



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

RECEIVED

MAY 26 15

HOBBS OCD

SEP 02 2015

RECEIVED

Well Name and Num: Macho Nacho State Com #7H
Location: Sec 7, T24S, R33E
Operator: COG
Drilling Contractor: McVay Drilling Company

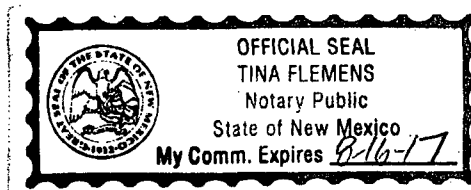
The undersigned certifies that he is an authorized representative of the drilling contractor who drilled the above described well and that he has conducted deviation tests and obtained the following results:

Degrees @	Depth	Degrees @	Depth	Degrees @	Depth
0.60	316	0.10	5564	90.90	12136
0.20	566	0.10	5846	91.30	12419
0.50	816	0.90	6130	88.70	12797
0.08	1088	0.60	6508	89.60	13176
0.60	1189	0.50	6885	90.10	13648
0.60	1316	0.30	7263	90.50	14025
0.30	1692	0.20	7641		
0.10	2070	0.60	7830		
0.20	2488	1.10	8207		
0.20	2826	32.10	9210		
0.10	3204	52.40	9399		
0.20	3581	78.60	9587		
0.10	3959	88.60	10060		
0.50	4337	88.30	10532		
0.60	4714	89.10	10720		
1.10	4903	91.40	11192		
0.90	5281	88.20	11664		

By: [Signature]

Subscribed and sworn to before me this 20th day of May, 2015

[Signature]
Notary Public, Lea County, New Mexico



SEP 02 2015

[Signature]

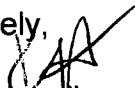
May 19, 2015

Concho Resources, Inc.
One Concho Center
600 W. Illinois Avenue
Midland, Texas 79701

Attn: Kanicia Castillo

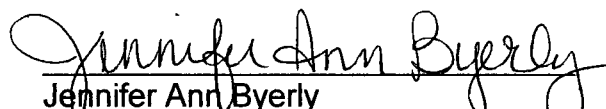
RE: **Macho Nacho State Com 7H**

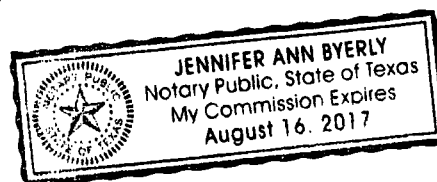
Please find enclosed a copy of the survey from 0' to 8760' ran on the above referenced well.

Sincerely,

Keith Havelka
Operations

STATE OF TEXAS §
 §
COUNTY OF NUECES §

This instrument was acknowledged before me on the 19 day of May,
A.D., 2015, by Keith Havelka.


Jennifer Ann Byerly
Notary Public, State of Texas





Company: Cog Operating LLC
Lease/Well: Macho Nacho Com /7H

Rig Name: McVay 8
State/County: New Mexico /Lea
VS-Azi: 0.00 Degrees
Latitude: 32.22534, Longitude: -103.60970
Grid Convergence Applied = -0.39 degs (NAD 27)
Grid North = True North -0.39 degs



Depth Reference : R.K.B= 25 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS
Filename: macho nacho com well 7h-de_01.ut
Minimum Curvature Method
Report Date/Time: 5/19/2015 / 14:00

VES Survey International
(432) 563-5444
West Texas
Surveyor: Javier Estrada
Macho Nacho State Com 7H / API 36-025-42489

