

FORM APPROVED
OMB No 1004 0137
Expires July 31, 2010

DUE 5-6-18

28b Production - Interval C

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr API	Gas Gravity	Production Method
Choke Size	Tbg Press Flwg. SI	Csg Press	24 Hr Rate →	Oil BBL	Gas MCF	Water BBL	Gas Oil Ratio	Well Status	

28c Production - Interval D

Date First Produced	Test Date	Hours Tested	Test Production →	Oil BBL	Gas MCF	Water BBL	Oil Gravity Corr API	Gas Gravity	Production Method
Choke Size	Tbg Press Flwg. SI	Csg Press	24 Hr Rate →	Oil BBL	Gas MCF	Water BBL	Gas Oil Ratio	Well Status	

29 Disposition of Gas(Sold used for fuel vented etc)
SOLD

30 Summary of Porous Zones (Include Aquifers)

Show all important zones of porosity and contents thereof Cored intervals and all drill-stem tests, including depth interval tested, cushion used, time tool open, flowing and shut-in pressures and recoveries

31 Formation (Log) Markers

Formation	Top	Bottom	Descriptions, Contents, etc	Name	Top
					Meas Depth
LAMAR	2023	2069		LAMAR	2023
BELL CANYON	2070	2929		BELL CANYON	2070
CHERRY CANYON	2930	4023		CHERRY CANYON	2930
BRUSHY CANYON	4024	5605		BRUSHY CANYON	4024
BONE SPRING LIME	5606	6535		BONE SPRING LIME	5606
BONE SPRING 1ST	6536	7381		BONE SPRING 1ST	6536
BONE SPRING 2ND	7382	7544		BONE SPRING 2ND	7382

32 Additional remarks (include plugging procedure)
Surveys and Perfs/Stimulation are attached

AMENDED TO CORRECT PRODUCING INTERVAL (Please delete previously submitted Form 3160-4 dated 11/16/17)

33 Circle enclosed attachments

- | | | | |
|--|-------------------|--------------|----------------------|
| 1 Electrical/Mechanical Logs (1 full set req'd) | 2 Geologic Report | 3 DST Report | 4 Directional Survey |
| 5 Sundry Notice for plugging and cement verification | 6 Core Analysis | 7 Other | |

34 I hereby certify that the foregoing and attached information is complete and correct as determined from all available records (see attached instructions)

Electronic Submission #396908 Verified by the BLM Well Information System
For COG OPERATING LLC, sent to the Carlsbad
Committed to AFMSS for processing by DUNCAN WHITLOCK on 02/28/2018 (18DW0083SE)

Name (please print) STORMI DAVIS

Title PREPARER

Signature _____ (Electronic Submission)

Date 12/05/2017

Title 18 U S C Section 1001 and Title 43 U S C Section 1212 make it a crime for any person knowingly and willfully to make to any department or agency of the United States any false, fictitious or fraudulent statements or representations as to any matter within its jurisdiction

**** REVISED ** REVISED ** REVISED ** REVISED ** REVISED ** REVISED ** REVISED ** REVISED ****

CRAIG FEDERAL COM #2H (30-015-44209)

<u>Perfs</u>	<u>15% Acid (Gal)</u>	<u>Sand (#)</u>	<u>Fluid (Gal)</u>
1	756	312842	370146
2	2352	312261	383712
3	2268	315485	365274
4	2352	292130	351162
5	2268	314589	358512
6	2268	310083	366828
7	3780	310463	475566
8	2226	310787	361914
9	2268	310467	357882
10	2268	315188	356538
11	2268	312219	348222
12	2268	317185	354102
13	2268	312476	346374
14	2268	314880	354984
15	2268	311310	352464
16	2268	314247	355656
17	2268	312036	350826
18	2268	312984	343308
19	2310	315630	318780
20	2268	311010	371112
21	2268	312878	339360
22	2268	315165	339612
23	2268	314862	351246
24	2226	313734	349146
25	2226	313714	336322
26	2268	312921	323862
27	2268	312253	355236
28	2268	311448	354942
29	2268	312254	358848
30	2268	312179	346920
31	2310	312109	332388
32	2310	311574	335454
33	2310	313023	386316
34	2310	308639	333144
35	2310	313765	332178
36	2268	307233	343434
37	2310	311992	333942
38	2268	312109	333732
39	3738	312859	356874
40	2268	312453	358596
41	2268	310405	318360
42	2268	312080	345912
43	2268	310000	323316
44	2268	312808	318528
45	3780	313239	350364
46	2310	312082	309960
47	2310	313313	342426
48	2268	312255	340242
49	2268	311102	355698
50	2268	312006	324828
51	2268	311364	314748
52	2268	313958	338898
53	2268	312742	322140
54	2268	312961	318990
55	2310	312937	339234
56	2310	312999	318066
57	2268	311941	318024
58	2310	312107	316218
59	2310	312373	336378
60	2268	311881	335832
61	3444	312103	314748
62	3108	309736	310254
63	2814	312146	341166
64	2814	308525	335790
Totals	151,830	19,972,499	22,035,034

P	P Group	COUNTRY DISTANCE CORRECTION									
		Shots	Distance Between Perfs	Shots	Distance Between Perfs	Shots	Distance Between Perfs	Shots	Distance Between Perfs	Shots	Distance Between Perfs
From Bottom to Top		Shots 1-10	19	Shots 1-10	47	Shots 1-10	21	Shots 1-10	20	Shots 1-10	21
		Shots 11-20	20	Shots 11-20	12	Shots 11-20	20	Shots 11-20	19	Shots 11-20	18
		Shots 21-30	20	Shots 21-30	20	Shots 21-30	19	Shots 21-30	20	Shots 21-30	20
		Shots 31-40	20	Shots 31-40	8	Shots 31-40	19	Shots 31-40	18	Shots 31-40	20
		Shots 41-50	20	Shots 41-50	13	Shots 41-50	19	Shots 41-50	18	Shots 41-50	20
		Shots 51-60	20	Shots 51-60	14	Shots 51-60	19	Shots 51-60	18	Shots 51-60	20
		Shots 61-70	20	Shots 61-70	14	Shots 61-70	19	Shots 61-70	18	Shots 61-70	20
		Shots 71-80	19	Shots 71-80	8	Shots 71-80	19	Shots 71-80	18	Shots 71-80	20
		Shots 81-90	19	Shots 81-90	8	Shots 81-90	19	Shots 81-90	18	Shots 81-90	20
		Shots 91-100	19	Shots 91-100	8	Shots 91-100	19	Shots 91-100	18	Shots 91-100	20
P Group		COUNTRY DISTANCE CORRECTION									
		COUNTRY DISTANCE CORRECTION									
Shots 1-10		Shots 1-10									
Shots 11-20		Shots 11-20									
Shots 21-30		Shots 21-30									
Shots 31-40		Shots 31-40									
Shots 41-50		Shots 41-50									
Shots 51-60		Shots 51-60									
Shots 61-70		Shots 61-70									
Shots 71-80		Shots 71-80									
Shots 81-90		Shots 81-90									
Shots 91-100		Shots 91-100									
P Group		COUNTRY DISTANCE CORRECTION									
		COUNTRY DISTANCE CORRECTION									
Shots 1-10		Shots 1-10									
Shots 11-20		Shots 11-20									
Shots 21-30		Shots 21-30									
Shots 31-40		Shots 31-40									
Shots 41-50		Shots 41-50									
Shots 51-60		Shots 51-60									
Shots 61-70		Shots 61-70									
Shots 71-80		Shots 71-80									
Shots 81-90		Shots 81-90									
Shots 91-100		Shots 91-100									
P Group		COUNTRY DISTANCE CORRECTION									
		COUNTRY DISTANCE CORRECTION									
Shots 1-10		Shots 1-10									
Shots 11-20		Shots 11-20									
Shots 21-30		Shots 21-30									
Shots 31-40		Shots 31-40									
Shots 41-50		Shots 41-50									
Shots 51-60		Shots 51-60									
Shots 61-70		Shots 61-70									
Shots 71-80		Shots 71-80									
Shots 81-90		Shots 81-90									
Shots 91-100		Shots 91-100									
P Group		COUNTRY DISTANCE CORRECTION									
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Shots 1-10		Shots 1-10									
Shots 11-20		Shots 11-20									
Shots 21-30		Shots 21-30									
Shots 31-40		Shots 31-40									
Shots 41-50		Shots 41-50									
Shots 51-60		Shots 51-60									
Shots 61-70		Shots 61-70									
Shots 71-80		Shots 71-80									
Shots 81-90		Shots 81-90									
Shots 91-100		Shots 91-100									
P Group		COUNTRY DISTANCE CORRECTION									
		COUNTRY DISTANCE CORRECTION									
Shots 1-10		Shots 1-10									
Shots 11-20		Shots 11-20									
Shots 21-30		Shots 21-30									
Shots 31-40		Shots 31-40									
Shots 41-50		Shots 41-50									
Shots 51-60		Shots 51-60									
Shots 61-70		Shots 61-70									

