

UNITED STATES
DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT

FORM APPROVED
OMB NO. 1004-0137
Expires: January 31, 2018

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

5. Lease Serial No.
NMNM125658

6. If Indian, Allottee or Tribe Name

7. If Unit or CA/Agreement, Name and/or No.

8. Well Name and No.
FEZ FEDERAL COM 603H

9. API Well No.
30-025-45276-00-X1

10. Field and Pool or Exploratory Area
WC025G09S243532M-WOLFBONE

11. County or Parish, State
LEA COUNTY, NM

SUBMIT IN TRIPLICATE - Other instructions on page 2

HOBBS OCD
NOV 28 2018
RECEIVED

1. Type of Well
 Oil Well Gas Well Other

2. Name of Operator
COG OPERATING LLC
Contact: MAYTE X REYES
E-Mail: mreyes1@concho.com

3a. Address
ONE CONCHO CENTER 600 W ILLINOIS AVENUE
MIDLAND, TX 79701-4287

3b. Phone No. (include area code)
Ph: 575-748-6945

4. Location of Well (Footage, Sec., T., R., M., or Survey Description)
Sec 9 T25S R35E SWSW 280FSL 1055FWL
32.138409 N Lat, 103.377617 W Lon

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

TYPE OF SUBMISSION	TYPE OF ACTION			
<input checked="" type="checkbox"/> Notice of Intent	<input type="checkbox"/> Acidize	<input type="checkbox"/> Deepen	<input type="checkbox"/> Production (Start/Resume)	<input type="checkbox"/> Water Shut-Off
<input type="checkbox"/> Subsequent Report	<input type="checkbox"/> Alter Casing	<input type="checkbox"/> Hydraulic Fracturing	<input type="checkbox"/> Reclamation	<input type="checkbox"/> Well Integrity
<input type="checkbox"/> Final Abandonment Notice	<input type="checkbox"/> Casing Repair	<input type="checkbox"/> New Construction	<input type="checkbox"/> Recomplete	<input checked="" type="checkbox"/> Other Change to Original APD
	<input type="checkbox"/> Change Plans	<input type="checkbox"/> Plug and Abandon	<input type="checkbox"/> Temporarily Abandon	
	<input type="checkbox"/> Convert to Injection	<input type="checkbox"/> Plug Back	<input type="checkbox"/> Water Approval	

13. Describe Proposed or Completed Operation: Clearly state all pertinent details, including estimated work and approximate duration thereof. If the proposal is to deepen directionally or recomplete horizontally, give subsurface locations and 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. Required subsequent reports must be filed within 30 days following completion of the involved operations. If the operation consists of a multiple completion in a new interval, a Form 3160-4 must be filed once testing has been completed. Final Abandonment Notices must be filed once the operation is completed and the operator has determined that the site is ready for final inspection. requirement

COG Operating LLC, respectfully requests approval for the following changes to the originally approved APD.

BHL
From: 200' FNL & 950' FWL Section 4, T25S, R35E.
To: 200' FNL & 1070' FWL Section 4, T25S, R35E

This results in the MD TD increasing to 22,395'.

C102 Attached.
AC Report Attached.

Carlsbad Field Office
OCD Hobbs

14. I hereby certify that the foregoing is true and correct.

Electronic Submission #442376 verified by the BLM Well Information System
For COG OPERATING LLC, sent to the Hobbs
Committed to AFMSS for processing by MUSTAFA HAQUE on 11/02/2018 (19MH0009SE)

Name (Printed/Typed) MAYTE X REYES Title REGULATORY ANALYST

Signature (Electronic Submission) Date 11/01/2018

THIS SPACE FOR FEDERAL OR STATE OFFICE USE

Approved By MUSTAFA HAQUE Title PETROLEUM ENGINEER Date 11/08/2018

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.

Office Hobbs

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.

(Instructions on page 2)

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

KJZ

Additional data for EC transaction #442376 that would not fit on the form

32. Additional remarks, continued

Directional Plan Attached.

COG Operating, LLC - Fez Federal Com 603H

1. Geologic Formations

TVD of target	12,295'	Pilot hole depth	NA
MD at TD:	22,395'	Deepest expected fresh water:	207'

Formation	Depth (TVD) from KB	Water/Mineral Bearing/ Target Zone?	Hazards*
Quaternary Fill	Surface	Water	
Rustler	848	Water	
Top of Salt	1189	Salt	
Base of Salt	4984	Salt	
Lamar	5315	Salt Water	
Bell Canyon	5347	Salt Water	
Cherry Canyon	6286	Oil/Gas	
Brushy Canyon	7746	Oil/Gas	
Bone Spring Lime	8977	Oil/Gas	
U. Avalon Shale	9194	Oil/Gas	
L. Avalon Shale	9558	Oil/Gas	
1st Bone Spring Sand	10375	Oil/Gas	
2nd Bone Spring Sand	10895	Oil/Gas	
3rd Bone Spring Sand	11369	Target Oil/Gas	
Wolfcamp	12356	Not Penetrated	

2. Casing Program

Hole Size	Casing		Csg. Size	Weight (lbs)	Grade	Conn.	SF Collapse	SF Burst	SF Tension
	From	To							
17.5"	0	1075	13.375"	54.5	J55	STC	2.35	7.03	8.77
12.25"	0	11525	9.625"	47	HCL80	BTC	1.61	1.08	2.07
8.75"	0	22,395	5.5"	23	P110	BTC	1.82	2.15	2.56
BLM Minimum Safety Factor							1.125	1	1.6 Dry 1.8 Wet

Intermediate casing will be kept at least 1/3 full while running casing to mitigate collapse. Intermediate burst based on 0.7 frac gradient at the shoe with Gas Gradient 0.1 psi/ft to surface.

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

COG Operating, LLC - Fez Federal Com 603H

	Y or N
Is casing new? If used, attach certification as required in Onshore Order #1	Y
Does casing meet API specifications? 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 intermediate 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? 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? If yes, are the first 2 strings cemented to surface and 3 rd string cement tied back 500' into previous casing?	N
Is well located in R-111-P and SOPA? If yes, are the first three strings cemented to surface? Is 2 nd string set 100' to 600' below the base of salt?	N
Is well located in high Cave/Karst? If yes, are there two strings cemented to surface? (For 2 string wells) If yes, is there a contingency casing if lost circulation occurs?	N
Is well located in critical Cave/Karst? If yes, are there three strings cemented to surface?	N

3. Cementing Program

Casing	# Sk	Wt. lb/ gal	Yld ft3/ sack	H ₂ O gal/sk	500# Comp. Strength (hours)	Slurry Description
Surf.	450	13.5	1.75	9	12	Lead: Class C + 4% Gel
	250	14.8	1.34	6.34	8	Tail: Class C + 2% CaCl ₂
Inter.	930	11	2.8	19	48	Lead: NeoCem
Stage1	300	16.4	1.1	5	8	Tail: Class H
DV Tool @ 5300'						
Inter.	730	11	2.8	19	48	Lead: NeoCem
Stage2	100	14.8	1.35	6.34	8	Tail: Class C + 2% Cacl
5.5 Prod	400	12.7	2	10.6	16	Lead: 35:65:6 H Blend
	2990	14.4	1.24	5.7	19	Tail: 50:50:2 Class H Blend

Volumes Subject to Observed Hole Conditions and/or Fluid Caliper Results
 Lab reports with the 500 psi compressive strength time for the cement will be onsite for review.

Casing String	TOC	% Excess
Surface	0'	50%
1 st Intermediate	0'	50%
Production	10,525'	35%

4. Pressure Control Equipment

Y	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	x	Tested to:
12-1/4"	13-5/8"	5M	Annular	x	2500 psi
			Blind Ram	x	5M
			Pipe Ram	x	
			Double Ram		
			Other*		
8-3/4"	13-5/8"	10M	5M Annular	x	5000 psi
			Blind Ram	x	10M
			Pipe Ram	x	
			Double Ram		
			Other*		

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 higher pressure but still tested to the working pressure listed in the table above. If the system is upgraded all the components installed will be functional and tested.

Pipe rams will be operationally checked each 24 hour period. Blind rams will be operationally checked on each trip out of the hole. These checks will be noted on the daily tour sheets. Other accessories to the BOP equipment will include a Kelly cock and floor safety valve (inside BOP) and choke lines and choke manifold. See attached schematics.

Y	Formation integrity test will be performed per Onshore Order #2. On Exploratory wells or on that portion of any well approved for a 5M BOPE system or greater, a pressure integrity test of each casing shoe shall be performed. Will be tested in accordance with Onshore Oil and Gas Order #2 III.B.1.i.
Y	A variance is requested for the use of a flexible choke line from the BOP to Choke Manifold. See attached for specs and hydrostatic test chart.
N	Are anchors required by manufacturer?
N	A multibowl wellhead is being used. The BOP will be tested per Onshore Order #2 after installation on the surface casing which will cover testing requirements for a maximum of 30 days. If any seal subject to test pressure is broken the system must be tested.

COG Operating, LLC - Fez Federal Com 603H

5. Mud Program

Depth		Type	Weight (ppg)	Viscosity	Water Loss
From	To				
0	Surf. Shoe	FW Gel	8.4 - 8.6	28-29	N/C
Surf csg	Int shoe	Diesel Brine Emul	8.6 - 8.9	30-40	N/C
Int shoe	Lateral TD	OBM	10.5 - 12.5	30-40	20

Sufficient mud materials to maintain mud properties and meet minimum lost circulation and weight increase requirements will be kept on location at all times.

What will be used to monitor the loss or gain of fluid?	PVT/Pason/Visual Monitoring
---------------------------------------------------------	-----------------------------

6. Logging and Testing Procedures

Logging, Coring and Testing.	
Y	Will run GR/CNL from TD to surface (horizontal well – vertical portion of hole). Stated logs run will be in the Completion Report and submitted to the BLM.
N	Are Logs are planned based on well control or offset log information.
N	Drill stem test? If yes, explain.
N	Coring? If yes, explain.

Additional logs planned		Interval
N	Resistivity	Pilot Hole TD to ICP
N	Density	Pilot Hole TD to ICP
Y	CBL	Production casing (If cement not circulated to surface)
Y	Mud log	Intermediate shoe to TD
N	PEX	

COG Operating, LLC - Fez Federal Com 603H

7. Drilling Conditions

Condition	Specify what type and where?
BH Pressure at deepest TVD	7995 psi at 12295' TVD
Abnormal Temperature	NO 180 Deg. F.

No abnormal pressure or temperature conditions are anticipated. Sufficient mud materials to maintain mud properties and weight increase requirements will be kept on location at all times.

Sufficient supplies of Paper/LCM for periodic sweeps to control seepage and losses will be maintained on location.

Hydrogen Sulfide (H2S) monitors will be installed prior to drilling out the surface shoe. If H2S is detected in concentrations greater than 100 ppm, the operator will comply with the provisions of Onshore Oil and Gas Order #6. If Hydrogen Sulfide is encountered, measured values and formations will be provided to the BLM.	
N	H2S is present
Y	H2S Plan attached

8. Other Facets of Operation

Y	Is it a walking operation?
N	Is casing pre-set?

x	H2S Plan.
x	BOP & Choke Schematics.
x	Directional Plan
x	5M Annular Variance

DISTRICT I
1625 N. FRANKLIN DR., BOBBS, NM 87640
Phone: (505) 836-4181 Fax: (505) 836-0720

DISTRICT II
811 S. FIRST ST., ARTESIA, NM 87010
Phone: (505) 748-1283 Fax: (505) 748-9720

DISTRICT III
1000 RIO BRAZOS RD., AZTEC, NM 87410
Phone: (505) 334-6176 Fax: (505) 334-6170

DISTRICT IV
1280 S. ST. FRANCIS DR., SANTA FE, NM 87506
Phone: (505) 476-3480 Fax: (505) 476-3488

State of New Mexico
Energy, Minerals & Natural Resources Department
OIL CONSERVATION DIVISION
1220 SOUTH ST. FRANCIS DR.
Santa Fe, New Mexico 87505

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

AMENDED REPORT

WELL LOCATION AND ACREAGE DEDICATION PLAT

API Number 30-025-45276	Pool Code 98098	Pool Name Wildcat; Wolfbone
Property Code 322742	Property Name FEZ FEDERAL COM	Well Number 603H
GRID No. 229137	Operator Name COG OPERATING, LLC	Elevation 3251.7'

Surface Location

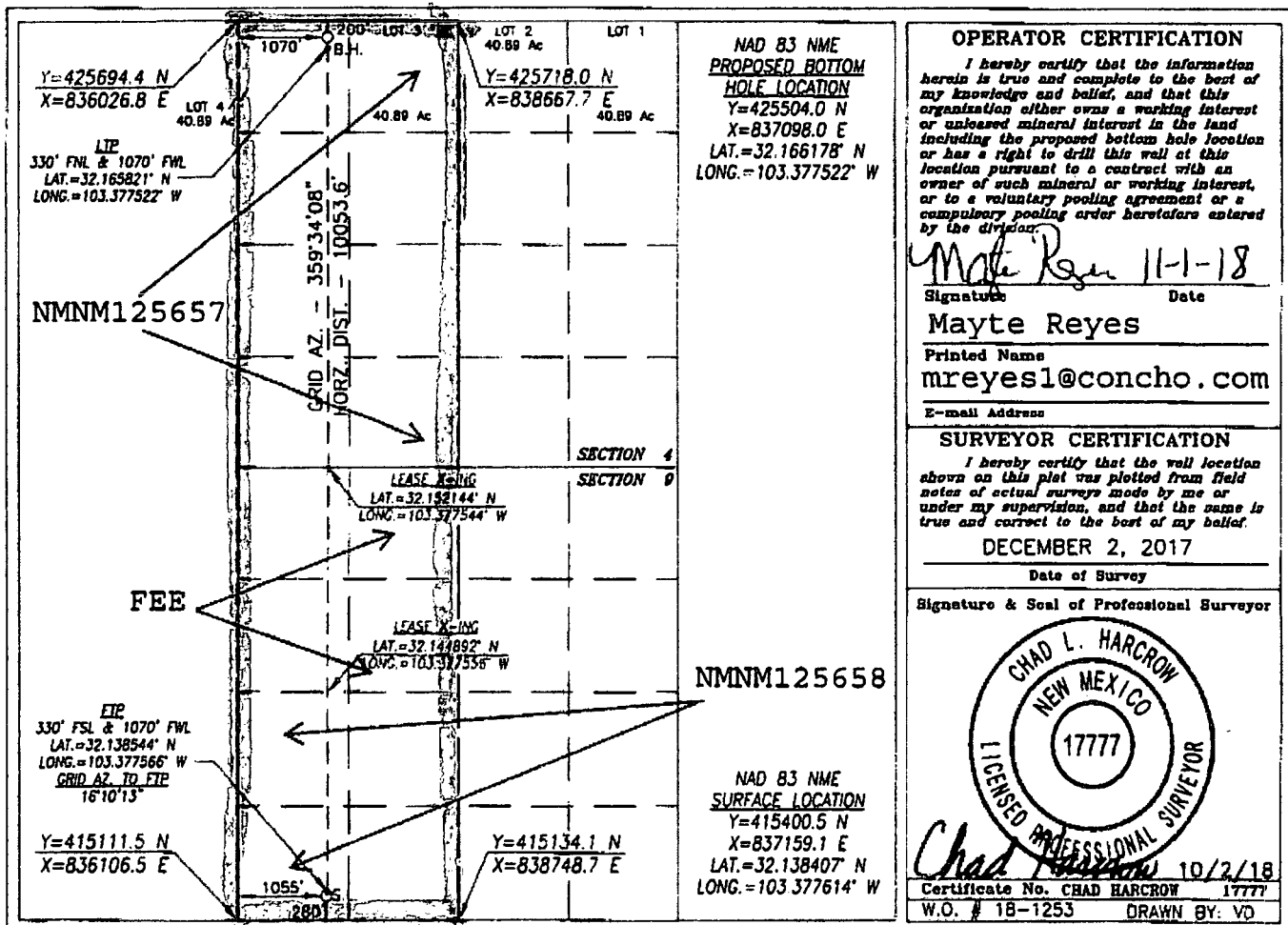
UL or lot No.	Section	Township	Range	Lot Idn	Feet from the	North/South line	Feet from the	East/West line	County
M	9	25-S	35-E		280	SOUTH	1055	WEST	LEA

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
4	4	25-S	35-E		200	NORTH	1070	WEST	LEA

Dedicated Acres	Joint or Infill	Consolidation Code	Order No.
639.8			

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



As Per LR2000 Lot 3: 39.89 Lot 4: 39.91



COG Operating LLC

Lea County, NM (NAD27 NME)

Fez Federal Com

603H

OH

Plan 1 10-12-18

Anticollision Report

12 October, 2018





Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Reference	Plan 1 10-12-18		
Filter type:	NO GLOBAL FILTER: Using user defined selection & filtering criteria		
Interpolation Method:	MD Interval 100.00usft	Error Model:	ISCWSA
Depth Range:	Unlimited	Scan Method:	Closest Approach 3D
Results Limited by:	Maximum center-center distance of 50,000.00 usft	Error Surface:	Major Axis
Warning Levels Evaluated at:	2.00 Sigma	Casing Method:	Not applied

Survey Tool Program	Date 10/12/2018			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
0.00	22,394.02	Plan 1 10-12-18 (OH)	MWD+HDGM	OWSG Rev.2 MWD + HDGM

Site Name	Reference	Offset	Distance		Separation Factor	Warning
	Measured Depth (usft)	Measured Depth (usft)	Between Centres (usft)	Between Ellipses (usft)		
Fez Federal Com						
604H - OH - Plan 1 10-12-18	1,410.22	1,426.42	604.92	595.21	62.289 CC	
604H - OH - Plan 1 10-12-18	22,394.02	22,420.22	740.11	435.88	2.433 ES, SF	
702H - OH - Plan 1 10-12-18	1,416.63	1,416.73	60.00	50.29	6.180 CC	
702H - OH - Plan 1 10-12-18	1,500.00	1,500.00	60.00	49.70	5.822 ES	
702H - OH - Plan 1 10-12-18	22,394.02	22,395.00	500.09	196.04	1.645 SF	
703H - OH - Plan 1 10-12-18	1,500.00	1,498.90	30.10	19.80	2.922 CC, ES	
704H - OH - Plan 1 10-12-18	22,394.02	22,393.01	330.23	43.98	1.161 Level 2 SF	
704H - OH - Plan 1 10-12-18	11,700.00	11,719.85	244.62	162.20	2.968 CC	
704H - OH - Plan 1 10-12-18	22,394.02	22,394.14	290.44	3.82	0.281 Level 1, ES, SF	

