

**McVAY DRILLING COMPANY**

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

Well Name and Num: Windward Federal #5 H
Location: Sec 30, T24S, R32E
Operator: COG
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:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
1.20	493	3.10	7550	89.30	14485		
1.30	861	2.50	8022	89.70	14862		
1.00	1231	2.50	8494	91.20	15333		
0.50	1605	14.00	8823	92.70	15711		
0.50	1982	43.00	9038	89.60	16088		
0.30	2360	63.20	9328	91.40	16465		
2.40	3304	83.20	9454	89.30	16844		
1.10	3684	90.60	9682	90.20	17316		
1.50	4059	90.10	10333	89.20	17693		
1.50	4501	89.30	10616	88.50	18165		
2.40	5001	90.60	11088	90.30	18542		
1.90	5191	89.60	11371	92.30	19013		
1.80	5568	89.70	11842	95.10	19204		
1.90	5946	91.50	12314				
0.20	6323	92.60	12691				
0.40	6701	93.50	13069				
2.70	7078	90.30	13541				

By: Maurice A. Evans

Subscribed and sworn to before me this 9th day of December, 2016

Tina FLEMENS
Notary Public, Lea County, New Mexico





CONCHO

COG Operating

Lea County, New Mexico (NAD27)

Windward Federal

#5H

Wellbore #1

Design: Surveys

Standard Survey Report

05 December, 2016

HOBBS OCD
OCT 10 2017
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Company:	COG Operating	Local Co-ordinate Reference:	Well #5H
Project:	Lea County, New Mexico (NAD27)	TVD Reference:	WELL @ 3564.90usft (McVay #8)
Site:	Windward Federal	MD Reference:	WELL @ 3564.90usft (McVay #8)
Well:	#5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	5000.1 Conroe DB

Project	Lea County, New Mexico (NAD27)		
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		

Well	#5H			
Well Position	+N/-S	0.00 usft	Northing:	435,165.31 usft
	+E/-W	0.00 usft	Easting:	689,487.64 usft
Position Uncertainty	0.00 usft		Wellhead Elevation:	usft
			Latitude:	32° 11' 41.650 N
			Longitude:	103° 43' 14.801 W
			Ground Level:	3,538.90 usft

Wellbore	Wellbore #1			
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2016	11/15/2016	7.14	60.02	48,036

Design	Surveys			
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Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.00

Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	180.76

Survey Program		Date 12/5/2016			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.00	8,340.00	Gyrodata Gyro (Wellbore #1)	GYRO-NS	OWSG Gyrocompass Gyro	
8,399.00	19,260.00	MS MWD (Wellbore #1)	MWD	OWSG MWD - Standard	

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
100.00	0.64	236.12	100.00	-0.31	-0.46	0.32	0.64	0.64	0.00
200.00	0.64	241.07	199.99	-0.89	-1.42	0.91	0.06	0.00	4.95
300.00	0.73	244.15	299.98	-1.44	-2.48	1.47	0.10	0.09	3.08
400.00	0.70	241.26	399.98	-2.01	-3.59	2.06	0.05	-0.03	-2.89
500.00	0.95	236.46	499.97	-2.76	-4.81	2.83	0.26	0.25	-4.80
600.00	0.94	234.63	599.95	-3.70	-6.17	3.78	0.03	-0.01	-1.83
700.00	0.94	235.82	699.94	-4.63	-7.52	4.73	0.02	0.00	1.19
800.00	1.00	251.83	799.93	-5.37	-9.03	5.48	0.28	0.06	16.01
900.00	1.06	250.70	899.91	-5.94	-10.73	6.09	0.06	0.06	-1.13
1,000.00	0.96	251.29	999.89	-6.52	-12.40	6.68	0.10	-0.10	0.59
1,100.00	0.89	243.17	1,099.88	-7.14	-13.88	7.32	0.15	-0.07	-8.12
1,200.00	0.81	241.09	1,199.87	-7.83	-15.20	8.03	0.09	-0.08	-2.08
1,300.00	0.85	241.70	1,299.86	-8.52	-16.47	8.74	0.04	0.04	0.61
1,400.00	0.72	249.19	1,399.85	-9.10	-17.71	9.33	0.17	-0.13	7.49