	Stage 5 100' - 120' - 140'	Stage 6 140' - 160' - 180'	Stage 7 180' - 200' - 220'	Stage 8 220' - 240' - 260'	Stage 9 260' - 280' - 300'	Stage 10 300' - 320' - 340'	Stage 11 340' - 360' - 380'	Stage 12 380' - 400' - 420'	Stage 13 420' - 440' - 460'	Stage 14 460' - 480' - 500'	Stage 15 500' - 520' - 540'	Stage 16 540' - 560' - 580'	Stage 17 580' - 600' - 620'	Stage 18 620' - 640' - 660'	Stage 19 660' - 680' - 700'	Stage 20 700' - 720' - 740'	Stage 21 740' - 760' - 780'	Stage 22 780' - 800' - 820'	Stage 23 820' - 840' - 860'	Stage 24 860' - 880' - 900'	Stage 25 900' - 920' - 940'	Stage 26 940' - 960' - 980'	Stage 27 980' - 1000' - 1020'	Stage 28 1020' - 1040' - 1060'	Stage 29 1060' - 1080' - 1100'	Stage 30 1100' - 1120' - 1140'	Stage 31 1140' - 1160' - 1180'	Stage 32 1180' - 1200' - 1220'	Stage 33 1220' - 1240' - 1260'	Stage 34 1260' - 1280' - 1300'	Stage 35 1300' - 1320' - 1340'	Stage 36 1340' - 1360' - 1380'	Stage 37 1380' - 1400' - 1420'	Stage 38 1420' - 1440' - 1460'	Stage 39 1460' - 1480' - 1500'	Stage 40 1500' - 1520' - 1540'	Stage 41 1540' - 1560' - 1580'	Stage 42 1580' - 1600' - 1620'	Stage 43 1620' - 1640' - 1660'	Stage 44 1660' - 1680' - 1700'	Stage 45 1700' - 1720' - 1740'	Stage 46 1740' - 1760' - 1780'	Stage 47 1780' - 1800' - 1820'	Stage 48 1820' - 1840' - 1860'	Stage 49 1860' - 1880' - 1900'	Stage 50 1900' - 1920' - 1940'	Stage 51 1940' - 1960' - 1980'	Stage 52 1980' - 2000' - 2020'	Stage 53 2020' - 2040' - 2060'	Stage 54 2060' - 2080' - 2100'	Stage 55 2100' - 2120' - 2140'	Stage 56 2140' - 2160' - 2180'	Stage 57 2180' - 2200' - 2220'	Stage 58 2220' - 2240' - 2260'	Stage 59 2260' - 2280' - 2300'	Stage 60 2300' - 2320' - 2340'	Stage 61 2340' - 2360' - 2380'	Stage 62 2380' - 2400' - 2420'	Stage 63 2420' - 2440' - 2460'	Stage 64 2460' - 2480' - 2500'	Stage 65 2500' - 2520' - 2540'	Stage 66 2540' - 2560' - 2580'	Stage 67 2580' - 2600' - 2620'	Stage 68 2620' - 2640' - 2660'	Stage 69 2660' - 2680' - 2700'	Stage 70 2700' - 2720' - 2740'	Stage 71 2740' - 2760' - 2780'	Stage 72 2780' - 2800' - 2820'	Stage 73 2820' - 2840' - 2860'	Stage 74 2860' - 2880' - 2900'	Stage 75 2900' - 2920' - 2940'	Stage 76 2940' - 2960' - 2980'	Stage 77 2980' - 3000' - 3020'	Stage 78 3020' - 3040' - 3060'	Stage 79 3060' - 3080' - 3100'	Stage 80 3100' - 3120' - 3140'	Stage 81 3140' - 3160' - 3180'	Stage 82 3180' - 3200' - 3220'	Stage 83 3220' - 3240' - 3260'	Stage 84 3260' - 3280' - 3300'	Stage 85 3300' - 3320' - 3340'	Stage 86 3340' - 3360' - 3380'	Stage 87 3380' - 3400' - 3420'	Stage 88 3420' - 3440' - 3460'	Stage 89 3460' - 3480' - 3500'	Stage 90 3500' - 3520' - 3540'	Stage 91 3540' - 3560' - 3580'	Stage 92 3580' - 3600' - 3620'	Stage 93 3620' - 3640' - 3660'	Stage 94 3660' - 3680' - 3700'	Stage 95 3700' - 3720' - 3740'	Stage 96 3740' - 3760' - 3780'	Stage 97 3780' - 3800' - 3820'	Stage 98 3820' - 3840' - 3860'	Stage 99 3860' - 3880' - 3900'	Stage 100 3900' - 3920' - 3940'	Stage 101 3940' - 3960' - 3980'	Stage 102 3980' - 4000' - 4020'	Stage 103 4020' - 4040' - 4060'	Stage 104 4060' - 4080' - 4100'	Stage 105 4100' - 4120' - 4140'	Stage 106 4140' - 4160' - 4180'	Stage 107 4180' - 4200' - 4220'	Stage 108 4220' - 4240' - 4260'	Stage 109 4260' - 4280' - 4300'	Stage 110 4300' - 4320' - 4340'	Stage 111 4340' - 4360' - 4380'	Stage 112 4380' - 4400' - 4420'	Stage 113 4420' - 4440' - 4460'	Stage 114 4460' - 4480' - 4500'	Stage 115 4500' - 4520' - 4540'	Stage 116 4540' - 4560' - 4580'	Stage 117 4580' - 4600' - 4620'	Stage 118 4620' - 4640' - 4660'	Stage 119 4660' - 4680' - 4700'	Stage 120 4700' - 4720' - 4740'	Stage 121 4740' - 4760' - 4780'	Stage 122 4780' - 4800' - 4820'	Stage 123 4820' - 4840' - 4860'	Stage 124 4860' - 4880' - 4900'	Stage 125 4900' - 4920' - 4940'	Stage 126 4940' - 4960' - 4980'	Stage 127 4980' - 5000' - 5020'	Stage 128 5020' - 5040' - 5060'	Stage 129 5060' - 5080' - 5100'	Stage 130 5100' - 5120' - 5140'	Stage 131 5140' - 5160' - 5180'	Stage 132 5180' - 5200' - 5220'	Stage 133 5220' - 5240' - 5260'	Stage 134 5260' - 5280' - 5300'	Stage 135 5300' - 5320' - 5340'	Stage 136 5340' - 5360' - 5380'	Stage 137 5380' - 5400' - 5420'	Stage 138 5420' - 5440' - 5460'	Stage 139 5460' - 5480' - 5500'	Stage 140 5500' - 5520' - 5540'	Stage 141 5540' - 5560' - 5580'	Stage 142 5580' - 5600' - 5620'	Stage 143 5620' - 5640' - 5660'	Stage 144 5660' - 5680' - 5700'	Stage 145 5700' - 5720' - 5740'	Stage 146 5740' - 5
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[illegible][illegible][illegible]

	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
From	14,415 ft	19	1	14,428 ft	30	1	14,438 ft	65	1	14,448 ft	17	1	14,458 ft	18	1
Bottom	14,430 ft	17	8	14,450 ft	13	8	14,460 ft	6	8	14,470 ft	20	8	14,480 ft	28	8
To Top	14,432 ft	17	8	14,452 ft	13	8	14,462 ft	6	8	14,472 ft	20	8	14,482 ft	28	8
	14,435 ft	21	8	14,455 ft	19	8	14,465 ft	21	8	14,475 ft	21	8	14,485 ft	35	8
	14,438 ft	19	8	14,458 ft	19	8	14,468 ft	14	8	14,478 ft	20	8	14,488 ft	14	8
	14,440 ft	20	8	14,460 ft	20	8	14,470 ft	13	8	14,480 ft	16	8	14,490 ft	19	8
	14,443 ft	19	8	14,463 ft	19	8	14,473 ft	13	8	14,483 ft	16	8	14,493 ft	20	8
	14,445 ft	184	44	14,465 ft	180	44	14,485 ft	130	44	14,505 ft	168	44	14,525 ft	140	44
Plug to Plug	14,416 ft			14,436 ft			14,456 ft			14,476 ft			14,496 ft		

[illegible][illegible]

[illegible][illegible][illegible][illegible][illegible]

COG

WELLBORE REPORT

CRAIG FEDERAL COM #2H

ENSIGN 155

8/22/2017

 Scientific Drilling

The Ultimate Partner In Wellbore Placement

SURVEY REPORT**CRAIG FEDERAL COM #2H****COMPUTED KEEPER GYRO WIRELINE SURVEY**

CUSTOMER COG
PROJECT Craig Federal Com #2H
FIELD Craig Federal Com #2H

SDI JOB NO OP003721
SDI DISTRICT Midland
SDI KIT/UNIT

SITE INFORMATION

Site Name Craig Federal Com #2H
Lat/Long 32 077153° N, 104 252773° E
Northing 391,815 ft
Easting 566,289 4 ft

Section
Township
Range

MAP INFORMATION

North Reference Grd North
Grid Correction -0 04 deg
System US State Plane 1983
Datum North American Datum 1983 (GRS 1980)
Map Zone New Mexico East 3001

**WELL INFORMATION**

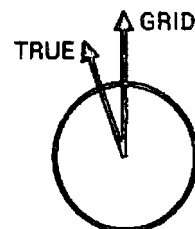
Lat/Long 32 077153° N, 104 252773° W
Northing 391,815 ft
Easting 566,289 4 ft
UWI 30-015-44209

DEPTH AND ELEVATION REFERENCE

Ground Level 3369 8 ft above Mean Sea
Level
Reference Datum RKB
Reference Height 24 ft above G L
Reference Elevation 3393 8 ft

VERTICAL SECTION REFERENCE

+N/-S 0 ft
+E/-W 0 ft
Proposal Direction 358 48°
Calculation Method Minimum Curvature

**LOCAL GRAVITY REFERENCE INFORMATION**

Local Gravity 998 492 mG [computed]
True to Grid subtract 0 04°

WELL NOTES

Keeper Gyro Wireline Survey in 4 1/2 IF to 6965 Ft

OPERATORS

Nathan Yerby

SDI Operator Name (Printed)

