

NM OIL CONSERVATION

ARTESTA DISTRICT

OCD Artesa

JUN 22 2015

Form 3160-5
(August 2007)

UNITED STATES DEPARTMENT OF THE INTERIOR BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0135
Expires: July 31, 2010

SUNDRY NOTICES AND REPORTS ON WELLS RECEIVED
Do not use this form for proposals to drill or to re-enter an abandoned well. Use form 3160-3 (APD) for such proposals.

SUBMIT IN TRIPLICATE - Other instructions on reverse side.

1. Type of Well ☒ Oil Well ☐ Gas Well ☐ Other		5. Lease Serial No. NMLC058181
2. Name of Operator COG OPERATING LLC Contact: ROBYN ODOM E-Mail: rodome@concho.com		6. If Indian, Allottee or Tribe Name
3a. Address ONE CONCHO CENTER 600 W ILLINOIS AVENUE MIDLAND, TX 79701	3b. Phone No. (include area code) Ph: 432-685-4385	7. If Unit or CA/Agreement, Name and/or No.
4. Location of Well (Footage, Sec., T., R., M., or Survey Description) Sec 25 T17S R27E SWSW 581FSL 237FWL		8. Well Name and No. BEECH 25 FEDERAL 11H
		9. API Well No. 30-015-43176
		10. Field and Pool, or Exploratory RED LAKE
		11. County or Parish, and State EDDY COUNTY, NM

12. CHECK APPROPRIATE BOX(ES) TO INDICATE NATURE OF NOTICE, REPORT, OR OTHER DATA

TYPE OF SUBMISSION	TYPE OF ACTION			
☒ Notice of Intent	☐ Acidize	☐ Deepen	☐ Production (Start/Resume)	☐ Water Shut-Off
☐ Subsequent Report	☐ Alter Casing	☐ Fracture Treat	☐ Reclamation	☐ Well Integrity
☐ Final Abandonment Notice	☐ Casing Repair	☐ New Construction	☐ Recomplete	☒ Other
	☐ Change Plans	☐ Plug and Abandon	☐ Temporarily Abandon	Change to Original A
	☐ Convert to Injection	☐ Plug Back	☐ Water Disposal	PD

13. Describe Proposed or Completed Operation (clearly state all pertinent details, including estimated starting date of any proposed work and approximate duration thereof. If the proposal is to deepen directionally or recompleat horizontally, give subsurface locations and measured and true vertical depths of all pertinent markers and zones. Attach the Bond under which the work will be performed or provide the Bond No. on file with BLM/BIA. Required subsequent reports shall be filed within 30 days following completion of the involved operations. If the operation results in a multiple completion or recompleat in a new interval, a Form 3160-4 shall be filed once testing has been completed. Final Abandonment Notices shall be filed only after all requirements, including reclamation, have been completed, and the operator has determined that the site is ready for final inspection.)

COG Operating LLC respectfully requests to make the following changes to the original APD:

Change the BHL
From: 990 FSL 330 FEL, Unit P
To: 991 FSL 1654 FEL, Unit O

Change the TD
From: 3934'TVD; 8485'MD
To: 3935'TVD; 7168'MD

original COAs still stand

*RD 6/23/15
accepted for record
NMOCD*

Attached are the updated plat, drilling plan and directional plan.

Cement excess low on production string.

14. I hereby certify that the foregoing is true and correct: Electronic Submission #304465 verified by the BLM Well Information System For COG OPERATING LLC, sent to the Carlsbad Committed to AFMSS for processing by CATHY QUEEN on 06/10/2015 (15CQ0244SE)	
Name (Printed/Typed) ROBYN ODOM	Title REGULATORY ANALYST
Signature (Electronic Submission)	Date 06/10/2015
THIS SPACE FOR FEDERAL OR STATE OFFICE USE	
Approved By	Title
APPROVED JUN 12 2015 BUREAU OF LAND MANAGEMENT CARLSBAD FIELD OFFICE	
Conditions of approval, if any, are attached. Approval of this notice does not warrant or certify that the applicant holds legal or equitable title to those rights in the subject lease which would entitle the applicant to conduct operations thereon.	
Title 18 U.S.C. Section 1001 and Title 43 U.S.C. Section 1212, make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction.	

**** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ** BLM REVISED ****

District I
1625 N. French Dr., Hobbs, NM 88240
Phone: (575) 393-6161 Fax: (575) 393-4720
District II
811 S. First St., Artesia, NM 88210
Phone: (575) 748-1283 Fax: (575) 748-9720
District III
1000 Rio Bravo 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) 476-2462

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

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

☐ AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

1 API Number 30-015-		2 Pool Code 96836		3 Pool Name RED LAKE; GLORIETA-YESO, NORTHEAST	
4 Property Code 302457		5 Property Name BEECH 25 FEDERAL			6 Well Number 11H
7 GRID NO 229137		8 Operator Name COG OPERATING, LLC			9 Elevation 3587'
10 Surface Location					
UL or lot no. M	Section 25	Township 17-S	Range 27-E	Lot Idn 581	Feet from the SOUTH
				Feet from the 237	East/West line WEST
				County EDDY	
11 Bottom Hole Location If Different From Surface					
UL or lot no. O	Section 25	Township 17-S	Range 27-E	Lot Idn 991	Feet from the SOUTH
				Feet from the 1654	East/West line EAST
				County EDDY	
12 Dedicated Acres 120		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 CORNER DATA NAD 27 GRID - NW EAST A: FND BRASS CAP 1941 N 653959.1 - E 528584.1 B: FND BRASS CAP 1941 N 656592.2 - E 528580.3 C: FND BRASS CAP 1941 N 659226.8 - E 528576.8 D: FND BRASS CAP 1941 N 659215.4 - E 531211.7 E: FND BRASS CAP 1941 N 659203.3 - E 533847.5 F: FND BRASS CAP 1941 N 656562.0 - E 533864.0 G: FND BRASS CAP 1941 N 653920.5 - E 533879.3 H: FND BRASS CAP 1941 N 653939.2 - E 531231.9 1: CALCULATED CORNER N 655275.7 - E 528582.2 2: CALCULATED CORNER N 655249.9 - E 532549.1 3: CALCULATED CORNER N 653929.9 - E 532555.6		17 GEODETIC DATA NAD 27 GRID - NW EAST SURFACE LOCATION N 654538.3 E 528520.3 LAT: 32.79938014° N LONG: 104.23954022° W BOTTOM LOCATION N 654923.3 E 532219.5	18 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 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 a mineral or working interest, or to a voluntary pooling agreement or a compulsory pooling. Signature: <i>[Signature]</i> Date: 6/3/2015 Printed Name: Robyn M. Odom E-mail Address: Rodom@concho.com
19 DETAIL "A" 3579.5 600' 3594.7 600' S. L. 3575.0 3593.0		20 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: 6/4/14 Signature and Seal of Professional Surveyor: <i>[Signature]</i> 19680 Certificate Number Revised 3 Dec 2014: B.H.	

Estimated
Completed
Interval:
591 FSL 330 FSL

RRC - Firm No.: TX 10193838 NM 4655451 - Job No.: LS140265

COG Operating LLC
Beech 25 Federal #11H Revised

1. Geologic Formations

TVD of target	3935	Pilot hole depth	NA
MD at TD:	7168	Deepest expected fresh water:	143

Back Reef

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Fresh Water	
Yates	175'	Barren	
Seven Rivers	430'	Barren	
Queen	955'	Barren	
Grayburg	1390'	Oil/Gas	
San Andres	1745'	Oil/Gas	
Glorieta	3080'	Oil/Gas	
Paddock	3165'	Oil/Gas	
Blinbry	3635'	Target	
Tubb	4605'	Oil/Gas	

*H₂S, water flows, loss of circulation, abnormal pressures, etc.

2. Casing Program

Hole Size	Casing Interval		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	350'	13.375"	48	H40	STC	7.06	3.33	19.17
12.25"	0	1000'	9.625"	40	J55	STC	3.81	1.87	15.67
8.75"	0	3450'	7.0"	29	L80	LTC	4.25	1.33	3.60
8.75"	3450'	4272'	5.5"	17	L80	LTC	3.34	1.26	5.35
7.875"	4272'	7168'	5.5"	17	L80	LTC	3.34	1.26	6.87
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

All casing strings will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.h

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Is casing API approved? If no, attach casing specification sheet.	Y
Is premium or uncommon casing planned? If yes attach casing specification sheet.	N
Does the above casing design meet or exceed BLM's minimum standards? If not provide justification (loading assumptions, casing design criteria).	Y
Will the pipe be kept at a minimum 1/3 fluid filled to avoid approaching the collapse pressure rating of the casing?	Y
Is well located within Capitan Reef?	N

COG Operating LLC
Beech 25 Federal #11H Revised

If yes, does production casing cement tie back a minimum of 50' above the Reef?	
Is well within the designated 4 string boundary.	N
Is well located in SOPA but not in R-111-P?	N
If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	
Is well located in R-111-P and SOPA?	N
If yes, are the first three strings cemented to surface?	
Is 2 nd string set 100' to 600' below the base of salt?	
Is well located in high Cave/Karst?	Y
If yes, are there two strings cemented to surface?	Y
(For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	NA
Is well located in critical Cave/Karst?	Y
If yes, are there three strings cemented to surface?	Y

3. Cementing Program

Casing	# Sks	Wt. lb/Gal	Yld ft3/sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	425	14.8	1.34	6.3	6	Tail: Class C + 2% CaCl ₂ + 0.25 pps CelloFlake
Inter.	150	11.8	2.45	14.4	24	Lead: 50:50:10 C PozGel w/5% Salt+ 5 pps LCM+ 0.25% CelloFlake
	250	14.8	1.32	6.3	6	Tail: Class C + 2% Ca Cl ₂
	Multi-stage Contingency DV/ECP Tool +/-400'					
	75	11.8	2.45	14.4	24	1 st stage Lead: 50:50:10 C: PozGel w/5% Salt+ 0.25% CelloFlake
	250	14.8	1.32	6.3	6	1 st stage Tail: Class C + 2% CaCl ₂
	75	11.8	2.45	14.4	11	2 nd Stage: 50:50:10 C: Poz Gel w/5% salt + 0.25% CF
Prod.	425	12.5	2.01	11.4	22	Lead: 35:65:6 C: Poz Gel w/5% salt+5 pps LCM+0.2% SMS + 1% FL-25+1% BA-58+0.3% FL-52A+ 0.125 pps CF
	600	14.0	1.37	6.4	10	Tail: 50:50:2 C: Poz Gel w/5% salt+ 3pps LCM+0.6% SMS + 0.3% FL-52A+0.125 pps CF+ 1% FL-25+1% BA-58
	Multi-stage Contingency DV/ECP Tool +/-2500'					
	125	12.5	2.01	11.4	22	1st stage Lead: 35:65:6 C: Poz Gel w/5% salt + 5 pps LCM + 0.2% SMS + 1% FL-25 + 1% Ba-58+0.3% FL-52A + 0.125 pps CF
	600	14.0	1.37	6.4	10	1st stage Tail: 50:50:2 C: Pox Gel w/5% salt+5 pps LCM + 0.2% SMS + 1% FL-25+1% Ba-58 + 0.3% FL-52A + 0.125 pps CF

COG Operating LLC
Beech 25 Federal #11H Revised

225	12.5	2.01	11.4	22	2 nd Stage Lead: 35:65;6 C:Poz Gel w/5% salt+5 pps LCM+0.2% SMS + 1% FL-25+1% BA-58+0.3% FL- 52A+ 0.125 pps CF
150	16.8	0.99	5.8	6	2 nd Stage Tail: Class "C" w/ 0.3% R-3 + 1.5% CD-32

Casing String	TOC	% Excess
Surface	0'	100%
Intermediate	0'	100%
Intermediate Contingency	0'	100%
Production	0'	35%
Production Contingency	0'	35%

4. Pressure Control Equipment

No	A variance is requested for the use of a diverter on the surface casing. See attached for schematic.
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BOP installed and tested before drilling which hole?	Size?	Min Required WP	Type	✓	Tested to:
12-1/4"	13-5/8"	2M	Annular	X	2000 psi
			Blind Ram		2000 psi
			Pipe Ram		
			Double Ram	X	
			Other*		
8-3/4" & 7 7/8"	13-5/8"	2M	Annular	X	2000 psi
			Blind Ram		2000 psi
			Pipe Ram		
			Double Ram	X	
			Other*		
			Annular		
			Blind Ram		
			Pipe Ram		
			Double Ram		
			Other*		

*Specify if additional ram is utilized.

