McVAY DRILLING COMPANY
P.O. Box 2450
Hobbs, New Mexico 88241
(575) 397-3311
FAX: 39-DRILL

Well Name and Num: Azores Fed #12 H
Location: Sec 29, T24S, R32 E
Operator: COG Operating
Drilling Contractor: McVay Drilling Company

The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

Degrees @	Depth	Degrees @	Depth	Degrees @	Depth	Degrees @	Depth
0.60	360	4.80	7275	90.70	13724		
1.00	604	4.20	7652	92.60	13913		
3.30	1054	4.90	8030				
6.00	1427	4.40	8408				
5.50	1804	3.50	8596				
4.10	2181	13.60	8742				
4.80	2559	46.30	9072				
4.90	2936	69.30	9261				
4.90	3312	87.70	9760				
4.90	3690	92.60	10137				
3.90	4067	90.90	11742				
5.30	5010	89.90	12120				
5.30	5387	91.40	12403				
5.10	5765	89.10	12875				
5.10	6142	88.70	13969				
4.40	6520	91.60	13346				
4.20	6897	89.90	13535				

By: _____

Subscribed and sworn to before me this 11th day of August, 2016

_____
Notary Public, Lea County, New Mexico

OFFICIAL SEAL
TINA FLEMENS
Notary Public
State of New Mexico
My Comm. Expires 8-16-17

SURVEY CERTIFICATION FORM

3610 Elkins Road Midland, TX 79705 t:432-684-0057 f: 432-686-7964

PHOENIX TECHNOLOGY SERVICES

Company: COG

Job #: 1610317

Well Name: Azores Federal 12H

County/State: Lea/ NM

Survey Instrument Type: North Seek Rate Gyro

API # 30-025-43178

TIE-IN DATA

Measure Depth (ft)	Vertical Depth (ft)	Inclination (°)	Azimuth (°)	N-S Coordinates	E-W Coordinates	Data Source
0	0	0	0	0	0	Surface

First Survey

Date	Depth (ft)	Inclination (°)	Azimuth (°)
2016-07-19	0	0	0

Last Survey

Date	Depth (ft)	Inclination (°)	Azimuth (°)
2016-07-19	745	2.34	284.87

Projected TD Survey

Date	Depth (ft)	Inclination (°)	Azimuth (°)
0	0	0	0

Grid Correction
-0.34

Gyro Operator: Phoenix Technology Services USA Ltd.

Gyro Supervisor: Jaime Stephenson

To the best of my knowledge I certify this survey data to be correct and true

Date: 7/19/16

Print Name: Andy Askew

Signature:

PHOENIX TECHNOLOGY SERVICES

Company: COG
Well: Azores Federal 12H
Location: Lea Co., NM
Rig: McVay 8

Job Number: 1610317
Grid Corr.: -0.34
Lat: 32.18
Long: -103.69

Date: 07-19-16
Calculation Method: Minimum Curvature
Proposed Azimuth:
RKB - MSL in feet: 26
Tie Into: Surface

Survey Tool Type	Survey Depth (ft)	Inclination (deg)	Azimuth (deg)	Course Length (ft)	True Vertical Depth (ft)	Vertical Section (ft)	Coordinates N/S (ft)	Coordinates E/W (ft)	Closure Distance (ft)	Closure Angle (deg)	Dogleg Severity (d/100')	Build Rate (d/100')	Walk Rate (d/100')
Enter Tie-In Survey on Line 10						**FIELD COPY, NON-DEFINITIVE**							
TIE IN	0			0	0	0	0	0					
Gyro	100.00	0.64	210.64	100	100.00	-0.48	0.48 S	0.28 W	0.56	210.64	0.64	0.64	210.64
	200.00	1.19	219.44	100	199.98	-1.76	1.76 S	1.23 W	2.15	214.88	0.57	0.55	8.80
	300.00	1.02	231.94	100	299.97	-3.11	3.11 S	2.59 W	4.05	219.75	0.29	-0.17	12.50
	400.00	0.65	245.82	100	399.96	-3.89	3.89 S	3.81 W	5.45	224.35	0.42	-0.37	13.88
	500.00	1.12	283.34	100	499.94	-3.90	3.90 S	5.28 W	6.56	233.52	0.72	0.47	37.52
	600.00	1.33	290.46	100	599.92	-3.27	3.27 S	7.31 W	8.01	245.91	0.26	0.21	7.12
	700.00	1.54	282.25	100	699.89	-2.58	2.58 S	9.71 W	10.05	255.13	0.29	0.21	-8.21
	745.75	2.34	284.87	46	745.61	-2.21	2.21 S	11.22 W	11.43	258.86	1.76	1.75	5.73