SIGNATURE

DATE

MD	INC	AZIM	TVD	VS	GRS	CEAW	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 90	290 91	100 00	0 30	0 28	-0 74	0 90	0 79	290 91
125 00	0 86	292 88	124 99	0 45	0 42	-1 09	0 23	1 17	291 23
150 00	0 84	298 66	149 99	0 62	0 59	-1 43	0 35	1 54	292 31
175 00	1 25	302 34	174 99	0 87	0 82	-1 82	1 65	1 99	294 26
200 00	1 04	299 78	199 98	1 14	1 08	-2 24	0 88	2 49	295 64
225 00	0 97	303 05	224 98	1 37	1 31	-2 62	0 35	2 93	296 50
250 00	1 00	303 42	249 97	1 62	1 54	-2 98	0 11	3 35	297 36
275 00	0 89	301 93	274 97	1 85	1 76	-3 32	0 44	3 76	297 95
300 00	0 71	299 54	299 97	2 04	1 94	-3 62	0 75	4 11	298 19
325 00	0 90	292 92	324 97	2 20	2 09	-3 94	0 84	4 46	298 01
350 00	0 68	295 47	349 96	2 35	2 23	-4 25	0 87	4 80	297 72
375 00	0 65	299 02	374 96	2 49	2 37	-4 51	0 20	5 09	297 70
400 00	0 65	292 55	399 96	2 62	2 49	-4 77	0 29	5 38	297 59
425 00	0 48	290 00	424 96	2 71	2 58	-5 00	0 70	5 62	297 33
450 00	0 64	287 70	449 96	2 80	2 66	-5 23	0 63	5 86	296 97
475 00	0 73	287 63	474 96	2 89	2 75	-5 51	0 36	6 16	296 52
500 00	0 48	270 09	499 95	2 95	2 80	-5 76	1 22	6 41	295 89
525 00	0 48	273 78	524 95	2 96	2 80	-5 97	0 12	6 60	295 15
550 00	0 45	285 01	549 95	3 00	2 84	-6 17	0 38	6 79	294 68
575 00	0 33	274 69	574 95	3 04	2 87	-6 34	0 58	6 96	294 34
600 00	0 32	270 14	599 95	3 05	2 87	-6 48	0 11	7 09	293 92
625 00	0 31	262 47	624 95	3 04	2 87	-6 62	0 17	7 21	293 42
650 00	0 29	272 73	649 95	3 04	2 86	-6 75	0 24	7 33	292 96
675 00	0 42	268 62	674 95	3 04	2 86	-6 90	0 55	7 47	292 50
700 00	0 39	278 09	699 95	3 06	2 87	-7 08	0 31	7 64	292 07
725 00	0 39	281 50	724 95	3 09	2 90	-7 25	0 10	7 81	291 80
750 00	0 34	295 09	749 95	3 14	2 95	-7 40	0 41	7 96	291 72
775 00	0 19	283 24	774 95	3 19	2 99	-7 51	0 65	8 08	291 71
800 00	0 19	240 20	799 95	3 18	2 98	-7 58	0 55	8 14	291 44
825 00	0 04	163 34	824 95	3 15	2 95	-7 61	0 73	8 16	291 17
850 00	0 36	117 95	849 95	3 10	2 90	-7 54	1 35	8 08	291 05

SURVEY REPORT

CRAIG FEDERAL COM #2H

COMPUTED KEEPER GYRO WIRELINE SURVEY

MD	INC	AZIM	TD	VS	WAS	FEAW	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
875 00	0 40	120 71	874 95	3 02	2 82	-7 40	0 15	7 92	290 88
900 00	0 46	121 04	899 95	2 92	2 73	-7 24	0 24	7 73	290 64
925 00	0 43	132 04	924 95	2 80	2 61	-7 08	0 36	7 55	290 24
950 00	0 41	132 68	949 95	2 67	2 49	-6 95	0 07	7 38	289 71
975 00	0 42	138 99	974 94	2 54	2 36	-6 82	0 18	7 22	289 08
1000 00	0 53	143 13	999 94	2 37	2 20	-6 69	0 48	7 04	288 18
1025 00	0 45	133 92	1024 94	2 21	2 04	-6 55	0 45	6 86	287 26
1050 00	0 39	145 29	1049 94	2 07	1 90	-6 43	0 43	6 71	286 44
1075 00	0 40	153 63	1074 94	1 92	1 75	-6 34	0 24	6 58	285 42
1100 00	0 42	178 41	1099 94	1 75	1 58	-6 30	0 71	6 50	284 08
1125 00	0 47	178 48	1124 94	1 55	1 39	-6 30	0 19	6 45	282 42
1150 00	0 46	174 03	1149 94	1 35	1 19	-6 29	0 15	6 40	280 69
1175 00	0 39	186 39	1174 94	1 17	1 00	-6 28	0 45	6 36	279 08
1200 00	0 40	170 15	1199 94	1 00	0 84	-6 28	0 44	6 33	277 58
1225 00	0 37	191 77	1224 94	0 84	0 67	-6 28	0 58	6 32	276 10
1250 00	0 60	145 87	1249 94	0 65	0 48	-6 22	1 73	6 24	274 44
1275 00	0 90	130 71	1274 93	0 41	0 25	-6 00	1 42	6 01	272 36
1300 00	1 35	123 77	1299 93	0 10	-0 04	-5 61	1 89	5 61	269 55
1325 00	2 06	115 96	1324 92	-0 27	-0 40	-4 96	2 98	4 98	265 34
1350 00	2 09	112 98	1349 90	-0 67	-0 78	-4 14	0 46	4 21	259 32
1375 00	2 44	112 17	1374 88	-1 07	-1 16	-3 22	1 39	3 42	250 21
1400 00	2 46	110 85	1399 86	-1 49	-1 55	2 23	0 23	2 71	235 16
1425 00	2 31	108 11	1424 84	-1 86	1 90	-1 25	0 73	2 27	213 30
1450 00	2 27	105 58	1449 82	-2 18	-2 19	-0 29	0 45	2 21	187 57
1475 00	2 20	100 17	1474 80	-2 42	-2 41	0 66	0 88	2 49	164 70
1500 00	2 17	93 28	1499 78	-2 56	-2 52	1 60	1 06	2 98	147 51
1525 00	2 30	87 38	1524 76	-2 59	-2 52	2 58	1 06	3 61	134 38
1550 00	2 41	82 25	1549 74	-2 52	-2 43	3 60	0 95	4 34	124 00
1575 00	2 50	78 45	1574 72	-2 37	2 25	4 65	0 74	5 17	115 77
1600 00	2 47	76 17	1599 69	-2 16	2 01	5 71	0 42	6 05	109 39
1625 00	2 45	77 85	1624 67	-1 95	-1 77	6 76	0 29	6 98	104 67
1650 00	2 42	77 27	1649 65	1 75	1 54	7 79	0 16	7 94	101 18

MD	INC	AZIM	TWD	VS	GRS	GEAW	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%/100ft	ft	deg
1675 00	2.10	72 18	1674 63	-1 52	-1 28	8 74	1 51	8 84	98 36
1700.00	1.57	64.76	1699 62	-1.25	-1.00	9.49	2.30	9 54	96 01
1725 00	1.14	43 69	1724 61	-0 94	-0 67	9 97	2.62	9 99	93 86
1750 00	0 96	22 66	1749 61	-0 57	-0 30	10.22	1 69	10.23	91 68
1775 00	0 89	1 96	1774 60	-0 19	0 09	10.31	1 35	10 31	89 52
1800.00	1 02	338 92	1799 60	0.22	0 49	10.24	1 60	10.25	87.27
1825 00	1 06	304 81	1824 59	0 56	0 83	9 96	2.45	10 00	85 25
1850 00	1 22	297 19	1849 59	0 83	1 08	9 54	0 87	9 60	83 52
1875 00	1 17	292.10	1874 58	1 06	1 30	9 07	0 47	9 16	81 84
1900 00	1 21	291 57	1899 58	1 26	1 49	8 58	0 17	8 71	80 14
1925 00	1 27	294 62	1924 57	1 49	1 70	8 09	0 35	8 27	78 10
1950.00	1.25	293 02	1949 57	1.72	1.93	7 59	0 15	7 83	75 76
1975 00	1.17	293.07	1974.56	1.94	2.13	7 10	0 32	7 41	73 29
2000 00	0 99	300 45	1999 56	2.16	2.34	6 68	0 89	7 08	70 68
2025 00	0 77	308 10	2024 55	2.39	2.56	6 36	1 00	6 85	68 11
2050 00	0 65	309.38	2049 55	2.59	2.75	6 12	0 51	6 71	65 80
2075 00	0 63	303 36	2074 55	2 76	2.91	5 90	0 28	6 58	63 70
2100 00	0 67	303 09	2099 55	2 92	3 07	5 66	0 16	6 44	61 53
2125 00	0 51	305 99	2124 55	3 07	3 21	5 45	0 62	6 32	59 46
2150 00	0 50	316 10	2149 55	3 22	3 36	5 28	0 36	6 26	57 55
2175 00	0 44	319 49	2174 55	3 37	3 51	5 14	0 23	6 23	55 69
2200 00	0 45	331 59	2199 55	3 54	3 67	5 03	0 38	6.23	53 90
2225 00	0 40	316 01	2224 54	3 69	3 82	4 93	0 51	6 23	52 20
2250 00	0 42	313.20	2249 54	3 82	3 95	4 80	0 11	6.21	50 57
2275 00	0 47	329 99	2274 54	3 97	4 10	4 68	0.55	6 22	48 81
2300 00	0 39	323 76	2299 54	4 13	4 25	4 58	0 35	6 25	47 10
2325 00	0 35	319 27	2324 54	4 26	4 38	4 48	0 20	6 26	45 61
2350 00	0 40	317 47	2349 54	4 39	4 51	4 37	0 19	6 27	44 11
2375 00	0 34	318 34	2374 54	4 51	4 63	4 26	0 24	6 29	42.64
2400 00	0 29	325 61	2399 54	4 62	4 73	4 17	0 25	6 31	41 41
2425 00	0 38	323 20	2424 54	4 74	4 85	4 09	0 37	6 34	40 11
2450 00	0 36	326.32	2449 54	4 88	4 99	3 99	0 11	6 39	38 69