BOP/BOPE will be tested by an independent service company to 250 psi low and the high pressure indicated above per Onshore Order 2 requirements. The System may be upgraded to a



COG Operating LLC

Eddy County, NM (NAD27 NME)

Beech 25 Federal

#11H

WB1 / Job #1412160

Plan: Plan #3 12-03-14

Surface: 581' FSL, 237' FWL, Sec 25, T17S, R27E, Unit M

PP: 591' FSL, 330' FWL, Sec 25, T17S, R27E, Unit M

BHL: 991' FSL, 1654' FEL, Sec 25, T17S, R27E, Unit O

Standard Planning Report

03 December, 2014





Phoenix Technology Services
Planning Report



Database: Compass 5000 GCR
Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Site: Beech 25 Federal
Well: #11H
Wellbore: WB1 / Job #1412160
Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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: Beech 25 Federal
Site Position: Northing: 654,947.50 usft Latitude: 32° 48' 1.81838 N
From: Map Easting: 528,762.70 usft Longitude: 104° 14' 23.01541 W
Position Uncertainty: 0.00 usft Slot Radius: 13-3/16" Grid Convergence: 0.05°

Well: #11H
Well Position: +N-S -409.20 usft Northing: 654,538.30 usft Latitude: 32° 47' 57.76866 N
+E-W 57.60 usft Easting: 528,820.30 usft Longitude: 104° 14' 22.34482 W
Position Uncertainty: 0.00 usft Wellhead Elevation: 0.00 usft Ground Level: 3,587.00 usft

Wellbore: WB1 / Job #1412160
Magnetics: Model Name Sample Date Declination Dip Angle Field Strength
(nT) (nT) (nT)
IGRF2010_14 12/3/2014 7.51 60.52 48.541

Design: Plan #3 12-03-14
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 83.54

Plan Sections

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Dogleg Ratio (%/100usft)	Build Rate (%/100usft)	Turn Rate (%/100usft)	TFC (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,449.62	0.00	0.00	3,449.62	0.00	0.00	0.00	0.00	0.00	0.00	
4,272.35	90.50	83.54	3,970.47	59.13	522.08	11.00	11.00	0.00	83.54	
7,167.97	90.50	83.54	3,945.20	385.00	3,399.20	0.00	0.00	0.00	0.00	PBHL-Beech 25 Fed 1



Phoenix Technology Services
Planning Report



Database: Compass 5000 GCR
Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Site: Beech 25 Federal
Well: #11H
Wellbore: WB1 / Job #1412160
Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
3,449.62	0.00	0.00	3,449.62	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Start 11°/100' Build									
3,500.00	5.54	83.54	3,499.92	0.27	2.42	2.43	11.00	11.00	0.00
3,600.00	16.54	83.54	3,597.92	2.43	21.42	21.56	11.00	11.00	0.00
3,700.00	27.54	83.54	3,690.47	6.64	58.65	59.03	11.00	11.00	0.00
3,800.00	38.54	83.54	3,774.17	12.77	112.75	113.47	11.00	11.00	0.00
3,900.00	49.54	83.54	3,845.94	20.58	181.72	182.88	11.00	11.00	0.00
4,000.00	60.54	83.54	3,903.15	29.79	263.03	264.71	11.00	11.00	0.00
4,100.00	71.54	83.54	3,943.69	40.06	353.70	355.96	11.00	11.00	0.00
4,200.00	82.54	83.54	3,966.08	51.01	450.38	453.26	11.00	11.00	0.00
4,265.02	89.69	83.54	3,970.48	58.31	514.80	518.09	11.00	11.00	0.00
TL, 3975' TVD @ 0 VZ, 90.5° Inc									
4,272.35	90.50	83.54	3,970.47	59.13	522.08	525.42	10.99	10.99	0.00
LP, Hold 90.50° Inc, 83.54° Azm									
4,300.00	90.50	83.54	3,970.23	62.24	549.56	553.07	0.00	0.00	0.00
4,400.00	90.50	83.54	3,969.35	73.50	648.92	653.07	0.00	0.00	0.00
4,500.00	90.50	83.54	3,968.48	84.75	748.28	753.06	0.00	0.00	0.00
4,600.00	90.50	83.54	3,967.61	96.01	847.64	853.06	0.00	0.00	0.00
4,700.00	90.50	83.54	3,966.74	107.26	947.00	953.05	0.00	0.00	0.00
4,800.00	90.50	83.54	3,965.86	118.51	1,046.36	1,053.05	0.00	0.00	0.00
4,900.00	90.50	83.54	3,964.99	129.77	1,145.72	1,153.05	0.00	0.00	0.00
5,000.00	90.50	83.54	3,964.12	141.02	1,245.08	1,253.04	0.00	0.00	0.00
5,100.00	90.50	83.54	3,963.25	152.27	1,344.44	1,353.04	0.00	0.00	0.00
5,200.00	90.50	83.54	3,962.37	163.53	1,443.80	1,453.04	0.00	0.00	0.00
5,300.00	90.50	83.54	3,961.50	174.78	1,543.17	1,553.03	0.00	0.00	0.00
5,400.00	90.50	83.54	3,960.63	186.04	1,642.53	1,653.03	0.00	0.00	0.00
5,500.00	90.50	83.54	3,959.76	197.29	1,741.89	1,753.02	0.00	0.00	0.00
5,600.00	90.50	83.54	3,958.88	208.54	1,841.25	1,853.02	0.00	0.00	0.00
5,700.00	90.50	83.54	3,958.01	219.80	1,940.61	1,953.02	0.00	0.00	0.00
5,800.00	90.50	83.54	3,957.14	231.05	2,039.97	2,053.01	0.00	0.00	0.00
5,900.00	90.50	83.54	3,956.27	242.30	2,139.33	2,153.01	0.00	0.00	0.00
6,000.00	90.50	83.54	3,955.39	253.56	2,238.69	2,253.01	0.00	0.00	0.00
6,100.00	90.50	83.54	3,954.52	264.81	2,338.05	2,353.00	0.00	0.00	0.00
6,200.00	90.50	83.54	3,953.65	276.07	2,437.41	2,453.00	0.00	0.00	0.00
6,300.00	90.50	83.54	3,952.77	287.32	2,536.77	2,552.99	0.00	0.00	0.00
6,400.00	90.50	83.54	3,951.90	298.57	2,636.14	2,652.99	0.00	0.00	0.00
6,500.00	90.50	83.54	3,951.03	309.83	2,735.50	2,752.99	0.00	0.00	0.00
6,600.00	90.50	83.54	3,950.16	321.08	2,834.86	2,852.98	0.00	0.00	0.00
6,700.00	90.50	83.54	3,949.28	332.34	2,934.22	2,952.98	0.00	0.00	0.00
6,800.00	90.50	83.54	3,948.41	343.59	3,033.58	3,052.97	0.00	0.00	0.00
6,900.00	90.50	83.54	3,947.54	354.84	3,132.94	3,152.97	0.00	0.00	0.00
7,000.00	90.50	83.54	3,946.67	366.10	3,232.30	3,252.97	0.00	0.00	0.00
7,100.00	90.50	83.54	3,945.79	377.35	3,331.66	3,352.96	0.00	0.00	0.00
7,167.97	90.50	83.54	3,945.20	385.00	3,399.20	3,420.93	0.00	0.00	0.00

TD at 7167.97' MD



Phoenix Technology Services
Planning Report



Database: Compass 5000 GCR
Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Site: Beech 25 Federal
Well: #11H
Wellbore: WB1 / Job #1412160
Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Design Targets

Target Name	hit/miss target	Shape	Dip Angle (°)	Dip Dir (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PP-Beech 25 Fed #11H			0.00	0.00	3,747.51	10.53	93.00	654,548.84	528,913.30	32° 47' 57.87207 N	104° 14' 21.25514 W
- plan misses target center by 0.02usft at 3766.77usft MD (3747.53 TVD, 10.53 N, 93.01 E)											
- Point											
PBHL-Beech 25 Fed #11			0.00	0.00	3,945.20	385.00	3,399.20	654,923.30	532,219.50	32° 48' 1.54682 N	104° 13' 42.51579 W
- plan hits target center											
- Point											

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,265.02	3,970.48	TL, 3975' TVD @ 0 VZ, 90.5° Inc		-0.50°	85.47

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	+E/-W (usft)	Comment
3,449.62	3,449.62	0.00	0.00	KOP, Start 11°/100' Build
4,272.35	3,970.47	59.13	522.08	LP, Hold 90.50° Inc, 83.54° Azm
7,167.97	3,945.20	385.00	3,399.20	TD at 7167.97' MD



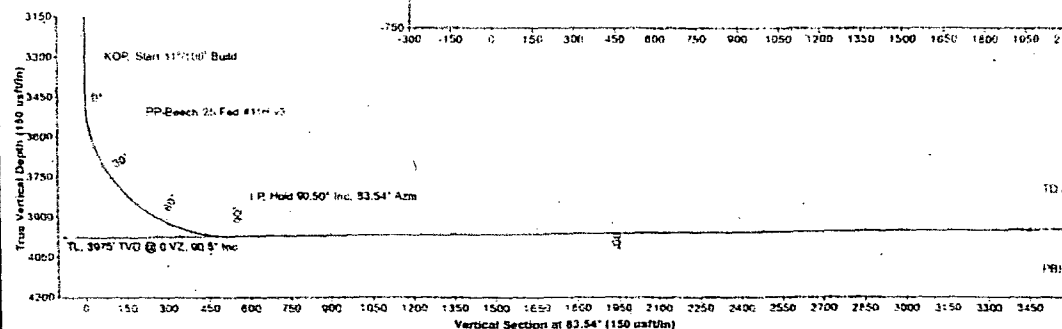
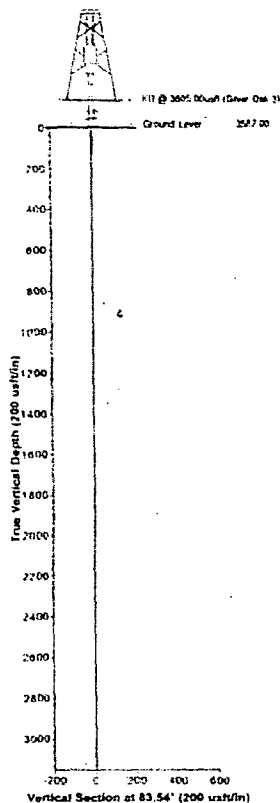
Project: Eddy County, NM (NAD27 NME)
Site: Beech 25 Federal
Well: #11H
Wellbore: WB1 / Job #141214
Design: Plan #3 12-03-14
Rig: Silver Oak 3



PHOENIX
TECHNOLOGY SERVICES



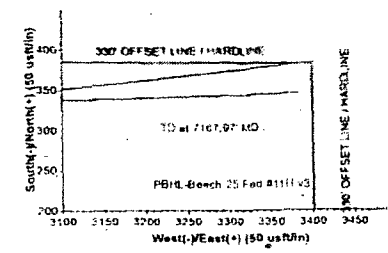
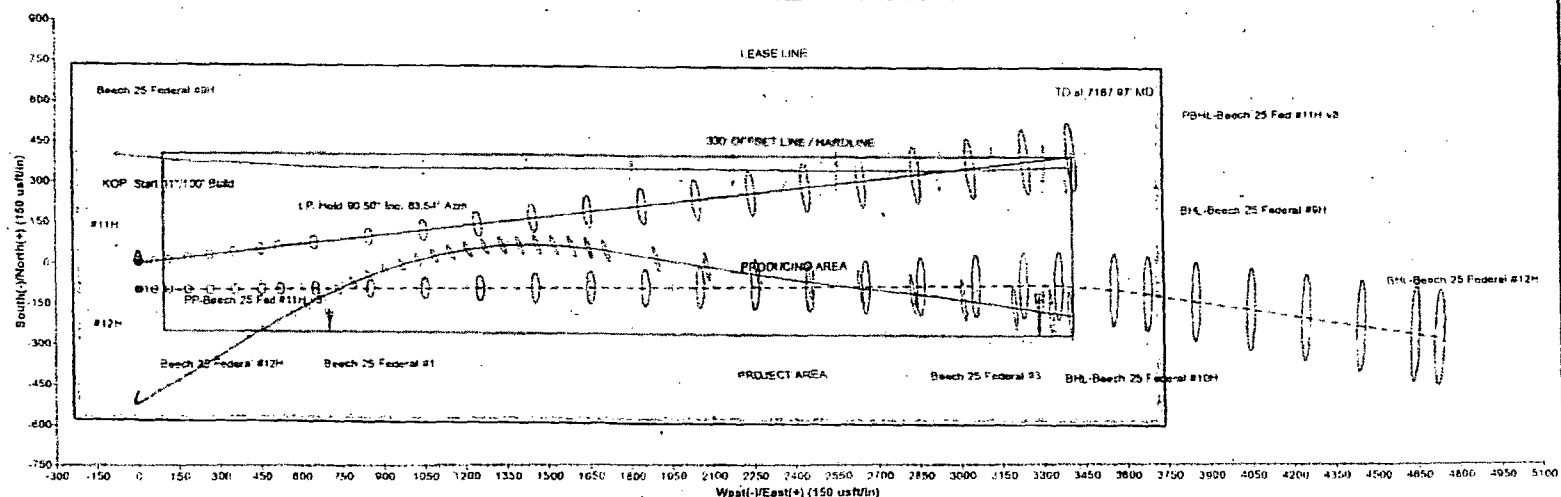
Azimuth to Grid North
True North: -0.03°
Magnetic North: 7.00°
Magnetic Field
Strength: 48540.7 nT
Dip Angle: 60.52°
Date: 12/03/14
Model: IGRF2010_14



WELL DETAILS											
			Ground Level		527.00	Latitude		Longitude			
			Easting		578270.30	32° 47' 57.7800 N		104° 14' 22.3482 W			
SECTION DETAILS											
Sec	MD	Inc	API	TVD	W/S	E/W	Depth	Face	V-Sect	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	3449.62	0.00	0.00	3449.62	0.00	0.00	0.00	0.00	0.00	0.00	KOP Start 117'100' Build
3	4272.85	80.50	83.54	3570.47	59.13	527.08	11.00	83.54	525.42		IP Hold 00.50' Inc. 83.54' Azm
4	2167.87	80.50	83.54	3345.20	335.36	3329.70	0.00	0.00	3420.93	FEHL-Beech 25 Fed #11H v3	TD at 7167.97 MD
DESIGN TARGET DETAILS											
Name	TVL	W/S	E/W	Depth	Easting	Latitude	Shore				
PP-Beech 25 Fed #11H v3	3747.51	10.53	23.00	654548.83	528513.30	32° 47' 57.8700 N	104° 14' 21.5514 W	Point			
plan has target center											
FEHL-Beech 25 Fed #11H v3	3345.20	80.50	3309.70	654203.30	532719.50	32° 47' 15.4527 N	104° 13' 42.5129 W	Point			
plan has target center											