CONCHO

COG Operating, LLC

Lea County, NM
Sec 32, T24-S, R32E
Azores Federal #12H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

03 August, 2016

QES
DIRECTIONAL DRILLING

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Azores Federal #12H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3522.0usft (McVay 8)
Site:	Sec 32, T24-S, R32E	**MD Reference:**	Well @ 3522.0usft (McVay 8)
Well:	Azores Federal #12H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

Project Lea County, NM

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 Sec 32, T24-S, R32E

Site Position:		**Northing:**	429,960.20 usft	**Latitude:**	32° 10' 49.697 N
From:	Map	**Easting:**	697,210.20 usft	**Longitude:**	103° 41' 45.292 W
Position Uncertainty:	0.0 usft	**Slot Radius:**	13-3/16 "	**Grid Convergence:**	0.34 °

Well Azores Federal #12H

Well Position	**+N/-S**	0.0 usft	**Northing:**	430,368.50 usft	**Latitude:**	32° 10' 53.799 N
	+E/-W	0.0 usft	**Easting:**	696,155.50 usft	**Longitude:**	103° 41' 57.536 W
Position Uncertainty		0.0 usft	**Wellhead Elevation:**	3,522.0 usft	**Ground Level:**	3,496.0 usft

Wellbore Wellbore #1

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	7/14/2016	7.11	60.01	47,994

Design Wellbore #1

Audit Notes:

Version:	1.0	**Phase:**	ACTUAL	**Tie On Depth:**	0.0

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	351.80

Survey Program **Date** 8/3/2016

From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	746.0	Gyro (Wellbore #1)	GYRO-NS	Gyrocompass Gyro
872.0	14,092.0	MWD Surveys (Wellbore #1)	MWD default	MWD - Standard

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	430,368.50	696,155.50	32° 10' 53.799 N	103° 41' 57.536 W
100.0	0.64	210.64	100.0	-0.5	-0.3	430,368.02	696,155.21	32° 10' 53.795 N	103° 41' 57.539 W
200.0	1.19	219.44	200.0	-1.8	-1.2	430,366.74	696,154.27	32° 10' 53.782 N	103° 41' 57.551 W
300.0	1.02	231.94	300.0	-3.1	-2.6	430,365.39	696,152.91	32° 10' 53.769 N	103° 41' 57.566 W
400.0	0.65	245.82	400.0	-3.9	-3.8	430,364.60	696,151.69	32° 10' 53.761 N	103° 41' 57.581 W
500.0	1.12	283.34	499.9	-3.9	-5.3	430,364.60	696,150.22	32° 10' 53.761 N	103° 41' 57.598 W
600.0	1.33	290.46	599.9	-3.3	-7.3	430,365.23	696,148.18	32° 10' 53.768 N	103° 41' 57.621 W
700.0	1.54	282.25	699.9	-2.6	-9.7	430,365.92	696,145.78	32° 10' 53.775 N	103° 41' 57.649 W
746.0	2.34	284.87	745.9	-2.2	-11.2	430,366.29	696,144.27	32° 10' 53.778 N	103° 41' 57.667 W
Gyro Tie-In @ 746' MD / 746' TVD									
872.0	1.40	298.40	871.8	-0.8	-15.1	430,367.68	696,140.43	32° 10' 53.792 N	103° 41' 57.712 W