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Well:	#5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	5000.1 Conroe DB

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)
1,500.00	0.64	256.24	1,499.84	-9.45	-18.84	9.70	0.12	-0.08	7.05
1,600.00	0.57	269.51	1,599.84	-9.59	-19.88	9.85	0.16	-0.07	13.27
1,700.00	0.53	315.50	1,699.83	-9.26	-20.70	9.54	0.43	-0.04	45.99
1,800.00	0.49	338.15	1,799.83	-8.54	-21.18	8.82	0.20	-0.04	22.65
1,900.00	0.59	349.08	1,899.82	-7.64	-21.44	7.92	0.14	0.10	10.93
2,000.00	0.59	346.74	1,999.82	-6.63	-21.65	6.92	0.02	0.00	-2.34
2,100.00	0.63	5.71	2,099.81	-5.58	-21.72	5.87	0.20	0.04	18.97
2,200.00	0.59	11.70	2,199.81	-4.53	-21.56	4.82	0.08	-0.04	5.99
2,300.00	0.23	354.87	2,299.81	-3.83	-21.47	4.11	0.38	-0.36	-16.83
2,400.00	0.17	221.91	2,399.81	-3.74	-21.59	4.02	0.37	-0.06	-132.96
2,500.00	0.76	198.88	2,499.80	-4.47	-21.90	4.76	0.61	0.59	-23.03
2,600.00	0.90	200.69	2,599.79	-5.84	-22.40	6.13	0.14	0.14	1.81
2,700.00	1.14	189.76	2,699.78	-7.55	-22.84	7.85	0.31	0.24	-10.93
2,800.00	1.30	165.46	2,799.75	-9.63	-22.73	9.93	0.54	0.16	-24.30
2,900.00	1.84	142.66	2,899.72	-12.00	-21.47	12.29	0.82	0.54	-22.80
3,000.00	2.26	122.97	2,999.65	-14.35	-18.84	14.60	0.81	0.42	-19.69
3,100.00	2.37	90.34	3,099.58	-15.44	-15.12	15.64	1.30	0.11	-32.63
3,200.00	2.52	79.00	3,199.49	-15.03	-10.89	15.17	0.51	0.15	-11.34
3,300.00	2.28	66.81	3,299.40	-13.83	-6.90	13.92	0.56	-0.24	-12.19
3,400.00	2.27	66.00	3,399.32	-12.24	-3.27	12.28	0.03	-0.01	-0.81
3,500.00	1.65	40.34	3,499.26	-10.34	-0.53	10.34	1.06	-0.62	-25.66
3,600.00	1.21	43.58	3,599.23	-8.48	1.13	8.46	0.45	-0.44	3.24
3,700.00	0.85	57.52	3,699.21	-7.31	2.49	7.28	0.44	-0.36	13.94
3,800.00	0.90	56.58	3,799.20	-6.48	3.77	6.43	0.05	0.05	-0.94
3,900.00	0.97	66.98	3,899.19	-5.72	5.20	5.65	0.18	0.07	10.40
4,000.00	1.21	84.50	3,999.17	-5.29	7.03	5.19	0.41	0.24	17.52
4,100.00	1.39	91.29	4,099.15	-5.21	9.30	5.09	0.24	0.18	6.79
4,200.00	1.48	98.50	4,199.11	-5.43	11.79	5.27	0.20	0.09	7.21
4,300.00	1.46	115.86	4,299.08	-6.18	14.21	5.99	0.44	-0.02	17.36
4,400.00	1.44	113.35	4,399.05	-7.23	16.51	7.01	0.07	-0.02	-2.51
4,500.00	1.47	115.43	4,499.02	-8.28	18.82	8.03	0.06	0.03	2.08
4,600.00	1.46	114.77	4,598.99	-9.36	21.14	9.08	0.02	-0.01	-0.66
4,700.00	1.44	113.32	4,698.95	-10.39	23.45	10.08	0.04	-0.02	-1.45
4,800.00	1.46	115.45	4,798.92	-11.44	25.75	11.10	0.06	0.02	2.13
4,900.00	1.41	114.58	4,898.89	-12.50	28.02	12.13	0.05	-0.05	-0.87
5,000.00	1.48	112.20	4,998.86	-13.50	30.34	13.09	0.09	0.07	-2.38
5,100.00	0.94	347.39	5,098.85	-13.19	31.35	12.77	2.16	-0.54	-124.81
5,200.00	1.76	329.31	5,198.82	-11.06	30.39	10.66	0.91	0.82	-18.08
5,300.00	1.89	327.40	5,298.77	-8.35	28.72	7.97	0.14	0.13	-1.91
5,400.00	1.82	327.13	5,398.72	-5.63	26.97	5.27	0.07	-0.07	-0.27
5,500.00	1.87	327.65	5,498.66	-2.92	25.23	2.58	0.05	0.05	0.52
5,600.00	1.94	324.53	5,598.61	-0.16	23.38	-0.15	0.13	0.07	-3.12
5,700.00	1.84	328.38	5,698.55	2.58	21.55	-2.87	0.16	-0.10	3.85