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	0 44	318 66	2474 54	5 02	5 12	3 89	0 39	6 43	37 17
2500 00	0 30	332 49	2499 54	5 15	5 26	3 79	0 67	6 48	35 80
2525 00	0 34	322 35	2524 54	5 27	5 37	3 72	0 28	6 53	34 66
2550 00	0 44	317 11	2549 54	5 40	5 50	3 60	0 44	6 58	33 23
2575 00	0 28	350 69	2574 54	5 54	5 63	3 53	1 05	6 65	32 06
2600 00	0 26	339 54	2599 54	5 65	5 75	3 50	0 22	6 73	31 34
2625 00	0 31	349 46	2624 54	5 77	5 87	3 47	0 28	6 81	30 57
2650 00	0 23	351 27	2649 54	5 89	5 98	3 45	0 32	6 91	29 93
2675 00	0 12	321 91	2674 54	5 96	6 05	3 42	0 56	6 96	29 48
2700 00	0 10	317 14	2699 54	6 00	6 09	3 39	0 09	6 97	29 11
2725 00	0 21	324 36	2724 54	6 05	6 14	3 35	0 44	7 00	28 61
2750 00	0 19	311 21	2749 54	6 12	6 21	3 29	0 20	7 03	27 95
2775 00	0 13	285 32	2774 54	6 15	6 24	3 24	0 37	7 03	27 40
2800 00	0 27	301 89	2799 54	6 19	6 28	3 16	0 59	7 03	26 71
2825 00	0 08	286 60	2824 54	6 23	6 32	3 09	0 77	7 03	26 10
2850 00	0 08	205 75	2849 54	6 22	6 30	3 07	0 42	7 01	25 97
2875 00	0 12	240 26	2874 54	6 19	6 27	3 04	0 27	6 97	25 85
2900 00	0 10	246 72	2899 54	6 17	6 25	3 00	0 08	6 94	25 62
2925 00	0 19	241 02	2924 54	6 14	6 22	2 94	0 36	6 89	25 30
2950 00	0 11	218 74	2949 54	6 11	6 19	2 89	0 37	6 83	25 06
2975 00	0 13	187 58	2974 54	6 06	6 14	2 87	0 27	6 78	25 08
3000 00	0 16	235 27	2999 53	6 01	6 09	2 84	0 48	6 72	25 00
3025 00	0 22	214 41	3024 53	5 96	6 03	2 78	0 36	6 64	24 78
3050 00	0 23	203 55	3049 53	5 87	5 95	2 74	0 17	6 55	24 72
3075 00	0 27	206 70	3074 53	5 78	5 85	2 69	0 16	6 44	24 71
3100 00	0 24	230 94	3099 53	5 69	5 76	2 62	0 44	6 33	24 48
3125 00	0 28	217 72	3124 53	5 61	5 68	2 55	0 30	6 23	24 14
3150 00	0 23	204 61	3149 53	5 52	5 59	2 49	0 33	6 12	24 00
3175 00	0 27	203 62	3174 53	5 42	5 49	2 44	0 18	6 01	23 99
3200 00	0 32	213 59	3199 53	5 31	5 38	2 38	0 29	5 88	23 88
3225 00	0 35	206 33	3224 53	5 18	5 25	2 31	0 20	5 73	23 73
3250 00	0 27	199 54	3249 53	5 06	5 12	2 25	0 34	5 60	23 74

MD	INC	AZIM	TVR	VS	GRS	GEAW	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	ft/100ft	ft	deg
3275 00	0 38	207 45	3274 53	4 94	5 00	2 20	0 46	5 46	23 73
3300 00	0 46	201 37	3299 53	4 77	4 83	2 12	0 39	5 27	23 72
3325 00	0 46	207 90	3324 53	4 59	4 64	2 04	0 21	5 07	23 68
3350 00	0 47	212 83	3349 53	4 42	4 47	1 93	0 16	4 87	23 40
3375 00	0 56	200 07	3374 53	4 22	4 27	1 84	0 57	4 65	23 28
3400 00	0 48	216 36	3399 53	4 02	4 07	1 73	0 66	4 42	23 06
3425 00	0 48	207 06	3424 53	3 85	3 89	1 62	0 31	4 22	22 64
3450 00	0 53	194 12	3449 53	3 64	3 69	1 55	0 50	4 00	22 77
3475 00	0 62	189 66	3474 52	3 40	3 44	1 50	0 40	3 75	23 50
3500 00	0 81	201 52	3499 52	3 10	3 14	1 41	0 97	3 44	24 15
3525 00	0 97	198 26	3524 52	2 74	2 77	1 28	0 67	3 05	24 71
3550 00	0 92	202 09	3549 52	2 36	2 39	1 13	0 33	2 64	25 42
3575 00	0 87	202 62	3574 51	2 00	2 03	0 99	0 21	2 25	25 95
3600 00	0 90	204 91	3599 51	1 65	1 67	0 83	0 20	1 87	26 40
3625 00	0 85	205 39	3624 51	1 31	1 33	0 67	0 21	1 49	26 72
3650 00	0 95	202 31	3649 50	0 96	0 97	0 51	0 46	1 10	27 78
3675 00	1 05	201 76	3674 50	0 56	0 57	0 35	0 37	0 66	31 57
3700 00	1 00	205 81	3699 50	0 15	0 16	0 17	0 33	0 23	46 97
3725 00	1 05	200 53	3724 49	-0 26	-0 26	-0 01	0 42	0 26	181 92
3750 00	0 91	206 06	3749 49	-0 64	-0 65	-0 18	0 68	0 67	195 20
3775 00	0 90	206 95	3774 49	-0 99	-1 00	-0 35	0 09	1 06	199 37
3800 00	1 03	199 98	3799 48	-1 37	-1 39	-0 52	0 70	1 48	200 46
3825 00	1 05	202 66	3824 48	-1 79	1 81	-0 68	0 21	1 93	200 66
3850 00	1 14	202 80	3849 47	-2 22	-2 25	-0 87	0 35	2 41	201 07
3875 00	1 15	201 59	3874 47	-2 68	2 71	1 05	0 12	2 91	201 26
3900 00	1 05	203 16	3899 46	-3 12	-3 16	-1 24	0 42	3 39	201 42
3925 00	1 09	199 48	3924 46	3 55	3 59	1 41	0 32	3 86	201 40
3950 00	1 09	201 85	3949 45	-4 00	-4 04	-1 58	0 18	4 34	201 32
3975 00	0 96	207 73	3974 45	-4 40	-4 44	-1 76	0 69	4 78	201 62
4000 00	1 01	205 49	3999 45	-4 77	-4 83	-1 95	0 26	5 21	202 03
4025 00	0 77	202 95	4024 44	-5 12	-5 18	-2 11	0 97	5 59	202 19
4050 00	0 84	195 37	4049 44	-5 45	-5 51	-2 23	0 50	5 94	202 01

MD	INC	AZIM	TWD	VS	GRAS	HEAV	DLS	CLOSURE	CLOSURE
ft	deg	deg	ft	ft	ft	ft	%/100ft	DIST	DIR
4075 00	0 75	201 28	4074 44	-5 77	-5 84	-2 33	0 49	6 29	201 80
4100 00	0 74	199 84	4099 44	-6 07	-6 14	-2 45	0 09	6 61	201 74
4125 00	0 84	193 76	4124 43	-6 40	-6 47	-2 55	0 54	6 95	201 48
4150 00	0 92	191 32	4149 43	6 77	-6 84	-2 63	0 34	7 33	201 01
4175 00	0 93	190 95	4174 43	-7 16	-7 24	-2 71	0 04	7 73	200 50
4200 00	0 83	184 22	4199 43	-7 54	-7 62	-2 76	0 57	8 10	199 91
4225 00	0 97	181 78	4224 42	-7 93	-8 01	-2 78	0 59	8 48	199 13
4250 00	0 98	184 98	4249 42	-8 36	-8 43	-2 80	0 23	8 89	198 39
4275 00	1 09	176 65	4274 41	-8 81	-8 89	-2 81	0 75	9 32	197 54
4300 00	1 21	167 76	4299 41	-9 31	-9 38	-2 74	0 86	9 77	196 27
4325 00	1 20	172 00	4324 40	-9 83	-9 90	-2 65	0 36	10 25	194 96
4350 00	1 36	171 51	4349 40	-10 38	-10 45	-2 57	0 63	10 76	193 79
4375 00	1 65	163 89	4374 39	-11 02	11 09	-2 42	1 40	11 35	192 32
4400 00	1 74	166 45	4399 38	-11 74	-11 80	-2 23	0 50	12 01	190 71
4425 00	1 72	166 03	4424 37	12 48	12 54	-2 05	0 12	12 71	189 30
4450 00	1 60	170 43	4449 36	-13 19	-13 25	-1 90	0 68	13 38	188 18
4475 00	1 02	187 60	4474 35	-13 76	-13 81	-1 88	2 78	13 94	187 74
4500 00	0 75	218 26	4499 35	-14 10	-14 16	-2 01	2 15	14 30	188 07
4525 00	0 79	223 03	4524 34	-14 35	-14 42	-2 23	0 31	14 59	188 78
4550 00	0 60	226 06	4549 34	-14 56	-14 63	-2 44	0 78	14 84	189 46
4575 00	0 73	229 92	4574 34	-14 75	-14 83	-2 66	0 55	15 06	190 15
4600 00	0 66	244 27	4599 34	-14 91	-14 99	-2 91	0 75	15 27	190 97
4625 00	0 62	250 43	4624 34	-15 01	-15 10	-3 16	0 32	15 43	191 83
4650 00	0 57	300 60	4649 34	-14 99	-15 08	-3 40	2 02	15 46	192 70
4675 00	0 86	318 51	4674 33	-14 78	14 88	3 63	1 46	15 32	193 71
4700 00	0 80	319 83	4699 33	-14 50	-14 61	-3 87	0 25	15 11	194 83
4725 00	0 83	322 50	4724 33	-14 22	-14 33	-4 09	0 19	14 90	195 93
4750 00	0 73	316 33	4749 33	-13 95	-14 07	-4 31	0 52	14 72	197 02
4775 00	0 84	316 27	4774 33	-13 70	-13 82	-4 55	0 47	14 55	198 20
4800 00	0 80	312 73	4799 32	-13 44	-13 57	-4 80	0 28	14 40	199 48
4825 00	0 77	304 32	4824 32	-13 22	-13 36	-5 07	0 47	14 29	200 77
4850 00	0 71	310 04	4849 32	-13 02	-13 17	-5 32	0 39	14 20	202 01

