

**McVAY DRILLING COMPANY**

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

Well Name and Num: Windward Federal #6H
Location: Sec 30,T24S,R32E
Operator: COG
Drilling Contractor: McVay Drilling Company

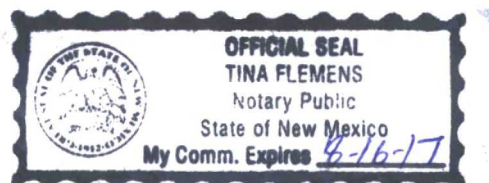
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>	<u>Degrees @</u>	<u>Depth</u>
0.75	484	1.88	6878	89.30	14485		
0.60	753	2.10	7349	89.70	14862		
1.10	861	1.97	7821	91.20	15333		
1.53	1320	2.08	8104	92.70	15711		
1.82	1507	2.20	8382	89.60	16088		
1.10	1979	24.75	8886	91.40	16465		
1.38	2451	68.06	9312	89.30	16844		
2.58	2829	89.37	9771	90.20	17316		
2.20	3112	91.95	10243	89.20	17693		
1.67	3489	89.45	10621	88.50	18165		
2.34	3961	91.47	13833	90.30	18542		
2.04	4433	93.77	14116	92.30	19013		
1.70	4551	91.19	14582	95.10	19204		
1.91	4991	90.01	15054				
1.94	5463	90.18	15526				
2.39	5935	94.53	15998				
2.39	6406	89.68	16334				

By: Mario A. Garcia

Subscribed and sworn to before me this 27th day of March, 2017

Tina Flemens
Notary Public, Lea County, New Mexico



COG

SURVEY REPORT

WINDWARD FEDERAL #6H

MCVAY 8

12/14/2016

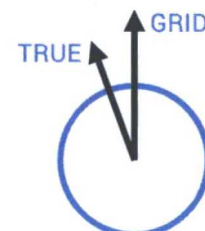


The **Ultimate Partner** In Wellbore Placement

SURVEY REPORT

WINDWARD FEDERAL #6H

COMPUTED KEEPER GYRO SURVEYS

CUSTOMER
PROJECT
FIELDCOG
Winward Federal #6H
Windward FederalSDI JOB NO.
SDI DISTRICT
SDI KIT/UNIT404913
Midland**SITE INFORMATION**Site Name Windward Federal #6H
Lat/Long 32.1949031° N, 103.7206814° W
Northing 435,165.5 ft
Easting 689,517.6 ftSection
Township
Range**MAP INFORMATION**North Reference Grid North
Grid Correction -0.33 deg
System US State Plane 1927
Datum North American Datum 1927 (Clarke 1866)
Map Zone New Mexico East: 3001**WELL INFORMATION**Lat/Long 32.1949031° N, 103.7206814° W
Northing 435,165.5 ft
Easting 689,517.6 ft
UWI 30-025-43465**DEPTH AND ELEVATION REFERENCE**Ground Level 3538.3 ft above Mean Sea
Level
Reference Datum KB
Reference Height 26 ft above G.L.
Reference Elevation 3564.3 ft**VERTICAL SECTION REFERENCE**+N/-S 0 ft
+E/-W 0 ft
Proposal Direction 177.22°
Calculation Method Minimum Curvature**LOCAL GRAVITY REFERENCE INFORMATION**Local Gravity 998.148 mG [computed]
True to Grid subtract 0.33°**WELL NOTES****OPERATORS**

Kyland Wegner

SDI Operator Name (Printed)

SIGNATURE

DATE

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
0.00	0.00	0.00	0.00	0.00	0.00	0.00	Invalid	0.00	0.00
100.00	0.49	339.80	100.00	-0.40	0.40	-0.15	0.49	0.42	339.80
125.00	0.48	318.61	125.00	-0.59	0.58	-0.25	0.71	0.63	336.38
150.00	0.43	344.19	150.00	-0.76	0.74	-0.35	0.82	0.82	335.07
175.00	0.46	342.26	175.00	-0.95	0.93	-0.40	0.10	1.01	336.62
200.00	0.44	332.46	200.00	-1.13	1.11	-0.48	0.31	1.21	336.75
225.00	0.48	339.68	224.99	-1.32	1.29	-0.56	0.28	1.41	336.68
250.00	0.46	334.22	249.99	-1.51	1.48	-0.64	0.19	1.61	336.72
275.00	0.49	324.13	274.99	-1.69	1.66	-0.74	0.35	1.82	335.85
300.00	0.51	324.61	299.99	-1.87	1.83	-0.87	0.08	2.03	334.63
325.00	0.54	319.30	324.99	-2.06	2.01	-1.01	0.24	2.25	333.34
350.00	0.45	337.58	349.99	-2.25	2.19	-1.13	0.72	2.47	332.85
375.00	0.46	337.83	374.99	-2.43	2.38	-1.20	0.02	2.66	333.21
400.00	0.39	320.90	399.99	-2.60	2.54	-1.29	0.56	2.85	333.00
425.00	0.41	302.98	424.99	-2.72	2.65	-1.42	0.50	3.01	331.82
450.00	0.50	258.63	449.99	-2.75	2.68	-1.60	1.41	3.12	329.12
475.00	0.84	233.32	474.99	-2.64	2.55	-1.86	1.77	3.15	323.94
500.00	0.91	228.62	499.98	-2.41	2.31	-2.15	0.39	3.15	317.03
525.00	0.97	228.49	524.98	-2.15	2.04	-2.46	0.25	3.19	309.67
550.00	1.03	227.59	549.98	-1.88	1.75	-2.78	0.26	3.28	302.11
575.00	0.97	225.83	574.97	-1.59	1.45	-3.10	0.27	3.42	295.00
600.00	0.88	223.31	599.97	-1.32	1.16	-3.38	0.39	3.58	288.88
625.00	0.68	215.43	624.97	-1.07	0.90	-3.60	0.92	3.71	283.98
650.00	0.37	169.79	649.97	-0.87	0.70	-3.67	1.98	3.74	280.74
675.00	0.46	121.85	674.96	-0.74	0.56	-3.57	1.39	3.62	278.97
700.00	0.56	112.10	699.96	-0.63	0.47	-3.38	0.54	3.41	277.84
725.00	0.71	99.82	724.96	-0.54	0.39	-3.11	0.81	3.13	277.19
750.00	0.63	99.70	749.96	-0.48	0.34	-2.82	0.31	2.84	276.93
775.00	0.70	100.77	774.96	-0.41	0.29	-2.53	0.25	2.55	276.55
800.00	0.76	103.72	799.96	-0.33	0.22	-2.22	0.28	2.23	275.73
825.00	0.95	101.41	824.95	-0.23	0.14	-1.86	0.80	1.86	274.39
850.00	0.98	103.11	849.95	-0.12	0.05	-1.44	0.16	1.45	272.09

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
875.00	0.90	102.23	874.95	-0.01	-0.04	-1.04	0.34	1.04	267.94
900.00	1.02	102.40	899.94	0.10	-0.13	-0.63	0.48	0.65	258.69
925.00	1.02	107.40	924.94	0.23	-0.24	-0.21	0.36	0.32	220.38
950.00	1.02	108.16	949.94	0.39	-0.38	0.22	0.05	0.44	149.94
975.00	1.13	104.98	974.93	0.54	-0.51	0.67	0.49	0.84	127.41
1000.00	1.15	107.09	999.93	0.70	-0.65	1.14	0.20	1.31	119.49
1025.00	1.24	102.53	1024.92	0.86	-0.78	1.65	0.51	1.82	115.31
1050.00	1.19	108.76	1049.92	1.03	-0.92	2.16	0.56	2.35	113.13
1075.00	1.00	100.19	1074.91	1.17	-1.04	2.62	1.00	2.82	111.73
1100.00	1.20	102.41	1099.91	1.29	-1.14	3.09	0.82	3.29	110.23
1125.00	1.28	111.66	1124.90	1.47	-1.30	3.61	0.86	3.83	109.80
1150.00	1.34	103.45	1149.89	1.67	-1.47	4.15	0.79	4.41	109.50
1175.00	1.29	106.37	1174.89	1.85	-1.62	4.71	0.34	4.98	108.97
1200.00	1.45	102.17	1199.88	2.02	-1.76	5.29	0.73	5.58	108.45
1225.00	1.34	108.98	1224.87	2.21	-1.93	5.87	0.78	6.18	108.15
1250.00	1.40	107.65	1249.87	2.42	-2.11	6.44	0.26	6.78	108.17
1275.00	1.33	105.38	1274.86	2.62	-2.28	7.01	0.34	7.38	108.04
1300.00	1.47	100.39	1299.85	2.78	-2.42	7.61	0.73	7.98	107.63
1325.00	1.44	94.98	1324.84	2.90	-2.50	8.24	0.56	8.61	106.91
1350.00	1.44	98.41	1349.83	3.00	-2.58	8.86	0.35	9.23	106.22
1375.00	1.45	98.06	1374.83	3.12	-2.67	9.49	0.05	9.85	105.71
1400.00	1.43	96.79	1399.82	3.24	-2.75	10.11	0.15	10.48	105.21
1425.00	1.42	97.78	1424.81	3.34	-2.83	10.73	0.11	11.09	104.77
1450.00	1.37	95.77	1449.80	3.45	-2.90	11.33	0.29	11.70	104.35
1475.00	1.37	95.96	1474.80	3.54	-2.96	11.92	0.02	12.29	103.94
1500.00	1.32	96.95	1499.79	3.63	-3.03	12.51	0.24	12.87	103.60
1525.00	1.27	94.51	1524.78	3.71	-3.08	13.07	0.28	13.43	103.27
1550.00	1.09	91.76	1549.78	3.77	-3.11	13.58	0.75	13.94	102.90
1575.00	0.84	61.27	1574.77	3.71	-3.03	13.98	2.26	14.31	102.23
1600.00	0.84	32.73	1599.77	3.48	-2.79	14.24	1.66	14.51	101.07
1625.00	0.85	14.93	1624.77	3.15	-2.45	14.39	1.05	14.60	99.68
1650.00	0.88	20.05	1649.77	2.80	-2.09	14.51	0.34	14.66	98.22

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
1675.00	0.86	21.25	1674.76	2.45	-1.74	14.64	0.12	14.74	96.77
1700.00	0.96	23.15	1699.76	2.09	-1.37	14.79	0.42	14.85	95.29
1725.00	1.04	26.61	1724.76	1.70	-0.97	14.97	0.40	15.01	93.72
1750.00	0.91	27.39	1749.75	1.33	-0.60	15.17	0.54	15.18	92.25
1775.00	1.01	25.85	1774.75	0.97	-0.22	15.35	0.42	15.36	90.83
1800.00	1.00	31.04	1799.75	0.59	0.16	15.56	0.36	15.56	89.41
1825.00	1.03	26.28	1824.74	0.22	0.55	15.77	0.36	15.78	88.00
1850.00	0.97	30.82	1849.74	-0.16	0.93	15.98	0.39	16.01	86.66
1875.00	0.95	23.94	1874.73	-0.52	1.31	16.18	0.47	16.23	85.38
1900.00	1.01	32.03	1899.73	-0.89	1.68	16.38	0.60	16.46	84.13
1925.00	1.14	35.34	1924.73	-1.26	2.07	16.64	0.56	16.77	82.90
1950.00	1.06	27.71	1949.72	-1.66	2.48	16.89	0.67	17.07	81.64
1975.00	1.04	38.13	1974.72	-2.03	2.86	17.14	0.76	17.37	80.52
2000.00	1.10	28.68	1999.71	-2.40	3.25	17.39	0.74	17.69	79.41
2025.00	1.11	29.05	2024.71	-2.81	3.67	17.62	0.07	18.00	78.23
2050.00	1.07	29.86	2049.70	-3.22	4.09	17.86	0.19	18.32	77.11
2075.00	1.11	29.16	2074.70	-3.62	4.50	18.09	0.18	18.64	76.03
2100.00	1.14	31.11	2099.69	-4.03	4.92	18.34	0.19	18.99	74.97
2125.00	1.15	36.05	2124.69	-4.43	5.34	18.61	0.40	19.36	73.99
2150.00	1.04	36.25	2149.69	-4.80	5.73	18.90	0.43	19.74	73.14
2175.00	1.05	33.70	2174.68	-5.16	6.10	19.16	0.19	20.11	72.33
2200.00	1.10	39.24	2199.68	-5.53	6.48	19.44	0.45	20.49	71.57
2225.00	1.07	41.56	2224.67	-5.87	6.84	19.74	0.20	20.89	70.90
2250.00	0.69	56.02	2249.67	-6.12	7.10	20.02	1.76	21.25	70.48
2275.00	0.35	71.64	2274.67	-6.22	7.21	20.22	1.46	21.47	70.38
2300.00	0.33	143.76	2299.67	-6.18	7.17	20.34	1.61	21.57	70.57
2325.00	0.54	177.23	2324.67	-6.00	7.00	20.39	1.27	21.55	71.06
2350.00	1.02	194.81	2349.66	-5.67	6.67	20.34	2.13	21.40	71.85
2375.00	1.10	194.56	2374.66	-5.23	6.22	20.22	0.32	21.15	72.91
2400.00	1.22	197.32	2399.66	-4.75	5.73	20.08	0.53	20.88	74.07
2425.00	1.21	194.78	2424.65	-4.25	5.22	19.93	0.22	20.60	75.32
2450.00	1.25	196.63	2449.64	-3.74	4.70	19.79	0.21	20.34	76.63

