



CONCHO

30-025-43566

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COG Operating L L C

Lea County, NM (NAD27 NME)

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

Windward Federal #9H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

21 March, 2017

Provide signature page for
directional survey





Integrity Directional Services, LLC
Survey Report - Geographic



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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 #9H, ACTIVE		
Well Position	+N/-S	0.00 ft	Northing:
	+E/-W	0.00 ft	Easting:
Position Uncertainty	0.00 ft	Wellhead Elevation:	0.00 ft
		Latitude:	32° 11' 41.711 N
		Longitude:	103° 42' 40.392 W
		Ground Level:	3,551.00 ft

Wellbore	Wellbore #1		
Magnetics	Model Name	Sample Date	Declination
	IGRF2015	2/22/2017	7.05
		Dip Angle	60.02
		Field Strength	47,937

Design	Wellbore #1		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S	+E/-W
	(ft)	(ft)	(ft)
	0.00	0.00	0.00
			181.89

Survey Program	Date 3/21/2017		
From	To	Survey (Wellbore)	Tool Name
(ft)	(ft)		
100.00	8,525.00	Gyros Surveys (Wellbore #1)	Keeper
8,586.00	19,086.00	IDS MWD Surveys (Wellbore #1)	MWD
			Description
			Standard Wireline Keeper ver 1.0.2
			MWD - Standard

Survey										
Measured	Inclination	Azimuth	Vertical	+N/-S	+E/-W	Map	Map			
Depth	(°)	(°)	Depth	(ft)	(ft)	Northing	Easting	Latitude	Longitude	
(ft)			(ft)			(usft)	(usft)			
0.00	0.00	0.00	0.00	0.00	0.00	435,188.4000	692,444.4000	32° 11' 41.711 N	103° 42' 40.392 W	
100.00	0.28	342.31	100.00	0.23	-0.07	435,188.6328	692,444.3257	32° 11' 41.713 N	103° 42' 40.393 W	
125.00	0.22	28.97	125.00	0.33	-0.07	435,188.7330	692,444.3304	32° 11' 41.714 N	103° 42' 40.393 W	
150.00	0.23	3.68	150.00	0.43	-0.04	435,188.8250	692,444.3569	32° 11' 41.715 N	103° 42' 40.392 W	
175.00	0.28	34.59	175.00	0.53	-0.01	435,188.9254	692,444.3948	32° 11' 41.716 N	103° 42' 40.392 W	
200.00	0.29	357.50	200.00	0.64	0.03	435,189.0389	692,444.4267	32° 11' 41.717 N	103° 42' 40.392 W	
225.00	0.35	13.99	225.00	0.78	0.04	435,189.1762	692,444.4424	32° 11' 41.719 N	103° 42' 40.391 W	
250.00	0.34	25.60	250.00	0.92	0.09	435,189.3172	692,444.4929	32° 11' 41.720 N	103° 42' 40.391 W	
275.00	0.46	17.59	275.00	1.08	0.16	435,189.4797	692,444.5553	32° 11' 41.722 N	103° 42' 40.390 W	
300.00	0.50	9.39	300.00	1.28	0.20	435,189.6830	692,444.6034	32° 11' 41.724 N	103° 42' 40.389 W	
325.00	0.54	15.84	325.00	1.50	0.25	435,189.9040	692,444.6534	32° 11' 41.726 N	103° 42' 40.389 W	

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
350.00	0.43	13.65	349.99	1.71	0.31	435,190.1085	692,444.7077	32° 11' 41.728 N	103° 42' 40.388 W
375.00	0.43	14.86	374.99	1.89	0.35	435,190.2903	692,444.7539	32° 11' 41.730 N	103° 42' 40.388 W
400.00	0.46	4.78	399.99	2.08	0.39	435,190.4810	692,444.7863	32° 11' 41.731 N	103° 42' 40.387 W
425.00	0.49	352.02	424.99	2.29	0.38	435,190.6869	692,444.7798	32° 11' 41.734 N	103° 42' 40.387 W
450.00	0.47	1.34	449.99	2.50	0.37	435,190.8952	692,444.7674	32° 11' 41.736 N	103° 42' 40.387 W
475.00	0.50	352.57	474.99	2.71	0.36	435,191.1059	692,444.7557	32° 11' 41.738 N	103° 42' 40.388 W
500.00	0.58	352.54	499.99	2.94	0.33	435,191.3395	692,444.7251	32° 11' 41.740 N	103° 42' 40.388 W
525.00	0.57	0.09	524.99	3.19	0.31	435,191.5893	692,444.7089	32° 11' 41.742 N	103° 42' 40.388 W
550.00	0.58	5.39	549.99	3.44	0.32	435,191.8397	692,444.7210	32° 11' 41.745 N	103° 42' 40.388 W
575.00	0.58	350.15	574.99	3.69	0.31	435,192.0903	692,444.7112	32° 11' 41.747 N	103° 42' 40.388 W
600.00	0.50	352.21	599.98	3.92	0.27	435,192.3231	692,444.6748	32° 11' 41.750 N	103° 42' 40.388 W
625.00	0.33	3.83	624.98	4.10	0.26	435,192.5030	692,444.6648	32° 11' 41.751 N	103° 42' 40.389 W
650.00	0.28	359.30	649.98	4.24	0.27	435,192.6359	692,444.6689	32° 11' 41.753 N	103° 42' 40.388 W
675.00	0.25	343.32	674.98	4.35	0.25	435,192.7492	692,444.6525	32° 11' 41.754 N	103° 42' 40.389 W
700.00	0.17	312.64	699.98	4.43	0.21	435,192.8266	692,444.6095	32° 11' 41.755 N	103° 42' 40.389 W
725.00	0.13	243.97	724.98	4.44	0.16	435,192.8393	692,444.5568	32° 11' 41.755 N	103° 42' 40.390 W
750.00	0.44	187.12	749.98	4.33	0.12	435,192.7316	692,444.5194	32° 11' 41.754 N	103° 42' 40.390 W
775.00	0.45	197.34	774.98	4.14	0.08	435,192.5426	692,444.4782	32° 11' 41.752 N	103° 42' 40.391 W
800.00	0.36	196.55	799.98	3.97	0.03	435,192.3736	692,444.4266	32° 11' 41.750 N	103° 42' 40.391 W
825.00	0.45	195.77	824.98	3.80	-0.02	435,192.2038	692,444.3775	32° 11' 41.749 N	103° 42' 40.392 W
850.00	0.55	195.64	849.98	3.59	-0.08	435,191.9938	692,444.3185	32° 11' 41.746 N	103° 42' 40.393 W
875.00	0.44	188.09	874.98	3.38	-0.13	435,191.7832	692,444.2727	32° 11' 41.744 N	103° 42' 40.393 W
900.00	0.46	202.23	899.98	3.20	-0.18	435,191.5953	692,444.2212	32° 11' 41.743 N	103° 42' 40.394 W
925.00	0.57	194.79	924.98	2.98	-0.25	435,191.3822	692,444.1515	32° 11' 41.740 N	103° 42' 40.395 W
950.00	0.57	187.78	949.98	2.74	-0.30	435,191.1387	692,444.1029	32° 11' 41.738 N	103° 42' 40.395 W
975.00	0.58	188.10	974.97	2.49	-0.33	435,190.8902	692,444.0682	32° 11' 41.736 N	103° 42' 40.396 W
1,000.00	0.56	205.29	999.97	2.25	-0.40	435,190.6545	692,443.9982	32° 11' 41.733 N	103° 42' 40.396 W
1,025.00	0.56	198.45	1,024.97	2.03	-0.49	435,190.4282	692,443.9074	32° 11' 41.731 N	103° 42' 40.397 W
1,050.00	0.62	186.43	1,049.97	1.78	-0.55	435,190.1779	692,443.8535	32° 11' 41.729 N	103° 42' 40.398 W
1,075.00	0.62	188.38	1,074.97	1.51	-0.58	435,189.9096	692,443.8187	32° 11' 41.726 N	103° 42' 40.399 W
1,100.00	0.59	199.83	1,099.97	1.25	-0.64	435,189.6547	692,443.7553	32° 11' 41.723 N	103° 42' 40.399 W
1,125.00	0.61	189.23	1,124.97	1.00	-0.71	435,189.4023	692,443.6903	32° 11' 41.721 N	103° 42' 40.400 W
1,150.00	0.61	184.31	1,149.97	0.74	-0.74	435,189.1382	692,443.6589	32° 11' 41.718 N	103° 42' 40.400 W
1,175.00	0.73	187.93	1,174.96	0.45	-0.77	435,188.8478	692,443.6270	32° 11' 41.715 N	103° 42' 40.401 W
1,200.00	0.66	189.34	1,199.96	0.15	-0.82	435,188.5480	692,443.5816	32° 11' 41.712 N	103° 42' 40.401 W
1,225.00	0.66	190.66	1,224.96	-0.14	-0.87	435,188.2644	692,443.5316	32° 11' 41.710 N	103° 42' 40.402 W
1,250.00	0.67	182.67	1,249.96	-0.42	-0.90	435,187.9769	692,443.4982	32° 11' 41.707 N	103° 42' 40.402 W
1,275.00	0.72	176.51	1,274.96	-0.73	-0.90	435,187.6741	692,443.5009	32° 11' 41.704 N	103° 42' 40.402 W
1,300.00	0.63	190.11	1,299.95	-1.02	-0.91	435,187.3820	692,443.4864	32° 11' 41.701 N	103° 42' 40.403 W
1,325.00	0.75	179.22	1,324.95	-1.32	-0.94	435,187.0831	692,443.4645	32° 11' 41.698 N	103° 42' 40.403 W
1,350.00	0.58	184.50	1,349.95	-1.61	-0.94	435,186.7934	692,443.4568	32° 11' 41.695 N	103° 42' 40.403 W
1,375.00	0.64	181.72	1,374.95	-1.87	-0.96	435,186.5277	692,443.4427	32° 11' 41.692 N	103° 42' 40.403 W
1,400.00	0.71	191.66	1,399.95	-2.16	-0.99	435,186.2364	692,443.4072	32° 11' 41.690 N	103° 42' 40.404 W
1,425.00	0.67	190.60	1,424.95	-2.46	-1.05	435,185.9410	692,443.3490	32° 11' 41.687 N	103° 42' 40.404 W
1,450.00	0.64	184.96	1,449.94	-2.74	-1.09	435,185.6583	692,443.3100	32° 11' 41.684 N	103° 42' 40.405 W
1,475.00	0.66	175.18	1,474.94	-3.02	-1.09	435,185.3757	692,443.3100	32° 11' 41.681 N	103° 42' 40.405 W
1,500.00	0.57	170.66	1,499.94	-3.29	-1.06	435,185.1095	692,443.3423	32° 11' 41.678 N	103° 42' 40.404 W
1,525.00	0.53	163.04	1,524.94	-3.52	-1.00	435,184.8762	692,443.3962	32° 11' 41.676 N	103° 42' 40.404 W
1,550.00	0.52	168.95	1,549.94	-3.75	-0.95	435,184.6543	692,443.4517	32° 11' 41.674 N	103° 42' 40.403 W
1,575.00	0.50	159.20	1,574.94	-3.96	-0.89	435,184.4409	692,443.5122	32° 11' 41.672 N	103° 42' 40.402 W
1,600.00	0.46	168.40	1,599.94	-4.16	-0.83	435,184.2407	692,443.5711	32° 11' 41.670 N	103° 42' 40.402 W
1,625.00	0.56	158.54	1,624.94	-4.37	-0.76	435,184.0287	692,443.6360	32° 11' 41.668 N	103° 42' 40.401 W
1,650.00	0.44	158.13	1,649.94	-4.57	-0.68	435,183.8259	692,443.7164	32° 11' 41.666 N	103° 42' 40.400 W
1,675.00	0.44	147.57	1,674.93	-4.74	-0.60	435,183.6558	692,443.8037	32° 11' 41.664 N	103° 42' 40.399 W
1,700.00	0.36	172.30	1,699.93	-4.90	-0.53	435,183.4969	692,443.8657	32° 11' 41.662 N	103° 42' 40.398 W