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	0 73	307 06	4874 32	-12.82	-12.97	-5 57	0 19	14 11	203 24
4900 00	0 71	304 92	4899 31	-12.63	-12.78	-5 82	0 13	14 05	204 49
4925 00	0 68	288 72	4924 31	-12 48	-12.65	-6 09	0 80	14 04	205 72
4950 00	0 58	291 80	4949 31	-12.38	-12.55	-6 35	0 42	14 07	206 84
4975 00	0 65	289 10	4974 31	-12.28	-12.46	-6 60	0 28	14 10	207 92
5000 00	0 59	279 75	4999 31	-12.20	-12.39	-6 86	0 46	14 16	208 98
5025 00	0 60	273 44	5024 31	-12.17	-12.36	-7 12	0 26	14 26	209 93
5050 00	0 59	264 88	5049 31	-12 17	-12.37	-7 38	0 36	14 40	210 82
5075 00	0 58	255 29	5074 30	-12 20	-12.41	-7 63	0 39	14 57	211 58
5100 00	0 64	241 19	5099 30	-12 29	-12.51	7 87	0 64	14 78	212 18
5125 00	0 64	234 91	5124 30	-12 44	-12.66	-8 11	0 28	15 03	212 64
5150 00	0 65	224 81	5149 30	-12 61	-12.84	-8 32	0 46	15 30	212 96
5175 00	0 71	223 00	5174 30	-12 82	-13 05	-8 53	0 26	15 59	213 16
5200 00	0 77	216 45	5199 30	-13 06	-13 30	-8 73	0 41	15 91	213 29
5225 00	0 86	212 89	5224 29	-13 35	-13 59	-8 93	0 42	16 26	213 32
5250 00	0 88	215 35	5249 29	-13 66	-13 90	-9 15	0 16	16 64	213 34
5275 00	0 96	214 84	5274 29	-13 98	-14 23	-9 38	0 33	17 04	213 38
5300 00	0 98	207 67	5299 28	-14 33	-14 59	-9 59	0 49	17 46	213 33
5325 00	1 11	207 28	5324 28	-14 73	-15 00	-9 80	0 52	17 92	213 18
5350 00	1 25	206 13	5349 27	-15 18	-15 46	-10 04	0 56	18 43	213 00
5375 00	1 30	205 95	5374 27	-15 68	-15 95	-10 28	0 23	18 98	212 79
5400 00	1 33	207 59	5399 26	-16 18	16 47	-10 54	0 19	19 55	212 62
5425 00	1 40	206 86	5424 25	-16 70	-17 00	-10 81	0 27	20 14	212 46
5450 00	1 42	204 64	5449 25	-17 25	-17 55	-11 08	0 24	20 75	212 26
5475 00	1 34	206 68	5474 24	-17 79	-18 09	-11 34	0 40	21 35	212 07
5500 00	0 77	215 30	5499 23	-18 18	-18 49	-11 56	2 35	21 81	212 03
5525 00	0 32	251 95	5524 23	-18 33	-18 65	-11 73	2 17	22 03	212 17
5550 00	0 38	280 54	5549 23	-18 33	-18 65	-11 88	0 72	22 11	212 48
5575 00	0 42	261 04	5574 23	-18 33	-18 65	-12 05	0 57	22 21	212 86
5600 00	0 46	237 89	5599 23	-18 39	-18 72	-12 23	0 72	22 36	213 14
5625 00	0 59	243 32	5624 23	18 50	-18 83	-12 43	0 57	22 56	213 42
5650 00	0 52	234 27	5649 23	-18 62	-18 96	-12 63	0 47	22 78	213 68

MD	INC	AZIM	TVD	VS	GRV-S	SEAT	DLS	CLOSURE DIST	CLOSURE DIR
ft	deg	deg	ft	ft	ft	ft	%100ft	ft	deg
5675 00	0 37	234 95	5674 23	-18 72	-19 07	-12 79	0 57	22.96	213 85
5700 00	0.23	205 96	5699 23	-18 81	-19 16	-12.88	0 82	23 09	213 91
5725 00	0 09	155 09	5724 23	-18 87	-19 22	-12.89	0 74	23 15	213 85
5750 00	0 08	161 84	5749 23	-18 91	-19 26	-12.88	0 05	23 17	213 78
5775 00	0 13	152 78	5774 23	-18 95	-19 30	-12.86	0 20	23 19	213 68
5800 00	0 17	164 04	5799 23	-19 01	-19 36	-12.84	0 19	23 23	213 56
5825 00	0 12	176 42	5824 23	-19 07	-19 42	-12 83	0 21	23 27	213 45
5850 00	0 28	187 75	5849 23	-19 16	-19 51	-12 83	0 66	23 35	213 34
5875 00	0 33	204 60	5874 23	-19 28	-19 63	-12 87	0 41	23 48	213 25
5900 00	0 45	206 29	5899 23	-19 44	-19 79	-12 95	0 47	23 65	213 20
5925 00	0 75	216 07	5924 23	-19 65	-20 01	-13 09	1 28	23 91	213 19
5950 00	1 26	235 48	5949 22	-19 93	-20 30	-13 41	2 42	24 32	213 45
5975 00	2 35	246 91	5974 21	-20 27	-20 65	-14 11	4 58	25 01	214 34
6000 00	2 72	247 52	5999 18	-20 67	-21 08	-15 13	1 47	25 95	215 66
6025 00	2 84	246 92	6024 16	-21 11	-21 55	-16 25	0 49	26 99	217 01
6050 00	2 60	240 56	6049 13	-21 60	-22 07	-17 31	1 54	28 05	218 10
6075 00	1 92	237 09	6074 11	-22 09	-22 58	18 16	2 77	28 97	218 80
6100 00	0 92	231 89	6099 10	-22 43	-22 93	18 67	4 04	29 57	219 15
6125 00	0 67	211 17	6124 10	-22 67	-23 18	-18 90	1 52	29 91	219 19
6150 00	0 59	196 61	6149 10	-22 91	23 43	-19 01	0 70	30 17	219 06
6175 00	0 94	174 08	6174 09	23 24	-23 75	-19 03	1 82	30 43	218 69
6200 00	1 32	172 51	6199 09	-23 73	-24 24	-18 97	1 53	30 78	218 04
6225 00	1 48	171 57	6224 08	-24 34	-24 85	-18 88	0 67	31 21	217 23
6250 00	1 69	176 60	6249 07	-25 03	-25 54	-18 81	1 00	31 72	216 38
6275 00	1 69	180 73	6274 06	-25 77	-26 27	-18 80	0 49	32 30	215 58
6300 00	1 75	188 96	6299 05	-26 51	-27 02	-18 86	1 02	32 95	214 92
6325 00	1 95	192 59	6324 04	-27 30	-27 81	-19 01	0 93	33 69	214 36
6350 00	2 15	198 29	6349 02	-28 15	-28 67	-19 25	1 16	34 54	213 88
6375 00	2 38	204 05	6374 00	-29 06	-29 59	-19 61	1 27	35 50	213 53
6400 00	2 62	203 87	6398 98	-30 04	-30 59	-20 05	0 98	36 58	213 25
6425 00	2 36	222 25	6423 95	-30 93	31 49	20 63	3 34	37 65	213 23
6450 00	2 23	220 22	6448 93	-31 67	-32 24	-21 29	0 62	38 64	213 44

MD ft	INC deg	AZIM deg	TWD ft	VS ft	INCL ft	FE/W ft	DLS %/100ft	CLOSURE DIST ft	CLOSURE DIR deg
6475 00	1 70	227.13	6473 92	-32.28	-32.87	-21 88	2.33	39 48	213 65
6500 00	1 49	241.23	6498 91	-32.67	-33.28	-22 44	1.76	40 13	213 99
6525 00	1 31	248.40	6523 90	-32.92	-33 54	-22 99	1 01	40 66	214 43
6550 00	1 01	258 59	6548 90	-33 05	-33 69	-23 47	1.46	41 06	214 86
6575 00	0 78	299 31	6573 89	-33 01	-33 65	-23 83	2 64	41 24	215 31
6600 00	0 92	313 60	6598 89	-32.78	-33 43	-24 13	1 02	41 23	215 82
6625 00	1 01	334 64	6623 89	-32.43	-33 09	-24 37	1 45	41 09	216 37
6650 00	0 96	335 08	6648 88	-32.04	-32 70	-24 55	0 18	40 89	216 90
6675 00	0 64	319 75	6673 88	-31 74	-32 40	-24 73	1 53	40 76	217 35
6700 00	0 91	311 50	6698 88	-31 49	-32.17	-24 97	1 15	40 72	217 82
6725 00	0 76	287 80	6723 88	-31 30	-31 98	-25 27	1 49	40 76	218 32
6750 00	0 84	278 95	6748 87	-31 21	-31 90	-25 61	0 59	40 91	218 76
6775 00	0 89	266.36	6773 87	-31 19	-31.89	-25 99	0 78	41 14	219 18
6800 00	0 95	239 02	6798 87	-31 30	-32.01	-26 36	1 76	41 46	219 47
6825 00	0 91	236.22	6823 87	-31 50	-32 22	-26 70	0 26	41 85	219 65
6840 00	0 88	234 46	6838 86	-31 63	-32.36	-26 89	0 26	42 07	219 73



NM OIL CONSERVATION
ARTESIA DISTRICT

MAR 05 2018

RECEIVED

COG Operating LLC

Eddy County, NM (NAD83 NME)

Craig Federal Com

2H

OH

Design: Surveys (Ensign 155)