FORMATION TOP DETAILS					
7167.97	MD	Formation	Depth	Dip	Dip
3970.43	4265.02	TL 3975 TVD @ 0 VZ 00.5' Inc	0.50	0.50	0.50
LEGEND					
— #11H, WB1/Job #141214, Surveys Silver Oak 31 VD					
--- #12H, WB1 Plan #2 05-25-14 VD					
--- #1, WB1, Inc Surveys VD					
--- #3, WB1, Inc Surveys VD					
--- #10H, WB1/Job #1410700, Surveys Silver Oak 31 VD					
--- Plan #3 12-03-14					

Map System: US State Plane 1027 (Elev solution)
Datum: NAD 1927 (NADCON CONUS)
Elevated: Clarke 1886
Zone Name: New Mexico East 3001
Local Origin: Well #11H, Grid North
Latitude: 32° 47' 57.7800 N
Longitude: 104° 14' 22.3482 W
Grid East: 578270.30
Grid North: 654538.30
Scale Factor: 1.000
Geographic Model: IGRF2010_14
Sample Date: 03-Dec-14
Magnetic Declination: 7.51°
Dip Angle from Horizontal: 60.52°
Magnetic Field Strength: 48541
To convert a Magnetic Direction to a Grid Direction, Add 7.48°
To convert a Magnetic Direction to a True Direction, Add 7.51° East
To convert a True Direction to a Grid Direction, Subtract 0.05°





COG Operating LLC

Eddy County, NM (NAD27 NME)

Beech 25 Federal

#11H

WB1 / Job #1412160

Plan #3 12-03-14

Anticollision Report

03 December, 2014



PHOENIX
TECHNOLOGY SERVICES



Phoenix Technology Services
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Reference: Plan #3 12-03-14
Filter type: NO GLOBAL FILTER: Using user defined selection & filtering criteria
Interpolation Method: Stations
Depth Range: Unlimited
Results Limited by: Maximum center-center distance of 9,999.98 usft
Warning Levels Evaluated at: 2.00 Sigma
Error Model: ISCWSA
Scan Method: Closest Approach 3D
Error Surface: Circular Conic
Casing Method: Not applied

Survey Tool Program: PHX-MWD+IGRF
Date: 12/3/2014
From (usft): 0.00
To (usft): 7,167.97
Survey (Wellbore): Plan #3 12-03-14 (WB1 / Job #1412160)
Tool Name: PHX-MWD+IGRF
Description: 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
Offset Well - Wellbore - Design						
Beech 25 Federal						
#1 - WB1 - Inc Surveys	4,422.75	3,980.16	285.70	250.94	8.219	CC ES
#1 - WB1 - Inc Surveys	4,500.00	3,979.56	295.96	258.69	7.942	SF
#10H - WB1/Job #1410706 - Surveys (Silver Oak 3)	3,426.50	3,520.05	449.15	429.46	22.819	CC
#10H - WB1/Job #1410706 - Surveys (Silver Oak 3)	5,400.00	5,030.36	501.25	396.50	4.785	ES
#10H - WB1/Job #1410706 - Surveys (Silver Oak 3)	7,167.97	6,736.29	757.29	542.06	3.518	SF
#12H - WB1 - Plan #2 08-25-14	3,449.62	3,448.62	99.90	75.59	4.110	CC
#12H - WB1 - Plan #2 08-25-14	3,500.00	3,499.03	100.17	75.51	4.062	ES
#12H - WB1 - Plan #2 08-25-14	7,100.00	7,065.92	467.37	217.29	1.868	SF
#3 - WB1 - Inc Surveys	6,982.64	3,965.44	591.48	462.75	4.595	CC
#3 - WB1 - Inc Surveys	7,000.00	3,965.32	591.74	462.35	4.573	ES
#3 - WB1 - Inc Surveys	7,100.00	3,964.65	603.01	469.87	4.529	SF
#9H - WB1/Job #1311101 - Surveys (Silver Oak 3)	3,295.43	3,316.91	391.42	374.25	22.795	CC
#9H - WB1/Job #1311101 - Surveys (Silver Oak 3)	7,167.97	6,738.00	489.82	268.74	2.216	ES
#9H - WB1/Job #1311101 - Surveys (Silver Oak 3)	7,168.27	6,738.00	489.83	268.75	2.216	SF

Offset Design: Beech 25 Federal - #1 - WB1 - Inc Surveys														Offset Site Error: 0.00 usft
Survey Program: PHX-MWD														Offset Well Error: 0.00 usft
Reference Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Offset Measured Depth (usft)	Offset Vertical Depth (usft)	Semi Major Axis (usft)	Highside Toolface (°)	Offset Wellbore Centre (usft)	Offset Wellbore Centre (usft)	Distance Between Centres (usft)	Distance Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
0.00	0.00	8.05	8.05	0.00	0.01	110.01		-256.30	703.70	748.92				
100.00	100.00	108.87	108.87	0.15	0.12	110.00		-256.16	703.70	748.87	748.81	0.27	2,816.592	
200.00	200.00	209.28	209.28	0.51	0.23	109.97		-255.77	703.70	748.74	748.01	0.73	1,019.465	
300.00	300.00	309.90	309.90	0.86	0.34	109.93		-255.15	703.70	748.53	747.33	1.20	622.213	
400.00	400.00	410.52	410.52	1.22	0.50	109.87		-254.28	703.70	748.24	746.51	1.73	433.642	
500.00	500.00	511.16	511.15	1.58	0.73	109.79		-253.15	703.70	747.86	745.55	2.31	322.681	
600.00	600.00	611.80	611.77	1.94	0.96	109.69		-251.77	703.70	747.30	744.50	2.90	258.100	
700.00	700.00	712.42	712.39	2.30	1.18	109.57		-250.14	703.70	746.85	743.37	3.48	214.556	
800.00	800.00	812.92	812.88	2.66	1.41	109.43		-248.25	703.70	746.22	742.16	4.06	183.594	
900.00	900.00	911.78	911.71	3.01	1.61	109.31		-246.54	703.70	745.85	741.03	4.62	161.377	
1,000.00	1,000.00	1,011.42	1,011.35	3.37	1.81	109.21		-245.17	703.70	745.19	740.01	5.18	143.832	
1,100.00	1,100.00	1,111.66	1,111.57	3.73	2.01	109.11		-243.76	703.70	744.73	738.99	5.74	129.633	
1,200.00	1,200.00	1,211.89	1,211.79	4.09	2.22	109.00		-242.24	703.70	744.24	737.03	6.31	117.967	
1,300.00	1,300.00	1,312.11	1,312.00	4.45	2.42	108.88		-240.62	703.70	743.71	736.84	6.87	108.211	

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design: Beech 25 Federal - #1 - WB1 - Inc Surveys													Offset Site Error: 0.00 usft
Survey Program: 384-MWD													Offset Well Error: 0.00 usft
Reference: Offset: Semi Major Axis													
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Footface (ft)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
1,400.00	1,400.00	1,412.22	1,412.10	4.81	2.83	108.75	-235.91	703.70	743.18	735.72	7.44	99.928	
1,500.00	1,500.00	1,511.79	1,511.65	5.17	2.84	108.83	-237.29	703.70	742.64	734.84	8.00	92.803	
1,600.00	1,600.00	1,611.36	1,611.21	5.52	3.04	108.53	-235.85	703.70	742.18	733.61	8.57	95.625	
1,700.00	1,700.00	1,710.93	1,710.77	5.88	3.25	108.44	-234.59	703.70	741.78	732.64	9.13	81.218	
1,800.00	1,800.00	1,810.51	1,810.34	6.24	3.46	108.36	-233.50	703.70	741.43	731.73	9.70	76.449	
1,900.00	1,900.00	1,910.25	1,910.08	6.60	3.68	108.29	-232.58	703.70	741.14	730.88	10.26	72.205	
2,000.00	2,000.00	2,010.45	2,010.28	6.96	3.87	108.22	-231.64	703.70	740.85	730.01	10.83	68.385	
2,100.00	2,100.00	2,110.65	2,110.47	7.32	4.08	108.14	-230.61	703.70	740.53	729.13	11.40	64.961	
2,200.00	2,200.00	2,210.85	2,210.68	7.67	4.29	108.06	-229.49	703.70	740.18	728.21	11.97	61.851	
2,300.00	2,300.00	2,311.04	2,310.85	8.03	4.50	107.97	-228.28	703.70	739.81	727.27	12.53	59.021	
2,400.00	2,400.00	2,411.22	2,411.03	8.39	4.71	107.88	-226.99	703.70	739.41	726.30	13.11	56.420	
2,500.00	2,500.00	2,511.41	2,511.20	8.75	4.93	107.78	-225.61	703.70	738.99	725.30	13.68	54.003	
2,600.00	2,600.00	2,611.58	2,611.36	9.11	5.15	107.67	-224.15	703.70	738.54	724.28	14.26	51.781	
2,700.00	2,700.00	2,711.76	2,711.52	9.47	5.37	107.55	-222.61	703.70	738.08	723.24	14.84	49.731	
2,800.00	2,800.00	2,811.93	2,811.68	9.83	5.59	107.43	-220.98	703.70	737.59	722.17	15.42	47.833	
2,900.00	2,900.00	2,912.07	2,911.81	10.18	5.81	107.31	-219.27	703.70	737.08	721.08	16.00	46.073	
3,000.00	3,000.00	3,011.67	3,011.40	10.54	6.02	107.18	-217.63	703.70	736.59	720.03	16.56	44.469	
3,100.00	3,100.00	3,111.28	3,110.99	10.90	6.23	107.08	-216.16	703.70	736.16	719.03	17.13	42.975	
3,200.00	3,200.00	3,210.89	3,210.60	11.26	6.44	106.98	-214.87	703.70	735.78	718.08	17.70	41.579	
3,300.00	3,300.00	3,310.50	3,310.20	11.62	6.64	106.90	-213.75	703.70	735.45	717.19	18.26	40.272	
3,400.00	3,400.00	3,410.16	3,409.86	11.98	6.85	106.83	-212.81	703.70	735.18	716.35	18.83	39.047	
3,449.00	3,449.62	3,459.78	3,459.47	12.15	6.95	106.79	-212.38	703.70	735.05	715.94	19.11	38.468	
3,499.00	3,499.92	3,510.08	3,509.77	12.33	7.06	23.40	-211.94	703.70	732.69	713.30	19.39	37.785	
3,549.00	3,549.38	3,559.54	3,559.24	12.50	7.16	23.90	-211.51	703.70	725.95	708.28	19.67	36.911	
3,599.00	3,597.92	3,609.09	3,607.78	12.63	7.28	24.77	-211.08	703.70	714.91	694.96	19.94	35.844	
3,649.00	3,645.09	3,655.28	3,654.97	12.87	7.38	26.05	-210.67	703.70	699.71	679.48	20.23	34.590	
3,700.00	3,690.47	3,700.68	3,700.36	13.07	7.46	27.83	-210.28	703.70	680.54	660.02	20.53	33.153	
3,750.00	3,733.62	3,743.86	3,743.54	13.31	7.55	30.19	-209.90	703.70	657.67	636.81	20.85	31.536	
3,800.00	3,774.17	3,784.42	3,784.11	13.60	7.63	33.24	-209.54	703.70	631.39	610.16	21.23	29.743	
3,850.00	3,811.72	3,822.01	3,821.69	13.96	7.71	37.14	-209.22	703.70	602.08	580.42	21.67	27.785	
3,900.00	3,845.94	3,856.26	3,855.94	14.42	7.78	42.02	-208.92	703.70	570.21	548.00	22.20	25.882	
3,950.00	3,876.51	3,886.87	3,886.55	15.01	7.84	47.99	-208.65	703.70	536.28	513.43	22.85	23.469	
4,000.00	3,903.15	3,913.58	3,913.26	15.73	7.90	55.02	-208.42	703.70	500.93	477.30	23.63	21.198	
4,050.00	3,925.61	3,936.13	3,935.81	16.60	7.95	62.84	-208.22	703.70	464.89	440.34	24.55	18.933	
4,100.00	3,943.69	3,954.30	3,953.98	17.63	7.99	70.88	-208.05	703.70	429.03	403.41	25.62	16.747	
4,150.00	3,957.22	3,967.91	3,967.59	18.79	8.02	78.41	-207.92	703.70	394.38	367.57	26.81	14.710	
4,200.00	3,969.08	3,978.84	3,978.51	20.08	8.04	84.71	-207.84	703.70	362.19	334.07	28.12	12.882	
4,250.00	3,970.18	3,981.00	3,980.68	21.45	8.05	89.32	-207.80	703.70	333.87	304.36	29.50	11.316	
4,272.35	3,970.47	3,981.31	3,980.99	22.09	8.05	90.77	-207.80	703.70	322.87	292.72	30.14	10.711	
4,300.00	3,970.23	3,981.10	3,980.78	22.90	8.05	90.73	-207.80	703.70	310.95	280.00	30.95	10.046	
4,400.00	3,969.35	3,980.33	3,980.01	25.98	8.05	90.57	-207.81	703.70	288.60	252.98	34.02	8.424	
4,422.75	3,969.15	3,980.16	3,979.83	28.71	8.05	90.54	-207.81	703.70	285.70	250.94	34.76	8.219 CC ES	
4,500.00	3,968.48	3,979.56	3,979.24	29.22	8.05	90.42	-207.81	703.70	295.95	256.69	37.26	7.942 SF	
4,600.00	3,967.61	3,978.80	3,978.47	32.58	8.04	90.26	-207.82	703.70	336.21	295.59	40.62	8.277	
4,700.00	3,968.74	3,978.03	3,977.70	36.02	8.04	90.11	-207.83	703.70	398.10	354.04	44.08	9.035	
4,800.00	3,965.86	3,977.26	3,976.93	39.53	8.04	89.95	-207.84	703.70	473.21	425.64	47.57	9.948	
4,900.00	3,964.99	3,976.49	3,976.16	43.09	8.04	89.80	-207.84	703.70	556.21	505.09	51.12	10.880	
5,000.00	3,964.12	3,975.72	3,975.39	46.68	8.04	89.65	-207.85	703.70	644.06	589.35	54.72	11.771	
5,100.00	3,963.25	3,974.95	3,974.52	50.30	8.04	89.49	-207.89	703.70	735.02	676.89	58.34	12.600	
5,200.00	3,962.37	3,974.18	3,973.86	53.94	8.03	89.34	-207.86	703.70	828.07	766.09	61.98	13.361	
5,300.00	3,961.50	3,973.41	3,973.09	57.61	8.03	89.18	-207.87	703.70	922.57	856.93	65.64	14.055	
5,400.00	3,960.63	3,972.64	3,972.32	61.29	8.03	89.03	-207.88	703.70	1,018.12	948.81	69.32	14.688	