Offset Design Fez Federal Com - 604H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Measured Depth (usft)	Vertical Depth (usft)	Offset		Semi Major Axis			Distance				Minimum Separation (usft)	Separation Factor	Warning	
		Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)				
0.00	0.00	16.20	16.20	0.00	0.02	-90.49	-5.20	-604.90	604.92					
100.00	100.00	116.20	116.20	0.13	0.18	-90.49	-5.20	-604.90	604.92	604.80	0.32	1,902.483		
200.00	200.00	216.20	216.20	0.49	0.54	-90.49	-5.20	-604.90	604.92	603.89	1.03	584.518		
300.00	300.00	316.20	316.20	0.85	0.90	-90.49	-5.20	-604.90	604.92	603.17	1.75	345.305		
400.00	400.00	416.20	416.20	1.21	1.26	-90.49	-5.20	-604.90	604.92	602.45	2.47	245.027		
500.00	500.00	516.20	516.20	1.57	1.62	-90.49	-5.20	-604.90	604.92	601.74	3.19	189.885		
600.00	600.00	616.20	616.20	1.93	1.98	-90.49	-5.20	-604.90	604.92	601.02	3.90	155.002		
700.00	700.00	716.20	716.20	2.29	2.33	-90.49	-5.20	-604.90	604.92	600.30	4.62	130.946		
800.00	800.00	816.20	816.20	2.64	2.69	-90.49	-5.20	-604.90	604.92	599.59	5.34	113.354		
900.00	900.00	916.20	916.20	3.00	3.05	-90.49	-5.20	-604.90	604.92	598.87	6.05	99.929		
1,000.00	1,000.00	1,016.20	1,016.20	3.36	3.41	-90.49	-5.20	-604.90	604.92	598.15	6.77	89.347		
1,100.00	1,100.00	1,116.20	1,116.20	3.72	3.77	-90.49	-5.20	-604.90	604.92	597.43	7.49	80.792		
1,200.00	1,200.00	1,216.20	1,216.20	4.08	4.13	-90.49	-5.20	-604.90	604.92	596.72	8.20	73.732		
1,300.00	1,300.00	1,316.20	1,316.20	4.44	4.49	-90.49	-5.20	-604.90	604.92	596.00	8.92	67.807		
1,400.00	1,400.00	1,416.20	1,416.20	4.79	4.84	-90.49	-5.20	-604.90	604.92	595.28	9.64	62.763		
1,410.22	1,410.22	1,426.42	1,426.42	4.83	4.88	-90.49	-5.20	-604.90	604.92	595.21	9.71	62.289 CC		
1,500.00	1,500.00	1,514.76	1,514.76	5.15	5.19	-90.50	-5.23	-604.92	604.94	594.59	10.35	58.463		
1,600.00	1,599.98	1,605.83	1,605.81	5.49	5.50	93.53	-6.94	-605.79	606.03	595.03	11.00	55.101		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 604H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													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 Tooffset (")	Offset Wellbore Centre +N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
1,700.00	1,699.84	1,700.00	1,699.84	5.82	5.81	93.52	-11.41	-608.08	608.81	597.17	11.63	52.328		
1,800.00	1,799.45	1,791.50	1,791.03	6.15	6.12	93.57	-18.13	-611.52	613.13	600.86	12.27	49.974		
1,900.00	1,898.90	1,891.36	1,890.50	6.48	6.45	93.82	-25.88	-615.48	617.82	604.89	12.94	47.758		
2,000.00	1,898.36	1,991.21	1,989.97	6.82	6.79	94.06	-33.62	-619.45	622.53	608.91	13.62	45.714		
2,100.00	2,097.81	2,091.06	2,089.45	7.17	7.14	94.31	-41.37	-623.42	627.25	612.94	14.31	43.838		
2,200.00	2,197.26	2,190.92	2,188.92	7.52	7.49	94.55	-49.12	-627.38	631.98	616.98	15.01	42.114		
2,300.00	2,296.72	2,290.77	2,288.39	7.87	7.84	94.78	-56.87	-631.35	636.72	621.01	15.71	40.527		
2,400.00	2,396.17	2,390.62	2,387.87	8.23	8.19	95.01	-64.62	-635.32	641.48	625.05	16.42	39.063		
2,500.00	2,495.62	2,490.48	2,487.34	8.59	8.55	95.24	-72.37	-639.28	646.24	629.10	17.14	37.710		
2,600.00	2,595.07	2,590.33	2,586.81	8.95	8.90	95.47	-80.12	-643.25	651.01	633.15	17.86	36.457		
2,700.00	2,694.53	2,690.18	2,686.29	9.32	9.26	95.69	-87.87	-647.22	655.79	637.21	18.58	35.295		
2,800.00	2,793.98	2,790.04	2,785.76	9.68	9.62	95.91	-95.62	-651.19	660.59	641.28	19.31	34.214		
2,900.00	2,893.43	2,889.89	2,885.23	10.05	9.99	96.12	-103.37	-655.15	665.39	645.35	20.04	33.207		
3,000.00	2,992.89	2,989.75	2,984.71	10.42	10.35	96.34	-111.12	-659.12	670.20	649.43	20.77	32.267		
3,100.00	3,092.34	3,089.60	3,084.18	10.79	10.71	96.55	-118.87	-663.09	675.02	653.51	21.51	31.388		
3,200.00	3,191.79	3,189.45	3,183.65	11.16	11.08	96.75	-126.62	-667.05	679.85	657.61	22.24	30.564		
3,300.00	3,291.24	3,289.31	3,283.13	11.54	11.45	96.96	-134.37	-671.02	684.69	661.70	22.98	29.791		
3,400.00	3,390.70	3,389.16	3,382.60	11.91	11.81	97.16	-142.12	-674.99	689.53	665.81	23.72	29.065		
3,500.00	3,490.15	3,489.01	3,482.07	12.29	12.18	97.36	-149.87	-678.95	694.39	669.92	24.47	28.381		
3,600.00	3,589.60	3,588.87	3,581.55	12.66	12.55	97.55	-157.62	-682.92	699.25	674.04	25.21	27.736		
3,700.00	3,689.06	3,688.72	3,681.02	13.04	12.92	97.74	-165.37	-686.89	704.12	678.16	25.96	27.126		
3,800.00	3,788.51	3,788.60	3,780.52	13.41	13.29	97.90	-173.12	-690.86	708.99	682.09	26.70	26.547		
3,900.00	3,888.50	3,888.47	3,880.01	13.77	13.66	97.77	-180.88	-694.82	712.98	685.55	27.43	25.991		
4,000.00	3,988.48	3,988.21	3,979.37	14.12	14.03	97.36	-188.62	-698.79	716.73	688.58	28.15	25.464		
4,100.00	4,088.48	4,087.83	4,078.61	14.45	14.40	-87.33	-196.35	-702.74	720.31	691.45	28.85	24.965		
4,200.00	4,188.48	4,187.45	4,177.85	14.79	14.77	-87.96	-204.08	-706.70	723.97	694.41	29.56	24.493		
4,300.00	4,288.48	4,287.07	4,277.09	15.12	15.14	-88.58	-211.81	-710.66	727.72	697.45	30.26	24.045		
4,400.00	4,388.48	4,386.69	4,376.33	15.46	15.51	-89.19	-219.54	-714.62	731.55	700.58	30.97	23.619		
4,500.00	4,488.48	4,487.68	4,476.94	15.80	15.89	-89.80	-227.36	-718.62	735.46	703.77	31.69	23.209		
4,600.00	4,588.48	4,600.79	4,589.81	16.14	16.31	-90.30	-233.74	-721.69	738.36	705.91	32.44	22.760		
4,700.00	4,688.48	4,714.29	4,703.28	16.47	16.71	-90.49	-236.16	-723.12	739.46	706.28	33.18	22.285		
4,800.00	4,788.48	4,815.69	4,804.68	16.82	17.05	-90.49	-236.18	-723.13	739.47	705.61	33.86	21.838		
4,900.00	4,888.48	4,915.69	4,904.68	17.16	17.38	-90.49	-236.18	-723.13	739.47	704.93	34.54	21.412		
5,000.00	4,988.48	5,015.69	5,004.68	17.50	17.71	-90.49	-236.18	-723.13	739.47	704.26	35.21	21.001		
5,100.00	5,088.48	5,115.69	5,104.68	17.84	18.05	-90.49	-236.18	-723.13	739.47	703.58	35.89	20.604		
5,200.00	5,188.48	5,215.69	5,204.68	18.18	18.38	-90.49	-236.18	-723.13	739.47	702.90	36.57	20.221		
5,300.00	5,288.48	5,315.69	5,304.68	18.53	18.72	-90.49	-236.18	-723.13	739.47	702.22	37.25	19.852		
5,400.00	5,388.48	5,415.69	5,404.68	18.87	19.06	-90.49	-236.18	-723.13	739.47	701.54	37.93	19.495		
5,500.00	5,488.48	5,515.69	5,504.68	19.22	19.40	-90.49	-236.18	-723.13	739.47	700.86	38.61	19.150		
5,600.00	5,588.48	5,615.69	5,604.68	19.56	19.74	-90.49	-236.18	-723.13	739.47	700.17	39.30	18.817		
5,700.00	5,688.48	5,715.69	5,704.68	19.91	20.08	-90.49	-236.18	-723.13	739.47	699.49	39.98	18.494		
5,800.00	5,788.48	5,815.69	5,804.68	20.25	20.42	-90.49	-236.18	-723.13	739.47	698.80	40.67	18.182		
5,900.00	5,888.48	5,915.69	5,904.68	20.60	20.76	-90.49	-236.18	-723.13	739.47	698.11	41.36	17.879		
6,000.00	5,988.48	6,015.69	6,004.68	20.95	21.10	-90.49	-236.18	-723.13	739.47	697.42	42.05	17.587		
6,100.00	6,088.48	6,115.69	6,104.68	21.29	21.44	-90.49	-236.18	-723.13	739.47	696.73	42.74	17.303		
6,200.00	6,188.48	6,215.69	6,204.68	21.64	21.79	-90.49	-236.18	-723.13	739.47	696.04	43.43	17.028		
6,300.00	6,288.48	6,315.69	6,304.68	21.99	22.13	-90.49	-236.18	-723.13	739.47	695.35	44.12	16.761		
6,400.00	6,388.48	6,415.69	6,404.68	22.34	22.47	-90.49	-236.18	-723.13	739.47	694.66	44.81	16.502		
6,500.00	6,488.48	6,515.69	6,504.68	22.69	22.82	-90.49	-236.18	-723.13	739.47	693.97	45.50	16.251		
6,600.00	6,588.48	6,615.69	6,604.68	23.04	23.16	-90.49	-236.18	-723.13	739.47	693.27	46.20	16.007		
6,700.00	6,688.48	6,715.69	6,704.68	23.39	23.51	-90.49	-236.18	-723.13	739.47	692.58	46.89	15.770		
6,800.00	6,788.48	6,815.69	6,804.68	23.73	23.85	-90.49	-236.18	-723.13	739.47	691.88	47.59	15.539		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 604H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													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	
6,900.00	6,888.48	6,915.69	6,904.68	24.08	24.20	-90.49	-236.18	-723.13	739.47	691.19	48.28	15.315		
7,000.00	6,988.48	7,015.69	7,004.68	24.43	24.54	-90.49	-236.18	-723.13	739.47	690.49	48.98	15.098		
7,100.00	7,088.48	7,115.69	7,104.68	24.78	24.89	-90.49	-236.18	-723.13	739.47	689.79	49.68	14.886		
7,200.00	7,188.48	7,215.69	7,204.68	25.14	25.24	-90.49	-236.18	-723.13	739.47	689.10	50.37	14.680		
7,300.00	7,288.48	7,315.69	7,304.68	25.49	25.59	-90.49	-236.18	-723.13	739.47	688.40	51.07	14.479		
7,400.00	7,388.48	7,415.69	7,404.68	25.84	25.93	-90.49	-236.18	-723.13	739.47	687.70	51.77	14.284		
7,500.00	7,488.48	7,515.69	7,504.68	26.19	26.28	-90.49	-236.18	-723.13	739.47	687.00	52.47	14.093		
7,600.00	7,588.48	7,615.69	7,604.68	26.54	26.63	-90.49	-236.18	-723.13	739.47	686.30	53.17	13.908		
7,700.00	7,688.48	7,715.69	7,704.68	26.89	26.98	-90.49	-236.18	-723.13	739.47	685.60	53.87	13.727		
7,800.00	7,788.48	7,815.69	7,804.68	27.24	27.33	-90.49	-236.18	-723.13	739.47	684.90	54.57	13.551		
7,900.00	7,888.48	7,915.69	7,904.68	27.59	27.67	-90.49	-236.18	-723.13	739.47	684.20	55.27	13.379		
8,000.00	7,988.48	8,015.69	8,004.68	27.95	28.02	-90.49	-236.18	-723.13	739.47	683.50	55.97	13.212		
8,100.00	8,088.48	8,115.69	8,104.68	28.30	28.37	-90.49	-236.18	-723.13	739.47	682.80	56.67	13.048		
8,200.00	8,188.48	8,215.69	8,204.68	28.65	28.72	-90.49	-236.18	-723.13	739.47	682.10	57.37	12.888		
8,300.00	8,288.48	8,315.69	8,304.68	29.00	29.07	-90.49	-236.18	-723.13	739.47	681.39	58.08	12.733		
8,400.00	8,388.48	8,415.69	8,404.68	29.36	29.42	-90.49	-236.18	-723.13	739.47	680.69	58.78	12.580		
8,500.00	8,488.48	8,515.69	8,504.68	29.71	29.77	-90.49	-236.18	-723.13	739.47	679.99	59.48	12.432		
8,600.00	8,588.48	8,615.69	8,604.68	30.06	30.12	-90.49	-236.18	-723.13	739.47	679.28	60.19	12.286		
8,700.00	8,688.48	8,715.69	8,704.68	30.42	30.47	-90.49	-236.18	-723.13	739.47	678.58	60.89	12.144		
8,800.00	8,788.48	8,815.69	8,804.68	30.77	30.82	-90.49	-236.18	-723.13	739.47	677.88	61.59	12.006		
8,900.00	8,888.48	8,915.69	8,904.68	31.12	31.18	-90.49	-236.18	-723.13	739.47	677.17	62.30	11.870		
9,000.00	8,988.48	9,015.69	9,004.68	31.48	31.53	-90.49	-236.18	-723.13	739.47	676.47	63.00	11.737		
9,100.00	9,088.48	9,115.69	9,104.68	31.83	31.88	-90.49	-236.18	-723.13	739.47	675.76	63.71	11.607		
9,200.00	9,188.48	9,215.69	9,204.68	32.18	32.23	-90.49	-236.18	-723.13	739.47	675.06	64.41	11.480		
9,300.00	9,288.48	9,315.69	9,304.68	32.54	32.58	-90.49	-236.18	-723.13	739.47	674.35	65.12	11.356		
9,400.00	9,388.48	9,415.69	9,404.68	32.89	32.93	-90.49	-236.18	-723.13	739.47	673.65	65.82	11.234		
9,500.00	9,488.48	9,515.69	9,504.68	33.24	33.28	-90.49	-236.18	-723.13	739.47	672.94	66.53	11.115		
9,600.00	9,588.48	9,615.69	9,604.68	33.60	33.64	-90.49	-236.18	-723.13	739.47	672.23	67.24	10.998		
9,700.00	9,688.48	9,715.69	9,704.68	33.95	33.99	-90.49	-236.18	-723.13	739.47	671.53	67.94	10.884		
9,800.00	9,788.48	9,815.69	9,804.68	34.31	34.34	-90.49	-236.18	-723.13	739.47	670.82	68.65	10.772		
9,900.00	9,888.48	9,915.69	9,904.68	34.66	34.69	-90.49	-236.18	-723.13	739.47	670.11	69.36	10.662		
10,000.00	9,988.48	10,015.69	10,004.68	35.02	35.05	-90.49	-236.18	-723.13	739.47	669.41	70.06	10.554		
10,100.00	10,088.48	10,115.69	10,104.68	35.37	35.40	-90.49	-236.18	-723.13	739.47	668.70	70.77	10.449		
10,200.00	10,188.48	10,215.69	10,204.68	35.72	35.75	-90.49	-236.18	-723.13	739.47	668.00	71.48	10.346		
10,300.00	10,288.48	10,315.69	10,304.68	36.08	36.11	-90.49	-236.18	-723.13	739.47	667.28	72.18	10.244		
10,400.00	10,388.48	10,415.69	10,404.68	36.43	36.46	-90.49	-236.18	-723.13	739.47	666.58	72.89	10.145		
10,500.00	10,488.48	10,515.69	10,504.68	36.79	36.81	-90.49	-236.18	-723.13	739.47	665.87	73.60	10.047		
10,600.00	10,588.48	10,615.69	10,604.68	37.14	37.16	-90.49	-236.18	-723.13	739.47	665.16	74.31	9.951		
10,700.00	10,688.48	10,715.69	10,704.68	37.50	37.52	-90.49	-236.18	-723.13	739.47	664.45	75.02	9.857		
10,800.00	10,788.48	10,815.69	10,804.68	37.85	37.87	-90.49	-236.18	-723.13	739.47	663.74	75.73	9.765		
10,900.00	10,888.48	10,915.69	10,904.68	38.21	38.22	-90.49	-236.18	-723.13	739.47	663.04	76.43	9.675		
11,000.00	10,988.48	11,015.69	11,004.68	38.56	38.58	-90.49	-236.18	-723.13	739.47	662.33	77.14	9.586		
11,100.00	11,088.48	11,115.69	11,104.68	38.92	38.93	-90.49	-236.18	-723.13	739.47	661.62	77.85	9.498		
11,200.00	11,188.48	11,215.69	11,204.68	39.27	39.29	-90.49	-236.18	-723.13	739.47	660.91	78.56	9.413		
11,300.00	11,288.48	11,315.69	11,304.68	39.63	39.64	-90.49	-236.18	-723.13	739.47	660.20	79.27	9.329		
11,400.00	11,388.48	11,415.69	11,404.68	39.99	39.99	-90.49	-236.18	-723.13	739.47	659.49	79.98	9.246		
11,500.00	11,488.48	11,515.69	11,504.68	40.34	40.35	-90.49	-236.18	-723.13	739.47	658.78	80.69	9.164		
11,600.00	11,588.48	11,615.69	11,604.68	40.70	40.70	-90.49	-236.18	-723.13	739.47	658.07	81.40	9.085		
11,700.00	11,688.48	11,715.69	11,704.68	41.05	41.06	-90.49	-236.18	-723.13	739.47	657.36	82.11	9.006		
11,800.00	11,788.33	11,815.82	11,804.71	41.40	41.41	-90.15	-233.47	-723.15	739.47	656.66	82.81	8.930		
11,900.00	11,886.15	11,916.30	11,903.35	41.74	41.74	-90.29	-215.01	-723.29	739.48	656.00	83.48	8.858		
12,000.00	11,978.98	12,017.09	11,997.54	42.04	42.05	-90.42	-179.49	-723.56	739.49	655.40	84.09	8.794		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 604H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													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	Warning
12,100.00	12,064.00	12,118.18	12,084.29	42.32	42.32	-90.54	-127.86	-723.94	739.51	654.87	84.64	8.737	
12,200.00	12,138.64	12,219.53	12,160.82	42.57	42.57	-90.65	-61.62	-724.44	739.53	654.38	85.14	8.686	
12,300.00	12,200.61	12,321.10	12,224.63	42.81	42.80	-90.73	17.24	-725.03	739.54	653.94	85.60	8.639	
12,400.00	12,248.05	12,422.84	12,273.59	43.03	43.01	-90.79	106.27	-725.70	739.56	653.52	86.04	8.595	
12,500.00	12,279.50	12,524.70	12,306.08	43.23	43.22	-90.83	202.67	-726.42	739.57	653.11	86.46	8.554	
12,600.00	12,294.02	12,626.62	12,321.02	43.43	43.42	-90.84	303.34	-727.18	739.58	652.72	86.85	8.515	
12,700.00	12,294.80	12,727.28	12,321.79	43.63	43.63	-90.84	403.99	-727.93	739.58	652.33	87.26	8.476	
12,800.00	12,294.49	12,827.28	12,321.49	43.87	43.87	-90.84	503.98	-728.68	739.59	651.85	87.74	8.429	
12,900.00	12,294.18	12,927.28	12,321.18	44.16	44.16	-90.84	603.98	-729.43	739.59	651.28	88.32	8.374	
13,000.00	12,293.87	13,027.28	12,320.87	44.49	44.49	-90.84	703.98	-730.18	739.60	650.62	88.98	8.312	
13,100.00	12,293.57	13,127.28	12,320.56	44.86	44.87	-90.84	803.97	-730.93	739.60	649.87	89.73	8.242	
13,200.00	12,293.26	13,227.28	12,320.26	45.28	45.29	-90.84	903.97	-731.68	739.61	649.04	90.57	8.166	
13,300.00	12,292.95	13,327.28	12,319.95	45.74	45.75	-90.84	1,003.97	-732.43	739.62	648.13	91.49	8.084	
13,400.00	12,292.64	13,427.28	12,319.64	46.24	46.25	-90.84	1,103.96	-733.18	739.62	647.13	92.49	7.997	
13,500.00	12,292.34	13,527.28	12,319.34	46.78	46.79	-90.84	1,203.96	-733.93	739.63	646.06	93.57	7.905	
13,600.00	12,292.03	13,627.28	12,319.03	47.35	47.36	-90.84	1,303.96	-734.68	739.63	644.91	94.72	7.809	
13,700.00	12,291.72	13,727.28	12,318.72	47.97	47.98	-90.84	1,403.95	-735.43	739.64	643.69	95.94	7.709	
13,800.00	12,291.42	13,827.28	12,318.41	48.61	48.62	-90.84	1,503.95	-736.18	739.64	642.41	97.24	7.607	
13,900.00	12,291.11	13,927.28	12,318.11	49.29	49.30	-90.84	1,603.95	-736.93	739.65	641.05	98.60	7.502	
14,000.00	12,290.80	14,027.28	12,317.80	50.00	50.02	-90.84	1,703.94	-737.68	739.65	639.63	100.02	7.395	
14,100.00	12,290.49	14,127.28	12,317.49	50.75	50.76	-90.84	1,803.94	-738.43	739.66	638.15	101.51	7.287	
14,200.00	12,290.19	14,227.28	12,317.18	51.52	51.53	-90.84	1,903.94	-739.18	739.66	636.61	103.05	7.178	
14,300.00	12,289.88	14,327.28	12,316.88	52.32	52.33	-90.84	2,003.93	-739.93	739.67	635.02	104.65	7.068	
14,400.00	12,289.57	14,427.28	12,316.57	53.14	53.16	-90.84	2,103.93	-740.68	739.67	633.37	106.30	6.958	
14,500.00	12,289.26	14,527.28	12,316.26	54.00	54.01	-90.84	2,203.93	-741.43	739.68	631.67	108.01	6.848	
14,600.00	12,288.96	14,627.28	12,315.95	54.87	54.89	-90.84	2,303.92	-742.18	739.69	629.92	109.76	6.739	
14,700.00	12,288.65	14,727.28	12,315.65	55.77	55.79	-90.84	2,403.92	-742.93	739.69	628.13	111.56	6.630	
14,800.00	12,288.34	14,827.28	12,315.34	56.69	56.71	-90.84	2,503.92	-743.68	739.70	626.29	113.41	6.523	
14,900.00	12,288.03	14,927.28	12,315.03	57.64	57.65	-90.84	2,603.91	-744.43	739.70	624.41	115.29	6.416	
15,000.00	12,287.73	15,027.28	12,314.72	58.60	58.62	-90.84	2,703.91	-745.18	739.71	622.49	117.22	6.311	
15,100.00	12,287.42	15,127.28	12,314.42	59.58	59.60	-90.84	2,803.91	-745.92	739.71	620.53	119.18	6.207	
15,200.00	12,287.11	15,227.28	12,314.11	60.58	60.60	-90.84	2,903.90	-746.67	739.72	618.54	121.18	6.104	
15,300.00	12,286.81	15,327.28	12,313.80	61.60	61.62	-90.84	3,003.90	-747.42	739.72	616.51	123.22	6.003	
15,400.00	12,286.50	15,427.28	12,313.49	62.63	62.65	-90.84	3,103.90	-748.17	739.73	614.44	125.28	5.904	
15,500.00	12,286.19	15,527.28	12,313.19	63.68	63.70	-90.84	3,203.89	-748.92	739.73	612.35	127.38	5.807	
15,600.00	12,285.88	15,627.28	12,312.88	64.75	64.77	-90.84	3,303.89	-749.67	739.74	610.23	129.51	5.712	
15,700.00	12,285.58	15,727.28	12,312.57	65.82	65.84	-90.84	3,403.89	-750.42	739.74	608.08	131.67	5.618	
15,800.00	12,285.27	15,827.28	12,312.27	66.92	66.94	-90.84	3,503.88	-751.17	739.75	605.90	133.85	5.527	
15,900.00	12,284.96	15,927.28	12,311.96	68.02	68.04	-90.84	3,603.88	-751.92	739.76	603.69	136.06	5.437	
16,000.00	12,284.65	16,027.28	12,311.65	69.14	69.16	-90.84	3,703.88	-752.67	739.76	601.47	138.30	5.349	
16,100.00	12,284.35	16,127.28	12,311.34	70.27	70.29	-90.84	3,803.87	-753.42	739.77	599.21	140.55	5.263	
16,200.00	12,284.04	16,227.28	12,311.04	71.41	71.43	-90.84	3,903.87	-754.17	739.77	596.94	142.83	5.179	
16,300.00	12,283.73	16,327.28	12,310.73	72.56	72.58	-90.84	4,003.87	-754.92	739.78	594.65	145.13	5.097	
16,400.00	12,283.42	16,427.28	12,310.42	73.72	73.74	-90.84	4,103.86	-755.67	739.78	592.33	147.45	5.017	
16,500.00	12,283.12	16,527.28	12,310.11	74.88	74.91	-90.84	4,203.86	-756.42	739.79	590.00	149.79	4.939	
16,600.00	12,282.81	16,627.28	12,309.81	76.06	76.09	-90.84	4,303.86	-757.17	739.79	587.65	152.15	4.862	
16,700.00	12,282.50	16,727.28	12,309.50	77.25	77.27	-90.84	4,403.85	-757.92	739.80	585.28	154.52	4.788	
16,800.00	12,282.19	16,827.28	12,309.19	78.45	78.47	-90.84	4,503.85	-758.67	739.80	582.89	156.91	4.715	
16,900.00	12,281.89	16,927.28	12,308.88	79.65	79.67	-90.84	4,603.85	-759.42	739.81	580.49	159.32	4.643	
17,000.00	12,281.58	17,027.28	12,308.58	80.85	80.88	-90.84	4,703.84	-760.17	739.82	578.07	161.74	4.574	
17,100.00	12,281.27	17,127.28	12,308.27	82.08	82.10	-90.84	4,803.84	-760.92	739.82	575.64	164.18	4.506	
17,200.00	12,280.97	17,227.28	12,307.96	83.31	83.33	-90.84	4,903.84	-761.67	739.83	573.19	166.63	4.440	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 604H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													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)	+EJ-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
17,300.00	12,280.66	17,327.28	12,307.65	84.54	84.56	-90.84	5,003.83	-762.42	739.83	570.73	169.10	4.375		
17,400.00	12,280.35	17,427.28	12,307.35	85.78	85.80	-90.84	5,103.83	-763.17	739.84	568.26	171.57	4.312		
17,500.00	12,280.04	17,527.28	12,307.04	87.02	87.04	-90.84	5,203.83	-763.92	739.84	565.78	174.06	4.250		
17,600.00	12,279.74	17,627.28	12,306.73	88.27	88.29	-90.84	5,303.83	-764.67	739.85	563.28	176.56	4.190		
17,700.00	12,279.43	17,727.28	12,306.43	89.53	89.55	-90.84	5,403.82	-765.42	739.85	560.78	179.08	4.132		
17,800.00	12,279.12	17,827.28	12,306.12	90.79	90.81	-90.84	5,503.82	-766.17	739.86	558.26	181.60	4.074		
17,900.00	12,278.81	17,927.28	12,305.81	92.05	92.08	-90.84	5,603.82	-766.92	739.86	555.73	184.13	4.018		
18,000.00	12,278.51	18,027.28	12,305.50	93.32	93.35	-90.84	5,703.81	-767.67	739.87	553.20	186.67	3.963		
18,100.00	12,278.20	18,127.28	12,305.20	94.60	94.62	-90.84	5,803.81	-768.42	739.87	550.65	189.23	3.910		
18,200.00	12,277.89	18,227.28	12,304.89	95.88	95.91	-90.84	5,903.81	-769.17	739.88	548.09	191.79	3.858		
18,300.00	12,277.58	18,327.28	12,304.58	97.17	97.19	-90.84	6,003.80	-769.92	739.89	545.53	194.36	3.807		
18,400.00	12,277.28	18,427.28	12,304.27	98.45	98.48	-90.84	6,103.80	-770.66	739.89	542.96	196.93	3.757		
18,500.00	12,276.97	18,527.28	12,303.97	99.75	99.77	-90.84	6,203.80	-771.41	739.90	540.38	199.52	3.708		
18,600.00	12,276.66	18,627.28	12,303.66	101.04	101.07	-90.84	6,303.79	-772.16	739.90	537.79	202.11	3.661		
18,700.00	12,276.35	18,727.28	12,303.35	102.32	102.37	-90.84	6,403.79	-772.91	739.91	535.19	204.72	3.614		
18,800.00	12,276.05	18,827.28	12,303.04	103.65	103.67	-90.84	6,503.79	-773.66	739.91	532.59	207.32	3.569		
18,900.00	12,275.74	18,927.28	12,302.74	104.96	104.98	-90.84	6,603.78	-774.41	739.92	529.98	209.94	3.524		
19,000.00	12,275.43	19,027.28	12,302.43	106.27	106.29	-90.84	6,703.78	-775.16	739.92	527.36	212.56	3.481		
19,100.00	12,275.13	19,127.28	12,302.12	107.58	107.61	-90.84	6,803.78	-775.91	739.93	524.74	215.19	3.439		
19,200.00	12,274.82	19,227.28	12,301.81	108.90	108.92	-90.84	6,903.77	-776.66	739.93	522.11	217.82	3.397		
19,300.00	12,274.51	19,327.28	12,301.51	110.22	110.24	-90.84	7,003.77	-777.41	739.94	519.48	220.46	3.356		
19,400.00	12,274.20	19,427.28	12,301.20	111.54	111.57	-90.84	7,103.77	-778.16	739.95	516.83	223.11	3.316		
19,500.00	12,273.90	19,527.28	12,300.89	112.87	112.89	-90.84	7,203.76	-778.91	739.95	514.19	225.76	3.278		
19,600.00	12,273.59	19,627.28	12,300.59	114.20	114.22	-90.84	7,303.76	-779.66	739.96	511.54	228.42	3.239		
19,700.00	12,273.28	19,727.28	12,300.28	115.53	115.55	-90.84	7,403.76	-780.41	739.96	508.88	231.08	3.202		
19,800.00	12,272.97	19,827.28	12,299.97	116.86	116.89	-90.84	7,503.75	-781.16	739.97	506.22	233.75	3.166		
19,900.00	12,272.67	19,927.28	12,299.66	118.20	118.22	-90.84	7,603.75	-781.91	739.97	503.55	236.42	3.130		
20,000.00	12,272.36	20,027.28	12,299.36	119.54	119.56	-90.84	7,703.75	-782.66	739.98	500.88	239.10	3.095		
20,100.00	12,272.05	20,127.28	12,299.05	120.88	120.90	-90.84	7,803.74	-783.41	739.98	498.21	241.78	3.061		
20,200.00	12,271.74	20,227.28	12,298.74	122.22	122.24	-90.84	7,903.74	-784.16	739.99	495.53	244.46	3.027		
20,300.00	12,271.44	20,327.28	12,298.43	123.56	123.59	-90.84	8,003.74	-784.91	739.99	492.84	247.15	2.994		
20,400.00	12,271.13	20,427.28	12,298.13	124.91	124.94	-90.84	8,103.73	-785.66	740.00	490.15	249.85	2.962		
20,500.00	12,270.82	20,527.28	12,297.82	126.26	126.28	-90.84	8,203.73	-786.41	740.00	487.46	252.54	2.930		
20,600.00	12,270.51	20,627.28	12,297.51	127.61	127.64	-90.84	8,303.73	-787.16	740.01	484.76	255.25	2.899		
20,700.00	12,270.21	20,727.28	12,297.20	128.96	128.99	-90.84	8,403.72	-787.91	740.02	482.06	257.95	2.869		
20,800.00	12,269.90	20,827.28	12,296.90	130.32	130.34	-90.84	8,503.72	-788.66	740.02	479.36	260.66	2.839		
20,900.00	12,269.59	20,927.28	12,296.59	131.67	131.70	-90.84	8,603.72	-789.41	740.03	476.66	263.37	2.810		
21,000.00	12,269.29	21,027.28	12,296.28	133.03	133.06	-90.84	8,703.71	-790.16	740.03	473.94	266.09	2.781		
21,100.00	12,268.98	21,127.28	12,295.97	134.39	134.42	-90.84	8,803.71	-790.91	740.04	471.23	268.81	2.753		
21,200.00	12,268.67	21,227.28	12,295.67	135.75	135.78	-90.84	8,903.71	-791.66	740.04	468.52	271.53	2.725		
21,300.00	12,268.36	21,327.28	12,295.36	137.11	137.14	-90.84	9,003.70	-792.41	740.05	465.80	274.25	2.698		
21,400.00	12,268.06	21,427.28	12,295.05	138.48	138.50	-90.84	9,103.70	-793.16	740.05	463.07	276.98	2.672		
21,500.00	12,267.75	21,527.28	12,294.74	139.84	139.87	-90.84	9,203.70	-793.91	740.06	460.35	279.71	2.646		
21,600.00	12,267.44	21,627.28	12,294.44	141.21	141.24	-90.84	9,303.69	-794.66	740.06	457.62	282.45	2.620		
21,700.00	12,267.13	21,727.28	12,294.13	142.58	142.60	-90.84	9,403.69	-795.41	740.07	454.89	285.18	2.595		
21,800.00	12,266.83	21,827.28	12,293.82	143.95	143.97	-90.84	9,503.69	-796.15	740.08	452.15	287.92	2.570		
21,900.00	12,266.52	21,927.28	12,293.52	145.32	145.34	-90.84	9,603.68	-796.90	740.08	449.42	290.66	2.546		
22,000.00	12,266.21	22,027.28	12,293.21	146.69	146.72	-90.84	9,703.68	-797.65	740.09	446.68	293.41	2.522		
22,100.00	12,265.90	22,127.28	12,292.90	148.06	148.09	-90.84	9,803.68	-798.40	740.09	443.94	296.15	2.499		
22,200.00	12,265.60	22,227.28	12,292.59	149.44	149.46	-90.84	9,903.67	-799.15	740.10	441.20	298.90	2.476		
22,300.00	12,265.29	22,327.28	12,292.29	150.81	150.84	-90.84	10,003.67	-799.90	740.10	438.45	301.65	2.453		
22,308.26	12,265.26	22,335.54	12,292.26	150.93	150.95	-90.84	10,011.93	-799.97	740.10	438.22	301.88	2.452		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design													Fez Federal Com - 604H - OH - Plan 1 10-12-18		Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM															Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Offset Wellbore Centre			Distance			Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	+N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor				
22,394.02	12,265.00	22,420.22	12,292.00	152.11	152.12	-90.84	10,096.60	-800.60	740.11	435.88	304.23	2.433	ES, SF			