Standard Survey Report

05 September, 2017





Phoenix Technology Services LP
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 2H
Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	GL + KB @ 3393.80usft (Ensign 155)
Site:	Craig Federal Com	MD Reference:	GL + KB @ 3393.80usft (Ensign 155)
Well:	2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	Compass 5000 GCR

Project:	Eddy County, NM (NAD83 NME)		
Map System	US State Plane 1983	System Datum	Mean Sea Level
Geo Datum	North American Datum 1983		
Map Zone	New Mexico Eastern Zone		

Site:	Craig Federal Com
--------------	-------------------

Site Position		Northing	391,815.00 usft	Latitude	32° 4' 37.75262 N
From	Map	Easting	566,289.40 usft	Longitude	104° 15' 9.98177 W
Position Uncertainty	0.00 usft	Slot Radius	13-3/16 "	Grid Convergence	0.04 "

Well	2H					
Well Position	+N-S	0 00 usft	Northing	391,815 00 usft	Latitude	32° 4' 37 75262 N
	+E-W	0 00 usft	Easting	566,289 40 usft	Longitude	104° 15' 9 98177 W
Position Uncertainty		0 00 usft	Wellhead Elevation	0 00 usft	Ground Level	3,369 80 usft

Wellbore:	OH
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Magnetics	Model Name	Sample Date	Declination	Dip Angle	Field Strength
	HDGM	8/31/2017	7.43	59.78	47,984

Design:	Surveys (Ensign 155)
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Audit Notes					
Version	1.0	Phase	ACTUAL	Tie On Depth	0.00

Vertical Section:	Depth From (TVD)	+N-S	+E-W	Direction
	(usft)	(usft)	(usft)	(°)
	0.00	0.00	0.00	358.48

Survey Program:		Date: 8/5/2017		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
165.00	6,840.00	Phoenix MWD Surveys (Pre-Gyro) (OH)	MWD+IFR1+MS	OWSG Rev 2 MWD + IFR1 + Multi-Station Corre
6,910.00	18,446.00	Phoenix MWD Surveys (OH)	MWD+IFR1+MS	OWSG Rev 2 MWD + IFR1 + Multi-Station Corre

Survey									
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00	0 00
165 00	1 08	291 09	164 99	0 56	-1 45	0 60	0 65	0 65	0 00
226 00	1 20	294 75	225 98	1 03	2 57	1 10	0 23	0 20	6 00
317 00	1 07	299 63	316 96	1 85	-4 17	1 96	0 18	-0 14	5 36
376 00	0 97	294 46	375 95	2 33	-5 10	2 47	0 23	-0 17	-8 76
501 00	0 66	281 84	500 94	2 92	-6 77	3 10	0 29	-0 25	-10 10
594 00	0 59	273 99	593 93	3 06	7 77	3 27	0 12	-0 08	-8 44
685 00	0 52	264 46	684 93	3 05	-8 65	3 28	0 13	-0 08	-10 47
775 00	0 51	275 80	774 92	3 05	-9 46	3 30	0 11	-0 01	12 60
865 00	0 14	223 05	864 92	3 01	-9 93	3 28	0 49	-0 41	-58 61



Phoenix Technology Services LP
Survey Report



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Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	GL + KB @ 3393 80usft (Ensign 155)
Site:	Craig Federal Com	MD Reference:	GL + KB @ 3393 80usft (Ensign 155)
Well:	2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	Compass 5000 GCR

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
956 00	0 43	120 00	955 92	2 76	9 71	3 02	0 53	0 32	-113 24
1,047 00	0 46	136 01	1,046 92	2 33	-9 16	2 57	0 14	0 03	17 59
1,138 00	0 42	174 60	1,137 92	1 73	-8 88	1 97	0 32	-0 04	42 41
1,228 00	0 46	184 10	1 227 91	1 05	-8 87	1 28	0 09	0 04	10 56
1,318 00	0 98	133 32	1,317 91	0 16	-8 34	0 38	0 86	0 58	56 42
1 409 00	2 40	113 87	1,408 87	-1 15	-6 03	-0 99	1 66	1 56	21 37
1,504 00	2 13	102 84	1,503 79	-2 34	2 49	-2 28	0 54	-0 28	-11 61
1,598 00	2 50	81 96	1,597 72	-2 45	1 24	-2 48	0 97	0 39	-22 21
1,692 00	2 50	75 05	1,691 63	-1 63	5 26	-1 77	0 32	0 00	-7 35
1,786 00	0 89	26 00	1,785 59	-0 45	7 56	-0 65	2 16	-1 71	-52 18
1,880 00	1 20	296 69	1,879 58	0 65	7 00	0 47	1 58	0 33	-95 01
1,975 00	1 46	292 20	1 974 55	1 56	4 99	1 42	0 29	0 27	-4 73
2 069 00	0 92	303 61	2,068 53	2 43	3 25	2 34	0 62	-0 57	12 14
2,163 00	0 68	311 01	2 162 52	3 21	2 20	3 15	0 28	-0 26	7 87
2,258 00	0 55	321 79	2,257 52	3 94	1 49	3 90	0 18	-0 14	11 35
2,382 00	0 41	308 55	2 381 51	4 68	0 78	4 66	0 14	-0 11	-10 68
2,445 00	0 48	323 64	2 444 51	5 04	0 45	5 02	0 22	0 11	23 95
2,539 00	0 45	327 03	2,538 51	5 66	0 01	5 66	0 04	-0 03	3 61
2,633 00	0 38	324 24	2 632 50	6 23	-0 37	6 23	0 08	-0 07	-2 97
2 727 00	0 23	306 04	2,726 50	6 59	-0 71	6 61	0 19	-0 16	-19 36
2,821 00	0 20	297 19	2,820 50	6 78	-1 00	6 80	0 05	-0 03	-9 41
2,915 00	0 16	196 08	2 914 50	6 72	-1 19	6 75	0 30	-0 04	-107 56
3 010 00	0 19	191 45	3,009 50	6 44	-1 26	6 47	0 03	0 03	-4 87
3 104 00	0 13	205 73	3,103 50	6 19	-1 33	6 23	0 08	-0 06	15 19
3 198 00	0 32	232 74	3 197 50	5 94	-1 59	5 98	0 23	0 20	28 73
3 292 00	0 40	198 47	3 291 50	5 47	-1 90	5 52	0 24	0 09	-36 46
3,386 00	0 54	195 14	3,385 50	4 73	-2 12	4 78	0 15	0 15	-3 54
3 481 00	0 51	214 52	3 480 49	3 95	-2 48	4 01	0 19	-0 03	20 40
3 575 00	0 90	197 60	3 574 48	2 90	-2 94	2 98	0 47	0 41	-18 00
3,668 00	1 03	193 24	3 667 47	1 39	-3 35	1 48	0 16	0 14	-4 69
3 762 00	1 14	199 02	3 761 45	-0 32	-3 85	-0 21	0 16	0 12	6 15
3 856 00	1 11	205 44	3,855 44	-2 02	-4 54	-1 90	0 14	-0 03	6 83
3 950 00	1 17	210 08	3,949 42	-3 67	-5 42	-3 53	0 12	0 06	4 94
4 044 00	1 05	201 78	4,043 40	-5 30	-6 22	-5 14	0 21	-0 13	-8 83
4 138 00	0 75	197 26	4 137 39	-6 69	-6 72	-6 51	0 33	-0 32	-4 81
4 232 00	0 97	183 55	4 231 38	-8 07	-6 95	-7 89	0 32	0 23	-14 59
4 326 00	1 29	176 99	4 325 36	-9 92	-6 94	-9 74	0 37	0 34	-6 98
4,420 00	1 75	163 32	4 419 33	-12 36	-6 48	-12 18	0 62	0 49	-14 54
4,514 00	0 82	202 59	4,513 30	-14 35	-6 32	-14 18	1 31	-0 99	41 78
4 608 00	0 70	235 47	4 607 30	-15 30	-7 05	-15 11	0 47	-0 13	34 98
4,703 00	0 70	325 07	4,702 29	-15 15	-7 86	-14 94	1 04	0 00	94 32
4 796 00	1 01	314 80	4 795 28	-14 11	-8 77	-13 87	0 37	0 33	-11 04
4,890 00	0 62	306 86	4,889 27	-13 22	9 77	-12 96	0 43	-0 41	-8 45



Phoenix Technology Services LP
Survey Report



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Site:	Craig Federal Com	MD Reference:	GL + KB @ 3393 80usft (Ensign 155)
Well:	2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	Compass 5000 GCR