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Azores Federal #12H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3522.0usft (McVay 8)
Site:	Sec 32, T24-S, R32E	**MD Reference:**	Well @ 3522.0usft (McVay 8)
Well:	Azores Federal #12H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,057.0	3.30	282.60	1,056.6	1.4	-22.3	430,369.92	696,133.24	32° 10' 53.815 N	103° 41' 57.795 W
1,241.0	5.40	256.40	1,240.1	0.5	-35.8	430,369.04	696,119.66	32° 10' 53.807 N	103° 41' 57.953 W
1,427.0	6.00	256.70	1,425.2	-3.8	-53.8	430,364.75	696,101.69	32° 10' 53.765 N	103° 41' 58.162 W
1,615.0	5.90	259.00	1,612.2	-7.9	-72.9	430,360.64	696,082.64	32° 10' 53.726 N	103° 41' 58.384 W
1,804.0	5.50	243.70	1,800.3	-13.7	-90.5	430,354.77	696,064.99	32° 10' 53.669 N	103° 41' 58.590 W
1,993.0	5.80	250.40	1,988.3	-20.9	-107.6	430,347.56	696,047.87	32° 10' 53.599 N	103° 41' 58.790 W
2,181.0	4.10	248.10	2,175.6	-26.6	-122.8	430,341.86	696,032.68	32° 10' 53.543 N	103° 41' 58.967 W
2,370.0	4.20	253.40	2,364.1	-31.1	-135.7	430,337.37	696,019.78	32° 10' 53.499 N	103° 41' 59.117 W
2,559.0	4.80	261.10	2,552.6	-34.3	-150.2	430,334.17	696,005.34	32° 10' 53.468 N	103° 41' 59.286 W
2,747.0	5.60	263.20	2,739.8	-36.6	-167.0	430,331.86	695,988.46	32° 10' 53.447 N	103° 41' 59.482 W
2,936.0	4.90	245.80	2,928.0	-41.0	-183.6	430,327.46	695,971.94	32° 10' 53.404 N	103° 41' 59.675 W
3,124.0	5.20	248.60	3,115.3	-47.4	-198.8	430,321.06	695,956.68	32° 10' 53.342 N	103° 41' 59.853 W
3,312.0	5.10	256.60	3,302.5	-52.5	-214.9	430,316.02	695,940.62	32° 10' 53.293 N	103° 42' 0.040 W
3,501.0	4.80	262.20	3,490.8	-55.5	-230.9	430,313.00	695,924.61	32° 10' 53.264 N	103° 42' 0.226 W
3,690.0	4.90	247.80	3,679.1	-59.6	-246.2	430,308.87	695,909.31	32° 10' 53.224 N	103° 42' 0.405 W
3,879.0	4.40	237.80	3,867.5	-66.5	-259.8	430,301.96	695,895.70	32° 10' 53.156 N	103° 42' 0.564 W
4,067.0	3.90	240.00	4,055.0	-73.6	-271.4	430,294.92	695,884.06	32° 10' 53.087 N	103° 42' 0.699 W
4,256.0	4.70	249.50	4,243.5	-79.5	-284.3	430,289.00	695,871.24	32° 10' 53.029 N	103° 42' 0.849 W
4,445.0	4.70	241.40	4,431.9	-85.9	-298.3	430,282.58	695,857.19	32° 10' 52.967 N	103° 42' 1.013 W
4,518.0	4.60	244.30	4,504.6	-88.6	-303.6	430,279.88	695,851.92	32° 10' 52.940 N	103° 42' 1.074 W
4,633.0	3.90	244.10	4,619.3	-92.3	-311.2	430,276.17	695,844.25	32° 10' 52.904 N	103° 42' 1.164 W
4,822.0	5.10	254.60	4,807.7	-97.4	-325.1	430,271.13	695,830.37	32° 10' 52.855 N	103° 42' 1.326 W
5,010.0	5.30	255.30	4,994.9	-101.8	-341.6	430,266.71	695,813.91	32° 10' 52.812 N	103° 42' 1.518 W
5,199.0	5.10	257.40	5,183.2	-105.8	-358.2	430,262.66	695,797.27	32° 10' 52.773 N	103° 42' 1.711 W
5,204.5	5.11	257.51	5,188.6	-105.9	-358.7	430,262.55	695,796.79	32° 10' 52.772 N	103° 42' 1.717 W
Entered Lease Line @ 5205' MD / 5189' TVD									
