



October 2, 2014

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

HOBBSOCD  
JAN 07 2015  
RECEIVED

Attn: Kanicia Castillo

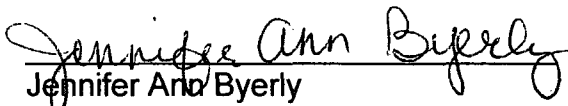
RE: **Gettysburg State Com No. 004H**

Please find enclosed a copy of the survey from 0.00' to 9700.00' ran on the above referenced well.

Sincerely,  
  
Keith Havelka  
Operations

STATE OF TEXAS     §  
                                  §  
COUNTY OF NUECES §

This instrument was acknowledged before me on the 2 day of October, A.D., 2014, by Keith Havelka.

  
Jennifer Ann Byerly  
Notary Public, State of Texas



FEB 26 2015

Company: COG Operating, LLC (Concho)  
 Lease/Well: Gettysburg State Com /No. 004H



Rig Name: Ensign 772  
 State/County: New Mexico/Lea  
 Latitude: 32.31, Longitude: -103.47  
 GRID North is 0.46 Degrees East of True North  
 VS-Azi: 0.00 Degrees



HOBSOCD

JAN 07 2015

RECEIVED

Depth Reference : RKB= 31 Feet

DRILLOG HA GYRO SURVEY CALCULATIONS

Filename: Gettysburg State Com 4H.ut  
 Minimum Curvature Method  
 Report Date/Time: 10/2/2014 / 11:08

VES Survey International  
 West Texas  
 (432) 563-5444

Surveyor: Bryan Massey  
 Gettysburg State Com No. 004H / API 30-025-41929

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	0.10	259.31	100.00	-0.02	-0.08	-0.02	0.08	259.31	0.10
200.00	0.25	94.08	200.00	-0.05	0.05	-0.05	0.07	132.49	0.34
300.00	0.16	44.09	300.00	0.04	0.36	0.04	0.36	84.19	0.19
400.00	0.05	325.76	400.00	0.17	0.43	0.17	0.46	68.52	0.15
500.00	0.22	140.87	500.00	0.06	0.53	0.06	0.53	83.96	0.27
600.00	0.37	183.77	600.00	-0.41	0.63	-0.41	0.75	123.33	0.26
700.00	0.35	177.49	700.00	-1.04	0.62	-1.04	1.21	149.15	0.04
800.00	0.34	180.60	799.99	-1.64	0.63	-1.64	1.76	158.97	0.02
900.00	0.06	223.33	899.99	-1.98	0.59	-1.98	2.06	163.40	0.30
1000.00	0.24	142.07	999.99	-2.18	0.68	-2.18	2.29	162.69	0.24
1100.00	0.16	103.93	1099.99	-2.38	0.94	-2.38	2.56	158.40	0.15
1200.00	0.09	69.54	1199.99	-2.39	1.15	-2.39	2.65	154.36	0.10
1300.00	0.44	121.99	1299.99	-2.57	1.54	-2.57	2.99	149.00	0.39
1400.00	0.39	125.09	1399.99	-2.96	2.14	-2.96	3.66	144.11	0.05
1500.00	1.00	139.11	1499.98	-3.82	2.99	-3.82	4.85	141.90	0.63
1600.00	1.63	146.20	1599.95	-5.66	4.36	-5.66	7.15	142.42	0.65
1700.00	1.68	145.27	1699.91	-8.05	5.99	-8.05	10.03	143.37	0.05
1800.00	1.73	149.78	1799.87	-10.55	7.58	-10.55	12.99	144.33	0.14