Integrity Directional Services, LLC
Survey Report - Geographic



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S., R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,725.00	0.40	137.28	1,724.93	-5.05	-0.46	435,183.3550	692,443.9354	32° 11' 41.661 N	103° 42' 40.398 W
1,750.00	0.29	125.32	1,749.93	-5.15	-0.35	435,183.2543	692,444.0462	32° 11' 41.660 N	103° 42' 40.396 W
1,775.00	0.44	119.08	1,774.93	-5.23	-0.22	435,183.1710	692,444.1817	32° 11' 41.659 N	103° 42' 40.395 W
1,800.00	0.31	107.87	1,799.93	-5.30	-0.07	435,183.1036	692,444.3300	32° 11' 41.658 N	103° 42' 40.393 W
1,825.00	0.54	104.10	1,824.93	-5.35	0.11	435,183.0542	692,444.5086	32° 11' 41.658 N	103° 42' 40.391 W
1,850.00	0.60	90.41	1,849.93	-5.38	0.35	435,183.0245	692,444.7538	32° 11' 41.658 N	103° 42' 40.388 W
1,875.00	0.68	90.26	1,874.93	-5.38	0.63	435,183.0229	692,445.0330	32° 11' 41.658 N	103° 42' 40.385 W
1,900.00	0.70	92.01	1,899.93	-5.38	0.93	435,183.0169	692,445.3340	32° 11' 41.658 N	103° 42' 40.381 W
1,925.00	0.70	82.88	1,924.92	-5.37	1.24	435,183.0305	692,445.6381	32° 11' 41.658 N	103° 42' 40.378 W
1,950.00	0.92	81.82	1,949.92	-5.32	1.59	435,183.0780	692,445.9883	32° 11' 41.658 N	103° 42' 40.374 W
1,975.00	0.97	74.30	1,974.92	-5.24	1.99	435,183.1638	692,446.3907	32° 11' 41.659 N	103° 42' 40.369 W
2,000.00	1.05	74.71	1,999.92	-5.12	2.42	435,183.2815	692,446.8154	32° 11' 41.660 N	103° 42' 40.364 W
2,025.00	1.14	73.62	2,024.91	-4.99	2.87	435,183.4120	692,447.2749	32° 11' 41.661 N	103° 42' 40.359 W
2,050.00	1.14	70.86	2,049.91	-4.84	3.35	435,183.5637	692,447.7485	32° 11' 41.663 N	103° 42' 40.353 W
2,075.00	1.30	67.93	2,074.90	-4.65	3.85	435,183.7518	692,448.2462	32° 11' 41.665 N	103° 42' 40.347 W
2,100.00	1.28	66.83	2,099.89	-4.43	4.37	435,183.9682	692,448.7657	32° 11' 41.667 N	103° 42' 40.341 W
2,125.00	1.36	59.40	2,124.89	-4.17	4.88	435,184.2291	692,449.2778	32° 11' 41.669 N	103° 42' 40.335 W
2,150.00	1.24	39.58	2,149.88	-3.81	5.31	435,184.5886	692,449.7055	32° 11' 41.673 N	103° 42' 40.330 W
2,175.00	1.29	21.72	2,174.87	-3.34	5.58	435,185.0585	692,449.9820	32° 11' 41.678 N	103° 42' 40.327 W
2,200.00	1.47	15.99	2,199.87	-2.77	5.77	435,185.6282	692,450.1745	32° 11' 41.683 N	103° 42' 40.325 W
2,225.00	1.45	12.91	2,224.86	-2.16	5.93	435,186.2448	692,450.3335	32° 11' 41.689 N	103° 42' 40.323 W
2,250.00	1.46	15.78	2,249.85	-1.54	6.09	435,186.8596	692,450.4908	32° 11' 41.695 N	103° 42' 40.321 W
2,275.00	1.44	17.92	2,274.84	-0.94	6.27	435,187.4649	692,450.6740	32° 11' 41.701 N	103° 42' 40.319 W
2,300.00	1.21	28.31	2,299.84	-0.40	6.50	435,187.9962	692,450.8959	32° 11' 41.707 N	103° 42' 40.316 W
2,325.00	1.01	51.29	2,324.83	-0.03	6.79	435,188.3664	692,451.1930	32° 11' 41.710 N	103° 42' 40.313 W
2,350.00	0.97	69.88	2,349.83	0.18	7.16	435,188.5770	692,451.5636	32° 11' 41.712 N	103° 42' 40.308 W
2,375.00	0.98	72.61	2,374.82	0.31	7.57	435,188.7137	692,451.9663	32° 11' 41.714 N	103° 42' 40.304 W
2,400.00	0.95	73.36	2,399.82	0.44	7.97	435,188.8369	692,452.3689	32° 11' 41.715 N	103° 42' 40.299 W
2,425.00	1.05	70.45	2,424.82	0.57	8.38	435,188.9729	692,452.7834	32° 11' 41.716 N	103° 42' 40.294 W
2,450.00	0.96	64.81	2,449.81	0.74	8.79	435,189.1387	692,453.1887	32° 11' 41.718 N	103° 42' 40.290 W
2,475.00	0.90	54.21	2,474.81	0.94	9.14	435,189.3427	692,453.5375	32° 11' 41.720 N	103° 42' 40.285 W
2,500.00	0.94	35.87	2,499.81	1.22	9.42	435,189.6237	692,453.8169	32° 11' 41.722 N	103° 42' 40.282 W
2,525.00	1.11	11.86	2,524.80	1.63	9.59	435,190.0268	692,453.9869	32° 11' 41.726 N	103° 42' 40.280 W
2,550.00	1.32	358.15	2,549.80	2.15	9.63	435,190.5516	692,454.0273	32° 11' 41.732 N	103° 42' 40.280 W
2,575.00	1.45	359.49	2,574.79	2.76	9.62	435,191.1557	692,454.0152	32° 11' 41.738 N	103° 42' 40.280 W
2,600.00	1.46	358.41	2,599.78	3.39	9.60	435,191.7904	692,454.0036	32° 11' 41.744 N	103° 42' 40.280 W
2,625.00	1.52	3.39	2,624.77	4.04	9.61	435,192.4397	692,454.0143	32° 11' 41.750 N	103° 42' 40.280 W
2,650.00	1.59	5.52	2,649.76	4.72	9.67	435,193.1159	692,454.0673	32° 11' 41.757 N	103° 42' 40.279 W
2,675.00	1.72	7.45	2,674.75	5.43	9.75	435,193.8332	692,454.1493	32° 11' 41.764 N	103° 42' 40.278 W
2,700.00	1.80	11.47	2,699.74	6.19	9.88	435,194.5900	692,454.2760	32° 11' 41.772 N	103° 42' 40.277 W
2,725.00	1.78	12.45	2,724.73	6.95	10.04	435,195.3539	692,454.4378	32° 11' 41.779 N	103° 42' 40.275 W
2,750.00	1.77	11.75	2,749.72	7.71	10.20	435,196.1111	692,454.6002	32° 11' 41.787 N	103° 42' 40.273 W
2,775.00	1.71	15.71	2,774.71	8.45	10.38	435,196.8482	692,454.7798	32° 11' 41.794 N	103° 42' 40.271 W
2,800.00	1.34	27.75	2,799.70	9.07	10.62	435,197.4659	692,455.0169	32° 11' 41.800 N	103° 42' 40.268 W
2,825.00	0.93	21.06	2,824.69	9.51	10.83	435,197.9140	692,455.2259	32° 11' 41.804 N	103° 42' 40.265 W
2,850.00	0.66	11.82	2,849.69	9.84	10.93	435,198.2442	692,455.3283	32° 11' 41.808 N	103° 42' 40.264 W
2,875.00	0.40	348.22	2,874.69	10.07	10.94	435,198.4706	692,455.3400	32° 11' 41.810 N	103° 42' 40.264 W
2,900.00	0.30	316.41	2,899.69	10.20	10.88	435,198.6034	692,455.2770	32° 11' 41.811 N	103° 42' 40.265 W
2,925.00	0.40	305.96	2,924.69	10.30	10.76	435,198.7021	692,455.1613	32° 11' 41.812 N	103° 42' 40.266 W
2,950.00	0.52	294.14	2,949.69	10.40	10.59	435,198.7997	692,454.9871	32° 11' 41.813 N	103° 42' 40.268 W
2,975.00	0.62	299.03	2,974.69	10.51	10.37	435,198.9117	692,454.7653	32° 11' 41.814 N	103° 42' 40.271 W
3,000.00	0.79	311.97	2,999.68	10.69	10.12	435,199.0926	692,454.5189	32° 11' 41.816 N	103° 42' 40.273 W
3,025.00	0.73	323.41	3,024.68	10.94	9.90	435,199.3358	692,454.2958	32° 11' 41.819 N	103° 42' 40.276 W
3,050.00	0.85	319.38	3,049.68	11.20	9.68	435,199.6044	692,454.0802	32° 11' 41.821 N	103° 42' 40.278 W
3,075.00	0.87	328.99	3,074.68	11.51	9.46	435,199.9078	692,453.8617	32° 11' 41.824 N	103° 42' 40.281 W