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
2475.00	1.20	204.66	2474.64	-3.25	4.21	19.60	0.71	20.05	77.89
2500.00	1.25	203.85	2499.63	-2.77	3.72	19.38	0.21	19.73	79.14
2525.00	1.20	203.21	2524.63	-2.29	3.23	19.17	0.21	19.43	80.45
2550.00	1.29	196.89	2549.62	-1.79	2.72	18.98	0.65	19.17	81.86
2575.00	1.35	200.87	2574.61	-1.26	2.17	18.79	0.44	18.92	83.41
2600.00	1.41	201.12	2599.61	-0.71	1.61	18.58	0.25	18.65	85.05
2625.00	1.51	206.27	2624.60	-0.14	1.03	18.32	0.66	18.35	86.79
2650.00	1.39	205.87	2649.59	0.42	0.46	18.04	0.47	18.05	88.55
2675.00	1.59	201.43	2674.58	1.00	-0.14	17.78	0.93	17.78	90.45
2700.00	1.84	198.47	2699.57	1.69	-0.84	17.53	1.03	17.55	92.76
2725.00	2.02	193.94	2724.56	2.49	-1.65	17.30	0.95	17.37	95.46
2750.00	2.27	192.61	2749.54	3.39	-2.56	17.08	1.03	17.27	98.53
2775.00	2.41	193.81	2774.52	4.37	-3.56	16.85	0.60	17.22	101.93
2800.00	2.34	192.39	2799.50	5.37	-4.57	16.61	0.38	17.23	105.37
2825.00	2.32	190.14	2824.48	6.35	-5.56	16.41	0.37	17.33	108.73
2850.00	2.29	189.81	2849.46	7.34	-6.56	16.24	0.14	17.51	111.99
2875.00	2.40	189.95	2874.43	8.34	-7.57	16.06	0.45	17.76	115.22
2900.00	2.43	188.20	2899.41	9.37	-8.61	15.90	0.31	18.08	118.43
2925.00	2.42	189.09	2924.39	10.40	-9.65	15.74	0.15	18.46	121.52
2950.00	2.41	191.61	2949.37	11.43	-10.69	15.55	0.43	18.87	124.50
2975.00	2.38	188.85	2974.35	12.44	-11.71	15.36	0.48	19.32	127.32
3000.00	2.34	187.71	2999.33	13.45	-12.73	15.22	0.25	19.84	129.92
3025.00	2.40	183.33	3024.30	14.48	-13.76	15.12	0.76	20.44	132.31
3050.00	2.43	182.46	3049.28	15.52	-14.81	15.06	0.21	21.13	134.52
3075.00	2.33	183.67	3074.26	16.56	-15.85	15.01	0.47	21.83	136.56
3100.00	2.33	182.18	3099.24	17.57	-16.86	14.96	0.24	22.54	138.43
3125.00	2.26	182.90	3124.22	18.56	-17.86	14.91	0.32	23.27	140.14
3150.00	2.11	179.96	3149.20	19.51	-18.81	14.89	0.72	23.99	141.64
3175.00	2.07	182.00	3174.18	20.42	-19.72	14.87	0.36	24.70	142.98
3200.00	1.97	180.90	3199.17	21.30	-20.60	14.85	0.41	25.40	144.22
3225.00	2.00	179.46	3224.15	22.17	-21.47	14.85	0.23	26.10	145.34
3250.00	1.90	176.58	3249.14	23.01	-22.32	14.88	0.57	26.82	146.32

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
3275.00	1.85	178.08	3274.13	23.83	-23.14	14.91	0.27	27.53	147.19
3300.00	1.93	175.77	3299.11	24.66	-23.96	14.96	0.46	28.24	148.02
3325.00	1.88	174.89	3324.10	25.49	-24.79	15.03	0.25	28.99	148.77
3350.00	1.88	176.41	3349.09	26.31	-25.60	15.09	0.20	29.72	149.49
3375.00	1.92	176.74	3374.07	27.14	-26.43	15.14	0.16	30.46	150.20
3400.00	1.86	178.52	3399.06	27.96	-27.26	15.17	0.33	31.20	150.90
3425.00	1.83	178.78	3424.05	28.77	-28.06	15.19	0.13	31.91	151.57
3450.00	1.80	177.72	3449.03	29.56	-28.86	15.22	0.18	32.62	152.20
3475.00	1.72	178.67	3474.02	30.33	-29.63	15.24	0.34	33.32	152.78
3500.00	1.67	175.22	3499.01	31.07	-30.36	15.28	0.47	33.99	153.29
3525.00	1.82	174.55	3524.00	31.83	-31.12	15.35	0.60	34.70	153.75
3550.00	1.81	176.15	3548.99	32.62	-31.91	15.41	0.20	35.44	154.22
3575.00	1.72	176.39	3573.97	33.39	-32.68	15.46	0.35	36.15	154.68
3600.00	1.83	177.55	3598.96	34.16	-33.45	15.50	0.45	36.87	155.14
3625.00	1.78	178.43	3623.95	34.95	-34.24	15.53	0.22	37.59	155.60
3650.00	1.88	178.25	3648.94	35.75	-35.03	15.55	0.42	38.33	156.06
3675.00	1.92	176.68	3673.92	36.58	-35.86	15.59	0.27	39.10	156.51
3700.00	1.93	177.82	3698.91	37.42	-36.70	15.63	0.15	39.89	156.93
3725.00	1.95	175.00	3723.89	38.26	-37.55	15.68	0.40	40.69	157.33
3750.00	2.03	170.29	3748.88	39.13	-38.41	15.79	0.71	41.53	157.65
3775.00	2.09	172.06	3773.86	40.02	-39.29	15.93	0.37	42.40	157.93
3800.00	2.08	169.85	3798.85	40.93	-40.19	16.08	0.32	43.29	158.20
3825.00	2.09	167.89	3823.83	41.83	-41.09	16.25	0.29	44.18	158.42
3850.00	2.15	170.52	3848.81	42.74	-41.99	16.42	0.47	45.09	158.64
3875.00	2.20	168.29	3873.79	43.68	-42.93	16.60	0.39	46.03	158.86
3900.00	2.17	165.71	3898.78	44.62	-43.86	16.81	0.42	46.97	159.03
3925.00	2.25	165.36	3923.76	45.56	-44.79	17.05	0.33	47.93	159.16
3950.00	2.23	165.16	3948.74	46.52	-45.73	17.30	0.08	48.90	159.28
3975.00	2.25	164.12	3973.72	47.47	-46.68	17.56	0.18	49.87	159.38
4000.00	2.29	159.29	3998.70	48.43	-47.62	17.87	0.78	50.86	159.43
4025.00	2.34	160.24	4023.68	49.39	-48.56	18.22	0.22	51.87	159.43
4050.00	2.28	160.07	4048.66	50.35	-49.51	18.56	0.22	52.88	159.45



MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
4075.00	2.21	158.48	4073.64	51.28	-50.43	18.91	0.38	53.86	159.44
4100.00	2.22	157.97	4098.62	52.20	-51.32	19.27	0.10	54.82	159.42
4125.00	2.35	156.29	4123.60	53.13	-52.24	19.66	0.56	55.82	159.38
4150.00	2.42	159.80	4148.58	54.12	-53.21	20.04	0.65	56.86	159.36
4175.00	2.45	159.11	4173.56	55.13	-54.20	20.42	0.16	57.92	159.36
4200.00	2.60	158.42	4198.53	56.17	-55.23	20.81	0.63	59.02	159.35
4225.00	2.61	157.80	4223.51	57.24	-56.28	21.24	0.12	60.15	159.32
4250.00	2.63	158.01	4248.48	58.32	-57.34	21.67	0.06	61.30	159.30
4275.00	2.63	156.08	4273.46	59.40	-58.40	22.12	0.35	62.44	159.26
4300.00	2.46	156.45	4298.43	60.44	-59.41	22.56	0.68	63.55	159.20
4325.00	2.51	153.67	4323.41	61.44	-60.40	23.02	0.51	64.63	159.14
4350.00	2.21	150.28	4348.39	62.37	-61.30	23.50	1.31	65.65	159.02
4375.00	2.16	144.76	4373.37	63.20	-62.11	24.01	0.87	66.59	158.86
4400.00	2.06	143.49	4398.35	63.97	-62.85	24.55	0.42	67.48	158.66
4425.00	1.96	144.02	4423.34	64.70	-63.56	25.07	0.41	68.33	158.47
4450.00	1.93	142.17	4448.32	65.40	-64.24	25.58	0.28	69.14	158.29
4475.00	2.04	140.19	4473.31	66.10	-64.91	26.12	0.51	69.97	158.08
4500.00	1.96	140.15	4498.29	66.80	-65.58	26.68	0.31	70.80	157.86
4525.00	1.84	138.94	4523.28	67.46	-66.22	27.22	0.51	71.59	157.65
4550.00	1.87	140.73	4548.26	68.10	-66.83	27.74	0.27	72.36	157.46
4575.00	1.66	136.76	4573.25	68.71	-67.42	28.25	0.98	73.09	157.26
4600.00	1.67	136.48	4598.24	69.26	-67.94	28.75	0.04	73.77	157.07
4625.00	1.76	134.05	4623.23	69.81	-68.47	29.28	0.48	74.47	156.85
4650.00	1.64	133.74	4648.22	70.35	-68.99	29.81	0.47	75.15	156.63
4675.00	1.80	133.77	4673.21	70.90	-69.51	30.35	0.64	75.85	156.41
4700.00	1.58	135.58	4698.20	71.44	-70.03	30.88	0.92	76.53	156.20
4725.00	1.82	130.94	4723.19	71.98	-70.53	31.42	1.10	77.22	155.99
4750.00	1.83	129.95	4748.17	72.52	-71.05	32.03	0.13	77.94	155.74
4775.00	1.77	129.89	4773.16	73.05	-71.55	32.63	0.23	78.64	155.49
4800.00	1.82	129.94	4798.15	73.58	-72.06	33.23	0.20	79.35	155.24
4825.00	1.82	131.81	4823.14	74.13	-72.58	33.83	0.24	80.07	155.01
4850.00	1.86	129.85	4848.12	74.68	-73.10	34.44	0.29	80.80	154.78