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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)
5,800.00	1.82	328.83	5,798.50	5.31	19.89	-5.57	0.02	-0.02	0.45
5,900.00	1.70	333.37	5,898.46	7.99	18.40	-8.24	0.18	-0.12	4.54
6,000.00	1.59	331.27	5,998.41	10.54	17.07	-10.76	0.13	-0.11	-2.10
6,100.00	0.29	275.68	6,098.40	11.78	16.15	-11.99	1.45	-1.30	-55.59
6,200.00	0.23	253.26	6,198.40	11.74	15.71	-11.95	0.12	-0.06	-22.42
6,300.00	0.26	264.36	6,298.40	11.66	15.29	-11.87	0.06	0.03	11.10
6,400.00	0.34	246.67	6,398.40	11.53	14.79	-11.72	0.12	0.08	-17.69
6,500.00	0.36	237.06	6,498.39	11.24	14.26	-11.42	0.06	0.02	-9.61
6,600.00	0.41	227.84	6,598.39	10.83	13.73	-11.01	0.08	0.05	-9.22
6,700.00	0.39	238.63	6,698.39	10.41	13.17	-10.58	0.08	-0.02	10.79
6,800.00	0.70	202.64	6,798.39	9.67	12.65	-9.83	0.45	0.31	-35.99
6,900.00	0.83	202.08	6,898.38	8.43	12.14	-8.59	0.13	0.13	-0.56
7,000.00	2.50	204.33	6,998.33	5.77	10.97	-5.92	1.67	1.67	2.25
7,100.00	2.66	206.63	7,098.23	1.71	9.03	-1.83	0.19	0.16	2.30
7,200.00	2.41	207.65	7,198.13	-2.22	7.01	2.13	0.25	-0.25	1.02
7,300.00	2.59	209.17	7,298.04	-6.06	4.94	5.99	0.19	0.18	1.52
7,400.00	2.40	210.22	7,397.94	-9.84	2.78	9.80	0.20	-0.19	1.05
7,500.00	2.88	202.08	7,497.84	-13.98	0.78	13.97	0.61	0.48	-8.14
7,600.00	2.95	200.09	7,597.71	-18.72	-1.05	18.74	0.12	0.07	-1.99
7,700.00	2.88	201.53	7,697.58	-23.48	-2.85	23.51	0.10	-0.07	1.44
7,800.00	2.69	201.58	7,797.46	-28.00	-4.64	28.06	0.19	-0.19	0.05
7,900.00	2.55	199.69	7,897.35	-32.27	-6.25	32.35	0.16	-0.14	-1.89
8,000.00	2.45	200.21	7,997.26	-36.37	-7.74	36.47	0.10	-0.10	0.52
8,100.00	2.79	196.57	8,097.15	-40.71	-9.17	40.83	0.38	0.34	-3.64
8,200.00	2.90	194.24	8,197.03	-45.50	-10.49	45.63	0.16	0.11	-2.33
8,300.00	2.89	194.84	8,296.90	-50.39	-11.75	50.54	0.03	-0.01	0.60
8,340.00	2.96	193.86	8,336.85	-52.36	-12.26	52.52	0.22	0.18	-2.45
Final Gyrodata Survey - 8340.00' MD									
8,399.00	3.10	190.90	8,395.77	-55.41	-12.93	55.57	0.36	0.24	-5.02
8,494.00	2.50	189.00	8,490.66	-59.98	-13.74	60.15	0.64	-0.63	-2.00
8,588.00	2.30	182.60	8,584.57	-63.89	-14.14	64.07	0.36	-0.21	-6.81
Tie-in to Gyrodata Gyro - 8588.00' MD									
8,634.00	2.50	184.80	8,630.53	-65.81	-14.27	65.99	0.48	0.43	4.78
8,728.00	4.50	193.80	8,724.35	-71.43	-15.32	71.63	2.20	2.13	9.57
8,823.00	14.00	192.30	8,818.01	-86.31	-18.66	86.55	10.00	10.00	-1.58
8,917.00	22.50	196.80	8,907.20	-114.69	-26.30	115.03	9.16	9.04	4.79
9,012.00	30.10	194.40	8,992.31	-155.23	-37.49	155.71	8.08	8.00	-2.53
9,106.00	39.00	194.90	9,069.65	-206.75	-50.99	207.41	9.47	9.47	0.53
9,138.00	43.00	196.70	9,093.80	-226.94	-56.72	227.67	13.03	12.50	5.63
9,169.00	47.20	197.40	9,115.68	-247.93	-63.16	248.74	13.64	13.55	2.26
9,203.00	49.60	198.50	9,138.25	-272.11	-71.00	273.03	7.46	7.06	3.24
9,234.00	53.60	197.10	9,157.50	-295.24	-78.41	296.25	13.38	12.90	-4.52
9,265.00	56.10	193.80	9,175.35	-319.66	-85.15	320.77	11.86	8.06	-10.65
9,297.00	59.40	190.60	9,192.43	-346.11	-90.86	347.29	13.34	10.31	-10.00