Integrity Directional Services, LLC
Survey Report - Geographic



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S., R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
3,100.00	0.79	345.01	3,099.67	11.84	9.32	435,200.2370	692,453.7193	32° 11' 41.828 N	103° 42' 40.283 W
3,125.00	0.74	1.83	3,124.67	12.16	9.28	435,200.5648	692,453.6799	32° 11' 41.831 N	103° 42' 40.283 W
3,150.00	0.73	358.53	3,149.67	12.49	9.28	435,200.8854	692,453.6810	32° 11' 41.834 N	103° 42' 40.283 W
3,175.00	0.75	0.70	3,174.67	12.81	9.28	435,201.2082	692,453.6789	32° 11' 41.837 N	103° 42' 40.283 W
3,200.00	0.79	12.73	3,199.67	13.14	9.32	435,201.5399	692,453.7189	32° 11' 41.840 N	103° 42' 40.283 W
3,225.00	0.89	15.09	3,224.66	13.50	9.41	435,201.8955	692,453.8074	32° 11' 41.844 N	103° 42' 40.281 W
3,250.00	0.95	17.39	3,249.66	13.88	9.52	435,202.2807	692,453.9199	32° 11' 41.848 N	103° 42' 40.280 W
3,275.00	0.90	18.08	3,274.66	14.27	9.64	435,202.6651	692,454.0427	32° 11' 41.852 N	103° 42' 40.279 W
3,300.00	1.07	21.41	3,299.65	14.67	9.79	435,203.0691	692,454.1889	32° 11' 41.856 N	103° 42' 40.277 W
3,325.00	1.22	30.72	3,324.65	15.12	10.01	435,203.5152	692,454.4101	32° 11' 41.860 N	103° 42' 40.274 W
3,350.00	1.28	32.06	3,349.64	15.58	10.29	435,203.9806	692,454.6942	32° 11' 41.864 N	103° 42' 40.271 W
3,375.00	1.27	27.05	3,374.64	16.06	10.57	435,204.4640	692,454.9684	32° 11' 41.869 N	103° 42' 40.268 W
3,400.00	1.32	28.82	3,399.63	16.56	10.83	435,204.9631	692,455.2332	32° 11' 41.874 N	103° 42' 40.265 W
3,425.00	1.18	24.38	3,424.62	17.05	11.08	435,205.4498	692,455.4783	32° 11' 41.879 N	103° 42' 40.262 W
3,450.00	0.74	353.57	3,449.62	17.44	11.17	435,205.8447	692,455.5665	32° 11' 41.883 N	103° 42' 40.261 W
3,475.00	0.84	294.82	3,474.62	17.68	10.98	435,206.0820	692,455.3821	32° 11' 41.885 N	103° 42' 40.263 W
3,500.00	1.17	279.54	3,499.61	17.80	10.56	435,206.2013	692,454.9640	32° 11' 41.886 N	103° 42' 40.268 W
3,525.00	1.16	274.26	3,524.61	17.86	10.06	435,206.2624	692,454.4600	32° 11' 41.887 N	103° 42' 40.274 W
3,550.00	1.15	279.89	3,549.60	17.92	9.56	435,206.3243	692,453.9605	32° 11' 41.888 N	103° 42' 40.279 W
3,575.00	1.02	286.25	3,574.60	18.03	9.10	435,206.4296	692,453.4997	32° 11' 41.889 N	103° 42' 40.285 W
3,600.00	0.83	299.70	3,599.60	18.18	8.73	435,206.5816	692,453.1288	32° 11' 41.890 N	103° 42' 40.289 W
3,625.00	0.76	307.39	3,624.59	18.37	8.44	435,206.7720	692,452.8398	32° 11' 41.892 N	103° 42' 40.292 W
3,650.00	0.67	320.97	3,649.59	18.59	8.22	435,206.9862	692,452.6160	32° 11' 41.894 N	103° 42' 40.295 W
3,675.00	0.50	335.34	3,674.59	18.80	8.08	435,207.1989	692,452.4784	32° 11' 41.896 N	103° 42' 40.297 W
3,700.00	0.42	332.82	3,699.59	18.98	7.99	435,207.3795	692,452.3911	32° 11' 41.898 N	103° 42' 40.298 W
3,725.00	0.26	343.19	3,724.59	19.12	7.93	435,207.5153	692,452.3328	32° 11' 41.900 N	103° 42' 40.298 W
3,750.00	0.19	159.86	3,749.59	19.13	7.93	435,207.5307	692,452.3307	32° 11' 41.900 N	103° 42' 40.298 W
3,775.00	0.57	162.43	3,774.59	18.97	7.98	435,207.3733	692,452.3825	32° 11' 41.898 N	103° 42' 40.298 W
3,800.00	0.78	146.34	3,799.59	18.71	8.11	435,207.1131	692,452.5144	32° 11' 41.896 N	103° 42' 40.296 W
3,825.00	0.97	135.95	3,824.58	18.42	8.36	435,206.8193	692,452.7558	32° 11' 41.893 N	103° 42' 40.293 W
3,850.00	1.09	121.22	3,849.58	18.14	8.71	435,206.5440	692,453.1063	32° 11' 41.890 N	103° 42' 40.289 W
3,875.00	1.11	108.51	3,874.58	17.94	9.14	435,206.3439	692,453.5393	32° 11' 41.888 N	103° 42' 40.284 W
3,900.00	1.16	108.80	3,899.57	17.79	9.61	435,206.1855	692,454.0084	32° 11' 41.886 N	103° 42' 40.279 W
3,925.00	1.06	106.45	3,924.57	17.64	10.07	435,206.0384	692,454.4698	32° 11' 41.885 N	103° 42' 40.274 W
3,950.00	0.90	104.55	3,949.56	17.52	10.48	435,205.9236	692,454.8816	32° 11' 41.884 N	103° 42' 40.269 W
3,975.00	0.80	101.04	3,974.56	17.44	10.84	435,205.8409	692,455.2429	32° 11' 41.883 N	103° 42' 40.265 W
4,000.00	0.37	145.10	3,999.56	17.34	11.06	435,205.7412	692,455.4604	32° 11' 41.882 N	103° 42' 40.262 W
4,025.00	0.71	245.41	4,024.56	17.21	10.97	435,205.6106	692,455.3657	32° 11' 41.881 N	103° 42' 40.263 W
4,050.00	1.10	259.79	4,049.55	17.10	10.59	435,205.5036	692,454.9887	32° 11' 41.880 N	103° 42' 40.267 W
4,075.00	1.26	261.38	4,074.55	17.02	10.08	435,205.4199	692,454.4808	32° 11' 41.879 N	103° 42' 40.273 W
4,100.00	1.36	263.24	4,099.54	16.94	9.51	435,205.3437	692,453.9144	32° 11' 41.878 N	103° 42' 40.280 W
4,125.00	1.32	263.31	4,124.54	16.88	8.93	435,205.2753	692,453.3338	32° 11' 41.877 N	103° 42' 40.287 W
4,150.00	1.04	255.07	4,149.53	16.78	8.43	435,205.1833	692,452.8286	32° 11' 41.877 N	103° 42' 40.293 W
4,175.00	0.85	243.50	4,174.53	16.64	8.04	435,205.0421	692,452.4434	32° 11' 41.875 N	103° 42' 40.297 W
4,200.00	0.77	234.60	4,199.52	16.46	7.74	435,204.8620	692,452.1405	32° 11' 41.873 N	103° 42' 40.301 W
4,225.00	0.71	223.93	4,224.52	16.25	7.50	435,204.6532	692,451.8962	32° 11' 41.871 N	103° 42' 40.304 W
4,250.00	0.75	215.56	4,249.52	16.01	7.29	435,204.4085	692,451.6935	32° 11' 41.869 N	103° 42' 40.306 W
4,275.00	0.98	216.60	4,274.52	15.70	7.07	435,204.1038	692,451.4709	32° 11' 41.866 N	103° 42' 40.309 W
4,300.00	1.21	213.46	4,299.51	15.31	6.80	435,203.7119	692,451.1979	32° 11' 41.862 N	103° 42' 40.312 W
4,325.00	1.34	211.28	4,324.51	14.84	6.50	435,203.2419	692,450.9006	32° 11' 41.857 N	103° 42' 40.315 W
4,350.00	1.32	206.37	4,349.50	14.33	6.22	435,202.7341	692,450.6209	32° 11' 41.852 N	103° 42' 40.319 W
4,375.00	1.36	206.74	4,374.49	13.81	5.96	435,202.2111	692,450.3595	32° 11' 41.847 N	103° 42' 40.322 W
4,400.00	1.34	209.55	4,399.49	13.29	5.68	435,201.6919	692,450.0819	32° 11' 41.842 N	103° 42' 40.325 W
4,425.00	1.32	214.45	4,424.48	12.80	5.37	435,201.2001	692,449.7748	32° 11' 41.837 N	103° 42' 40.328 W
4,450.00	1.32	214.76	4,449.47	12.33	5.05	435,200.7261	692,449.4478	32° 11' 41.833 N	103° 42' 40.332 W

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,475.00	1.34	215.89	4,474.47	11.85	4.71	435,200.2527	692,449.1122	32° 11' 41.828 N	103° 42' 40.336 W
4,500.00	1.32	216.12	4,499.46	11.38	4.37	435,199.7833	692,448.7711	32° 11' 41.823 N	103° 42' 40.340 W
4,525.00	1.32	212.47	4,524.45	10.91	4.05	435,199.3078	692,448.4468	32° 11' 41.819 N	103° 42' 40.344 W
4,550.00	1.24	216.47	4,549.45	10.45	3.73	435,198.8473	692,448.1314	32° 11' 41.814 N	103° 42' 40.348 W
4,575.00	1.36	215.61	4,574.44	9.99	3.40	435,198.3886	692,447.7979	32° 11' 41.810 N	103° 42' 40.352 W
4,600.00	1.24	218.74	4,599.43	9.54	3.06	435,197.9364	692,447.4559	32° 11' 41.805 N	103° 42' 40.356 W
4,625.00	1.20	225.72	4,624.43	9.14	2.70	435,197.5426	692,447.0992	32° 11' 41.801 N	103° 42' 40.360 W
4,650.00	1.40	226.10	4,649.42	8.75	2.29	435,197.1481	692,446.6917	32° 11' 41.797 N	103° 42' 40.365 W
4,675.00	1.34	231.68	4,674.41	8.36	1.84	435,196.7551	692,446.2423	32° 11' 41.793 N	103° 42' 40.370 W
4,700.00	1.25	236.07	4,699.41	8.02	1.39	435,196.4216	692,445.7867	32° 11' 41.790 N	103° 42' 40.375 W
4,725.00	1.26	234.05	4,724.40	7.71	0.94	435,196.1080	692,445.3379	32° 11' 41.787 N	103° 42' 40.380 W
4,750.00	1.21	236.11	4,749.40	7.40	0.50	435,195.7995	692,444.8963	32° 11' 41.784 N	103° 42' 40.386 W
4,775.00	1.29	235.71	4,774.39	7.09	0.04	435,195.4937	692,444.4447	32° 11' 41.781 N	103° 42' 40.391 W
4,800.00	1.38	232.38	4,799.38	6.75	-0.43	435,195.1514	692,443.9737	32° 11' 41.778 N	103° 42' 40.396 W
4,825.00	1.49	229.62	4,824.38	6.36	-0.91	435,194.7571	692,443.4877	32° 11' 41.774 N	103° 42' 40.402 W
4,850.00	1.57	227.00	4,849.37	5.91	-1.41	435,194.3130	692,442.9896	32° 11' 41.769 N	103° 42' 40.408 W
4,875.00	1.64	228.50	4,874.36	5.44	-1.93	435,193.8424	692,442.4712	32° 11' 41.765 N	103° 42' 40.414 W
4,900.00	1.72	230.80	4,899.35	4.97	-2.49	435,193.3682	692,441.9125	32° 11' 41.760 N	103° 42' 40.420 W
4,925.00	1.81	227.91	4,924.33	4.47	-3.07	435,192.8664	692,441.3288	32° 11' 41.755 N	103° 42' 40.427 W
4,950.00	1.74	226.55	4,949.32	3.94	-3.64	435,192.3407	692,440.7603	32° 11' 41.750 N	103° 42' 40.434 W
4,975.00	1.78	228.98	4,974.31	3.42	-4.21	435,191.8249	692,440.1918	32° 11' 41.745 N	103° 42' 40.441 W
5,000.00	1.96	225.24	4,999.30	2.87	-4.80	435,191.2690	692,439.5953	32° 11' 41.740 N	103° 42' 40.448 W
5,025.00	1.67	231.37	5,024.29	2.34	-5.39	435,190.7406	692,439.0071	32° 11' 41.734 N	103° 42' 40.454 W
5,050.00	1.85	229.14	5,049.27	1.85	-5.98	435,190.2491	692,438.4173	32° 11' 41.730 N	103° 42' 40.461 W
5,075.00	1.97	225.70	5,074.26	1.29	-6.60	435,189.6850	692,437.8046	32° 11' 41.724 N	103° 42' 40.469 W
5,100.00	1.83	228.86	5,099.25	0.72	-7.20	435,189.1223	692,437.1965	32° 11' 41.718 N	103° 42' 40.476 W
5,125.00	1.50	236.01	5,124.24	0.28	-7.78	435,188.6768	692,436.6245	32° 11' 41.714 N	103° 42' 40.482 W
5,150.00	1.01	248.61	5,149.23	0.01	-8.25	435,188.4135	692,436.1481	32° 11' 41.712 N	103° 42' 40.488 W
5,175.00	0.64	276.76	5,174.23	-0.05	-8.60	435,188.3495	692,435.8042	32° 11' 41.711 N	103° 42' 40.492 W
5,200.00	0.65	310.37	5,199.22	0.06	-8.84	435,188.4578	692,435.5576	32° 11' 41.712 N	103° 42' 40.495 W
5,225.00	0.88	320.13	5,224.22	0.30	-9.07	435,188.6970	692,435.3264	32° 11' 41.714 N	103° 42' 40.497 W
5,250.00	0.95	331.77	5,249.22	0.63	-9.29	435,189.0270	692,435.1054	32° 11' 41.718 N	103° 42' 40.500 W
5,275.00	0.89	328.39	5,274.22	0.97	-9.49	435,189.3749	692,434.9056	32° 11' 41.721 N	103° 42' 40.502 W
5,300.00	0.86	322.40	5,299.21	1.29	-9.71	435,189.6889	692,434.6893	32° 11' 41.724 N	103° 42' 40.505 W
5,325.00	0.97	336.23	5,324.21	1.63	-9.91	435,190.0312	692,434.4895	32° 11' 41.728 N	103° 42' 40.507 W
5,350.00	0.91	332.35	5,349.21	2.00	-10.09	435,190.4007	692,434.3121	32° 11' 41.731 N	103° 42' 40.509 W
5,375.00	0.73	323.24	5,374.20	2.30	-10.28	435,190.7042	692,434.1247	32° 11' 41.734 N	103° 42' 40.511 W
5,400.00	0.81	329.24	5,399.20	2.58	-10.46	435,190.9836	692,433.9390	32° 11' 41.737 N	103° 42' 40.513 W
5,425.00	0.82	326.81	5,424.20	2.89	-10.65	435,191.2852	692,433.7507	32° 11' 41.740 N	103° 42' 40.516 W
5,450.00	0.84	317.89	5,449.20	3.17	-10.87	435,191.5708	692,433.5299	32° 11' 41.743 N	103° 42' 40.518 W
5,475.00	0.89	322.21	5,474.19	3.46	-11.11	435,191.8602	692,433.2880	32° 11' 41.746 N	103° 42' 40.521 W
5,500.00	0.93	313.31	5,499.19	3.75	-11.38	435,192.1528	692,433.0214	32° 11' 41.749 N	103° 42' 40.524 W
5,525.00	0.87	305.80	5,524.19	4.00	-11.68	435,192.4030	692,432.7199	32° 11' 41.751 N	103° 42' 40.528 W
5,550.00	0.87	307.72	5,549.19	4.23	-11.98	435,192.6301	692,432.4158	32° 11' 41.753 N	103° 42' 40.531 W
5,575.00	0.86	312.69	5,574.18	4.47	-12.27	435,192.8735	692,432.1278	32° 11' 41.756 N	103° 42' 40.534 W
5,600.00	0.83	308.12	5,599.18	4.71	-12.55	435,193.1124	692,431.8474	32° 11' 41.758 N	103° 42' 40.538 W
5,625.00	0.90	308.11	5,624.18	4.95	-12.85	435,193.3454	692,431.5505	32° 11' 41.761 N	103° 42' 40.541 W
5,650.00	0.88	312.88	5,649.17	5.20	-13.14	435,193.5972	692,431.2553	32° 11' 41.763 N	103° 42' 40.544 W
5,675.00	0.94	303.51	5,674.17	5.44	-13.46	435,193.8411	692,430.9436	32° 11' 41.766 N	103° 42' 40.548 W
5,700.00	0.95	307.03	5,699.17	5.68	-13.79	435,194.0791	692,430.6072	32° 11' 41.768 N	103° 42' 40.552 W
5,725.00	0.98	309.65	5,724.16	5.94	-14.12	435,194.3403	692,430.2771	32° 11' 41.770 N	103° 42' 40.556 W
5,750.00	0.98	304.06	5,749.16	6.20	-14.46	435,194.5965	692,429.9354	32° 11' 41.773 N	103° 42' 40.560 W
5,775.00	1.08	300.06	5,774.16	6.43	-14.85	435,194.8342	692,429.5544	32° 11' 41.775 N	103° 42' 40.564 W
5,800.00	1.15	305.50	5,799.15	6.70	-15.25	435,195.0979	692,429.1462	32° 11' 41.778 N	103° 42' 40.569 W
5,825.00	1.07	306.24	5,824.15	6.98	-15.65	435,195.3816	692,428.7537	32° 11' 41.781 N	103° 42' 40.573 W