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
4875.00	1.82	132.53	4873.11	75.24	-73.63	35.04	0.37	81.54	154.55
4900.00	1.84	131.77	4898.10	75.80	-74.16	35.63	0.12	82.28	154.34
4925.00	1.80	130.89	4923.08	76.36	-74.69	36.23	0.18	83.01	154.12
4950.00	1.77	132.09	4948.07	76.90	-75.20	36.81	0.19	83.73	153.92
4975.00	1.91	129.57	4973.06	77.45	-75.73	37.42	0.63	84.47	153.71
5000.00	1.94	128.40	4998.05	78.01	-76.26	38.07	0.20	85.23	153.47
5025.00	1.79	130.87	5023.03	78.56	-76.77	38.70	0.67	85.98	153.25
5050.00	1.92	129.69	5048.02	79.11	-77.30	39.32	0.52	86.72	153.04
5075.00	1.68	128.93	5073.01	79.64	-77.80	39.92	0.95	87.44	152.83
5100.00	1.78	131.08	5098.00	80.15	-78.28	40.50	0.46	88.14	152.64
5125.00	1.80	129.09	5122.98	80.68	-78.78	41.10	0.27	88.86	152.45
5150.00	1.71	127.02	5147.97	81.18	-79.26	41.70	0.46	89.56	152.25
5175.00	1.82	128.55	5172.96	81.69	-79.73	42.31	0.48	90.26	152.05
5200.00	1.83	129.63	5197.95	82.22	-80.23	42.93	0.15	90.99	151.85
5225.00	1.81	133.24	5222.93	82.77	-80.75	43.52	0.47	91.73	151.68
5250.00	2.04	139.76	5247.92	83.41	-81.36	44.10	1.28	92.54	151.54
5275.00	1.96	138.05	5272.91	84.09	-82.02	44.67	0.40	93.39	151.43
5300.00	2.08	141.68	5297.89	84.79	-82.69	45.23	0.69	94.26	151.32
5325.00	2.13	142.66	5322.87	85.54	-83.42	45.80	0.27	95.16	151.23
5350.00	2.00	143.08	5347.86	86.29	-84.14	46.34	0.55	96.06	151.15
5375.00	2.14	144.64	5372.84	87.04	-84.87	46.87	0.59	96.95	151.09
5400.00	2.04	145.08	5397.82	87.81	-85.61	47.40	0.39	97.86	151.03
5425.00	2.04	146.41	5422.81	88.57	-86.35	47.90	0.19	98.74	150.98
5450.00	2.00	145.36	5447.79	89.32	-87.07	48.39	0.21	99.62	150.94
5475.00	1.92	146.01	5472.78	90.05	-87.78	48.87	0.34	100.47	150.89
5500.00	2.05	150.91	5497.76	90.81	-88.52	49.33	0.86	101.33	150.87
5525.00	1.88	145.65	5522.75	91.56	-89.25	49.77	1.00	102.19	150.85
5550.00	1.97	145.90	5547.73	92.27	-89.94	50.25	0.35	103.02	150.81
5575.00	2.05	147.63	5572.72	93.03	-90.67	50.73	0.43	103.90	150.78
5600.00	2.06	146.04	5597.70	93.80	-91.42	51.22	0.23	104.79	150.74
5625.00	1.99	147.36	5622.69	94.56	-92.16	51.70	0.35	105.67	150.71
5650.00	1.99	147.16	5647.67	95.31	-92.89	52.17	0.03	106.54	150.68

MD ft	INC deg	AZIM deg	TVD ft	VS ft	+N/-S ft	+E/-W ft	DLS "/100ft	CLOSURE DIST ft	CLOSURE DIR deg
5675.00	1.84	148.59	5672.66	96.04	-93.60	52.61	0.62	107.37	150.66
5700.00	1.92	147.41	5697.64	96.76	-94.29	53.05	0.36	108.19	150.64
5725.00	1.94	145.80	5722.63	97.48	-95.00	53.51	0.24	109.03	150.61
5750.00	1.90	146.98	5747.62	98.20	-95.70	53.98	0.24	109.87	150.57
5775.00	1.98	150.56	5772.60	98.94	-96.42	54.41	0.58	110.71	150.56
5800.00	1.96	149.61	5797.59	99.71	-97.16	54.84	0.16	111.57	150.56
5825.00	2.05	147.99	5822.57	100.48	-97.91	55.30	0.44	112.44	150.54
5850.00	2.07	148.07	5847.56	101.26	-98.67	55.77	0.09	113.34	150.52
5875.00	1.94	148.11	5872.54	102.02	-99.41	56.23	0.52	114.22	150.51
5900.00	2.08	147.73	5897.53	102.79	-100.16	56.70	0.56	115.09	150.49
5925.00	1.88	150.40	5922.51	103.55	-100.90	57.14	0.88	115.96	150.47
5950.00	1.98	153.11	5947.50	104.31	-101.64	57.54	0.54	116.80	150.48
5975.00	2.03	151.89	5972.48	105.10	-102.41	57.95	0.25	117.67	150.50
6000.00	2.02	153.66	5997.47	105.91	-103.20	58.35	0.25	118.55	150.52
6025.00	1.97	149.60	6022.45	106.69	-103.96	58.76	0.60	119.42	150.52
6050.00	1.99	153.14	6047.44	107.47	-104.72	59.18	0.50	120.29	150.53
6075.00	1.93	156.45	6072.42	108.26	-105.50	59.54	0.52	121.14	150.56
6100.00	1.97	159.81	6097.41	109.06	-106.29	59.86	0.48	121.98	150.61
6125.00	1.95	163.96	6122.39	109.89	-107.10	60.12	0.57	122.82	150.69
6150.00	1.97	162.32	6147.38	110.71	-107.91	60.37	0.24	123.65	150.78
6175.00	2.09	163.32	6172.36	111.57	-108.76	60.63	0.49	124.52	150.86
6200.00	2.09	166.93	6197.34	112.46	-109.64	60.87	0.53	125.40	150.96
6225.00	2.06	167.90	6222.33	113.35	-110.52	61.06	0.19	126.27	151.08
6250.00	2.10	170.25	6247.31	114.25	-111.41	61.23	0.37	127.13	151.21
6275.00	2.02	168.60	6272.30	115.14	-112.29	61.40	0.38	127.98	151.33
6300.00	2.06	168.05	6297.28	116.02	-113.17	61.58	0.16	128.84	151.45
6325.00	2.16	167.96	6322.26	116.93	-114.07	61.77	0.41	129.72	151.56
6350.00	2.21	170.19	6347.24	117.87	-115.00	61.95	0.39	130.63	151.69
6375.00	2.18	171.69	6372.23	118.82	-115.95	62.10	0.27	131.53	151.83
6400.00	2.31	169.81	6397.21	119.79	-116.91	62.26	0.61	132.46	151.96
6425.00	2.26	172.33	6422.19	120.78	-117.90	62.41	0.45	133.40	152.10
6450.00	2.37	171.16	6447.17	121.79	-118.89	62.56	0.47	134.35	152.25

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
6475.00	2.35	173.83	6472.15	122.81	-119.91	62.69	0.44	135.31	152.40
6500.00	2.29	173.72	6497.13	123.82	-120.92	62.80	0.25	136.26	152.55
6525.00	2.47	173.96	6522.10	124.86	-121.95	62.91	0.73	137.22	152.71
6550.00	2.41	173.77	6547.08	125.92	-123.01	63.03	0.23	138.22	152.87
6575.00	2.37	174.13	6572.06	126.96	-124.05	63.14	0.20	139.19	153.02
6600.00	2.46	176.42	6597.04	128.01	-125.10	63.22	0.53	140.17	153.19
6625.00	2.51	174.06	6622.01	129.10	-126.17	63.31	0.46	141.17	153.35
6650.00	2.35	174.65	6646.99	130.16	-127.23	63.42	0.64	142.16	153.51
6675.00	2.21	174.92	6671.97	131.15	-128.22	63.51	0.58	143.09	153.65
6700.00	2.09	176.62	6696.95	132.09	-129.16	63.58	0.52	143.96	153.79
6725.00	2.02	175.69	6721.94	132.99	-130.05	63.64	0.33	144.79	153.93
6750.00	1.95	178.86	6746.92	133.85	-130.92	63.68	0.52	145.58	154.06
6775.00	1.83	178.75	6771.91	134.67	-131.74	63.70	0.46	146.33	154.20
6800.00	1.96	177.20	6796.90	135.50	-132.57	63.73	0.55	147.09	154.33
6825.00	1.79	179.69	6821.88	136.32	-133.38	63.75	0.77	147.84	154.45
6850.00	1.92	174.93	6846.87	137.13	-134.19	63.79	0.80	148.58	154.58
6875.00	1.90	178.68	6871.86	137.96	-135.02	63.84	0.50	149.35	154.70
6900.00	1.92	179.48	6896.84	138.79	-135.85	63.85	0.14	150.11	154.83
6925.00	1.94	177.09	6921.83	139.63	-136.70	63.87	0.33	150.88	154.95
6950.00	1.99	165.04	6946.81	140.48	-137.54	64.01	1.66	151.70	155.04
6975.00	2.18	148.05	6971.80	141.32	-138.36	64.37	2.57	152.60	155.05
7000.00	2.23	147.06	6996.78	142.15	-139.17	64.89	0.24	153.55	155.00
7025.00	2.20	145.23	7021.76	142.98	-139.97	65.42	0.31	154.51	154.95
7050.00	2.22	145.28	7046.74	143.80	-140.76	65.97	0.09	155.46	154.89
7075.00	2.11	145.87	7071.72	144.60	-141.54	66.51	0.43	156.39	154.83
7100.00	2.17	151.44	7096.71	145.42	-142.34	66.99	0.86	157.31	154.80
7125.00	2.11	153.81	7121.69	146.27	-143.16	67.42	0.42	158.25	154.78
7150.00	2.18	155.99	7146.67	147.13	-144.01	67.82	0.44	159.18	154.78
7175.00	2.21	156.95	7171.65	148.03	-144.89	68.20	0.19	160.14	154.79
7200.00	2.14	157.04	7196.63	148.92	-145.76	68.57	0.29	161.09	154.81
7225.00	2.04	157.48	7221.62	149.78	-146.61	68.92	0.38	162.00	154.82
7250.00	2.03	157.11	7246.60	150.61	-147.43	69.27	0.08	162.89	154.83