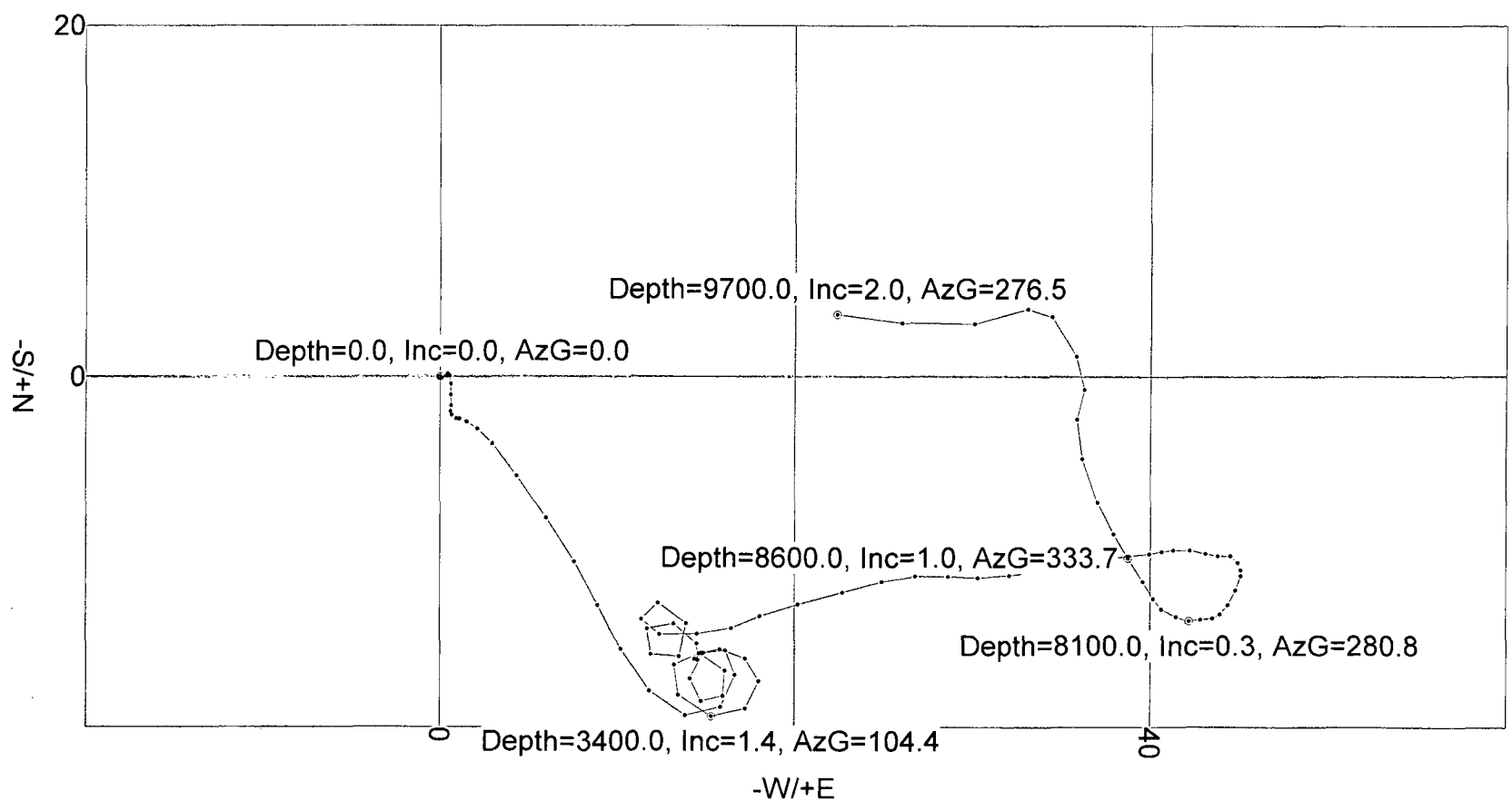
Measured Depth FT	Incl Angle Deg	Drift Direction Deg	TVD FT	+N/-S FT	+E/-W FT	Vertical Section FT	Closure Distance FT	Closure Direction Deg	Dogleg Severity Deg/100
1900.00	1.49	154.69	1899.83	-13.03	8.89	-13.03	15.78	145.70	0.27
2000.00	1.73	150.70	1999.79	-15.53	10.19	-15.53	18.57	146.73	0.27
2100.00	1.64	141.21	2099.75	-17.96	11.82	-17.96	21.50	146.64	0.29
2200.00	1.34	103.63	2199.71	-19.35	13.85	-19.35	23.80	144.40	1.00
2300.00	1.31	47.91	2299.69	-18.86	15.83	-18.86	24.62	139.98	1.24
2400.00	1.21	357.03	2399.67	-17.04	16.63	-17.04	23.81	135.69	1.09
2500.00	0.70	304.93	2499.66	-15.64	16.08	-15.64	22.43	134.20	0.95
2600.00	1.02	235.71	2599.65	-15.79	14.84	-15.79	21.67	136.76	1.01
2700.00	1.10	181.07	2699.63	-17.24	14.09	-17.24	22.27	140.74	0.97
2800.00	0.83	116.74	2799.62	-18.53	14.72	-18.53	23.66	141.53	1.05
2900.00	0.97	42.94	2899.61	-18.24	15.94	-18.24	24.22	138.83	1.08
3000.00	1.08	330.91	2999.60	-16.79	16.06	-16.79	23.24	136.28	1.21
3100.00	1.15	278.92	3099.58	-15.81	14.61	-15.81	21.53	137.26	0.98
3200.00	1.04	207.25	3199.57	-16.47	13.20	-16.47	21.11	141.27	1.29
3300.00	1.29	144.15	3299.55	-18.18	13.44	-18.18	22.61	143.52	1.24
3400.00	1.42	104.43	3399.53	-19.40	15.30	-19.40	24.71	141.74	0.93
3500.00	1.22	43.40	3499.51	-18.93	17.23	-18.93	25.60	137.69	1.35
3600.00	0.90	0.34	3599.49	-17.37	17.97	-17.37	25.00	134.03	0.84
3700.00	1.05	302.13	3699.48	-16.10	17.20	-16.10	23.56	133.11	0.96
3800.00	0.73	271.90	3799.47	-15.59	15.78	-15.59	22.18	134.65	0.56
3900.00	0.49	242.06	3899.46	-15.77	14.76	-15.77	21.60	136.89	0.39
4000.00	0.20	192.24	3999.46	-16.14	14.35	-16.14	21.59	138.37	0.40
4100.00	0.28	56.72	4099.46	-16.17	14.51	-16.17	21.73	138.09	0.44
4200.00	0.95	342.76	4199.45	-15.25	14.47	-15.25	21.02	136.49	0.91
4300.00	1.25	289.21	4299.44	-14.10	13.20	-14.10	19.31	136.88	1.03
4400.00	0.93	215.84	4399.42	-14.39	11.70	-14.39	18.55	140.90	1.33
4500.00	1.20	140.64	4499.41	-15.86	11.89	-15.86	19.82	143.15	1.32
4600.00	1.33	52.97	4599.39	-15.97	13.48	-15.97	20.90	139.84	1.76
4700.00	1.49	337.25	4699.37	-14.07	13.90	-14.07	19.78	135.34	1.74
4800.00	1.26	267.64	4799.35	-12.91	12.30	-12.91	17.84	136.38	1.58
4900.00	1.03	169.68	4899.33	-13.84	11.37	-13.84	17.91	140.60	1.73
5000.00	1.00	89.13	4999.32	-14.71	12.40	-14.71	19.24	139.88	1.31
5100.00	1.44	89.06	5099.30	-14.68	14.52	-14.68	20.65	135.31	0.44
5200.00	0.83	66.29	5199.28	-14.37	16.44	-14.37	21.83	131.16	0.75
5300.00	1.18	66.73	5299.27	-13.67	18.04	-13.67	22.64	127.16	0.35
5400.00	1.41	77.44	5399.24	-13.00	20.18	-13.00	24.01	122.79	0.34
5500.00	1.56	71.68	5499.21	-12.30	22.68	-12.30	25.80	118.48	0.21
5600.00	1.07	78.10	5599.18	-11.68	24.89	-11.68	27.49	115.15	0.51
5700.00	1.10	83.93	5699.16	-11.39	26.76	-11.39	29.08	113.06	0.12