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S., R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
5,850.00	1.16	306.46	5,849.14	7.27	-16.04	435,195.6700	692,428.3619	32° 11' 41.784 N	103° 42' 40.578 W
5,875.00	1.23	306.19	5,874.14	7.58	-16.46	435,195.9788	692,427.9419	32° 11' 41.787 N	103° 42' 40.583 W
5,900.00	1.19	302.44	5,899.13	7.88	-16.89	435,196.2765	692,427.5062	32° 11' 41.790 N	103° 42' 40.588 W
5,925.00	1.15	306.52	5,924.13	8.17	-17.31	435,196.5650	692,427.0855	32° 11' 41.793 N	103° 42' 40.593 W
5,950.00	1.27	309.48	5,949.12	8.49	-17.73	435,196.8905	692,426.6701	32° 11' 41.796 N	103° 42' 40.598 W
5,975.00	1.25	314.12	5,974.11	8.86	-18.14	435,197.2565	692,426.2605	32° 11' 41.800 N	103° 42' 40.602 W
6,000.00	1.25	311.46	5,999.11	9.23	-18.54	435,197.6268	692,425.8603	32° 11' 41.803 N	103° 42' 40.607 W
6,025.00	1.26	309.23	6,024.10	9.58	-18.96	435,197.9812	692,425.4431	32° 11' 41.807 N	103° 42' 40.612 W
6,050.00	1.13	316.42	6,049.10	9.93	-19.34	435,198.3336	692,425.0602	32° 11' 41.810 N	103° 42' 40.616 W
6,075.00	0.67	297.19	6,074.09	10.18	-19.64	435,198.5790	692,424.7603	32° 11' 41.813 N	103° 42' 40.620 W
6,100.00	0.40	251.20	6,099.09	10.22	-19.85	435,198.6177	692,424.5476	32° 11' 41.813 N	103° 42' 40.622 W
6,125.00	0.47	216.32	6,124.09	10.11	-20.00	435,198.5069	692,424.4043	32° 11' 41.812 N	103° 42' 40.624 W
6,150.00	0.48	209.31	6,149.09	9.93	-20.11	435,198.3330	692,424.2923	32° 11' 41.810 N	103° 42' 40.625 W
6,175.00	0.42	215.43	6,174.09	9.77	-20.21	435,198.1670	692,424.1879	32° 11' 41.809 N	103° 42' 40.626 W
6,200.00	0.44	215.10	6,199.09	9.61	-20.32	435,198.0138	692,424.0796	32° 11' 41.807 N	103° 42' 40.628 W
6,225.00	0.47	218.80	6,224.09	9.46	-20.44	435,197.8554	692,423.9602	32° 11' 41.806 N	103° 42' 40.629 W
6,250.00	0.44	224.80	6,249.09	9.31	-20.57	435,197.7074	692,423.8283	32° 11' 41.804 N	103° 42' 40.631 W
6,275.00	0.52	230.45	6,274.09	9.17	-20.73	435,197.5670	692,423.6732	32° 11' 41.803 N	103° 42' 40.632 W
6,300.00	0.56	224.80	6,299.09	9.01	-20.90	435,197.4081	692,423.4996	32° 11' 41.801 N	103° 42' 40.634 W
6,325.00	0.58	229.97	6,324.08	8.84	-21.08	435,197.2400	692,423.3166	32° 11' 41.800 N	103° 42' 40.637 W
6,350.00	0.61	230.02	6,349.08	8.67	-21.28	435,197.0731	692,423.1178	32° 11' 41.798 N	103° 42' 40.639 W
6,375.00	0.60	236.72	6,374.08	8.52	-21.49	435,196.9158	692,422.9064	32° 11' 41.796 N	103° 42' 40.641 W
6,400.00	0.79	243.09	6,399.08	8.37	-21.76	435,196.7660	692,422.6432	32° 11' 41.795 N	103° 42' 40.644 W
6,425.00	0.90	237.08	6,424.08	8.18	-22.08	435,196.5812	692,422.3247	32° 11' 41.793 N	103° 42' 40.648 W
6,450.00	0.76	239.31	6,449.07	7.99	-22.38	435,196.3899	692,422.0174	32° 11' 41.791 N	103° 42' 40.652 W
6,475.00	0.92	235.18	6,474.07	7.79	-22.69	435,196.1907	692,421.7100	32° 11' 41.789 N	103° 42' 40.655 W
6,500.00	0.84	241.18	6,499.07	7.59	-23.02	435,195.9877	692,421.3847	32° 11' 41.787 N	103° 42' 40.659 W
6,525.00	0.89	242.14	6,524.07	7.41	-23.35	435,195.8087	692,421.0525	32° 11' 41.786 N	103° 42' 40.663 W
6,550.00	0.89	238.83	6,549.06	7.22	-23.69	435,195.6175	692,420.7147	32° 11' 41.784 N	103° 42' 40.667 W
6,575.00	0.82	238.62	6,574.06	7.02	-24.00	435,195.4238	692,420.3958	32° 11' 41.782 N	103° 42' 40.671 W
6,600.00	0.89	239.76	6,599.06	6.83	-24.32	435,195.2329	692,420.0754	32° 11' 41.780 N	103° 42' 40.674 W
6,625.00	0.89	245.10	6,624.05	6.65	-24.67	435,195.0533	692,419.7315	32° 11' 41.778 N	103° 42' 40.678 W
6,650.00	0.90	243.63	6,649.05	6.48	-25.02	435,194.8844	692,419.3795	32° 11' 41.777 N	103° 42' 40.683 W
6,675.00	0.96	235.10	6,674.05	6.28	-25.37	435,194.6774	692,419.0318	32° 11' 41.774 N	103° 42' 40.687 W
6,700.00	0.97	236.07	6,699.04	6.04	-25.72	435,194.4394	692,418.6845	32° 11' 41.772 N	103° 42' 40.691 W
6,725.00	1.06	237.21	6,724.04	5.80	-26.09	435,194.1961	692,418.3145	32° 11' 41.770 N	103° 42' 40.695 W
6,750.00	0.97	234.88	6,749.04	5.55	-26.45	435,193.9491	692,417.9470	32° 11' 41.767 N	103° 42' 40.699 W
6,775.00	0.98	234.43	6,774.03	5.30	-26.80	435,193.7030	692,417.6000	32° 11' 41.765 N	103° 42' 40.703 W
6,800.00	0.98	235.37	6,799.03	5.06	-27.15	435,193.4571	692,417.2502	32° 11' 41.762 N	103° 42' 40.707 W
6,825.00	1.05	233.46	6,824.03	4.80	-27.51	435,193.1993	692,416.8903	32° 11' 41.760 N	103° 42' 40.712 W
6,850.00	1.06	236.29	6,849.02	4.53	-27.89	435,192.9346	692,416.5139	32° 11' 41.757 N	103° 42' 40.716 W
6,875.00	1.04	235.88	6,874.02	4.28	-28.27	435,192.6790	692,416.1337	32° 11' 41.755 N	103° 42' 40.721 W
6,900.00	0.86	241.21	6,899.01	4.06	-28.62	435,192.4613	692,415.7814	32° 11' 41.753 N	103° 42' 40.725 W
6,925.00	0.84	239.12	6,924.01	3.88	-28.94	435,192.2769	692,415.4597	32° 11' 41.751 N	103° 42' 40.728 W
6,950.00	0.90	246.40	6,949.01	3.70	-29.28	435,192.1043	692,415.1225	32° 11' 41.749 N	103° 42' 40.732 W
6,975.00	0.83	250.97	6,974.01	3.57	-29.63	435,191.9666	692,414.7714	32° 11' 41.748 N	103° 42' 40.736 W
7,000.00	0.90	247.02	6,999.00	3.43	-29.98	435,191.8309	692,414.4195	32° 11' 41.747 N	103° 42' 40.741 W
7,025.00	0.95	247.23	7,024.00	3.27	-30.35	435,191.6741	692,414.0477	32° 11' 41.745 N	103° 42' 40.745 W
7,050.00	0.88	251.64	7,049.00	3.13	-30.73	435,191.5334	692,413.6744	32° 11' 41.744 N	103° 42' 40.749 W
7,075.00	1.04	248.97	7,073.99	2.99	-31.12	435,191.3915	692,413.2804	32° 11' 41.742 N	103° 42' 40.754 W
7,100.00	1.03	250.87	7,098.99	2.84	-31.54	435,191.2364	692,412.8563	32° 11' 41.741 N	103° 42' 40.759 W
7,125.00	1.08	252.71	7,123.98	2.69	-31.98	435,191.0928	692,412.4191	32° 11' 41.739 N	103° 42' 40.764 W
7,150.00	1.12	250.85	7,148.98	2.54	-32.44	435,190.9426	692,411.9633	32° 11' 41.738 N	103° 42' 40.769 W
7,175.00	1.15	252.70	7,173.97	2.39	-32.91	435,190.7878	692,411.4930	32° 11' 41.736 N	103° 42' 40.775 W
7,200.00	1.02	243.43	7,198.97	2.21	-33.35	435,190.6137	692,411.0544	32° 11' 41.735 N	103° 42' 40.780 W



