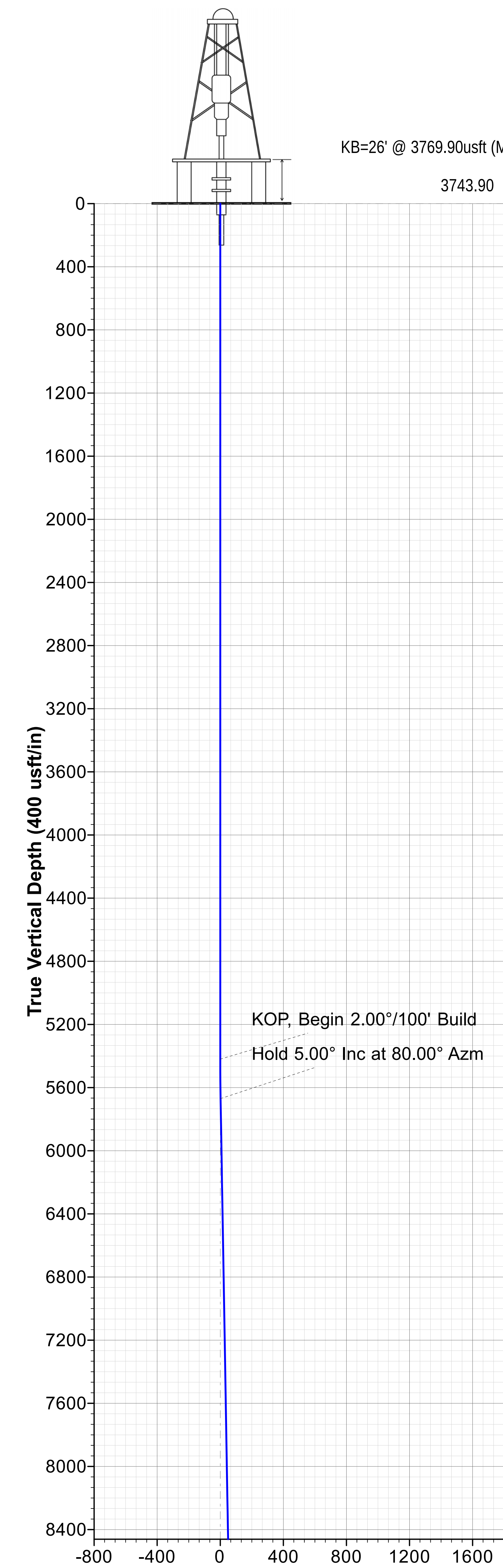




Project: Lea County, NM (NAD27 NME)
Site: Huckleberry State Com
Well: 503H
Wellbore: OH
Design: Plan 1 09-14-18
Rig: McVay 8