5,387.0	5.30	261.00	5,370.4	-109.0	-375.0	430,259.48	695,780.54	32° 10' 52.742 N	103° 42' 1.906 W
5,576.0	4.90	258.50	5,558.6	-112.0	-391.5	430,256.50	695,764.01	32° 10' 52.714 N	103° 42' 2.099 W
5,765.0	5.10	259.20	5,746.9	-115.2	-407.6	430,253.32	695,747.85	32° 10' 52.683 N	103° 42' 2.287 W
5,954.0	5.30	261.30	5,935.1	-118.1	-424.5	430,250.43	695,730.97	32° 10' 52.656 N	103° 42' 2.484 W
6,142.0	5.10	261.30	6,122.4	-120.7	-441.4	430,247.85	695,714.13	32° 10' 52.631 N	103° 42' 2.680 W
6,331.0	4.90	264.50	6,310.7	-122.7	-457.7	430,245.80	695,697.79	32° 10' 52.612 N	103° 42' 2.870 W
6,520.0	4.40	262.70	6,499.0	-124.4	-472.9	430,244.11	695,682.56	32° 10' 52.596 N	103° 42' 3.047 W
6,708.0	4.40	260.60	6,686.5	-126.5	-487.2	430,242.01	695,668.29	32° 10' 52.576 N	103° 42' 3.214 W
6,897.0	4.20	260.60	6,874.9	-128.8	-501.2	430,239.70	695,654.31	32° 10' 52.554 N	103° 42' 3.376 W
7,086.0	4.80	249.40	7,063.4	-132.7	-515.4	430,235.79	695,640.08	32° 10' 52.516 N	103° 42' 3.542 W
7,275.0	4.80	247.90	7,251.7	-138.5	-530.1	430,230.03	695,625.35	32° 10' 52.460 N	103° 42' 3.714 W
7,463.0	4.80	249.00	7,439.0	-144.2	-544.8	430,224.25	695,610.72	32° 10' 52.404 N	103° 42' 3.885 W
7,652.0	4.20	247.60	7,627.5	-149.7	-558.6	430,218.78	695,596.94	32° 10' 52.350 N	103° 42' 4.045 W
7,841.0	4.20	245.50	7,816.0	-155.2	-571.3	430,213.27	695,584.24	32° 10' 52.297 N	103° 42' 4.193 W
8,030.0	4.90	255.30	8,004.4	-160.1	-585.4	430,208.35	695,570.14	32° 10' 52.249 N	103° 42' 4.358 W
8,219.0	4.80	257.40	8,192.7	-163.9	-600.9	430,204.58	695,554.61	32° 10' 52.212 N	103° 42' 4.539 W
8,408.0	4.40	255.00	8,381.1	-167.5	-615.6	430,200.98	695,539.89	32° 10' 52.178 N	103° 42' 4.710 W
8,596.0	3.50	250.40	8,568.6	-171.3	-628.0	430,197.19	695,527.52	32° 10' 52.141 N	103° 42' 4.855 W
8,647.0	3.60	251.50	8,619.5	-172.3	-631.0	430,196.16	695,524.54	32° 10' 52.131 N	103° 42' 4.889 W
8,695.0	7.70	288.90	8,667.3	-171.8	-635.4	430,196.72	695,520.06	32° 10' 52.137 N	103° 42' 4.941 W
8,742.0	13.60	306.30	8,713.5	-167.5	-642.9	430,201.02	695,512.62	32° 10' 52.180 N	103° 42' 5.028 W
8,789.0	17.40	320.00	8,758.8	-158.8	-651.9	430,209.68	695,503.64	32° 10' 52.266 N	103° 42' 5.132 W
8,836.0	21.90	329.90	8,803.0	-145.8	-660.8	430,222.66	695,494.72	32° 10' 52.395 N	103° 42' 5.234 W
8,883.0	26.60	342.90	8,845.9	-128.2	-668.3	430,240.32	695,487.22	32° 10' 52.570 N	103° 42' 5.320 W
8,930.0	31.60	353.20	8,887.0	-105.9	-672.8	430,262.63	695,482.67	32° 10' 52.791 N	103° 42' 5.372 W
8,978.0	36.10	2.40	8,926.9	-79.2	-673.7	430,289.28	695,481.77	32° 10' 53.055 N	103° 42' 5.381 W
9,025.0	41.40	3.60	8,963.5	-49.9	-672.2	430,318.64	695,483.33	32° 10' 53.345 N	103° 42' 5.361 W
9,072.0	46.30	3.30	8,997.4	-17.4	-670.2	430,351.14	695,485.28	32° 10' 53.667 N	103° 42' 5.336 W
9,119.0	52.50	0.60	9,028.0	18.3	-669.0	430,386.78	695,486.45	32° 10' 54.019 N	103° 42' 5.319 W