Integrity Directional Services, LLC
Survey Report - Geographic



Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
7,225.00	0.79	225.40	7,223.97	1.99	-33.67	435,190.3932	692,410.7327	32° 11' 41.733 N	103° 42' 40.784 W
7,250.00	0.64	197.80	7,248.97	1.74	-33.83	435,190.1392	692,410.5673	32° 11' 41.730 N	103° 42' 40.785 W
7,275.00	0.71	186.70	7,273.96	1.45	-33.89	435,189.8524	692,410.5065	32° 11' 41.727 N	103° 42' 40.786 W
7,300.00	0.75	181.75	7,298.96	1.14	-33.92	435,189.5351	692,410.4835	32° 11' 41.724 N	103° 42' 40.786 W
7,325.00	0.79	175.02	7,323.96	0.80	-33.91	435,189.1998	692,410.4934	32° 11' 41.721 N	103° 42' 40.786 W
7,350.00	0.72	177.38	7,348.96	0.47	-33.88	435,188.8712	692,410.5156	32° 11' 41.718 N	103° 42' 40.786 W
7,375.00	0.76	176.08	7,373.95	0.15	-33.87	435,188.5489	692,410.5341	32° 11' 41.714 N	103° 42' 40.786 W
7,400.00	0.78	178.18	7,398.95	-0.19	-33.85	435,188.2134	692,410.5508	32° 11' 41.711 N	103° 42' 40.786 W
7,425.00	0.80	176.51	7,423.95	-0.53	-33.83	435,187.8691	692,410.5669	32° 11' 41.708 N	103° 42' 40.786 W
7,450.00	0.76	178.63	7,448.95	-0.87	-33.82	435,187.5292	692,410.5815	32° 11' 41.704 N	103° 42' 40.785 W
7,475.00	0.79	177.88	7,473.95	-1.21	-33.81	435,187.1912	692,410.5918	32° 11' 41.701 N	103° 42' 40.785 W
7,500.00	0.88	178.36	7,498.94	-1.57	-33.80	435,186.8271	692,410.6037	32° 11' 41.697 N	103° 42' 40.785 W
7,525.00	0.85	173.09	7,523.94	-1.95	-33.77	435,186.4511	692,410.6315	32° 11' 41.694 N	103° 42' 40.785 W
7,550.00	0.78	175.47	7,548.94	-2.30	-33.73	435,186.0973	692,410.6672	32° 11' 41.690 N	103° 42' 40.785 W
7,575.00	0.86	173.00	7,573.94	-2.66	-33.70	435,185.7415	692,410.7035	32° 11' 41.687 N	103° 42' 40.784 W
7,600.00	0.87	169.18	7,598.93	-3.03	-33.64	435,185.3689	692,410.7620	32° 11' 41.683 N	103° 42' 40.784 W
7,625.00	0.83	168.04	7,623.93	-3.39	-33.56	435,185.0053	692,410.8352	32° 11' 41.679 N	103° 42' 40.783 W
7,650.00	0.85	163.15	7,648.93	-3.75	-33.47	435,184.6507	692,410.9264	32° 11' 41.676 N	103° 42' 40.782 W
7,675.00	0.81	158.10	7,673.92	-4.09	-33.35	435,184.3093	692,411.0461	32° 11' 41.672 N	103° 42' 40.780 W
7,700.00	0.89	162.78	7,698.92	-4.44	-33.23	435,183.9598	692,411.1695	32° 11' 41.669 N	103° 42' 40.779 W
7,725.00	0.94	161.83	7,723.92	-4.82	-33.11	435,183.5795	692,411.2909	32° 11' 41.665 N	103° 42' 40.777 W
7,750.00	0.81	155.24	7,748.92	-5.18	-32.97	435,183.2242	692,411.4289	32° 11' 41.662 N	103° 42' 40.776 W
7,775.00	0.87	158.18	7,773.91	-5.51	-32.83	435,182.8876	692,411.5734	32° 11' 41.658 N	103° 42' 40.774 W
7,800.00	0.95	160.66	7,798.91	-5.88	-32.69	435,182.5158	692,411.7126	32° 11' 41.655 N	103° 42' 40.773 W
7,825.00	0.91	159.40	7,823.91	-6.27	-32.55	435,182.1344	692,411.8511	32° 11' 41.651 N	103° 42' 40.771 W
7,850.00	0.97	159.73	7,848.90	-6.65	-32.41	435,181.7501	692,411.9943	32° 11' 41.647 N	103° 42' 40.769 W
7,875.00	1.04	153.36	7,873.90	-7.05	-32.23	435,181.3488	692,412.1693	32° 11' 41.643 N	103° 42' 40.767 W
7,900.00	1.03	157.67	7,898.89	-7.46	-32.04	435,180.9382	692,412.3564	32° 11' 41.639 N	103° 42' 40.765 W
7,925.00	1.13	156.30	7,923.89	-7.90	-31.86	435,180.5046	692,412.5409	32° 11' 41.635 N	103° 42' 40.763 W
7,950.00	1.03	152.01	7,948.89	-8.32	-31.65	435,180.0805	692,412.7454	32° 11' 41.630 N	103° 42' 40.761 W
7,975.00	1.16	154.95	7,973.88	-8.75	-31.44	435,179.6528	692,412.9580	32° 11' 41.626 N	103° 42' 40.758 W
8,000.00	1.21	150.34	7,998.88	-9.21	-31.20	435,179.1942	692,413.1958	32° 11' 41.622 N	103° 42' 40.756 W
8,025.00	1.20	156.50	8,023.87	-9.68	-30.97	435,178.7247	692,413.4308	32° 11' 41.617 N	103° 42' 40.753 W
8,050.00	1.26	151.85	8,048.86	-10.16	-30.74	435,178.2423	692,413.6648	32° 11' 41.612 N	103° 42' 40.750 W
8,075.00	1.26	155.10	8,073.86	-10.65	-30.49	435,177.7506	692,413.9102	32° 11' 41.607 N	103° 42' 40.747 W
8,100.00	1.36	152.03	8,098.85	-11.16	-30.23	435,177.2393	692,414.1651	32° 11' 41.602 N	103° 42' 40.744 W
8,125.00	1.29	153.84	8,123.85	-11.68	-29.97	435,176.7247	692,414.4283	32° 11' 41.597 N	103° 42' 40.741 W
8,150.00	1.38	153.96	8,148.84	-12.20	-29.72	435,176.2016	692,414.6845	32° 11' 41.592 N	103° 42' 40.738 W
8,175.00	1.35	151.97	8,173.83	-12.73	-29.44	435,175.6712	692,414.9551	32° 11' 41.587 N	103° 42' 40.735 W
8,200.00	1.29	155.59	8,198.83	-13.25	-29.19	435,175.1550	692,415.2098	32° 11' 41.582 N	103° 42' 40.732 W
8,225.00	1.35	153.27	8,223.82	-13.76	-28.94	435,174.6357	692,415.4585	32° 11' 41.576 N	103° 42' 40.730 W
8,250.00	1.40	155.82	8,248.81	-14.31	-28.68	435,174.0941	692,415.7161	32° 11' 41.571 N	103° 42' 40.727 W
8,275.00	1.44	155.47	8,273.80	-14.87	-28.43	435,173.5297	692,415.9716	32° 11' 41.565 N	103° 42' 40.724 W
8,300.00	1.41	157.13	8,298.80	-15.44	-28.18	435,172.9605	692,416.2216	32° 11' 41.560 N	103° 42' 40.721 W
8,325.00	1.47	156.12	8,323.79	-16.02	-27.93	435,172.3839	692,416.4709	32° 11' 41.554 N	103° 42' 40.718 W
8,350.00	1.42	155.35	8,348.78	-16.59	-27.67	435,171.8091	692,416.7299	32° 11' 41.548 N	103° 42' 40.715 W
8,375.00	1.50	158.45	8,373.77	-17.18	-27.42	435,171.2233	692,416.9793	32° 11' 41.542 N	103° 42' 40.712 W
8,400.00	1.50	153.72	8,398.76	-17.77	-27.16	435,170.6255	692,417.2444	32° 11' 41.537 N	103° 42' 40.709 W
8,425.00	1.42	150.07	8,423.76	-18.34	-26.86	435,170.0637	692,417.5438	32° 11' 41.531 N	103° 42' 40.706 W
8,450.00	1.49	153.14	8,448.75	-18.89	-26.55	435,169.5053	692,417.8452	32° 11' 41.525 N	103° 42' 40.702 W
8,475.00	1.40	147.96	8,473.74	-19.44	-26.25	435,168.9564	692,418.1541	32° 11' 41.520 N	103° 42' 40.699 W
8,500.00	1.37	142.75	8,498.73	-19.94	-25.90	435,168.4596	692,418.4970	32° 11' 41.515 N	103° 42' 40.695 W
8,525.00	1.52	147.40	8,523.72	-20.46	-25.54	435,167.9424	692,418.8565	32° 11' 41.510 N	103° 42' 40.691 W
8,586.00	1.33	141.28	8,584.71	-21.69	-24.66	435,166.7085	692,419.7352	32° 11' 41.498 N	103° 42' 40.680 W

First IDS MWD Survey

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S., R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,691.00	9.27	195.76	8,689.20	-30.80	-26.20	435,157.6017	692,418.1976	32° 11' 41.408 N	103° 42' 40.699 W
8,722.00	14.00	202.79	8,719.56	-36.66	-28.33	435,151.7380	692,416.0656	32° 11' 41.350 N	103° 42' 40.724 W
8,754.00	17.52	205.79	8,750.35	-44.57	-31.93	435,143.8300	692,412.4695	32° 11' 41.272 N	103° 42' 40.766 W
8,784.00	20.14	208.00	8,778.74	-53.20	-36.32	435,135.2024	692,408.0794	32° 11' 41.187 N	103° 42' 40.818 W
8,817.00	24.20	209.43	8,809.30	-64.11	-42.31	435,124.2907	692,402.0863	32° 11' 41.079 N	103° 42' 40.889 W
8,846.00	27.33	211.92	8,835.41	-74.94	-48.76	435,113.4603	692,395.6440	32° 11' 40.972 N	103° 42' 40.964 W
8,878.00	29.24	209.61	8,863.59	-87.97	-56.50	435,100.4288	692,387.8975	32° 11' 40.844 N	103° 42' 41.055 W
8,909.00	31.92	210.33	8,890.27	-101.63	-64.38	435,086.7701	692,380.0166	32° 11' 40.709 N	103° 42' 41.148 W
8,942.00	35.06	211.00	8,917.79	-117.29	-73.67	435,071.1117	692,370.7272	32° 11' 40.554 N	103° 42' 41.257 W
8,973.00	38.07	209.83	8,942.69	-133.22	-83.02	435,055.1846	692,361.3849	32° 11' 40.397 N	103° 42' 41.367 W
9,006.00	41.72	208.55	8,968.00	-151.69	-93.33	435,036.7064	692,351.0724	32° 11' 40.215 N	103° 42' 41.488 W
9,037.00	45.32	207.91	8,990.48	-170.50	-103.42	435,017.9001	692,340.9803	32° 11' 40.030 N	103° 42' 41.607 W
9,067.00	49.04	207.11	9,010.87	-190.02	-113.58	434,998.3851	692,330.8223	32° 11' 39.837 N	103° 42' 41.726 W
9,114.00	53.77	206.68	9,040.18	-222.77	-130.19	434,965.6317	692,314.2143	32° 11' 39.514 N	103° 42' 41.922 W
9,162.00	57.30	206.99	9,067.34	-258.07	-148.05	434,930.3256	692,296.3503	32° 11' 39.166 N	103° 42' 42.132 W
9,209.00	62.24	206.10	9,090.99	-294.39	-166.19	434,894.0062	692,278.2153	32° 11' 38.807 N	103° 42' 42.346 W
9,256.00	65.90	204.59	9,111.54	-332.59	-184.27	434,855.8106	692,260.1332	32° 11' 38.430 N	103° 42' 42.559 W
9,303.00	69.98	203.01	9,129.19	-372.44	-201.83	434,815.9624	692,242.5675	32° 11' 38.037 N	103° 42' 42.766 W
9,351.00	70.73	200.35	9,145.33	-414.44	-218.53	434,773.9582	692,225.8716	32° 11' 37.622 N	103° 42' 42.963 W
9,398.00	75.49	199.54	9,158.98	-456.71	-233.86	434,731.6943	692,210.5390	32° 11' 37.205 N	103° 42' 43.144 W
9,445.00	80.55	199.73	9,168.73	-500.00	-249.31	434,688.4058	692,195.0941	32° 11' 36.777 N	103° 42' 43.327 W
9,473.00	82.44	198.97	9,172.88	-526.12	-258.48	434,662.2792	692,185.9196	32° 11' 36.519 N	103° 42' 43.435 W
9,504.00	83.37	198.30	9,176.70	-555.27	-268.31	434,633.1299	692,176.0901	32° 11' 36.231 N	103° 42' 43.552 W
9,536.00	85.67	197.06	9,179.76	-585.62	-277.98	434,602.7832	692,166.4176	32° 11' 35.932 N	103° 42' 43.666 W
9,566.00	87.35	196.13	9,181.59	-614.31	-286.53	434,574.0874	692,157.8660	32° 11' 35.648 N	103° 42' 43.768 W
9,599.00	88.29	195.98	9,182.84	-646.00	-295.65	434,542.3979	692,148.7462	32° 11' 35.335 N	103° 42' 43.876 W
9,630.00	89.72	194.21	9,183.38	-675.93	-303.73	434,512.4740	692,140.6751	32° 11' 35.039 N	103° 42' 43.972 W
9,661.00	90.99	193.34	9,183.19	-706.03	-311.11	434,482.3672	692,133.2940	32° 11' 34.742 N	103° 42' 44.060 W
9,756.00	91.38	191.45	9,181.22	-798.80	-331.49	434,389.6060	692,112.9075	32° 11' 33.825 N	103° 42' 44.303 W
9,851.00	91.78	189.89	9,178.60	-892.11	-349.08	434,296.2873	692,095.3253	32° 11' 32.903 N	103° 42' 44.514 W
9,945.00	91.84	187.21	9,175.63	-985.01	-363.04	434,203.3871	692,081.3583	32° 11' 31.984 N	103° 42' 44.683 W
10,039.00	92.28	187.47	9,172.26	-1,078.18	-375.04	434,110.2181	692,069.3570	32° 11' 31.063 N	103° 42' 44.829 W
10,133.00	91.47	185.85	9,169.18	-1,171.50	-385.94	434,016.9064	692,058.4617	32° 11' 30.140 N	103° 42' 44.962 W
10,228.00	91.63	183.23	9,166.61	-1,266.15	-393.46	433,922.2476	692,050.9454	32° 11' 29.204 N	103° 42' 45.056 W
10,322.00	91.10	180.63	9,164.37	-1,360.07	-396.62	433,828.3362	692,047.7810	32° 11' 28.275 N	103° 42' 45.099 W
10,416.00	91.88	180.44	9,161.93	-1,454.03	-397.50	433,734.3730	692,046.9036	32° 11' 27.345 N	103° 42' 45.115 W
10,511.00	92.18	179.97	9,158.56	-1,548.97	-397.84	433,639.4338	692,046.5638	32° 11' 26.405 N	103° 42' 45.126 W
10,605.00	92.91	180.28	9,154.39	-1,642.88	-398.04	433,545.5277	692,046.3590	32° 11' 25.476 N	103° 42' 45.134 W
10,699.00	91.16	179.76	9,151.05	-1,736.81	-398.07	433,451.5913	692,046.3265	32° 11' 24.546 N	103° 42' 45.141 W
10,786.00	90.98	179.91	9,149.42	-1,823.80	-397.82	433,364.6070	692,046.5770	32° 11' 23.686 N	103° 42' 45.144 W
10,881.00	90.62	179.53	9,148.10	-1,918.79	-397.36	433,269.6179	692,047.0412	32° 11' 22.746 N	103° 42' 45.145 W
10,975.00	90.38	180.56	9,147.28	-2,012.78	-397.43	433,175.6231	692,046.9674	32° 11' 21.815 N	103° 42' 45.152 W
11,069.00	89.66	180.48	9,147.24	-2,106.78	-398.29	433,081.6278	692,046.1143	32° 11' 20.885 N	103° 42' 45.168 W
11,164.00	90.26	179.25	9,147.31	-2,201.77	-398.06	432,986.6305	692,046.3381	32° 11' 19.945 N	103° 42' 45.172 W
11,258.00	92.42	178.94	9,145.11	-2,295.73	-396.58	432,892.6738	692,047.8222	32° 11' 19.015 N	103° 42' 45.161 W
11,352.00	93.11	178.30	9,140.58	-2,389.59	-394.32	432,798.8117	692,050.0832	32° 11' 18.086 N	103° 42' 45.141 W
11,447.00	91.18	179.67	9,137.02	-2,484.50	-392.64	432,703.9001	692,051.7640	32° 11' 17.147 N	103° 42' 45.128 W
11,541.00	90.76	180.26	9,135.43	-2,578.49	-392.58	432,609.9144	692,051.8214	32° 11' 16.217 N	103° 42' 45.134 W
11,636.00	92.05	180.24	9,133.10	-2,673.46	-392.99	432,514.9460	692,051.4070	32° 11' 15.277 N	103° 42' 45.145 W
11,730.00	89.17	180.12	9,132.10	-2,767.44	-393.29	432,420.9619	692,051.1118	32° 11' 14.347 N	103° 42' 45.155 W
11,824.00	88.38	178.81	9,134.11	-2,861.42	-392.41	432,326.9905	692,051.9891	32° 11' 13.417 N	103° 42' 45.151 W
11,919.00	90.48	178.17	9,135.06	-2,956.37	-389.91	432,232.0342	692,054.4923	32° 11' 12.477 N	103° 42' 45.128 W
12,013.00	90.61	178.22	9,134.16	-3,050.32	-386.95	432,138.0853	692,057.4530	32° 11' 11.548 N	103° 42' 45.100 W
12,107.00	90.77	178.07	9,133.03	-3,144.26	-383.91	432,044.1416	692,060.4955	32° 11' 10.618 N	103° 42' 45.071 W
12,202.00	91.97	180.34	9,130.76	-3,239.22	-382.59	431,949.1860	692,061.8136	32° 11' 9.678 N	103° 42' 45.062 W