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset-TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #1 - WB1 - Inc Surveys														Offset Site Error: 0.00 usft
Survey Program 364-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)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
5,500.00	3,959.76	3,971.87	3,971.55	64.98	8.03	88.88	-207.89	703.70	1,114.48	1,041.45	73.01	15.285		
5,600.00	3,958.98	3,971.10	3,970.78	68.68	8.03	88.72	-207.89	703.70	1,211.38	1,134.68	76.71	15.792		
5,700.00	3,958.01	3,970.33	3,970.01	72.39	8.03	88.57	-207.90	703.70	1,303.77	1,228.35	80.42	16.275		
5,800.00	3,957.14	3,969.56	3,969.23	76.11	8.02	88.41	-207.91	703.70	1,406.53	1,322.39	84.14	16.717		
5,900.00	3,956.27	3,968.79	3,968.46	79.84	8.02	88.26	-207.92	703.70	1,504.55	1,416.72	87.85	17.125		
6,000.00	3,955.39	3,968.02	3,967.69	83.57	8.02	88.10	-207.92	703.70	1,602.87	1,511.28	91.59	17.500		
6,100.00	3,954.52	3,967.25	3,966.92	87.31	8.02	87.95	-207.93	703.70	1,701.38	1,606.03	95.32	17.848		
6,200.00	3,953.65	3,966.48	3,966.15	91.05	8.02	87.80	-207.94	703.70	1,800.01	1,700.95	99.06	18.170		
6,300.00	3,952.77	3,965.71	3,965.38	94.79	8.02	87.64	-207.94	703.70	1,898.81	1,796.00	102.81	18.470		
6,400.00	3,951.90	3,964.93	3,964.61	98.54	8.01	87.49	-207.95	703.70	1,997.72	1,891.17	106.55	18.748		
6,500.00	3,951.03	3,964.16	3,963.84	102.29	8.01	87.33	-207.96	703.70	2,098.74	1,986.44	110.30	19.009		
6,600.00	3,950.16	3,963.39	3,963.07	106.05	8.01	87.18	-207.97	703.70	2,195.85	2,081.79	114.06	19.252		
6,700.00	3,949.28	3,962.62	3,962.29	109.80	8.01	87.02	-207.97	703.70	2,295.03	2,177.22	117.81	19.481		
6,800.00	3,948.41	3,961.85	3,961.52	113.56	8.01	86.87	-207.98	703.70	2,394.28	2,272.71	121.57	19.695		
6,900.00	3,947.54	3,961.08	3,960.75	117.32	8.01	86.72	-207.99	703.70	2,493.59	2,368.27	125.33	19.897		
7,000.00	3,946.67	3,960.30	3,959.98	121.09	8.00	86.56	-207.99	703.70	2,592.96	2,463.87	129.09	20.087		
7,100.00	3,945.79	3,959.53	3,959.21	124.85	8.00	86.41	-208.00	703.70	2,692.37	2,559.52	132.85	20.266		
7,167.97	3,945.20	3,959.01	3,958.68	127.41	8.00	86.30	-208.01	703.70	2,759.97	2,624.55	135.41	20.382		
7,188.27	3,945.20	3,959.00	3,958.68	127.42	8.00	86.30	-208.01	703.70	2,780.28	2,624.85	135.42	20.383		



Phoenix Technology Services
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #10H - WB1/Job #1410706 - Surveys (Silver Oak 3)														Offset Site Error: 0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3 2615-MWD														Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Distance		Warning								
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	0.00	0.00	0.00	0.00	179.56	-471.00	3.60	471.04					
100.00	100.00	93.80	93.80	0.15	0.07	179.57	-471.12	3.55	471.14	470.92	0.22	2,152.017		
200.00	200.00	104.40	104.40	0.51	0.25	179.55	-471.32	3.69	471.34	470.59	0.75	627.835		
300.00	300.00	297.36	297.36	0.86	0.42	179.52	-471.14	3.98	471.17	469.88	1.28	388.744		
400.00	400.00	396.49	396.49	1.22	0.59	179.53	-470.73	3.82	470.75	468.94	1.81	259.768		
484.63	484.63	479.63	479.63	1.53	0.74	179.58	-470.60	3.47	470.61	468.35	2.26	208.148		
500.00	500.00	494.73	494.72	1.58	0.76	179.58	-470.60	3.41	470.62	468.27	2.34	200.688		
600.00	600.00	591.82	591.81	1.94	0.93	179.65	-470.96	2.84	470.98	468.10	2.87	183.668		
700.00	700.00	690.29	690.28	2.30	1.11	179.76	-471.80	1.95	471.83	468.42	3.41	138.358		
800.00	800.00	790.56	790.54	2.66	1.29	179.87	-472.80	1.03	472.82	468.87	3.95	119.882		
900.00	900.00	890.97	890.97	3.01	1.48	179.98	-473.78	0.34	473.81	469.32	4.49	105.485		
1,000.00	1,000.00	988.77	988.73	3.37	1.66	-179.96	-474.95	-0.36	475.00	469.96	5.03	94.399		
1,100.00	1,100.00	1,087.66	1,087.60	3.73	1.84	-179.85	-476.37	-1.23	476.43	470.86	5.57	85.489		
1,200.00	1,200.00	1,186.71	1,186.64	4.09	2.02	-179.73	-478.01	-2.23	478.09	471.97	6.12	78.181		
1,300.00	1,300.00	1,286.28	1,286.19	4.45	2.21	-178.61	-478.65	-3.28	479.71	473.04	6.69	72.002		
1,400.00	1,400.00	1,386.54	1,386.44	4.81	2.40	-178.49	-481.01	-4.29	481.08	473.87	7.21	66.746		
1,500.00	1,500.00	1,486.80	1,486.68	5.17	2.59	-179.40	-482.58	-5.05	482.69	474.95	7.75	62.309		
1,600.00	1,600.00	1,586.98	1,586.84	5.52	2.76	-179.33	-484.87	-5.69	484.83	476.54	8.29	58.502		
1,700.00	1,700.00	1,684.65	1,684.48	5.88	2.95	-179.25	-486.94	-6.36	487.10	478.27	8.83	55.148		
1,800.00	1,800.00	1,783.47	1,783.27	6.24	3.13	-179.21	-489.16	-6.72	489.34	479.97	9.37	52.203		
1,900.00	1,900.00	1,882.64	1,882.41	6.60	3.32	-179.18	-491.82	-7.07	491.83	481.92	9.92	49.599		
2,000.00	2,000.00	1,981.20	1,981.03	6.96	3.50	-179.11	-494.26	-7.69	494.52	484.06	10.46	47.284		
2,100.00	2,100.00	2,083.26	2,082.95	7.32	3.69	-179.03	-496.89	-8.39	497.21	486.20	11.01	45.172		
2,200.00	2,200.00	2,182.28	2,181.94	7.67	3.87	-178.98	-499.41	-8.87	499.68	488.11	11.55	43.202		
2,300.00	2,300.00	2,279.87	2,279.49	8.03	4.06	-178.94	-502.17	-9.29	502.50	490.41	12.09	41.563		
2,400.00	2,400.00	2,379.51	2,379.06	8.39	4.24	-178.89	-505.32	-9.79	505.86	493.03	12.63	40.023		
2,500.00	2,500.00	2,478.87	2,478.39	8.75	4.43	-178.88	-508.48	-9.98	508.85	495.67	13.18	38.615		
2,600.00	2,600.00	2,579.82	2,579.28	9.11	4.62	-178.84	-511.71	-10.34	512.08	498.33	13.72	37.310		
2,700.00	2,700.00	2,681.91	2,681.34	9.47	4.81	-178.78	-514.83	-10.98	514.93	500.66	14.27	36.076		
2,800.00	2,800.00	2,780.71	2,780.09	9.83	4.99	-178.75	-517.30	-11.25	517.64	502.82	14.82	34.937		
2,900.00	2,900.00	2,878.48	2,877.82	10.18	5.03	-178.71	-520.37	-11.71	520.79	505.57	15.22	34.225		
3,000.00	3,000.00	3,019.66	3,018.58	10.54	5.06	-179.64	-521.33	-3.20	521.88	506.26	15.60	33.452		
3,100.00	3,100.00	3,218.89	3,207.85	10.90	5.25	174.45	-490.19	47.63	505.22	489.08	16.16	31.272		
3,200.00	3,200.00	3,342.20	3,309.48	11.28	5.89	166.75	-455.20	107.16	481.45	464.50	16.95	28.403		
3,300.00	3,300.00	3,430.90	3,371.19	11.62	6.45	159.02	-424.21	162.83	460.68	442.59	18.07	25.496		
3,400.00	3,400.00	3,504.67	3,413.79	11.98	7.38	151.42	-384.55	214.97	448.71	430.35	19.36	23.232		
3,428.50	3,428.50	3,520.05	3,421.50	12.07	7.61	149.72	-387.87	228.47	448.15	429.48	19.68	22.819 CC		
3,449.82	3,449.82	3,532.06	3,427.20	12.15	7.79	149.37	-382.52	235.59	449.59	429.84	19.95	22.538		
3,500.00	3,499.92	3,555.71	3,437.59	12.33	8.18	61.89	-371.71	253.88	452.65	432.14	20.51	22.067		
3,550.00	3,549.38	3,579.40	3,446.87	12.50	8.59	58.83	-360.53	272.58	457.65	436.55	21.09	21.695		
3,600.00	3,597.92	3,602.36	3,454.79	12.68	9.00	55.80	-349.34	291.00	464.21	442.53	21.69	21.407		
3,650.00	3,645.09	3,623.33	3,461.12	12.87	9.40	52.97	-338.95	308.07	472.09	449.82	22.27	21.201		
3,700.00	3,690.47	3,644.46	3,466.57	13.07	9.81	50.15	-328.31	325.50	480.98	458.07	22.89	21.015		
3,750.00	3,733.62	3,665.03	3,470.84	13.31	10.23	47.44	-317.76	342.62	490.48	465.95	23.54	20.840		
3,800.00	3,774.17	3,690.00	3,474.55	13.60	10.74	44.43	-304.87	363.56	500.48	476.14	24.34	20.583		
3,850.00	3,811.72	3,705.10	3,478.09	13.96	11.06	42.39	-296.69	376.28	510.53	485.51	25.02	20.402		
3,900.00	3,845.94	3,726.18	3,477.61	14.42	11.51	40.00	-285.60	394.15	520.46	494.52	25.84	20.068		
3,950.00	3,876.61	3,750.10	3,478.50	15.01	12.03	37.59	-273.11	414.52	529.90	502.88	27.04	19.600		
4,000.00	3,903.15	3,782.89	3,479.30	15.73	12.75	34.89	-256.33	442.88	538.12	509.04	28.48	18.806		
4,050.00	3,925.61	3,820.99	3,480.24	16.60	13.57	32.33	-237.69	474.88	544.27	514.10	30.18	18.036		
4,100.00	3,943.69	3,856.84	3,481.02	17.53	14.41	30.20	-219.72	506.91	548.11	516.07	32.03	17.110		
4,150.00	3,957.22	3,896.18	3,481.56	18.79	15.32	28.30	-200.78	541.38	549.30	515.19	34.11	16.106		