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Azores Federal #12H
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Site:	Sec 32, T24-S, R32E	**MD Reference:**	Well @ 3522.0usft (McVay 8)
Well:	Azores Federal #12H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
9,167.0	58.70	357.50	9,055.1	57.9	-669.7	430,426.35	695,485.76	32° 10' 54.411 N	103° 42' 5.325 W
9,214.0	63.10	355.90	9,077.9	98.8	-672.1	430,467.34	695,483.38	32° 10' 54.817 N	103° 42' 5.350 W
9,228.9	65.06	356.19	9,084.4	112.2	-673.0	430,480.71	695,482.46	32° 10' 54.949 N	103° 42' 5.359 W
FTP @ 9229' MD / 9084' TVD									
9,261.0	69.30	356.80	9,096.9	141.7	-674.8	430,510.23	695,480.66	32° 10' 55.241 N	103° 42' 5.378 W
9,288.0	73.40	358.20	9,105.5	167.3	-676.0	430,535.78	695,479.54	32° 10' 55.494 N	103° 42' 5.390 W
9,335.0	76.50	359.40	9,117.7	212.7	-676.9	430,581.16	695,478.60	32° 10' 55.943 N	103° 42' 5.398 W
9,382.0	81.90	359.40	9,126.5	258.8	-677.4	430,627.30	695,478.11	32° 10' 56.400 N	103° 42' 5.400 W
9,477.0	87.40	358.50	9,135.4	353.3	-679.1	430,721.84	695,476.38	32° 10' 57.336 N	103° 42' 5.414 W
9,571.0	87.00	358.30	9,140.0	447.2	-681.7	430,815.69	695,473.76	32° 10' 58.264 N	103° 42' 5.438 W
9,665.0	87.80	358.50	9,144.2	541.1	-684.4	430,909.55	695,471.13	32° 10' 59.193 N	103° 42' 5.462 W
9,760.0	87.70	358.00	9,148.0	635.9	-687.3	431,004.43	695,468.24	32° 11' 0.133 N	103° 42' 5.489 W
9,854.0	91.40	356.90	9,148.7	729.8	-691.4	431,098.32	695,464.05	32° 11' 1.062 N	103° 42' 5.531 W
9,948.0	90.90	356.60	9,146.8	823.7	-696.8	431,192.15	695,458.73	32° 11' 1.991 N	103° 42' 5.587 W
10,043.0	90.60	354.80	9,145.6	918.4	-703.9	431,286.87	695,451.60	32° 11' 2.929 N	103° 42' 5.663 W
10,137.0	92.60	357.60	9,143.0	1,012.1	-710.1	431,380.61	695,445.38	32° 11' 3.857 N	103° 42' 5.729 W
10,232.0	92.20	359.70	9,139.0	1,107.0	-712.4	431,475.50	695,443.14	32° 11' 4.796 N	103° 42' 5.749 W
10,326.0	93.60	1.10	9,134.2	1,200.9	-711.7	431,569.37	695,443.79	32° 11' 5.725 N	103° 42' 5.735 W
10,421.0	90.60	2.00	9,130.7	1,295.8	-709.1	431,664.26	695,446.36	32° 11' 6.663 N	103° 42' 5.699 W
10,515.0	90.80	2.70	9,129.6	1,389.7	-705.3	431,758.17	695,450.22	32° 11' 7.593 N	103° 42' 5.647 W
10,609.0	91.80	1.90	9,127.5	1,483.6	-701.5	431,852.07	695,453.99	32° 11' 8.522 N	103° 42' 5.597 W
10,704.0	92.40	1.10	9,124.0	1,578.5	-699.0	431,946.97	695,456.47	32° 11' 9.461 N	103° 42' 5.562 W
10,798.0	90.70	1.10	9,121.4	1,672.4	-697.2	432,040.92	695,458.28	32° 11' 10.390 N	103° 42' 5.534 W
10,893.0	91.00	0.10	9,120.0	1,767.4	-696.2	432,135.90	695,459.27	32° 11' 11.330 N	103° 42' 5.516 W
10,987.0	91.60	359.90	9,117.9	1,861.4	-696.2	432,229.88	695,459.27	32° 11' 12.260 N	103° 42' 5.510 W
11,081.0	90.00	1.30	9,116.6	1,955.4	-695.2	432,323.86	695,460.26	32° 11' 13.190 N	103° 42' 5.492 W
11,176.0	90.40	2.50	9,116.2	2,050.3	-692.1	432,418.80	695,463.41	32° 11' 14.129 N	103° 42' 5.449 W