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S., R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
12,296.00	88.84	180.95	9,130.09	-3,333.20	-383.65	431,855.2067	692,060.7555	32° 11' 8.748 N	103° 42' 45.080 W
12,390.00	88.48	181.05	9,132.29	-3,427.16	-385.29	431,761.2470	692,059.1155	32° 11' 7.818 N	103° 42' 45.106 W
12,485.00	87.05	181.08	9,136.00	-3,522.07	-387.05	431,666.3383	692,057.3511	32° 11' 6.879 N	103° 42' 45.133 W
12,579.00	88.42	180.22	9,139.71	-3,615.99	-388.11	431,572.4211	692,056.2860	32° 11' 5.950 N	103° 42' 45.151 W
12,674.00	90.69	178.76	9,140.45	-3,710.97	-387.27	431,477.4367	692,057.1317	32° 11' 5.010 N	103° 42' 45.148 W
12,768.00	91.25	177.98	9,138.86	-3,804.92	-384.60	431,383.4895	692,059.8050	32° 11' 4.080 N	103° 42' 45.123 W
12,862.00	91.38	177.20	9,136.70	-3,898.81	-380.64	431,289.5983	692,063.7566	32° 11' 3.151 N	103° 42' 45.083 W
12,957.00	91.34	178.40	9,134.45	-3,993.71	-377.00	431,194.6970	692,067.4024	32° 11' 2.211 N	103° 42' 45.047 W
13,051.00	89.17	180.00	9,134.03	-4,087.69	-375.69	431,100.7160	692,068.7146	32° 11' 1.281 N	103° 42' 45.038 W
13,146.00	90.57	178.48	9,134.24	-4,182.68	-374.43	431,005.7299	692,069.9746	32° 11' 0.341 N	103° 42' 45.030 W
13,241.00	90.10	178.00	9,133.69	-4,277.63	-371.51	430,910.7771	692,072.8923	32° 10' 59.401 N	103° 42' 45.002 W
13,335.00	90.18	179.26	9,133.46	-4,371.60	-369.26	430,816.8063	692,075.1396	32° 10' 58.471 N	103° 42' 44.983 W
13,430.00	91.47	180.04	9,132.09	-4,466.59	-368.68	430,721.8209	692,075.7200	32° 10' 57.531 N	103° 42' 44.982 W
13,525.00	91.64	180.01	9,129.51	-4,561.55	-368.72	430,626.8561	692,075.6785	32° 10' 56.592 N	103° 42' 44.989 W
13,620.00	91.30	181.29	9,127.08	-4,656.51	-369.80	430,531.8958	692,074.6011	32° 10' 55.652 N	103° 42' 45.008 W
13,715.00	91.02	181.06	9,125.15	-4,751.47	-371.75	430,436.9355	692,072.6535	32° 10' 54.712 N	103° 42' 45.037 W
13,810.00	91.05	181.03	9,123.44	-4,846.44	-373.48	430,341.9670	692,070.9212	32° 10' 53.773 N	103° 42' 45.064 W
13,904.00	91.41	181.60	9,121.42	-4,940.40	-375.64	430,248.0142	692,068.7645	32° 10' 52.843 N	103° 42' 45.095 W
13,999.00	88.84	179.77	9,121.21	-5,035.38	-376.77	430,153.0334	692,067.6290	32° 10' 51.903 N	103° 42' 45.115 W
14,093.00	89.43	181.10	9,122.63	-5,129.36	-377.49	430,059.0495	692,066.9153	32° 10' 50.973 N	103° 42' 45.129 W
14,189.00	89.65	182.08	9,123.40	-5,225.32	-380.15	429,963.0910	692,064.2517	32° 10' 50.024 N	103° 42' 45.167 W
14,283.00	89.43	182.07	9,124.16	-5,319.25	-383.55	429,869.1559	692,060.8483	32° 10' 49.094 N	103° 42' 45.213 W
14,378.00	89.73	182.36	9,124.85	-5,414.18	-387.22	429,774.2298	692,057.1767	32° 10' 48.155 N	103° 42' 45.262 W
14,472.00	89.54	181.15	9,125.45	-5,508.13	-390.10	429,680.2778	692,054.2980	32° 10' 47.226 N	103° 42' 45.301 W
14,566.00	90.74	179.17	9,125.22	-5,602.13	-390.37	429,586.2850	692,054.0355	32° 10' 46.295 N	103° 42' 45.311 W
14,660.00	91.86	179.45	9,123.09	-5,696.09	-389.23	429,492.3179	692,055.1672	32° 10' 45.366 N	103° 42' 45.304 W
14,754.00	89.51	178.98	9,121.96	-5,790.07	-387.95	429,398.3405	692,056.4550	32° 10' 44.435 N	103° 42' 45.295 W
14,849.00	90.55	178.45	9,121.92	-5,885.05	-385.82	429,303.3662	692,058.5854	32° 10' 43.495 N	103° 42' 45.277 W
14,943.00	91.53	177.83	9,120.21	-5,978.98	-382.77	429,209.4330	692,061.6357	32° 10' 42.566 N	103° 42' 45.248 W
15,038.00	88.73	178.55	9,119.99	-6,073.92	-379.76	429,114.4909	692,064.6360	32° 10' 41.626 N	103° 42' 45.219 W
15,132.00	89.73	178.63	9,121.26	-6,167.88	-377.45	429,020.5292	692,066.9487	32° 10' 40.696 N	103° 42' 45.199 W
15,227.00	90.57	178.89	9,121.01	-6,262.86	-375.40	428,925.5529	692,069.0045	32° 10' 39.756 N	103° 42' 45.181 W
15,321.00	91.41	179.35	9,119.38	-6,356.83	-373.95	428,831.5793	692,070.4480	32° 10' 38.826 N	103° 42' 45.171 W
15,416.00	89.29	179.93	9,118.80	-6,451.82	-373.36	428,736.5890	692,071.0448	32° 10' 37.886 N	103° 42' 45.170 W
15,510.00	88.53	179.83	9,120.59	-6,545.81	-373.16	428,642.6071	692,071.2416	32° 10' 36.956 N	103° 42' 45.174 W
15,604.00	88.53	180.35	9,123.00	-6,639.77	-373.31	428,548.6387	692,071.0940	32° 10' 36.026 N	103° 42' 45.182 W
15,699.00	88.50	178.96	9,125.47	-6,734.74	-372.73	428,453.6748	692,071.6659	32° 10' 35.086 N	103° 42' 45.182 W
15,794.00	89.87	178.28	9,126.82	-6,829.70	-370.45	428,358.7150	692,073.9536	32° 10' 34.146 N	103° 42' 45.162 W
15,888.00	89.76	178.94	9,127.12	-6,923.67	-368.17	428,264.7438	692,076.2338	32° 10' 33.216 N	103° 42' 45.141 W
15,982.00	90.69	178.95	9,126.75	-7,017.65	-366.44	428,170.7617	692,077.9645	32° 10' 32.286 N	103° 42' 45.127 W
16,077.00	89.37	178.66	9,126.70	-7,112.63	-364.46	428,075.7848	692,079.9457	32° 10' 31.346 N	103° 42' 45.111 W
16,172.00	89.71	178.63	9,127.46	-7,207.60	-362.21	427,980.8147	692,082.1920	32° 10' 30.406 N	103° 42' 45.091 W
16,266.00	89.34	178.96	9,128.24	-7,301.58	-360.23	427,886.8392	692,084.1688	32° 10' 29.476 N	103° 42' 45.074 W
16,360.00	89.73	178.88	9,129.01	-7,395.56	-358.46	427,792.8594	692,085.9404	32° 10' 28.546 N	103° 42' 45.060 W
16,456.00	89.59	179.02	9,129.58	-7,491.54	-356.70	427,696.8775	692,087.6996	32° 10' 27.596 N	103° 42' 45.046 W
16,550.00	88.95	179.87	9,130.77	-7,585.52	-355.79	427,602.8910	692,088.6101	32° 10' 26.666 N	103° 42' 45.042 W
16,645.00	87.97	180.09	9,133.33	-7,680.49	-355.76	427,507.9268	692,088.6433	32° 10' 25.726 N	103° 42' 45.048 W
16,739.00	88.78	179.27	9,135.99	-7,774.45	-355.23	427,413.9678	692,089.1682	32° 10' 24.797 N	103° 42' 45.048 W
16,833.00	90.35	180.39	9,136.71	-7,868.44	-354.95	427,319.9755	692,089.4470	32° 10' 23.866 N	103° 42' 45.051 W
16,928.00	90.94	180.53	9,135.64	-7,963.43	-355.72	427,224.9853	692,088.6843	32° 10' 22.926 N	103° 42' 45.066 W
17,023.00	91.84	180.67	9,133.33	-8,058.40	-356.71	427,130.0196	692,087.6898	32° 10' 21.987 N	103° 42' 45.084 W
17,119.00	90.88	179.42	9,131.05	-8,154.37	-356.79	427,034.0499	692,087.6147	32° 10' 21.037 N	103° 42' 45.091 W
17,214.00	89.12	178.81	9,131.05	-8,249.35	-355.32	426,939.0656	692,089.0819	32° 10' 20.097 N	103° 42' 45.081 W
17,309.00	88.02	179.57	9,133.42	-8,344.31	-353.98	426,844.1070	692,090.4246	32° 10' 19.157 N	103° 42' 45.072 W
17,404.00	88.14	180.12	9,136.61	-8,439.26	-353.72	426,749.1613	692,090.6815	32° 10' 18.218 N	103° 42' 45.075 W