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #10H - WB1/Job #1410706 - Surveys (Silver Oak 3)														Offset Site Error: 0.00 usft
Survey Program: 100-VES-ISCWSA-GYRD-3 2815-MWD														Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Footface (ft)	N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor		
4,200.00	3,969.08	3,939.82	3,481.95	20.08	16.31	26.55	-179.92	579.48	547.32	510.93	36.39	15.040		
4,250.00	3,970.18	3,978.01	3,481.68	21.45	17.21	25.30	-161.70	613.28	542.22	503.56	38.57	14.023		
4,272.35	3,970.47	3,995.71	3,481.82	22.09	17.63	24.81	-153.38	628.91	538.37	499.24	39.73	13.567		
4,300.00	3,970.23	4,019.90	3,481.57	22.90	18.20	23.94	-142.14	650.32	534.55	493.54	41.11	13.006		
4,400.00	3,969.35	4,103.46	3,480.45	25.98	20.20	21.01	-104.76	725.04	521.28	475.10	46.18	11.268		
4,500.00	3,969.48	4,187.64	3,478.67	28.22	22.25	18.23	-60.79	801.58	511.63	460.16	51.47	9.940		
4,600.00	3,967.61	4,278.11	3,476.71	32.58	24.49	15.70	-37.04	885.88	505.24	448.17	57.07	8.854		
4,700.00	3,966.74	4,375.32	3,475.45	36.02	26.92	13.48	-6.49	978.15	500.38	437.44	62.94	7.950		
4,800.00	3,965.86	4,469.98	3,474.89	39.53	29.31	11.85	-18.55	1,069.42	496.89	427.85	68.84	7.215		
4,900.00	3,964.99	4,565.39	3,474.87	43.09	31.74	10.79	-38.63	1,162.68	493.90	419.07	74.82	6.601		
5,000.00	3,964.12	4,658.47	3,474.56	46.68	34.12	10.27	-53.72	1,254.52	492.45	411.66	80.80	6.095		
5,100.00	3,963.25	4,755.03	3,474.38	50.30	36.58	10.45	-63.18	1,350.57	492.04	405.18	86.88	5.684		
5,102.74	3,963.22	4,757.49	3,474.39	50.40	36.64	10.47	-63.29	1,353.03	492.04	405.00	87.04	5.653		
5,200.00	3,962.37	4,843.23	3,474.47	53.94	38.80	11.42	-64.75	1,438.75	492.93	400.18	92.74	5.315		
5,300.00	3,961.50	4,934.28	3,473.19	57.61	41.08	12.84	-62.31	1,529.74	490.40	397.71	98.69	5.030		
5,400.00	3,960.63	5,030.36	3,472.38	61.29	43.46	14.87	-54.00	1,625.44	501.25	396.50	104.75	4.785 ES		
5,500.00	3,959.76	5,114.00	3,471.97	64.98	45.51	17.25	-42.52	1,708.28	508.10	397.61	110.49	4.598		
5,600.00	3,958.88	5,207.00	3,470.19	68.68	47.80	19.83	-28.13	1,800.15	517.88	401.40	116.48	4.448		
5,700.00	3,958.01	5,301.00	3,467.56	72.35	50.13	22.38	-12.95	1,892.87	529.84	407.32	122.52	4.325		
5,800.00	3,957.14	5,391.12	3,464.20	76.11	52.38	24.87	-1.38	1,981.78	543.59	415.10	128.50	4.230		
5,900.00	3,956.27	5,489.00	3,460.18	79.94	54.80	26.98	-16.60	2,078.39	558.49	423.79	134.70	4.146		
6,000.00	3,955.39	5,583.00	3,456.16	83.57	57.26	29.08	-31.21	2,171.16	574.38	433.55	140.83	4.079		
6,100.00	3,954.52	5,681.24	3,452.38	87.31	60.05	31.33	-47.81	2,278.05	590.34	442.99	147.35	4.006		
6,200.00	3,953.65	5,786.27	3,450.27	91.05	62.78	33.53	-63.16	2,381.93	605.42	451.59	153.83	3.936		
6,300.00	3,952.77	5,899.28	3,449.35	94.79	65.49	35.50	-77.06	2,483.99	619.67	459.39	160.28	3.866		
6,400.00	3,951.90	6,003.85	3,448.09	98.54	68.25	37.33	-90.29	2,587.71	634.33	467.54	168.79	3.803		
6,500.00	3,951.03	6,112.33	3,449.20	102.20	71.14	39.18	-102.75	2,695.47	647.04	473.81	173.43	3.731		
6,600.00	3,950.16	6,213.04	3,450.85	106.05	73.83	40.82	-113.85	2,795.55	659.80	479.92	179.88	3.668		
6,700.00	3,949.28	6,299.73	3,451.84	109.80	76.15	42.19	-123.66	2,881.68	673.19	487.24	185.96	3.620		
6,800.00	3,948.41	6,390.93	3,452.47	113.58	78.59	43.69	-135.83	2,972.08	688.05	496.80	192.16	3.585		
6,900.00	3,947.54	6,479.20	3,452.73	117.32	80.95	45.01	-147.89	3,059.52	705.58	507.30	198.28	3.559		
7,000.00	3,946.67	6,566.25	3,452.88	121.09	83.28	46.37	-161.28	3,145.51	724.42	520.06	204.36	3.545		
7,100.00	3,945.79	6,665.83	3,452.74	124.85	85.94	47.89	-177.51	3,243.76	744.17	533.38	210.79	3.530		
7,187.97	3,945.20	6,739.29	3,452.65	127.41	87.82	48.27	-188.09	3,313.41	757.29	542.06	215.23	3.518 SF		
7,189.27	3,945.20	6,736.59	3,452.65	127.42	87.83	48.88	-188.13	3,313.71	757.35	542.10	215.25	3.518		

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset, TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #12H - WB1 - Plan #2 08-25-14														Offset Site Error: 0.00 usft
Survey Program: O-PRX-MWD-GCR														Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside	Offset Wellbore Centre		Distance		Minimum Separation	Separation Factor	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.00	0.00	0.00	0.00	0.00	0.00	179.94	-99.90	0.10	99.91					
100.00	100.00	99.00	99.00	0.15	0.15	179.94	-99.90	0.10	99.90	99.61	0.29	341.565		
200.00	200.00	199.00	199.00	0.51	0.50	179.94	-99.90	0.10	99.90	98.89	1.01	99.176		
300.00	300.00	299.00	299.00	0.88	0.88	179.94	-99.90	0.10	99.90	98.18	1.72	57.938		
400.00	400.00	399.00	399.00	1.22	1.22	179.94	-99.90	0.10	99.90	97.46	2.44	40.923		
500.00	500.00	499.00	499.00	1.58	1.58	179.94	-99.90	0.10	99.90	96.74	3.18	31.633		
600.00	600.00	599.00	599.00	1.94	1.94	179.94	-99.90	0.10	99.90	96.02	3.88	25.780		
700.00	700.00	699.00	699.00	2.30	2.29	179.94	-99.90	0.10	99.90	95.31	4.59	21.755		
800.00	800.00	799.00	799.00	2.66	2.65	179.94	-99.90	0.10	99.90	94.59	5.31	18.817		
900.00	900.00	899.00	899.00	3.01	3.01	179.94	-99.90	0.10	99.90	93.87	6.03	16.578		
1,000.00	1,000.00	999.00	999.00	3.37	3.37	179.94	-99.90	0.10	99.90	93.16	6.74	14.616		
1,100.00	1,100.00	1,099.00	1,099.00	3.73	3.73	179.94	-99.90	0.10	99.90	92.44	7.46	13.392		
1,200.00	1,200.00	1,199.00	1,199.00	4.09	4.09	179.94	-99.90	0.10	99.90	91.72	8.18	12.218		
1,300.00	1,300.00	1,299.00	1,299.00	4.45	4.45	179.94	-99.90	0.10	99.90	91.01	8.89	11.233		
1,400.00	1,400.00	1,399.00	1,399.00	4.81	4.80	179.94	-99.90	0.10	99.90	90.29	9.61	10.395		
1,500.00	1,500.00	1,499.00	1,499.00	5.17	5.16	179.94	-99.90	0.10	99.90	89.57	10.33	9.673		
1,600.00	1,600.00	1,599.00	1,599.00	5.52	5.52	179.94	-99.90	0.10	99.90	88.86	11.04	9.045		
1,700.00	1,700.00	1,699.00	1,699.00	5.88	5.88	179.94	-99.90	0.10	99.90	88.14	11.76	8.494		
1,800.00	1,800.00	1,799.00	1,799.00	6.24	6.24	179.94	-99.90	0.10	99.90	87.42	12.48	8.006		
1,900.00	1,900.00	1,899.00	1,899.00	6.60	6.60	179.94	-99.90	0.10	99.90	86.70	13.20	7.571		
2,000.00	2,000.00	1,999.00	1,999.00	6.96	6.95	179.94	-99.90	0.10	99.90	85.99	13.91	7.161		
2,100.00	2,100.00	2,099.00	2,099.00	7.32	7.31	179.94	-99.90	0.10	99.90	85.27	14.63	6.829		
2,200.00	2,200.00	2,199.00	2,199.00	7.67	7.67	179.94	-99.90	0.10	99.90	84.55	15.35	6.510		
2,300.00	2,300.00	2,299.00	2,299.00	8.03	8.03	179.94	-99.90	0.10	99.90	83.84	16.06	6.219		
2,400.00	2,400.00	2,399.00	2,399.00	8.39	8.39	179.94	-99.90	0.10	99.90	83.12	16.78	5.954		
2,500.00	2,500.00	2,499.00	2,499.00	8.75	8.75	179.94	-99.90	0.10	99.90	82.40	17.50	5.710		
2,600.00	2,600.00	2,599.00	2,599.00	9.11	9.11	179.94	-99.90	0.10	99.90	81.69	18.21	5.485		
2,700.00	2,700.00	2,699.00	2,699.00	9.47	9.46	179.94	-99.90	0.10	99.90	80.97	18.93	5.277		
2,800.00	2,800.00	2,799.00	2,799.00	9.83	9.82	179.94	-99.90	0.10	99.90	80.25	19.65	5.085		
2,900.00	2,900.00	2,899.00	2,899.00	10.18	10.18	179.94	-99.90	0.10	99.90	79.54	20.36	4.906		
3,000.00	3,000.00	2,999.00	2,999.00	10.54	10.54	179.94	-99.90	0.10	99.90	78.82	21.08	4.739		
3,100.00	3,100.00	3,099.00	3,099.00	10.90	10.90	179.94	-99.90	0.10	99.90	78.10	21.80	4.583		
3,200.00	3,200.00	3,199.00	3,199.00	11.26	11.26	179.94	-99.90	0.10	99.90	77.38	22.52	4.437		
3,300.00	3,300.00	3,299.00	3,299.00	11.62	11.61	179.94	-99.90	0.10	99.90	76.67	23.23	4.300		
3,400.00	3,400.00	3,399.00	3,399.00	11.98	11.97	179.94	-99.90	0.10	99.90	75.95	23.95	4.171		
3,449.62	3,449.62	3,448.62	3,448.62	12.15	12.15	179.94	-99.90	0.10	99.90	75.59	24.31	4.110 CC		
3,500.00	3,499.92	3,499.03	3,498.98	12.33	12.33	98.46	-98.80	2.37	100.17	75.51	24.66	4.062 ES		
3,550.00	3,549.38	3,549.07	3,548.48	12.50	12.50	98.45	-98.87	9.42	100.95	75.95	25.00	4.037		
3,600.00	3,597.92	3,599.11	3,597.09	12.68	12.68	98.35	-98.83	21.18	102.25	76.90	25.36	4.033		
3,650.00	3,645.09	3,649.14	3,644.35	12.87	12.86	98.10	-99.77	37.58	104.05	78.33	25.73	4.044		
3,700.00	3,690.47	3,699.15	3,688.80	13.07	13.06	95.95	-99.70	58.36	106.34	80.21	26.14	4.069		
3,750.00	3,733.62	3,749.15	3,733.04	13.31	13.30	95.65	-99.61	83.45	109.09	82.48	26.61	4.100		
3,800.00	3,774.17	3,799.12	3,773.65	13.60	13.59	95.30	-99.51	112.54	112.28	85.09	27.19	4.130		
3,850.00	3,811.72	3,849.08	3,811.27	13.98	13.95	94.90	-99.39	145.36	115.88	87.96	27.91	4.151		
3,900.00	3,845.94	3,898.98	3,845.55	14.42	14.42	94.48	-99.27	181.61	119.65	91.01	28.84	4.156		
3,950.00	3,876.51	3,948.87	3,876.20	15.01	15.00	93.99	-99.13	220.96	124.16	94.15	30.01	4.137		
4,000.00	3,903.15	3,998.74	3,902.92	15.73	15.73	93.49	-98.98	263.04	128.79	97.31	31.40	4.093		
4,050.00	3,925.61	4,048.59	3,925.50	16.60	16.61	92.67	-98.83	307.46	133.65	100.43	32.22	4.023		
4,100.00	3,943.69	4,098.43	3,943.73	17.63	17.65	92.44	-98.67	353.83	138.73	103.46	35.27	3.933		
4,150.00	3,957.22	4,148.27	3,957.44	18.79	18.82	91.91	-98.50	401.72	143.98	106.37	37.61	3.828		
4,200.00	3,966.08	4,198.11	3,966.51	20.08	20.12	91.27	-98.33	450.71	149.35	109.15	40.20	3.715		
4,250.00	3,970.18	4,247.98	3,970.69	21.45	21.52	90.84	-98.15	500.35	154.78	111.81	42.97	3.602		