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
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 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 702H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (")	Offset Wellbore Centre N-S (usft)	Offset Wellbore Centre E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning	
0.00	0.00	0.10	0.10	0.00	0.00	89.52	0.50	60.00	60.00					
100.00	100.00	100.10	100.10	0.13	0.13	89.52	0.50	60.00	60.00	59.73	0.27	222.880		
200.00	200.00	200.10	200.10	0.49	0.49	89.52	0.50	60.00	60.00	59.02	0.99	60.844		
300.00	300.00	300.10	300.10	0.85	0.85	89.52	0.50	60.00	60.00	58.30	1.70	35.231		
400.00	400.00	400.10	400.10	1.21	1.21	89.52	0.50	60.00	60.00	57.58	2.42	24.794		
500.00	500.00	500.10	500.10	1.57	1.57	89.52	0.50	60.00	60.00	56.87	3.14	19.127		
600.00	600.00	600.10	600.10	1.93	1.93	89.52	0.50	60.00	60.00	56.15	3.85	15.569		
700.00	700.00	700.10	700.10	2.29	2.29	89.52	0.50	60.00	60.00	55.43	4.57	13.127		
800.00	800.00	800.10	800.10	2.64	2.64	89.52	0.50	60.00	60.00	54.71	5.29	11.347		
900.00	900.00	900.10	900.10	3.00	3.00	89.52	0.50	60.00	60.00	54.00	6.00	9.992		
1,000.00	1,000.00	1,000.10	1,000.10	3.36	3.36	89.52	0.50	60.00	60.00	53.28	6.72	8.927		
1,100.00	1,100.00	1,100.10	1,100.10	3.72	3.72	89.52	0.50	60.00	60.00	52.56	7.44	8.066		
1,200.00	1,200.00	1,200.10	1,200.10	4.08	4.08	89.52	0.50	60.00	60.00	51.85	8.16	7.357		
1,300.00	1,300.00	1,300.10	1,300.10	4.44	4.44	89.52	0.50	60.00	60.00	51.13	8.87	6.763		
1,400.00	1,400.00	1,400.10	1,400.10	4.79	4.79	89.52	0.50	60.00	60.00	50.41	9.59	6.257		
1,416.63	1,416.63	1,416.73	1,416.73	4.85	4.85	89.52	0.50	60.00	60.00	50.29	9.71	6.180 CC		
1,500.00	1,500.00	1,500.00	1,500.00	5.15	5.15	89.52	0.50	60.00	60.00	49.70	10.31	5.822 ES		
1,600.00	1,599.98	1,598.23	1,598.22	5.49	5.49	-87.28	-0.25	61.51	61.43	50.45	10.99	5.592		
1,700.00	1,699.84	1,696.20	1,696.05	5.82	5.82	-89.62	-2.48	66.02	65.79	54.15	11.64	5.651		
1,800.00	1,799.45	1,793.82	1,793.31	6.15	6.16	-92.87	-6.18	73.49	73.26	60.96	12.31	5.953		
1,900.00	1,898.90	1,893.16	1,892.10	6.48	6.50	-96.10	-10.79	82.78	82.65	69.67	12.98	6.366		
2,000.00	1,998.36	1,992.62	1,991.02	6.82	6.85	-98.67	-15.40	92.09	92.25	78.58	13.67	6.747		
2,100.00	2,097.81	2,092.08	2,089.94	7.17	7.20	-100.76	-20.02	101.40	102.00	87.63	14.37	7.098		
2,200.00	2,197.26	2,191.54	2,188.85	7.52	7.56	-102.48	-24.63	110.71	111.87	96.79	15.08	7.420		
2,300.00	2,296.72	2,291.00	2,287.77	7.87	7.91	-103.92	-29.24	120.02	121.81	106.02	15.79	7.715		
2,400.00	2,396.17	2,390.47	2,386.69	8.23	8.27	-105.14	-33.85	129.32	131.82	115.32	16.51	7.986		
2,500.00	2,495.62	2,489.93	2,485.60	8.59	8.64	-106.19	-38.47	138.63	141.88	124.66	17.23	8.235		
2,600.00	2,595.07	2,589.39	2,584.52	8.95	9.00	-107.10	-43.08	147.94	151.99	134.03	17.96	8.465		
2,700.00	2,694.53	2,688.85	2,683.44	9.32	9.37	-107.90	-47.69	157.25	162.12	143.44	18.69	8.676		
2,800.00	2,793.98	2,788.31	2,782.36	9.68	9.74	-108.60	-52.31	166.56	172.29	152.87	19.42	8.872		
2,900.00	2,893.43	2,887.77	2,881.27	10.05	10.11	-109.22	-56.92	175.87	182.47	162.32	20.16	9.053		
3,000.00	2,992.89	2,987.23	2,980.19	10.42	10.48	-109.78	-61.53	185.18	192.68	171.78	20.90	9.221		
3,100.00	3,092.34	3,086.69	3,079.11	10.79	10.85	-110.29	-66.15	194.49	202.90	181.26	21.64	9.377		
3,200.00	3,191.79	3,186.16	3,178.03	11.16	11.22	-110.74	-70.76	203.79	213.13	190.75	22.38	9.522		
3,300.00	3,291.24	3,285.62	3,276.94	11.54	11.59	-111.15	-75.37	213.10	223.38	200.25	23.13	9.658		
3,400.00	3,390.70	3,385.08	3,375.86	11.91	11.97	-111.53	-79.99	222.41	233.64	209.76	23.88	9.786		
3,500.00	3,490.15	3,484.54	3,474.78	12.29	12.34	-111.87	-84.60	231.72	243.91	219.28	24.63	9.905		
3,600.00	3,589.60	3,584.00	3,573.89	12.66	12.71	-112.19	-89.21	241.03	254.18	228.81	25.38	10.017		
3,700.00	3,689.06	3,683.46	3,672.61	13.04	13.09	-112.48	-93.83	250.34	264.46	238.34	26.13	10.122		
3,800.00	3,788.51	3,782.99	3,771.59	13.41	13.47	-112.62	-98.44	259.65	274.16	247.28	26.88	10.200		
3,900.00	3,888.50	3,882.57	3,870.63	13.77	13.84	-112.09	-103.06	268.97	282.54	254.92	27.62	10.231		
4,000.00	3,988.48	3,982.11	3,969.62	14.12	14.22	-110.94	-107.68	278.29	289.70	261.36	28.34	10.223		
4,100.00	4,088.48	4,081.56	4,068.53	14.45	14.60	66.57	-112.29	287.60	296.35	267.30	29.05	10.202		
4,200.00	4,188.48	4,181.01	4,167.44	14.79	14.98	68.07	-116.90	296.91	303.22	273.46	29.76	10.188		
4,300.00	4,288.48	4,280.47	4,266.35	15.12	15.35	69.50	-121.52	306.21	310.29	279.82	30.48	10.181		
4,400.00	4,388.48	4,379.92	4,365.26	15.46	15.73	70.88	-126.13	315.52	317.55	286.35	31.19	10.180		
4,500.00	4,488.48	4,479.37	4,464.17	15.80	16.11	72.19	-130.74	324.83	324.98	293.07	31.91	10.185		
4,600.00	4,588.48	4,578.82	4,563.08	16.14	16.49	73.44	-135.35	334.14	332.57	299.94	32.63	10.193		
4,700.00	4,688.48	4,678.28	4,661.98	16.47	16.87	74.63	-139.97	343.45	340.31	306.96	33.35	10.205		
4,800.00	4,788.48	4,777.73	4,760.89	16.82	17.25	75.77	-144.58	352.75	348.19	314.13	34.07	10.221		
4,900.00	4,888.48	4,877.18	4,859.80	17.16	17.63	76.86	-149.19	362.06	356.21	321.42	34.79	10.240		
5,000.00	4,988.48	4,976.64	4,958.71	17.50	18.01	77.91	-153.80	371.37	364.34	328.84	35.51	10.261		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 702H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference				Offset			Semi Major Axis		Distance				Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
5,100.00	5,088.48	5,076.09	5,057.62	17.84	18.39	78.90	-158.42	380.68	372.60	336.37	36.23	10.284		
5,200.00	5,188.48	5,175.54	5,156.53	18.18	18.77	79.86	-163.03	389.99	380.96	344.00	36.95	10.309		
5,300.00	5,288.48	5,275.00	5,255.44	18.53	19.15	80.77	-167.64	399.29	389.42	351.74	37.68	10.335		
5,400.00	5,388.48	5,374.45	5,354.35	18.87	19.53	81.64	-172.26	408.60	397.98	359.57	38.40	10.363		
5,500.00	5,488.48	5,473.90	5,453.26	19.22	19.91	82.48	-176.87	417.91	406.62	367.49	39.13	10.392		
5,600.00	5,588.48	5,573.35	5,552.16	19.56	20.29	83.28	-181.48	427.22	415.35	375.49	39.86	10.421		
5,700.00	5,688.48	5,672.81	5,651.07	19.91	20.68	84.05	-186.09	436.53	424.15	383.57	40.58	10.451		
5,800.00	5,788.48	5,772.26	5,749.98	20.25	21.06	84.79	-190.71	445.83	433.03	391.72	41.31	10.482		
5,900.00	5,888.48	5,871.71	5,848.89	20.60	21.44	85.50	-195.32	455.14	441.98	399.94	42.04	10.514		
6,000.00	5,988.48	5,971.17	5,947.80	20.95	21.82	86.18	-199.93	464.45	450.99	408.22	42.77	10.545		
6,100.00	6,088.48	6,070.62	6,046.71	21.29	22.20	86.83	-204.54	473.76	460.06	416.56	43.50	10.577		
6,200.00	6,188.48	6,170.07	6,145.62	21.64	22.58	87.46	-209.16	483.07	469.19	424.96	44.23	10.609		
6,300.00	6,288.48	6,269.53	6,244.53	21.99	22.97	88.06	-213.77	492.37	478.37	433.41	44.96	10.641		
6,400.00	6,388.48	6,368.98	6,343.44	22.34	23.35	88.64	-218.38	501.68	487.60	441.92	45.69	10.673		
6,500.00	6,488.48	6,468.57	6,459.59	22.69	23.79	89.18	-222.84	510.67	495.26	448.78	46.47	10.657		
6,600.00	6,588.48	6,603.75	6,577.64	23.04	24.21	89.46	-225.21	515.45	499.28	452.03	47.25	10.567		
6,700.00	6,688.48	6,714.69	6,688.58	23.39	24.58	89.51	-225.59	516.22	499.93	451.96	47.97	10.422		
6,800.00	6,788.48	6,814.69	6,788.58	23.73	24.91	89.51	-225.59	516.22	499.93	451.29	48.65	10.277		
6,900.00	6,888.48	6,914.69	6,888.58	24.08	25.24	89.51	-225.59	516.22	499.93	450.61	49.33	10.135		
7,000.00	6,988.48	7,014.69	6,988.58	24.43	25.57	89.51	-225.59	516.22	499.93	449.93	50.01	9.997		
7,100.00	7,088.48	7,114.70	7,088.58	24.78	25.90	89.51	-225.59	516.22	499.93	449.25	50.69	9.863		
7,200.00	7,188.48	7,214.70	7,188.58	25.14	26.23	89.51	-225.59	516.22	499.93	448.56	51.37	9.732		
7,300.00	7,288.48	7,314.70	7,288.58	25.49	26.57	89.51	-225.59	516.22	499.93	447.88	52.05	9.604		
7,400.00	7,388.48	7,414.70	7,388.58	25.84	26.90	89.51	-225.59	516.22	499.93	447.20	52.74	9.480		
7,500.00	7,488.48	7,514.70	7,488.58	26.19	27.23	89.51	-225.59	516.22	499.93	446.51	53.42	9.358		
7,600.00	7,588.48	7,614.70	7,588.58	26.54	27.57	89.51	-225.59	516.22	499.93	445.83	54.11	9.240		
7,700.00	7,688.48	7,714.70	7,688.58	26.89	27.90	89.51	-225.59	516.22	499.93	445.14	54.79	9.124		
7,800.00	7,788.48	7,814.70	7,788.58	27.24	28.24	89.51	-225.59	516.22	499.93	444.45	55.48	9.011		
7,900.00	7,888.48	7,914.70	7,888.58	27.59	28.57	89.51	-225.59	516.22	499.93	443.76	56.17	8.901		
8,000.00	7,988.48	8,014.70	7,988.58	27.95	28.91	89.51	-225.59	516.22	499.93	443.08	56.86	8.793		
8,100.00	8,088.48	8,114.70	8,088.58	28.30	29.25	89.51	-225.59	516.22	499.93	442.39	57.55	8.687		
8,200.00	8,188.48	8,214.70	8,188.58	28.65	29.59	89.51	-225.59	516.22	499.93	441.70	58.24	8.585		
8,300.00	8,288.48	8,314.70	8,288.58	29.00	29.92	89.51	-225.59	516.22	499.93	441.01	58.93	8.484		
8,400.00	8,388.48	8,414.70	8,388.58	29.36	30.26	89.51	-225.59	516.22	499.93	440.31	59.62	8.386		
8,500.00	8,488.48	8,514.70	8,488.58	29.71	30.60	89.51	-225.59	516.22	499.93	439.62	60.31	8.289		
8,600.00	8,588.48	8,614.70	8,588.58	30.06	30.94	89.51	-225.59	516.22	499.93	438.93	61.00	8.195		
8,700.00	8,688.48	8,714.70	8,688.58	30.42	31.28	89.51	-225.59	516.22	499.93	438.24	61.70	8.103		
8,800.00	8,788.48	8,814.70	8,788.58	30.77	31.62	89.51	-225.59	516.22	499.93	437.54	62.39	8.013		
8,900.00	8,888.48	8,914.70	8,888.58	31.12	31.96	89.51	-225.59	516.22	499.93	436.85	63.08	7.925		
9,000.00	8,988.48	9,014.70	8,988.58	31.48	32.30	89.51	-225.59	516.22	499.93	436.16	63.78	7.839		
9,100.00	9,088.48	9,114.70	9,088.58	31.83	32.64	89.51	-225.59	516.22	499.93	435.46	64.47	7.754		
9,200.00	9,188.48	9,214.70	9,188.58	32.18	32.98	89.51	-225.59	516.22	499.93	434.77	65.17	7.671		
9,300.00	9,288.48	9,314.70	9,288.58	32.54	33.33	89.51	-225.59	516.22	499.93	434.07	65.86	7.590		
9,400.00	9,388.48	9,414.70	9,388.58	32.89	33.67	89.51	-225.59	516.22	499.93	433.37	66.56	7.511		
9,500.00	9,488.48	9,514.70	9,488.58	33.24	34.01	89.51	-225.59	516.22	499.93	432.68	67.26	7.433		
9,600.00	9,588.48	9,614.70	9,588.58	33.60	34.36	89.51	-225.59	516.22	499.93	431.98	67.95	7.357		
9,700.00	9,688.48	9,714.70	9,688.58	33.95	34.70	89.51	-225.59	516.22	499.93	431.28	68.65	7.282		
9,800.00	9,788.48	9,814.70	9,788.58	34.31	35.04	89.51	-225.59	516.22	499.93	430.58	69.35	7.209		
9,900.00	9,888.48	9,914.70	9,888.58	34.66	35.39	89.51	-225.59	516.22	499.93	429.88	70.05	7.137		
10,000.00	9,988.48	10,014.70	9,988.58	35.02	35.73	89.51	-225.59	516.22	499.93	429.19	70.75	7.067		
10,100.00	10,088.48	10,114.70	10,088.58	35.37	36.08	89.51	-225.59	516.22	499.93	428.49	71.45	6.997		
10,200.00	10,188.48	10,214.70	10,188.58	35.72	36.42	89.51	-225.59	516.22	499.93	427.79	72.15	6.930		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 702H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi-Major Axis			Distance						Warning	
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
10,300.00	10,288.48	10,314.70	10,288.58	36.08	36.77	89.51	-225.59	516.22	499.93	427.09	72.85	6.863		
10,400.00	10,388.48	10,414.70	10,388.58	36.43	37.11	89.51	-225.59	516.22	499.93	426.39	73.55	6.798		
10,500.00	10,488.48	10,514.70	10,488.58	36.79	37.46	89.51	-225.59	516.22	499.93	425.69	74.25	6.733		
10,600.00	10,588.48	10,614.70	10,588.58	37.14	37.80	89.51	-225.59	516.22	499.93	424.99	74.95	6.671		
10,700.00	10,688.48	10,714.70	10,688.58	37.50	38.15	89.51	-225.59	516.22	499.93	424.29	75.65	6.609		
10,800.00	10,788.48	10,814.70	10,788.58	37.85	38.49	89.51	-225.59	516.22	499.93	423.58	76.35	6.548		
10,900.00	10,888.48	10,914.70	10,888.58	38.21	38.84	89.51	-225.59	516.22	499.93	422.88	77.05	6.488		
11,000.00	10,988.48	11,014.70	10,988.58	38.56	39.19	89.51	-225.59	516.22	499.93	422.18	77.75	6.430		
11,100.00	11,088.48	11,114.70	11,088.58	38.92	39.54	89.51	-225.59	516.22	499.93	421.48	78.45	6.372		
11,200.00	11,188.48	11,214.70	11,188.58	39.27	39.88	89.51	-225.59	516.22	499.93	420.78	79.16	6.316		
11,300.00	11,288.48	11,314.70	11,288.58	39.63	40.23	89.51	-225.59	516.22	499.93	420.07	79.86	6.260		
11,400.00	11,388.48	11,414.70	11,388.58	39.99	40.58	89.51	-225.59	516.22	499.93	419.37	80.56	6.206		
11,500.00	11,488.48	11,514.70	11,488.58	40.34	40.93	89.51	-225.59	516.22	499.93	418.67	81.27	6.152		
11,600.00	11,588.48	11,614.70	11,588.58	40.70	41.27	89.51	-225.59	516.22	499.93	417.96	81.97	6.099		
11,700.00	11,688.48	11,714.70	11,688.58	41.05	41.62	89.51	-225.59	516.22	499.93	417.26	82.67	6.047		
11,800.00	11,788.33	11,814.49	11,788.12	41.40	41.96	89.74	-220.11	516.18	499.94	416.57	83.37	5.997		
11,900.00	11,886.15	11,913.89	11,884.89	41.74	42.28	89.49	-197.94	516.02	499.95	415.94	84.02	5.951		
12,000.00	11,978.98	12,012.92	11,976.05	42.04	42.56	89.26	-159.57	515.73	499.97	415.37	84.60	5.910		
12,100.00	12,064.00	12,111.62	12,058.99	42.32	42.79	89.04	-106.30	515.34	500.00	414.89	85.11	5.875		
12,200.00	12,138.64	12,210.03	12,131.38	42.57	42.97	88.86	-39.82	514.84	500.03	414.49	85.55	5.845		
12,300.00	12,200.61	12,308.19	12,191.21	42.81	43.10	88.71	37.86	514.26	500.06	414.15	85.91	5.821		
12,400.00	12,248.05	12,406.17	12,236.84	43.03	43.18	88.59	124.42	513.62	500.08	413.88	86.20	5.801		
12,500.00	12,279.50	12,504.01	12,267.05	43.23	43.25	88.52	217.35	512.93	500.10	413.59	86.51	5.781		
12,600.00	12,294.02	12,601.79	12,281.03	43.43	43.43	88.50	314.00	512.21	500.10	413.21	86.89	5.755		
12,700.00	12,294.80	12,700.99	12,281.80	43.63	43.63	88.50	413.18	511.47	500.10	412.82	87.28	5.730		
12,800.00	12,294.49	12,800.99	12,281.49	43.87	43.89	88.50	513.17	510.73	500.10	412.34	87.76	5.698		
12,900.00	12,294.18	12,900.99	12,281.18	44.16	44.18	88.50	613.17	509.98	500.10	411.76	88.34	5.661		
13,000.00	12,293.87	13,000.99	12,280.88	44.49	44.52	88.50	713.17	509.24	500.10	411.10	89.01	5.619		
13,100.00	12,293.57	13,100.99	12,280.57	44.86	44.90	88.50	813.17	508.49	500.10	410.34	89.76	5.571		
13,200.00	12,293.26	13,200.99	12,280.26	45.28	45.32	88.50	913.16	507.75	500.10	409.50	90.60	5.520		
13,300.00	12,292.95	13,300.99	12,279.95	45.74	45.78	88.50	1,013.16	507.00	500.10	408.58	91.52	5.465		
13,400.00	12,292.64	13,400.99	12,279.65	46.24	46.28	88.50	1,113.16	506.26	500.10	407.59	92.52	5.406		
13,500.00	12,292.34	13,500.99	12,279.34	46.78	46.81	88.50	1,213.15	505.51	500.10	406.51	93.59	5.344		
13,600.00	12,292.03	13,600.99	12,279.03	47.35	47.39	88.50	1,313.15	504.77	500.10	405.36	94.74	5.279		
13,700.00	12,291.72	13,700.99	12,278.72	47.97	47.99	88.50	1,413.15	504.03	500.10	404.14	95.96	5.212		
13,800.00	12,291.42	13,800.99	12,278.42	48.61	48.64	88.50	1,513.14	503.28	500.10	402.85	97.25	5.142		
13,900.00	12,291.11	13,900.99	12,278.11	49.29	49.31	88.50	1,613.14	502.54	500.10	401.50	98.60	5.072		
14,000.00	12,290.80	14,000.99	12,277.80	50.00	50.02	88.50	1,713.14	501.79	500.10	400.08	100.02	5.000		
14,100.00	12,290.49	14,100.99	12,277.50	50.75	50.76	88.50	1,813.13	501.05	500.10	398.60	101.51	4.927		
14,200.00	12,290.19	14,200.99	12,277.19	51.52	51.53	88.50	1,913.13	500.30	500.10	397.06	103.04	4.853		
14,300.00	12,289.88	14,300.99	12,276.88	52.32	52.32	88.50	2,013.13	499.56	500.10	395.46	104.64	4.779		
14,400.00	12,289.57	14,400.99	12,276.57	53.14	53.14	88.50	2,113.12	498.81	500.10	393.81	106.29	4.705		
14,500.00	12,289.26	14,500.99	12,276.27	54.00	53.99	88.50	2,213.12	498.07	500.10	392.11	107.99	4.631		
14,600.00	12,288.96	14,600.99	12,275.96	54.87	54.86	88.50	2,313.12	497.33	500.10	390.36	109.74	4.557		
14,700.00	12,288.65	14,700.99	12,275.65	55.77	55.76	88.50	2,413.11	496.58	500.10	388.57	111.53	4.484		
14,800.00	12,288.34	14,800.99	12,275.34	56.69	56.68	88.50	2,513.11	495.84	500.10	386.73	113.37	4.411		
14,900.00	12,288.03	14,900.99	12,275.04	57.64	57.62	88.50	2,613.11	495.09	500.10	384.85	115.25	4.339		
15,000.00	12,287.73	15,000.99	12,274.73	58.60	58.57	88.50	2,713.10	494.35	500.10	382.93	117.17	4.268		
15,100.00	12,287.42	15,100.99	12,274.42	59.58	59.55	88.50	2,813.10	493.60	500.10	380.97	119.13	4.198		
15,200.00	12,287.11	15,200.99	12,274.11	60.58	60.55	88.50	2,913.10	492.86	500.10	378.97	121.13	4.129		
15,300.00	12,286.81	15,300.99	12,273.81	61.60	61.56	88.50	3,013.09	492.12	500.10	376.94	123.16	4.061		
15,400.00	12,286.50	15,400.99	12,273.50	62.63	62.59	88.50	3,113.09	491.37	500.10	374.88	125.22	3.994		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 702H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													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 Tooffset (")	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	12,286.19	15,500.99	12,273.19	63.88	63.64	88.50	3,213.09	490.63	500.10	372.78	127.32	3.928		
15,600.00	12,285.88	15,600.99	12,272.89	64.75	64.70	88.50	3,313.08	489.88	500.10	370.66	129.44	3.863		
15,700.00	12,285.58	15,700.99	12,272.58	65.82	65.77	88.50	3,413.08	489.14	500.10	368.50	131.60	3.800		
15,800.00	12,285.27	15,800.99	12,272.27	66.92	66.86	88.50	3,513.08	488.39	500.10	366.32	133.78	3.738		
15,900.00	12,284.96	15,900.99	12,271.96	68.02	67.96	88.50	3,613.07	487.65	500.10	364.12	135.98	3.678		
16,000.00	12,284.65	16,000.99	12,271.65	69.14	69.07	88.50	3,713.07	486.90	500.10	361.89	138.21	3.618		
16,100.00	12,284.35	16,100.99	12,271.35	70.27	70.20	88.50	3,813.07	486.16	500.10	359.63	140.47	3.560		
16,200.00	12,284.04	16,200.99	12,271.04	71.41	71.34	88.50	3,913.06	485.42	500.10	357.36	142.74	3.504		
16,300.00	12,283.73	16,300.99	12,270.73	72.56	72.48	88.50	4,013.06	484.67	500.10	355.06	145.04	3.448		
16,400.00	12,283.42	16,400.99	12,270.43	73.72	73.64	88.50	4,113.06	483.93	500.10	352.74	147.35	3.394		
16,500.00	12,283.12	16,500.99	12,270.12	74.88	74.81	88.50	4,213.05	483.18	500.10	350.41	149.69	3.341		
16,600.00	12,282.81	16,600.99	12,269.81	76.06	75.98	88.50	4,313.05	482.44	500.10	348.05	152.05	3.289		
16,700.00	12,282.50	16,700.99	12,269.50	77.25	77.17	88.50	4,413.05	481.69	500.10	345.68	154.42	3.239		
16,800.00	12,282.19	16,800.99	12,269.20	78.45	78.36	88.50	4,513.05	480.95	500.10	343.29	156.81	3.189		