Company:	COG Operating L L C	Local Co-ordinate Reference:	Well Windward Federal #9H
Project:	Lea County, NM (NAD27 NME)	TVD Reference:	KB=26' @ 3577.00ft (McVay 8)
Site:	Sec. 30, T 24 S. , R 32 E	MD Reference:	KB=26' @ 3577.00ft (McVay 8)
Well:	Windward Federal #9H	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)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
17,498.00	88.50	179.97	9,139.36	-8,533.22	-353.79	426,655.2021	692,090.6077	32° 10' 17.288 N	103° 42' 45.082 W
17,593.00	87.88	179.85	9,142.36	-8,628.17	-353.64	426,560.2503	692,090.7568	32° 10' 16.348 N	103° 42' 45.087 W
17,687.00	87.52	180.72	9,146.14	-8,722.09	-354.11	426,466.3284	692,090.2897	32° 10' 15.419 N	103° 42' 45.098 W
17,782.00	87.38	179.69	9,150.36	-8,816.99	-354.45	426,371.4246	692,089.9501	32° 10' 14.480 N	103° 42' 45.109 W
17,877.00	90.04	178.66	9,152.50	-8,911.95	-353.08	426,276.4685	692,091.3179	32° 10' 13.540 N	103° 42' 45.099 W
17,972.00	92.12	178.38	9,150.71	-9,006.90	-350.63	426,181.5225	692,093.7709	32° 10' 12.600 N	103° 42' 45.077 W
18,066.00	92.48	178.60	9,146.94	-9,100.79	-348.15	426,087.6313	692,096.2460	32° 10' 11.671 N	103° 42' 45.055 W
18,161.00	90.66	178.96	9,144.34	-9,195.73	-346.13	425,992.6928	692,098.2677	32° 10' 10.731 N	103° 42' 45.037 W
18,255.00	92.14	178.64	9,142.04	-9,289.67	-344.17	425,898.7444	692,100.2355	32° 10' 9.801 N	103° 42' 45.021 W
18,350.00	90.77	179.03	9,139.63	-9,384.62	-342.23	425,803.7973	692,102.1663	32° 10' 8.862 N	103° 42' 45.005 W
18,445.00	90.29	179.52	9,138.75	-9,479.61	-341.03	425,708.8097	692,103.3682	32° 10' 7.922 N	103° 42' 44.997 W
18,541.00	91.02	178.96	9,137.65	-9,575.59	-339.76	425,612.8256	692,104.6415	32° 10' 6.972 N	103° 42' 44.989 W
18,636.00	91.16	178.39	9,135.84	-9,670.55	-337.56	425,517.8689	692,106.8378	32° 10' 6.032 N	103° 42' 44.970 W
18,731.00	92.34	177.63	9,132.94	-9,765.45	-334.27	425,422.9731	692,110.1348	32° 10' 5.093 N	103° 42' 44.938 W
18,893.00	91.50	177.74	9,127.51	-9,927.22	-327.73	425,261.1980	692,116.6748	32° 10' 3.491 N	103° 42' 44.872 W
19,034.00	94.61	178.38	9,120.00	-10,067.92	-322.96	425,120.4974	692,121.4418	32° 10' 2.099 N	103° 42' 44.826 W
Final IDS MWD Survey									
19,086.00	94.61	178.38	9,115.82	-10,119.73	-321.49	425,068.6864	692,122.9071	32° 10' 1.586 N	103° 42' 44.813 W
Projection to TD									

Design Annotations				
Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
8,586.00	8,584.71	-21.69	-24.66	First IDS MWD Survey
19,034.00	9,120.00	-10,067.92	-322.96	Final IDS MWD Survey
19,086.00	9,115.82	-10,119.73	-321.49	Projection to TD

Checked By: _____	Approved By: _____	Date: _____
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WINDWARD FEDERAL #9H

<u>Perfs</u>	<u>7 1/2% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>
1	1512	300933	339612
2	3024	300037	365904
3	3024	301116	359436
4	3066	276340	344610
5	3024	300782	361032
6	3276	243327	381066
7	3024	254718	336798
8	3024	298549	391188
9	3024	295651	368172
10	3108	297636	352548
11	3024	301536	352338
12	3024	299931	360486
13	3024	301724	356874
14	3066	302792	358428
15	3024	302768	355572
16	3024	300533	355446
17	3024	302019	355950
18	3024	301593	346626
19	3024	299644	349734
20	3024	300813	345870
21	3024	300004	347298
22	3024	300943	349566
23	3024	301090	352548
24	1512	302766	345996
25	1512	302760	349398
26	3024	301384	350784
27	3024	300994	345408
28	3024	303472	347760
29	3024	300905	345996
30	3024	300683	371490
31	3024	299756	354186
32	3024	300395	348684
33	3024	302916	344400
34	3024	300050	402738
35	3024	300599	372372
36	3024	301456	348642
37	2982	300750	346332
38	2982	300239	342006
39	3024	298473	355278
40	2940	301868	360108
41	3024	299905	343686
42	2940	301151	341838
43	3024	299612	340788
44	3318	301243	344232
45	2940	299012	347718
46	3276	299967	343896
47	3024	301048	343056
48	3024	299436	343182
49	3024	299576	343602
50	3024	300767	373716
51	3024	304062	347298
52	3024	298479	341628
53	4536	301832	355278
54	3024	301363	339654
55	3024	301447	341754
56	2982	299143	341796
57	3024	301989	338184
58	3024	299800	338730
59	3024	300369	341391
60	2982	301494	340914
61	3024	300161	340746
62	3024	301063	309078
63	3024	301253	336672
64	3024	291144	348348
Totals	191,058	19,109,261	22,445,865

From Bottom to Top	Stage 1	Distance Between Perfs	Shots	Stage 2	Distance Between Perfs	Shots	Stage 3	Distance Between Perfs	Shots	Stage 4	Distance Between Perfs	Shots	Stage 5	Distance Between Perfs	Shots
	18,900	19	6	18,807	50	8	18,685	23	6	18,536	24	6	18,388	20	8
	18,971	19	6	18,795	15	8	18,671	19	6	18,521	19	6	18,371	19	8
	18,952	19	6	18,780	15	8	18,652	19	6	18,502	19	6	18,352	19	8
	18,933	19	6	18,765	14	6	18,633	18	6	18,483	20	6	18,333	19	8
	18,914	19	6	18,751	12	5	18,615		5	18,463	17	5	18,314	19	5
	18,895	19	5	18,739	14	5	18,592	15	6	18,446	16	5	18,295	18	5
	18,876	19	5	18,725	17	5	18,577	17	5	18,430	22	5	18,277	14	5
	18,857		5	18,708		5	18,560		5	18,408		5	18,263		5
	Plug to Plug	193	44	Plug to Plug	129	44	Plug to Plug	149	44	Plug to Plug	148	44	Plug to Plug	148	44
Frac Plug	18,815	Total Shots	Frac Plug	18,822	Total Shots	Frac Plug	18,893	Total Shots	Frac Plug	18,844	Total Shots	Frac Plug	18,398	Total Shots	
From Bottom to Top	Stage 6	Distance Between Perfs	Shots	Stage 7	Distance Between Perfs	Shots	Stage 8	Distance Between Perfs	Shots	Stage 9	Distance Between Perfs	Shots	Stage 10	Distance Between Perfs	Shots
	18,239	24	8	18,084	26	8	17,935	20	8	17,791	19	8	17,638	19	8
	18,220	19	6	18,058	16	8	17,922	21	6	17,770	19	6	17,625	24	6
	18,202	19	6	18,052	19	8	17,901	18	6	17,751	19	6	17,601	19	6
	18,183	19	6	18,033	19	8	17,883	19	6	17,732	18	6	17,582	19	6
	18,164	19	5	18,014	19	8	17,864	19	6	17,714	19	5	17,563	19	5
	18,145	18	5	17,995	19	8	17,845	20	5	17,695	19	5	17,545	19	5
	18,127	17	5	17,976	21	5	17,825	15	5	17,676	19	5	17,526	19	5
	18,110		5	17,955		5	17,810		5	17,657		5	17,507		5
	Plug to Plug	148	44	Plug to Plug	158	44	Plug to Plug	164	44	Plug to Plug	153	44	Plug to Plug	163	44
Frac Plug	18,247	Total Shots	Frac Plug	18,096	Total Shots	Frac Plug	17,843	Total Shots	Frac Plug	17,799	Total Shots	Frac Plug	17,648	Total Shots	
From Bottom to Top	Stage 11	Distance Between Perfs	Shots	Stage 12	Distance Between Perfs	Shots	Stage 13	Distance Between Perfs	Shots	Stage 14	Distance Between Perfs	Shots	Stage 15	Distance Between Perfs	Shots
	17,475	32	8	17,338	19	8	17,173	34	8	17,038	19	6	16,872	34	6
	17,460	15	6	17,315	14	8	17,158	15	6	17,023	23	6	16,858	15	6
	17,445	13	6	17,301	18	6	17,143	11	6	17,008	16	6	16,843	12	6
	17,432	19	8	17,283	20	8	17,132	19	6	16,982	19	6	16,831	18	6
	17,413	19	5	17,263	19	8	17,113	19	5	16,963	19	5	16,813	19	5
	17,394	18	5	17,244	18	5	17,094	19	5	16,944	19	5	16,794	19	5
	17,376	19	5	17,226	19	5	17,075	18	5	16,925	19	5	16,775	19	5
	17,357		5	17,207		5	17,057		5	16,906		5	16,756		5
	Plug to Plug	137	44	Plug to Plug	165	44	Plug to Plug	135	44	Plug to Plug	168	44	Plug to Plug	135	44
Frac Plug	17,483	Total Shots	Frac Plug	17,348	Total Shots	Frac Plug	17,181	Total Shots	Frac Plug	17,046	Total Shots	Frac Plug	16,880	Total Shots	
From Bottom to Top	Stage 16	Distance Between Perfs	Shots	Stage 17	Distance Between Perfs	Shots	Stage 18	Distance Between Perfs	Shots	Stage 19	Distance Between Perfs	Shots	Stage 20	Distance Between Perfs	Shots
	16,737	19	6	16,584	26	6	16,435	19	6	16,273	30	6	16,130	28	6
	16,723	23	6	16,569	18	6	16,421	21	6	16,263	9	6	16,115	16	6
	16,709	19	6	16,551	20	6	16,400	19	6	16,254	23	6	16,099	14	6
	16,681	19	6	16,531	19	6	16,381	19	6	16,231	19	6	16,085	23	6
	16,662	18	5	16,512	19	5	16,362	19	5	16,212	19	5	16,062	19	5
	16,644	19	5	16,493	18	5	16,343	17	5	16,193	19	5	16,043	19	5
	16,625	15	5	16,475	21	5	16,328	14	5	16,174	19	5	16,024	19	5
	16,610		5	16,454		5	16,312		5	16,158		5	16,005		5
	Plug to Plug	148	44	Plug to Plug	156	44	Plug to Plug	161	44	Plug to Plug	145	44	Plug to Plug	154	44
Frac Plug	16,748	Total Shots	Frac Plug	16,595	Total Shots	Frac Plug	16,443	Total Shots	Frac Plug	16,292	Total Shots	Frac Plug	16,137	Total Shots	
From Bottom to Top	Stage 21	Distance Between Perfs	Shots	Stage 22	Distance Between Perfs	Shots	Stage 23	Distance Between Perfs	Shots	Stage 24	Distance Between Perfs	Shots	Stage 25	Distance Between Perfs	Shots
	15,975	30	6	15,834	21	8	15,680	25	6	15,536	19	8	15,382	23	8
	15,960	15	6	15,818	19	8	15,665	16	6	15,517	19	8	15,367	19	8
	15,945	15	6	15,799	19	8	15,649	19	8	15,499	19	6	15,348	18	8
	15,930	23	6	15,780	19	8	15,630	21	6	15,480	19	8	15,330	20	8
	15,907	14	5	15,761	13	5	15,609	17	5	15,461	14	5	15,310	16	5
	15,893	17	5	15,748	24	5	15,592	17	5	15,447	23	5	15,292	15	5
	15,879	21	5	15,724	19	5	15,575	20	5	15,424	19	5	15,277	17	5
	15,855		5	15,705		5	15,553		5	15,405		5	15,250		5
	Plug to Plug	141	44	Plug to Plug	154	44	Plug to Plug	144	44	Plug to Plug	154	44	Plug to Plug	140	44
Frac Plug	15,983	Total Shots	Frac Plug	15,842	Total Shots	Frac Plug	15,688	Total Shots	Frac Plug	15,544	Total Shots	Frac Plug	15,390	Total Shots	
From Bottom to Top	Stage 26	Distance Between Perfs	Shots	Stage 27	Distance Between Perfs	Shots	Stage 28	Distance Between Perfs	Shots	Stage 29	Distance Between Perfs	Shots	Stage 30	Distance Between Perfs	Shots
	15,235	25	6	15,089	18	6	14,923	31	6	14,778	26	6	14,632	25	6
	15,217	16	6	15,071	23	6	14,908	18	6	14,761	13	6	14,616	22	6
	15,201	22	6	15,048	18	6	14,892	13	6	14,748	17	6	14,594	15	6
	15,179	18	6	15,030	19	6	14,879	19	6	14,731	21	6	14,579	18	6
	15,161	19	5	15,011	19	6	14,860	18	5	14,710	19	6	14,563	22	5
	15,142	19	5	14,992	19	5	14,842	19	5	14,691	18	6	14,541	18	5
	15,123	19	5	14,973	19	5	14,823	19	5	14,673	18	5	14,523	18	5
	15,104		5	14,954		5	14,804		5	14,657		5	14,504		5
	Plug to Plug	156	44	Plug to Plug	163	44	Plug to Plug	146	44	Plug to Plug	138	44	Plug to Plug	164	44
Frac Plug	15,250	Total Shots	Frac Plug	15,094	Total Shots	Frac Plug	14,931	Total Shots	Frac Plug	14,783	Total Shots	Frac Plug	14,647	Total Shots	
From Bottom to Top	Stage 31	Distance Between Perfs	Shots	Stage 32	Distance Between Perfs	Shots	Stage 33	Distance Between Perfs	Shots	Stage 34	Distance Between Perfs	Shots	Stage 35	Distance Between Perfs	Shots
	14,486	18	6	14,330	24	6	14,178	25	8	14,027	28	8	13,875	28	8
	14,468	19	6	14,318	19	6	14,166	19	8	14,012	15	6	13,863	19	8
	14,447	15	6	14,297	19	6	14,147	20	8	13,997	19	6	13,847	19	8
	14,432	22	6	14,278	21	8	14,127	17	8	13,978	23	6	13,828	19	8
	14,410	16	5	14,257	18	5	14,110	18	5	13,955	14	5	13,809	22	5
	14,394	22	8	14,241	18	5	14,094	22	5	13,941	19	5	13,787	15	5
	14,372	18	6	14,223	20	5	14,072	19	5	13,922	19	5	13,772	13	5
	14,354		5	14,203		5	14,053		5	13,903		5	13,759		5
	Plug to Plug	156	44	Plug to Plug	162	44	Plug to Plug	161	44	Plug to Plug	150	44	Plug to Plug	143	44
Frac Plug	14,493	Total Shots	Frac Plug	14,337	Total Shots	Frac Plug	14,183	Total Shots	Frac Plug	14,034	Total Shots	Frac Plug	13,884	Total Shots	
From Bottom to Top	Stage 36	Distance Between Perfs	Shots	Stage 37	Distance Between Perfs	Shots	Stage 38	Distance Between Perfs	Shots	Stage 39	Distance Between Perfs	Shots	Stage 40	Distance Between Perfs	Shots
	13,735	24	8	13,581	22	8	13,427	26	8	13,284	19	8	13,130	23	8
	13,716	18	8	13,565	19	8	13,411	15	6	13,268	18	6	13,115	19	8
	13,697	19	6	13,548	19	6	13,396	19	8	13,248	18	6	13,096	19	8
	13,678	21	8	13,527	18	6	13,377	18	8	13,227	18	8	13,077	20	8
	13,657	17	5	13,509	16	8	13,359	19	6	13,209	22	5	13,057	17	8
	13,640	17	5	13,493	22	8	13,340	23	8	13,187	16	5	13,040	17	5
	13,623	20	5	13,471	18	5	13,317	15	5	13,171	18	8	13,023	21	6
	13,603		5	13,453		5	13,302		8	13,153		5	13,002		5
	Plug to Plug	154	44	Plug to Plug	154	44	Plug to Plug	143	44	Plug to Plug	154	44	Plug to Plug	150	44
Frac Plug	13,743	Total Shots	Frac Plug	13,588	Total Shots	Frac Plug	13,434	Total Shots	Frac Plug	13,281	Total Shots	Frac Plug	13,127	Total Shots	