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
7275.00	2.08	157.30	7271.59	151.45	-148.25	69.61	0.18	163.78	154.85
7300.00	2.06	156.54	7296.57	152.30	-149.08	69.97	0.13	164.68	154.86
7325.00	2.06	156.40	7321.55	153.14	-149.90	70.32	0.03	165.58	154.87
7350.00	2.13	157.02	7346.54	154.00	-150.74	70.69	0.30	166.50	154.88
7375.00	2.07	159.02	7371.52	154.86	-151.59	71.03	0.39	167.41	154.89
7400.00	2.13	160.12	7396.50	155.73	-152.45	71.35	0.30	168.32	154.92
7425.00	2.02	158.98	7421.49	156.60	-153.30	71.66	0.48	169.22	154.94
7450.00	2.18	156.56	7446.47	157.46	-154.15	72.01	0.74	170.14	154.96
7475.00	2.11	156.85	7471.45	158.34	-155.01	72.38	0.28	171.07	154.97
7500.00	1.96	154.97	7496.44	159.16	-155.82	72.74	0.67	171.96	154.97
7525.00	1.90	155.99	7521.42	159.95	-156.58	73.09	0.28	172.80	154.98
7550.00	1.92	152.36	7546.41	160.71	-157.33	73.46	0.49	173.64	154.97
7575.00	1.95	152.27	7571.39	161.48	-158.08	73.85	0.09	174.48	154.96
7600.00	2.00	152.25	7596.38	162.26	-158.84	74.25	0.22	175.34	154.95
7625.00	1.92	150.54	7621.36	163.03	-159.60	74.66	0.38	176.20	154.93
7650.00	2.14	148.10	7646.35	163.81	-160.36	75.11	0.94	177.08	154.90
7675.00	1.97	148.99	7671.33	164.60	-161.12	75.58	0.70	177.97	154.87
7700.00	2.04	148.10	7696.32	165.37	-161.87	76.04	0.30	178.84	154.84
7725.00	2.05	147.59	7721.30	166.14	-162.62	76.51	0.09	179.73	154.80
7750.00	2.08	146.48	7746.29	166.92	-163.38	77.00	0.18	180.62	154.76
7775.00	2.05	146.11	7771.27	167.70	-164.13	77.50	0.11	181.51	154.72
7800.00	2.06	147.12	7796.25	168.47	-164.88	78.00	0.15	182.40	154.68
7825.00	2.00	145.61	7821.24	169.23	-165.62	78.49	0.35	183.27	154.64
7850.00	2.00	141.59	7846.22	169.95	-166.32	79.00	0.56	184.13	154.59
7875.00	1.92	141.51	7871.21	170.65	-166.99	79.54	0.29	184.96	154.53
7900.00	1.96	142.78	7896.19	171.34	-167.66	80.06	0.22	185.79	154.48
7925.00	1.97	140.56	7921.18	172.04	-168.33	80.59	0.31	186.62	154.42
7950.00	2.09	141.49	7946.16	172.75	-169.02	81.14	0.52	187.49	154.35
7975.00	2.02	142.08	7971.15	173.49	-169.72	81.70	0.31	188.36	154.30
8000.00	2.04	139.36	7996.13	174.20	-170.41	82.26	0.39	189.22	154.23
8025.00	2.04	140.70	8021.11	174.90	-171.09	82.83	0.19	190.09	154.17
8050.00	2.03	138.21	8046.10	175.61	-171.76	83.41	0.35	190.94	154.10

MD	INC	AZIM	TVD	VS	+N/-S	+E/-W	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	"/100ft	ft	deg
8075.00	1.94	139.88	8071.08	176.29	-172.42	83.98	0.44	191.78	154.03
8100.00	1.96	138.13	8096.07	176.96	-173.06	84.53	0.25	192.60	153.97
8125.00	2.04	138.95	8121.05	177.64	-173.71	85.11	0.36	193.44	153.90
8150.00	2.08	137.93	8146.04	178.34	-174.39	85.71	0.21	194.31	153.83
8175.00	2.33	139.60	8171.02	179.09	-175.11	86.34	1.04	195.24	153.75
8200.00	2.23	139.73	8196.00	179.88	-175.87	86.99	0.42	196.21	153.68
8225.00	2.27	140.30	8220.98	180.66	-176.62	87.62	0.19	197.16	153.62
8250.00	2.27	139.59	8245.96	181.45	-177.38	88.25	0.11	198.12	153.55
8275.00	2.30	140.97	8270.94	182.25	-178.15	88.89	0.26	199.09	153.48
8300.00	2.44	141.49	8295.92	183.08	-178.95	89.54	0.57	200.10	153.42
8325.00	2.32	142.32	8320.90	183.93	-179.77	90.18	0.50	201.12	153.36
8350.00	2.20	143.58	8345.88	184.75	-180.56	90.77	0.52	202.09	153.31
8375.00	2.22	143.15	8370.86	185.55	-181.33	91.35	0.09	203.04	153.26
8400.00	2.18	145.33	8395.84	186.35	-182.11	91.91	0.37	203.99	153.22
8425.00	2.32	153.72	8420.82	187.22	-182.95	92.40	1.44	204.96	153.20
8450.00	2.13	149.36	8445.80	188.09	-183.81	92.86	1.02	205.93	153.20
8475.00	2.05	146.76	8470.79	188.89	-184.58	93.35	0.50	206.84	153.17
8500.00	2.11	152.08	8495.77	189.69	-185.36	93.81	0.81	207.75	153.16
8525.00	2.16	152.08	8520.75	190.54	-186.19	94.24	0.19	208.68	153.15
8550.00	2.03	154.48	8545.74	191.37	-187.00	94.66	0.63	209.60	153.15
8575.00	1.97	156.12	8570.72	192.18	-187.80	95.02	0.33	210.47	153.16
8599.00	1.84	159.82	8594.71	192.94	-188.54	95.32	0.75	211.26	153.18



COG Operating L L C

Lea County, NM (NAD27 NME)

Sec. 30, T 24 S. , R 32 E

Windward Federal 6H

Wellbore #1

Design: Wellbore #1

Standard Survey Report

02 January, 2017



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

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	Sec. 30, T 24 S. , R 32 E		
Site Position:		Northing:	435,165.5000 usft
From:	Map	Easting:	689,517.6000 usft
Position Uncertainty:	0.00 ft	Slot Radius:	13-3/16 "
		Latitude:	32° 11' 41.651 N
		Longitude:	103° 43' 14.453 W
		Grid Convergence:	0.33 °

Well	Windward Federal 6H		
Well Position	+N/-S	0.00 ft	Northing: 435,165.5000 usft
	+E/-W	0.00 ft	Easting: 689,517.6000 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32° 11' 41.651 N
		Longitude:	103° 43' 14.453 W
		Ground Level:	3,538.30 ft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	12/2/2016	7.08	60.02	47,960

Design	Wellbore #1				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	177.22	

Survey Program	Date 1/2/2017				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
100.00	8,599.00	Keeper Gyros (Wellbore #1)	Keeper	Standard Wireline Keeper ver 1.0.2	
8,667.00	18,953.00	IDS MWD Survey (Wellbore #1)	MWD	MWD - Standard	

Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	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	0.49	339.80	100.00	0.40	-0.15	-0.41	0.49	0.49	0.00	
125.00	0.48	318.61	125.00	0.58	-0.25	-0.59	0.71	-0.04	-84.76	
150.00	0.43	344.19	150.00	0.75	-0.35	-0.77	0.83	-0.20	102.32	
175.00	0.46	342.26	175.00	0.93	-0.40	-0.95	0.13	0.12	-7.72	
200.00	0.44	332.46	200.00	1.12	-0.48	-1.14	0.32	-0.08	-39.20	
225.00	0.48	339.68	224.99	1.30	-0.56	-1.32	0.28	0.16	28.88	
250.00	0.46	334.22	249.99	1.49	-0.64	-1.52	0.20	-0.08	-21.84	
275.00	0.49	324.13	274.99	1.66	-0.75	-1.70	0.35	0.12	-40.36	
300.00	0.51	324.61	299.99	1.84	-0.87	-1.88	0.08	0.08	1.92	

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
325.00	0.54	319.30	324.99	2.02	-1.02	-2.07	0.23	0.12	-21.24
350.00	0.45	337.58	349.99	2.20	-1.13	-2.25	0.72	-0.36	73.12
375.00	0.46	337.83	374.99	2.39	-1.20	-2.44	0.04	0.04	1.00
400.00	0.39	320.90	399.99	2.54	-1.30	-2.60	0.57	-0.28	-67.72
425.00	0.41	302.98	424.99	2.66	-1.42	-2.73	0.50	0.08	-71.68
450.00	0.50	258.63	449.99	2.69	-1.61	-2.76	1.41	0.36	-177.40
475.00	0.84	233.32	474.99	2.56	-1.86	-2.64	1.77	1.36	-101.24
500.00	0.91	228.62	499.98	2.31	-2.16	-2.42	0.40	0.28	-18.80
525.00	0.97	228.49	524.98	2.04	-2.46	-2.16	0.24	0.24	-0.52
550.00	1.03	227.59	549.98	1.75	-2.79	-1.88	0.25	0.24	-3.60
575.00	0.97	225.83	574.97	1.45	-3.11	-1.60	0.27	-0.24	-7.04
600.00	0.88	223.31	599.97	1.17	-3.39	-1.33	0.39	-0.36	-10.08
625.00	0.68	215.43	624.97	0.90	-3.61	-1.08	0.91	-0.80	-31.52
650.00	0.37	169.79	649.97	0.70	-3.68	-0.88	1.99	-1.24	-182.56
675.00	0.46	121.85	674.96	0.57	-3.58	-0.74	1.39	0.36	-191.76
700.00	0.56	112.10	699.96	0.47	-3.38	-0.64	0.53	0.40	-39.00
725.00	0.71	99.82	724.96	0.40	-3.12	-0.55	0.81	0.60	-49.12
750.00	0.63	99.70	749.96	0.35	-2.83	-0.49	0.32	-0.32	-0.48
775.00	0.70	100.77	774.96	0.30	-2.54	-0.42	0.28	0.28	4.28
800.00	0.76	103.72	799.96	0.23	-2.23	-0.34	0.28	0.24	11.80
825.00	0.95	101.41	824.95	0.15	-1.87	-0.24	0.77	0.76	-9.24
850.00	0.98	103.11	849.95	0.06	-1.45	-0.13	0.17	0.12	6.80
875.00	0.90	102.23	874.95	-0.03	-1.05	-0.02	0.33	-0.32	-3.52
900.00	1.02	102.40	899.94	-0.12	-0.65	0.09	0.48	0.48	0.68
925.00	1.02	107.40	924.94	-0.23	-0.22	0.22	0.36	0.00	20.00
950.00	1.02	108.16	949.94	-0.37	0.21	0.38	0.05	0.00	3.04
975.00	1.13	104.98	974.93	-0.50	0.66	0.53	0.50	0.44	-12.72
1,000.00	1.15	107.09	999.93	-0.64	1.14	0.69	0.19	0.08	8.44
1,025.00	1.24	102.53	1,024.92	-0.77	1.64	0.85	0.52	0.36	-18.24
1,050.00	1.19	108.76	1,049.92	-0.91	2.15	1.02	0.56	-0.20	24.92
1,075.00	1.00	100.19	1,074.91	-1.04	2.61	1.16	1.00	-0.76	-34.28
1,100.00	1.20	102.41	1,099.91	-1.13	3.08	1.28	0.82	0.80	8.88
1,125.00	1.28	111.66	1,124.90	-1.29	3.60	1.46	0.86	0.32	37.00
1,150.00	1.34	103.45	1,149.89	-1.46	4.14	1.66	0.79	0.24	-32.84
1,175.00	1.29	106.37	1,174.89	-1.61	4.69	1.83	0.33	-0.20	11.68
1,200.00	1.45	102.17	1,199.88	-1.75	5.27	2.01	0.76	0.64	-16.80
1,225.00	1.34	108.98	1,224.87	-1.92	5.86	2.20	0.80	-0.44	27.24
1,250.00	1.40	107.65	1,249.87	-2.10	6.43	2.41	0.27	0.24	-5.32
1,275.00	1.33	105.38	1,274.86	-2.27	7.00	2.61	0.35	-0.28	-9.08
1,300.00	1.47	100.39	1,299.85	-2.41	7.59	2.77	0.74	0.56	-19.96
1,325.00	1.44	94.98	1,324.84	-2.49	8.22	2.89	0.56	-0.12	-21.64
1,350.00	1.44	98.41	1,349.83	-2.57	8.84	2.99	0.34	0.00	13.72
1,375.00	1.45	98.06	1,374.83	-2.66	9.47	3.11	0.05	0.04	-1.40

