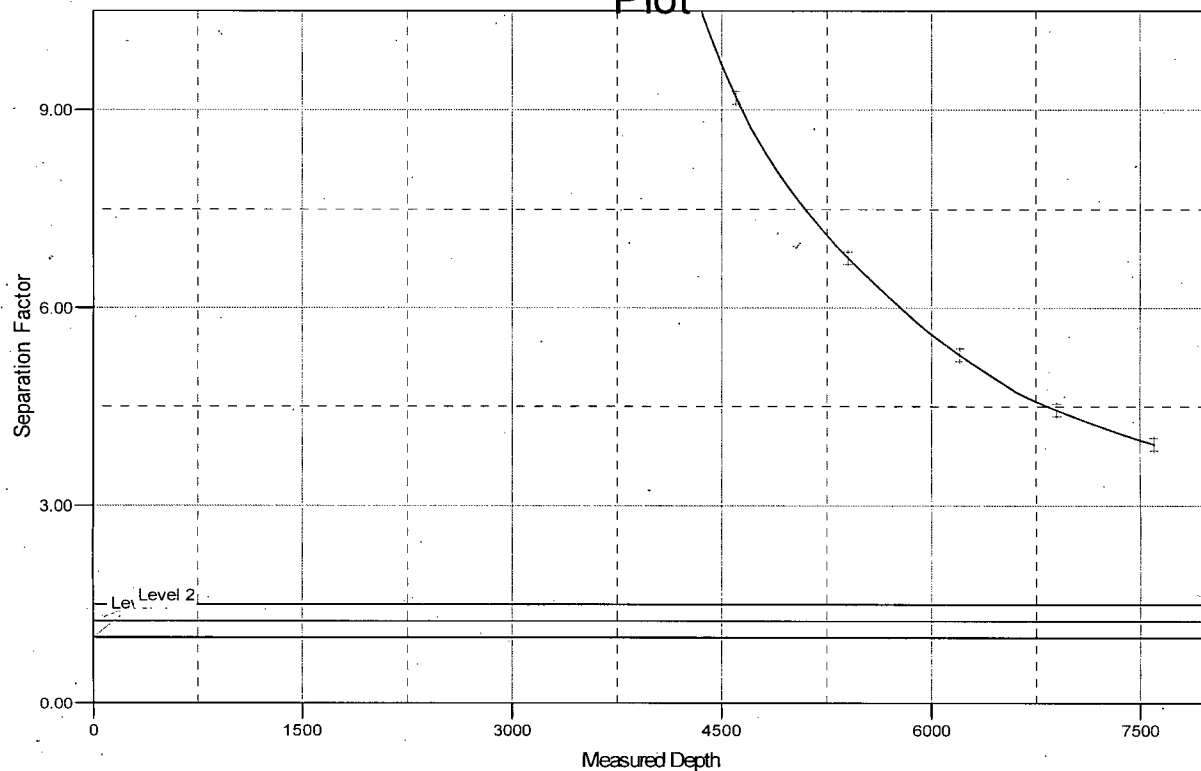
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #8H

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

Grid Convergence at Surface is: -0.02°

Separation Factor Plot



LEGEND

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