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset-TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #12H - WB1 - Plan #2 08-25-14												Offset Site Error: 0.00 usft	
Survey Program: O-PHX-MWD-IGRF												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 Depth (usft)	Offset Depth (usft)		N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)			
4,272.35	3,970.47	4,270.25	3,971.27	22.09	22.17	90.60	-98.08	522.63	157.22	112.90	44.26	3.552	
4,300.00	3,970.23	4,297.75	3,971.04	22.90	22.98	90.60	-97.98	550.13	160.24	114.35	45.89	3.492	
4,400.00	3,969.35	4,397.15	3,970.17	25.98	26.09	90.58	-97.63	649.53	171.14	119.08	52.06	3.287	
4,500.00	3,968.48	4,496.55	3,969.30	29.22	29.36	90.52	-97.29	748.93	182.05	123.47	58.58	3.108	
4,600.00	3,967.61	4,595.95	3,968.43	32.58	32.75	90.49	-96.94	848.33	192.95	127.83	65.33	2.954	
4,700.00	3,966.74	4,695.36	3,967.57	36.02	36.23	90.46	-96.59	947.73	203.86	131.61	72.25	2.822	
4,800.00	3,965.86	4,794.76	3,966.70	39.53	39.77	90.44	-96.25	1,047.13	214.77	135.47	79.29	2.708	
4,900.00	3,964.99	4,894.17	3,965.83	43.09	43.35	90.42	-95.90	1,146.53	225.67	139.24	86.44	2.611	
5,000.00	3,964.12	4,993.57	3,964.96	46.68	46.98	90.39	-95.55	1,245.92	236.58	142.83	93.66	2.526	
5,100.00	3,963.25	5,092.97	3,964.10	50.30	50.63	90.38	-95.20	1,345.32	247.49	146.58	100.93	2.452	
5,200.00	3,962.37	5,192.38	3,963.23	53.94	54.31	90.36	-94.86	1,444.72	258.39	150.14	108.25	2.387	
5,300.00	3,961.50	5,291.78	3,962.36	57.51	58.00	90.34	-94.51	1,544.12	269.30	153.69	115.61	2.329	
5,400.00	3,960.63	5,391.18	3,961.49	61.29	61.71	90.33	-94.16	1,643.52	280.21	157.21	123.00	2.278	
5,500.00	3,959.76	5,490.59	3,960.63	64.98	65.44	90.32	-93.82	1,742.92	291.11	160.70	130.41	2.232	
5,600.00	3,958.88	5,589.99	3,959.76	68.68	69.17	90.30	-93.47	1,842.32	302.02	164.17	137.85	2.191	
5,700.00	3,958.01	5,689.39	3,958.89	72.39	72.91	90.29	-93.12	1,941.72	312.93	167.62	145.31	2.154	
5,800.00	3,957.14	5,788.80	3,958.02	76.11	76.66	90.28	-92.78	2,041.12	323.83	171.00	152.78	2.120	
5,900.00	3,956.27	5,888.20	3,957.16	79.84	80.42	90.27	-92.43	2,140.52	334.74	174.48	160.26	2.089	
6,000.00	3,955.39	5,987.60	3,956.29	83.57	84.18	90.26	-92.08	2,239.91	345.65	177.89	167.75	2.060	
6,100.00	3,954.52	6,087.01	3,955.42	87.31	87.95	90.25	-91.73	2,339.31	356.55	181.30	175.20	2.034	
6,200.00	3,953.65	6,186.41	3,954.55	91.05	91.72	90.24	-91.39	2,438.71	367.46	184.69	182.77	2.010	
6,300.00	3,952.77	6,285.82	3,953.69	94.79	95.50	90.24	-91.04	2,538.11	378.37	188.08	190.29	1.988	
6,400.00	3,951.90	6,385.22	3,952.82	98.54	99.28	90.23	-90.69	2,637.51	389.27	191.45	197.82	1.968	
6,500.00	3,951.03	6,484.62	3,951.95	102.29	103.06	90.22	-90.35	2,736.91	400.18	194.83	205.35	1.949	
6,600.00	3,950.16	6,584.03	3,951.08	106.05	106.85	90.22	-90.00	2,836.31	411.09	198.19	212.89	1.931	
6,700.00	3,949.28	6,683.43	3,950.22	109.80	110.64	90.21	-89.65	2,935.71	422.00	201.56	220.44	1.914	
6,800.00	3,948.41	6,782.83	3,949.35	113.56	114.43	90.20	-89.31	3,035.11	432.90	204.91	227.99	1.899	
6,900.00	3,947.54	6,882.24	3,948.48	117.32	118.22	90.20	-88.96	3,134.51	443.81	208.27	235.54	1.884	
7,000.00	3,946.67	6,980.47	3,947.63	121.09	121.97	90.19	-88.63	3,232.74	454.73	211.67	243.05	1.871	
7,100.00	3,945.79	7,085.92	3,946.88	124.85	125.73	90.19	-88.28	3,331.17	467.37	217.29	250.08	1.859 SF	
7,167.97	3,945.20	7,123.60	3,946.38	127.41	127.44	90.18	-92.07	3,375.81	477.65	222.79	254.85	1.874	
7,168.27	3,945.20	7,123.86	3,946.37	127.42	127.45	90.18	-92.08	3,376.06	477.69	222.83	254.87	1.874	



Phoenix Technology Services
Anticollision Report



Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #3 - WB1 - Inc Surveys														Offset Site Error	0.00 usft
Survey Program: 250-MWD														Offset Well Error	0.00 usft
Reference															
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning		
0.00	0.00	8.08	8.08	0.00	0.01	94.80	-275.30	3.281.70	3.293.23						
100.00	100.00	109.05	109.05	0.15	0.12	94.79	-275.09	3.281.70	3.293.21	3.292.94	0.27	N/A			
200.00	200.00	210.01	210.01	0.51	0.24	94.78	-274.53	3.281.70	3.293.16	3.292.42	0.74	4.440.053			
300.00	300.00	310.85	310.85	0.89	0.42	94.77	-273.63	3.281.70	3.293.09	3.291.81	1.28	2.568.485			
400.00	400.00	411.56	411.55	1.22	0.64	94.75	-272.44	3.281.70	3.292.99	3.291.12	1.87	1.764.226			
500.00	500.00	511.13	511.11	1.58	0.85	94.72	-271.22	3.281.70	3.292.89	3.290.48	2.43	1.357.064			
600.00	600.00	610.69	610.66	1.94	1.05	94.71	-270.16	3.281.70	3.292.80	3.289.82	2.99	1.102.584			
700.00	700.00	710.38	710.35	2.30	1.25	94.69	-269.25	3.281.70	3.292.73	3.289.18	3.55	927.744			
800.00	800.00	810.38	810.34	2.66	1.46	94.68	-268.38	3.281.70	3.292.66	3.288.54	4.12	800.139			
900.00	900.00	910.37	910.33	3.01	1.67	94.66	-267.50	3.281.70	3.292.59	3.287.90	4.68	703.389			
1,000.00	1,000.00	1,010.44	1,010.40	3.37	1.88	94.64	-266.63	3.281.70	3.292.51	3.287.27	5.25	627.208			
1,100.00	1,100.00	1,110.81	1,110.76	3.73	2.10	94.63	-265.66	3.281.70	3.292.44	3.286.61	5.83	564.828			
1,200.00	1,200.00	1,211.19	1,211.12	4.09	2.32	94.61	-264.54	3.281.70	3.292.35	3.285.94	6.41	513.730			
1,300.00	1,300.00	1,311.54	1,311.48	4.45	2.54	94.59	-263.28	3.281.70	3.292.25	3.285.26	6.99	471.091			
1,400.00	1,400.00	1,411.86	1,411.79	4.81	2.76	94.50	-261.90	3.281.70	3.292.14	3.284.57	7.57	434.851			
1,500.00	1,500.00	1,512.18	1,512.10	5.17	2.99	94.54	-260.38	3.281.70	3.292.02	3.283.86	8.15	403.786			
1,600.00	1,600.00	1,612.49	1,612.40	5.52	3.21	94.51	-258.74	3.281.70	3.291.89	3.283.15	8.74	376.862			
1,700.00	1,700.00	1,712.60	1,712.40	5.88	3.43	94.48	-257.00	3.281.70	3.291.75	3.282.43	9.32	353.292			
1,800.00	1,800.00	1,811.98	1,811.88	6.24	3.65	94.45	-255.30	3.281.70	3.291.62	3.281.73	9.89	332.743			
1,900.00	1,900.00	1,910.40	1,910.27	6.60	3.85	94.43	-254.17	3.281.70	3.291.53	3.281.08	10.45	314.904			
2,000.00	2,000.00	2,010.82	2,010.69	6.96	4.06	94.41	-253.19	3.281.70	3.291.45	3.280.44	11.02	298.751			
2,100.00	2,100.00	2,111.25	2,111.10	7.32	4.27	94.39	-252.03	3.281.70	3.291.37	3.279.78	11.58	284.173			
2,200.00	2,200.00	2,211.86	2,211.51	7.67	4.48	94.37	-250.71	3.281.70	3.291.26	3.279.11	12.16	270.739			
2,300.00	2,300.00	2,312.05	2,311.89	8.03	4.71	94.34	-249.23	3.281.70	3.291.15	3.278.41	12.74	258.355			
2,400.00	2,400.00	2,412.45	2,412.27	8.39	4.93	94.31	-247.58	3.281.70	3.291.03	3.277.71	13.32	247.053			
2,500.00	2,500.00	2,512.11	2,511.92	8.75	5.14	94.29	-245.91	3.281.70	3.290.90	3.277.02	13.89	236.970			
2,600.00	2,600.00	2,611.88	2,611.48	9.11	5.34	94.28	-244.40	3.281.70	3.290.79	3.276.34	14.45	227.714			
2,700.00	2,700.00	2,711.39	2,711.18	9.47	5.55	94.24	-243.05	3.281.70	3.290.69	3.275.67	15.02	219.147			
2,800.00	2,800.00	2,811.38	2,811.16	9.83	5.76	94.21	-241.75	3.281.70	3.290.59	3.275.01	15.58	211.188			
2,900.00	2,900.00	2,911.38	2,911.15	10.18	5.98	94.19	-240.44	3.281.70	3.290.50	3.274.35	16.15	203.788			
3,000.00	3,000.00	3,011.41	3,011.17	10.54	6.17	94.17	-239.13	3.281.70	3.290.40	3.273.69	16.72	196.850			
3,100.00	3,100.00	3,111.61	3,111.36	10.90	6.40	94.14	-237.75	3.281.70	3.290.30	3.273.01	17.30	190.229			
3,200.00	3,200.00	3,211.80	3,211.55	11.26	6.62	94.12	-236.30	3.281.70	3.290.20	3.272.32	17.88	184.039			
3,300.00	3,300.00	3,312.00	3,311.73	11.62	6.84	94.09	-234.75	3.281.70	3.290.09	3.271.63	18.46	178.236			
3,400.00	3,400.00	3,412.19	3,411.91	11.98	7.06	94.06	-233.11	3.281.70	3.289.97	3.270.93	19.04	172.791			
3,449.62	3,449.62	3,461.90	3,461.62	12.15	7.17	94.05	-232.27	3.281.70	3.289.91	3.270.58	19.33	170.210			
3,500.00	3,499.92	3,512.26	3,511.97	12.33	7.29	10.55	-231.39	3.281.70	3.287.46	3.267.84	19.62	167.576			
3,550.00	3,549.38	3,561.73	3,561.42	12.50	7.40	10.71	-230.53	3.281.70	3.280.31	3.260.41	19.90	164.825			
3,600.00	3,597.92	3,610.28	3,609.97	12.68	7.51	10.98	-229.68	3.281.70	3.268.53	3.248.35	20.19	161.917			
3,650.00	3,645.09	3,657.48	3,657.16	12.87	7.61	11.39	-228.86	3.281.70	3,292.24	3.231.76	20.48	158.819			
3,700.00	3,690.47	3,702.89	3,702.57	13.07	7.71	11.95	-228.07	3.281.70	3,291.56	3,210.80	20.78	155.487			
3,750.00	3,733.62	3,746.09	3,745.76	13.31	7.81	12.71	-227.31	3.281.70	3,206.75	3,185.84	21.12	151.854			
3,800.00	3,774.17	3,786.68	3,786.34	13.60	7.90	13.70	-226.60	3.281.70	3,177.98	3,158.48	21.50	147.835			
3,850.00	3,811.72	3,824.30	3,823.95	13.96	7.98	14.99	-225.95	3.281.70	3,145.54	3,122.59	21.94	143.343			
3,900.00	3,845.94	3,858.58	3,858.23	14.42	8.06	16.70	-225.35	3.281.70	3,109.72	3,087.24	22.46	138.316			
3,950.00	3,876.51	3,889.22	3,888.87	15.01	8.13	18.98	-224.81	3.281.70	3,079.87	3,047.74	23.13	132.737			
4,000.00	3,903.35	3,915.94	3,915.58	15.73	8.19	22.12	-224.35	3,291.70	3,029.35	3,005.43	23.92	126.653			
4,050.00	3,925.61	3,938.49	3,938.13	16.60	8.24	26.56	-223.95	3,291.70	2,985.54	2,960.70	24.84	120.179			
4,100.00	3,943.69	3,956.66	3,956.30	17.63	8.28	33.10	-223.64	3,291.70	2,939.86	2,913.95	25.91	113.478			
4,150.00	3,957.22	3,970.28	3,969.92	18.79	8.31	43.17	-223.40	3,291.70	2,892.72	2,865.62	27.10	106.738			
4,200.00	3,966.08	3,979.24	3,978.87	20.06	8.33	58.91	-223.24	3,291.70	2,844.57	2,816.17	28.41	100.141			
4,250.00	3,970.18	3,983.44	3,983.07	21.45	8.34	81.40	-223.17	3,291.70	2,795.86	2,766.07	29.79	93.838			

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset.TVD Reference: Offset Datum