16,900.00	12,281.89	16,900.99	12,268.89	79.65	79.56	88.50	4,613.04	480.21	500.10	340.89	159.21	3.141		
17,000.00	12,281.58	17,000.99	12,268.58	80.86	80.77	88.50	4,713.04	479.46	500.10	338.47	161.63	3.094		
17,100.00	12,281.27	17,100.99	12,268.27	82.08	81.99	88.50	4,813.04	478.72	500.10	336.03	164.06	3.048		
17,200.00	12,280.97	17,200.99	12,267.97	83.31	83.21	88.50	4,913.03	477.97	500.10	333.59	166.51	3.003		
17,300.00	12,280.66	17,300.99	12,267.66	84.54	84.44	88.50	5,013.03	477.23	500.10	331.12	168.98	2.960		
17,400.00	12,280.35	17,400.99	12,267.35	85.78	85.67	88.50	5,113.03	476.48	500.10	328.65	171.45	2.917		
17,500.00	12,280.04	17,500.99	12,267.05	87.02	86.92	88.50	5,213.02	475.74	500.10	326.16	173.94	2.875		
17,600.00	12,279.74	17,600.99	12,266.74	88.27	88.16	88.50	5,313.02	474.99	500.10	323.66	176.43	2.834		
17,700.00	12,279.43	17,700.99	12,266.43	89.53	89.42	88.50	5,413.02	474.25	500.10	321.15	178.94	2.795		
17,800.00	12,279.12	17,800.99	12,266.12	90.79	90.68	88.50	5,513.01	473.51	500.10	318.63	181.46	2.756		
17,900.00	12,278.81	17,900.99	12,265.82	92.05	91.94	88.50	5,613.01	472.76	500.10	316.10	184.00	2.718		
18,000.00	12,278.51	18,000.99	12,265.51	93.32	93.21	88.50	5,713.01	472.02	500.10	313.56	186.54	2.681		
18,100.00	12,278.20	18,100.99	12,265.20	94.60	94.49	88.50	5,813.00	471.27	500.10	311.01	189.09	2.645		
18,200.00	12,277.89	18,200.99	12,264.89	95.88	95.76	88.50	5,913.00	470.53	500.10	308.45	191.65	2.609		
18,300.00	12,277.58	18,300.99	12,264.59	97.17	97.05	88.50	6,013.00	469.78	500.10	305.88	194.21	2.575		
18,400.00	12,277.28	18,400.99	12,264.28	98.45	98.33	88.50	6,112.99	469.04	500.10	303.31	196.79	2.541		
18,500.00	12,276.97	18,500.99	12,263.97	99.75	99.63	88.50	6,212.99	468.29	500.10	300.72	199.37	2.508		
18,600.00	12,276.66	18,600.99	12,263.66	101.04	100.92	88.50	6,312.99	467.55	500.10	298.13	201.97	2.476		
18,700.00	12,276.35	18,700.99	12,263.36	102.35	102.22	88.50	6,412.98	466.81	500.10	295.53	204.57	2.445		
18,800.00	12,276.05	18,800.99	12,263.05	103.65	103.52	88.50	6,512.98	466.06	500.10	292.92	207.17	2.414		
18,900.00	12,275.74	18,900.99	12,262.74	104.96	104.83	88.50	6,612.98	465.32	500.10	290.31	209.79	2.384		
19,000.00	12,275.43	19,000.99	12,262.44	106.27	106.14	88.50	6,712.97	464.57	500.10	287.69	212.41	2.354		
19,100.00	12,275.13	19,100.99	12,262.13	107.58	107.45	88.50	6,812.97	463.83	500.10	285.06	215.03	2.326		
19,200.00	12,274.82	19,200.99	12,261.82	108.90	108.77	88.50	6,912.97	463.08	500.10	282.43	217.67	2.298		
19,300.00	12,274.51	19,300.99	12,261.51	110.22	110.09	88.50	7,012.96	462.34	500.10	279.79	220.31	2.270		
19,400.00	12,274.20	19,400.99	12,261.21	111.54	111.41	88.50	7,112.96	461.60	500.10	277.15	222.95	2.243		
19,500.00	12,273.90	19,500.99	12,260.90	112.87	112.73	88.50	7,212.96	460.85	500.10	274.50	225.60	2.217		
19,600.00	12,273.59	19,600.99	12,260.59	114.20	114.06	88.50	7,312.95	460.11	500.10	271.84	228.26	2.191		
19,700.00	12,273.28	19,700.99	12,260.28	115.53	115.39	88.50	7,412.95	459.36	500.10	269.18	230.92	2.166		
19,800.00	12,272.97	19,800.99	12,259.98	116.86	116.72	88.50	7,512.95	458.62	500.10	266.51	233.58	2.141		
19,900.00	12,272.67	19,900.99	12,259.67	118.20	118.06	88.50	7,612.94	457.87	500.10	263.84	236.25	2.117		
20,000.00	12,272.36	20,000.99	12,259.36	119.54	119.39	88.50	7,712.94	457.13	500.10	261.17	238.93	2.093		
20,100.00	12,272.05	20,100.99	12,259.05	120.88	120.73	88.50	7,812.94	456.38	500.10	258.49	241.61	2.070		
20,200.00	12,271.74	20,200.99	12,258.75	122.22	122.07	88.50	7,912.93	455.64	500.10	255.80	244.29	2.047		
20,300.00	12,271.44	20,300.99	12,258.44	123.56	123.42	88.50	8,012.93	454.90	500.10	253.11	246.98	2.025		
20,400.00	12,271.13	20,400.99	12,258.13	124.91	124.76	88.50	8,112.93	454.15	500.09	250.42	249.67	2.003		
20,500.00	12,270.82	20,500.99	12,257.82	126.26	126.11	88.50	8,212.93	453.41	500.09	247.72	252.37	1.982		
20,600.00	12,270.51	20,600.99	12,257.52	127.61	127.46	88.50	8,312.92	452.66	500.09	245.02	255.07	1.961		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 702H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance							Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
20,700.00	12,270.21	20,700.99	12,257.21	128.96	128.81	88.50	8,412.92	451.92	500.09	242.32	257.78	1.940		
20,800.00	12,269.90	20,800.99	12,256.90	130.32	130.17	88.50	8,512.92	451.17	500.09	239.61	260.48	1.920		
20,900.00	12,269.59	20,900.99	12,256.60	131.67	131.52	88.50	8,612.91	450.43	500.09	236.90	263.19	1.900		
21,000.00	12,269.29	21,000.99	12,256.29	133.03	132.88	88.50	8,712.91	449.68	500.09	234.19	265.91	1.881		
21,100.00	12,268.98	21,100.99	12,255.98	134.39	134.24	88.50	8,812.91	448.94	500.09	231.47	268.63	1.862		
21,200.00	12,268.67	21,200.99	12,255.67	135.75	135.60	88.50	8,912.90	448.20	500.09	228.75	271.35	1.843		
21,300.00	12,268.36	21,300.99	12,255.37	137.11	136.96	88.50	9,012.90	447.45	500.09	226.02	274.07	1.825		
21,400.00	12,268.06	21,400.99	12,255.06	138.48	138.32	88.50	9,112.90	446.71	500.09	223.30	276.80	1.807		
21,500.00	12,267.75	21,500.99	12,254.75	139.84	139.69	88.50	9,212.89	445.96	500.09	220.57	279.53	1.789		
21,600.00	12,267.44	21,600.99	12,254.44	141.21	141.05	88.50	9,312.89	445.22	500.09	217.83	282.26	1.772		
21,700.00	12,267.13	21,700.99	12,254.14	142.58	142.42	88.50	9,412.89	444.47	500.09	215.10	285.00	1.755		
21,800.00	12,266.83	21,800.99	12,253.83	143.95	143.79	88.50	9,512.88	443.73	500.09	212.36	287.73	1.738		
21,900.00	12,266.52	21,900.99	12,253.52	145.32	145.16	88.50	9,612.88	442.99	500.09	209.62	290.48	1.722		
22,000.00	12,266.21	22,000.99	12,253.21	146.69	146.53	88.50	9,712.88	442.24	500.09	206.87	293.22	1.706		
22,100.00	12,265.90	22,100.99	12,252.91	148.06	147.90	88.50	9,812.87	441.50	500.09	204.13	295.96	1.690		
22,200.00	12,265.60	22,200.99	12,252.60	149.44	149.28	88.50	9,912.87	440.75	500.09	201.38	298.71	1.674		
22,300.00	12,265.29	22,300.99	12,252.29	150.81	150.65	88.50	10,012.87	440.01	500.09	198.63	301.46	1.659		
22,394.02	12,265.00	22,395.00	12,252.00	152.11	151.94	88.50	10,106.88	439.31	500.09	196.04	304.05	1.645 SF		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design: Fez Federal Com - 703H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													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	89.43	0.30	30.10	30.12				
100.00	100.00	98.90	98.90	0.13	0.13	89.43	0.30	30.10	30.10	29.83	0.27	112.561	
200.00	200.00	198.90	198.90	0.49	0.49	89.43	0.30	30.10	30.10	29.12	0.98	30.658	
300.00	300.00	298.90	298.90	0.85	0.85	89.43	0.30	30.10	30.10	28.40	1.70	17.719	
400.00	400.00	398.90	398.90	1.21	1.21	89.43	0.30	30.10	30.10	27.69	2.42	12.461	
500.00	500.00	498.90	498.90	1.57	1.56	89.43	0.30	30.10	30.10	26.97	3.13	9.609	
600.00	600.00	598.90	598.90	1.93	1.92	89.43	0.30	30.10	30.10	26.25	3.85	7.819	
700.00	700.00	698.90	698.90	2.29	2.28	89.43	0.30	30.10	30.10	25.53	4.57	6.592	
800.00	800.00	798.90	798.90	2.64	2.64	89.43	0.30	30.10	30.10	24.82	5.28	5.697	
900.00	900.00	898.90	898.90	3.00	3.00	89.43	0.30	30.10	30.10	24.10	6.00	5.017	
1,000.00	1,000.00	998.90	998.90	3.36	3.36	89.43	0.30	30.10	30.10	23.38	6.72	4.481	
1,100.00	1,100.00	1,098.90	1,098.90	3.72	3.72	89.43	0.30	30.10	30.10	22.67	7.43	4.049	
1,200.00	1,200.00	1,198.90	1,198.90	4.08	4.07	89.43	0.30	30.10	30.10	21.95	8.16	3.693	
1,300.00	1,300.00	1,298.90	1,298.90	4.44	4.43	89.43	0.30	30.10	30.10	21.23	8.87	3.394	
1,400.00	1,400.00	1,398.90	1,398.90	4.79	4.79	89.43	0.30	30.10	30.10	20.52	9.59	3.140	
1,500.00	1,500.00	1,498.90	1,498.90	5.15	5.15	89.43	0.30	30.10	30.10	19.80	10.30	2.922 CC, ES	
1,600.00	1,599.98	1,598.17	1,598.15	5.49	5.49	-87.45	-0.89	31.28	31.18	20.20	10.98	2.839	
1,700.00	1,699.84	1,697.34	1,697.19	5.82	5.82	-89.81	-4.52	34.88	34.51	22.87	11.64	2.965	
1,800.00	1,799.45	1,796.35	1,795.82	6.15	6.15	-92.83	-10.57	40.88	40.18	27.87	12.30	3.266	
1,900.00	1,898.90	1,895.05	1,894.98	6.48	6.49	-95.46	-17.97	48.22	47.16	34.18	12.98	3.634	
2,000.00	1,998.36	1,995.79	1,994.17	6.82	6.84	-97.41	-25.38	55.57	54.22	40.56	13.66	3.968	
2,100.00	2,097.81	2,095.52	2,093.35	7.17	7.19	-98.91	-32.78	62.91	61.33	46.97	14.36	4.271	
2,200.00	2,197.26	2,195.26	2,192.54	7.52	7.54	-100.10	-40.19	70.25	68.47	53.41	15.06	4.546	
2,300.00	2,296.72	2,294.99	2,291.73	7.87	7.90	-101.06	-47.59	77.60	75.63	59.86	15.77	4.795	
2,400.00	2,396.17	2,394.73	2,390.92	8.23	8.26	-101.86	-55.00	84.94	82.81	66.32	16.49	5.022	
2,500.00	2,495.62	2,494.47	2,490.11	8.59	8.62	-102.53	-62.40	92.28	90.01	72.80	17.21	5.230	
2,600.00	2,595.07	2,594.20	2,589.30	8.95	8.98	-103.10	-69.80	99.63	97.21	79.28	17.94	5.420	
2,700.00	2,694.53	2,693.94	2,688.49	9.32	9.35	-103.59	-77.21	106.97	104.43	85.76	18.67	5.595	
2,800.00	2,793.98	2,793.67	2,787.68	9.68	9.72	-104.02	-84.61	114.31	111.65	92.25	19.40	5.755	
2,900.00	2,893.43	2,893.41	2,886.87	10.05	10.08	-104.40	-92.02	121.66	118.87	98.74	20.14	5.904	
3,000.00	2,992.89	2,993.14	2,986.06	10.42	10.45	-104.73	-99.42	129.00	126.10	105.23	20.87	6.041	
3,100.00	3,092.34	3,092.88	3,085.25	10.79	10.82	-105.03	-106.83	136.34	133.34	111.72	21.62	6.168	
3,200.00	3,191.79	3,192.62	3,184.43	11.16	11.20	-105.29	-114.23	143.69	140.58	118.21	22.36	6.287	
3,300.00	3,291.24	3,292.35	3,283.62	11.54	11.57	-105.53	-121.63	151.03	147.82	124.71	23.11	6.397	
3,400.00	3,390.70	3,392.09	3,382.81	11.91	11.94	-105.75	-129.04	158.37	155.06	131.20	23.86	6.500	
3,500.00	3,490.15	3,491.82	3,482.00	12.29	12.32	-105.95	-136.44	165.72	162.30	137.70	24.60	6.596	
3,600.00	3,589.60	3,591.56	3,581.19	12.66	12.69	-106.13	-143.85	173.06	169.55	144.19	25.36	6.687	
3,700.00	3,689.06	3,691.29	3,680.38	13.04	13.07	-106.30	-151.25	180.40	176.80	150.69	26.11	6.771	
3,800.00	3,788.65	3,791.05	3,779.59	13.41	13.45	-106.11	-158.66	187.75	183.61	156.75	26.86	6.836	
3,900.00	3,888.50	3,890.78	3,878.77	13.77	13.83	-104.92	-166.06	195.09	189.51	161.92	27.60	6.867	
4,000.00	3,988.48	3,990.36	3,977.81	14.12	14.20	-102.80	-173.45	202.42	194.71	166.39	28.32	6.876	
4,100.00	4,088.48	4,089.82	4,076.72	14.45	14.58	75.77	-180.84	209.75	199.84	170.81	29.03	6.884	
4,200.00	4,188.48	4,189.27	4,175.62	14.79	14.96	78.28	-188.22	217.07	205.37	175.63	29.74	6.905	
4,300.00	4,288.48	4,288.72	4,274.53	15.12	15.34	80.65	-195.60	224.39	211.28	180.82	30.46	6.937	
4,400.00	4,388.48	4,388.17	4,373.44	15.46	15.71	82.88	-202.99	231.71	217.52	186.35	31.17	6.978	
4,500.00	4,488.48	4,487.62	4,472.34	15.80	16.09	84.99	-210.37	239.04	224.08	192.19	31.89	7.027	
4,600.00	4,588.48	4,587.92	4,572.10	16.14	16.48	86.99	-217.79	246.39	230.91	198.29	32.61	7.081	
4,700.00	4,688.48	4,693.43	4,677.25	16.47	16.87	88.53	-223.84	252.39	236.38	203.03	33.34	7.089	
4,800.00	4,788.48	4,799.42	4,783.14	16.82	17.25	89.34	-227.14	255.67	239.41	205.35	34.07	7.028	
4,900.00	4,888.48	4,903.67	4,887.38	17.16	17.60	89.50	-227.80	256.32	240.02	205.26	34.76	6.905	
5,000.00	4,988.48	5,003.67	4,987.38	17.50	17.93	89.50	-227.80	256.32	240.02	204.59	35.43	6.774	
5,100.00	5,088.48	5,103.67	5,087.38	17.84	18.27	89.50	-227.80	256.32	240.02	203.91	36.11	6.647	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 703H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													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 Centra (usft)	Between Ellipsas (usft)	Minimum Separation (usft)	Separation Factor		
5,200.00	5,188.48	5,203.67	5,187.38	18.18	18.60	89.50	-227.80	256.32	240.02	203.24	36.78	6.525		
5,300.00	5,288.48	5,303.67	5,287.38	18.53	18.94	89.50	-227.80	256.32	240.02	202.56	37.46	6.407		
5,400.00	5,388.48	5,403.67	5,387.38	18.87	19.27	89.50	-227.80	256.32	240.02	201.88	38.14	6.293		
5,500.00	5,488.48	5,503.67	5,487.38	19.22	19.61	89.50	-227.80	256.32	240.02	201.20	38.82	6.182		
5,600.00	5,588.48	5,603.67	5,587.38	19.56	19.94	89.50	-227.80	256.32	240.02	200.51	39.51	6.076		
5,700.00	5,688.48	5,703.67	5,687.38	19.91	20.28	89.50	-227.80	256.32	240.02	199.83	40.19	5.972		
5,800.00	5,788.48	5,803.67	5,787.38	20.25	20.62	89.50	-227.80	256.32	240.02	199.15	40.87	5.872		
5,900.00	5,888.48	5,903.67	5,887.38	20.60	20.96	89.50	-227.80	256.32	240.02	198.46	41.56	5.775		
6,000.00	5,988.48	6,003.67	5,987.38	20.95	21.30	89.50	-227.80	256.32	240.02	197.77	42.25	5.681		
6,100.00	6,088.48	6,103.67	6,087.38	21.29	21.64	89.50	-227.80	256.32	240.02	197.09	42.93	5.590		
6,200.00	6,188.48	6,203.67	6,187.38	21.64	21.98	89.50	-227.80	256.32	240.02	196.40	43.62	5.502		
6,300.00	6,288.48	6,303.67	6,287.38	21.99	22.32	89.50	-227.80	256.32	240.02	195.71	44.31	5.417		
6,400.00	6,388.48	6,403.67	6,387.38	22.34	22.67	89.50	-227.80	256.32	240.02	195.02	45.00	5.333		
6,500.00	6,488.48	6,503.67	6,487.38	22.69	23.01	89.50	-227.80	256.32	240.02	194.33	45.69	5.253		
6,600.00	6,588.48	6,603.67	6,587.38	23.04	23.35	89.50	-227.80	256.32	240.02	193.63	46.39	5.174		
6,700.00	6,688.48	6,703.67	6,687.38	23.39	23.69	89.50	-227.80	256.32	240.02	192.94	47.08	5.098		
6,800.00	6,788.48	6,803.67	6,787.38	23.73	24.04	89.50	-227.80	256.32	240.02	192.25	47.77	5.024		
6,900.00	6,888.48	6,903.67	6,887.38	24.08	24.38	89.50	-227.80	256.32	240.02	191.55	48.47	4.952		
7,000.00	6,988.48	7,003.67	6,987.38	24.43	24.73	89.50	-227.80	256.32	240.02	190.86	49.16	4.882		
7,100.00	7,088.48	7,103.67	7,087.38	24.78	25.07	89.50	-227.80	256.32	240.02	190.16	49.86	4.814		
7,200.00	7,188.48	7,203.67	7,187.38	25.14	25.42	89.50	-227.80	256.32	240.02	189.47	50.55	4.748		
7,300.00	7,288.48	7,303.67	7,287.38	25.49	25.76	89.50	-227.80	256.32	240.02	188.77	51.25	4.683		
7,400.00	7,388.48	7,403.67	7,387.38	25.84	26.11	89.50	-227.80	256.32	240.02	188.07	51.95	4.620		
7,500.00	7,488.48	7,503.67	7,487.38	26.19	26.46	89.50	-227.80	256.32	240.02	187.38	52.65	4.559		
7,600.00	7,588.48	7,603.67	7,587.38	26.54	26.80	89.50	-227.80	256.32	240.02	186.68	53.34	4.500		
7,700.00	7,688.48	7,703.67	7,687.38	26.89	27.15	89.50	-227.80	256.32	240.02	185.98	54.04	4.441		
7,800.00	7,788.48	7,803.67	7,787.38	27.24	27.50	89.50	-227.80	256.32	240.02	185.28	54.74	4.385		
7,900.00	7,888.48	7,903.67	7,887.38	27.59	27.85	89.50	-227.80	256.32	240.02	184.58	55.44	4.329		
8,000.00	7,988.48	8,003.67	7,987.38	27.95	28.19	89.50	-227.80	256.32	240.02	183.88	56.14	4.275		
8,100.00	8,088.48	8,103.67	8,087.38	28.30	28.54	89.50	-227.80	256.32	240.02	183.18	56.84	4.223		
8,200.00	8,188.48	8,203.67	8,187.38	28.65	28.89	89.50	-227.80	256.32	240.02	182.48	57.54	4.171		
8,300.00	8,288.48	8,303.67	8,287.38	29.00	29.24	89.50	-227.80	256.32	240.02	181.78	58.24	4.121		
8,400.00	8,388.48	8,403.67	8,387.38	29.36	29.59	89.50	-227.80	256.32	240.02	181.08	58.95	4.072		
8,500.00	8,488.48	8,503.67	8,487.38	29.71	29.94	89.50	-227.80	256.32	240.02	180.37	59.65	4.024		
8,600.00	8,588.48	8,603.67	8,587.38	30.06	30.29	89.50	-227.80	256.32	240.02	179.67	60.35	3.977		
8,700.00	8,688.48	8,703.67	8,687.38	30.42	30.64	89.50	-227.80	256.32	240.02	178.97	61.05	3.931		
8,800.00	8,788.48	8,803.67	8,787.38	30.77	30.99	89.50	-227.80	256.32	240.02	178.26	61.76	3.887		
8,900.00	8,888.48	8,903.67	8,887.38	31.12	31.34	89.50	-227.80	256.32	240.02	177.56	62.46	3.843		
9,000.00	8,988.48	9,003.67	8,987.38	31.48	31.69	89.50	-227.80	256.32	240.02	176.86	63.16	3.800		
9,100.00	9,088.48	9,103.67	9,087.38	31.83	32.04	89.50	-227.80	256.32	240.02	176.15	63.87	3.758		
9,200.00	9,188.48	9,203.67	9,187.38	32.18	32.39	89.50	-227.80	256.32	240.02	175.45	64.57	3.717		
9,300.00	9,288.48	9,303.67	9,287.38	32.54	32.74	89.50	-227.80	256.32	240.02	174.74	65.28	3.677		
9,400.00	9,388.48	9,403.67	9,387.38	32.89	33.09	89.50	-227.80	256.32	240.02	174.04	65.98	3.638		
9,500.00	9,488.48	9,503.67	9,487.38	33.24	33.44	89.50	-227.80	256.32	240.02	173.33	66.69	3.599		
9,600.00	9,588.48	9,603.67	9,587.38	33.60	33.79	89.50	-227.80	256.32	240.02	172.63	67.39	3.562		
9,700.00	9,688.48	9,703.67	9,687.38	33.95	34.14	89.50	-227.80	256.32	240.02	171.92	68.10	3.525		
9,800.00	9,788.48	9,803.67	9,787.38	34.31	34.50	89.50	-227.80	256.32	240.02	171.22	68.80	3.489		
9,900.00	9,888.48	9,903.67	9,887.38	34.66	34.85	89.50	-227.80	256.32	240.02	170.51	69.51	3.453		
10,000.00	9,988.48	10,003.67	9,987.38	35.02	35.20	89.50	-227.80	256.32	240.02	169.81	70.22	3.418		
10,100.00	10,088.48	10,103.67	10,087.38	35.37	35.55	89.50	-227.80	256.32	240.02	169.10	70.92	3.384		
10,200.00	10,188.48	10,203.67	10,187.38	35.72	35.90	89.50	-227.80	256.32	240.02	168.39	71.63	3.351		
10,300.00	10,288.48	10,303.67	10,287.38	36.08	36.26	89.50	-227.80	256.32	240.02	167.69	72.34	3.318		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 703H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													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)	+EJ-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
10,400.00	10,388.48	10,403.67	10,387.38	36.43	36.61	89.50	-227.80	256.32	240.02	166.98	73.04	3.286	
10,500.00	10,488.48	10,503.67	10,487.38	36.79	36.96	89.50	-227.80	256.32	240.02	166.27	73.75	3.255	
10,600.00	10,588.48	10,603.67	10,587.38	37.14	37.31	89.50	-227.80	256.32	240.02	165.56	74.46	3.224	
10,700.00	10,688.48	10,703.67	10,687.38	37.50	37.67	89.50	-227.80	256.32	240.02	164.86	75.17	3.193	
10,800.00	10,788.48	10,803.67	10,787.38	37.85	38.02	89.50	-227.80	256.32	240.02	164.15	75.87	3.163	
10,900.00	10,888.48	10,903.67	10,887.38	38.21	38.37	89.50	-227.80	256.32	240.02	163.44	76.58	3.134	
11,000.00	10,988.48	11,003.67	10,987.38	38.56	38.72	89.50	-227.80	256.32	240.02	162.73	77.29	3.105	
11,100.00	11,088.48	11,103.67	11,087.38	38.92	39.08	89.50	-227.80	256.32	240.02	162.02	78.00	3.077	
11,200.00	11,188.48	11,203.67	11,187.38	39.27	39.43	89.50	-227.80	256.32	240.02	161.32	78.71	3.050	
11,300.00	11,288.48	11,303.67	11,287.38	39.63	39.78	89.50	-227.80	256.32	240.02	160.61	79.41	3.022	