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
4,984 00	0 79	294 08	4,983 26	-12 65	-10 76	-12 36	0 25	0 18	-13 60
5 078 00	0 53	260 19	5,077 26	-12 46	-11 78	-12 14	0 49	-0 28	36 05
5,173 00	0 76	232 97	5,172 25	-12 91	-12 72	-12 57	0 40	0 24	-28 65
5,268 00	0 92	210 92	5,267 24	-13 95	-13 62	-13 58	0 38	0 17	-23 21
5,362 00	1 19	204 83	5,361 23	-15 48	-14 41	-15 09	0 31	0 29	-6 48
5 456 00	1 60	208 66	5,455 20	-17 52	-15 45	-17 10	0 45	0 44	4 07
5,550 00	0 40	278 99	5 549 18	-18 62	-16 41	-18 18	1 61	-1 28	74 82
5 644 00	0 52	251 55	5,643 18	-18 70	-17 13	-18 24	0 26	0 13	-29 19
5,738 00	0 06	126 86	5,737 18	-18 87	-17 50	-18 40	0 59	-0 49	-132 65
5,832 00	0 04	65 64	5,831 18	-18 88	-17 43	-18 41	0 06	-0 02	-65 13
5,926 00	0 45	197 41	5,925 18	-19 22	-17 51	-18 75	0 51	0 44	140 18
6,020 00	2 86	250 63	6,019 14	-20 35	-19 83	-19 82	2 78	2 56	56 62
6,114 00	1 25	229 90	6,113 07	-21 79	-22 83	-21 18	1 86	1 71	-22 05
6 208 00	1 12	170 86	6 207 06	-23 36	-23 47	-22 73	1 25	-0 14	-62 81
6,303 00	1 71	181 41	6,302 03	-25 69	-23 36	-25 06	0 68	0 62	11 11
6,397 00	2 53	201 16	6,395 96	-29 03	-24 14	-28 38	1 16	0 87	21 01
6,491 00	1 97	228 66	6,489 89	-32 03	-26 10	-31 33	1 28	-0 60	29 26
6 585 00	0 73	272 56	6 583 87	-33 07	-27 91	-32 32	1 63	-1 32	46 70
6,678 00	1 25	340 22	6,676 86	-32 09	-28 85	-31 31	1 27	0 56	72 75
6,772 00	0 84	257 23	6 770 84	-31 28	-29 87	-30 47	1 51	-0 44	-88 29
6,840 00	0 81	239 61	6,838 84	-31 63	-30 77	-30 80	0 37	-0 04	-25 90
Tie In									
6,910 00	0 87	222 11	6,908 83	-32 28	-31 56	-31 43	0 37	0 08	-25 01
First Phoenix MWD Survey									
6,967 00	0 62	301 22	6,965 83	-32 44	-32 11	-31 58	1 70	-0 44	138 79
6 998 00	4 66	331 26	6,996 79	-31 25	-32 86	-30 36	13 34	13 03	96 90
7,029 00	8 46	329 66	7,027 58	-28 17	-34 62	-27 25	12 27	12 26	-5 16
7,061 00	11 62	329 36	7,059 08	-23 37	-37 45	-22 37	9 88	9 88	-0 94
7,092 00	15 19	331 84	7,089 24	-17 10	-40 96	-16 01	11 66	11 52	8 00
7 124 00	18 54	333 97	7,119 85	-8 83	-45 17	-7 63	10 64	10 47	6 66
7,155 00	20 98	338 66	7,149 03	0 77	-49 35	2 08	9 38	7 87	15 13
7,187 00	23 28	342 87	7,178 67	12 15	-53 30	13 56	8 73	7 19	13 16
7 218 00	26 62	345 13	7 206 78	24 72	-56 89	26 22	11 20	10 77	7 29
7 249 00	29 30	344 99	7,234 15	38 76	-60 64	40 36	8 65	8 65	-0 45
7 281 00	32 24	343 43	7 261 65	54 51	-65 10	56 22	9 52	9 19	-4 88
7,312 00	34 97	343 65	7,287 46	70 96	-69 96	72 80	8 82	8 81	0 71
7 343 00	38 24	343 52	7 312 35	88 69	-75 19	90 66	10 55	10 55	-0 42
7,375 00	41 86	342 88	7,336 84	108 40	-81 14	110 52	11 39	11 31	-2 00
7,406 00	45 18	341 69	7,359 31	128 73	-87 64	131 01	11 03	10 71	-3 84
7,438 00	48 33	340 01	7,381 24	150 74	-95 29	153 22	10 56	9 84	-5 25
7,469 00	52 03	339 14	7,401 08	173 05	-103 61	175 74	12 13	11 94	-2 81
7,500 00	55 23	336 35	7,419 47	196 14	-113 07	199 07	12 61	10 32	-9 00
7,532 00	59 36	336 03	7,436 75	220 77	-123 94	223 98	12 93	12 91	-1 00
7 563 00	63 51	336 08	7,451 57	245 65	-134 99	249 14	13 39	13 39	0 16



Phoenix Technology Services LP
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 2H:
Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	GL + KB @ 3393.80usft (Ensign 155)
Site:	Craig Federal Com.	MD Reference:	GL + KB @ 3393.80usft (Ensign 155)
Well:	2H	North Reference:	Grid:
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	Compass 5000 GCR

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
7,594.00	67.25	336.52	7,464.49	271.45	-146.31	275.24	12.13	12.06	1.42
7,626.00	70.13	335.78	7,476.11	298.71	-158.36	302.81	9.25	9.00	-2.31
7,657.00	73.03	334.07	7,485.91	325.34	-170.83	329.76	10.72	9.35	-5.52
7,689.00	76.10	332.56	7,494.42	352.90	-184.68	357.68	10.62	9.59	-4.72
7,720.00	79.00	332.77	7,501.11	379.79	-198.58	384.92	9.38	9.35	0.68
7,752.00	82.41	332.93	7,506.27	407.88	-212.99	413.39	10.67	10.66	0.50
7,785.00	86.44	332.45	7,509.48	437.06	-228.06	442.96	12.30	12.21	-1.45
7,879.00	89.27	335.93	7,513.00	521.60	-268.94	528.56	4.77	3.01	3.70
7,973.00	89.41	337.81	7,514.08	608.04	-305.86	615.94	2.01	0.15	2.00
8,067.00	88.46	340.61	7,515.83	695.89	-339.22	704.65	3.14	-1.01	2.98
8,160.00	89.30	345.28	7,517.65	784.76	-366.48	794.21	5.10	0.90	5.02
8,254.00	91.88	349.16	7,516.68	876.40	-387.27	886.37	4.96	2.74	4.13
8,349.00	93.36	353.34	7,512.34	970.17	-401.70	980.50	4.66	1.56	4.40
8,442.00	89.16	357.77	7,510.29	1,062.83	-408.90	1,073.31	6.56	-4.52	4.76
8,537.00	89.52	1.62	7,511.38	1,157.80	-409.41	1,168.26	4.07	0.38	4.05
8,631.00	88.85	1.73	7,512.72	1,251.75	-406.66	1,262.11	0.72	-0.71	0.12
8,725.00	88.80	2.19	7,514.65	1,345.68	-403.45	1,355.91	0.49	-0.05	0.49
8,819.00	89.80	0.65	7,515.80	1,439.64	-401.12	1,449.78	1.95	1.06	-1.64
8,913.00	90.64	0.77	7,515.44	1,533.63	-399.95	1,543.71	0.90	0.89	0.13
9,008.00	89.08	1.23	7,515.67	1,628.61	-398.29	1,638.61	1.71	-1.64	0.48
9,102.00	89.75	1.13	7,516.63	1,722.58	-396.36	1,732.50	0.72	0.71	-0.11
9,196.00	89.94	1.36	7,516.88	1,816.56	-394.32	1,826.39	0.32	0.20	0.24
9,290.00	90.42	1.22	7,516.59	1,910.54	-392.20	1,920.28	0.53	0.51	-0.15
9,385.00	89.47	0.67	7,516.68	2,005.52	-390.63	2,015.19	1.16	-1.00	-0.58
9,479.00	89.36	0.67	7,517.64	2,099.51	-389.53	2,109.11	0.12	-0.12	0.00
9,573.00	89.72	1.17	7,518.39	2,193.50	-388.03	2,203.02	0.66	0.38	0.53
9,667.00	89.94	2.25	7,518.67	2,287.45	-385.22	2,296.87	1.17	0.23	1.15
9,761.00	88.96	1.16	7,519.57	2,381.40	-382.42	2,390.72	1.56	-1.04	-1.16
9,855.00	89.08	359.36	7,521.18	2,475.38	-382.00	2,484.65	1.92	0.13	-1.91
9,949.00	88.77	0.10	7,522.95	2,569.37	-382.44	2,578.61	0.85	-0.33	0.79
10,044.00	88.46	0.31	7,525.24	2,664.34	-382.10	2,673.54	0.39	-0.33	0.22
10,138.00	89.55	359.62	7,526.87	2,758.32	-382.16	2,767.50	1.37	1.16	0.73
10,232.00	88.43	359.37	7,528.53	2,852.30	-382.99	2,861.46	1.22	-1.19	-0.27
10,326.00	85.93	359.89	7,533.16	2,946.18	-383.59	2,955.32	2.72	-2.66	0.55
10,420.00	87.25	359.72	7,538.75	3,040.01	-383.91	3,049.13	1.42	1.40	-0.18
10,515.00	88.32	359.66	7,542.42	3,134.93	-384.43	3,144.04	1.13	1.13	-0.06
10,610.00	89.69	359.73	7,544.07	3,229.92	-384.93	3,239.00	1.44	1.44	0.07
10,704.00	92.27	359.42	7,542.46	3,323.89	-385.63	3,332.96	2.76	2.74	-0.33
10,798.00	92.50	359.17	7,538.55	3,417.80	-386.78	3,426.87	0.36	0.24	-0.27
10,892.00	91.88	0.23	7,534.96	3,511.73	-387.28	3,520.78	1.31	-0.66	1.13
10,986.00	91.26	0.14	7,532.38	3,605.70	-386.97	3,614.70	0.67	-0.66	-0.10
11,080.00	91.37	0.06	7,530.22	3,699.67	-386.81	3,708.64	0.14	0.12	-0.09
11,174.00	90.56	359.65	7,528.64	3,793.66	-387.05	3,802.60	0.97	-0.86	-0.44