Offset Design: Beech 25 Federal - #3 - WB1 - Inc Surveys														Offset Site Error: 0.00 usft
Survey Program: 250-MWD														Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Distance		Minimum Separation (usft)	Separation Factor	Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference Depth (usft)	Offset Depth (usft)		Between Centres (usft)	Between Ellipses (usft)						
4,272.35	3,970.47	3,983.76	3,983.40	22.09	8.34	92.77	-223.16	3,281.70	2,774.03	2,743.59	30.44	91.145		
4,300.00	3,970.23	3,983.58	3,983.21	22.90	8.34	92.75	-223.17	3,281.70	2,747.02	2,715.77	31.24	87.519		
4,400.00	3,969.35	3,982.90	3,982.53	25.98	8.34	92.68	-223.18	3,281.70	2,849.45	2,615.14	34.31	77.210		
4,500.00	3,968.48	3,982.23	3,981.86	29.22	8.34	92.62	-223.19	3,281.70	2,552.07	2,514.52	37.55	67.958		
4,600.00	3,967.61	3,981.55	3,981.18	32.58	8.34	92.55	-223.20	3,281.70	2,454.91	2,414.00	40.91	60.005		
4,700.00	3,966.74	3,980.87	3,980.51	36.02	8.33	92.49	-223.21	3,281.70	2,357.98	2,313.63	44.36	53.161		
4,800.00	3,965.86	3,980.20	3,979.83	39.53	8.33	92.42	-223.23	3,281.70	2,261.32	2,213.46	47.86	47.247		
4,900.00	3,964.99	3,979.52	3,979.15	43.09	8.33	92.36	-223.24	3,281.70	2,164.98	2,113.54	51.42	42.107		
5,000.00	3,964.12	3,978.84	3,978.48	46.68	8.33	92.29	-223.25	3,281.70	2,069.95	2,013.94	55.01	37.612		
5,100.00	3,963.25	3,978.17	3,977.80	50.30	8.33	92.23	-223.26	3,281.70	1,973.33	1,914.70	58.63	33.659		
5,200.00	3,962.37	3,977.49	3,977.13	53.94	8.33	92.16	-223.27	3,281.70	1,878.17	1,815.90	62.27	30.161		
5,300.00	3,961.50	3,976.82	3,976.45	57.61	8.32	92.10	-223.29	3,281.70	1,783.54	1,717.61	65.93	27.051		
5,400.00	3,960.63	3,976.14	3,975.77	61.29	8.32	92.03	-223.30	3,281.70	1,689.53	1,619.91	69.61	24.271		
5,500.00	3,959.76	3,975.46	3,975.10	64.98	8.32	91.96	-223.31	3,281.70	1,596.24	1,522.94	73.30	21.777		
5,600.00	3,958.88	3,974.79	3,974.42	68.68	8.32	91.90	-223.32	3,281.70	1,503.82	1,426.82	77.00	19.530		
5,700.00	3,958.01	3,974.11	3,973.75	72.39	8.32	91.83	-223.33	3,281.70	1,412.43	1,331.72	80.71	17.500		
5,800.00	3,957.14	3,973.44	3,973.07	76.11	8.32	91.77	-223.34	3,281.70	1,322.28	1,237.85	84.43	15.661		
5,900.00	3,956.27	3,972.76	3,972.39	79.84	8.32	91.70	-223.36	3,281.70	1,233.66	1,145.51	88.15	13.894		
6,000.00	3,955.39	3,972.08	3,971.72	83.57	8.31	91.64	-223.37	3,281.70	1,148.91	1,055.02	91.86	12.482		
6,100.00	3,954.52	3,971.41	3,971.04	87.31	8.31	91.57	-223.38	3,281.70	1,062.49	966.87	95.62	11.112		
6,200.00	3,953.65	3,970.73	3,970.37	91.05	8.31	91.51	-223.39	3,281.70	981.00	881.64	99.38	9.873		
6,300.00	3,952.77	3,970.06	3,969.69	94.79	8.31	91.44	-223.40	3,281.70	903.23	800.13	103.10	8.761		
6,400.00	3,951.90	3,969.38	3,969.01	98.54	8.31	91.38	-223.42	3,281.70	830.25	723.40	106.85	7.770		
6,500.00	3,951.03	3,968.70	3,968.34	102.29	8.31	91.31	-223.43	3,281.70	763.40	652.81	110.60	6.902		
6,600.00	3,950.16	3,968.03	3,967.66	106.05	8.31	91.24	-223.44	3,281.70	704.46	590.11	114.35	6.160		
6,700.00	3,949.28	3,967.35	3,966.99	109.80	8.30	91.18	-223.45	3,281.70	655.54	537.44	118.11	5.550		
6,800.00	3,948.41	3,966.67	3,966.31	113.56	8.30	91.11	-223.46	3,281.70	619.04	497.18	121.86	5.080		
6,900.00	3,947.54	3,966.00	3,965.63	117.32	8.30	91.05	-223.47	3,281.70	597.23	471.61	125.62	4.754		
6,982.64	3,946.82	3,965.44	3,965.07	120.43	8.30	90.99	-223.48	3,281.70	591.48	462.75	128.73	4.595 CC		
7,000.00	3,946.67	3,965.32	3,964.96	121.09	8.30	90.98	-223.49	3,281.70	591.74	462.35	129.38	4.573 ES		
7,100.00	3,945.79	3,964.65	3,964.28	124.85	8.30	90.92	-223.50	3,281.70	603.01	469.87	133.15	4.529 SF		
7,167.97	3,945.20	3,964.19	3,963.82	127.41	8.30	90.87	-223.51	3,281.70	619.84	484.13	135.71	4.567		
7,169.27	3,945.20	3,964.18	3,963.82	127.42	8.30	90.87	-223.51	3,281.70	619.93	484.21	135.71	4.568		

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
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #9H - WB1/Job #1311101 - Surveys (Silver Oak 3)														Offset Site Error: 0.00 usft
Survey Program: 100-VES-SCWSA-GYRO-3-2874-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	Offset	Highside	Offset Wellbore Centre	Between Centres	Between Ellipses	Minimum Separation	Separation Factor			
(usft)	(usft)	(usft)	(usft)	(usft)	(usft)	(ft)	N/S (usft)	E/W (usft)	(usft)	(usft)	(usft)			
0.00	0.00	0.00	0.00	0.00	0.00	-8.01	409.20	-57.60	413.24					
100.00	100.00	95.99	95.99	0.15	0.08	-8.17	409.44	-58.39	413.59	413.38	0.23	1.785	114	
200.00	200.00	196.34	196.32	0.51	0.26	-8.32	409.93	-59.96	414.30	413.53	0.77	539.048		
300.00	300.00	296.81	296.78	0.86	0.45	-8.52	410.30	-61.47	414.89	413.58	1.31	315.823		
400.00	400.00	395.39	395.35	1.22	0.83	-8.73	410.76	-63.07	415.59	413.73	1.86	223.822		
500.00	500.00	497.72	497.67	1.58	0.83	-8.91	411.18	-64.45	416.21	413.80	2.41	172.931		
600.00	600.00	597.54	597.48	1.94	1.01	-9.06	411.35	-65.57	416.55	413.59	2.95	141.087		
700.00	700.00	698.81	698.74	2.30	1.20	-9.24	411.38	-66.93	416.76	413.26	3.50	118.083		
800.00	800.00	798.74	798.66	2.66	1.39	-9.43	411.20	-68.29	416.83	412.79	4.05	103.037		
900.00	900.00	899.23	899.14	3.01	1.58	-9.57	411.05	-69.33	416.86	412.27	4.59	90.760		
923.03	923.03	922.12	922.03	3.10	1.62	-9.60	411.02	-69.52	416.86	412.14	4.72	88.376		
1,000.00	1,000.00	998.58	998.49	3.37	1.76	-9.70	410.95	-70.22	416.90	411.77	5.14	81.176		
1,100.00	1,100.00	1,101.03	1,100.93	3.73	1.95	-9.88	410.57	-71.40	416.73	411.05	5.68	73.307		
1,200.00	1,200.00	1,200.00	1,199.89	4.09	2.14	-10.04	410.08	-72.62	416.46	410.23	6.23	66.880		
1,300.00	1,300.00	1,301.85	1,301.73	4.45	2.33	-10.21	409.48	-73.77	416.08	409.31	6.77	61.427		
1,400.00	1,400.00	1,400.00	1,399.88	4.81	2.51	-10.38	408.85	-74.87	415.66	408.34	7.31	56.834		
1,500.00	1,500.00	1,502.17	1,502.04	5.17	2.70	-10.55	408.15	-75.99	415.18	407.32	7.86	52.816		
1,600.00	1,600.00	1,600.00	1,599.86	5.52	2.88	-10.66	407.60	-76.71	414.76	406.36	8.40	49.375		
1,700.00	1,700.00	1,701.85	1,701.72	5.88	3.06	-10.75	407.09	-77.26	414.37	405.42	8.95	46.320		
1,800.00	1,800.00	1,801.71	1,801.57	6.24	3.25	-10.87	406.29	-78.05	413.73	404.24	9.49	43.610		
1,900.00	1,900.00	1,901.18	1,901.03	6.60	3.43	-10.98	405.60	-78.72	413.17	403.15	10.03	41.204		
2,000.00	2,000.00	2,000.00	1,999.85	6.96	3.61	-11.06	405.18	-79.23	412.85	402.29	10.57	39.086		
2,100.00	2,100.00	2,101.34	2,101.18	7.32	3.80	-11.17	404.69	-79.63	412.51	401.40	11.12	37.112		
2,200.00	2,200.00	2,200.61	2,200.45	7.67	3.98	-11.28	404.11	-80.60	412.07	400.42	11.66	35.346		
2,300.00	2,300.00	2,301.79	2,301.63	8.03	4.17	-11.37	403.49	-81.13	411.57	399.37	12.20	33.728		
2,400.00	2,400.00	2,400.00	2,399.83	8.39	4.35	-11.42	403.02	-81.43	411.17	398.43	12.74	32.271		
2,500.00	2,500.00	2,501.29	2,501.12	8.75	4.53	-11.46	402.62	-81.85	410.82	397.54	13.28	30.925		
2,600.00	2,600.00	2,601.04	2,600.88	9.11	4.71	-11.49	402.12	-81.72	410.34	396.52	13.82	29.698		
2,700.00	2,700.00	2,702.41	2,702.24	9.47	4.88	-11.48	401.50	-81.54	409.71	395.38	14.35	28.558		
2,800.00	2,800.00	2,802.01	2,801.84	9.83	5.04	-11.48	400.79	-81.42	408.99	394.12	14.87	27.512		
2,900.00	2,900.00	2,904.25	2,904.07	10.18	5.11	-11.46	399.96	-81.09	408.13	392.84	15.29	26.692		
3,000.00	3,000.00	3,016.08	3,015.59	10.54	5.13	-10.49	398.26	-73.73	405.37	388.70	15.67	25.870		
3,100.00	3,100.00	3,124.42	3,121.57	10.90	5.19	-7.45	396.88	-51.85	402.69	384.80	16.09	24.900		
3,200.00	3,200.00	3,231.99	3,221.46	11.28	5.32	-1.82	393.52	-12.48	394.36	377.78	16.58	23.784		
3,295.43	3,295.43	3,316.91	3,294.43	11.60	5.57	4.50	390.21	30.71	391.42	374.25	17.17	22.795	CC	
3,300.00	3,300.00	3,320.66	3,297.52	11.63	5.59	4.81	390.04	32.84	391.43	374.22	17.21	22.750		
3,400.00	3,400.00	3,395.83	3,355.98	11.98	6.09	11.68	386.25	79.84	398.76	378.69	18.07	21.962		
3,449.82	3,449.82	3,428.17	3,378.75	12.15	6.40	14.97	384.13	102.69	403.71	385.15	18.56	21.756		
3,500.00	3,499.82	3,457.03	3,397.53	12.33	6.74	-64.63	381.87	124.48	413.27	394.20	19.07	21.672		
3,550.00	3,549.38	3,481.36	3,412.15	12.50	7.08	-61.17	379.82	143.82	424.29	404.72	19.57	21.686		
3,600.00	3,597.92	3,502.00	3,423.60	12.68	7.38	-58.09	378.27	160.91	436.76	416.72	20.04	21.766		
3,650.00	3,645.08	3,523.15	3,434.38	12.87	7.70	-55.05	376.92	179.07	450.33	429.78	20.57	21.894		
3,700.00	3,698.47	3,543.71	3,443.84	13.07	8.06	-52.19	375.85	197.28	464.61	443.48	21.13	21.990		
3,750.00	3,733.62	3,565.00	3,452.62	13.31	8.44	-49.45	375.00	216.05	478.25	457.50	21.75	22.032		
3,800.00	3,774.17	3,585.58	3,460.15	13.60	8.85	-46.97	374.43	235.79	493.88	471.43	22.45	22.002		
3,850.00	3,811.72	3,608.69	3,467.56	13.96	9.32	-44.59	374.08	257.68	508.13	484.85	23.28	21.823		
3,900.00	3,843.94	3,634.66	3,474.61	14.42	9.88	-42.34	373.69	282.07	521.55	497.25	24.30	21.460		
3,950.00	3,876.51	3,659.00	3,480.19	15.01	10.42	-40.41	373.18	306.35	533.64	508.21	25.43	20.986		
4,000.00	3,903.15	3,690.00	3,485.76	15.73	11.14	-38.47	372.08	336.82	544.05	517.18	26.87	20.247		
4,050.00	3,925.61	3,716.00	3,498.60	16.60	11.76	-36.93	370.57	362.59	552.89	524.52	28.37	19.461		
4,100.00	3,943.69	3,748.42	3,491.11	17.63	12.56	-35.39	368.58	394.86	559.95	529.76	30.19	18.540		
4,150.00	3,957.22	3,779.00	3,491.76	18.79	13.31	-34.17	366.61	425.37	565.18	533.07	32.10	17.605		

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
 Project: Eddy County, NM (NAD27 NME)
 Reference Site: Beech 25 Federal
 Site Error: 0.00 usft
 Reference Well: #11H
 Well Error: 0.00 usft
 Reference Wellbore: WB1 / Job #1412160
 Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
 TVD Reference: KB @ 3605.00usft (Silver Oak 3)
 MD Reference: KB @ 3605.00usft (Silver Oak 3)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: Compass 5000 GCR
 Offset TVD Reference: Offset Datum