11,400.00	11,388.48	11,403.67	11,387.38	39.99	40.14	89.50	-227.80	256.32	240.02	159.90	80.12	2.996	
11,500.00	11,488.48	11,503.67	11,487.38	40.34	40.49	89.50	-227.80	256.32	240.02	159.19	80.83	2.969	
11,600.00	11,588.48	11,603.67	11,587.38	40.70	40.85	89.50	-227.80	256.32	240.02	158.48	81.54	2.944	
11,700.00	11,688.48	11,703.67	11,687.38	41.05	41.20	89.50	-227.80	256.32	240.02	157.77	82.25	2.918	
11,722.53	11,711.00	11,726.19	11,709.90	41.13	41.28	90.00	-227.80	256.32	240.02	157.61	82.41	2.913	
11,800.00	11,788.33	11,803.52	11,787.23	41.40	41.55	90.84	-227.80	256.32	240.05	157.09	82.96	2.894	
11,900.00	11,886.15	11,901.34	11,885.05	41.74	41.90	95.41	-227.80	256.32	241.19	157.56	83.63	2.884	
12,000.00	11,978.98	11,994.39	11,978.10	42.04	42.23	102.73	-227.80	256.32	247.54	163.27	84.27	2.938	
12,100.00	12,064.00	12,099.26	12,082.35	42.32	42.59	111.44	-227.80	256.25	261.91	177.00	84.91	3.085	
12,200.00	12,138.64	12,215.39	12,193.51	42.57	42.96	119.24	-184.93	256.00	281.70	196.17	85.53	3.294	
12,300.00	12,200.61	12,345.58	12,307.33	42.81	43.31	125.89	-122.31	255.54	303.94	217.83	86.11	3.530	
12,400.00	12,248.05	12,492.18	12,414.85	43.03	43.62	131.19	-23.25	254.80	325.07	238.43	86.64	3.752	
12,500.00	12,279.50	12,655.45	12,500.73	43.23	43.92	134.86	114.96	253.77	341.40	254.24	87.15	3.917	
12,600.00	12,294.02	12,831.38	12,545.76	43.43	44.25	136.62	284.31	252.51	349.67	261.98	87.69	3.988	
12,700.00	12,294.80	12,959.26	12,548.80	43.63	44.49	136.74	412.07	251.56	350.26	262.14	88.13	3.974	
12,800.00	12,294.49	13,059.26	12,548.49	43.87	44.73	136.74	512.06	250.81	350.26	261.66	88.60	3.953	
12,900.00	12,294.18	13,159.26	12,548.18	44.16	45.00	136.74	612.06	250.07	350.26	261.10	89.17	3.928	
13,000.00	12,293.87	13,259.26	12,547.87	44.49	45.33	136.74	712.06	249.33	350.26	260.44	89.82	3.900	
13,100.00	12,293.57	13,359.26	12,547.57	44.86	45.69	136.74	812.05	248.58	350.26	259.71	90.56	3.868	
13,200.00	12,293.26	13,459.26	12,547.26	45.28	46.10	136.74	912.05	247.84	350.26	258.88	91.38	3.833	
13,300.00	12,292.95	13,559.26	12,546.95	45.74	46.55	136.74	1,012.05	247.09	350.26	257.98	92.29	3.795	
13,400.00	12,292.64	13,659.26	12,546.64	46.24	47.03	136.74	1,112.04	246.35	350.26	256.99	93.27	3.755	
13,500.00	12,292.34	13,759.26	12,546.34	46.78	47.56	136.74	1,212.04	245.60	350.26	255.93	94.33	3.713	
13,600.00	12,292.03	13,859.26	12,546.03	47.35	48.12	136.74	1,312.04	244.86	350.26	254.79	95.47	3.669	
13,700.00	12,291.72	13,959.26	12,545.72	47.97	48.72	136.74	1,412.04	244.12	350.26	253.58	96.68	3.623	
13,800.00	12,291.42	14,059.26	12,545.41	48.61	49.35	136.74	1,512.03	243.37	350.26	252.30	97.96	3.576	
13,900.00	12,291.11	14,159.26	12,545.11	49.29	50.01	136.74	1,612.03	242.63	350.26	250.96	99.30	3.527	
14,000.00	12,290.80	14,259.26	12,544.80	50.00	50.71	136.74	1,712.03	241.88	350.26	249.55	100.71	3.478	
14,100.00	12,290.49	14,359.26	12,544.49	50.75	51.44	136.74	1,812.02	241.14	350.26	248.08	102.18	3.428	
14,200.00	12,290.19	14,459.26	12,544.18	51.52	52.19	136.74	1,912.02	240.39	350.26	246.55	103.71	3.377	
14,300.00	12,289.88	14,559.26	12,543.88	52.32	52.98	136.74	2,012.02	239.65	350.26	244.97	105.30	3.326	
14,400.00	12,289.57	14,659.26	12,543.57	53.14	53.79	136.74	2,112.01	238.90	350.26	243.33	106.94	3.275	
14,500.00	12,289.26	14,759.26	12,543.26	54.00	54.63	136.74	2,212.01	238.16	350.26	241.64	108.62	3.225	
14,600.00	12,288.96	14,859.26	12,542.96	54.87	55.49	136.74	2,312.01	237.42	350.26	239.90	110.36	3.174	
14,700.00	12,288.65	14,959.26	12,542.65	55.77	56.38	136.74	2,412.00	236.67	350.26	238.12	112.15	3.123	
14,800.00	12,288.34	15,059.26	12,542.34	56.69	57.28	136.74	2,512.00	235.93	350.26	236.29	113.98	3.073	
14,900.00	12,288.03	15,159.26	12,542.03	57.64	58.21	136.74	2,612.00	235.18	350.26	234.41	115.85	3.023	
15,000.00	12,287.73	15,259.26	12,541.73	58.60	59.16	136.74	2,711.99	234.44	350.26	232.50	117.76	2.974	
15,100.00	12,287.42	15,359.26	12,541.42	59.58	60.13	136.74	2,811.99	233.69	350.26	230.55	119.71	2.926	
15,200.00	12,287.11	15,459.26	12,541.11	60.58	61.12	136.74	2,911.99	232.95	350.26	228.56	121.70	2.878	
15,300.00	12,286.81	15,559.26	12,540.80	61.60	62.12	136.74	3,011.98	232.20	350.26	226.54	123.72	2.831	
15,400.00	12,286.50	15,659.26	12,540.50	62.63	63.14	136.74	3,111.98	231.46	350.26	224.49	125.78	2.785	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 703H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
15,500.00	12,286.19	15,759.26	12,540.19	63.68	64.18	136.74	3,211.98	230.72	350.26	222.40	127.86	2.739		
15,600.00	12,285.88	15,859.26	12,539.88	64.75	65.23	136.74	3,311.97	229.97	350.26	220.29	129.98	2.695		
15,700.00	12,285.58	15,959.26	12,539.57	65.82	66.30	136.74	3,411.97	229.23	350.26	218.14	132.12	2.651		
15,800.00	12,285.27	16,059.26	12,539.27	66.92	67.38	136.74	3,511.97	228.48	350.26	215.97	134.29	2.608		
15,900.00	12,284.96	16,159.26	12,538.96	68.02	68.47	136.74	3,611.96	227.74	350.26	213.77	136.49	2.566		
16,000.00	12,284.65	16,259.26	12,538.65	69.14	69.58	136.74	3,711.96	226.99	350.26	211.55	138.71	2.525		
16,100.00	12,284.35	16,359.26	12,538.34	70.27	70.69	136.74	3,811.96	226.25	350.26	209.30	140.96	2.485		
16,200.00	12,284.04	16,459.26	12,538.04	71.41	71.82	136.74	3,911.95	225.51	350.26	207.03	143.23	2.445		
16,300.00	12,283.73	16,559.26	12,537.73	72.56	72.96	136.74	4,011.95	224.76	350.26	204.74	145.52	2.407		
16,400.00	12,283.42	16,659.26	12,537.42	73.72	74.11	136.74	4,111.95	224.02	350.26	202.43	147.83	2.369		
16,500.00	12,283.12	16,759.26	12,537.12	74.88	75.27	136.74	4,211.94	223.27	350.26	200.11	150.16	2.333		
16,600.00	12,282.81	16,859.26	12,536.81	76.06	76.44	136.74	4,311.94	222.53	350.26	197.76	152.50	2.297		
16,700.00	12,282.50	16,959.26	12,536.50	77.25	77.62	136.74	4,411.94	221.78	350.26	195.39	154.87	2.262		
16,800.00	12,282.19	17,059.26	12,536.19	78.45	78.81	136.75	4,511.93	221.04	350.26	193.01	157.25	2.227		
16,900.00	12,281.89	17,159.26	12,535.89	79.65	80.00	136.75	4,611.93	220.29	350.26	190.61	159.65	2.194		
17,000.00	12,281.58	17,259.26	12,535.58	80.86	81.20	136.75	4,711.93	219.55	350.26	188.20	162.07	2.161		
17,100.00	12,281.27	17,359.26	12,535.27	82.08	82.41	136.75	4,811.92	218.81	350.26	185.77	164.49	2.129		
17,200.00	12,280.97	17,459.26	12,534.96	83.31	83.63	136.75	4,911.92	218.06	350.26	183.33	166.94	2.098		
17,300.00	12,280.66	17,559.26	12,534.66	84.54	84.86	136.75	5,011.92	217.32	350.26	180.87	169.39	2.068		
17,400.00	12,280.35	17,659.26	12,534.35	85.78	86.09	136.75	5,111.92	216.57	350.26	178.40	171.86	2.038		
17,500.00	12,280.04	17,759.26	12,534.04	87.02	87.32	136.75	5,211.91	215.83	350.26	175.92	174.34	2.009		
17,600.00	12,279.74	17,859.26	12,533.73	88.27	88.57	136.75	5,311.91	215.08	350.26	173.43	176.84	1.981		
17,700.00	12,279.43	17,959.26	12,533.43	89.53	89.81	136.75	5,411.91	214.34	350.26	170.92	179.34	1.953		
17,800.00	12,279.12	18,059.26	12,533.12	90.79	91.07	136.75	5,511.90	213.60	350.26	168.41	181.86	1.926		
17,900.00	12,278.81	18,159.26	12,532.81	92.05	92.33	136.75	5,611.90	212.85	350.26	165.88	184.38	1.900		
18,000.00	12,278.51	18,259.26	12,532.50	93.32	93.59	136.75	5,711.90	212.11	350.26	163.34	186.92	1.874		
18,100.00	12,278.20	18,359.26	12,532.20	94.60	94.86	136.75	5,811.89	211.36	350.26	160.80	189.46	1.849		
18,200.00	12,277.89	18,459.26	12,531.89	95.88	96.14	136.75	5,911.89	210.62	350.26	158.24	192.02	1.824		
18,300.00	12,277.58	18,559.26	12,531.58	97.17	97.42	136.75	6,011.89	209.87	350.26	155.68	194.58	1.800		
18,400.00	12,277.28	18,659.26	12,531.28	98.45	98.70	136.75	6,111.88	209.13	350.26	153.11	197.15	1.777		
18,500.00	12,276.97	18,759.26	12,530.97	99.75	99.99	136.75	6,211.88	208.38	350.26	150.53	199.73	1.754		
18,600.00	12,276.66	18,859.26	12,530.66	101.04	101.28	136.75	6,311.88	207.64	350.26	147.94	202.32	1.731		
18,700.00	12,276.35	18,959.26	12,530.35	102.35	102.57	136.75	6,411.87	206.90	350.26	145.34	204.92	1.709		
18,800.00	12,276.05	19,059.26	12,530.05	103.65	103.87	136.75	6,511.87	206.15	350.26	142.74	207.52	1.688		
18,900.00	12,275.74	19,159.26	12,529.74	104.96	105.17	136.75	6,611.87	205.41	350.26	140.13	210.13	1.667		
19,000.00	12,275.43	19,259.26	12,529.43	106.27	106.48	136.75	6,711.86	204.66	350.26	137.51	212.75	1.646		
19,100.00	12,275.13	19,359.26	12,529.12	107.58	107.79	136.75	6,811.86	203.92	350.26	134.89	215.37	1.626		
19,200.00	12,274.82	19,459.26	12,528.82	108.90	109.10	136.75	6,911.86	203.17	350.26	132.26	218.00	1.607		
19,300.00	12,274.51	19,559.26	12,528.51	110.22	110.42	136.75	7,011.85	202.43	350.26	129.63	220.64	1.588		
19,400.00	12,274.20	19,659.26	12,528.20	111.54	111.73	136.75	7,111.85	201.69	350.26	126.98	223.28	1.569		
19,500.00	12,273.90	19,759.26	12,527.89	112.87	113.05	136.75	7,211.85	200.94	350.26	124.34	225.92	1.550		
19,600.00	12,273.59	19,859.26	12,527.59	114.20	114.38	136.75	7,311.84	200.20	350.26	121.68	228.58	1.532		
19,700.00	12,273.28	19,959.26	12,527.28	115.53	115.71	136.75	7,411.84	199.45	350.26	119.03	231.23	1.515		
19,800.00	12,272.97	20,059.26	12,526.97	116.86	117.03	136.75	7,511.84	198.71	350.26	116.36	233.90	1.498 Level 3		
19,900.00	12,272.67	20,159.26	12,526.67	118.20	118.37	136.75	7,611.83	197.96	350.26	113.70	236.56	1.481 Level 3		
20,000.00	12,272.36	20,259.26	12,526.36	119.54	119.70	136.75	7,711.83	197.22	350.26	111.02	239.24	1.464 Level 3		
20,100.00	12,272.05	20,359.26	12,526.05	120.88	121.04	136.75	7,811.83	196.47	350.26	108.35	241.91	1.448 Level 3		
20,200.00	12,271.74	20,459.26	12,525.74	122.22	122.38	136.75	7,911.82	195.73	350.26	105.67	244.59	1.432 Level 3		
20,300.00	12,271.44	20,559.26	12,525.44	123.56	123.72	136.75	8,011.82	194.99	350.26	102.98	247.28	1.416 Level 3		
20,400.00	12,271.13	20,659.26	12,525.13	124.91	125.06	136.75	8,111.82	194.24	350.26	100.29	249.97	1.401 Level 3		
20,500.00	12,270.82	20,759.26	12,524.82	126.26	126.40	136.75	8,211.81	193.50	350.26	97.60	252.66	1.386 Level 3		
20,600.00	12,270.51	20,859.26	12,524.51	127.61	127.75	136.75	8,311.81	192.75	350.26	94.90	255.36	1.372 Level 3		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 703H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													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		
20,700.00	12,270.21	20,959.26	12,524.21	128.96	129.10	136.75	8,411.81	192.01	350.26	92.20	258.06	1.357	Level 3	
20,800.00	12,269.90	21,059.26	12,523.90	130.32	130.45	136.75	8,511.80	191.26	350.26	89.49	260.77	1.343	Level 3	
20,900.00	12,269.59	21,159.26	12,523.59	131.67	131.80	136.75	8,611.80	190.52	350.26	86.78	263.48	1.329	Level 3	
21,000.00	12,269.29	21,259.26	12,523.28	133.03	133.16	136.75	8,711.80	189.77	350.26	84.07	266.19	1.316	Level 3	
21,100.00	12,268.98	21,359.26	12,522.98	134.39	134.51	136.75	8,811.80	189.03	350.26	81.36	268.90	1.303	Level 3	
21,200.00	12,268.67	21,459.26	12,522.67	135.75	135.87	136.75	8,911.79	188.29	350.26	78.64	271.62	1.290	Level 3	
21,300.00	12,268.36	21,559.26	12,522.36	137.11	137.23	136.75	9,011.79	187.54	350.26	75.91	274.34	1.277	Level 3	
21,400.00	12,268.06	21,659.26	12,522.05	138.48	138.59	136.75	9,111.79	186.80	350.26	73.19	277.07	1.264	Level 3	
21,500.00	12,267.75	21,759.26	12,521.75	139.84	139.95	136.75	9,211.78	186.05	350.26	70.46	279.80	1.252	Level 3	
21,600.00	12,267.44	21,859.26	12,521.44	141.21	141.32	136.75	9,311.78	185.31	350.26	67.73	282.53	1.240	Level 2	
21,700.00	12,267.13	21,959.26	12,521.13	142.58	142.68	136.75	9,411.78	184.56	350.26	65.00	285.26	1.228	Level 2	
21,800.00	12,266.83	22,059.26	12,520.83	143.95	144.05	136.75	9,511.77	183.82	350.26	62.26	288.00	1.216	Level 2	
21,900.00	12,266.52	22,159.26	12,520.52	145.32	145.42	136.75	9,611.77	183.08	350.26	59.52	290.74	1.205	Level 2	
22,000.00	12,266.21	22,259.26	12,520.21	146.69	146.79	136.75	9,711.77	182.33	350.26	56.78	293.48	1.193	Level 2	
22,100.00	12,265.90	22,359.26	12,519.90	148.06	148.16	136.75	9,811.76	181.59	350.26	54.04	296.22	1.182	Level 2	
22,200.00	12,265.60	22,459.26	12,519.60	149.44	149.53	136.75	9,911.76	180.84	350.26	51.29	298.97	1.172	Level 2	
22,300.00	12,265.29	22,559.26	12,519.29	150.81	150.90	136.75	10,011.76	180.10	350.26	48.54	301.72	1.161	Level 2	
22,391.21	12,265.01	22,650.47	12,519.01	152.07	152.16	136.75	10,102.96	179.42	350.26	46.03	304.22	1.151	Level 2	
22,394.02	12,265.00	22,653.01	12,519.00	152.11	152.19	136.75	10,105.50	179.40	350.26	45.96	304.30	1.151	Level 2, SF	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 704H - OH - Plan 1 10-12-18													Offset Site Error:	0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error:	0.00 usft
Reference		Offset		Semi Major Axis			Distance				Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N-S (usft)	+E-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor		
0.00	0.00	13.60	13.60	0.00	0.02	-90.49	-4.90	-574.90	574.92					
100.00	100.00	113.60	113.60	0.13	0.17	-90.49	-4.90	-574.90	574.92	574.61	0.31	1,862.729		
200.00	200.00	213.60	213.60	0.49	0.53	-90.49	-4.90	-574.90	574.92	573.90	1.03	560.577		
300.00	300.00	313.60	313.60	0.85	0.89	-90.49	-4.90	-574.90	574.92	573.18	1.74	329.934		
400.00	400.00	413.60	413.60	1.21	1.25	-90.49	-4.90	-574.90	574.92	572.46	2.46	233.758		
500.00	500.00	513.60	513.60	1.57	1.61	-90.49	-4.90	-574.90	574.92	571.74	3.18	180.997		
600.00	600.00	613.60	613.60	1.93	1.97	-90.49	-4.90	-574.90	574.92	571.03	3.89	147.667		
700.00	700.00	713.60	713.60	2.29	2.33	-90.49	-4.90	-574.90	574.92	570.31	4.61	124.704		
800.00	800.00	813.60	813.60	2.64	2.68	-90.49	-4.90	-574.90	574.92	569.59	5.33	107.921		
900.00	900.00	913.60	913.60	3.00	3.04	-90.49	-4.90	-574.90	574.92	568.88	6.04	95.120		
1,000.00	1,000.00	1,013.60	1,013.60	3.36	3.40	-90.49	-4.90	-574.90	574.92	568.16	6.76	85.033		
1,100.00	1,100.00	1,113.60	1,113.60	3.72	3.76	-90.49	-4.90	-574.90	574.92	567.44	7.48	76.881		
1,200.00	1,200.00	1,213.60	1,213.60	4.08	4.12	-90.49	-4.90	-574.90	574.92	566.73	8.20	70.155		
1,300.00	1,300.00	1,313.60	1,313.60	4.44	4.48	-90.49	-4.90	-574.90	574.92	566.01	8.91	64.511		
1,400.00	1,400.00	1,413.60	1,413.60	4.79	4.83	-90.49	-4.90	-574.90	574.92	565.29	9.63	59.708		
1,500.00	1,500.00	1,516.32	1,516.32	5.15	5.20	-90.49	-4.93	-574.86	574.89	564.54	10.35	55.527		
1,600.00	1,599.98	1,636.30	1,636.24	5.49	5.61	93.64	-6.68	-572.19	572.78	561.68	11.10	51.583		
1,700.00	1,699.84	1,755.00	1,754.66	5.82	6.01	93.92	-11.11	-565.42	567.43	555.60	11.83	47.964		
1,800.00	1,799.45	1,854.70	1,853.60	6.15	6.35	94.45	-15.88	-558.15	560.75	548.25	12.50	44.856		
1,900.00	1,898.90	1,954.32	1,953.23	6.48	6.69	95.04	-20.63	-550.88	554.26	541.08	13.18	42.058		
2,000.00	1,998.36	2,053.95	2,052.47	6.82	7.04	95.64	-25.39	-543.62	547.82	533.95	13.87	39.505		
2,100.00	2,097.81	2,153.57	2,151.72	7.17	7.39	96.25	-30.15	-536.35	541.44	526.88	14.56	37.178		
2,200.00	2,197.26	2,253.20	2,250.97	7.52	7.75	96.88	-34.91	-529.09	535.13	519.86	15.27	35.051		
2,300.00	2,296.72	2,352.83	2,350.21	7.87	8.10	97.52	-39.67	-521.82	528.88	512.91	15.98	33.104		
2,400.00	2,396.17	2,452.45	2,449.46	8.23	8.46	98.18	-44.43	-514.56	522.71	506.02	16.69	31.317		
2,500.00	2,495.62	2,552.08	2,548.71	8.59	8.82	98.85	-49.19	-507.29	516.60	499.19	17.41	29.674		
2,600.00	2,595.07	2,651.70	2,647.95	8.95	9.18	99.54	-53.95	-500.03	510.56	492.43	18.13	28.158		
2,700.00	2,694.53	2,751.33	2,747.20	9.32	9.54	100.25	-58.71	-492.76	504.61	485.75	18.86	26.758		
2,800.00	2,793.98	2,850.95	2,846.45	9.68	9.90	100.97	-63.47	-485.50	498.73	479.14	19.59	25.462		
2,900.00	2,893.43	2,950.58	2,945.69	10.05	10.27	101.71	-68.23	-478.23	492.93	472.61	20.32	24.260		
3,000.00	2,992.89	3,050.21	3,044.94	10.42	10.63	102.47	-72.99	-470.97	487.21	466.16	21.05	23.142		
3,100.00	3,092.34	3,149.83	3,144.19	10.79	11.00	103.25	-77.74	-463.70	481.59	459.80	21.79	22.102		
3,200.00	3,191.79	3,249.46	3,243.43	11.16	11.36	104.04	-82.50	-456.44	476.05	453.52	22.53	21.131		
3,300.00	3,291.24	3,349.08	3,342.68	11.54	11.73	104.85	-87.26	-449.17	470.61	447.34	23.27	20.225		
3,400.00	3,390.70	3,448.71	3,441.93	11.91	12.10	105.68	-92.02	-441.91	465.26	441.25	24.01	19.378		
3,500.00	3,490.15	3,548.34	3,541.17	12.29	12.47	106.53	-96.78	-434.64	460.01	435.26	24.75	18.584		
3,600.00	3,589.60	3,647.96	3,640.42	12.66	12.84	107.40	-101.54	-427.38	454.87	429.37	25.50	17.839		
3,700.00	3,689.06	3,747.59	3,739.67	13.04	13.21	108.29	-106.30	-420.11	449.84	423.59	26.24	17.140		
3,800.00	3,788.65	3,847.28	3,838.97	13.41	13.58	109.19	-111.06	-412.84	444.41	417.42	26.99	16.468		
3,900.00	3,888.50	3,947.03	3,938.35	13.77	13.95	109.10	-115.83	-405.57	437.89	410.17	27.72	15.797		
4,000.00	3,988.48	4,046.73	4,037.67	14.12	14.32	108.83	-120.59	-398.30	430.24	401.81	28.44	15.131		
4,100.00	4,088.48	4,146.35	4,136.91	14.45	14.69	-75.61	-125.35	-391.03	421.98	392.84	29.14	14.481		
4,200.00	4,188.48	4,245.97	4,236.15	14.79	15.06	-76.00	-130.11	-383.77	413.74	383.89	29.85	13.862		
4,300.00	4,288.48	4,345.59	4,335.39	15.12	15.43	-76.40	-134.87	-376.50	405.51	374.96	30.55	13.272		
4,400.00	4,388.48	4,445.21	4,434.63	15.46	15.80	-76.82	-139.63	-369.24	397.31	366.04	31.26	12.709		
4,500.00	4,488.48	4,544.83	4,533.87	15.80	16.18	-77.26	-144.38	-361.97	389.13	357.15	31.97	12.170		
4,600.00	4,588.48	4,644.44	4,633.11	16.14	16.55	-77.72	-149.14	-354.71	380.97	348.28	32.68	11.656		
4,700.00	4,688.48	4,744.06	4,732.35	16.47	16.92	-78.20	-153.90	-347.44	372.84	339.44	33.40	11.164		
4,800.00	4,788.48	4,843.68	4,831.59	16.82	17.29	-78.70	-158.66	-340.18	364.73	330.62	34.11	10.693		
4,900.00	4,888.48	4,943.30	4,930.83	17.16	17.67	-79.23	-163.42	-332.92	356.65	321.83	34.82	10.242		
5,000.00	4,988.48	5,042.92	5,030.07	17.50	18.04	-79.77	-168.18	-325.65	348.61	313.07	35.54	9.809		
5,100.00	5,088.48	5,142.54	5,129.31	17.84	18.41	-80.34	-172.94	-318.39	340.60	304.34	36.25	9.395		