11,270.0	88.00	1.70	9,117.6	2,144.2	-688.6	432,512.72	695,466.85	32° 11' 15.058 N	103° 42' 5.402 W
11,364.0	87.80	0.80	9,121.0	2,238.1	-686.6	432,606.64	695,468.90	32° 11' 15.988 N	103° 42' 5.372 W
11,459.0	89.70	359.20	9,123.1	2,333.1	-686.6	432,701.61	695,468.90	32° 11' 16.928 N	103° 42' 5.365 W
11,553.0	90.10	359.00	9,123.2	2,427.1	-688.1	432,795.59	695,467.42	32° 11' 17.858 N	103° 42' 5.376 W
11,648.0	90.80	358.90	9,122.5	2,522.1	-689.8	432,890.58	695,465.68	32° 11' 18.798 N	103° 42' 5.390 W
11,742.0	90.90	359.70	9,121.1	2,616.1	-691.0	432,984.56	695,464.53	32° 11' 19.728 N	103° 42' 5.397 W
11,837.0	91.80	359.40	9,118.9	2,711.0	-691.7	433,079.53	695,463.79	32° 11' 20.668 N	103° 42' 5.399 W
11,931.0	92.50	0.10	9,115.3	2,805.0	-692.1	433,173.46	695,463.38	32° 11' 21.597 N	103° 42' 5.397 W
12,025.0	91.80	359.70	9,111.8	2,898.9	-692.3	433,267.39	695,463.21	32° 11' 22.527 N	103° 42' 5.393 W
12,120.0	89.90	359.70	9,110.4	2,993.9	-692.8	433,362.38	695,462.72	32° 11' 23.467 N	103° 42' 5.392 W
12,214.0	90.00	359.60	9,110.5	3,087.9	-693.4	433,456.37	695,462.14	32° 11' 24.397 N	103° 42' 5.393 W
12,309.0	90.60	359.90	9,110.0	3,182.9	-693.8	433,551.37	695,461.73	32° 11' 25.337 N	103° 42' 5.391 W
12,403.0	91.40	0.30	9,108.3	3,276.9	-693.6	433,645.36	695,461.89	32° 11' 26.267 N	103° 42' 5.383 W
12,497.0	89.60	359.40	9,107.5	3,370.8	-693.8	433,739.35	695,461.65	32° 11' 27.197 N	103° 42' 5.379 W
12,592.0	90.90	359.70	9,107.1	3,465.8	-694.6	433,834.34	695,460.90	32° 11' 28.137 N	103° 42' 5.381 W
12,686.0	90.00	359.90	9,106.4	3,559.8	-694.9	433,928.34	695,460.57	32° 11' 29.067 N	103° 42' 5.379 W
12,780.0	91.40	0.30	9,105.2	3,653.8	-694.8	434,022.33	695,460.74	32° 11' 29.998 N	103° 42' 5.370 W
12,875.0	89.10	359.40	9,104.8	3,748.8	-695.0	434,117.32	695,460.49	32° 11' 30.938 N	103° 42' 5.367 W
12,969.0	88.70	359.00	9,106.6	3,842.8	-696.3	434,211.29	695,459.17	32° 11' 31.868 N	103° 42' 5.375 W
13,063.0	88.70	359.60	9,108.7	3,936.8	-697.5	434,305.26	695,458.03	32° 11' 32.798 N	103° 42' 5.382 W
13,158.0	88.80	359.60	9,110.8	4,031.7	-698.1	434,400.23	695,457.36	32° 11' 33.738 N	103° 42' 5.384 W
13,252.0	89.00	359.70	9,112.6	4,125.7	-698.7	434,494.22	695,456.79	32° 11' 34.668 N	103° 42' 5.384 W
13,346.0	91.60	359.60	9,112.1	4,219.7	-699.3	434,588.20	695,456.22	32° 11' 35.598 N	103° 42' 5.384 W
13,441.0	92.70	359.90	9,108.6	4,314.6	-699.7	434,683.14	695,455.80	32° 11' 36.537 N	103° 42' 5.382 W
13,535.0	89.90	358.70	9,106.4	4,408.6	-700.8	434,777.09	695,454.65	32° 11' 37.467 N	103° 42' 5.389 W
13,630.0	90.20	359.00	9,106.4	4,503.6	-702.7	434,872.07	695,452.75	32° 11' 38.407 N	103° 42' 5.405 W
13,724.0	90.70	359.70	9,105.6	4,597.6	-703.8	434,966.06	695,451.68	32° 11' 39.337 N	103° 42' 5.411 W
13,818.0	91.70	0.40	9,103.6	4,691.5	-703.7	435,060.04	695,451.76	32° 11' 40.267 N	103° 42' 5.404 W