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9,328.00	63.20	190.50	9,207.31	-372.84	-95.83	374.08	12.26	12.26	-0.32
9,360.00	68.00	190.20	9,220.53	-401.50	-101.07	402.80	15.02	15.00	-0.94
9,391.00	72.80	190.70	9,230.92	-430.21	-106.36	431.58	15.56	15.48	1.61
9,423.00	77.80	191.70	9,239.04	-460.56	-112.38	462.01	15.91	15.63	3.13
9,454.00	83.20	191.60	9,244.16	-490.49	-118.55	492.02	17.42	17.42	-0.32
9,485.00	87.70	192.00	9,246.62	-520.74	-124.87	522.35	14.57	14.52	1.29
9,579.00	90.40	188.70	9,248.17	-613.17	-141.75	615.00	4.54	2.87	-3.51
9,674.00	90.00	184.50	9,247.84	-707.52	-152.66	709.48	4.44	-0.42	-4.42
9,768.00	89.30	180.00	9,248.42	-801.42	-156.35	803.43	4.84	-0.74	-4.79
9,862.00	90.60	178.90	9,248.50	-895.41	-155.45	897.40	1.81	1.38	-1.17
9,956.00	92.60	178.30	9,245.87	-989.34	-153.16	991.29	2.22	2.13	-0.64
10,051.00	92.30	181.40	9,241.81	-1,084.25	-152.91	1,086.18	3.28	-0.32	3.26
10,145.00	94.40	182.10	9,236.32	-1,178.03	-155.77	1,180.00	2.35	2.23	0.74
10,239.00	92.10	181.50	9,230.99	-1,271.83	-158.72	1,273.82	2.53	-2.45	-0.64
10,333.00	90.10	182.20	9,229.19	-1,365.76	-161.75	1,367.78	2.25	-2.13	0.74
10,428.00	88.30	182.80	9,230.51	-1,460.66	-165.90	1,462.73	2.00	-1.89	0.63
10,522.00	89.10	182.70	9,232.65	-1,554.52	-170.41	1,556.65	0.86	0.85	-0.11
10,616.00	89.30	181.90	9,233.96	-1,648.44	-174.18	1,650.60	0.88	0.21	-0.85
10,711.00	89.10	179.60	9,235.28	-1,743.41	-175.42	1,745.59	2.43	-0.21	-2.42
10,805.00	90.60	179.40	9,235.53	-1,837.41	-174.60	1,839.56	1.61	1.60	-0.21
10,899.00	91.70	179.40	9,233.64	-1,931.38	-173.62	1,933.51	1.17	1.17	0.00
10,994.00	89.70	179.30	9,232.48	-2,026.36	-172.54	2,028.47	2.11	-2.11	-0.11
11,088.00	90.60	179.30	9,232.24	-2,120.35	-171.39	2,122.44	0.96	0.96	0.00
11,182.00	91.60	178.60	9,230.43	-2,214.32	-169.67	2,216.37	1.30	1.06	-0.74
11,277.00	90.80	179.00	9,228.44	-2,309.28	-167.68	2,311.30	0.94	-0.84	0.42
11,371.00	89.60	180.40	9,228.12	-2,403.27	-167.19	2,405.28	1.96	-1.28	1.49
11,465.00	90.30	181.30	9,228.20	-2,497.26	-168.58	2,499.27	1.21	0.74	0.96
11,559.00	90.90	181.20	9,227.21	-2,591.23	-170.63	2,593.27	0.65	0.64	-0.11
11,654.00	88.10	181.50	9,228.04	-2,686.19	-172.87	2,688.25	2.96	-2.95	0.32
11,748.00	89.00	181.90	9,230.42	-2,780.12	-175.66	2,782.20	1.05	0.96	0.43
11,842.00	89.70	181.40	9,231.49	-2,874.07	-178.36	2,876.19	0.92	0.74	-0.53
11,937.00	90.60	181.60	9,231.24	-2,969.04	-180.85	2,971.18	0.97	0.95	0.21
12,031.00	92.30	180.70	9,228.86	-3,062.99	-182.74	3,065.14	2.05	1.81	-0.96
12,125.00	89.80	181.40	9,227.14	-3,156.95	-184.46	3,159.11	2.76	-2.66	0.74
12,219.00	90.40	181.40	9,226.97	-3,250.92	-186.76	3,253.11	0.64	0.64	0.00
12,314.00	91.50	181.20	9,225.40	-3,345.88	-188.91	3,348.09	1.18	1.16	-0.21
12,408.00	90.80	179.10	9,223.51	-3,439.85	-189.16	3,442.06	2.35	-0.74	-2.23
12,503.00	91.10	177.20	9,221.94	-3,534.79	-186.09	3,536.94	2.02	0.32	-2.00
12,597.00	91.40	176.20	9,219.89	-3,628.61	-180.68	3,630.68	1.11	0.32	-1.06
12,691.00	92.60	176.30	9,216.60	-3,722.35	-174.54	3,724.33	1.28	1.28	0.11
12,786.00	94.10	176.00	9,211.05	-3,816.97	-168.17	3,818.86	1.61	1.58	-0.32
12,880.00	91.40	177.40	9,206.54	-3,910.69	-162.77	3,912.51	3.23	-2.87	1.49
12,974.00	92.70	177.50	9,203.18	-4,004.54	-158.59	4,006.29	1.39	1.38	0.11