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 704H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance			Warning			
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre -N-S (usft)	+E-JW (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
5,200.00	5,188.48	5,242.16	5,228.55	18.18	18.79	-80.94	-177.70	-311.12	332.62	295.65	36.97	8.997	
5,300.00	5,288.48	5,341.78	5,327.79	18.53	19.16	-81.57	-182.46	-303.86	324.68	286.99	37.69	8.615	
5,400.00	5,388.48	5,441.40	5,427.03	18.87	19.54	-82.24	-187.21	-296.59	316.78	278.38	38.41	8.248	
5,500.00	5,488.48	5,541.02	5,526.27	19.22	19.91	-82.93	-191.97	-289.33	308.93	269.80	39.13	7.896	
5,600.00	5,588.48	5,640.64	5,625.51	19.56	20.28	-83.66	-196.73	-282.06	301.12	261.28	39.85	7.557	
5,700.00	5,688.48	5,740.26	5,724.75	19.91	20.66	-84.43	-201.49	-274.80	293.37	252.80	40.57	7.232	
5,800.00	5,788.48	5,839.88	5,823.99	20.25	21.03	-85.24	-206.25	-267.53	285.67	244.38	41.29	6.919	
5,900.00	5,888.48	5,939.50	5,923.23	20.60	21.41	-86.10	-211.01	-260.27	278.03	236.02	42.01	6.619	
6,000.00	5,988.48	6,039.11	6,022.47	20.95	21.78	-87.00	-215.77	-253.01	270.46	227.73	42.73	6.330	
6,100.00	6,088.48	6,138.73	6,121.71	21.29	22.16	-87.96	-220.53	-245.74	262.95	219.50	43.45	6.052	
6,200.00	6,188.48	6,238.35	6,220.95	21.64	22.53	-88.97	-225.29	-238.48	255.53	211.35	44.17	5.785	
6,300.00	6,288.48	6,332.19	6,314.51	21.99	22.88	-89.84	-229.17	-232.55	249.17	204.31	44.87	5.553	
6,400.00	6,388.48	6,425.37	6,407.60	22.34	23.21	-90.35	-231.38	-229.18	245.56	200.01	45.55	5.391	
6,500.00	6,488.48	6,519.85	6,502.08	22.69	23.54	-90.48	-231.95	-228.31	244.62	198.40	46.22	5.292	
6,600.00	6,588.48	6,619.85	6,602.08	23.04	23.87	-90.48	-231.95	-228.31	244.62	197.72	46.90	5.215	
6,700.00	6,688.48	6,719.85	6,702.08	23.39	24.20	-90.48	-231.95	-228.31	244.62	197.04	47.59	5.141	
6,800.00	6,788.48	6,819.85	6,802.08	23.73	24.53	-90.48	-231.95	-228.31	244.62	196.36	48.27	5.068	
6,900.00	6,888.48	6,919.85	6,902.08	24.08	24.87	-90.48	-231.95	-228.31	244.62	195.67	48.95	4.997	
7,000.00	6,988.48	7,019.85	7,002.08	24.43	25.20	-90.48	-231.95	-228.31	244.62	194.99	49.64	4.928	
7,100.00	7,088.48	7,119.85	7,102.08	24.78	25.54	-90.48	-231.95	-228.31	244.62	194.30	50.32	4.861	
7,200.00	7,188.48	7,219.85	7,202.08	25.14	25.87	-90.48	-231.95	-228.31	244.62	193.62	51.01	4.796	
7,300.00	7,288.48	7,319.85	7,302.08	25.49	26.21	-90.48	-231.95	-228.31	244.62	192.93	51.69	4.732	
7,400.00	7,388.48	7,419.85	7,402.08	25.84	26.54	-90.48	-231.95	-228.31	244.62	192.24	52.38	4.670	
7,500.00	7,488.48	7,519.85	7,502.08	26.19	26.88	-90.48	-231.95	-228.31	244.62	191.55	53.07	4.609	
7,600.00	7,588.48	7,619.85	7,602.08	26.54	27.22	-90.48	-231.95	-228.31	244.62	190.87	53.76	4.550	
7,700.00	7,688.48	7,719.85	7,702.08	26.89	27.56	-90.48	-231.95	-228.31	244.62	190.18	54.45	4.493	
7,800.00	7,788.48	7,819.85	7,802.08	27.24	27.90	-90.48	-231.95	-228.31	244.62	189.49	55.14	4.436	
7,900.00	7,888.48	7,919.85	7,902.08	27.59	28.24	-90.48	-231.95	-228.31	244.62	188.79	55.83	4.382	
8,000.00	7,988.48	8,019.85	8,002.08	27.95	28.58	-90.48	-231.95	-228.31	244.62	188.10	56.52	4.328	
8,100.00	8,088.48	8,119.85	8,102.08	28.30	28.92	-90.48	-231.95	-228.31	244.62	187.41	57.22	4.275	
8,200.00	8,188.48	8,219.85	8,202.08	28.65	29.26	-90.48	-231.95	-228.31	244.62	186.72	57.91	4.224	
8,300.00	8,288.48	8,319.85	8,302.08	29.00	29.60	-90.48	-231.95	-228.31	244.62	186.02	58.60	4.174	
8,400.00	8,388.48	8,419.85	8,402.08	29.36	29.94	-90.48	-231.95	-228.31	244.62	185.33	59.30	4.125	
8,500.00	8,488.48	8,519.85	8,502.08	29.71	30.28	-90.48	-231.95	-228.31	244.62	184.63	59.99	4.078	
8,600.00	8,588.48	8,619.85	8,602.08	30.06	30.62	-90.48	-231.95	-228.31	244.62	183.94	60.69	4.031	
8,700.00	8,688.48	8,719.85	8,702.08	30.42	30.97	-90.48	-231.95	-228.31	244.62	183.24	61.38	3.985	
8,800.00	8,788.48	8,819.85	8,802.08	30.77	31.31	-90.48	-231.95	-228.31	244.62	182.55	62.08	3.941	
8,900.00	8,888.48	8,919.85	8,902.08	31.12	31.65	-90.48	-231.95	-228.31	244.62	181.85	62.78	3.897	
9,000.00	8,988.48	9,019.85	9,002.08	31.48	32.00	-90.48	-231.95	-228.31	244.62	181.15	63.47	3.854	
9,100.00	9,088.48	9,119.85	9,102.08	31.83	32.34	-90.48	-231.95	-228.31	244.62	180.45	64.17	3.812	
9,200.00	9,188.48	9,219.85	9,202.08	32.18	32.69	-90.48	-231.95	-228.31	244.62	179.76	64.87	3.771	
9,300.00	9,288.48	9,319.85	9,302.08	32.54	33.03	-90.48	-231.95	-228.31	244.62	179.06	65.57	3.731	
9,400.00	9,388.48	9,419.85	9,402.08	32.89	33.38	-90.48	-231.95	-228.31	244.62	178.36	66.27	3.692	
9,500.00	9,488.48	9,519.85	9,502.08	33.24	33.72	-90.48	-231.95	-228.31	244.62	177.66	66.97	3.653	
9,600.00	9,588.48	9,619.85	9,602.08	33.60	34.07	-90.48	-231.95	-228.31	244.62	176.96	67.66	3.615	
9,700.00	9,688.48	9,719.85	9,702.08	33.95	34.41	-90.48	-231.95	-228.31	244.62	176.26	68.36	3.578	
9,800.00	9,788.48	9,819.85	9,802.08	34.31	34.76	-90.48	-231.95	-228.31	244.62	175.56	69.06	3.542	
9,900.00	9,888.48	9,919.85	9,902.08	34.66	35.10	-90.48	-231.95	-228.31	244.62	174.86	69.77	3.506	
10,000.00	9,988.48	10,019.85	10,002.08	35.02	35.45	-90.48	-231.95	-228.31	244.62	174.16	70.47	3.472	
10,100.00	10,088.48	10,119.85	10,102.08	35.37	35.80	-90.48	-231.95	-228.31	244.62	173.46	71.17	3.437	
10,200.00	10,188.48	10,219.85	10,202.08	35.72	36.14	-90.48	-231.95	-228.31	244.62	172.76	71.87	3.404	
10,300.00	10,288.48	10,319.85	10,302.08	36.08	36.49	-90.48	-231.95	-228.31	244.62	172.05	72.57	3.371	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 704H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference				Semi-Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Tooface (")	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	Warning
10,400.00	10,388.48	10,419.85	10,402.08	36.43	36.84	-90.48	-231.95	-228.31	244.62	171.35	73.27	3.339	
10,500.00	10,488.48	10,519.85	10,502.08	36.79	37.19	-90.48	-231.95	-228.31	244.62	170.65	73.98	3.307	
10,600.00	10,588.48	10,619.85	10,602.08	37.14	37.53	-90.48	-231.95	-228.31	244.62	169.95	74.68	3.276	
10,700.00	10,688.48	10,719.85	10,702.08	37.50	37.88	-90.48	-231.95	-228.31	244.62	169.24	75.38	3.245	
10,800.00	10,788.48	10,819.85	10,802.08	37.85	38.23	-90.48	-231.95	-228.31	244.62	168.54	76.08	3.215	
10,900.00	10,888.48	10,919.85	10,902.08	38.21	38.58	-90.48	-231.95	-228.31	244.62	167.84	76.79	3.186	
11,000.00	10,988.48	11,019.85	11,002.08	38.56	38.93	-90.48	-231.95	-228.31	244.62	167.13	77.49	3.157	
11,100.00	11,088.48	11,119.85	11,102.08	38.92	39.28	-90.48	-231.95	-228.31	244.62	166.43	78.20	3.128	
11,200.00	11,188.48	11,219.85	11,202.08	39.27	39.63	-90.48	-231.95	-228.31	244.62	165.72	78.90	3.100	
11,300.00	11,288.48	11,319.85	11,302.08	39.63	39.98	-90.48	-231.95	-228.31	244.62	165.02	79.61	3.073	
11,400.00	11,388.48	11,419.85	11,402.08	39.99	40.32	-90.48	-231.95	-228.31	244.62	164.32	80.31	3.046	
11,500.00	11,488.48	11,519.85	11,502.08	40.34	40.67	-90.48	-231.95	-228.31	244.62	163.61	81.01	3.020	
11,600.00	11,588.48	11,619.85	11,602.08	40.70	41.02	-90.48	-231.95	-228.31	244.62	162.91	81.72	2.993	
11,700.00	11,688.48	11,719.85	11,702.08	41.05	41.37	-90.48	-231.95	-228.31	244.62	162.20	82.43	2.968 CC	
11,702.95	11,691.43	11,722.80	11,705.03	41.06	41.38	-90.06	-231.95	-228.31	244.62	162.18	82.45	2.967	
11,800.00	11,788.33	11,819.71	11,801.93	41.40	41.72	-90.95	-231.95	-228.31	244.66	161.53	83.13	2.943	
11,900.00	11,886.15	11,917.52	11,899.75	41.74	42.07	-95.43	-231.95	-228.31	245.82	162.02	83.80	2.933	
12,000.00	11,978.98	12,019.77	12,001.55	42.04	42.41	-101.88	-223.93	-228.37	250.48	166.02	84.46	2.966	
12,100.00	12,064.00	12,128.57	12,106.46	42.32	42.76	-107.95	-195.75	-228.58	258.16	173.08	85.08	3.034	
12,200.00	12,138.64	12,244.39	12,210.15	42.57	43.07	-113.35	-144.58	-228.96	267.86	182.21	85.65	3.127	
12,300.00	12,200.61	12,367.72	12,306.85	42.81	43.34	-117.88	-68.42	-229.53	278.18	192.03	86.15	3.229	
12,400.00	12,248.05	12,498.40	12,389.04	43.03	43.54	-121.38	32.80	-230.29	287.55	200.98	86.57	3.322	
12,500.00	12,278.50	12,635.35	12,448.28	43.23	43.74	-123.71	155.91	-231.21	294.51	207.53	86.98	3.386	
12,600.00	12,294.02	12,776.41	12,477.04	43.43	44.00	-124.79	293.64	-232.24	297.91	210.46	87.45	3.407	
12,700.00	12,294.80	12,891.02	12,478.79	43.63	44.22	-124.86	408.19	-233.09	298.14	210.27	87.87	3.393	
12,800.00	12,294.49	12,991.02	12,478.49	43.87	44.46	-124.86	508.19	-233.84	298.14	209.80	88.35	3.375	
12,900.00	12,284.18	13,091.02	12,478.18	44.16	44.75	-124.86	608.18	-234.59	298.15	209.23	88.91	3.353	
13,000.00	12,293.87	13,191.02	12,477.87	44.49	45.08	-124.86	708.18	-235.34	298.15	208.58	89.57	3.329	
13,100.00	12,293.57	13,291.02	12,477.56	44.86	45.45	-124.86	808.18	-236.09	298.15	207.84	90.32	3.301	
13,200.00	12,293.26	13,391.02	12,477.26	45.28	45.87	-124.86	908.17	-236.83	298.16	207.01	91.15	3.271	
13,300.00	12,292.95	13,491.02	12,476.95	45.74	46.32	-124.85	1,008.17	-237.58	298.16	206.10	92.06	3.239	
13,400.00	12,292.64	13,591.02	12,476.64	46.24	46.81	-124.85	1,108.17	-238.33	298.16	205.11	93.05	3.204	
13,500.00	12,292.34	13,691.02	12,476.34	46.78	47.34	-124.85	1,208.16	-239.08	298.17	204.05	94.12	3.168	
13,600.00	12,292.03	13,791.02	12,476.03	47.35	47.91	-124.85	1,308.16	-239.83	298.17	202.91	95.26	3.130	
13,700.00	12,291.72	13,891.02	12,475.72	47.97	48.51	-124.85	1,408.16	-240.57	298.17	201.70	96.48	3.091	
13,800.00	12,291.42	13,991.02	12,475.41	48.61	49.15	-124.85	1,508.15	-241.32	298.18	200.41	97.76	3.050	
13,900.00	12,291.11	14,091.02	12,475.11	49.29	49.82	-124.85	1,608.15	-242.07	298.18	199.07	99.11	3.009	
14,000.00	12,290.80	14,191.02	12,474.80	50.00	50.52	-124.85	1,708.15	-242.82	298.18	197.66	100.52	2.966	
14,100.00	12,290.49	14,291.02	12,474.49	50.75	51.25	-124.85	1,808.14	-243.57	298.18	196.19	102.00	2.923	
14,200.00	12,290.19	14,391.02	12,474.18	51.52	52.01	-124.85	1,908.14	-244.31	298.19	194.66	103.53	2.880	
14,300.00	12,289.88	14,491.02	12,473.88	52.32	52.80	-124.85	2,008.14	-245.06	298.19	193.07	105.12	2.837	
14,400.00	12,289.57	14,591.02	12,473.57	53.14	53.62	-124.85	2,108.13	-245.81	298.19	191.43	106.76	2.793	
14,500.00	12,289.26	14,691.02	12,473.26	54.00	54.46	-124.85	2,208.13	-246.56	298.20	189.74	108.46	2.749	
14,600.00	12,288.96	14,791.02	12,472.95	54.87	55.33	-124.85	2,308.13	-247.31	298.20	188.00	110.20	2.706	
14,700.00	12,288.65	14,891.02	12,472.65	55.77	56.22	-124.85	2,408.13	-248.05	298.20	186.21	111.99	2.663	
14,800.00	12,288.34	14,991.02	12,472.34	56.69	57.13	-124.85	2,508.12	-248.80	298.21	184.38	113.82	2.620	
14,900.00	12,288.03	15,091.02	12,472.03	57.64	58.06	-124.85	2,608.12	-249.55	298.21	182.51	115.70	2.577	
15,000.00	12,287.73	15,191.02	12,471.72	58.60	59.01	-124.85	2,708.12	-250.30	298.21	180.60	117.61	2.535	
15,100.00	12,287.42	15,291.02	12,471.42	59.58	59.99	-124.85	2,808.11	-251.05	298.22	178.65	119.57	2.494	
15,200.00	12,287.11	15,391.02	12,471.11	60.58	60.98	-124.85	2,908.11	-251.79	298.22	176.66	121.56	2.453	
15,300.00	12,286.81	15,491.02	12,470.80	61.60	61.99	-124.85	3,008.11	-252.54	298.22	174.64	123.58	2.413	
15,400.00	12,286.50	15,591.02	12,470.50	62.63	63.01	-124.85	3,108.10	-253.29	298.22	172.58	125.64	2.374	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Offset Design Fez Federal Com - 704H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis		Highside Toolface (°)	Offset Wellbore Centre		Distance		Minimum Separation (usft)	Separation Factor	Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)		+N/S (usft)	+E/W (usft)	Between Centres (usft)	Between Ellipses (usft)			
15,500.00	12,286.19	15,691.02	12,470.19	63.68	64.05	-124.85	3,208.10	-254.04	298.23	170.50	127.73	2.335	
15,600.00	12,285.88	15,791.02	12,469.88	64.75	65.10	-124.85	3,308.10	-254.79	298.23	168.38	129.85	2.297	
15,700.00	12,285.58	15,891.02	12,469.57	65.82	66.17	-124.85	3,408.09	-255.53	298.23	166.23	132.00	2.259	
15,800.00	12,285.27	15,991.02	12,469.27	66.92	67.26	-124.84	3,508.09	-256.28	298.24	164.06	134.17	2.223	
15,900.00	12,284.96	16,091.02	12,468.96	68.02	68.35	-124.84	3,608.09	-257.03	298.24	161.86	136.37	2.187	
16,000.00	12,284.65	16,191.02	12,468.65	69.14	69.46	-124.84	3,708.08	-257.78	298.24	159.64	138.60	2.152	
16,100.00	12,284.35	16,291.02	12,468.34	70.27	70.58	-124.84	3,808.08	-258.53	298.25	157.40	140.85	2.117	
16,200.00	12,284.04	16,391.02	12,468.04	71.41	71.71	-124.84	3,908.08	-259.27	298.25	155.13	143.12	2.084	
16,300.00	12,283.73	16,491.02	12,467.73	72.56	72.86	-124.84	4,008.07	-260.02	298.25	152.84	145.41	2.051	
16,400.00	12,283.42	16,591.02	12,467.42	73.72	74.01	-124.84	4,108.07	-260.77	298.25	150.53	147.72	2.019	
16,500.00	12,283.12	16,691.02	12,467.11	74.88	75.17	-124.84	4,208.07	-261.52	298.26	148.20	150.06	1.988	
16,600.00	12,282.81	16,791.02	12,466.81	76.06	76.34	-124.84	4,308.06	-262.27	298.26	145.85	152.41	1.957	
16,700.00	12,282.50	16,891.02	12,466.50	77.25	77.52	-124.84	4,408.06	-263.01	298.26	143.49	154.77	1.927	
16,800.00	12,282.19	16,991.02	12,466.19	78.45	78.71	-124.84	4,508.06	-263.76	298.27	141.11	157.16	1.898	
16,900.00	12,281.89	17,091.02	12,465.88	79.65	79.91	-124.84	4,608.05	-264.51	298.27	138.71	159.56	1.869	
17,000.00	12,281.58	17,191.02	12,465.58	80.86	81.11	-124.84	4,708.05	-265.26	298.27	136.30	161.98	1.841	
17,100.00	12,281.27	17,291.02	12,465.27	82.08	82.33	-124.84	4,808.05	-266.01	298.28	133.87	164.41	1.814	
17,200.00	12,280.97	17,391.02	12,464.96	83.31	83.55	-124.84	4,908.04	-266.75	298.28	131.43	166.85	1.788	
17,300.00	12,280.66	17,491.02	12,464.66	84.54	84.77	-124.84	5,008.04	-267.50	298.28	128.97	169.31	1.762	
17,400.00	12,280.35	17,591.02	12,464.35	85.78	86.01	-124.84	5,108.04	-268.25	298.29	126.50	171.78	1.736	
17,500.00	12,280.04	17,691.02	12,464.04	87.02	87.24	-124.84	5,208.03	-269.00	298.29	124.02	174.26	1.712	
17,600.00	12,279.74	17,791.02	12,463.73	88.27	88.49	-124.84	5,308.03	-269.75	298.29	121.53	176.76	1.688	
17,700.00	12,279.43	17,891.02	12,463.43	89.53	89.74	-124.84	5,408.03	-270.49	298.29	119.03	179.27	1.664	
17,800.00	12,279.12	17,991.02	12,463.12	90.79	91.00	-124.84	5,508.02	-271.24	298.30	116.52	181.78	1.641	
17,900.00	12,278.81	18,091.02	12,462.81	92.05	92.26	-124.84	5,608.02	-271.99	298.30	113.99	184.31	1.618	
18,000.00	12,278.51	18,191.02	12,462.50	93.32	93.52	-124.84	5,708.02	-272.74	298.30	111.46	186.85	1.597	
18,100.00	12,278.20	18,291.02	12,462.20	94.60	94.79	-124.84	5,808.01	-273.49	298.31	108.91	189.39	1.575	
18,200.00	12,277.89	18,391.02	12,461.89	95.88	96.07	-124.83	5,908.01	-274.23	298.31	106.36	191.95	1.554	
18,300.00	12,277.58	18,491.02	12,461.58	97.17	97.35	-124.83	6,008.01	-274.98	298.31	103.80	194.52	1.534	
18,400.00	12,277.28	18,591.02	12,461.27	98.45	98.63	-124.83	6,108.00	-275.73	298.32	101.23	197.09	1.514	
18,500.00	12,276.97	18,691.02	12,460.97	99.75	99.92	-124.83	6,208.00	-276.48	298.32	98.65	199.67	1.494 Level 3	
18,600.00	12,276.66	18,791.02	12,460.66	101.04	101.22	-124.83	6,308.00	-277.23	298.32	96.06	202.26	1.475 Level 3	
18,700.00	12,276.35	18,891.02	12,460.35	102.35	102.51	-124.83	6,407.99	-277.98	298.33	93.47	204.86	1.456 Level 3	
18,800.00	12,276.05	18,991.02	12,460.04	103.65	103.81	-124.83	6,507.99	-278.72	298.33	90.87	207.46	1.438 Level 3	
18,900.00	12,275.74	19,091.02	12,459.74	104.96	105.12	-124.83	6,607.99	-279.47	298.33	88.26	210.07	1.420 Level 3	
19,000.00	12,275.43	19,191.02	12,459.43	106.27	106.42	-124.83	6,707.98	-280.22	298.33	85.64	212.69	1.403 Level 3	
19,100.00	12,275.13	19,291.02	12,459.12	107.58	107.73	-124.83	6,807.98	-280.97	298.34	83.02	215.32	1.386 Level 3	
19,200.00	12,274.82	19,391.02	12,458.82	108.90	109.05	-124.83	6,907.98	-281.72	298.34	80.39	217.95	1.369 Level 3	
19,300.00	12,274.51	19,491.02	12,458.51	110.22	110.36	-124.83	7,007.97	-282.46	298.34	77.76	220.58	1.353 Level 3	
19,400.00	12,274.20	19,591.02	12,458.20	111.54	111.68	-124.83	7,107.97	-283.21	298.35	75.12	223.23	1.337 Level 3	
19,500.00	12,273.90	19,691.02	12,457.89	112.87	113.01	-124.83	7,207.97	-283.96	298.35	72.48	225.87	1.321 Level 3	
19,600.00	12,273.59	19,791.02	12,457.59	114.20	114.33	-124.83	7,307.96	-284.71	298.35	69.83	228.53	1.306 Level 3	
19,700.00	12,273.28	19,891.02	12,457.28	115.53	115.66	-124.83	7,407.96	-285.46	298.36	67.17	231.19	1.291 Level 3	
19,800.00	12,272.97	19,991.02	12,456.97	116.86	116.99	-124.83	7,507.96	-286.20	298.36	64.51	233.85	1.276 Level 3	
19,900.00	12,272.67	20,091.02	12,456.66	118.20	118.32	-124.83	7,607.96	-286.95	298.36	61.84	236.52	1.261 Level 3	
20,000.00	12,272.36	20,191.02	12,456.36	119.54	119.66	-124.83	7,707.95	-287.70	298.36	59.17	239.19	1.247 Level 2	
20,100.00	12,272.05	20,291.02	12,456.05	120.88	120.99	-124.83	7,807.95	-288.45	298.37	56.50	241.87	1.234 Level 2	
20,200.00	12,271.74	20,391.02	12,455.74	122.22	122.33	-124.83	7,907.95	-289.20	298.37	53.82	244.55	1.220 Level 2	
20,300.00	12,271.44	20,491.02	12,455.43	123.56	123.68	-124.83	8,007.94	-289.94	298.37	51.14	247.24	1.207 Level 2	
20,400.00	12,271.13	20,591.02	12,455.13	124.91	125.02	-124.83	8,107.94	-290.69	298.38	48.45	249.93	1.194 Level 2	
20,500.00	12,270.82	20,691.02	12,454.82	126.26	126.37	-124.83	8,207.94	-291.44	298.38	45.76	252.62	1.181 Level 2	
20,600.00	12,270.51	20,791.02	12,454.51	127.61	127.71	-124.82	8,307.93	-292.19	298.38	43.06	255.32	1.169 Level 2	