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
5800.00	1.02	97.23	5799.14	-11.40	28.60	-11.40	30.79	111.73	0.26
5900.00	0.91	86.62	5899.13	-11.46	30.27	-11.46	32.37	110.74	0.21
6000.00	1.17	84.75	5999.11	-11.32	32.07	-11.32	34.01	109.45	0.26
6100.00	0.97	81.35	6099.10	-11.10	33.92	-11.10	35.69	108.13	0.21
6200.00	0.70	81.78	6199.09	-10.89	35.36	-10.89	37.00	107.12	0.26
6300.00	0.73	70.71	6299.08	-10.59	36.57	-10.59	38.07	106.15	0.14
6400.00	0.56	87.97	6399.07	-10.36	37.66	-10.36	39.06	105.39	0.26
6500.00	0.75	79.49	6499.07	-10.23	38.79	-10.23	40.11	104.77	0.21
6600.00	0.58	87.58	6599.06	-10.09	39.94	-10.09	41.19	104.17	0.19
6700.00	0.25	62.07	6699.06	-9.97	40.64	-9.97	41.84	103.78	0.38
6800.00	0.51	90.94	6799.05	-9.87	41.28	-9.87	42.44	103.45	0.32
6900.00	0.53	90.15	6899.05	-9.88	42.19	-9.88	43.33	103.18	0.02
7000.00	0.53	114.29	6999.05	-10.07	43.08	-10.07	44.24	103.16	0.22
7100.00	0.30	79.14	7099.04	-10.21	43.77	-10.21	44.94	103.14	0.33
7200.00	0.51	95.31	7199.04	-10.21	44.47	-10.21	45.63	102.93	0.23
7300.00	0.39	185.38	7299.04	-10.59	44.88	-10.59	46.11	103.27	0.64
7400.00	0.24	116.76	7399.04	-11.02	45.03	-11.02	46.36	103.75	0.38
7500.00	0.34	216.47	7499.04	-11.35	45.05	-11.35	46.46	104.15	0.45
7600.00	0.68	190.36	7599.03	-12.18	44.77	-12.18	46.39	105.22	0.40
7700.00	0.46	231.58	7699.03	-13.01	44.35	-13.01	46.21	106.35	0.45
7800.00	0.35	203.70	7799.03	-13.54	43.91	-13.54	45.95	107.14	0.22
7900.00	0.35	280.45	7899.02	-13.77	43.48	-13.77	45.61	107.57	0.44
8000.00	0.46	251.50	7999.02	-13.84	42.80	-13.84	44.99	107.92	0.23
8100.00	0.29	280.85	8099.02	-13.92	42.17	-13.92	44.41	108.27	0.25
8200.00	0.59	293.70	8199.02	-13.67	41.45	-13.67	43.64	108.25	0.31
8300.00	0.48	300.55	8299.01	-13.25	40.62	-13.25	42.73	108.06	0.13
8400.00	0.46	345.12	8399.01	-12.65	40.16	-12.65	42.11	107.49	0.35
8500.00	0.86	321.04	8499.00	-11.68	39.59	-11.68	41.27	106.44	0.48
8600.00	0.96	333.67	8598.99	-10.35	38.74	-10.35	40.10	104.95	0.22
8700.00	0.88	325.80	8698.98	-8.96	37.94	-8.96	38.98	103.29	0.15
8800.00	1.46	337.53	8798.96	-7.15	37.02	-7.15	37.71	100.94	0.63
8900.00	1.55	344.32	8898.92	-4.67	36.17	-4.67	36.47	97.36	0.20
9000.00	1.09	4.29	8998.90	-2.42	35.88	-2.42	35.96	93.85	0.65
9100.00	0.92	24.16	9098.88	-0.73	36.28	-0.73	36.28	91.15	0.39
9200.00	1.61	326.02	9198.86	1.17	35.82	1.17	35.84	88.13	1.37
9300.00	1.42	330.80	9298.82	3.42	34.43	3.42	34.60	84.33	0.23
9400.00	1.15	230.53	9398.81	3.86	33.05	3.86	33.27	83.34	1.98
9500.00	2.57	264.62	9498.76	3.01	30.04	3.01	30.19	84.28	1.74
9600.00	2.14	278.37	9598.67	3.07	25.96	3.07	26.15	83.26	0.70

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
9700.00	2.04	276.51	9698.60	3.54	22.35	3.54	22.62	80.99	0.12



VES Survey International  
West Texas  
(432) 563-5444  
Surveyor: Bryan Massey  
Gettysburg State Com No. 004H / API 30-025-41929





## COG Operating LLC

Lea County, NM  
Gettysburg State Com  
#4H

OH

Design: OH

## Standard Survey Report

14 October, 2014

HOBSOCD

JAN 07 2015

RECEIVED





TDS  
Survey Report



Company: COG Operating LLC  
 Project: Lea County, NM  
 Site: Gettysburg State Com  
 Well: #4H  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well #4H  
 TVD Reference: KB @ 3438.0usft  
 MD Reference: KB @ 3438.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

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	Gettysburg State Com				
Site Position:		Northing:	478,028.00 usft	Latitude:	32° 18' 40.473 N
From:	Map	Easting:	767,625.30 usft	Longitude:	103° 28' 1.511 W
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.46 °

Well	#4H					
Well Position	+N/-S	0.0 usft	Northing:	478,028.00 usft	Latitude:	32° 18' 40.473 N
	+E/-W	0.0 usft	Easting:	767,625.30 usft	Longitude:	103° 28' 1.511 W
Position Uncertainty		0.0 usft	Wellhead Elevation:	0.0 usft	Ground Level:	3,406.6 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/10/2014	7.14	60.20	48,356

Design	OH				
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	179.88	

Survey Program	Date 10/14/2014				
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description	
100.0	9,700.0	Gyro #1 (OH)	Good_gyro	Good Gyro	
9,790.0	17,507.0	MWD #1 (OH)	MWD	MWD - Standard	

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
100.0	0.10	259.31	100.0	0.0	-0.1	0.0	0.10	0.10	0.00
200.0	0.25	94.08	200.0	0.0	0.0	0.0	0.35	0.15	-165.23
300.0	0.16	44.09	300.0	0.0	0.4	0.0	0.19	-0.09	-49.99
400.0	0.05	325.76	400.0	0.2	0.4	-0.2	0.16	-0.11	-78.33
500.0	0.22	140.87	500.0	0.1	0.5	-0.1	0.27	0.17	175.11
600.0	0.37	183.77	600.0	-0.4	0.6	0.4	0.26	0.15	42.90
700.0	0.35	177.49	700.0	-1.0	0.6	1.0	0.04	-0.02	-6.28
800.0	0.34	180.60	800.0	-1.6	0.6	1.6	0.02	-0.01	3.11
900.0	0.06	223.33	900.0	-2.0	0.6	2.0	0.30	-0.28	42.73