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,400.00	1.43	96.79	1,399.82	-2.74	10.09	3.22	0.15	-0.08	-5.08
1,425.00	1.42	97.78	1,424.81	-2.82	10.71	3.33	0.11	-0.04	3.96
1,450.00	1.37	95.77	1,449.80	-2.89	11.31	3.43	0.28	-0.20	-8.04
1,475.00	1.37	95.96	1,474.80	-2.95	11.91	3.52	0.02	0.00	0.76
1,500.00	1.32	96.95	1,499.79	-3.01	12.49	3.62	0.22	-0.20	3.96
1,525.00	1.27	94.51	1,524.78	-3.07	13.05	3.70	0.30	-0.20	-9.76
1,550.00	1.09	91.76	1,549.78	-3.10	13.56	3.75	0.75	-0.72	-11.00
1,575.00	0.84	61.27	1,574.77	-3.02	13.96	3.69	2.25	-1.00	-121.96
1,600.00	0.84	32.73	1,599.77	-2.78	14.22	3.46	1.66	0.00	-114.16
1,625.00	0.85	14.93	1,624.77	-2.44	14.37	3.14	1.05	0.04	-71.20
1,650.00	0.88	20.05	1,649.77	-2.08	14.48	2.78	0.33	0.12	20.48
1,675.00	0.86	21.25	1,674.76	-1.73	14.62	2.44	0.11	-0.08	4.80
1,700.00	0.96	23.15	1,699.76	-1.36	14.77	2.08	0.42	0.40	7.60
1,725.00	1.04	26.61	1,724.76	-0.97	14.95	1.69	0.40	0.32	13.84
1,750.00	0.91	27.39	1,749.75	-0.59	15.14	1.32	0.52	-0.52	3.12
1,775.00	1.01	25.85	1,774.75	-0.21	15.33	0.96	0.41	0.40	-6.16
1,800.00	1.00	31.04	1,799.75	0.17	15.54	0.58	0.37	-0.04	20.76
1,825.00	1.03	26.28	1,824.74	0.56	15.75	0.20	0.36	0.12	-19.04
1,850.00	0.97	30.82	1,849.74	0.94	15.96	-0.17	0.40	-0.24	18.16
1,875.00	0.95	23.94	1,874.73	1.31	16.15	-0.53	0.47	-0.08	-27.52
1,900.00	1.01	32.03	1,899.73	1.69	16.35	-0.90	0.60	0.24	32.36
1,925.00	1.14	35.34	1,924.73	2.08	16.61	-1.27	0.58	0.52	13.24
1,950.00	1.06	27.71	1,949.72	2.49	16.87	-1.67	0.67	-0.32	-30.52
1,975.00	1.04	38.13	1,974.72	2.87	17.11	-2.04	0.77	-0.08	41.68
2,000.00	1.10	28.68	1,999.71	3.26	17.37	-2.41	0.74	0.24	-37.80
2,025.00	1.11	29.05	2,024.71	3.68	17.60	-2.82	0.05	0.04	1.48
2,050.00	1.07	29.86	2,049.70	4.10	17.84	-3.23	0.17	-0.16	3.24
2,075.00	1.11	29.16	2,074.70	4.51	18.07	-3.63	0.17	0.16	-2.80
2,100.00	1.14	31.11	2,099.70	4.94	18.32	-4.04	0.19	0.12	7.80
2,125.00	1.15	36.05	2,124.69	5.35	18.59	-4.44	0.40	0.04	19.76
2,150.00	1.04	36.25	2,149.69	5.74	18.87	-4.81	0.44	-0.44	0.80
2,175.00	1.05	33.70	2,174.68	6.11	19.14	-5.17	0.19	0.04	-10.20
2,200.00	1.10	39.24	2,199.68	6.49	19.41	-5.54	0.46	0.20	22.16
2,225.00	1.07	41.56	2,224.67	6.85	19.72	-5.88	0.21	-0.12	9.28
2,250.00	0.69	56.02	2,249.67	7.11	20.00	-6.13	1.75	-1.52	57.84
2,275.00	0.35	71.64	2,274.67	7.21	20.20	-6.23	1.46	-1.36	62.48
2,300.00	0.33	143.76	2,299.67	7.18	20.31	-6.19	1.60	-0.08	288.48
2,325.00	0.54	177.23	2,324.67	7.00	20.36	-6.01	1.28	0.84	133.88
2,350.00	1.02	194.81	2,349.67	6.67	20.31	-5.68	2.12	1.92	70.32
2,375.00	1.10	194.56	2,374.66	6.22	20.19	-5.24	0.32	0.32	-1.00
2,400.00	1.22	197.32	2,399.66	5.74	20.05	-4.76	0.53	0.48	11.04
2,425.00	1.21	194.78	2,424.65	5.23	19.91	-4.26	0.22	-0.04	-10.16
2,450.00	1.25	196.63	2,449.64	4.71	19.76	-3.75	0.23	0.16	7.40

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Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
2,475.00	1.20	204.66	2,474.64	4.21	19.57	-3.26	0.71	-0.20	32.12
2,500.00	1.25	203.85	2,499.63	3.73	19.35	-2.78	0.21	0.20	-3.24
2,525.00	1.20	203.21	2,524.63	3.24	19.14	-2.30	0.21	-0.20	-2.56
2,550.00	1.29	196.89	2,549.62	2.73	18.96	-1.80	0.66	0.36	-25.28
2,575.00	1.35	200.87	2,574.61	2.18	18.77	-1.27	0.44	0.24	15.92
2,600.00	1.41	201.12	2,599.61	1.62	18.55	-0.72	0.24	0.24	1.00
2,625.00	1.51	206.27	2,624.60	1.04	18.30	-0.15	0.66	0.40	20.60
2,650.00	1.39	205.87	2,649.59	0.47	18.02	0.41	0.48	-0.48	-1.60
2,675.00	1.59	201.43	2,674.58	-0.13	17.76	0.99	0.92	0.80	-17.76
2,700.00	1.84	198.47	2,699.57	-0.83	17.51	1.68	1.06	1.00	-11.84
2,725.00	2.02	193.94	2,724.56	-1.64	17.27	2.47	0.94	0.72	-18.12
2,750.00	2.27	192.61	2,749.54	-2.55	17.06	3.37	1.02	1.00	-5.32
2,775.00	2.41	193.81	2,774.52	-3.54	16.82	4.36	0.59	0.56	4.80
2,800.00	2.34	192.39	2,799.50	-4.55	16.59	5.35	0.37	-0.28	-5.68
2,825.00	2.32	190.14	2,824.48	-5.55	16.39	6.34	0.37	-0.08	-9.00
2,850.00	2.29	189.81	2,849.46	-6.54	16.22	7.32	0.13	-0.12	-1.32
2,875.00	2.40	189.95	2,874.44	-7.55	16.04	8.32	0.44	0.44	0.56
2,900.00	2.43	188.20	2,899.41	-8.59	15.88	9.35	0.32	0.12	-7.00
2,925.00	2.42	189.09	2,924.39	-9.63	15.72	10.38	0.16	-0.04	3.56
2,950.00	2.41	191.61	2,949.37	-10.67	15.53	11.41	0.43	-0.04	10.08
2,975.00	2.38	188.85	2,974.35	-11.70	15.34	12.43	0.48	-0.12	-11.04
3,000.00	2.34	187.71	2,999.33	-12.72	15.19	13.44	0.25	-0.16	-4.56
3,025.00	2.40	183.33	3,024.30	-13.74	15.09	14.46	0.76	0.24	-17.52
3,050.00	2.43	182.46	3,049.28	-14.80	15.04	15.51	0.19	0.12	-3.48
3,075.00	2.33	183.67	3,074.26	-15.83	14.99	16.54	0.45	-0.40	4.84
3,100.00	2.33	182.18	3,099.24	-16.85	14.93	17.55	0.24	0.00	-5.96
3,125.00	2.26	182.90	3,124.22	-17.85	14.89	18.55	0.30	-0.28	2.88
3,150.00	2.11	179.96	3,149.20	-18.80	14.87	19.50	0.75	-0.60	-11.76
3,175.00	2.07	182.00	3,174.19	-19.71	14.85	20.41	0.34	-0.16	8.16
3,200.00	1.97	180.90	3,199.17	-20.59	14.83	21.29	0.43	-0.40	-4.40
3,225.00	2.00	179.46	3,224.15	-21.46	14.82	22.15	0.23	0.12	-5.76
3,250.00	1.90	176.58	3,249.14	-22.31	14.85	23.00	0.56	-0.40	-11.52
3,275.00	1.85	178.08	3,274.13	-23.12	14.89	23.82	0.28	-0.20	6.00
3,300.00	1.93	175.77	3,299.11	-23.95	14.94	24.64	0.44	0.32	-9.24
3,325.00	1.88	174.89	3,324.10	-24.78	15.00	25.47	0.23	-0.20	-3.52
3,350.00	1.88	176.41	3,349.09	-25.59	15.07	26.29	0.20	0.00	6.08
3,375.00	1.92	176.74	3,374.07	-26.42	15.12	27.12	0.17	0.16	1.32
3,400.00	1.86	178.52	3,399.06	-27.25	15.15	27.95	0.34	-0.24	7.12
3,425.00	1.83	178.78	3,424.05	-28.05	15.17	28.75	0.12	-0.12	1.04
3,450.00	1.80	177.72	3,449.03	-28.84	15.19	29.54	0.18	-0.12	-4.24
3,475.00	1.72	178.67	3,474.02	-29.61	15.22	30.31	0.34	-0.32	3.80
3,500.00	1.67	175.22	3,499.01	-30.35	15.26	31.05	0.45	-0.20	-13.80
3,525.00	1.82	174.55	3,524.00	-31.10	15.32	31.81	0.61	0.60	-2.68
3,550.00	1.81	176.15	3,548.99	-31.89	15.39	32.60	0.21	-0.04	6.40

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
3,575.00	1.72	176.39	3,573.97	-32.66	15.44	33.37	0.36	-0.36	0.96
3,600.00	1.83	177.55	3,598.96	-33.44	15.48	34.15	0.46	0.44	4.64
3,625.00	1.78	178.43	3,623.95	-34.22	15.51	34.93	0.23	-0.20	3.52
3,650.00	1.88	178.25	3,648.94	-35.02	15.53	35.73	0.40	0.40	-0.72
3,675.00	1.92	176.68	3,673.92	-35.85	15.57	36.56	0.26	0.16	-6.28
3,700.00	1.93	177.82	3,698.91	-36.69	15.61	37.40	0.16	0.04	4.56
3,725.00	1.95	175.00	3,723.90	-37.53	15.66	38.25	0.39	0.08	-11.28
3,750.00	2.03	170.29	3,748.88	-38.39	15.77	39.11	0.73	0.32	-18.84
3,775.00	2.09	172.06	3,773.86	-39.28	15.91	40.01	0.35	0.24	7.08
3,800.00	2.08	169.85	3,798.85	-40.18	16.05	40.91	0.32	-0.04	-8.84
3,825.00	2.09	167.89	3,823.83	-41.07	16.23	41.81	0.29	0.04	-7.84
3,850.00	2.15	170.52	3,848.81	-41.98	16.40	42.72	0.46	0.24	10.52
3,875.00	2.20	168.29	3,873.80	-42.91	16.58	43.66	0.39	0.20	-8.92
3,900.00	2.17	165.71	3,898.78	-43.84	16.79	44.60	0.41	-0.12	-10.32
3,925.00	2.25	165.36	3,923.76	-44.77	17.03	45.55	0.32	0.32	-1.40
3,950.00	2.23	165.16	3,948.74	-45.72	17.28	46.50	0.09	-0.08	-0.80
3,975.00	2.25	164.12	3,973.72	-46.66	17.54	47.46	0.18	0.08	-4.16
4,000.00	2.29	159.29	3,998.70	-47.60	17.85	48.41	0.78	0.16	-19.32
4,025.00	2.34	160.24	4,023.68	-48.55	18.20	49.37	0.25	0.20	3.80
4,050.00	2.28	160.07	4,048.66	-49.49	18.54	50.34	0.24	-0.24	-0.68
4,075.00	2.21	158.48	4,073.64	-50.41	18.89	51.27	0.37	-0.28	-6.36
4,100.00	2.22	157.97	4,098.62	-51.31	19.25	52.18	0.09	0.04	-2.04
4,125.00	2.35	156.29	4,123.60	-52.23	19.63	53.12	0.58	0.52	-6.72
4,150.00	2.42	159.80	4,148.58	-53.19	20.02	54.10	0.65	0.28	14.04
4,175.00	2.45	159.11	4,173.56	-54.19	20.39	55.11	0.17	0.12	-2.76
4,200.00	2.60	158.42	4,198.53	-55.21	20.79	56.16	0.61	0.60	-2.76
4,225.00	2.61	157.80	4,223.51	-56.27	21.22	57.23	0.12	0.04	-2.48
4,250.00	2.63	158.01	4,248.48	-57.32	21.65	58.31	0.09	0.08	0.84
4,275.00	2.63	156.08	4,273.46	-58.38	22.09	59.38	0.35	0.00	-7.72
4,300.00	2.46	156.45	4,298.43	-59.40	22.54	60.42	0.68	-0.68	1.48
4,325.00	2.51	153.67	4,323.41	-60.38	23.00	61.42	0.52	0.20	-11.12
4,350.00	2.21	150.28	4,348.39	-61.29	23.48	62.36	1.32	-1.20	-13.56
4,375.00	2.16	144.76	4,373.37	-62.09	23.99	63.18	0.86	-0.20	-22.08
4,400.00	2.06	143.49	4,398.35	-62.84	24.53	63.95	0.44	-0.40	-5.08
4,425.00	1.96	144.02	4,423.34	-63.55	25.05	64.69	0.41	-0.40	2.12
4,450.00	1.93	142.17	4,448.32	-64.22	25.56	65.39	0.28	-0.12	-7.40
4,475.00	2.04	140.19	4,473.31	-64.90	26.10	66.09	0.52	0.44	-7.92
4,500.00	1.96	140.15	4,498.29	-65.57	26.66	66.78	0.32	-0.32	-0.16
4,525.00	1.84	138.94	4,523.28	-66.20	27.20	67.44	0.51	-0.48	-4.84
4,550.00	1.87	140.73	4,548.26	-66.82	27.72	68.08	0.26	0.12	7.16
4,575.00	1.66	136.76	4,573.25	-67.40	28.23	68.69	0.97	-0.84	-15.88
4,600.00	1.67	136.48	4,598.24	-67.93	28.72	69.24	0.05	0.04	-1.12
4,625.00	1.76	134.05	4,623.23	-68.46	29.25	69.79	0.46	0.36	-9.72