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



Anticollision Report



Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

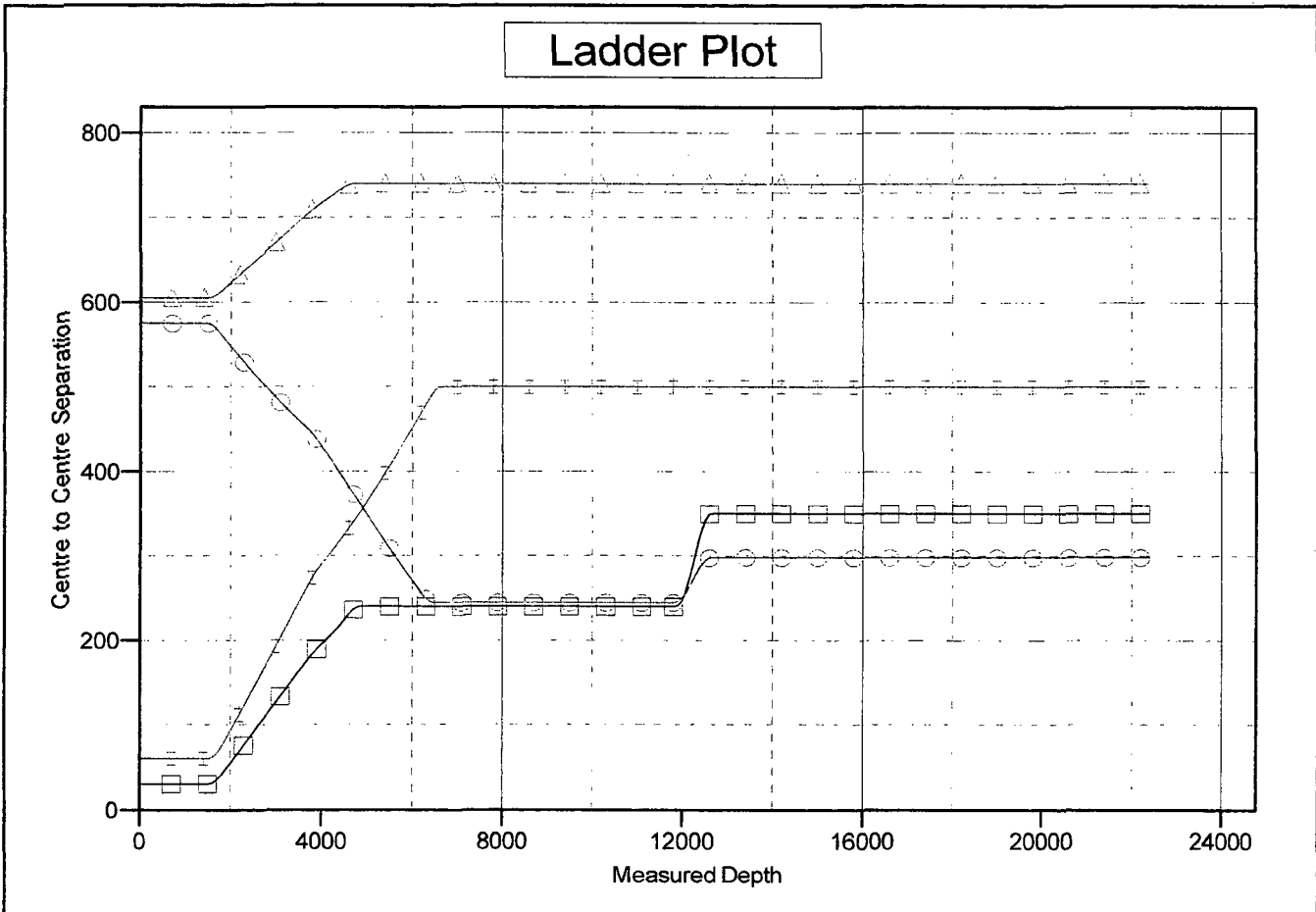
Offset Design Fez Federal Com - 704H - OH - Plan 1 10-12-18													Offset Site Error: 0.00 usft
Survey Program: 0-MWD+HDGM													Offset Well Error: 0.00 usft
Reference		Offset		Semi Major Axis			Distance						Warning
Measured Depth (usft)	Vertical Depth (usft)	Measured Depth (usft)	Vertical Depth (usft)	Reference (usft)	Offset (usft)	Highside Toolface (°)	Offset Wellbore Centre +N/-S (usft)	+E/-W (usft)	Between Centres (usft)	Between Ellipses (usft)	Minimum Separation (usft)	Separation Factor	
20,700.00	12,270.21	20,891.02	12,454.20	128.96	129.06	-124.82	8,407.93	-292.94	298.39	40.36	258.03	1.156	Level 2
20,800.00	12,269.90	20,991.02	12,453.90	130.32	130.41	-124.82	8,507.93	-293.68	298.39	37.66	260.73	1.144	Level 2
20,900.00	12,269.59	21,091.02	12,453.59	131.67	131.77	-124.82	8,607.92	-294.43	298.39	34.95	263.44	1.133	Level 2
21,000.00	12,269.29	21,191.02	12,453.28	133.03	133.12	-124.82	8,707.92	-295.18	298.40	32.24	266.15	1.121	Level 2
21,100.00	12,268.98	21,291.02	12,452.97	134.39	134.48	-124.82	8,807.92	-295.93	298.40	29.53	268.87	1.110	Level 2
21,200.00	12,268.67	21,391.02	12,452.67	135.75	135.84	-124.82	8,907.91	-296.68	298.40	26.81	271.59	1.099	Level 2
21,300.00	12,268.36	21,491.02	12,452.36	137.11	137.20	-124.82	9,007.91	-297.42	298.40	24.09	274.31	1.088	Level 2
21,400.00	12,268.06	21,591.02	12,452.05	138.48	138.56	-124.82	9,107.91	-298.17	298.41	21.37	277.04	1.077	Level 2
21,500.00	12,267.75	21,691.02	12,451.75	139.84	139.92	-124.82	9,207.90	-298.92	298.41	18.64	279.77	1.067	Level 2
21,600.00	12,267.44	21,791.02	12,451.44	141.21	141.29	-124.82	9,307.90	-299.67	298.41	15.92	282.50	1.056	Level 2
21,700.00	12,267.13	21,891.02	12,451.13	142.58	142.65	-124.82	9,407.90	-300.42	298.42	13.19	285.23	1.046	Level 2
21,800.00	12,266.83	21,991.02	12,450.82	143.95	144.02	-124.82	9,507.89	-301.16	298.42	10.45	287.97	1.036	Level 2
21,900.00	12,266.52	22,091.02	12,450.52	145.32	145.39	-124.82	9,607.89	-301.91	298.42	7.72	290.71	1.027	Level 2
22,000.00	12,266.21	22,191.02	12,450.21	146.69	146.76	-124.82	9,707.89	-302.66	298.43	4.98	293.45	1.017	Level 2
22,100.00	12,265.90	22,291.02	12,449.90	148.06	148.13	-124.82	9,807.88	-303.41	298.43	2.24	296.19	1.008	Level 2
22,200.00	12,265.60	22,391.02	12,449.59	149.44	149.50	-124.82	9,907.88	-304.16	298.43	-0.51	298.94	0.998	Level 1
22,300.00	12,265.29	22,491.02	12,449.29	150.81	150.88	-124.82	10,007.88	-304.90	298.44	-3.25	301.69	0.989	Level 1
22,309.66	12,265.26	22,500.67	12,449.26	150.95	151.01	-124.82	10,017.53	-304.98	298.44	-3.52	301.96	0.988	Level 1
22,394.02	12,265.00	22,584.14	12,449.00	152.11	152.16	-124.82	10,101.00	-305.60	298.44	-5.82	304.26	0.981	Level 1, ES, SF

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

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
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 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB= @ 3276.70usft (Precision 595) Coordinates are relative to: 603H
 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: 0.51°



LEGEND

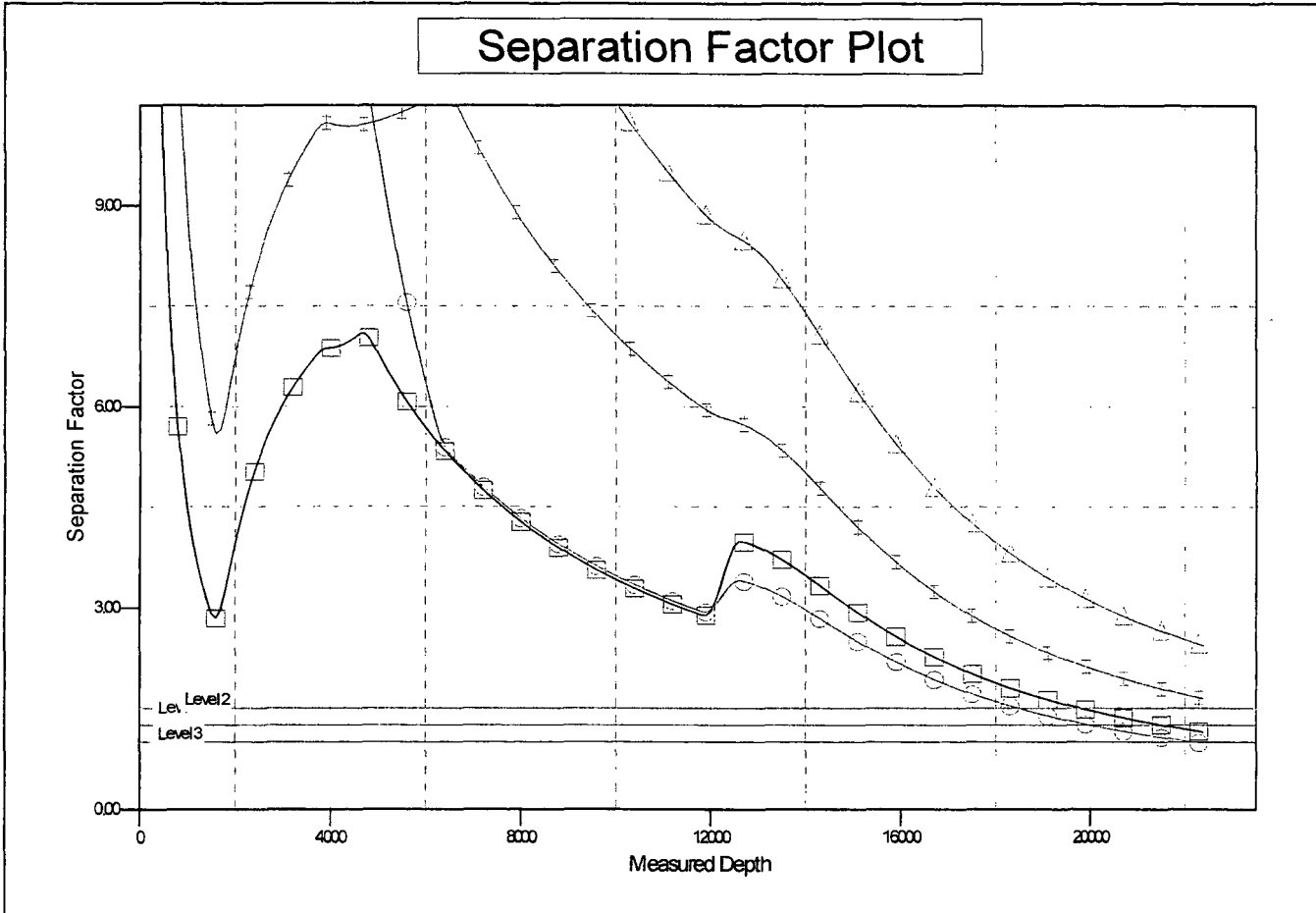
- △ 604H, OH, Plan 1 10-12-18 V0
- ⊠ 703H, OH, Plan 1 10-12-18 V0
- ⊗ 702H, OH, Plan 1 10-12-18 V0
- 704H, OH, Plan 1 10-12-18 V0

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

Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Reference Site: Fez Federal Com
 Site Error: 0.00 usft
 Reference Well: 603H
 Well Error: 0.00 usft
 Reference Wellbore: OH
 Reference Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 North Reference: Grid
 Survey Calculation Method: Minimum Curvature
 Output errors are at: 2.00 sigma
 Database: USA Compass
 Offset TVD Reference: Offset Datum

Reference Depths are relative to RKB= @ 3276.70usft (Precision 595) Coordinates are relative to: 603H
 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: 0.51°



LEGEND

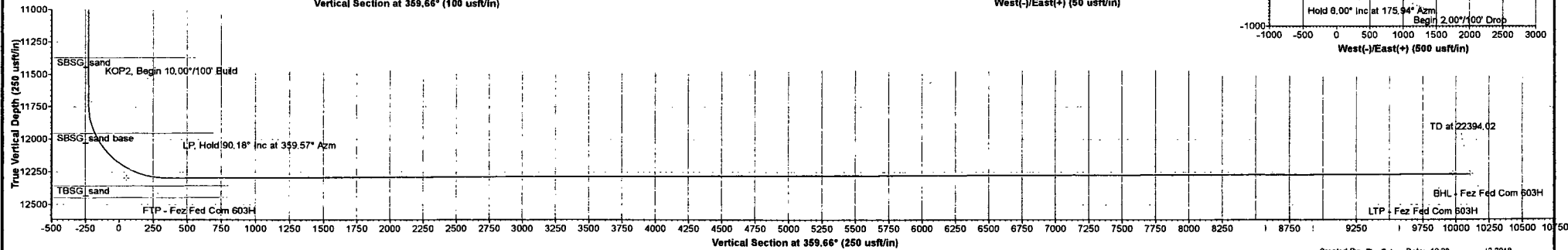
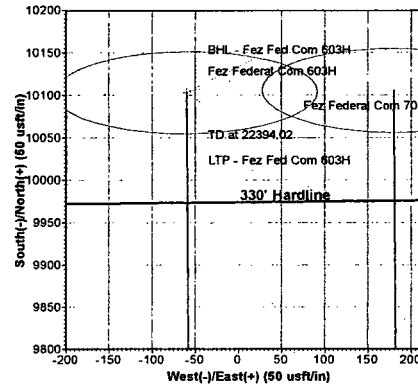
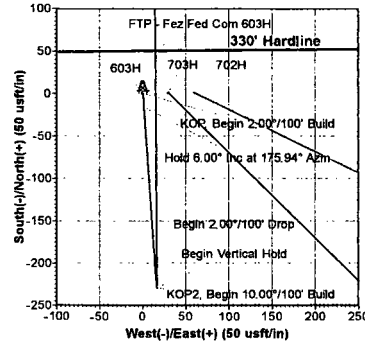
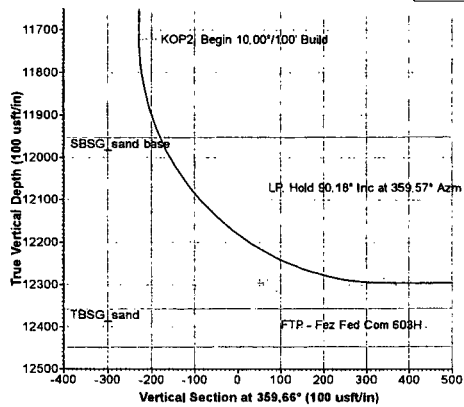
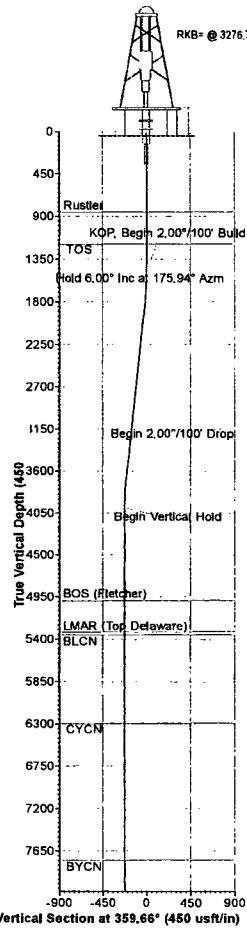
- ▲ 604H, OH, Plan 110-12-18 V0 ■ 703H, OH, Plan 110-12-18 V0
- 702H, OH, Plan 110-12-18 V0 ◆ 704H, OH, Plan 110-12-18 V0



Project: Lea County, NM (NAD27 NME)
 Site: Fez Federal Com
 Well: 603H
 Wellbore: OH
 Design: Plan 1 10-12-18
 Rig: Precision 595



Azimuths to Grid North
 True North: -0.51°
 Magnetic North: 6.17°
 Magnetic Field
 Strength: 47836.35nT
 Dip Angle: 59.80°
 Date: 10/11/2018
 Model: MVHD



WELL DETAILS						
+N/S	+E/W	Nothing	Easting	Latitude	Longitude	3251.70
0.00	0.00	415342.20	795972.50	32° 8' 17.81002 N	103° 22' 37.73484 W	

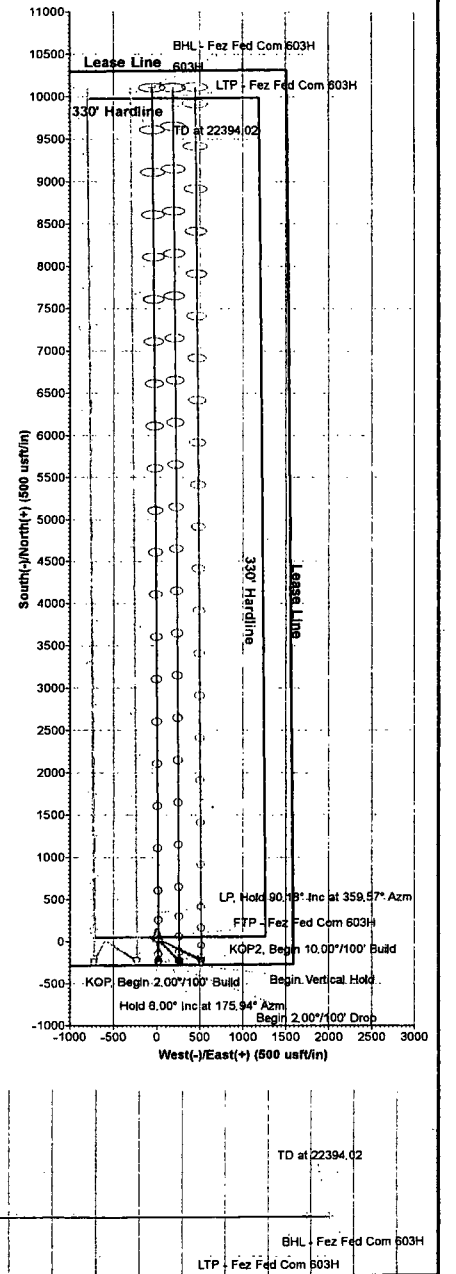
DESIGN TARGET DETAILS							
Name	TVD	+N/S	+E/W	Nothing	Easting	Latitude	Longitude
LTP - Fez Fed Com 603H	12260.00	9973.28	-59.83	425315.48	795912.87	32° 9' 56.50200 N	103° 22' 37.39800 W
BHL - Fez Fed Com 603H	12265.00	10103.20	-60.80	425445.40	795911.80	32° 9' 57.78766 N	103° 22' 37.39591 W
FTP - Fez Fed Com 603H	12295.00	50.13	14.59	415392.33	795987.09	32° 8' 18.30480 N	103° 22' 37.56000 W

SECTION DETAILS												
Sec	MD	Inc	Azi	TVD	+N/S	+E/W	Diag	TFace	VScale	Target	Annotation	
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP, Begin 2.00°/100' Build	
2	1500.00	0.00	0.00	1500.00	0.00	0.00	0.00	0.00	0.00	0.00	Hold 6.00° Inc at 175.94° Azm	
3	1799.83	8.00	175.94	1799.29	-15.94	1.11	2.00	175.94	-15.94		Begin 2.00°/100' Drop	
4	3705.69	8.00	175.94	3694.71	-214.24	15.20	0.00	-214.33			Begin Vertical Hold	
5	4005.52	0.00	0.00	3994.00	-229.88	16.31	2.00	180.00	-229.87		KOP2, Begin 10.00°/100' Build	
6	11733.58	0.00	0.00	11722.04	-229.88	16.31	0.00	0.00	-229.87		LP, Hold 90.18° Inc at 359.57° Azm	
7	12635.32	90.18	359.57	12295.00	344.82	12.03	10.00	359.57	344.74		TD at 22394.02	
8	22394.02	90.18	359.57	12265.00	10103.20	-60.80	0.00	0.00	1013.38		BHL - Fez Fed Com 603H	

LEGEND	
---	604H, OH, Plan 1 10-12-18 VO
---	702H, OH, Plan 1 10-12-18 VO
---	703H, OH, Plan 1 10-12-18 VO
---	704H, OH, Plan 1 10-12-18 VO
---	Plan 1 10-12-18