Company:	COG Operating	Local Co-ordinate Reference:	Well #5H
Project:	Lea County, New Mexico (NAD27)	TVD Reference:	WELL @ 3564.90usft (McVay #8)
Site:	Windward Federal	MD Reference:	WELL @ 3564.90usft (McVay #8)
Well:	#5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	5000.1 Conroe DB

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)
13,069.00	93.50	177.10	9,198.04	-4,099.29	-154.12	4,100.98	0.94	0.84	-0.42
13,163.00	93.40	178.10	9,192.39	-4,193.04	-150.19	4,194.66	1.07	-0.11	1.06
13,258.00	94.00	179.30	9,186.26	-4,287.81	-148.04	4,289.40	1.41	0.63	1.26
13,352.00	91.50	180.70	9,181.75	-4,381.70	-148.04	4,383.27	3.05	-2.66	1.49
13,447.00	89.90	179.90	9,180.59	-4,476.68	-148.54	4,478.26	1.88	-1.68	-0.84
13,541.00	90.30	179.80	9,180.42	-4,570.68	-148.29	4,572.25	0.44	0.43	-0.11
13,635.00	91.30	180.10	9,179.11	-4,664.67	-148.21	4,666.23	1.11	1.06	0.32
13,730.00	92.40	179.90	9,176.04	-4,759.62	-148.21	4,761.17	1.18	1.16	-0.21
13,824.00	91.10	179.30	9,173.17	-4,853.57	-147.55	4,855.10	1.52	-1.38	-0.64
13,918.00	88.50	179.90	9,173.50	-4,947.56	-146.90	4,949.07	2.84	-2.77	0.64
14,013.00	88.30	179.80	9,176.15	-5,042.52	-146.65	5,044.02	0.24	-0.21	-0.11
14,107.00	88.80	179.40	9,178.53	-5,136.49	-145.99	5,137.98	0.68	0.53	-0.43
14,201.00	89.70	179.00	9,179.76	-5,230.47	-144.68	5,231.93	1.05	0.96	-0.43
14,296.00	90.50	178.40	9,179.60	-5,325.45	-142.52	5,326.87	1.05	0.84	-0.63
14,390.00	91.80	178.60	9,177.71	-5,419.39	-140.06	5,420.77	1.40	1.38	0.21
14,485.00	89.30	179.20	9,176.80	-5,514.36	-138.24	5,515.71	2.71	-2.63	0.63
14,579.00	89.60	178.50	9,177.70	-5,608.34	-136.35	5,609.65	0.81	0.32	-0.74
14,673.00	89.50	177.90	9,178.44	-5,702.29	-133.40	5,703.56	0.65	-0.11	-0.64
14,767.00	88.60	180.70	9,180.00	-5,796.26	-132.25	5,797.50	3.13	-0.96	2.98