TDS  
Survey Report



Company: COG Operating LLC  
 Project: Lea County, NM  
 Site: Gettysburg State Com  
 Well: #4H  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well #4H  
 TVD Reference: KB @ 3438.0usft  
 MD Reference: KB @ 3438.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
1,000.0	0.24	142.07	1,000.0	-2.2	0.7	2.2	0.24	0.18	-81.26
1,100.0	0.16	103.93	1,100.0	-2.4	1.0	2.4	0.15	-0.08	-38.14
1,200.0	0.09	69.54	1,200.0	-2.4	1.2	2.4	0.10	-0.07	-34.39
1,300.0	0.44	121.99	1,300.0	-2.6	1.6	2.6	0.39	0.35	52.45
1,400.0	0.39	125.09	1,400.0	-3.0	2.2	3.0	0.05	-0.05	3.10
1,500.0	1.00	139.11	1,500.0	-3.8	3.0	3.8	0.63	0.61	14.02
1,600.0	1.63	146.20	1,600.0	-5.7	4.4	5.7	0.65	0.63	7.09
1,700.0	1.68	145.27	1,699.9	-8.0	6.0	8.1	0.06	0.05	-0.93
1,800.0	1.73	149.78	1,799.9	-10.6	7.6	10.6	0.14	0.05	4.51
1,900.0	1.49	154.69	1,899.8	-13.0	8.9	13.0	0.28	-0.24	4.91
2,000.0	1.73	150.70	1,999.8	-15.5	10.2	15.5	0.26	0.24	-3.99
2,100.0	1.64	141.21	2,099.7	-18.0	11.8	18.0	0.29	-0.09	-9.49
2,200.0	1.34	103.63	2,199.7	-19.3	13.9	19.4	1.00	-0.30	-37.58
2,300.0	1.31	47.91	2,299.7	-18.9	15.9	18.9	1.24	-0.03	-55.72
2,400.0	1.21	357.03	2,399.7	-17.0	16.7	17.1	1.09	-0.10	-50.88
2,500.0	0.70	304.93	2,499.7	-15.6	16.1	15.7	0.96	-0.51	-52.10
2,600.0	1.02	235.71	2,599.6	-15.8	14.9	15.8	1.01	0.32	-69.22
2,700.0	1.10	181.07	2,699.6	-17.2	14.1	17.3	0.98	0.08	-54.64
2,800.0	0.83	116.74	2,799.6	-18.5	14.7	18.6	1.05	-0.27	-64.33
2,900.0	0.97	42.94	2,899.6	-18.2	16.0	18.3	1.09	0.14	-73.80
3,000.0	1.08	330.91	2,999.6	-16.8	16.1	16.8	1.21	0.11	-72.03
3,100.0	1.15	278.92	3,099.6	-15.8	14.6	15.8	0.98	0.07	-51.99
3,200.0	1.04	207.25	3,199.6	-16.5	13.2	16.5	1.29	-0.11	-71.67
3,300.0	1.29	144.15	3,299.6	-18.2	13.5	18.2	1.24	0.25	-63.10
3,400.0	1.42	104.43	3,399.5	-19.4	15.3	19.4	0.93	0.13	-39.72
3,500.0	1.22	43.40	3,499.5	-18.9	17.3	19.0	1.35	-0.20	-61.03
3,600.0	0.90	0.34	3,599.5	-17.4	18.0	17.4	0.83	-0.32	-43.06
3,700.0	1.05	302.13	3,699.5	-16.1	17.2	16.1	0.96	0.15	-58.21
3,800.0	0.73	271.90	3,799.5	-15.6	15.8	15.6	0.56	-0.32	-30.23
3,900.0	0.49	242.06	3,899.5	-15.8	14.8	15.8	0.39	-0.24	-29.84
4,000.0	0.20	192.24	3,999.5	-16.1	14.4	16.2	0.39	-0.29	-49.82
4,100.0	0.28	56.72	4,099.5	-16.2	14.5	16.2	0.45	0.08	-135.52
4,200.0	0.95	342.76	4,199.5	-15.3	14.5	15.3	0.91	0.67	-73.96
4,300.0	1.25	289.21	4,299.4	-14.1	13.2	14.1	1.03	0.30	-53.55
4,400.0	0.93	215.84	4,399.4	-14.4	11.7	14.4	1.33	-0.32	-73.37
4,500.0	1.20	140.64	4,499.4	-15.9	11.9	15.9	1.32	0.27	-75.20
4,600.0	1.33	52.97	4,599.4	-16.0	13.5	16.0	1.75	0.13	-87.67
4,700.0	1.49	337.25	4,699.4	-14.1	13.9	14.1	1.74	0.16	-75.72
4,800.0	1.26	267.64	4,799.3	-12.9	12.3	13.0	1.58	-0.23	-69.61
4,900.0	1.03	169.68	4,899.3	-13.9	11.4	13.9	1.73	-0.23	-97.96
5,000.0	1.00	89.13	4,999.3	-14.7	12.4	14.8	1.31	-0.03	-80.55
5,100.0	1.44	89.06	5,099.3	-14.7	14.6	14.7	0.44	0.44	-0.07
5,200.0	0.83	66.29	5,199.3	-14.4	16.5	14.4	0.75	-0.61	-22.77



TDS  
Survey Report



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 Site: Gettysburg State Com  
 Well: #4H  
 Wellbore: OH  
 Design: OH

Local Co-ordinate Reference: Well #4H  
 TVD Reference: KB @ 3438.0usft  
 MD Reference: KB @ 3438.0usft  
 North Reference: Grid  
 Survey Calculation Method: Minimum Curvature  
 Database: EDM 5000.1 Single User Db