Map System: US State Plane 1927 (Exact solution)
 Datum: NAD 1927 (NADCON CONUS)
 Ellipsoid: Clarke 1866
 Zone Name: New Mexico East 3001
 Local Origin: Well 603H, Grid North
 Latitude: 32° 8' 17.81002 N
 Longitude: 103° 22' 37.73484 W
 Grid East: 795972.50
 Grid North: 415342.20
 Scale Factor: 1.000
 Geomagnetic Model: MVHD
 Sample Date: 11-Oct-18
 Magnetic Declination: 6.68°
 Dip Angle from Horizontal: 59.80°
 Magnetic Field Strength: 47836.30827387nT
 To convert a Magnetic Direction to a Grid Direction, Add 6.17°
 To convert a Magnetic Direction to a True Direction, Add 6.68° East
 To convert a True Direction to a Grid Direction, Subtract 0.51°

FORMATION TOP DETAILS				
TVDPath	MDPath	Formation	DipAngle	DipDir
848.00	848.00	Rustler	-0.18	359.66
1189.00	1189.00	TOS	-0.18	359.66
4984.72	4986.25	BOS (Fletcher)	-0.18	359.66
5315.72	5327.25	LMAR (Top Delaware)	-0.18	359.66
5347.72	5359.25	BLCN	-0.18	359.66
6286.72	6298.25	CYCN	-0.18	359.66
7446.72	7458.25	BYCN	-0.18	359.66
8977.72	8988.25	Bone Sprng	-0.18	359.66
9194.72	9206.25	U Avalon	-0.18	359.66
9558.72	9570.25	L Avalon	-0.18	359.66
10375.72	10387.25	FBSP_sand	-0.18	359.66
10895.72	10907.25	SBSG_sand	-0.18	359.66
11369.72	11381.25	SBSG_sand	-0.18	359.66
11952.57	11970.82	SBSG_sand base	-0.18	359.66





COG Operating LLC

Lea County, NM (NAD27 NME)

Fez Federal Com

603H

OH

Plan: Plan 1 10-12-18

Standard Planning Report

12 October, 2018





Planning Report



Database: USA Compass
Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH
Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Project	Lea 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	Fez Federal Com				
Site Position:		Northing:	415,342.20 usft	Latitude:	32° 8' 17.81002 N
From:	Map	Easting:	795,972.50 usft	Longitude:	103° 22' 37.73484 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.51 °

Well	603H					
Well Position	+N-S	0.00 usft	Northing:	415,342.20 usft	Latitude:	32° 8' 17.81002 N
	+E-W	0.00 usft	Easting:	795,972.50 usft	Longitude:	103° 22' 37.73484 W
Position Uncertainty	0.00 usft		Wellhead Elevation:		Ground Level:	3,251.70 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	MVHD	10/11/2018	(°) 6.68	(°) 59.80	(nT) 47,836.30827387

Design	Plan 1 10-12-18				
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	359.66	

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,799.83	6.00	175.94	1,799.29	-15.64	1.11	2.00	2.00	0.00	175.94	
3,705.69	6.00	175.94	3,694.71	-214.24	15.20	0.00	0.00	0.00	0.00	
4,005.52	0.00	0.00	3,994.00	-229.88	16.31	2.00	-2.00	0.00	180.00	
11,733.56	0.00	0.00	11,722.04	-229.88	16.31	0.00	0.00	0.00	0.00	
12,635.32	90.18	359.57	12,295.00	344.82	12.03	10.00	10.00	-0.05	359.57	
22,394.02	90.18	359.57	12,265.00	10,103.20	-60.60	0.00	0.00	0.00	0.00	BHL - Fez Fed Com 6



Database: USA Compass
 Company: COG Operating LLC
 Project: Lea County, NM (NAD27 NME)
 Site: Fez Federal Com
 Well: 603H
 Wellbore: OH
 Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 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
848.00	0.00	0.00	848.00	0.00	0.00	0.00	0.00	0.00	0.00
Rustler									
1,189.00	0.00	0.00	1,189.00	0.00	0.00	0.00	0.00	0.00	0.00
TOS									
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100° Build									
1,600.00	2.00	175.94	1,599.98	-1.74	0.12	-1.74	2.00	2.00	0.00
1,700.00	4.00	175.94	1,699.84	-6.96	0.49	-6.96	2.00	2.00	0.00
1,799.83	6.00	175.94	1,799.29	-15.64	1.11	-15.64	2.00	2.00	0.00
Hold 6.00° Inc at 175.94° Azm									
1,800.00	6.00	175.94	1,799.45	-15.65	1.11	-15.66	0.00	0.00	0.00
1,900.00	6.00	175.94	1,898.90	-26.08	1.85	-26.09	0.00	0.00	0.00
2,000.00	6.00	175.94	1,998.36	-36.50	2.59	-36.51	0.00	0.00	0.00
2,100.00	6.00	175.94	2,097.81	-46.92	3.33	-46.94	0.00	0.00	0.00
2,200.00	6.00	175.94	2,197.26	-57.34	4.07	-57.36	0.00	0.00	0.00
2,300.00	6.00	175.94	2,296.72	-67.76	4.81	-67.79	0.00	0.00	0.00
2,400.00	6.00	175.94	2,396.17	-78.18	5.55	-78.21	0.00	0.00	0.00
2,500.00	6.00	175.94	2,495.62	-88.60	6.29	-88.64	0.00	0.00	0.00
2,600.00	6.00	175.94	2,595.07	-99.02	7.03	-99.06	0.00	0.00	0.00
2,700.00	6.00	175.94	2,694.53	-109.44	7.76	-109.49	0.00	0.00	0.00
2,800.00	6.00	175.94	2,793.98	-119.86	8.50	-119.91	0.00	0.00	0.00
2,900.00	6.00	175.94	2,893.43	-130.28	9.24	-130.34	0.00	0.00	0.00
3,000.00	6.00	175.94	2,992.89	-140.70	9.98	-140.76	0.00	0.00	0.00
3,100.00	6.00	175.94	3,092.34	-151.13	10.72	-151.19	0.00	0.00	0.00
3,200.00	6.00	175.94	3,191.79	-161.55	11.46	-161.61	0.00	0.00	0.00
3,300.00	6.00	175.94	3,291.24	-171.97	12.20	-172.04	0.00	0.00	0.00
3,400.00	6.00	175.94	3,390.70	-182.39	12.94	-182.46	0.00	0.00	0.00
3,500.00	6.00	175.94	3,490.15	-192.81	13.68	-192.89	0.00	0.00	0.00
3,600.00	6.00	175.94	3,589.60	-203.23	14.42	-203.31	0.00	0.00	0.00
3,700.00	6.00	175.94	3,689.06	-213.65	15.16	-213.74	0.00	0.00	0.00
3,705.69	6.00	175.94	3,694.71	-214.24	15.20	-214.33	0.00	0.00	0.00
Begin 2.00°/100° Drop									
3,800.00	4.11	175.94	3,788.65	-222.53	15.79	-222.62	2.00	-2.00	0.00
3,900.00	2.11	175.94	3,888.50	-227.94	16.17	-228.03	2.00	-2.00	0.00
4,000.00	0.11	175.94	3,988.48	-229.87	16.31	-229.97	2.00	-2.00	0.00
4,005.52	0.00	0.00	3,994.00	-229.88	16.31	-229.97	2.00	-2.00	-3,185.58
Begin Vertical Hold									
4,996.25	0.00	0.00	4,984.72	-229.88	16.31	-229.97	0.00	0.00	0.00
BOS (Fletcher)									
5,327.25	0.00	0.00	5,315.72	-229.88	16.31	-229.97	0.00	0.00	0.00
LMAR (Top Delaware)									
5,359.25	0.00	0.00	5,347.72	-229.88	16.31	-229.97	0.00	0.00	0.00
BLCN									
6,298.25	0.00	0.00	6,286.72	-229.88	16.31	-229.97	0.00	0.00	0.00
CYCN									
7,758.25	0.00	0.00	7,746.72	-229.88	16.31	-229.97	0.00	0.00	0.00
BYCN									
8,989.25	0.00	0.00	8,977.72	-229.88	16.31	-229.97	0.00	0.00	0.00
Bone Sprg									
9,206.25	0.00	0.00	9,194.72	-229.88	16.31	-229.97	0.00	0.00	0.00
U Avalon									
9,570.25	0.00	0.00	9,558.72	-229.88	16.31	-229.97	0.00	0.00	0.00

Database: USA Compass
Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Fez Federal Com
Well: 603H
Wellbore: OH
Design: Plan 1 10-12-18

Local Co-ordinate Reference:
TVD Reference:
MD Reference:
North Reference:
Survey Calculation Method:

Well 603H
RKB= @ 3276.70usft (Precision 595)
RKB= @ 3276.70usft (Precision 595)
Grid
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)
L Avalon									
10,387.25	0.00	0.00	10,375.72	-229.88	16.31	-229.97	0.00	0.00	0.00
FBSG_sand									
10,907.25	0.00	0.00	10,895.72	-229.88	16.31	-229.97	0.00	0.00	0.00
SBSG_sand									
11,381.25	0.00	0.00	11,369.72	-229.88	16.31	-229.97	0.00	0.00	0.00
SBSG_sand									
11,733.56	0.00	0.00	11,722.04	-229.88	16.31	-229.97	0.00	0.00	0.00
KOP2, Begin 10.00°/100' Build									
11,800.00	6.64	359.57	11,788.33	-226.03	16.28	-226.13	10.00	10.00	0.00
11,900.00	16.64	359.57	11,886.15	-205.88	16.13	-205.97	10.00	10.00	0.00
11,970.82	23.73	359.57	11,952.57	-181.46	15.95	-181.55	10.00	10.00	0.00
SBSG_sand base									
12,000.00	26.64	359.57	11,978.98	-169.04	15.86	-169.13	10.00	10.00	0.00
12,100.00	36.64	359.57	12,064.00	-116.65	15.47	-116.74	10.00	10.00	0.00
12,200.00	46.64	359.57	12,138.64	-50.28	14.97	-50.37	10.00	10.00	0.00
12,300.00	56.64	359.57	12,200.61	28.03	14.39	27.95	10.00	10.00	0.00
12,400.00	66.64	359.57	12,248.05	115.92	13.74	115.84	10.00	10.00	0.00
12,500.00	76.64	359.57	12,279.50	210.71	13.03	210.63	10.00	10.00	0.00
12,600.00	86.64	359.57	12,294.02	309.52	12.30	309.44	10.00	10.00	0.00
12,635.32	90.18	359.57	12,295.00	344.82	12.03	344.74	10.00	10.00	0.00
LP, Hold 90.18° Inc at 359.57° Azm									
12,700.00	90.18	359.57	12,294.80	409.50	11.55	409.42	0.00	0.00	0.00
12,800.00	90.18	359.57	12,294.49	509.49	10.81	509.42	0.00	0.00	0.00
12,900.00	90.18	359.57	12,294.18	609.49	10.06	609.42	0.00	0.00	0.00
13,000.00	90.18	359.57	12,293.87	709.49	9.32	709.42	0.00	0.00	0.00
13,100.00	90.18	359.57	12,293.57	809.48	8.57	809.42	0.00	0.00	0.00
13,200.00	90.18	359.57	12,293.26	909.48	7.83	909.42	0.00	0.00	0.00
13,300.00	90.18	359.57	12,292.95	1,009.48	7.09	1,009.42	0.00	0.00	0.00
13,400.00	90.18	359.57	12,292.64	1,109.47	6.34	1,109.42	0.00	0.00	0.00
13,500.00	90.18	359.57	12,292.34	1,209.47	5.60	1,209.42	0.00	0.00	0.00
13,600.00	90.18	359.57	12,292.03	1,309.47	4.85	1,309.41	0.00	0.00	0.00
13,700.00	90.18	359.57	12,291.72	1,409.46	4.11	1,409.41	0.00	0.00	0.00
13,800.00	90.18	359.57	12,291.42	1,509.46	3.36	1,509.41	0.00	0.00	0.00
13,900.00	90.18	359.57	12,291.11	1,609.46	2.62	1,609.41	0.00	0.00	0.00
14,000.00	90.18	359.57	12,290.80	1,709.45	1.88	1,709.41	0.00	0.00	0.00
14,100.00	90.18	359.57	12,290.49	1,809.45	1.13	1,809.41	0.00	0.00	0.00
14,200.00	90.18	359.57	12,290.19	1,909.45	0.39	1,909.41	0.00	0.00	0.00
14,300.00	90.18	359.57	12,289.88	2,009.44	-0.36	2,009.41	0.00	0.00	0.00
14,400.00	90.18	359.57	12,289.57	2,109.44	-1.10	2,109.41	0.00	0.00	0.00
14,500.00	90.18	359.57	12,289.26	2,209.44	-1.85	2,209.41	0.00	0.00	0.00
14,600.00	90.18	359.57	12,288.96	2,309.44	-2.59	2,309.41	0.00	0.00	0.00
14,700.00	90.18	359.57	12,288.65	2,409.43	-3.33	2,409.41	0.00	0.00	0.00
14,800.00	90.18	359.57	12,288.34	2,509.43	-4.08	2,509.41	0.00	0.00	0.00
14,900.00	90.18	359.57	12,288.03	2,609.43	-4.82	2,609.41	0.00	0.00	0.00
15,000.00	90.18	359.57	12,287.73	2,709.42	-5.57	2,709.41	0.00	0.00	0.00
15,100.00	90.18	359.57	12,287.42	2,809.42	-6.31	2,809.41	0.00	0.00	0.00
15,200.00	90.18	359.57	12,287.11	2,909.42	-7.06	2,909.41	0.00	0.00	0.00
15,300.00	90.18	359.57	12,286.81	3,009.41	-7.80	3,009.41	0.00	0.00	0.00
15,400.00	90.18	359.57	12,286.50	3,109.41	-8.54	3,109.40	0.00	0.00	0.00
15,500.00	90.18	359.57	12,286.19	3,209.41	-9.29	3,209.40	0.00	0.00	0.00
15,600.00	90.18	359.57	12,285.88	3,309.40	-10.03	3,309.40	0.00	0.00	0.00
15,700.00	90.18	359.57	12,285.58	3,409.40	-10.78	3,409.40	0.00	0.00	0.00



Database: USA Compass
 Company: COG Operating LLC
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 Site: Fez Federal Com
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 Design: Plan 1 10-12-18

Local Co-ordinate Reference: Well 603H
 TVD Reference: RKB= @ 3276.70usft (Precision 595)
 MD Reference: RKB= @ 3276.70usft (Precision 595)
 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)
15,800.00	90.18	359.57	12,285.27	3,509.40	-11.52	3,509.40	0.00	0.00	0.00
15,900.00	90.18	359.57	12,284.96	3,609.39	-12.27	3,609.40	0.00	0.00	0.00
16,000.00	90.18	359.57	12,284.65	3,709.39	-13.01	3,709.40	0.00	0.00	0.00
16,100.00	90.18	359.57	12,284.35	3,809.39	-13.75	3,809.40	0.00	0.00	0.00
16,200.00	90.18	359.57	12,284.04	3,909.38	-14.50	3,909.40	0.00	0.00	0.00
16,300.00	90.18	359.57	12,283.73	4,009.38	-15.24	4,009.40	0.00	0.00	0.00
16,400.00	90.18	359.57	12,283.42	4,109.38	-15.99	4,109.40	0.00	0.00	0.00
16,500.00	90.18	359.57	12,283.12	4,209.37	-16.73	4,209.40	0.00	0.00	0.00
16,600.00	90.18	359.57	12,282.81	4,309.37	-17.48	4,309.40	0.00	0.00	0.00
16,700.00	90.18	359.57	12,282.50	4,409.37	-18.22	4,409.40	0.00	0.00	0.00
16,800.00	90.18	359.57	12,282.19	4,509.36	-18.96	4,509.40	0.00	0.00	0.00
16,900.00	90.18	359.57	12,281.89	4,609.36	-19.71	4,609.40	0.00	0.00	0.00
17,000.00	90.18	359.57	12,281.58	4,709.36	-20.45	4,709.40	0.00	0.00	0.00
17,100.00	90.18	359.57	12,281.27	4,809.35	-21.20	4,809.39	0.00	0.00	0.00
17,200.00	90.18	359.57	12,280.97	4,909.35	-21.94	4,909.39	0.00	0.00	0.00
17,300.00	90.18	359.57	12,280.66	5,009.35	-22.69	5,009.39	0.00	0.00	0.00
17,400.00	90.18	359.57	12,280.35	5,109.34	-23.43	5,109.39	0.00	0.00	0.00
17,500.00	90.18	359.57	12,280.04	5,209.34	-24.17	5,209.39	0.00	0.00	0.00
17,600.00	90.18	359.57	12,279.74	5,309.34	-24.92	5,309.39	0.00	0.00	0.00
17,700.00	90.18	359.57	12,279.43	5,409.33	-25.66	5,409.39	0.00	0.00	0.00
17,800.00	90.18	359.57	12,279.12	5,509.33	-26.41	5,509.39	0.00	0.00	0.00
17,900.00	90.18	359.57	12,278.81	5,609.33	-27.15	5,609.39	0.00	0.00	0.00
18,000.00	90.18	359.57	12,278.51	5,709.32	-27.90	5,709.39	0.00	0.00	0.00
18,100.00	90.18	359.57	12,278.20	5,809.32	-28.64	5,809.39	0.00	0.00	0.00
18,200.00	90.18	359.57	12,277.89	5,909.32	-29.38	5,909.39	0.00	0.00	0.00
18,300.00	90.18	359.57	12,277.58	6,009.32	-30.13	6,009.39	0.00	0.00	0.00
18,400.00	90.18	359.57	12,277.28	6,109.31	-30.87	6,109.39	0.00	0.00	0.00
18,500.00	90.18	359.57	12,276.97	6,209.31	-31.62	6,209.39	0.00	0.00	0.00
18,600.00	90.18	359.57	12,276.66	6,309.31	-32.36	6,309.39	0.00	0.00	0.00
18,700.00	90.18	359.57	12,276.35	6,409.30	-33.11	6,409.39	0.00	0.00	0.00
18,800.00	90.18	359.57	12,276.05	6,509.30	-33.85	6,509.39	0.00	0.00	0.00
18,900.00	90.18	359.57	12,275.74	6,609.30	-34.59	6,609.38	0.00	0.00	0.00
19,000.00	90.18	359.57	12,275.43	6,709.29	-35.34	6,709.38	0.00	0.00	0.00
19,100.00	90.18	359.57	12,275.13	6,809.29	-36.08	6,809.38	0.00	0.00	0.00
19,200.00	90.18	359.57	12,274.82	6,909.29	-36.83	6,909.38	0.00	0.00	0.00
19,300.00	90.18	359.57	12,274.51	7,009.28	-37.57	7,009.38	0.00	0.00	0.00
19,400.00	90.18	359.57	12,274.20	7,109.28	-38.32	7,109.38	0.00	0.00	0.00
19,500.00	90.18	359.57	12,273.90	7,209.28	-39.06	7,209.38	0.00	0.00	0.00
19,600.00	90.18	359.57	12,273.59	7,309.27	-39.80	7,309.38	0.00	0.00	0.00
19,700.00	90.18	359.57	12,273.28	7,409.27	-40.55	7,409.38	0.00	0.00	0.00
19,800.00	90.18	359.57	12,272.97	7,509.27	-41.29	7,509.38	0.00	0.00	0.00
19,900.00	90.18	359.57	12,272.67	7,609.26	-42.04	7,609.38	0.00	0.00	0.00
20,000.00	90.18	359.57	12,272.36	7,709.26	-42.78	7,709.38	0.00	0.00	0.00
20,100.00	90.18	359.57	12,272.05	7,809.26	-43.53	7,809.38	0.00	0.00	0.00
20,200.00	90.18	359.57	12,271.74	7,909.25	-44.27	7,909.38	0.00	0.00	0.00
20,300.00	90.18	359.57	12,271.44	8,009.25	-45.01	8,009.38	0.00	0.00	0.00
20,400.00	90.18	359.57	12,271.13	8,109.25	-45.76	8,109.38	0.00	0.00	0.00
20,500.00	90.18	359.57	12,270.82	8,209.24	-46.50	8,209.38	0.00	0.00	0.00
20,600.00	90.18	359.57	12,270.51	8,309.24	-47.25	8,309.37	0.00	0.00	0.00
20,700.00	90.18	359.57	12,270.21	8,409.24	-47.99	8,409.37	0.00	0.00	0.00
20,800.00	90.18	359.57	12,269.90	8,509.23	-48.74	8,509.37	0.00	0.00	0.00
20,900.00	90.18	359.57	12,269.59	8,609.23	-49.48	8,609.37	0.00	0.00	0.00
21,000.00	90.18	359.57	12,269.29	8,709.23	-50.22	8,709.37	0.00	0.00	0.00
21,100.00	90.18	359.57	12,268.98	8,809.22	-50.97	8,809.37	0.00	0.00	0.00

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Local Co-ordinate Reference: Well 603H
TVD Reference: RKB= @ 3276.70usft (Precision 595)
MD Reference: RKB= @ 3276.70usft (Precision 595)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
21,200.00	90.18	359.57	12,268.67	8,909.22	-51.71	8,909.37	0.00	0.00	0.00
21,300.00	90.18	359.57	12,268.36	9,009.22	-52.46	9,009.37	0.00	0.00	0.00
21,400.00	90.18	359.57	12,268.06	9,109.21	-53.20	9,109.37	0.00	0.00	0.00
21,500.00	90.18	359.57	12,267.75	9,209.21	-53.95	9,209.37	0.00	0.00	0.00
21,600.00	90.18	359.57	12,267.44	9,309.21	-54.69	9,309.37	0.00	0.00	0.00
21,700.00	90.18	359.57	12,267.13	9,409.21	-55.43	9,409.37	0.00	0.00	0.00
21,800.00	90.18	359.57	12,266.83	9,509.20	-56.18	9,509.37	0.00	0.00	0.00
21,900.00	90.18	359.57	12,266.52	9,609.20	-56.92	9,609.37	0.00	0.00	0.00
22,000.00	90.18	359.57	12,266.21	9,709.20	-57.67	9,709.37	0.00	0.00	0.00
22,100.00	90.18	359.57	12,265.90	9,809.19	-58.41	9,809.37	0.00	0.00	0.00
22,200.00	90.18	359.57	12,265.60	9,909.19	-59.16	9,909.37	0.00	0.00	0.00
22,300.00	90.18	359.57	12,265.29	10,009.19	-59.90	10,009.36	0.00	0.00	0.00
22,394.02	90.18	359.57	12,265.00	10,103.20	-60.60	10,103.38	0.00	0.00	0.00

TD at 22394.02

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
LTP - Fez Fed Com 603H - hit/miss target - Shape - Point	0.00	0.00	12,260.00	9,973.28	-59.63	425,315.48	795,912.87	32° 9' 56.50200 N	103° 22' 37.39800 W
- plan misses target center by 5.40usft at 22264.11usft MD (12265.40 TVD, 9973.30 N, -59.63 E)									
BHL - Fez Fed Com 603 - plan hits target center - Point	0.00	0.00	12,265.00	10,103.20	-60.60	425,445.40	795,911.90	32° 9' 57.78766 N	103° 22' 37.39591 W
FTP - Fez Fed Com 603 - plan misses target center by 70.57usft at 12364.36usft MD (12232.91 TVD, 83.66 N, 13.98 E) - Point	0.00	0.00	12,295.00	50.13	14.59	415,392.33	795,987.09	32° 8' 18.30480 N	103° 22' 37.56000 W

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
848.00	848.00	Rustler		-0.18	359.66
1,189.00	1,189.00	TOS		-0.18	359.66
4,996.25	4,984.72	BOS (Fletcher)		-0.18	359.66
5,327.25	5,315.72	LMAR (Top Delaware)		-0.18	359.66
5,359.25	5,347.72	BLCN		-0.18	359.66
6,298.25	6,286.72	CYCN		-0.18	359.66
7,758.25	7,746.72	BYCN		-0.18	359.66
8,989.25	8,977.72	Bone Sprg		-0.18	359.66
9,206.25	9,194.72	U Avalon		-0.18	359.66
9,570.25	9,558.72	L Avalon		-0.18	359.66
10,387.25	10,375.72	FBSG_sand		-0.18	359.66
10,907.25	10,895.72	SBSG_sand		-0.18	359.66
11,381.25	11,369.72	SBSG_sand		-0.18	359.66
11,970.82	11,952.57	SBSG_sand base		-0.18	359.66

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North Reference: Grid
Survey Calculation Method: Minimum Curvature

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
1,500.00	1,500.00	0.00	0.00	KOP, Begin 2.00°/100' Build
1,799.83	1,799.29	-15.64	1.11	Hold 6.00° Inc at 175.94° Azm
3,705.69	3,694.71	-214.24	15.20	Begin 2.00°/100' Drop
4,005.52	3,994.00	-229.88	16.31	Begin Vertical Hold
11,733.56	11,722.04	-229.88	16.31	KOP2, Begin 10.00°/100' Build
12,635.32	12,295.00	344.82	12.03	LP, Hold 90.18° Inc at 359.57° Azm
22,394.02	12,265.00	10,103.20	-60.60	TD at 22394.02