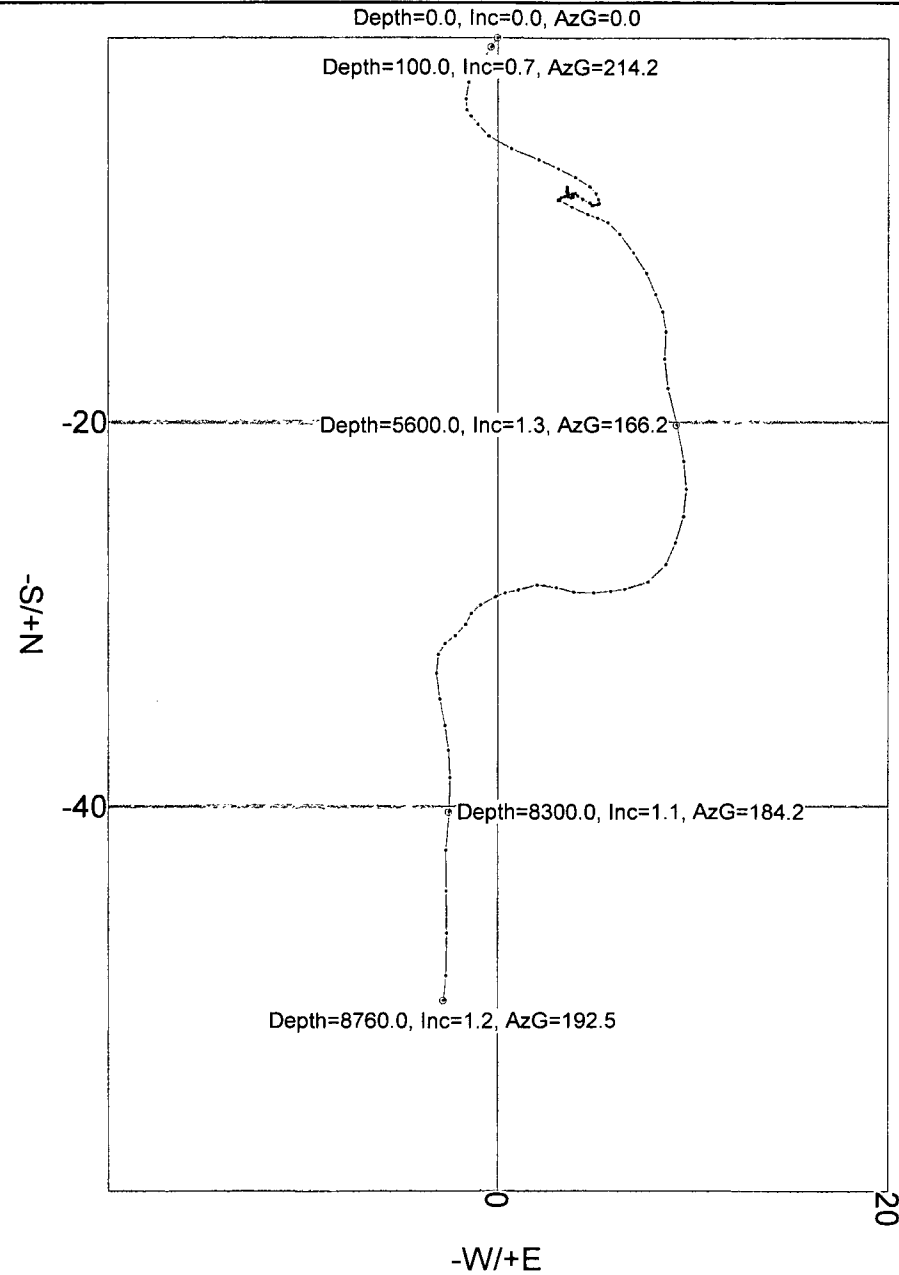
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	****
100.00	0.65	214.19	100.00	-0.47	-0.32	-0.47	0.57	214.19	0.65
200.00	0.66	215.04	199.99	-1.41	-0.97	-1.41	1.72	214.48	0.01
300.00	0.57	203.15	299.99	-2.34	-1.50	-2.34	2.78	212.58	0.15
400.00	0.47	174.04	399.98	-3.20	-1.65	-3.20	3.60	207.24	0.28
500.00	0.18	172.54	499.98	-3.76	-1.59	-3.76	4.08	202.86	0.29
600.00	0.31	135.73	599.98	-4.11	-1.38	-4.11	4.33	198.57	0.19
700.00	0.32	142.43	699.98	-4.52	-1.03	-4.52	4.63	192.80	0.04
800.00	0.63	134.94	799.97	-5.13	-0.47	-5.13	5.15	185.20	0.32
900.00	0.92	108.96	899.97	-5.78	0.69	-5.78	5.82	173.21	0.45
1000.00	0.82	115.29	999.95	-6.35	2.10	-6.35	6.68	161.73	0.14
1100.00	0.45	115.27	1099.95	-6.82	3.10	-6.82	7.49	155.58	0.36
1200.00	0.66	118.58	1199.94	-7.26	3.96	-7.26	8.27	151.40	0.21
1300.00	0.35	130.06	1299.94	-7.74	4.70	-7.74	9.05	148.71	0.33
1400.00	0.23	153.70	1399.94	-8.11	5.02	-8.11	9.54	148.23	0.17
1500.00	0.15	169.46	1499.94	-8.42	5.14	-8.42	9.86	148.62	0.09
1600.00	0.10	166.54	1599.94	-8.63	5.18	-8.63	10.07	149.03	0.06

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1700.00	0.12	298.21	1699.94	-8.66	5.10	-8.66	10.05	149.49	0.20
1800.00	0.16	230.17	1799.94	-8.70	4.90	-8.70	9.98	150.62	0.16
1900.00	0.07	18.89	1899.94	-8.74	4.81	-8.74	9.97	151.18	0.22
2000.00	0.17	308.42	1999.94	-8.59	4.71	-8.59	9.80	151.27	0.16
2100.00	0.30	289.80	2099.93	-8.41	4.35	-8.41	9.47	152.67	0.15
2200.00	0.11	350.40	2199.93	-8.23	4.08	-8.23	9.18	153.60	0.26
2300.00	0.14	289.99	2299.93	-8.09	3.95	-8.09	9.00	153.96	0.13
2400.00	0.11	203.58	2399.93	-8.14	3.80	-8.14	8.98	154.99	0.18
2500.00	0.08	163.78	2499.93	-8.30	3.78	-8.30	9.12	155.52	0.07
2600.00	0.11	27.39	2599.93	-8.28	3.84	-8.28	9.13	155.14	0.17
2700.00	0.05	217.70	2699.93	-8.24	3.85	-8.24	9.09	154.93	0.16