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,650.00	1.64	133.74	4,648.22	-68.97	29.79	70.33	0.48	-0.48	-1.24
4,675.00	1.80	133.77	4,673.21	-69.49	30.33	70.88	0.64	0.64	0.12
4,700.00	1.58	135.58	4,698.20	-70.01	30.85	71.42	0.91	-0.88	7.24
4,725.00	1.82	130.94	4,723.19	-70.51	31.39	71.95	1.11	0.96	-18.56
4,750.00	1.83	129.95	4,748.17	-71.03	32.00	72.50	0.13	0.04	-3.96
4,775.00	1.77	129.89	4,773.16	-71.53	32.60	73.03	0.24	-0.24	-0.24
4,800.00	1.82	129.94	4,798.15	-72.04	33.20	73.56	0.20	0.20	0.20
4,825.00	1.82	131.81	4,823.14	-72.56	33.80	74.11	0.24	0.00	7.48
4,850.00	1.86	129.85	4,848.12	-73.08	34.41	74.66	0.30	0.16	-7.84
4,875.00	1.82	132.53	4,873.11	-73.61	35.01	75.22	0.38	-0.16	10.72
4,900.00	1.84	131.77	4,898.10	-74.14	35.61	75.78	0.13	0.08	-3.04
4,925.00	1.80	130.89	4,923.09	-74.67	36.20	76.34	0.20	-0.16	-3.52
4,950.00	1.77	132.09	4,948.07	-75.18	36.79	76.88	0.19	-0.12	4.80
4,975.00	1.91	129.57	4,973.06	-75.71	37.39	77.43	0.65	0.56	-10.08
5,000.00	1.94	128.40	4,998.05	-76.24	38.05	77.99	0.20	0.12	-4.68
5,025.00	1.79	130.87	5,023.03	-76.76	38.67	78.54	0.68	-0.60	9.88
5,050.00	1.92	129.69	5,048.02	-77.28	39.29	79.09	0.54	0.52	-4.72
5,075.00	1.68	128.93	5,073.01	-77.78	39.90	79.62	0.96	-0.96	-3.04
5,100.00	1.78	131.08	5,098.00	-78.26	40.48	80.13	0.48	0.40	8.60
5,125.00	1.80	129.09	5,122.98	-78.76	41.07	80.66	0.26	0.08	-7.96
5,150.00	1.71	127.02	5,147.97	-79.24	41.68	81.16	0.44	-0.36	-8.28
5,175.00	1.82	128.55	5,172.96	-79.71	42.28	81.67	0.48	0.44	6.12
5,200.00	1.83	129.63	5,197.95	-80.21	42.90	82.20	0.14	0.04	4.32
5,225.00	1.81	133.24	5,222.94	-80.74	43.50	82.75	0.47	-0.08	14.44
5,250.00	2.04	139.76	5,247.92	-81.35	44.07	83.39	1.27	0.92	26.08
5,275.00	1.96	138.05	5,272.91	-82.00	44.64	84.07	0.40	-0.32	-6.84
5,300.00	2.08	141.68	5,297.89	-82.68	45.21	84.77	0.70	0.48	14.52
5,325.00	2.13	142.66	5,322.87	-83.40	45.78	85.52	0.25	0.20	3.92
5,350.00	2.00	143.08	5,347.86	-84.12	46.32	86.27	0.52	-0.52	1.68
5,375.00	2.14	144.64	5,372.84	-84.85	46.85	87.02	0.60	0.56	6.24
5,400.00	2.04	145.08	5,397.82	-85.60	47.38	87.79	0.41	-0.40	1.76
5,425.00	2.04	146.41	5,422.81	-86.33	47.88	88.55	0.19	0.00	5.32
5,450.00	2.00	145.36	5,447.79	-87.06	48.37	89.30	0.22	-0.16	-4.20
5,475.00	1.92	146.01	5,472.78	-87.77	48.85	90.03	0.33	-0.32	2.60
5,500.00	2.05	150.91	5,497.76	-88.50	49.30	90.79	0.85	0.52	19.60
5,525.00	1.88	145.65	5,522.75	-89.23	49.75	91.54	0.99	-0.68	-21.04
5,550.00	1.97	145.90	5,547.73	-89.93	50.23	92.26	0.36	0.36	1.00
5,575.00	2.05	147.63	5,572.72	-90.66	50.71	93.01	0.40	0.32	6.92
5,600.00	2.06	146.04	5,597.70	-91.41	51.20	93.79	0.23	0.04	-6.36
5,625.00	1.99	147.36	5,622.69	-92.15	51.68	94.55	0.34	-0.28	5.28
5,650.00	1.99	147.16	5,647.67	-92.88	52.15	95.30	0.03	0.00	-0.80
5,675.00	1.84	148.59	5,672.66	-93.59	52.60	96.03	0.63	-0.60	5.72
5,700.00	1.92	147.41	5,697.65	-94.28	53.03	96.74	0.36	0.32	-4.72

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,725.00	1.94	145.80	5,722.63	-94.99	53.49	97.47	0.23	0.08	-6.44
5,750.00	1.90	146.98	5,747.62	-95.68	53.96	98.19	0.22	-0.16	4.72
5,775.00	1.98	150.56	5,772.60	-96.41	54.40	98.93	0.58	0.32	14.32
5,800.00	1.96	149.61	5,797.59	-97.15	54.82	99.70	0.15	-0.08	-3.80
5,825.00	2.05	147.99	5,822.57	-97.90	55.28	100.47	0.43	0.36	-6.48
5,850.00	2.07	148.07	5,847.56	-98.66	55.75	101.25	0.08	0.08	0.32
5,875.00	1.94	148.11	5,872.54	-99.40	56.22	102.01	0.52	-0.52	0.16
5,900.00	2.08	147.73	5,897.53	-100.15	56.68	102.78	0.56	0.56	-1.52
5,925.00	1.88	150.40	5,922.51	-100.89	57.13	103.54	0.88	-0.80	10.68
5,950.00	1.98	153.11	5,947.50	-101.63	57.52	104.30	0.54	0.40	10.84
5,975.00	2.03	151.89	5,972.48	-102.41	57.93	105.09	0.26	0.20	-4.88
6,000.00	2.02	153.66	5,997.47	-103.19	58.33	105.90	0.25	-0.04	7.08
6,025.00	1.97	149.60	6,022.45	-103.96	58.75	106.68	0.60	-0.20	-16.24
6,050.00	1.99	153.14	6,047.44	-104.71	59.16	107.46	0.50	0.08	14.16
6,075.00	1.93	156.45	6,072.42	-105.49	59.52	108.25	0.51	-0.24	13.24
6,100.00	1.97	159.81	6,097.41	-106.28	59.84	109.05	0.48	0.16	13.44
6,125.00	1.95	163.96	6,122.39	-107.09	60.11	109.88	0.57	-0.08	16.60
6,150.00	1.97	162.32	6,147.38	-107.91	60.35	110.71	0.24	0.08	-6.56
6,175.00	2.09	163.32	6,172.36	-108.75	60.61	111.56	0.50	0.48	4.00
6,200.00	2.09	166.93	6,197.34	-109.63	60.85	112.46	0.53	0.00	14.44
6,225.00	2.06	167.90	6,222.33	-110.52	61.05	113.35	0.18	-0.12	3.88
6,250.00	2.10	170.25	6,247.31	-111.41	61.22	114.25	0.38	0.16	9.40
6,275.00	2.02	168.60	6,272.30	-112.29	61.38	115.14	0.40	-0.32	-6.60
6,300.00	2.06	168.05	6,297.28	-113.16	61.56	116.02	0.18	0.16	-2.20
6,325.00	2.16	167.96	6,322.26	-114.06	61.75	116.92	0.40	0.40	-0.36
6,350.00	2.21	170.19	6,347.24	-115.00	61.93	117.87	0.39	0.20	8.92
6,375.00	2.18	171.69	6,372.23	-115.94	62.08	118.82	0.26	-0.12	6.00
6,400.00	2.31	169.81	6,397.21	-116.91	62.24	119.79	0.60	0.52	-7.52
6,425.00	2.26	172.33	6,422.19	-117.90	62.40	120.78	0.45	-0.20	10.08
6,450.00	2.37	171.16	6,447.17	-118.89	62.54	121.79	0.48	0.44	-4.68
6,475.00	2.35	173.83	6,472.15	-119.91	62.68	122.81	0.45	-0.08	10.68
6,500.00	2.29	173.72	6,497.13	-120.92	62.79	123.82	0.24	-0.24	-0.44
6,525.00	2.47	173.96	6,522.10	-121.95	62.90	124.86	0.72	0.72	0.96
6,550.00	2.41	173.77	6,547.08	-123.01	63.01	125.92	0.24	-0.24	-0.76
6,575.00	2.37	174.13	6,572.06	-124.05	63.12	126.96	0.17	-0.16	1.44
6,600.00	2.46	176.42	6,597.04	-125.10	63.21	128.02	0.53	0.36	9.16
6,625.00	2.51	174.06	6,622.01	-126.18	63.30	129.10	0.46	0.20	-9.44
6,650.00	2.35	174.65	6,646.99	-127.23	63.40	130.16	0.65	-0.64	2.36
6,675.00	2.21	174.92	6,671.97	-128.22	63.49	131.15	0.56	-0.56	1.08
6,700.00	2.09	176.62	6,696.95	-129.16	63.56	132.09	0.54	-0.48	6.80
6,725.00	2.02	175.69	6,721.94	-130.05	63.62	132.99	0.31	-0.28	-3.72
6,750.00	1.95	178.86	6,746.92	-130.92	63.66	133.85	0.52	-0.28	12.68
6,775.00	1.83	178.75	6,771.91	-131.74	63.68	134.68	0.48	-0.48	-0.44
6,800.00	1.96	177.20	6,796.90	-132.57	63.71	135.50	0.56	0.52	-6.20