From Bottom to Top	Stage 41	Distance Between Perfs	Shots	Stage 42	Distance Between Perfs	Shots	Stage 43	Distance Between Perfs	Shots	Stage 44	Distance Between Perfs	Shots	Stage 45	Distance Between Perfs	Shots
	12,960	22	8	12,831	23	8	12,883	19	8	12,533	24	8	12,381	25	8
	12,965	19	8	12,814	18	8	12,884	19	8	12,518	23	8	12,364	17	8
	12,946	19	8	12,798	19	8	12,845	18	8	12,495	19	8	12,347	21	8
	12,927	19	8	12,777	19	8	12,827	19	8	12,478	18	8	12,328	18	8
	12,908	21	8	12,758	19	8	12,808	20	8	12,458	19	8	12,308	19	8
	12,887	16	8	12,739	14	8	12,588	18	8	12,438	19	8	12,289	19	8
	12,871	17	8	12,725	23	8	12,570	13	8	12,420	14	8	12,270	19	8
	12,854	17	8	12,702	19	8	12,557	19	8	12,408	19	8	12,251	19	8
	Plug to Plug	149	44	Plug to Plug	148	44	Plug to Plug	150	44	Plug to Plug	144	44	Plug to Plug	157	44
	Frac Plug	12,987	Total Shots	Frac Plug	12,838	Total Shots	Frac Plug	12,889	Total Shots	Frac Plug	12,946	Total Shots	Frac Plug	12,396	Total Shots

From Bottom to Top	Stage 46	Distance Between Perfs	Shots	Stage 47	Distance Between Perfs	Shots	Stage 48	Distance Between Perfs	Shots	Stage 49	Distance Between Perfs	Shots	Stage 50	Distance Between Perfs	Shots
	12,232	19	8	12,078	25	8	11,932	19	8	11,782	23	8	11,629	28	8
	12,214	19	8	12,064	19	8	11,913	18	8	11,765	21	8	11,613	14	8
	12,195	21	8	12,045	19	8	11,895	21	8	11,744	18	8	11,599	24	8
	12,174	17	8	12,026	23	8	11,874	17	8	11,724	19	8	11,575	18	8
	12,157	17	8	12,003	15	8	11,857	19	8	11,707	19	8	11,557	19	8
	12,140	20	8	11,988	18	8	11,838	19	8	11,688	19	8	11,538	19	8
	12,120	19	8	11,970	19	8	11,819	14	8	11,669	14	8	11,519	19	8
	12,101	19	8	11,951	19	8	11,805	19	8	11,655	19	8	11,500	19	8
	Plug to Plug	158	44	Plug to Plug	144	44	Plug to Plug	150	44	Plug to Plug	145	44	Plug to Plug	155	44
	Frac Plug	12,238	Total Shots	Frac Plug	12,083	Total Shots	Frac Plug	11,939	Total Shots	Frac Plug	11,789	Total Shots	Frac Plug	11,644	Total Shots

From Bottom to Top	Stage 51	Distance Between Perfs	Shots	Stage 52	Distance Between Perfs	Shots	Stage 53	Distance Between Perfs	Shots	Stage 54	Distance Between Perfs	Shots	Stage 55	Distance Between Perfs	Shots
	11,482	18	8	11,323	27	8	11,181	19	8	11,025	25	8	10,883	19	8
	11,463	19	8	11,308	14	8	11,162	18	8	11,008	14	8	10,862	19	8
	11,444	24	8	11,294	19	8	11,144	20	8	10,994	19	8	10,843	19	8
	11,420	13	8	11,275	21	8	11,124	18	8	10,973	19	8	10,823	19	8
	11,407	19	8	11,254	18	8	11,108	16	8	10,956	19	8	10,806	19	8
	11,388	19	8	11,238	15	8	11,090	21	8	10,937	21	8	10,787	19	8
	11,369	19	8	11,223	23	8	11,069	19	8	10,916	14	8	10,768	13	8
	11,350	19	8	11,200	19	8	11,050	19	8	10,902	19	8	10,758	19	8
	Plug to Plug	159	44	Plug to Plug	142	44	Plug to Plug	150	44	Plug to Plug	142	44	Plug to Plug	152	44
	Frac Plug	11,488	Total Shots	Frac Plug	11,339	Total Shots	Frac Plug	11,189	Total Shots	Frac Plug	11,032	Total Shots	Frac Plug	10,889	Total Shots

From Bottom to Top	Stage 56	Distance Between Perfs	Shots	Stage 57	Distance Between Perfs	Shots	Stage 58	Distance Between Perfs	Shots	Stage 59	Distance Between Perfs	Shots	Stage 60	Distance Between Perfs	Shots
	10,731	24	8	10,577	25	8	10,420	20	8	10,281	22	8	10,121	28	8
	10,714	21	8	10,562	24	8	10,412	19	8	10,261	18	8	10,105	18	8
	10,693	19	8	10,538	14	8	10,393	19	8	10,243	19	8	10,089	15	8
	10,674	18	8	10,524	23	8	10,374	19	8	10,224	19	8	10,074	23	8
	10,656	19	8	10,501	14	8	10,355	20	8	10,205	19	8	10,051	15	8
	10,637	19	8	10,487	15	8	10,335	17	8	10,186	18	8	10,036	15	8
	10,618	16	8	10,472	23	8	10,318	15	8	10,168	19	8	10,021	22	8
	10,602	19	8	10,449	19	8	10,303	19	8	10,149	19	8	9,999	19	8
	Plug to Plug	146	44	Plug to Plug	154	44	Plug to Plug	150	44	Plug to Plug	160	44	Plug to Plug	141	44
	Frac Plug	10,738	Total Shots	Frac Plug	10,592	Total Shots	Frac Plug	10,438	Total Shots	Frac Plug	10,288	Total Shots	Frac Plug	10,128	Total Shots

From Bottom to Top	Stage 61	Distance Between Perfs	Shots	Stage 62	Distance Between Perfs	Shots	Stage 63	Distance Between Perfs	Shots	Stage 64	Distance Between Perfs	Shots	Stage 65	Distance Between Perfs	Shots
	9,978	21	8	9,828	22	8	9,680	18	8	9,529	22	8	9,398		
	9,961	19	8	9,811	19	8	9,661	19	8	9,511	18	8			
	9,942	18	8	9,792	19	8	9,642	19	8	9,492	19	8			
	9,924	19	8	9,773	19	8	9,623	19	8	9,473	19	8			
	9,905	23	8	9,754	18	8	9,604	19	8	9,454	18	8			
	9,882	15	8	9,736	14	8	9,585	18	8	9,438	19	8			
	9,867	17	8	9,722	24	8	9,567	18	8	9,417	19	8			
	9,850	19	8	9,709	19	8	9,551	19	8	9,399	19	8			
	Plug to Plug	152	44	Plug to Plug	148	44	Plug to Plug	151	44	Plug to Plug	83	44	Plug to Plug	0	8
	Frac Plug	9,987	Total Shots	Frac Plug	9,835	Total Shots	Frac Plug	9,687	Total Shots	Frac Plug	9,538	Total Shots	Frac Plug		Total Shots