Company:	COG Operating, LLC	**Local Co-ordinate Reference:**	Well Azores Federal #12H
Project:	Lea County, NM	**TVD Reference:**	Well @ 3522.0usft (McVay 8)
Site:	Sec 32, T24-S, R32E	**MD Reference:**	Well @ 3522.0usft (McVay 8)
Well:	Azores Federal #12H	**North Reference:**	Grid
Wellbore:	Wellbore #1	**Survey Calculation Method:**	Minimum Curvature
Design:	Wellbore #1	**Database:**	EDM5002

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
13,913.0	92.60	0.10	9,100.1	4,786.5	-703.3	435,154.97	695,452.18	32° 11' 41.207 N	103° 42' 5.392 W
14,089.2	92.60	0.20	9,092.1	4,962.5	-702.9	435,330.99	695,452.63	32° 11' 42.948 N	103° 42' 5.375 W
LTP @ 14089' MD / 9092' TVD									
14,092.0	92.60	0.20	9,092.0	4,965.3	-702.9	435,333.79	695,452.64	32° 11' 42.976 N	103° 42' 5.375 W
TD @ 14092' MD / 9092' TVD									

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates +N/-S (usft)	Local Coordinates +E/-W (usft)	Comment
746.0	745.9	-2.2	-11.2	Gyro Tie-In @ 746' MD / 746' TVD
5,204.5	5,188.6	-105.9	-358.7	Entered Lease Line @ 5205' MD / 5189' TVD
9,228.9	9,084.4	112.2	-673.0	FTP @ 9229' MD / 9084' TVD
14,089.2	9,092.1	4,962.5	-702.9	LTP @ 14089' MD / 9092' TVD
14,092.0	9,092.0	4,965.3	-702.9	TD @ 14092' MD / 9092' TVD