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
5,300.0	1.18	66.73	5,299.3	-13.7	18.1	13.7	0.35	0.35	0.44
5,400.0	1.41	77.44	5,399.2	-13.0	20.2	13.1	0.33	0.23	10.71
5,500.0	1.56	71.68	5,499.2	-12.3	22.7	12.4	0.21	0.15	-5.76
5,600.0	1.07	78.10	5,599.2	-11.7	24.9	11.8	0.51	-0.49	6.42
5,700.0	1.10	83.93	5,699.2	-11.4	26.8	11.5	0.11	0.03	5.83
5,800.0	1.02	97.23	5,799.1	-11.4	28.6	11.5	0.26	-0.08	13.30
5,900.0	0.91	86.62	5,899.1	-11.5	30.3	11.5	0.21	-0.11	-10.61
6,000.0	1.17	84.75	5,999.1	-11.3	32.1	11.4	0.26	0.26	-1.87
6,100.0	0.97	81.35	6,099.1	-11.1	34.0	11.2	0.21	-0.20	-3.40
6,200.0	0.70	81.78	6,199.1	-10.9	35.4	11.0	0.27	-0.27	0.43
6,300.0	0.73	70.71	6,299.1	-10.6	36.6	10.7	0.14	0.03	-11.07
6,400.0	0.56	87.97	6,399.1	-10.4	37.7	10.5	0.26	-0.17	17.26
6,500.0	0.75	79.49	6,499.1	-10.2	38.8	10.3	0.21	0.19	-8.48
6,600.0	0.58	87.58	6,599.1	-10.1	40.0	10.2	0.19	-0.17	8.09
6,700.0	0.25	62.07	6,699.1	-10.0	40.7	10.1	0.37	-0.33	-25.51
6,800.0	0.51	90.94	6,799.1	-9.9	41.3	10.0	0.32	0.26	28.87
6,900.0	0.53	90.15	6,899.0	-9.9	42.2	10.0	0.02	0.02	-0.79
7,000.0	0.53	114.29	6,999.0	-10.1	43.1	10.2	0.22	0.00	24.14
7,100.0	0.30	79.14	7,099.0	-10.2	43.8	10.3	0.33	-0.23	-35.15
7,200.0	0.51	95.31	7,199.0	-10.2	44.5	10.3	0.24	0.21	16.17
7,300.0	0.39	185.38	7,299.0	-10.6	44.9	10.7	0.64	-0.12	90.07
7,400.0	0.24	116.76	7,399.0	-11.0	45.1	11.1	0.38	-0.15	-68.62
7,500.0	0.34	216.47	7,499.0	-11.4	45.1	11.5	0.45	0.10	99.71
7,600.0	0.68	190.36	7,599.0	-12.2	44.8	12.3	0.40	0.34	-26.11
7,700.0	0.46	231.58	7,699.0	-13.0	44.4	13.1	0.45	-0.22	41.22
7,800.0	0.35	203.70	7,799.0	-13.5	43.9	13.6	0.22	-0.11	-27.88
7,900.0	0.35	280.45	7,899.0	-13.8	43.5	13.9	0.43	0.00	76.75
8,000.0	0.46	251.50	7,999.0	-13.8	42.8	13.9	0.23	0.11	-28.95
8,100.0	0.29	280.85	8,099.0	-13.9	42.2	14.0	0.25	-0.17	29.35
8,200.0	0.59	293.70	8,199.0	-13.7	41.5	13.8	0.31	0.30	12.85
8,300.0	0.48	300.55	8,299.0	-13.3	40.6	13.3	0.13	-0.11	6.85
8,400.0	0.46	345.12	8,399.0	-12.6	40.2	12.7	0.36	-0.02	44.57
8,500.0	0.86	321.04	8,499.0	-11.7	39.6	11.8	0.48	0.40	-24.08
8,600.0	0.96	333.67	8,599.0	-10.3	38.8	10.4	0.22	0.10	12.63
8,700.0	0.88	325.80	8,699.0	-9.0	38.0	9.0	0.15	-0.08	-7.87
8,800.0	1.46	337.53	8,799.0	-7.1	37.0	7.2	0.62	0.58	11.73
8,900.0	1.55	344.32	8,898.9	-4.7	36.2	4.7	0.20	0.09	6.79
9,000.0	1.09	4.29	8,998.9	-2.4	35.9	2.5	0.64	-0.46	19.97
9,100.0	0.92	24.16	9,098.9	-0.7	36.3	0.8	0.39	-0.17	19.87
9,200.0	1.61	326.02	9,198.9	1.2	35.8	-1.1	1.37	0.69	-58.14
9,300.0	1.42	330.80	9,298.8	3.4	34.4	-3.3	0.23	-0.19	4.78
9,400.0	1.15	230.53	9,398.8	3.9	33.1	-3.8	1.98	-0.27	-100.27
9,500.0	2.57	264.62	9,498.8	3.0	30.1	-2.9	1.74	1.42	34.09