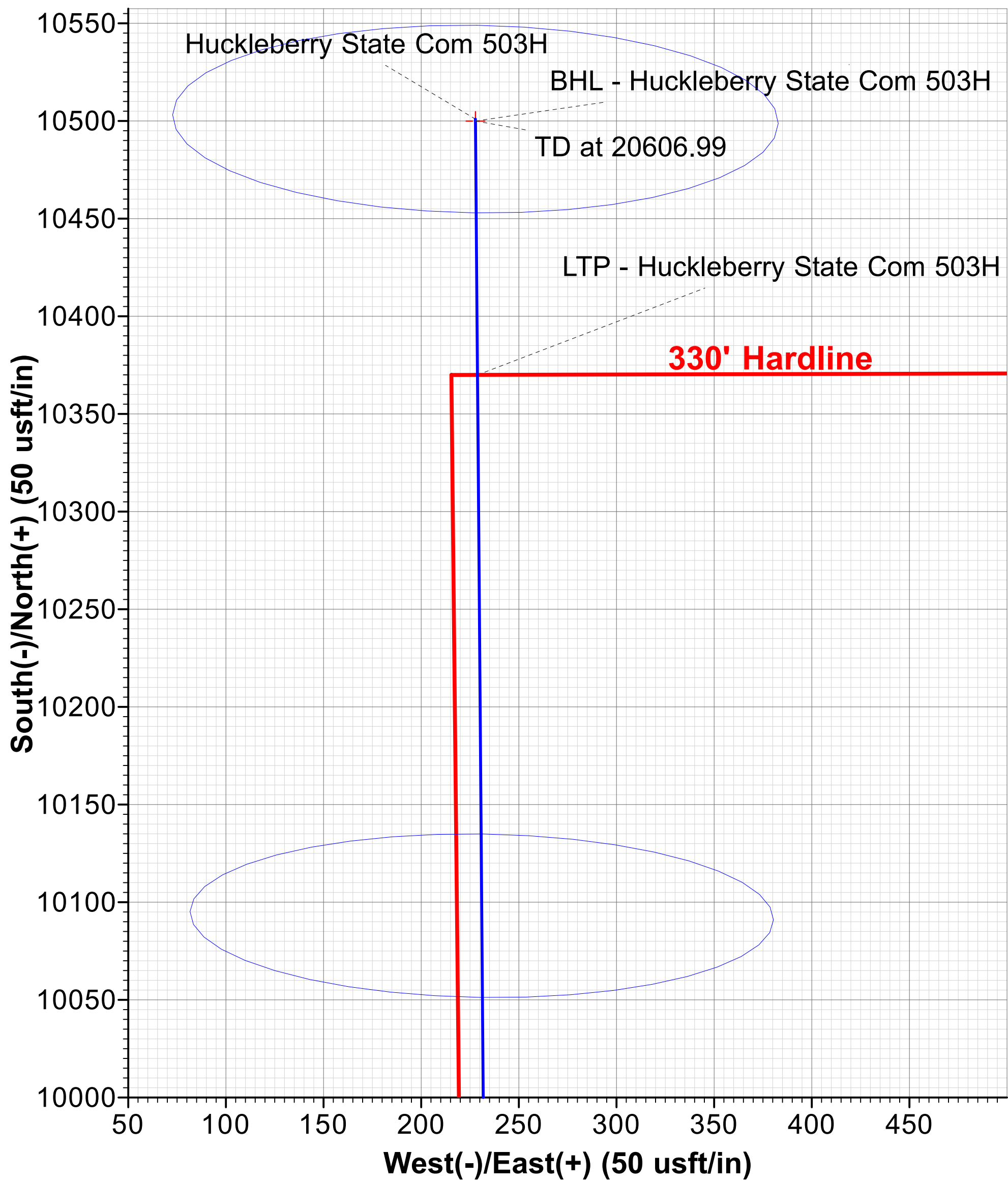
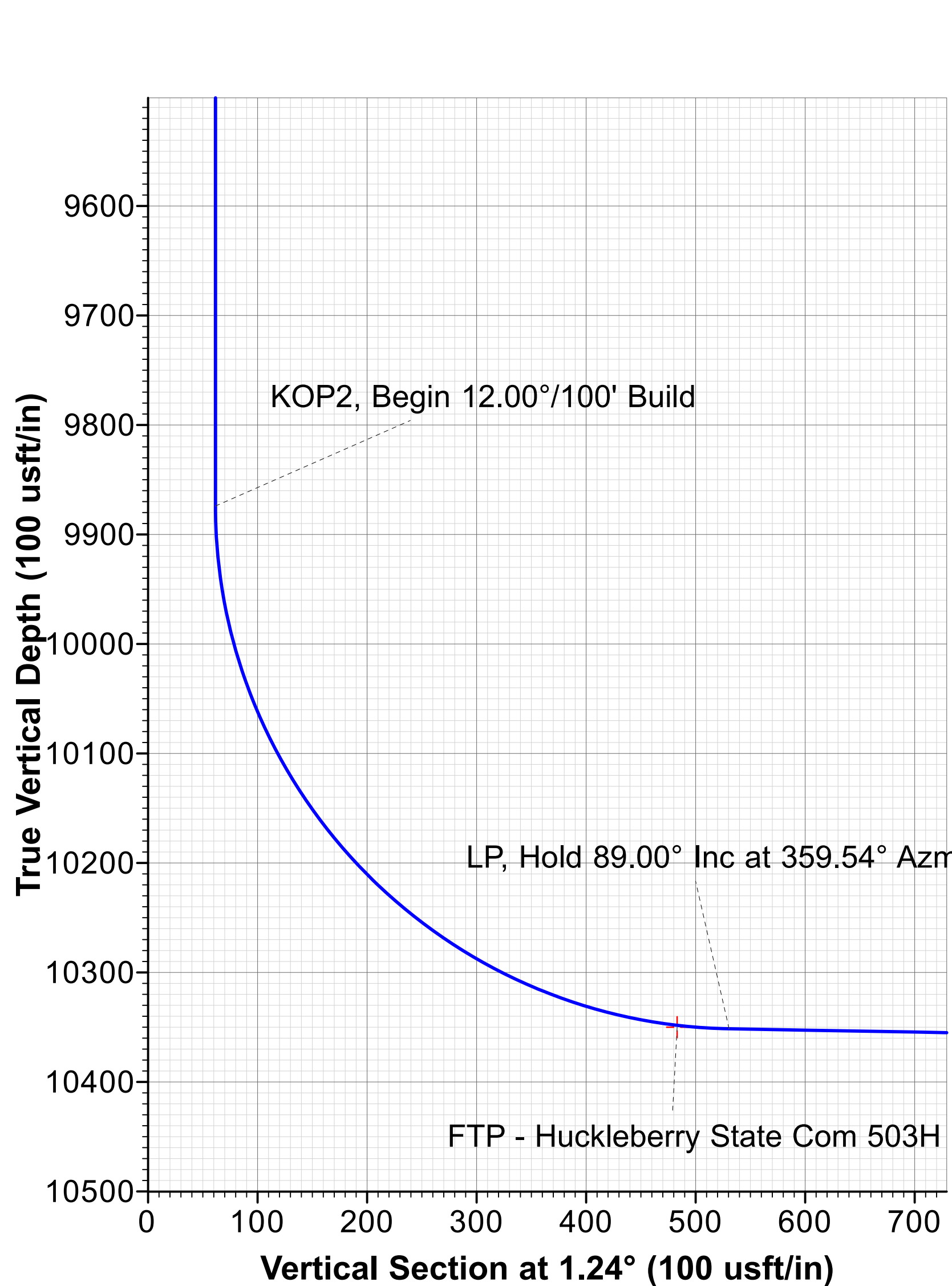
Azimuths to Grid North
True North: -0.41°
Magnetic North: 6.30°
Magnetic Field
Strength: 48182.8snT
Dip Angle: 60.29°
Date: 9/13/2018
Model: MVHD