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
6,825.00	1.79	179.69	6,821.88	-133.38	63.73	136.32	0.75	-0.68	9.96
6,850.00	1.92	174.93	6,846.87	-134.19	63.77	137.13	0.81	0.52	-19.04
6,875.00	1.90	178.68	6,871.86	-135.02	63.82	137.96	0.51	-0.08	15.00
6,900.00	1.92	179.48	6,896.84	-135.86	63.83	138.79	0.13	0.08	3.20
6,925.00	1.94	177.09	6,921.83	-136.70	63.86	139.63	0.33	0.08	-9.56
6,950.00	1.99	165.04	6,946.81	-137.54	63.99	140.48	1.66	0.20	-48.20
6,975.00	2.18	148.05	6,971.80	-138.36	64.36	141.32	2.58	0.76	-67.96
7,000.00	2.23	147.06	6,996.78	-139.18	64.87	142.16	0.25	0.20	-3.96
7,025.00	2.20	145.23	7,021.76	-139.98	65.41	142.99	0.31	-0.12	-7.32
7,050.00	2.22	145.28	7,046.74	-140.77	65.96	143.80	0.08	0.08	0.20
7,075.00	2.11	145.87	7,071.72	-141.55	66.49	144.61	0.45	-0.44	2.36
7,100.00	2.17	151.44	7,096.71	-142.35	66.98	145.43	0.87	0.24	22.28
7,125.00	2.11	153.81	7,121.69	-143.17	67.41	146.27	0.43	-0.24	9.48
7,150.00	2.18	155.99	7,146.67	-144.02	67.80	147.14	0.43	0.28	8.72
7,175.00	2.21	156.95	7,171.65	-144.90	68.19	148.04	0.19	0.12	3.84
7,200.00	2.14	157.04	7,196.63	-145.77	68.56	148.93	0.28	-0.28	0.36
7,225.00	2.04	157.48	7,221.62	-146.61	68.91	149.78	0.41	-0.40	1.76
7,250.00	2.03	157.11	7,246.60	-147.43	69.25	150.62	0.07	-0.04	-1.48
7,275.00	2.08	157.30	7,271.59	-148.26	69.60	151.46	0.20	0.20	0.76
7,300.00	2.06	156.54	7,296.57	-149.09	69.95	152.31	0.14	-0.08	-3.04
7,325.00	2.06	156.40	7,321.55	-149.91	70.31	153.15	0.02	0.00	-0.56
7,350.00	2.13	157.02	7,346.54	-150.75	70.67	154.00	0.29	0.28	2.48
7,375.00	2.07	159.02	7,371.52	-151.60	71.02	154.87	0.38	-0.24	8.00
7,400.00	2.13	160.12	7,396.50	-152.46	71.34	155.74	0.29	0.24	4.40
7,425.00	2.02	158.98	7,421.49	-153.31	71.65	156.60	0.47	-0.44	-4.56
7,450.00	2.18	156.56	7,446.47	-154.16	72.00	157.47	0.73	0.64	-9.68
7,475.00	2.11	156.85	7,471.45	-155.02	72.37	158.34	0.28	-0.28	1.16
7,500.00	1.96	154.97	7,496.44	-155.83	72.73	159.17	0.66	-0.60	-7.52
7,525.00	1.90	155.99	7,521.42	-156.59	73.08	159.95	0.28	-0.24	4.08
7,550.00	1.92	152.36	7,546.41	-157.34	73.44	160.72	0.49	0.08	-14.52
7,575.00	1.95	152.27	7,571.39	-158.09	73.84	161.48	0.12	0.12	-0.36
7,600.00	2.00	152.25	7,596.38	-158.85	74.24	162.27	0.20	0.20	-0.08
7,625.00	1.92	150.54	7,621.36	-159.60	74.65	163.04	0.40	-0.32	-6.84
7,650.00	2.14	148.10	7,646.35	-160.36	75.10	163.82	0.95	0.88	-9.76
7,675.00	1.97	148.99	7,671.33	-161.13	75.57	164.60	0.69	-0.68	3.56
7,700.00	2.04	148.10	7,696.32	-161.87	76.02	165.37	0.31	0.28	-3.56
7,725.00	2.05	147.59	7,721.30	-162.63	76.50	166.15	0.08	0.04	-2.04
7,750.00	2.08	146.48	7,746.29	-163.39	76.99	166.93	0.20	0.12	-4.44
7,775.00	2.05	146.11	7,771.27	-164.13	77.49	167.70	0.13	-0.12	-1.48
7,800.00	2.06	147.12	7,796.25	-164.88	77.98	168.47	0.15	0.04	4.04
7,825.00	2.00	145.61	7,821.24	-165.62	78.47	169.23	0.32	-0.24	-6.04
7,850.00	2.00	141.59	7,846.22	-166.32	78.99	169.96	0.56	0.00	-16.08
7,875.00	1.92	141.51	7,871.21	-166.99	79.52	170.65	0.32	-0.32	-0.32

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,900.00	1.96	142.78	7,896.19	-167.66	80.04	171.34	0.23	0.16	5.08
7,925.00	1.97	140.56	7,921.18	-168.33	80.57	172.04	0.31	0.04	-8.88
7,950.00	2.09	141.49	7,946.16	-169.02	81.13	172.76	0.50	0.48	3.72
7,975.00	2.02	142.08	7,971.15	-169.73	81.68	173.49	0.29	-0.28	2.36
8,000.00	2.04	139.36	7,996.13	-170.41	82.24	174.20	0.39	0.08	-10.88
8,025.00	2.04	140.70	8,021.11	-171.09	82.82	174.91	0.19	0.00	5.36
8,050.00	2.03	138.21	8,046.10	-171.77	83.39	175.61	0.36	-0.04	-9.96
8,075.00	1.94	139.88	8,071.08	-172.42	83.96	176.29	0.43	-0.36	6.68
8,100.00	1.96	138.13	8,096.07	-173.06	84.52	176.96	0.25	0.08	-7.00
8,125.00	2.04	138.95	8,121.05	-173.72	85.10	177.64	0.34	0.32	3.28
8,150.00	2.08	137.93	8,146.04	-174.39	85.69	178.34	0.22	0.16	-4.08
8,175.00	2.33	139.60	8,171.02	-175.11	86.33	179.09	1.03	1.00	6.68
8,200.00	2.23	139.73	8,196.00	-175.87	86.97	179.88	0.40	-0.40	0.52
8,225.00	2.27	140.30	8,220.98	-176.62	87.60	180.66	0.18	0.16	2.28
8,250.00	2.27	139.59	8,245.96	-177.38	88.24	181.45	0.11	0.00	-2.84
8,275.00	2.30	140.97	8,270.94	-178.15	88.87	182.25	0.25	0.12	5.52
8,300.00	2.44	141.49	8,295.92	-178.95	89.52	183.08	0.57	0.56	2.08
8,325.00	2.32	142.32	8,320.90	-179.77	90.16	183.93	0.50	-0.48	3.32
8,350.00	2.20	143.58	8,345.88	-180.56	90.76	184.75	0.52	-0.48	5.04
8,375.00	2.22	143.15	8,370.86	-181.33	91.33	185.55	0.10	0.08	-1.72
8,400.00	2.18	145.33	8,395.84	-182.11	91.89	186.35	0.37	-0.16	8.72
8,425.00	2.32	153.72	8,420.82	-182.95	92.39	187.22	1.43	0.56	33.56
8,450.00	2.13	149.36	8,445.80	-183.81	92.85	188.09	1.02	-0.76	-17.44
8,475.00	2.05	146.76	8,470.79	-184.58	93.33	188.89	0.50	-0.32	-10.40
8,500.00	2.11	152.08	8,495.77	-185.36	93.79	189.69	0.81	0.24	21.28
8,525.00	2.16	152.08	8,520.75	-186.18	94.23	190.54	0.20	0.20	0.00
8,550.00	2.03	154.48	8,545.74	-187.00	94.64	191.37	0.63	-0.52	9.60
8,575.00	1.97	156.12	8,570.72	-187.79	95.00	192.18	0.33	-0.24	6.56
8,599.00	1.84	159.82	8,594.71	-188.53	95.30	192.93	0.75	-0.54	15.42
8,667.00	2.03	171.23	8,662.67	-190.75	95.86	195.17	0.63	0.28	16.78
First IDS MWD Survey									
8,694.00	3.85	165.88	8,689.63	-192.10	96.16	196.54	6.81	6.74	-19.81
8,730.00	6.70	165.45	8,725.48	-195.30	96.98	199.78	7.92	7.92	-1.19
8,762.00	9.58	163.70	8,757.15	-199.67	98.20	204.20	9.03	9.00	-5.47
8,791.00	12.92	159.54	8,785.59	-205.02	100.01	209.63	11.85	11.52	-14.34
8,825.00	16.89	159.44	8,818.44	-213.21	103.07	217.96	11.68	11.68	-0.29
8,856.00	21.19	158.64	8,847.74	-222.65	106.69	227.56	13.90	13.87	-2.58
8,886.00	24.75	158.57	8,875.35	-233.55	110.97	238.66	11.87	11.87	-0.23
8,935.00	29.73	159.42	8,918.91	-254.49	118.99	259.96	10.19	10.16	1.73
8,980.00	34.75	159.64	8,956.96	-276.97	127.38	282.82	11.16	11.16	0.49
9,029.00	40.04	159.45	8,995.87	-304.84	137.78	311.16	10.80	10.80	-0.39
9,074.00	44.41	158.44	9,029.19	-333.05	148.65	339.87	9.83	9.71	-2.24
9,123.00	48.47	152.42	9,062.96	-365.28	163.45	372.78	12.16	8.29	-12.29