Offset Design Beech 25 Federal - #9H - WB1/Job #1311101 - Surveys (Silver Oak 3)														Offset Site Error: 0.00 usft
Survey Program: 100-VES-ISCWSA-GYRO-3.2874-MWD														Offset Well Error: 0.00 usft
Reference	Offset	Semi Major Axis		Reference	Offset	Highside	Offset Wellbore Centre		Distance		Minimum	Separation	Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Toothface (ft)	N-S (usft)	E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Separation (usft)	Factor		
4,200.00	3,966.08	3,823.51	3,491.74	20.08	14.44	-32.94	363.82	489.79	587.70	533.19	34.51	16.450		
4,250.00	3,970.18	3,870.29	3,491.78	21.45	15.63	-32.12	381.09	516.49	586.48	529.39	37.09	15.275		
4,272.35	3,970.47	3,890.66	3,491.76	22.09	16.16	-31.92	360.00	536.84	564.75	526.50	38.25	14.764		
4,300.00	3,970.23	3,915.91	3,491.68	22.90	16.81	-31.57	358.73	562.05	562.24	522.52	38.71	14.158		
4,400.00	3,969.35	4,006.42	3,491.03	25.98	18.17	-30.36	355.12	652.49	554.22	509.08	45.15	12.276		
4,500.00	3,968.48	4,105.52	3,490.22	29.22	21.79	-29.15	352.87	751.55	547.42	490.42	51.01	10.732		
4,800.00	3,967.51	4,198.17	3,489.88	32.58	24.26	-28.08	351.61	844.19	541.12	484.28	56.84	9.520		
4,700.00	3,966.74	4,300.07	3,488.45	36.02	27.00	-26.89	350.62	946.05	535.75	472.73	63.02	8.502		
4,800.00	3,965.86	4,403.12	3,488.17	39.53	29.78	-25.70	349.59	1,049.13	529.76	460.45	69.31	7.644		
4,900.00	3,964.99	4,497.00	3,487.19	43.09	32.32	-24.53	348.38	1,142.99	524.53	449.12	75.41	6.956		
5,000.00	3,964.12	4,598.30	3,486.19	46.68	35.07	-23.31	347.88	1,244.28	519.78	438.03	81.75	6.358		
5,100.00	3,963.25	4,699.53	3,485.04	50.30	37.55	-22.21	347.27	1,335.50	515.59	427.74	87.85	5.869		
5,200.00	3,962.37	4,790.80	3,483.55	53.94	40.31	-21.09	348.09	1,436.76	512.27	418.02	94.25	5.435		
5,300.00	3,961.50	4,897.52	3,483.06	57.61	43.22	-19.87	348.37	1,543.47	508.02	407.19	100.82	5.039		
5,400.00	3,960.63	4,994.21	3,482.67	61.29	45.86	-18.57	348.94	1,640.15	503.38	396.23	107.15	4.699		
5,500.00	3,959.76	5,083.95	3,480.81	64.98	48.31	-17.31	345.85	1,729.86	500.85	387.35	113.29	4.419		
5,600.00	3,958.88	5,182.01	3,478.01	68.68	50.99	-16.04	345.88	1,827.88	499.31	379.64	119.68	4.172		
5,700.00	3,958.01	5,284.90	3,475.41	72.39	53.81	-14.60	344.06	1,930.74	497.70	371.49	126.20	3.944		
5,800.00	3,957.14	5,385.28	3,473.25	76.11	56.56	-13.23	344.27	2,031.05	496.08	363.39	132.67	3.739		
5,900.00	3,956.27	5,482.88	3,471.12	79.84	59.24	-11.79	342.77	2,128.85	494.58	355.50	139.08	3.556		
6,000.00	3,955.39	5,585.35	3,468.61	83.57	62.05	-10.33	341.81	2,231.09	493.79	348.18	145.62	3.391		
6,100.00	3,954.52	5,685.33	3,467.13	87.31	64.78	-8.82	339.98	2,331.04	492.22	340.12	152.10	3.236		
6,200.00	3,953.65	5,787.79	3,465.53	91.05	67.61	-7.31	338.51	2,433.48	491.12	332.47	158.65	3.096		
6,300.00	3,952.77	5,884.64	3,464.56	94.79	70.26	-5.92	337.42	2,530.31	489.83	324.77	165.08	2.968		
6,400.00	3,951.90	5,988.69	3,463.42	98.54	73.12	-4.46	336.65	2,634.35	488.97	317.31	171.08	2.848		
6,495.79	3,951.07	6,078.41	3,462.61	102.13	75.59	-3.16	335.58	2,724.06	488.22	310.50	177.72	2.747		
6,500.00	3,951.03	6,082.31	3,462.54	102.29	75.69	-3.10	335.54	2,727.98	488.22	310.23	177.99	2.743		
6,600.00	3,950.16	6,190.57	3,461.77	106.05	78.67	-1.60	334.95	2,836.21	487.59	302.87	184.72	2.640		
6,700.00	3,948.28	6,288.48	3,461.63	109.80	81.30	-0.39	335.39	2,932.12	488.67	295.57	191.10	2.547		
6,800.00	3,948.41	6,389.75	3,461.75	113.56	84.13	0.87	336.41	3,035.38	485.72	298.02	197.70	2.457		
6,897.58	3,947.56	6,482.91	3,461.87	117.25	86.69	1.88	338.32	3,128.52	485.17	281.23	203.94	2.379		
6,900.00	3,947.54	6,484.80	3,461.85	117.32	86.74	1.60	338.37	3,130.41	485.17	281.11	204.05	2.378		
7,000.00	3,946.87	6,578.42	3,460.51	121.09	89.30	2.84	340.89	3,223.99	485.88	275.49	210.39	2.309		
7,100.00	3,945.79	6,672.83	3,458.12	124.85	91.89	3.73	343.87	3,318.32	488.01	271.27	216.74	2.252		
7,167.97	3,945.20	6,738.00	3,456.19	127.41	93.67	4.33	346.03	3,383.43	489.82	268.74	221.08	2.216 ES		
7,168.27	3,945.20	6,738.00	3,456.19	127.42	93.67	4.33	346.03	3,383.43	489.83	268.75	221.09	2.216 SF		



Phoenix Technology Services
Anticollision Report



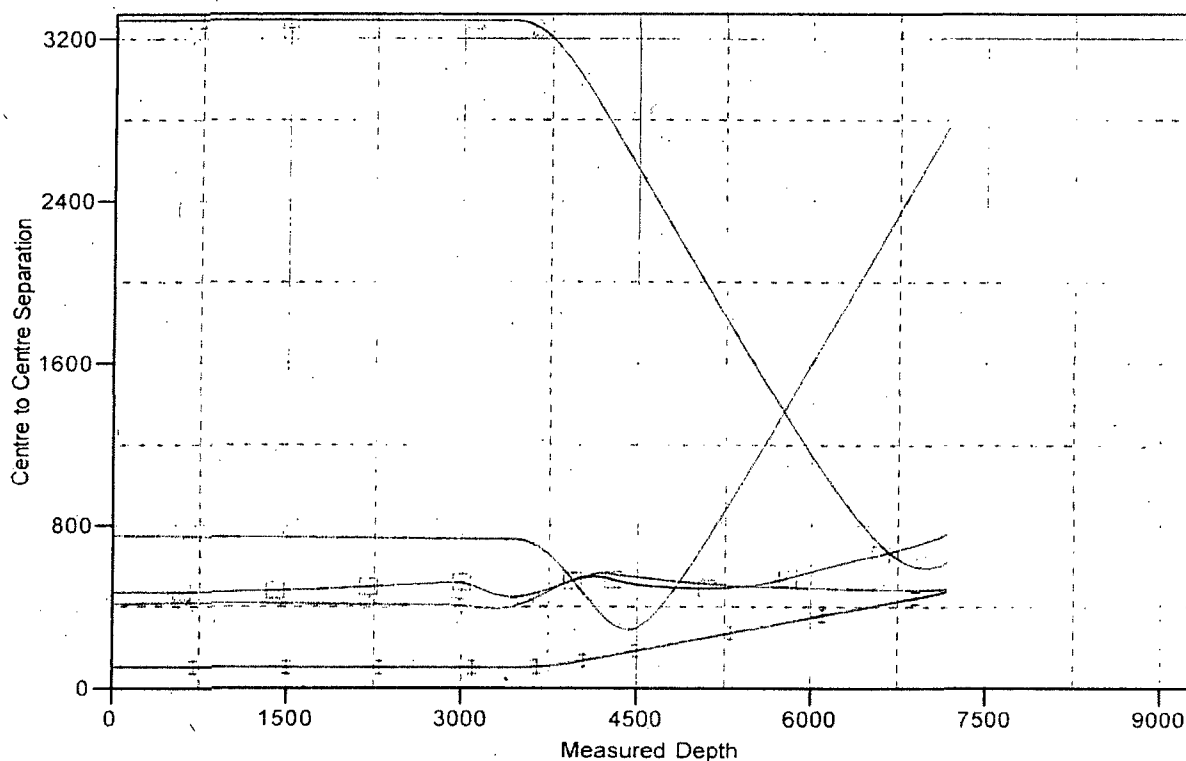
Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset: TVD Reference: Offset Datum

Reference Depths are relative to KB @ 3605.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 60.00000 W

Coordinates are relative to: #11H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.05°

Ladder Plot



LEGEND

#9H, WB1/Job #1311101, Surveys (Silver Oak 3) V0 ✕ #1, WB1, Inc Surveys V0 □ #10H, WB1/Job #1410706, Surveys (Silver Oak 3) V0
#12H, WB1, Plan #2 08-25-14 V0 ▲ #3, WB1, Inc Surveys V0

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



Phoenix Technology Services
Anticollision Report



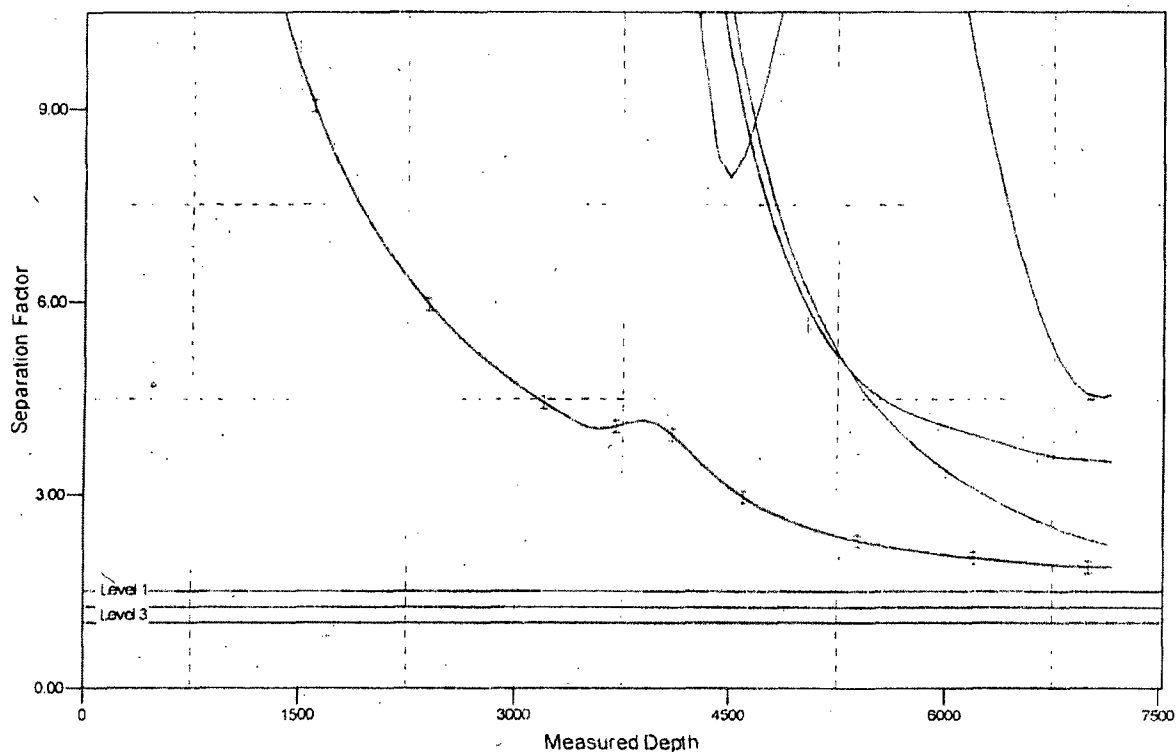
Company: COG Operating LLC
Project: Eddy County, NM (NAD27 NME)
Reference Site: Beech 25 Federal
Site Error: 0.00 usft
Reference Well: #11H
Well Error: 0.00 usft
Reference Wellbore: WB1 / Job #1412160
Reference Design: Plan #3 12-03-14

Local Co-ordinate Reference: Well #11H
TVD Reference: KB @ 3605.00usft (Silver Oak 3)
MD Reference: KB @ 3605.00usft (Silver Oak 3)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Output errors are at: 2.00 sigma
Database: Compass 5000 GCR
Offset TVD Reference: Offset Datum

Reference Depths are relative to KB @ 3605.00usft (Silver Oak 3)
Offset Depths are relative to Offset Datum
Central Meridian is 104° 19' 50.00000 W

Coordinates are relative to: #11H
Coordinate System is US State Plane 1927 (Exact solution), New Mexico East 30
Grid Convergence at Surface is: 0.05°

Separation Factor Plot



LEGEND

#9H, WB1/Job #1311101, Surveys (Silver Oak 3) V0
#12H, WB1, Plan #2 08-25-14 V0

✕ #1, WB1, Inc Surveys V0
▲ #3, WB1, Inc Surveys V0

⊞ #10H, WB1/Job #1410706, Surveys (Silver Oak 3) V0