WELL DETAILS						
			3743.90			
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	530673.10	738606.70	32° 27' 23.60284 N	103° 33' 35.18499 W	

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FTP - Huckleberry State Com 503H	10350.00	476.60	306.40	531149.70	738913.10	32° 27' 28.29686 N	103° 33' 31.56887 W
LTP - Huckleberry State Com 503H	10523.00	10370.00	228.80	541043.10	738835.50	32° 29' 6.19845 N	103° 33' 31.63647 W
BHL - Huckleberry State Com 503H	10525.00	10500.00	227.80	541173.10	738834.50	32° 29' 7.48488 N	103° 33' 31.63712 W

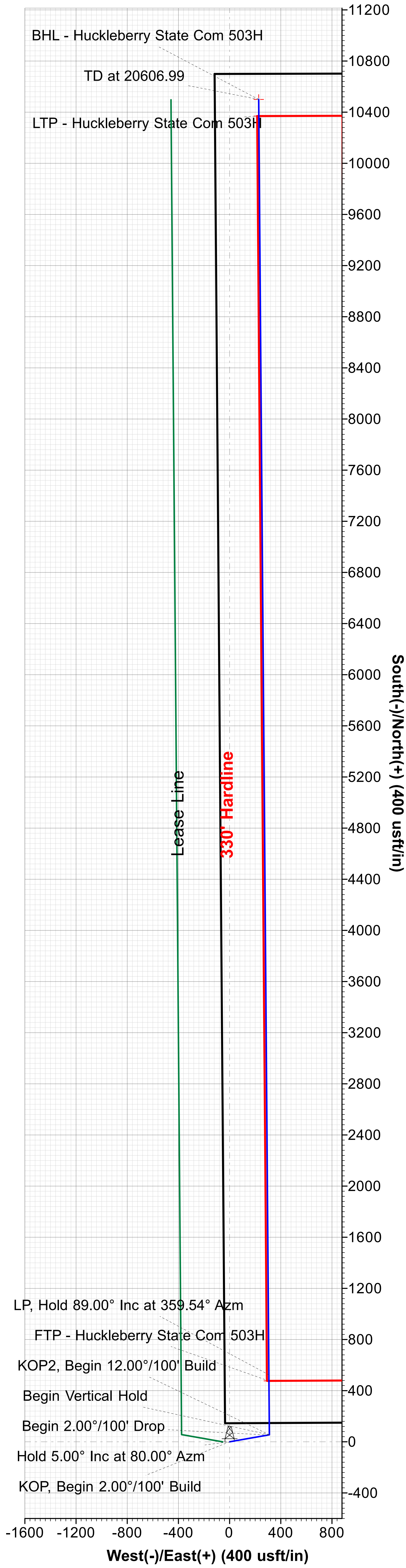
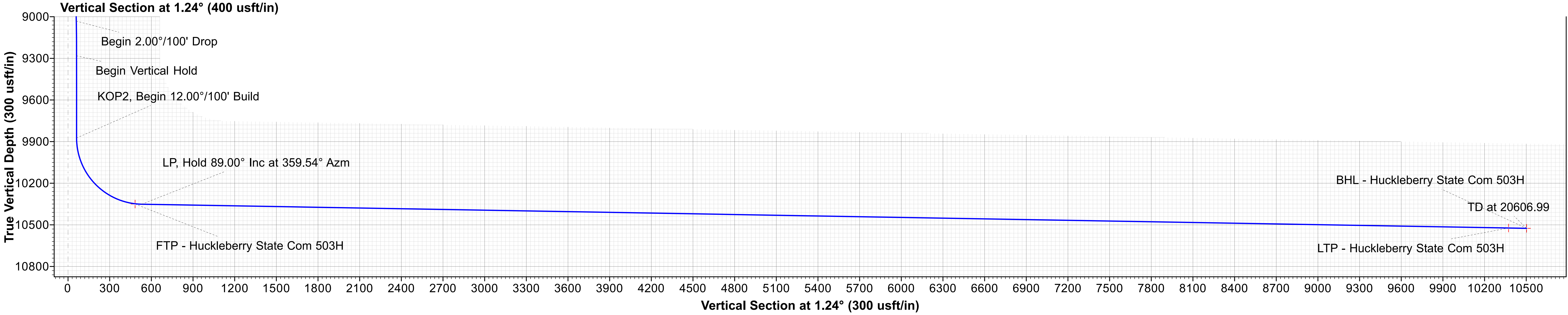
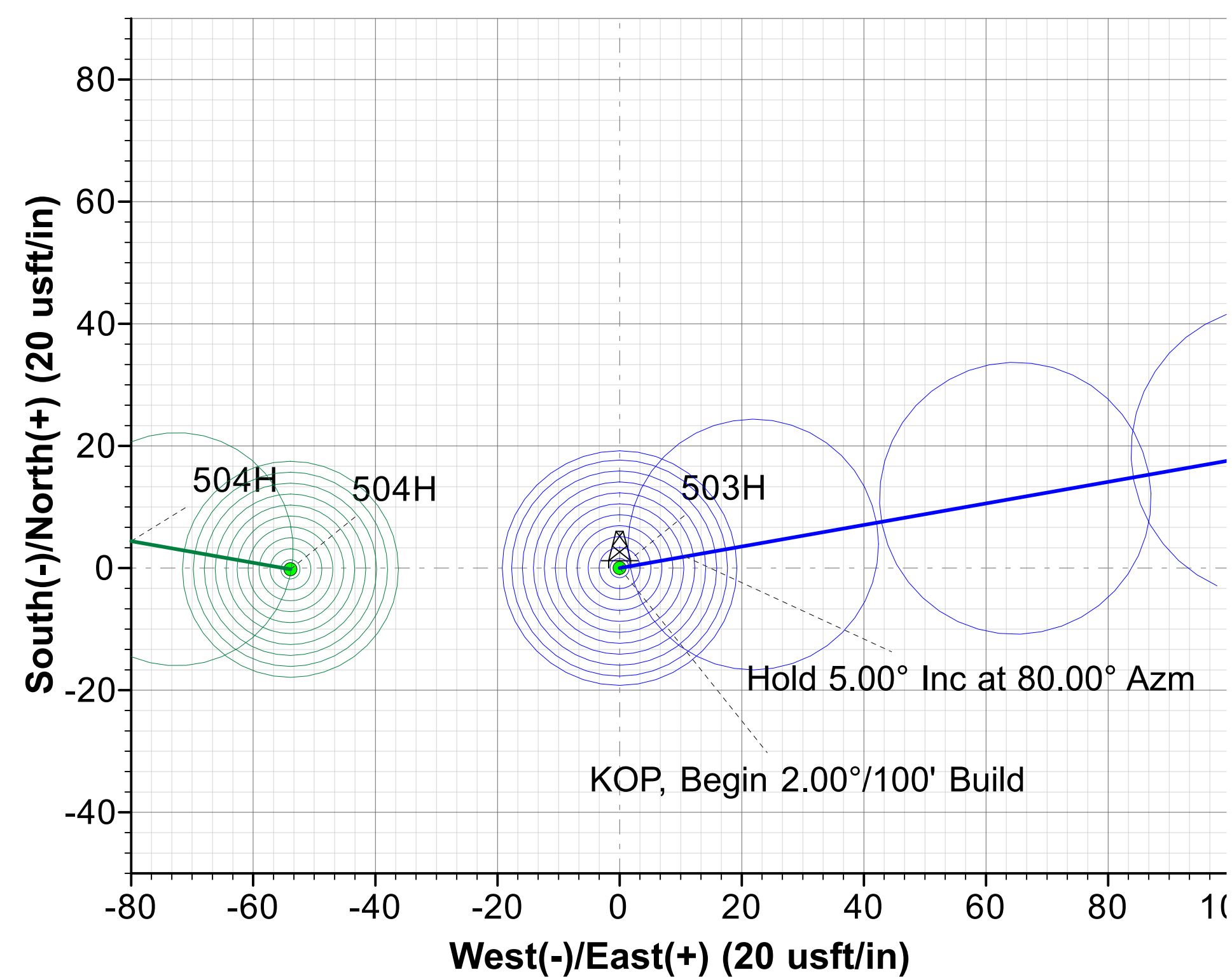
SECTION DETAILS												
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target	Annotation	
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00			
2	5420.00	0.00	0.00	5420.00	0.00	0.00	0.00	0.00	0.00		KOP, Begin 2.00°/100' Build	
3	5670.00	5.00	80.00	5669.68	1.89	10.74	2.00	80.00	2.13		Hold 5.00° Inc at 80.00° Azm	
4	9045.00	5.00	80.00	9031.84	52.97	300.42	0.00	0.00	59.48		Begin 2.00°/100' Drop	
5	9295.00	0.00	0.00	9281.52	54.86	311.15	2.00	180.00	61.60		Begin Vertical Hold	
6	9887.48	0.00	0.00	9874.00	54.86	311.15	0.00	0.00	61.60		KOP2, Begin 12.00°/100' Build	
7	10629.17	89.00	359.54	10351.39	524.01	307.41	12.00	359.54	530.55		LP, Hold 89.00° Inc at 359.54° Azm	
8	20606.99	89.00	359.54	10525.00	10500.00	227.80	0.00	0.00	10502.47	BHL - Huckleberry State Com 503H TD at 20606.99		