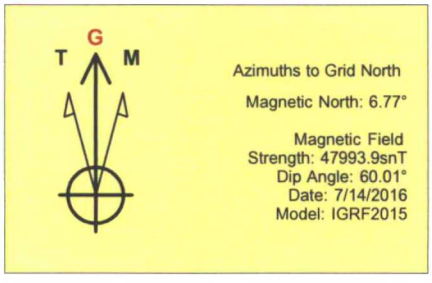
Checked By: _____ Approved By: _____ Date: _____

Company Name: COG Operating, LLC
Azores Federal #12H
Lea County, NM
Rig: McVay 8
Created By: Sam Hays
Date: 07/31/2016

Azores Federal #12H
Lea County, NM
Q160411 & WT-160259
Target Change #2

CONCHO

QES
DIRECTIONAL DRILLING



Azimuths to Grid North
Magnetic North: 6.77°

Magnetic Field
Strength: 47993.9snT
Dip Angle: 60.01°
Date: 7/14/2016
Model: IGRF2015

PROJECT DETAILS: Lea County, NM

Geodetic System:	US State Plane 1927 (Exact solution)
Datum:	NAD 1927 (NADCON CONUS)
Ellipsoid:	Clarke 1866
Zone:	New Mexico East 3001
System Datum:	Mean Sea Level

WELL DETAILS: Azores Federal #12H

Ground Level: 3486.0

+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
0.0	0.0	430368.50	896155.50	32° 10' 53.700 N	103° 41' 57.536 W

DESIGN TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
PBHL Azores Federal #12H TC#1 - plan hits target center	9097.0	5012.3	-722.0	435380.80	895433.50	32° 11' 43.442 N	103° 42' 5.594 W
3000' VS Azores Federal #12H TC#2 - plan hits target center	9125.0	2928.9	-708.5	433297.40	895448.05	32° 11' 22.825 N	103° 42' 5.580 W
LP Azores Federal #12H TC#1 - plan misses target center by 17.3usft at 9440.7usft MD (9133.1 TVD, 317.1 N, -678.3 E)	9144.0	315.9	-691.7	430084.30	895463.83	32° 10' 50.905 N	103° 42' 5.562 W

ANNOTATIONS

MD	Inc	Azi	TVD	+N/-S	+E/-W	VSect	Departure	Annotation
746.0	2.34	284.87	745.9	-2.2	-11.2	-0.8	13.3	Gyro Tie-In @ 746' MD / 746' TVD
5204.5	5.11	257.51	5188.6	-105.9	-358.7	-53.7	381.6	Entered Lease Line @ 5205' MD / 5189' TVD
9228.9	85.06	356.19	9084.4	112.2	-673.0	207.1	985.8	FTP @ 9229' MD / 9084' TVD
14089.2	92.00	0.20	9092.1	4092.5	-702.9	5012.0	5817.3	LTP @ 14089' MD / 9092' TVD
14092.0	92.00	0.20	9092.0	4095.3	-702.9	5014.8	5820.1	TD @ 14092' MD / 9092' TVD

Gyro Tie-In @ 746' MD / 746' TVD

Entered Lease Line @ 5205' MD / 5189' TVD

FTP @ 9229' MD / 9084' TVD

LTP @ 14089' MD / 9092' TVD

TD @ 14092' MD / 9092' TVD

Lease Line

Drilling Corridor
50' L / 50' R

Azores Federal #2H Wellbore #1

Azores Federal #3H Wellbore #1

Conro Federal #3H Wellbore #1

Drilling Corridor
+/- 10' TVD

Vertical Section at 351.80° (200 usft/in)