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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)
9,600.0	2.14	278.37	9,598.7	3.1	26.0	-3.0	0.71	-0.43	13.75
9,700.0	2.04	276.51	9,698.6	3.5	22.4	-3.5	0.12	-0.10	-1.86
9,790.0	1.70	277.50	9,788.6	3.9	19.5	-3.9	0.38	-0.38	1.10
9,821.0	4.80	218.10	9,819.5	2.9	18.2	-2.9	13.54	10.00	-191.61
9,853.0	8.00	201.60	9,851.3	-0.2	16.5	0.2	11.44	10.00	-51.56
9,880.0	10.30	199.70	9,878.0	-4.2	15.0	4.2	8.59	8.52	-7.04
9,910.0	12.80	197.80	9,907.4	-9.9	13.1	9.9	8.43	8.33	-6.33
9,942.0	16.40	196.90	9,938.3	-17.6	10.7	17.6	11.27	11.25	-2.81
9,974.0	20.20	195.50	9,968.7	-27.2	7.9	27.3	11.95	11.88	-4.38
10,005.0	24.00	193.90	9,997.4	-38.5	5.0	38.5	12.41	12.26	-5.16
10,037.0	28.10	191.70	10,026.2	-52.2	1.9	52.2	13.16	12.81	-6.88
10,068.0	31.70	189.80	10,053.0	-67.4	-1.0	67.4	12.01	11.61	-6.13
10,100.0	35.30	188.80	10,079.7	-84.8	-3.8	84.8	11.38	11.25	-3.13
10,131.0	38.80	188.60	10,104.4	-103.3	-6.6	103.3	11.30	11.29	-0.65
10,163.0	41.90	190.10	10,128.8	-123.7	-10.0	123.7	10.15	9.69	4.69
10,195.0	44.60	191.60	10,152.1	-145.3	-14.2	145.2	9.03	8.44	4.69
10,226.0	47.50	195.40	10,173.6	-167.0	-19.4	166.9	12.86	9.35	12.26
10,258.0	50.60	196.10	10,194.6	-190.2	-25.9	190.2	9.83	9.69	2.19
10,289.0	54.40	195.10	10,213.5	-213.9	-32.5	213.8	12.52	12.26	-3.23
10,321.0	58.30	194.20	10,231.2	-239.7	-39.3	239.6	12.41	12.19	-2.81
10,352.0	62.00	194.20	10,246.6	-265.7	-45.9	265.6	11.94	11.94	0.00
10,384.0	65.20	194.00	10,260.9	-293.5	-52.9	293.4	10.02	10.00	-0.63
10,415.0	69.50	193.40	10,272.8	-321.3	-59.6	321.2	13.99	13.87	-1.94
10,447.0	73.30	193.00	10,283.0	-350.8	-66.5	350.7	11.93	11.88	-1.25
10,478.0	75.70	193.00	10,291.3	-379.9	-73.3	379.8	7.74	7.74	0.00
10,512.0	79.30	193.20	10,298.7	-412.3	-80.8	412.1	10.60	10.59	0.59
10,544.0	81.70	192.30	10,303.9	-443.0	-87.8	442.9	8.00	7.50	-2.81
10,576.0	82.90	190.90	10,308.2	-474.1	-94.1	473.9	5.73	3.75	-4.38
10,606.0	83.90	189.80	10,311.7	-503.4	-99.5	503.2	4.94	3.33	-3.67
10,701.0	87.50	187.40	10,318.8	-597.1	-113.6	596.8	4.55	3.79	-2.53
10,796.0	89.80	186.90	10,321.0	-691.3	-125.5	691.0	2.48	2.42	-0.53
10,890.0	91.10	186.20	10,320.3	-784.7	-136.2	784.4	1.57	1.38	-0.74
10,985.0	91.70	186.00	10,318.0	-879.1	-146.3	878.8	0.67	0.63	-0.21
11,080.0	90.50	185.60	10,316.1	-973.6	-155.9	973.3	1.33	-1.26	-0.42
11,173.0	89.90	184.20	10,315.8	-1,066.3	-163.8	1,065.9	1.64	-0.65	-1.51
11,267.0	88.80	181.90	10,316.9	-1,160.1	-168.8	1,159.8	2.71	-1.17	-2.45
11,361.0	89.20	179.30	10,318.5	-1,254.1	-169.8	1,253.7	2.80	0.43	-2.77
11,455.0	87.90	177.90	10,320.9	-1,348.0	-167.5	1,347.7	2.03	-1.38	-1.49
11,548.0	87.60	177.70	10,324.6	-1,440.9	-163.9	1,440.5	0.39	-0.32	-0.22
11,643.0	86.40	176.00	10,329.5	-1,535.6	-158.7	1,535.3	2.19	-1.26	-1.79
11,737.0	87.40	175.60	10,334.6	-1,629.2	-151.9	1,628.9	1.15	1.06	-0.43
11,831.0	88.50	175.60	10,338.0	-1,722.9	-144.6	1,722.6	1.17	1.17	0.00
11,925.0	88.90	176.10	10,340.1	-1,816.6	-137.8	1,816.3	0.68	0.43	0.53
12,020.0	89.30	176.70	10,341.6	-1,911.4	-131.9	1,911.1	0.76	0.42	0.63



TDS  
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Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)
12,114.0	88.80	177.50	10,343.2	-2,005.3	-127.1	2,005.0	1.00	-0.53	0.85
12,207.0	90.00	177.70	10,344.1	-2,098.2	-123.2	2,097.9	1.31	1.29	0.22
12,302.0	89.30	178.20	10,344.7	-2,193.1	-119.8	2,192.9	0.91	-0.74	0.53
12,396.0	88.80	177.90	10,346.3	-2,287.1	-116.6	2,286.8	0.62	-0.53	-0.32
12,490.0	87.90	178.40	10,349.0	-2,381.0	-113.6	2,380.7	1.10	-0.96	0.53
12,584.0	89.30	178.10	10,351.3	-2,474.9	-110.7	2,474.7	1.52	1.49	-0.32
12,678.0	88.80	179.50	10,352.8	-2,568.9	-108.8	2,568.6	1.58	-0.53	1.49
12,772.0	88.10	179.80	10,355.4	-2,662.8	-108.2	2,662.6	0.81	-0.74	0.32
12,863.0	88.90	179.50	10,357.8	-2,753.8	-107.6	2,753.6	0.94	0.88	-0.33
12,959.0	89.70	179.60	10,358.9	-2,849.8	-106.9	2,849.5	0.84	0.83	0.10
13,053.0	88.90	178.40	10,360.1	-2,943.7	-105.2	2,943.5	1.53	-0.85	-1.28
13,147.0	88.60	177.20	10,362.1	-3,037.7	-101.6	3,037.4	1.32	-0.32	-1.28
13,241.0	89.20	177.50	10,363.9	-3,131.5	-97.3	3,131.3	0.71	0.64	0.32
13,335.0	87.10	177.00	10,367.0	-3,225.4	-92.8	3,225.2	2.30	-2.23	-0.53
13,429.0	87.30	176.70	10,371.6	-3,319.1	-87.6	3,318.9	0.38	0.21	-0.32
13,523.0	87.80	178.10	10,375.6	-3,412.9	-83.4	3,412.8	1.58	0.53	1.49
13,619.0	88.20	177.90	10,378.9	-3,508.8	-80.0	3,508.6	0.47	0.42	-0.21
13,713.0	87.40	178.80	10,382.5	-3,602.7	-77.3	3,602.5	1.28	-0.85	0.96
13,807.0	88.10	178.90	10,386.2	-3,696.6	-75.4	3,696.4	0.75	0.74	0.11
13,902.0	88.00	179.10	10,389.5	-3,791.5	-73.8	3,791.4	0.24	-0.11	0.21
13,996.0	88.50	179.30	10,392.3	-3,885.5	-72.5	3,885.3	0.57	0.53	0.21
14,090.0	89.60	178.40	10,393.9	-3,979.5	-70.6	3,979.3	1.51	1.17	-0.96
14,184.0	89.40	177.20	10,394.7	-4,073.4	-67.0	4,073.2	1.29	-0.21	-1.28
14,278.0	90.40	177.20	10,394.9	-4,167.3	-62.4	4,167.1	1.06	1.06	0.00
14,371.0	89.80	178.20	10,394.7	-4,260.2	-58.6	4,260.1	1.25	-0.65	1.08
14,465.0	90.20	177.00	10,394.7	-4,354.1	-54.7	4,354.0	1.35	0.43	-1.28
14,560.0	88.70	177.20	10,395.6	-4,449.0	-49.9	4,448.9	1.59	-1.58	0.21
14,654.0	88.70	178.90	10,397.8	-4,542.9	-46.7	4,542.8	1.81	0.00	1.81
14,747.0	87.70	180.20	10,400.7	-4,635.8	-46.0	4,635.7	1.76	-1.08	1.40
14,842.0	88.50	179.60	10,403.8	-4,730.8	-45.8	4,730.7	1.05	0.84	-0.63
14,936.0	89.30	178.80	10,405.6	-4,824.8	-44.5	4,824.7	1.20	0.85	-0.85
15,031.0	88.90	179.80	10,407.1	-4,919.7	-43.3	4,919.6	1.13	-0.42	1.05
15,125.0	89.20	180.20	10,408.7	-5,013.7	-43.3	5,013.6	0.53	0.32	0.43
15,219.0	89.30	179.50	10,409.9	-5,107.7	-43.1	5,107.6	0.75	0.11	-0.74
15,313.0	90.10	178.80	10,410.4	-5,201.7	-41.7	5,201.6	1.13	0.85	-0.74
15,407.0	89.30	179.30	10,410.9	-5,295.7	-40.1	5,295.6	1.00	-0.85	0.53
15,502.0	89.60	178.90	10,411.8	-5,390.7	-38.6	5,390.6	0.53	0.32	-0.42
15,596.0	88.60	179.50	10,413.3	-5,484.7	-37.3	5,484.6	1.24	-1.06	0.64
15,690.0	88.00	178.90	10,416.1	-5,578.6	-36.0	5,578.5	0.90	-0.64	-0.64
15,785.0	88.20	178.20	10,419.2	-5,673.5	-33.6	5,673.4	0.77	0.21	-0.74
15,879.0	88.70	177.20	10,421.8	-5,767.4	-29.8	5,767.3	1.19	0.53	-1.06
15,973.0	87.60	177.90	10,424.8	-5,861.3	-25.8	5,861.2	1.39	-1.17	0.74
16,068.0	87.80	179.80	10,428.6	-5,956.2	-23.9	5,956.1	2.01	0.21	2.00