Map System: US State Plane 1927 (Exact solution)
Datum: NAD 1927 (NADCON CONUS)
Ellipsoid: Clarke 1866
Zone Name: New Mexico East 3001
Local Origin: Well 503H, Grid North
Latitude: 32° 27' 23.60284 N
Longitude: 103° 33' 35.18499 W
Grid East: 738606.70
Grid North: 530673.10
Scale Factor: 1.000
Geomagnetic Model: MVHD
Sample Date: 13-Sep-18
Magnetic Declination: 6.72°
Dip Angle from Horizontal: 60.29°
Magnetic Field Strength: 48182.81096554nT
To convert a Magnetic Direction to a Grid Direction, Add 6.30°
To convert a Magnetic Direction to a True Direction, Add 6.72° East
To convert a True Direction to a Grid Direction, Subtract 0.42°

LEGEND

- 504H, OH, Plan 1 09-14-18 V0
- 501H, OH, Plan 1 09-14-18 V0
- 502H, OH, Plan 1 09-14-18 V0
- Plan 1 09-14-18





COG Operating LLC

Lea County, NM (NAD27 NME)

Huckleberry State Com

503H

OH

Plan: Plan 1 09-14-18

Standard Planning Report

14 September, 2018



Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Project	Lea County, NM (NAD27 NME)		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	New Mexico East 3001		

Site		Huckleberry State Com			
Site Position:		Northing:	530,679.80 usft	Latitude:	32° 27' 23.57603 N
From:	Map	Easting:	739,901.70 usft	Longitude:	103° 33' 20.07147 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.42 °

Well	503H					
Well Position	+N/-S	-6.70 usft	Northing:	530,673.10 usft	Latitude:	32° 27' 23.60284 N
	+E/-W	-1,295.00 usft	Easting:	738,606.70 usft	Longitude:	103° 33' 35.18499 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	3,743.90 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	9/13/2018	6.72	60.29	48,182.81096554

Design	Plan 1 09-14-18			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)	Direction (°)
	0.00	0.00	0.00	1.24

Plan Sections										
Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Dogleg Rate (°/100usft)	Build Rate (°/100usft)	Turn Rate (°/100usft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,420.00	0.00	0.00	5,420.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,670.00	5.00	80.00	5,669.68	1.89	10.74	2.00	2.00	0.00	80.00	
9,045.00	5.00	80.00	9,031.84	52.97	300.42	0.00	0.00	0.00	0.00	
9,295.00	0.00	0.00	9,281.52	54.86	311.15	2.00	-2.00	0.00	180.00	
9,887.48	0.00	0.00	9,874.00	54.86	311.15	0.00	0.00	0.00	0.00	
10,629.17	89.00	359.54	10,351.39	524.01	307.41	12.00	12.00	-0.06	359.54	
20,606.99	89.00	359.54	10,525.00	10,500.00	227.80	0.00	0.00	0.00	0.00	BHL - Huckleberry Str



Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Planned 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
100.00	0.00	0.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00
200.00	0.00	0.00	200.00	0.00	0.00	0.00	0.00	0.00	0.00
300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	0.00
400.00	0.00	0.00	400.00	0.00	0.00	0.00	0.00	0.00	0.00
500.00	0.00	0.00	500.00	0.00	0.00	0.00	0.00	0.00	0.00
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00
700.00	0.00	0.00	700.00	0.00	0.00	0.00	0.00	0.00	0.00
800.00	0.00	0.00	800.00	0.00	0.00	0.00	0.00	0.00	0.00
900.00	0.00	0.00	900.00	0.00	0.00	0.00	0.00	0.00	0.00
1,000.00	0.00	0.00	1,000.00	0.00	0.00	0.00	0.00	0.00	0.00
1,100.00	0.00	0.00	1,100.00	0.00	0.00	0.00	0.00	0.00	0.00
1,200.00	0.00	0.00	1,200.00	0.00	0.00	0.00	0.00	0.00	0.00
1,300.00	0.00	0.00	1,300.00	0.00	0.00	0.00	0.00	0.00	0.00
1,400.00	0.00	0.00	1,400.00	0.00	0.00	0.00	0.00	0.00	0.00
1,500.00	0.00	0.00	1,500.00	0.00	0.00	0.00	0.00	0.00	0.00
1,600.00	0.00	0.00	1,600.00	0.00	0.00	0.00	0.00	0.00	0.00
1,700.00	0.00	0.00	1,700.00	0.00	0.00	0.00	0.00	0.00	0.00
1,800.00	0.00	0.00	1,800.00	0.00	0.00	0.00	0.00	0.00	0.00
1,900.00	0.00	0.00	1,900.00	0.00	0.00	0.00	0.00	0.00	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00
2,100.00	0.00	0.00	2,100.00	0.00	0.00	0.00	0.00	0.00	0.00
2,200.00	0.00	0.00	2,200.00	0.00	0.00	0.00	0.00	0.00	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00
2,400.00	0.00	0.00	2,400.00	0.00	0.00	0.00	0.00	0.00	0.00
2,500.00	0.00	0.00	2,500.00	0.00	0.00	0.00	0.00	0.00	0.00
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00
2,700.00	0.00	0.00	2,700.00	0.00	0.00	0.00	0.00	0.00	0.00
2,800.00	0.00	0.00	2,800.00	0.00	0.00	0.00	0.00	0.00	0.00
2,900.00	0.00	0.00	2,900.00	0.00	0.00	0.00	0.00	0.00	0.00
3,000.00	0.00	0.00	3,000.00	0.00	0.00	0.00	0.00	0.00	0.00
3,100.00	0.00	0.00	3,100.00	0.00	0.00	0.00	0.00	0.00	0.00
3,200.00	0.00	0.00	3,200.00	0.00	0.00	0.00	0.00	0.00	0.00
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
3,400.00	0.00	0.00	3,400.00	0.00	0.00	0.00	0.00	0.00	0.00
3,500.00	0.00	0.00	3,500.00	0.00	0.00	0.00	0.00	0.00	0.00
3,600.00	0.00	0.00	3,600.00	0.00	0.00	0.00	0.00	0.00	0.00
3,700.00	0.00	0.00	3,700.00	0.00	0.00	0.00	0.00	0.00	0.00
3,800.00	0.00	0.00	3,800.00	0.00	0.00	0.00	0.00	0.00	0.00
3,900.00	0.00	0.00	3,900.00	0.00	0.00	0.00	0.00	0.00	0.00
4,000.00	0.00	0.00	4,000.00	0.00	0.00	0.00	0.00	0.00	0.00
4,100.00	0.00	0.00	4,100.00	0.00	0.00	0.00	0.00	0.00	0.00
4,200.00	0.00	0.00	4,200.00	0.00	0.00	0.00	0.00	0.00	0.00
4,300.00	0.00	0.00	4,300.00	0.00	0.00	0.00	0.00	0.00	0.00
4,400.00	0.00	0.00	4,400.00	0.00	0.00	0.00	0.00	0.00	0.00