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Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
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11,268 00	89 52	358 31	7,528 58	3,887 64	-388 72	3,896 59	1 80	-1 11	-1 43
11,362 00	88 82	0 27	7,529 94	3,981 62	-389 88	3,990 56	2 21	-0 74	2 09
11,456 00	92 61	1 96	7,528 76	4,075 57	-388 06	4,084 44	4 41	4 03	1 80
11,551 00	93 14	2 09	7,524 00	4 170 39	-384 70	4,179 13	0 57	0 56	0 14
11,645 00	93 56	2 04	7,518 51	4 264 17	-381 32	4,272 79	0 45	0 45	-0 05
11 739 00	90 03	2 53	7 515 56	4 358 03	-377 58	4 366 52	3 79	-3 76	0 52
11,830 00	90 81	2 22	7,514 90	4,448 95	-373 81	4,457 31	0 92	0 86	-0 34
11,920 00	91 15	3 03	7,513 36	4,538 84	-369 68	4,547 06	0 98	0 38	0 90
12,009 00	88 49	2 86	7,513 64	4,627 72	-365 11	4,635 78	2 99	-2 99	-0 19
12,100 00	88 71	3 30	7,515 86	4 718 56	-360 22	4 728 46	0 54	0 24	0 48
12,191 00	88 54	3 26	7,518 04	4 809 38	-355 02	4,817 11	0 19	-0 19	-0 04
12,283 00	91 04	2 18	7,518 38	4 901 27	-350 65	4 908 85	2 96	2 72	-1 17
12 374 00	93 70	0 30	7,514 62	4,992 16	-348 68	4 999 66	3 58	2 92	-2 07
12 464 00	94 71	358 49	7,508 02	5 081 91	-349 63	5,089 40	2 30	1 12	-2 01
12,554 00	93 84	358 47	7,501 31	5,171 62	-352 01	5,179 15	0 97	-0 97	-0 02
12,645 00	92 47	358 03	7,496 30	5 262 44	-354 79	5,270 01	1 58	-1 51	-0 48
12 739 00	90 90	358 24	7,493 54	5,356 35	-357 84	5 363 96	1 69	-1 67	0 22
12,833 00	89 61	358 75	7 493 12	5 450 31	-360 31	5 457 96	1 48	-1 37	0 54
12 928 00	90 39	359 12	7,493 12	5 545 29	-362 08	5 552 95	0 91	0 82	0 39
13,022 00	91 46	359 59	7 491 60	5 639 27	-363 14	5,646 93	1 24	1 14	0 50
13,116 00	91 20	0 21	7,489 42	5,733 25	-363 30	5 740 87	0 72	-0 28	0 66
13 210 00	92 41	0 97	7 488 46	5,827 19	-362 33	5 834 76	1 52	1 29	0 81
13,304 00	90 61	0 80	7,483 98	5 921 15	-360 88	5,928 64	1 92	-1 91	-0 18
13,399 00	90 98	0 86	7,482 66	6 016 13	-359 51	6 023 55	0 39	0 39	0 06
13,493 00	89 75	0 46	7 482 06	6 110 12	-358 42	6 117 48	1 38	-1 31	-0 43
13,587 00	90 98	1 12	7 481 46	6 204 10	-357 13	6 211 40	1 48	1 31	0 70
13,681 00	88 85	0 87	7,481 60	6,298 08	-355 50	6 305 30	2 28	-2 27	-0 27
13 776 00	89 75	1 05	7 482 76	6 393 06	-353 90	6 400 21	0 97	0 95	0 19
13 870 00	88 48	0 75	7 484 22	6,487 04	-352 43	6 494 11	1 39	-1 35	-0 32
13,964 00	89 97	1 37	7 485 49	6 581 01	-350 69	6 588 00	1 72	1 59	0 66
14 058 00	89 39	1 56	7 486 01	6,674 98	-348 29	6 681 87	0 65	-0 62	0 20
14 152 00	90 39	2 04	7 486 19	6 768 93	-345 33	6 775 71	1 18	1 06	0 51
14 246 00	88 49	1 43	7 487 11	6,862 88	-342 49	6 869 55	2 12	-2 02	-0 65
14,341 00	89 55	1 46	7 488 74	6,957 83	-340 09	6 964 41	1 12	1 12	0 03
14 435 00	91 04	2 12	7,488 25	7 051 78	-337 16	7 058 25	1 73	1 59	0 70
14 529 00	89 52	0 92	7,487 79	7 145 74	-334 66	7 152 11	2 06	-1 62	-1 28
14 624 00	90 22	1 23	7 488 01	7 240 73	-332 88	7,247 01	0 81	0 74	0 33
14,717 00	91 74	2 08	7,486 42	7,333 67	-330 20	7,339 85	1 87	1 63	0 91
14,811 00	90 34	0 49	7,484 71	7,427 63	-328 09	7 433 72	2 25	-1 49	-1 69
14,905 00	90 17	358 70	7,484 29	7,521 62	-328 75	7 527 70	1 91	-0 18	-1 90
14 999 00	92 61	359 01	7,482 01	7,615 56	-330 63	7 621 66	2 62	2 60	0 33
15,093 00	90 84	359 10	7,479 18	7,709 51	-332 18	7,715 61	1 89	-1 88	0 10
15,187 00	88 85	358 41	7 479 44	7 803 48	-334 22	7,809 60	2 24	-2 12	-0 73



Phoenix Technology Services LP
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 2H
Project:	Eddy County, NM (NAD83 NME)	TVD Reference:	GL + KB @ 3393 80usft (Ensign 155)
Site:	Craig Federal Corn	MD Reference:	GL + KB @ 3393 80usft (Ensign 155)
Well:	2H	North Reference:	Grid:
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	Compass 5000 GCR

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
15,281 00	86 83	358 23	7,482 98	7,897 37	-336 98	7,903 53	2 16	-2 15	-0 19
15,375 00	87 73	358 78	7 487 44	7,991 23	-339 43	7 997 42	1 12	0 96	0 59
15,469 00	88 99	359 37	7,490 13	8,085 17	-340 94	8,091 38	1 48	1 34	0 63
15,563 00	89 19	0 54	7,491 63	8,179 16	-341 02	8,185 33	1 26	0 21	1 24
15,656 00	89 64	0 76	7,492 57	8,272 15	-339 96	8,278 26	0 54	0 48	0 24
15,750 00	90 59	1 13	7,492 39	8,366 13	-338 41	8,372 17	1 08	1 01	0 39
15,844 00	91 26	1 74	7,490 87	8,460 09	-336 06	8,466 03	0 96	0 71	0 65
15,938 00	92 52	2 61	7,487 77	8,553 97	-332 49	8,559 78	1 63	1 34	0 93
16,032 00	91 46	1 75	7,484 50	8,647 84	-328 92	8,653 53	1 45	-1 13	-0 91
16 126 00	90 36	1 29	7 483 01	8,741 80	-326 43	8 747 38	1 27	-1 17	-0 49
16,220 00	90 92	0 95	7,481 96	8,835 77	-324 59	8,841 28	0 70	0 60	-0 36
16,314 00	91 88	0 67	7,479 66	8,929 73	-323 26	8 935 17	1 06	1 02	-0 30
16,408 00	93 23	0 97	7,475 47	9 023 63	-321 92	9,028 99	1 47	1 44	0 32
16,502 00	90 89	0 34	7,472 10	9,117 55	-320 84	9,122 86	2 58	-2 49	-0 67
16 597 00	92 10	0 16	7,469 62	9 212 52	-320 43	9,217 78	1 29	1 27	-0 19
16,691 00	91 37	359 31	7,466 77	9,306 47	-320 86	9,311 71	1 19	-0 78	-0 90
16 785 00	92 35	0 12	7 463 72	9,400 42	-321 33	9 405 64	1 35	1 04	0 86
16 880 00	91 34	0 77	7,460 66	9,495 37	-320 59	9,500 53	1 26	-1 06	0 68
16,974 00	92 72	0 74	7 457 33	9,589 30	-319 36	9,594 40	1 47	1 47	-0 03
17,068 00	90 56	0 93	7 454 64	9,683 24	-317 99	9,688 27	2 31	-2 30	0 20
17,160 00	90 95	1 12	7 453 43	9,775 22	-316 34	9 780 17	0 47	0 42	0 21
17,254 00	93 23	1 65	7 450 00	9,869 12	-314 07	9 873 98	2 49	2 43	0 56
17,348 00	91 96	1 02	7 445 75	9 963 00	-311 88	9,967 77	1 51	-1 35	-0 67
17,443 00	89 47	0 34	7,444 56	10,057 98	-310 76	10,062 68	2 72	-2 62	-0 72
17,537 00	90 81	0 30	7,444 33	10,151 97	-310 23	10,156 63	1 43	1 43	-0 04
17,632 00	92 38	0 40	7,441 69	10,246 93	-309 65	10,251 54	1 66	1 65	0 11
17 726 00	90 92	0 87	7 438 98	10,340 88	-308 61	10 345 43	1 63	-1 55	0 50
17,820 00	88 18	0 85	7,439 72	10,434 86	-307 20	10,439 34	2 91	-2 91	-0 02
17,914 00	90 03	1 20	7,441 19	10,528 83	-305 52	10,533 23	2 00	1 97	0 37
18,008 00	88 35	2 05	7 442 52	10 622 78	-302 85	10 627 08	2 00	-1 79	0 90
18 103 00	89 83	2 65	7 444 02	10 717 69	-298 96	10 721 84	1 68	1 56	0 63
18 197 00	89 10	3 22	7 444 90	10,811 56	-294 14	10 815 56	0 99	-0 78	0 61
18 291 00	91 12	1 09	7,444 72	10 905 48	-290 61	10,909 35	3 12	2 15	-2 27
18 384 00	93 28	1 21	7 441 15	10 998 39	-288 75	11,002 18	2 33	2 32	0 13
Final Phoenix MWD Survey									
18,446 00	93 28	1 21	7 437 60	11,060 27	-287 44	11 064 00	0 00	0 00	0 00
Projection to TD									



Phoenix Technology Services LP
Survey Report



Company:	COG Operating LLC	Local Co-ordinate Reference:	Well 2H:
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Site:	Craig Federal Com	MD Reference:	GL + KB @ 3393 80usft (Ensign 155)
Well:	2H	North Reference:	Grid
Wellbore:	OH	Survey Calculation Method:	Minimum Curvature
Design:	Surveys (Ensign 155)	Database:	Compass 5000 GCR

Design Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N-S (usft)	+E-W (usft)	
6,840 00	6,838 84	-31 63	-30 77	Tie In
6,910 00	6,908 83	-32 28	-31 56	First Phoenix MWD Survey
18,384 00	7,441 15	10,998 39	-288 75	Final Phoenix MWD Survey
18,446 00	7,437 60	11,060 27	-287 44	Projection to TD