14,862.00	89.70	180.70	9,181.41	-5,891.24	-133.41	5,892.49	1.16	1.16	0.00
14,956.00	90.10	180.10	9,181.57	-5,985.24	-134.07	5,986.49	0.77	0.43	-0.64
15,050.00	91.30	179.60	9,180.42	-6,079.23	-133.82	6,080.47	1.38	1.28	-0.53
15,145.00	89.40	181.00	9,179.84	-6,174.22	-134.32	6,175.46	2.48	-2.00	1.47
15,239.00	90.40	181.10	9,180.01	-6,268.20	-136.04	6,269.45	1.07	1.06	0.11
15,333.00	91.20	180.70	9,178.69	-6,362.18	-137.52	6,363.44	0.95	0.85	-0.43
15,428.00	92.20	180.30	9,175.87	-6,457.13	-138.35	6,458.40	1.13	1.05	-0.42
15,522.00	90.30	181.20	9,173.82	-6,551.10	-139.58	6,552.37	2.24	-2.02	0.96
15,616.00	91.70	180.80	9,172.18	-6,645.07	-141.22	6,646.35	1.55	1.49	-0.43
15,711.00	92.90	180.70	9,168.37	-6,739.98	-142.46	6,741.28	1.27	1.26	-0.11
15,805.00	90.20	181.20	9,165.83	-6,833.92	-144.02	6,835.23	2.92	-2.87	0.53
15,900.00	91.30	181.00	9,164.59	-6,928.90	-145.84	6,930.22	1.18	1.16	-0.21
15,994.00	88.80	180.50	9,164.50	-7,022.88	-147.07	7,024.21	2.71	-2.66	-0.53
16,088.00	89.60	180.70	9,165.82	-7,116.86	-148.06	7,118.20	0.88	0.85	0.21
16,182.00	91.10	180.40	9,165.24	-7,210.86	-148.96	7,212.20	1.63	1.60	-0.32
16,277.00	92.30	180.00	9,162.42	-7,305.81	-149.29	7,307.15	1.33	1.26	-0.42
16,371.00	90.50	180.80	9,160.13	-7,399.78	-149.95	7,401.11	2.10	-1.91	0.85
16,465.00	91.40	180.80	9,158.57	-7,493.75	-151.26	7,495.10	0.96	0.96	0.00
16,561.00	88.10	182.70	9,158.99	-7,589.69	-154.19	7,591.07	3.97	-3.44	1.98
16,656.00	88.00	182.60	9,162.22	-7,684.53	-158.58	7,685.96	0.15	-0.11	-0.11
16,750.00	88.90	182.20	9,164.76	-7,778.42	-162.52	7,779.89	1.05	0.96	-0.43
16,844.00	89.30	182.20	9,166.24	-7,872.33	-166.12	7,873.85	0.43	0.43	0.00
16,939.00	89.90	181.90	9,166.90	-7,967.27	-169.52	7,968.82	0.71	0.63	-0.32
17,033.00	90.80	182.00	9,166.33	-8,061.21	-172.72	8,062.80	0.96	0.96	0.11