2800.00	0.11	248.67	2799.93	-8.31	3.73	-8.31	9.11	155.82	0.07
2900.00	0.12	321.75	2899.93	-8.27	3.58	-8.27	9.01	156.61	0.14
3000.00	0.11	40.62	2999.93	-8.12	3.57	-8.12	8.87	156.23	0.14
3100.00	0.11	281.31	3099.93	-8.03	3.54	-8.03	8.77	156.18	0.18
3200.00	0.06	82.09	3199.93	-8.00	3.50	-8.00	8.73	156.36	0.16
3300.00	0.17	357.65	3299.93	-7.85	3.55	-7.85	8.61	155.67	0.17
3400.00	0.06	185.15	3399.93	-7.75	3.54	-7.75	8.52	155.48	0.23
3500.00	0.06	174.87	3499.93	-7.86	3.54	-7.86	8.62	155.79	0.01
3600.00	0.11	168.91	3599.93	-8.02	3.56	-8.02	8.77	156.06	0.05
3700.00	0.05	131.65	3699.93	-8.14	3.61	-8.14	8.91	156.09	0.08
3800.00	0.09	253.58	3799.93	-8.20	3.56	-8.20	8.94	156.49	0.13
3900.00	0.11	242.78	3899.93	-8.26	3.40	-8.26	8.94	157.64	0.03
4000.00	0.10	263.66	3999.93	-8.32	3.23	-8.32	8.92	158.77	0.04
4100.00	0.14	199.55	4099.93	-8.44	3.11	-8.44	8.99	159.79	0.13
4200.00	0.11	358.86	4199.93	-8.46	3.07	-8.46	8.99	160.08	0.24
4300.00	0.17	142.40	4299.93	-8.47	3.15	-8.47	9.04	159.60	0.26
4400.00	0.67	112.54	4399.93	-8.81	3.78	-8.81	9.59	156.77	0.54
4500.00	0.37	119.65	4499.92	-9.20	4.60	-9.20	10.29	153.41	0.31
4600.00	0.26	95.49	4599.92	-9.38	5.11	-9.38	10.68	151.44	0.17
4700.00	0.43	125.35	4699.92	-9.61	5.63	-9.61	11.14	149.64	0.24
4800.00	0.59	142.51	4799.92	-10.24	6.25	-10.24	11.99	148.60	0.22
4900.00	0.79	145.35	4899.91	-11.21	6.95	-11.21	13.19	148.20	0.21
5000.00	0.67	150.19	4999.90	-12.28	7.63	-12.28	14.46	148.14	0.14
5100.00	0.70	163.27	5099.90	-13.37	8.10	-13.37	15.63	148.80	0.16
5200.00	0.43	149.28	5199.89	-14.28	8.46	-14.28	16.60	149.34	0.30
5300.00	0.80	181.71	5299.88	-15.30	8.64	-15.30	17.57	150.56	0.49
5400.00	0.81	183.31	5399.87	-16.71	8.57	-16.71	18.78	152.83	0.03
5500.00	0.97	166.17	5499.86	-18.24	8.74	-18.24	20.23	154.41	0.31

Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
5600.00	1.27	166.23	5599.84	-20.14	9.20	-20.14	22.14	155.44	0.29
5700.00	0.95	173.25	5699.82	-22.04	9.56	-22.04	24.02	156.54	0.34
5800.00	0.72	177.07	5799.81	-23.49	9.69	-23.49	25.41	157.58	0.24
5900.00	0.94	193.01	5899.80	-24.92	9.54	-24.92	26.68	159.04	0.31
6000.00	0.71	202.49	5999.79	-26.28	9.12	-26.28	27.82	160.86	0.27
6100.00	0.70	203.44	6099.79	-27.41	8.64	-27.41	28.74	162.49	0.01
6200.00	0.89	241.57	6199.78	-28.34	7.72	-28.34	29.37	164.76	0.55
6300.00	0.60	271.03	6299.77	-28.70	6.52	-28.70	29.43	167.20	0.47
6400.00	0.25	239.99	6399.77	-28.80	5.81	-28.80	29.38	168.60	0.40
6500.00	0.80	272.72	6499.76	-28.88	4.92	-28.88	29.29	170.34	0.60
6600.00	0.38	268.25	6599.76	-28.85	3.88	-28.85	29.11	172.33	0.42
6700.00	0.70	294.91	6699.75	-28.61	2.99	-28.61	28.76	174.03	0.40
6800.00	0.50	252.61	6799.75	-28.48	2.02	-28.48	28.55	175.94	0.47
6900.00	0.65	257.53	6899.74	-28.73	1.05	-28.73	28.75	177.90	0.16
7000.00	0.15	258.68	6999.74	-28.88	0.37	-28.88	28.88	179.26	0.49
7100.00	0.46	243.51	7099.74	-29.08	-0.12	-29.08	29.08	180.23	0.31
7200.00	0.55	238.59	7199.73	-29.51	-0.88	-29.51	29.52	181.71	0.10
7300.00	0.24	202.54	7299.73	-29.95	-1.37	-29.95	29.99	182.62	0.38
7400.00	0.49	208.61	7399.73	-30.53	-1.66	-30.53	30.57	183.11	0.25
7500.00	0.42	238.25	7499.73	-31.10	-2.18	-31.10	31.17	184.00	0.24
7600.00	0.35	223.36	7599.72	-31.51	-2.70	-31.51	31.62	184.89	0.12
7700.00	0.42	201.49	7699.72	-32.07	-3.04	-32.07	32.22	185.41	0.16
7800.00	0.74	175.79	7799.72	-33.06	-3.13	-33.06	33.21	185.40	0.41
7900.00	0.81	170.24	7899.71	-34.40	-2.96	-34.40	34.53	184.91	0.10
8000.00	0.80	168.89	7999.70	-35.78	-2.71	-35.78	35.88	184.32	0.02
8100.00	0.70	174.64	8099.69	-37.07	-2.51	-37.07	37.15	183.88	0.12
8200.00	0.94	178.42	8199.68	-38.49	-2.43	-38.49	38.57	183.62	0.24
8300.00	1.12	184.18	8299.66	-40.28	-2.48	-40.28	40.36	183.53	0.21
8400.00	1.16	185.52	8399.64	-42.26	-2.65	-42.26	42.34	183.59	0.05
8500.00	1.29	174.47	8499.62	-44.39	-2.64	-44.39	44.47	183.40	0.27
8600.00	1.23	184.05	8599.60	-46.58	-2.61	-46.58	46.66	183.20	0.22
8700.00	1.29	178.40	8699.57	-48.78	-2.65	-48.78	48.85	183.11	0.14
8760.00	1.22	192.53	8759.56	-50.07	-2.77	-50.07	50.15	183.17	0.53



VES Survey International
(432) 563-5444
West Texas
Surveyor: Javier Estrada
Macho Nacho State Com 7H / API 36-025-42489



VES Survey Date: 5/9/2015



COG Operating, LLC

Lea County, NM

Sec 7,T24S,R33E

Macho Nacho State #7H

Wellbore #1

Design: Wellbore #1

Survey Report - Geographic

18 May, 2015





HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Macho Nacho State #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3597.7usft (McVay #8)
Site:	Sec 7,T24S,R33E	MD Reference:	Well @ 3597.7usft (McVay #8)
Well:	Macho Nacho State #7H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Project	Lea County, NM		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site	Sec 7,T24S,R33E		
Site Position:		Northing:	446,452.30 usft
From:	Map	Easting:	723,874.70 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 13' 31.228 N
		Longitude:	103° 36' 33.756 W
		Grid Convergence:	0.39 °