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
9,169.00	53.27	149.94	9,091.99	-396.52	180.67	404.82	11.24	10.43	-5.39
9,218.00	58.85	150.96	9,119.33	-431.87	200.70	441.10	11.52	11.39	2.08
9,263.00	63.70	152.54	9,140.96	-466.63	219.36	476.72	11.21	10.78	3.51
9,312.00	68.06	153.71	9,160.97	-506.51	239.57	517.54	9.16	8.90	2.39
9,357.00	73.49	153.70	9,175.79	-544.59	258.38	556.49	12.07	12.07	-0.02
9,398.00	79.28	154.52	9,185.43	-580.43	275.77	593.12	14.25	14.12	2.00
9,422.00	83.11	154.85	9,189.11	-601.86	285.91	615.02	16.02	15.96	1.38
9,488.00	89.87	155.95	9,193.15	-661.73	313.31	676.14	10.38	10.24	1.67
9,582.00	90.74	157.07	9,192.65	-747.93	350.78	764.07	1.51	0.93	1.19
9,677.00	90.46	161.34	9,191.65	-836.72	384.50	854.38	4.50	-0.29	4.49
9,771.00	89.37	165.22	9,191.79	-926.73	411.54	945.60	4.29	-1.16	4.13
9,865.00	87.52	172.34	9,194.34	-1,018.83	429.81	1,038.48	7.82	-1.97	7.57
9,960.00	88.22	177.76	9,197.88	-1,113.38	438.00	1,133.31	5.75	0.74	5.71
10,054.00	89.54	182.14	9,199.72	-1,207.33	438.08	1,227.16	4.87	1.40	4.66
10,148.00	90.69	182.45	9,199.53	-1,301.26	434.31	1,320.79	1.27	1.22	0.33
10,243.00	91.95	180.90	9,197.34	-1,396.19	431.54	1,415.47	2.10	1.33	-1.63
10,337.00	91.92	179.62	9,194.16	-1,490.13	431.11	1,509.28	1.36	-0.03	-1.36
10,432.00	91.27	178.49	9,191.52	-1,585.08	432.68	1,604.20	1.37	-0.68	-1.19
10,526.00	90.94	178.97	9,189.71	-1,679.04	434.76	1,698.15	0.62	-0.35	0.51
10,621.00	89.45	178.50	9,189.38	-1,774.01	436.86	1,793.11	1.64	-1.57	-0.49
10,715.00	90.15	178.62	9,189.71	-1,867.98	439.22	1,887.08	0.76	0.74	0.13
10,809.00	92.09	179.59	9,187.87	-1,961.94	440.69	1,981.01	2.31	2.06	1.03
10,904.00	91.13	177.82	9,185.21	-2,056.88	442.83	2,075.93	2.12	-1.01	-1.86
10,998.00	90.57	175.59	9,183.81	-2,150.71	448.24	2,169.91	2.45	-0.60	-2.37
11,093.00	88.45	175.91	9,184.62	-2,245.43	455.28	2,264.87	2.26	-2.23	0.34
11,188.00	89.12	175.51	9,186.64	-2,340.15	462.38	2,359.82	0.82	0.71	-0.42
11,283.00	88.67	178.58	9,188.47	-2,434.99	467.28	2,454.79	3.27	-0.47	3.23
11,377.00	89.34	180.03	9,190.10	-2,528.97	468.42	2,548.71	1.70	0.71	1.54
11,472.00	91.84	181.04	9,189.12	-2,623.95	467.53	2,643.54	2.84	2.63	1.06
11,567.00	90.32	179.80	9,187.33	-2,718.93	466.83	2,738.37	2.06	-1.60	-1.31
11,661.00	89.48	178.75	9,187.50	-2,812.92	468.02	2,832.30	1.43	-0.89	-1.12
11,756.00	91.08	179.28	9,187.03	-2,907.90	469.66	2,927.25	1.77	1.68	0.56
11,851.00	91.75	179.10	9,184.69	-3,002.86	471.00	3,022.17	0.73	0.71	-0.19
11,945.00	90.69	178.28	9,182.69	-3,096.81	473.15	3,116.11	1.43	-1.13	-0.87
12,039.00	86.29	177.90	9,185.16	-3,190.70	476.28	3,210.05	4.70	-4.68	-0.40
12,134.00	87.29	179.21	9,190.48	-3,285.52	478.67	3,304.87	1.73	1.05	1.38
12,228.00	88.89	180.11	9,193.61	-3,379.46	479.23	3,398.73	1.95	1.70	0.96
12,322.00	90.66	179.91	9,193.98	-3,473.46	479.21	3,492.61	1.89	1.88	-0.21
12,417.00	88.14	178.46	9,194.98	-3,568.43	480.56	3,587.54	3.06	-2.65	-1.53
12,511.00	88.08	178.18	9,198.08	-3,662.34	483.32	3,681.47	0.30	-0.06	-0.30
12,605.00	88.70	178.67	9,200.72	-3,756.27	485.90	3,775.41	0.84	0.66	0.52
12,700.00	91.84	179.50	9,200.27	-3,851.24	487.42	3,870.35	3.42	3.31	0.87
12,794.00	93.32	180.42	9,196.04	-3,945.14	487.48	3,964.14	1.85	1.57	0.98
12,889.00	92.03	180.48	9,191.61	-4,040.03	486.74	4,058.89	1.36	-1.36	0.06

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,983.00	91.25	180.45	9,188.92	-4,133.99	485.97	4,152.70	0.83	-0.83	-0.03
13,077.00	91.11	180.62	9,186.98	-4,227.97	485.10	4,246.52	0.23	-0.15	0.18
13,172.00	89.51	180.95	9,186.47	-4,322.95	483.79	4,341.33	1.72	-1.68	0.35
13,266.00	89.57	181.15	9,187.22	-4,416.93	482.07	4,435.12	0.22	0.06	0.21
13,361.00	89.76	181.31	9,187.78	-4,511.91	480.03	4,529.88	0.26	0.20	0.17
13,455.00	90.10	180.72	9,187.89	-4,605.90	478.37	4,623.68	0.72	0.36	-0.63
13,550.00	91.11	181.50	9,186.89	-4,700.87	476.53	4,718.45	1.34	1.06	0.82
13,644.00	90.60	179.73	9,185.49	-4,794.85	475.52	4,812.27	1.96	-0.54	-1.88
13,738.00	89.76	178.51	9,185.19	-4,888.84	476.96	4,906.22	1.58	-0.89	-1.30
13,833.00	91.47	178.63	9,184.17	-4,983.80	479.33	5,001.18	1.80	1.80	0.13
13,927.00	89.90	179.09	9,183.05	-5,077.77	481.20	5,095.13	1.74	-1.67	0.49
14,021.00	91.70	179.50	9,181.74	-5,171.75	482.36	5,189.06	1.96	1.91	0.44
14,116.00	93.77	180.01	9,177.20	-5,266.63	482.77	5,283.85	2.24	2.18	0.54
14,205.00	93.41	178.80	9,171.63	-5,355.45	483.69	5,372.61	1.42	-0.40	-1.36
14,299.00	91.50	178.49	9,167.60	-5,449.34	485.91	5,466.49	2.06	-2.03	-0.33
14,393.00	89.65	178.27	9,166.66	-5,543.29	488.57	5,560.46	1.98	-1.97	-0.23
14,488.00	90.80	178.33	9,166.29	-5,638.25	491.38	5,655.44	1.21	1.21	0.06
14,582.00	91.19	177.88	9,164.65	-5,732.18	494.49	5,749.42	0.63	0.41	-0.48
14,677.00	89.03	177.51	9,164.47	-5,827.10	498.31	5,844.41	2.31	-2.27	-0.39
14,771.00	89.54	177.81	9,165.65	-5,921.01	502.15	5,938.40	0.63	0.54	0.32
14,865.00	90.74	179.09	9,165.42	-6,014.97	504.69	6,032.37	1.87	1.28	1.36
14,960.00	89.29	179.37	9,165.39	-6,109.96	505.97	6,127.31	1.55	-1.53	0.29
15,054.00	90.01	179.42	9,165.96	-6,203.95	506.96	6,221.24	0.77	0.77	0.05
15,149.00	91.02	179.52	9,165.11	-6,298.94	507.84	6,316.16	1.07	1.06	0.11
15,243.00	89.23	179.00	9,164.91	-6,392.93	509.05	6,410.10	1.98	-1.90	-0.55
15,337.00	89.51	178.74	9,165.94	-6,486.91	510.91	6,504.05	0.41	0.30	-0.28
15,432.00	88.36	177.14	9,167.71	-6,581.83	514.32	6,599.02	2.07	-1.21	-1.68
15,526.00	90.18	178.21	9,168.90	-6,675.74	518.14	6,693.01	2.25	1.94	1.14
15,620.00	90.13	180.64	9,168.65	-6,769.72	519.08	6,786.93	2.59	-0.05	2.59
15,715.00	89.34	180.77	9,169.09	-6,864.71	517.91	6,881.75	0.84	-0.83	0.14
15,809.00	90.55	180.74	9,169.18	-6,958.70	516.67	6,975.57	1.29	1.29	-0.03
15,903.00	89.71	181.01	9,168.96	-7,052.69	515.24	7,069.38	0.94	-0.89	0.29
15,998.00	94.53	180.16	9,165.45	-7,147.59	514.27	7,164.12	5.15	5.07	-0.89
16,081.00	97.09	180.42	9,157.05	-7,230.16	513.85	7,246.57	3.10	3.08	0.31
16,175.00	96.78	180.64	9,145.70	-7,323.47	512.98	7,339.73	0.40	-0.33	0.23
16,270.00	92.45	180.16	9,138.06	-7,418.13	512.32	7,434.25	4.59	-4.56	-0.51
16,364.00	89.68	180.11	9,136.31	-7,512.11	512.10	7,528.11	2.95	-2.95	-0.05
16,458.00	88.14	179.75	9,138.10	-7,606.09	512.22	7,621.98	1.68	-1.64	-0.38
16,553.00	88.78	179.23	9,140.65	-7,701.05	513.06	7,716.87	0.87	0.67	-0.55
16,647.00	90.10	178.68	9,141.57	-7,795.03	514.78	7,810.82	1.52	1.40	-0.59
16,742.00	88.14	179.90	9,143.03	-7,890.00	515.96	7,905.74	2.43	-2.06	1.28
16,836.00	89.09	179.86	9,145.30	-7,983.97	516.15	7,999.61	1.01	1.01	-0.04
16,931.00	88.98	179.57	9,146.90	-8,078.96	516.62	8,094.51	0.33	-0.12	-0.31

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal 6H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3564.30ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3564.30ft (McVay 8)
Well:	Windward Federal 6H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	EDM 5000.1 Multi User Db

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
17,025.00	90.32	179.30	9,147.48	-8,172.95	517.55	8,188.43	1.45	1.43	-0.29
17,120.00	91.11	180.05	9,146.29	-8,267.94	518.09	8,283.34	1.15	0.83	0.79
17,214.00	89.73	181.16	9,145.60	-8,361.93	517.10	8,377.17	1.88	-1.47	1.18
17,309.00	91.13	181.21	9,144.89	-8,456.90	515.13	8,471.93	1.47	1.47	0.05
17,403.00	88.98	180.93	9,144.80	-8,550.88	513.38	8,565.72	2.31	-2.29	-0.30
17,497.00	89.76	180.89	9,145.83	-8,644.86	511.89	8,659.52	0.83	0.83	-0.04
17,593.00	91.30	181.02	9,144.94	-8,740.84	510.29	8,755.30	1.61	1.60	0.14
17,687.00	92.12	180.77	9,142.14	-8,834.79	508.82	8,849.07	0.91	0.87	-0.27
17,781.00	91.33	180.63	9,139.31	-8,928.74	507.67	8,942.85	0.85	-0.84	-0.15
17,876.00	90.15	180.04	9,138.08	-9,023.73	507.11	9,037.70	1.39	-1.24	-0.62
17,971.00	89.31	179.28	9,138.53	-9,118.72	507.68	9,132.61	1.19	-0.88	-0.80
18,065.00	90.83	178.55	9,138.42	-9,212.70	509.46	9,226.57	1.79	1.62	-0.78
18,160.00	88.75	179.27	9,138.76	-9,307.68	511.26	9,321.52	2.32	-2.19	0.76
18,254.00	87.72	180.08	9,141.66	-9,401.63	511.80	9,415.39	1.39	-1.10	0.86
18,349.00	88.53	179.76	9,144.77	-9,496.58	511.93	9,510.23	0.92	0.85	-0.34
18,443.00	89.76	179.50	9,146.17	-9,590.56	512.54	9,604.13	1.34	1.31	-0.28
18,538.00	90.32	179.66	9,146.10	-9,685.56	513.23	9,699.05	0.61	0.59	0.17
18,632.00	92.03	179.06	9,144.18	-9,779.53	514.28	9,792.96	1.93	1.82	-0.64
18,726.00	93.86	178.71	9,139.35	-9,873.38	516.11	9,886.80	1.98	1.95	-0.37
18,821.00	94.36	178.31	9,132.54	-9,968.11	518.57	9,981.53	0.67	0.53	-0.42
18,903.00	95.97	177.96	9,125.16	-10,049.73	521.23	10,063.18	2.01	1.96	-0.43
Final IDS MWD Survey									
18,953.00	95.97	177.96	9,119.96	-10,099.43	523.00	10,112.91	0.00	0.00	0.00
Projection to TD									

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,667.00	8,662.67	-190.75	95.86	First IDS MWD Survey
18,903.00	9,125.16	-10,049.73	521.23	Final IDS MWD Survey
18,953.00	9,119.96	-10,099.43	523.00	Projection to TD

Checked By: _____ Approved By: _____ Date: _____