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16,162.0	89.40	179.50	10,430.9	-6,050.1	-23.3	6,050.1	1.73	1.70	-0.32
16,256.0	91.40	178.80	10,430.3	-6,144.1	-21.9	6,144.1	2.25	2.13	-0.74
16,350.0	92.60	178.20	10,427.0	-6,238.0	-19.5	6,238.0	1.43	1.28	-0.64
16,444.0	92.80	179.10	10,422.5	-6,331.9	-17.3	6,331.8	0.98	0.21	0.96
16,538.0	93.30	180.20	10,417.5	-6,425.8	-16.7	6,425.7	1.28	0.53	1.17
16,632.0	92.20	181.60	10,413.0	-6,519.6	-18.2	6,519.6	1.89	-1.17	1.49
16,726.0	90.90	182.60	10,410.5	-6,613.5	-21.6	6,613.5	1.74	-1.38	1.06
16,821.0	88.40	182.50	10,411.1	-6,708.4	-25.8	6,708.4	2.63	-2.63	-0.11
16,915.0	86.60	182.50	10,415.2	-6,802.2	-29.9	6,802.2	1.91	-1.91	0.00
17,009.0	84.80	181.40	10,422.2	-6,895.9	-33.1	6,895.8	2.24	-1.91	-1.17
17,103.0	84.70	180.40	10,430.8	-6,989.5	-34.6	6,989.4	1.06	-0.11	-1.06
17,197.0	85.10	178.80	10,439.2	-7,083.1	-34.0	7,083.1	1.75	0.43	-1.70
17,291.0	85.40	177.00	10,447.0	-7,176.8	-30.5	7,176.7	1.93	0.32	-1.91
17,386.0	87.10	176.30	10,453.2	-7,271.4	-25.0	7,271.3	1.93	1.79	-0.74
17,466.0	88.80	175.60	10,456.0	-7,351.1	-19.3	7,351.1	2.30	2.13	-0.88
17,507.0	88.80	175.60	10,456.9	-7,392.0	-16.2	7,391.9	0.00	0.00	0.00

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

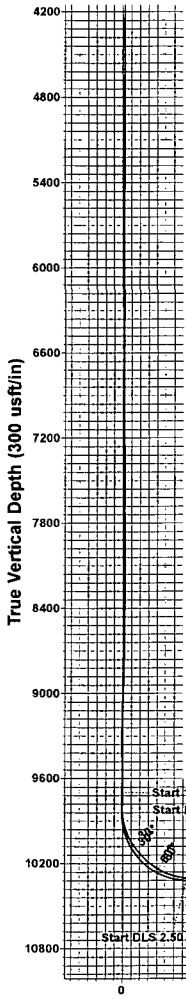


COG Operating LLC  
 Project: Lea County, NM  
 Site: Gettysburg State Com  
 Well: #4H  
 Wellbore: OH  
 Plan: Plan #3 (#4H/OH)

Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	9700.0	2.04	276.51	9698.6	3.5	22.4	0.00	0.00	-3.5	
2	9846.2	2.04	276.51	9844.7	4.1	17.2	0.00	0.00	-4.1	
3	10585.6	88.93	192.45	10320.0	-449.9	-100.0	12.00	-84.10	449.7	
4	11143.6	88.93	178.50	10330.5	-1003.9	-153.1	2.50	-90.14	1003.6	
5	17545.9	88.93	178.50	10450.0	-7402.9	15.0	0.00	0.00	7402.9	PBHL (GSC #4H/OH)