Company:	COG Operating	Local Co-ordinate Reference:	Well #5H
Project:	Lea County, New Mexico (NAD27)	TVD Reference:	WELL @ 3564.90usft (McVay #8)
Site:	Windward Federal	MD Reference:	WELL @ 3564.90usft (McVay #8)
Well:	#5H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Surveys	Database:	5000.1 Conroe DB

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)
17,127.00	91.90	181.40	9,164.11	-8,155.14	-175.51	8,156.75	1.33	1.17	-0.64
17,222.00	89.80	181.10	9,162.70	-8,250.11	-177.58	8,251.74	2.23	-2.21	-0.32
17,316.00	90.20	180.70	9,162.70	-8,344.09	-179.06	8,345.73	0.60	0.43	-0.43
17,410.00	91.10	180.70	9,161.64	-8,438.08	-180.21	8,439.73	0.96	0.96	0.00
17,504.00	90.70	180.00	9,160.16	-8,532.07	-180.78	8,533.71	0.86	-0.43	-0.74
17,599.00	89.00	180.00	9,160.41	-8,627.06	-180.78	8,628.70	1.79	-1.79	0.00
17,693.00	89.70	179.90	9,161.48	-8,721.06	-180.70	8,722.68	0.75	0.74	-0.11
17,788.00	89.90	179.10	9,161.81	-8,816.05	-179.87	8,817.66	0.87	0.21	-0.84
17,882.00	91.30	178.90	9,160.82	-8,910.03	-178.23	8,911.61	1.50	1.49	-0.21
17,976.00	88.00	178.70	9,161.40	-9,003.99	-176.26	9,005.54	3.52	-3.51	-0.21
18,070.00	87.90	178.50	9,164.76	-9,097.90	-173.97	9,099.41	0.24	-0.11	-0.21
18,165.00	88.50	179.20	9,167.74	-9,192.84	-172.06	9,194.31	0.97	0.63	0.74
18,259.00	89.80	179.10	9,169.14	-9,286.82	-170.67	9,288.26	1.39	1.38	-0.11
18,353.00	91.40	179.20	9,168.15	-9,380.80	-169.27	9,382.22	1.71	1.70	0.11
18,448.00	89.60	179.20	9,167.33	-9,475.78	-167.94	9,477.17	1.89	-1.89	0.00
18,542.00	90.00	178.60	9,167.65	-9,569.76	-166.14	9,571.12	0.77	0.43	-0.64
18,636.00	91.30	177.90	9,166.59	-9,663.71	-163.27	9,665.02	1.57	1.38	-0.74
18,731.00	92.80	178.10	9,163.19	-9,758.59	-159.96	9,759.85	1.59	1.58	0.21
18,825.00	90.30	177.60	9,160.65	-9,852.48	-156.43	9,853.69	2.71	-2.66	-0.53
18,919.00	91.00	177.50	9,159.58	-9,946.39	-152.41	9,947.53	0.75	0.74	-0.11
19,013.00	92.30	176.50	9,156.87	-10,040.22	-147.50	10,041.29	1.74	1.38	-1.06
19,108.00	93.50	176.40	9,152.07	-10,134.91	-141.62	10,135.90	1.27	1.26	-0.11
19,204.00	95.10	176.30	9,144.87	-10,230.44	-135.53	10,231.34	1.67	1.67	-0.10
19,260.00	95.10	176.30	9,139.89	-10,286.10	-131.93	10,286.95	0.00	0.00	0.00
Projection to TD-19260.00' MD									

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,340.00	8,336.85	-52.36	-12.26	Final Gyrodata Survey - 8340.00' MD
8,588.00	8,584.57	-63.89	-14.14	Tie-in to Gyrodata Gyro - 8588.00' MD
19,260.00	9,139.89	-10,286.10	-131.93	Projection to TD-19260.00' MD

Checked By: _____	Approved By: _____	Date: _____
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