Well	Macho Nacho State #7H		
Well Position	+N/-S	0.0 usft	Northing:
	+E/-W	0.0 usft	Easting:
Position Uncertainty	0.0 usft	Wellhead Elevation:	0.0 usft
		Latitude:	32° 13' 31.230 N
		Longitude:	103° 36' 34.922 W
		Ground Level:	3,571.7 usft

Wellbore	Wellbore #1				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	4/14/2015	7.21	60.09	48,158

Design	Wellbore #1			
Audit Notes:				
Version:	1.0	Phase:	ACTUAL	Tie On Depth: 0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.0	0.0	0.0	358.59

Survey Program	Date 5/16/2015			
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
100.0	8,760.0	GYRO (Wellbore #1)	Good_gyro	Good Gyro
8,832.0	14,153.0	MWD (Wellbore #1)	MWD default	MWD - Standard

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	446,451.80	723,774.60	32° 13' 31.230 N	103° 36' 34.922 W
100.0	0.65	214.19	100.0	-0.5	-0.3	446,451.33	723,774.28	32° 13' 31.225 N	103° 36' 34.925 W
200.0	0.66	215.04	200.0	-1.4	-1.0	446,450.39	723,773.63	32° 13' 31.216 N	103° 36' 34.933 W
300.0	0.57	203.15	300.0	-2.3	-1.5	446,449.46	723,773.10	32° 13' 31.206 N	103° 36' 34.939 W
400.0	0.47	174.04	400.0	-3.2	-1.6	446,448.60	723,772.95	32° 13' 31.198 N	103° 36' 34.941 W
500.0	0.18	172.54	500.0	-3.8	-1.6	446,448.03	723,773.01	32° 13' 31.192 N	103° 36' 34.940 W
600.0	0.31	135.73	600.0	-4.1	-1.4	446,447.68	723,773.22	32° 13' 31.189 N	103° 36' 34.938 W
700.0	0.32	142.43	700.0	-4.5	-1.0	446,447.27	723,773.58	32° 13' 31.185 N	103° 36' 34.934 W
800.0	0.63	134.94	800.0	-5.1	-0.5	446,446.66	723,774.14	32° 13' 31.179 N	103° 36' 34.927 W
900.0	0.92	108.96	900.0	-5.8	0.7	446,446.01	723,775.29	32° 13' 31.172 N	103° 36' 34.914 W
1,000.0	0.82	115.29	1,000.0	-6.4	2.1	446,445.44	723,776.69	32° 13' 31.166 N	103° 36' 34.898 W



HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Macho Nacho State #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3597.7usft (McVay #8)
Site:	Sec 7,T24S,R33E	MD Reference:	Well @ 3597.7usft (McVay #8)
Well:	Macho Nacho State #7H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N-S (usft)	+E-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
1,100.0	0.45	115.27	1,099.9	-6.8	3.1	446,444.97	723,777.70	32° 13' 31.162 N	103° 36' 34.886 W
1,200.0	0.66	118.58	1,199.9	-7.3	4.0	446,444.53	723,778.56	32° 13' 31.157 N	103° 36' 34.876 W
1,300.0	0.35	130.06	1,299.9	-7.7	4.7	446,444.05	723,779.30	32° 13' 31.153 N	103° 36' 34.867 W
1,400.0	0.23	153.70	1,399.9	-8.1	5.0	446,443.68	723,779.62	32° 13' 31.149 N	103° 36' 34.864 W
1,500.0	0.15	169.46	1,499.9	-8.4	5.1	446,443.37	723,779.73	32° 13' 31.146 N	103° 36' 34.862 W
1,600.0	0.10	166.54	1,599.9	-8.6	5.2	446,443.15	723,779.78	32° 13' 31.144 N	103° 36' 34.862 W
1,700.0	0.12	298.21	1,699.9	-8.7	5.1	446,443.12	723,779.70	32° 13' 31.143 N	103° 36' 34.863 W
1,800.0	0.16	230.17	1,799.9	-8.7	4.9	446,443.08	723,779.51	32° 13' 31.143 N	103° 36' 34.865 W
1,900.0	0.07	18.89	1,899.9	-8.8	4.8	446,443.05	723,779.42	32° 13' 31.143 N	103° 36' 34.866 W
2,000.0	0.17	308.42	1,999.9	-8.6	4.7	446,443.20	723,779.32	32° 13' 31.144 N	103° 36' 34.867 W
2,100.0	0.30	289.80	2,099.9	-8.4	4.4	446,443.38	723,778.96	32° 13' 31.146 N	103° 36' 34.871 W
2,200.0	0.11	350.40	2,199.9	-8.2	4.1	446,443.56	723,778.70	32° 13' 31.148 N	103° 36' 34.874 W
2,300.0	0.14	289.99	2,299.9	-8.1	4.0	446,443.70	723,778.57	32° 13' 31.149 N	103° 36' 34.876 W
2,400.0	0.11	203.58	2,399.9	-8.1	3.8	446,443.65	723,778.41	32° 13' 31.149 N	103° 36' 34.878 W
2,500.0	0.08	163.78	2,499.9	-8.3	3.8	446,443.50	723,778.39	32° 13' 31.147 N	103° 36' 34.878 W
2,600.0	0.11	27.39	2,599.9	-8.3	3.9	446,443.52	723,778.46	32° 13' 31.147 N	103° 36' 34.877 W
2,700.0	0.05	217.70	2,699.9	-8.2	3.9	446,443.57	723,778.47	32° 13' 31.148 N	103° 36' 34.877 W
2,800.0	0.11	248.67	2,799.9	-8.3	3.8	446,443.50	723,778.36	32° 13' 31.147 N	103° 36' 34.878 W
2,900.0	0.12	321.75	2,899.9	-8.3	3.6	446,443.54	723,778.20	32° 13' 31.148 N	103° 36' 34.880 W
3,000.0	0.11	40.62	2,999.9	-8.1	3.6	446,443.70	723,778.20	32° 13' 31.149 N	103° 36' 34.880 W
3,100.0	0.11	281.31	3,099.9	-8.0	3.6	446,443.79	723,778.17	32° 13' 31.150 N	103° 36' 34.881 W
3,200.0	0.06	82.09	3,199.9	-8.0	3.5	446,443.82	723,778.13	32° 13' 31.150 N	103° 36' 34.881 W
3,300.0	0.17	357.65	3,299.9	-7.8	3.6	446,443.97	723,778.17	32° 13' 31.152 N	103° 36' 34.881 W
3,400.0	0.06	185.15	3,399.9	-7.7	3.6	446,444.07	723,778.16	32° 13' 31.153 N	103° 36' 34.881 W
3,500.0	0.06	174.87	3,499.9	-7.8	3.6	446,443.96	723,778.16	32° 13' 31.152 N	103° 36' 34.881 W
3,600.0	0.11	168.91	3,599.9	-8.0	3.6	446,443.82	723,778.19	32° 13' 31.150 N	103° 36' 34.880 W
3,700.0	0.05	131.65	3,699.9	-8.1	3.6	446,443.69	723,778.24	32° 13' 31.149 N	103° 36' 34.880 W
3,800.0	0.09	253.58	3,799.9	-8.2	3.6	446,443.64	723,778.19	32° 13' 31.149 N	103° 36' 34.880 W
3,900.0	0.11	242.78	3,899.9	-8.2	3.4	446,443.58	723,778.03	32° 13' 31.148 N	103° 36' 34.882 W
4,000.0	0.10	263.66	3,999.9	-8.3	3.3	446,443.52	723,777.86	32° 13' 31.147 N	103° 36' 34.884 W
4,100.0	0.14	199.55	4,099.9	-8.4	3.1	446,443.40	723,777.73	32° 13' 31.146 N	103° 36' 34.886 W
4,200.0	0.11	358.86	4,199.9	-8.4	3.1	446,443.38	723,777.69	32° 13' 31.146 N	103° 36' 34.886 W
4,300.0	0.17	142.40	4,299.9	-8.4	3.2	446,443.36	723,777.78	32° 13' 31.146 N	103° 36' 34.885 W
4,400.0	0.67	112.54	4,399.9	-8.8	3.8	446,443.02	723,778.41	32° 13' 31.142 N	103° 36' 34.878 W
4,500.0	0.37	119.65	4,499.9	-9.2	4.6	446,442.63	723,779.23	32° 13' 31.138 N	103° 36' 34.868 W
4,600.0	0.26	95.49	4,599.9	-9.3	5.1	446,442.45	723,779.74	32° 13' 31.137 N	103° 36' 34.862 W
4,700.0	0.43	125.35	4,699.9	-9.6	5.7	446,442.21	723,780.27	32° 13' 31.134 N	103° 36' 34.856 W
4,800.0	0.59	142.51	4,799.9	-10.2	6.3	446,441.59	723,780.89	32° 13' 31.128 N	103° 36' 34.849 W
4,900.0	0.79	145.35	4,899.9	-11.2	7.0	446,440.61	723,781.59	32° 13' 31.118 N	103° 36' 34.841 W
5,000.0	0.67	150.19	4,999.9	-12.3	7.7	446,439.54	723,782.28	32° 13' 31.108 N	103° 36' 34.833 W
5,100.0	0.70	163.27	5,099.9	-13.4	8.1	446,438.44	723,782.74	32° 13' 31.097 N	103° 36' 34.828 W
5,200.0	0.43	149.28	5,199.9	-14.3	8.5	446,437.54	723,783.11	32° 13' 31.088 N	103° 36' 34.824 W
5,300.0	0.80	181.71	5,299.9	-15.3	8.7	446,436.52	723,783.28	32° 13' 31.078 N	103° 36' 34.822 W
5,400.0	0.81	183.31	5,399.9	-16.7	8.6	446,435.11	723,783.22	32° 13' 31.064 N	103° 36' 34.822 W
5,500.0	0.97	166.17	5,499.9	-18.2	8.8	446,433.59	723,783.38	32° 13' 31.049 N	103° 36' 34.821 W
5,600.0	1.27	166.23	5,599.8	-20.1	9.3	446,431.69	723,783.85	32° 13' 31.030 N	103° 36' 34.815 W
5,700.0	0.95	173.25	5,699.8	-22.0	9.6	446,429.79	723,784.21	32° 13' 31.011 N	103° 36' 34.811 W
5,800.0	0.72	177.07	5,799.8	-23.5	9.7	446,428.34	723,784.34	32° 13' 30.997 N	103° 36' 34.810 W
5,900.0	0.94	193.01	5,899.8	-24.9	9.6	446,426.91	723,784.19	32° 13' 30.983 N	103° 36' 34.812 W
6,000.0	0.71	202.49	5,999.8	-26.3	9.2	446,425.54	723,783.76	32° 13' 30.969 N	103° 36' 34.817 W
6,100.0	0.70	203.44	6,099.8	-27.4	8.7	446,424.41	723,783.28	32° 13' 30.958 N	103° 36' 34.823 W
6,200.0	0.89	241.57	6,199.8	-28.3	7.8	446,423.48	723,782.36	32° 13' 30.949 N	103° 36' 34.833 W
6,300.0	0.60	271.03	6,299.8	-28.7	6.6	446,423.12	723,781.15	32° 13' 30.945 N	103° 36' 34.847 W
6,400.0	0.25	239.99	6,399.8	-28.8	5.8	446,423.02	723,780.44	32° 13' 30.944 N	103° 36' 34.856 W
6,500.0	0.80	272.72	6,499.8	-28.9	5.0	446,422.94	723,779.55	32° 13' 30.944 N	103° 36' 34.866 W



HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Macho Nacho State #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3597.7usft (McVay #8)
Site:	Sec 7,T24S,R33E	MD Reference:	Well @ 3597.7usft (McVay #8)
Well:	Macho Nacho State #7H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
6,600.0	0.38	268.25	6,599.8	-28.8	3.9	446,422.96	723,778.52	32° 13' 30.944 N	103° 36' 34.878 W
6,700.0	0.70	294.91	6,699.8	-28.6	3.0	446,423.21	723,777.64	32° 13' 30.946 N	103° 36' 34.888 W
6,800.0	0.50	252.61	6,799.7	-28.5	2.1	446,423.34	723,776.67	32° 13' 30.948 N	103° 36' 34.900 W
6,900.0	0.65	257.53	6,899.7	-28.7	1.1	446,423.08	723,775.70	32° 13' 30.945 N	103° 36' 34.911 W
7,000.0	0.15	258.68	6,999.7	-28.9	0.4	446,422.94	723,775.02	32° 13' 30.944 N	103° 36' 34.919 W
7,100.0	0.46	243.51	7,099.7	-29.1	-0.1	446,422.73	723,774.53	32° 13' 30.942 N	103° 36' 34.925 W
7,200.0	0.55	238.59	7,199.7	-29.5	-0.8	446,422.30	723,773.76	32° 13' 30.938 N	103° 36' 34.934 W
7,300.0	0.24	202.54	7,299.7	-29.9	-1.3	446,421.86	723,773.27	32° 13' 30.933 N	103° 36' 34.939 W
7,400.0	0.49	208.61	7,399.7	-30.5	-1.6	446,421.29	723,772.98	32° 13' 30.928 N	103° 36' 34.943 W
7,500.0	0.42	238.25	7,499.7	-31.1	-2.1	446,420.72	723,772.47	32° 13' 30.922 N	103° 36' 34.949 W
7,600.0	0.35	223.36	7,599.7	-31.5	-2.6	446,420.31	723,771.95	32° 13' 30.918 N	103° 36' 34.955 W
7,700.0	0.42	201.49	7,699.7	-32.1	-3.0	446,419.74	723,771.60	32° 13' 30.912 N	103° 36' 34.959 W
7,800.0	0.74	175.79	7,799.7	-33.0	-3.1	446,418.76	723,771.52	32° 13' 30.903 N	103° 36' 34.960 W
7,900.0	0.81	170.24	7,899.7	-34.4	-2.9	446,417.42	723,771.68	32° 13' 30.889 N	103° 36' 34.958 W
8,000.0	0.80	168.89	7,999.7	-35.8	-2.7	446,416.04	723,771.94	32° 13' 30.876 N	103° 36' 34.955 W
8,100.0	0.70	174.64	8,099.7	-37.1	-2.5	446,414.74	723,772.13	32° 13' 30.863 N	103° 36' 34.953 W
8,200.0	0.94	178.42	8,199.7	-38.5	-2.4	446,413.31	723,772.21	32° 13' 30.849 N	103° 36' 34.952 W
8,300.0	1.12	184.18	8,299.7	-40.3	-2.4	446,411.52	723,772.16	32° 13' 30.831 N	103° 36' 34.953 W
8,400.0	1.16	185.52	8,399.6	-42.3	-2.6	446,409.54	723,771.99	32° 13' 30.811 N	103° 36' 34.955 W
8,500.0	1.29	174.47	8,499.6	-44.4	-2.6	446,407.41	723,772.00	32° 13' 30.790 N	103° 36' 34.955 W
8,600.0	1.23	184.05	8,599.6	-46.6	-2.6	446,405.22	723,772.04	32° 13' 30.769 N	103° 36' 34.955 W
8,700.0	1.29	178.40	8,699.6	-48.8	-2.6	446,403.02	723,771.99	32° 13' 30.747 N	103° 36' 34.956 W
8,760.0	1.22	192.53	8,759.6	-50.1	-2.7	446,401.72	723,771.87	32° 13' 30.734 N	103° 36' 34.957 W
Tie In @ 8760' MD / 8760' TVD									
8,832.0	1.40	202.60	8,831.5	-51.6	-3.2	446,400.16	723,771.37	32° 13' 30.719 N	103° 36' 34.963 W
8,864.0	3.30	239.60	8,863.5	-52.5	-4.2	446,399.34	723,770.42	32° 13' 30.711 N	103° 36' 34.974 W
8,895.0	7.00	253.40	8,894.4	-53.5	-6.8	446,398.35	723,767.84	32° 13' 30.701 N	103° 36' 35.004 W
8,927.0	9.90	268.70	8,926.0	-54.1	-11.4	446,397.73	723,763.22	32° 13' 30.695 N	103° 36' 35.058 W
8,958.0	13.30	274.00	8,956.4	-53.9	-17.6	446,397.91	723,757.00	32° 13' 30.697 N	103° 36' 35.131 W
8,990.0	16.60	277.00	8,987.3	-53.1	-25.8	446,398.73	723,748.79	32° 13' 30.706 N	103° 36' 35.226 W
9,021.0	19.50	284.20	9,016.8	-51.3	-35.2	446,400.54	723,739.37	32° 13' 30.725 N	103° 36' 35.336 W
9,053.0	23.50	287.90	9,046.6	-48.0	-46.5	446,403.81	723,728.12	32° 13' 30.758 N	103° 36' 35.466 W
9,084.0	27.50	291.10	9,074.5	-43.5	-59.0	446,408.29	723,715.55	32° 13' 30.803 N	103° 36' 35.612 W
9,115.0	29.20	298.10	9,101.8	-37.4	-72.4	446,414.43	723,702.20	32° 13' 30.865 N	103° 36' 35.767 W
9,147.0	29.10	306.70	9,129.8	-29.0	-85.5	446,422.76	723,689.07	32° 13' 30.948 N	103° 36' 35.919 W
9,178.0	30.20	315.00	9,156.7	-19.0	-97.1	446,432.78	723,677.51	32° 13' 31.048 N	103° 36' 36.053 W
9,210.0	32.10	320.40	9,184.1	-6.8	-108.2	446,445.03	723,666.39	32° 13' 31.170 N	103° 36' 36.182 W
9,241.0	34.60	325.00	9,210.0	6.8	-118.5	446,458.59	723,656.09	32° 13' 31.305 N	103° 36' 36.300 W
9,273.0	37.60	328.70	9,235.9	22.6	-128.8	446,474.38	723,645.81	32° 13' 31.462 N	103° 36' 36.419 W
9,304.0	40.90	331.30	9,259.9	39.6	-138.6	446,491.37	723,636.02	32° 13' 31.630 N	103° 36' 36.532 W
9,336.0	44.50	334.30	9,283.4	58.9	-148.5	446,510.67	723,626.12	32° 13' 31.822 N	103° 36' 36.645 W
9,367.0	48.50	337.30	9,304.7	79.4	-157.7	446,531.18	723,616.92	32° 13' 32.026 N	103° 36' 36.751 W
9,399.0	52.40	339.60	9,325.1	102.3	-166.7	446,554.13	723,607.87	32° 13' 32.253 N	103° 36' 36.854 W
9,430.0	56.60	342.40	9,343.1	126.2	-174.9	446,577.98	723,599.68	32° 13' 32.490 N	103° 36' 36.948 W
9,462.0	60.50	346.10	9,359.8	152.5	-182.3	446,604.25	723,592.29	32° 13' 32.750 N	103° 36' 37.032 W
9,493.0	64.50	349.90	9,374.1	179.3	-188.0	446,631.14	723,586.59	32° 13' 33.017 N	103° 36' 37.096 W
9,525.0	68.50	353.10	9,386.9	208.4	-192.3	446,660.15	723,582.27	32° 13' 33.304 N	103° 36' 37.144 W
9,556.0	72.20	356.60	9,397.3	237.4	-194.9	446,689.22	723,579.66	32° 13' 33.592 N	103° 36' 37.172 W
9,587.0	76.60	0.80	9,405.6	267.3	-195.6	446,719.06	723,578.99	32° 13' 33.887 N	103° 36' 37.178 W
9,620.0	79.80	4.00	9,412.4	299.5	-194.2	446,751.32	723,580.35	32° 13' 34.206 N	103° 36' 37.159 W
9,651.0	81.90	5.10	9,417.3	330.0	-191.8	446,781.83	723,582.78	32° 13' 34.508 N	103° 36' 37.129 W
9,683.0	82.50	5.10	9,421.7	361.6	-189.0	446,813.41	723,585.60	32° 13' 34.820 N	103° 36' 37.093 W
9,777.0	82.80	5.40	9,433.7	454.4	-180.5	446,906.24	723,594.13	32° 13' 35.739 N	103° 36' 36.987 W
9,871.0	84.60	5.60	9,444.0	547.4	-171.5	446,999.24	723,603.08	32° 13' 36.658 N	103° 36' 36.875 W
9,965.0	86.60	5.10	9,451.2	640.8	-162.8	447,092.55	723,611.82	32° 13' 37.581 N	103° 36' 36.766 W



HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Macho Nacho State #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3597.7usft (McVay #8)
Site:	Sec 7,T24S,R33E	MD Reference:	Well @ 3597.7usft (McVay #8)
Well:	Macho Nacho State #7H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
10,060.0	88.60	3.70	9,455.2	735.4	-155.5	447,187.18	723,619.10	32° 13' 38.517 N	103° 36' 36.674 W
10,154.0	89.20	4.40	9,457.0	829.1	-148.9	447,280.93	723,625.74	32° 13' 39.444 N	103° 36' 36.589 W
10,238.4	88.67	4.49	9,458.6	913.3	-142.3	447,365.06	723,632.28	32° 13' 40.276 N	103° 36' 36.507 W
Entered Hard Line Box @ 10238' MD / 9459' TVD									
10,249.0	88.60	4.50	9,458.8	923.8	-141.5	447,375.62	723,633.11	32° 13' 40.381 N	103° 36' 36.496 W
10,343.0	89.00	5.10	9,460.8	1,017.5	-133.6	447,469.27	723,640.97	32° 13' 41.307 N	103° 36' 36.397 W
10,437.0	89.00	5.20	9,462.4	1,111.1	-125.2	447,562.88	723,649.41	32° 13' 42.233 N	103° 36' 36.292 W
10,532.0	88.30	5.80	9,464.7	1,205.6	-116.1	447,657.41	723,658.51	32° 13' 43.167 N	103° 36' 36.178 W
10,626.0	87.90	6.30	9,467.8	1,299.0	-106.2	447,750.84	723,668.41	32° 13' 44.091 N	103° 36' 36.056 W
10,720.0	89.10	4.90	9,470.2	1,392.6	-97.0	447,844.35	723,677.58	32° 13' 45.016 N	103° 36' 35.942 W
10,815.0	88.70	1.90	9,472.1	1,487.4	-91.4	447,939.16	723,683.21	32° 13' 45.954 N	103° 36' 35.869 W
10,909.0	89.20	359.60	9,473.8	1,581.3	-90.2	448,033.13	723,684.44	32° 13' 46.884 N	103° 36' 35.847 W
11,003.0	89.00	359.60	9,475.3	1,675.3	-90.8	448,127.11	723,683.79	32° 13' 47.814 N	103° 36' 35.847 W
11,098.0	90.80	359.10	9,475.4	1,770.3	-91.9	448,222.10	723,682.71	32° 13' 48.754 N	103° 36' 35.852 W
11,192.0	91.40	359.60	9,473.6	1,864.3	-93.0	448,316.08	723,681.64	32° 13' 49.684 N	103° 36' 35.857 W
11,286.0	91.70	0.00	9,471.1	1,958.2	-93.3	448,410.04	723,681.31	32° 13' 50.614 N	103° 36' 35.854 W
11,381.0	91.70	0.00	9,468.3	2,053.2	-93.3	448,505.00	723,681.31	32° 13' 51.553 N	103° 36' 35.846 W
11,475.0	89.20	359.80	9,467.5	2,147.2	-93.4	448,598.99	723,681.15	32° 13' 52.483 N	103° 36' 35.841 W
11,570.0	88.50	359.40	9,469.4	2,242.2	-94.1	448,693.97	723,680.49	32° 13' 53.423 N	103° 36' 35.841 W
11,664.0	88.20	359.80	9,472.1	2,336.1	-94.8	448,787.93	723,679.83	32° 13' 54.353 N	103° 36' 35.842 W
11,758.0	88.40	0.10	9,474.9	2,430.1	-94.8	448,881.89	723,679.75	32° 13' 55.283 N	103° 36' 35.835 W
11,853.0	88.40	0.50	9,477.6	2,525.0	-94.3	448,976.85	723,680.25	32° 13' 56.223 N	103° 36' 35.822 W
11,947.0	89.80	359.40	9,479.1	2,619.0	-94.4	449,070.83	723,680.16	32° 13' 57.153 N	103° 36' 35.816 W
12,041.0	90.60	0.10	9,478.7	2,713.0	-94.8	449,164.83	723,679.75	32° 13' 58.083 N	103° 36' 35.813 W
12,136.0	90.90	1.20	9,477.5	2,808.0	-93.8	449,259.81	723,680.83	32° 13' 59.023 N	103° 36' 35.793 W
12,230.0	90.30	359.30	9,476.5	2,902.0	-93.4	449,353.80	723,681.24	32° 13' 59.953 N	103° 36' 35.781 W
12,325.0	90.60	359.40	9,475.8	2,997.0	-94.4	449,448.79	723,680.16	32° 14' 0.893 N	103° 36' 35.786 W
12,419.0	91.30	0.50	9,474.2	3,091.0	-94.5	449,542.78	723,680.08	32° 14' 1.823 N	103° 36' 35.779 W
12,513.0	89.70	359.60	9,473.4	3,185.0	-94.4	449,636.77	723,680.16	32° 14' 2.753 N	103° 36' 35.771 W
12,608.0	89.60	0.00	9,474.0	3,280.0	-94.8	449,731.77	723,679.83	32° 14' 3.693 N	103° 36' 35.768 W
12,702.0	89.30	0.70	9,474.9	3,374.0	-94.2	449,825.76	723,680.41	32° 14' 4.623 N	103° 36' 35.753 W
12,797.0	88.70	358.00	9,476.5	3,468.9	-95.3	449,920.73	723,679.33	32° 14' 5.563 N	103° 36' 35.759 W
12,891.0	89.50	357.30	9,478.0	3,562.8	-99.1	450,014.64	723,675.48	32° 14' 6.492 N	103° 36' 35.796 W
12,987.0	90.40	356.50	9,478.1	3,658.7	-104.3	450,110.50	723,670.28	32° 14' 7.441 N	103° 36' 35.849 W
13,081.0	90.20	356.60	9,477.6	3,752.5	-110.0	450,204.33	723,664.63	32° 14' 8.370 N	103° 36' 35.908 W
13,176.0	89.60	356.30	9,477.8	3,847.3	-115.9	450,299.14	723,658.74	32° 14' 9.309 N	103° 36' 35.969 W
13,270.0	89.00	356.50	9,478.9	3,941.1	-121.8	450,392.95	723,652.84	32° 14' 10.238 N	103° 36' 36.030 W
13,365.0	90.00	357.90	9,479.7	4,036.0	-126.4	450,487.83	723,648.20	32° 14' 11.177 N	103° 36' 36.077 W
13,459.0	90.50	358.70	9,479.3	4,130.0	-129.2	450,581.79	723,645.41	32° 14' 12.107 N	103° 36' 36.102 W
13,554.0	90.10	358.70	9,478.8	4,225.0	-131.3	450,676.76	723,643.26	32° 14' 13.047 N	103° 36' 36.119 W
13,648.0	90.10	358.70	9,478.7	4,318.9	-133.5	450,770.74	723,641.13	32° 14' 13.977 N	103° 36' 36.137 W
13,742.0	90.30	359.30	9,478.3	4,412.9	-135.1	450,864.72	723,639.49	32° 14' 14.907 N	103° 36' 36.148 W
13,837.0	90.00	359.30	9,478.1	4,507.9	-136.3	450,959.71	723,638.33	32° 14' 15.847 N	103° 36' 36.155 W
13,931.0	89.80	359.80	9,478.2	4,601.9	-137.0	451,053.71	723,637.59	32° 14' 16.777 N	103° 36' 36.156 W
14,025.0	90.50	359.80	9,478.0	4,695.9	-137.3	451,147.71	723,637.26	32° 14' 17.707 N	103° 36' 36.152 W
14,088.8	90.50	359.80	9,477.4	4,759.7	-137.6	451,211.51	723,637.04	32° 14' 18.339 N	103° 36' 36.150 W
Exited Hard Line Box @ 10489' MD / 9477' TVD									
14,153.0	90.50	359.80	9,476.9	4,823.9	-137.8	451,275.70	723,636.81	32° 14' 18.974 N	103° 36' 36.147 W
TD @ 14153' MD / 9477' TVD									



HP
Survey Report - Geographic



Company:	COG Operating, LLC	Local Co-ordinate Reference:	Well Macho Nacho State #7H
Project:	Lea County, NM	TVD Reference:	Well @ 3597.7usft (McVay #8)
Site:	Sec 7,T24S,R33E	MD Reference:	Well @ 3597.7usft (McVay #8)
Well:	Macho Nacho State #7H	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Compass

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
8,760.0	8,759.6	-50.1	-2.7	Tie In @ 8760' MD / 8760' TVD
10,238.4	9,458.6	913.3	-142.3	Entered Hard Line Box @ 10238' MD / 9459' TVD
14,088.8	9,477.4	4,759.7	-137.6	Exited Hard Line Box @ 10489' MD / 9477' TVD
14,153.0	9,476.9	4,823.9	-137.8	TD @ 14153' MD / 9477' TVD

Checked By: _____	Approved By: _____	Date: _____
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