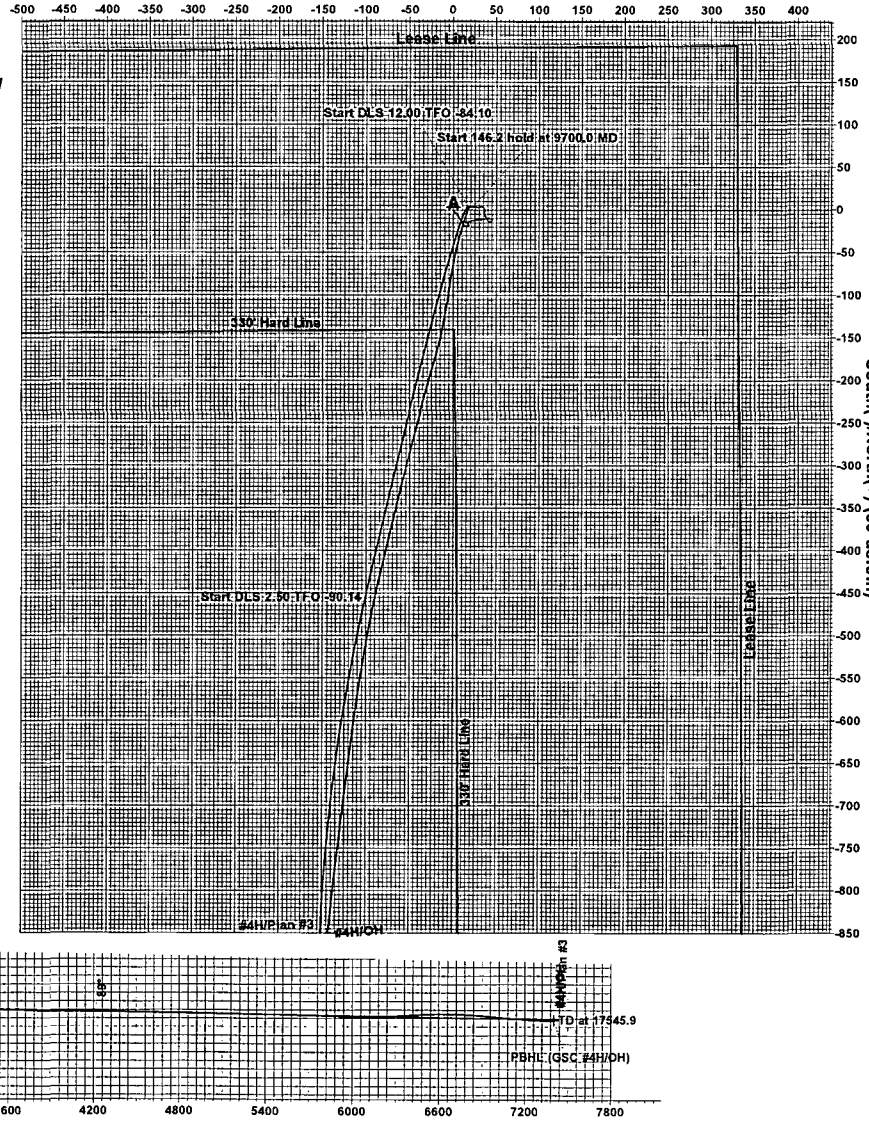
Ground Elevation: 3406.6  
 RKB Elevation: KB @ 3438.0usft

Northing 478028.00    Easting 767625.30    Latitude 32° 18' 40.473 N    Longitude 103° 28' 1.511 W



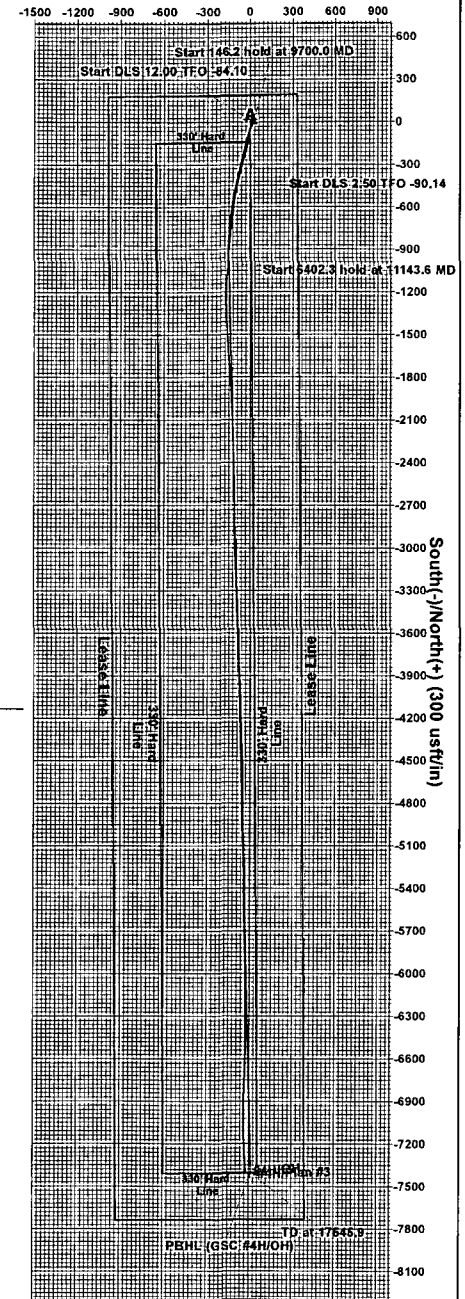
Azimuths to Grid North  
 True North: -0.46°  
 Magnetic North: 6.68°  
 Magnetic Field  
 Strength: 48355.8snT  
 Dip Angle: 60.20°  
 Date: 9/10/2014  
 Model: IGRF2010

West(-)/East(+) (50 usft/in)



Vertical Section at 179.88° (300 usft/in)

West(-)/East(+) (300 usft/in)



Terra Directional Services LLC  
 322 Spring Hill Drive, Suite A300, Spring, Tx 77386  
 Phone: 432-425-7532

PROJECT DETAILS: Lea County, NM  
 Geodetic System: US State Plane 1927 (Exact solution)  
 Datum: NAD 1927 (NADCON CONUS)  
 Ellipsoid: Clarke 1866  
 Zone: New Mexico East 3001  
 System Datum: Mean Sea Level