4,500.00	0.00	0.00	4,500.00	0.00	0.00	0.00	0.00	0.00	0.00
4,600.00	0.00	0.00	4,600.00	0.00	0.00	0.00	0.00	0.00	0.00
4,700.00	0.00	0.00	4,700.00	0.00	0.00	0.00	0.00	0.00	0.00
4,800.00	0.00	0.00	4,800.00	0.00	0.00	0.00	0.00	0.00	0.00
4,900.00	0.00	0.00	4,900.00	0.00	0.00	0.00	0.00	0.00	0.00
5,000.00	0.00	0.00	5,000.00	0.00	0.00	0.00	0.00	0.00	0.00
5,100.00	0.00	0.00	5,100.00	0.00	0.00	0.00	0.00	0.00	0.00
5,200.00	0.00	0.00	5,200.00	0.00	0.00	0.00	0.00	0.00	0.00
5,300.00	0.00	0.00	5,300.00	0.00	0.00	0.00	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Planned 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)
5,400.00	0.00	0.00	5,400.00	0.00	0.00	0.00	0.00	0.00	0.00
5,420.00	0.00	0.00	5,420.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100' Build									
5,500.00	1.60	80.00	5,499.99	0.19	1.10	0.22	2.00	2.00	0.00
5,600.00	3.60	80.00	5,599.88	0.98	5.57	1.10	2.00	2.00	0.00
5,670.00	5.00	80.00	5,669.68	1.89	10.74	2.13	2.00	2.00	0.00
Hold 5.00° Inc at 80.00° Azm									
5,700.00	5.00	80.00	5,699.57	2.35	13.31	2.64	0.00	0.00	0.00
5,800.00	5.00	80.00	5,799.19	3.86	21.89	4.33	0.00	0.00	0.00
5,900.00	5.00	80.00	5,898.81	5.37	30.48	6.03	0.00	0.00	0.00
6,000.00	5.00	80.00	5,998.43	6.89	39.06	7.73	0.00	0.00	0.00
6,100.00	5.00	80.00	6,098.05	8.40	47.64	9.43	0.00	0.00	0.00
6,200.00	5.00	80.00	6,197.67	9.91	56.23	11.13	0.00	0.00	0.00
6,300.00	5.00	80.00	6,297.29	11.43	64.81	12.83	0.00	0.00	0.00
6,400.00	5.00	80.00	6,396.91	12.94	73.39	14.53	0.00	0.00	0.00
6,500.00	5.00	80.00	6,496.52	14.45	81.98	16.23	0.00	0.00	0.00
6,600.00	5.00	80.00	6,596.14	15.97	90.56	17.93	0.00	0.00	0.00
6,700.00	5.00	80.00	6,695.76	17.48	99.14	19.63	0.00	0.00	0.00
6,800.00	5.00	80.00	6,795.38	18.99	107.73	21.33	0.00	0.00	0.00
6,900.00	5.00	80.00	6,895.00	20.51	116.31	23.03	0.00	0.00	0.00
7,000.00	5.00	80.00	6,994.62	22.02	124.89	24.73	0.00	0.00	0.00
7,100.00	5.00	80.00	7,094.24	23.54	133.48	26.42	0.00	0.00	0.00
7,200.00	5.00	80.00	7,193.86	25.05	142.06	28.12	0.00	0.00	0.00
7,300.00	5.00	80.00	7,293.48	26.56	150.64	29.82	0.00	0.00	0.00
7,400.00	5.00	80.00	7,393.10	28.08	159.22	31.52	0.00	0.00	0.00
7,500.00	5.00	80.00	7,492.72	29.59	167.81	33.22	0.00	0.00	0.00
7,600.00	5.00	80.00	7,592.34	31.10	176.39	34.92	0.00	0.00	0.00
7,700.00	5.00	80.00	7,691.96	32.62	184.97	36.62	0.00	0.00	0.00
7,800.00	5.00	80.00	7,791.58	34.13	193.56	38.32	0.00	0.00	0.00
7,900.00	5.00	80.00	7,891.20	35.64	202.14	40.02	0.00	0.00	0.00
8,000.00	5.00	80.00	7,990.82	37.16	210.72	41.72	0.00	0.00	0.00
8,100.00	5.00	80.00	8,090.44	38.67	219.31	43.42	0.00	0.00	0.00
8,200.00	5.00	80.00	8,190.06	40.18	227.89	45.12	0.00	0.00	0.00
8,300.00	5.00	80.00	8,289.68	41.70	236.47	46.82	0.00	0.00	0.00
8,400.00	5.00	80.00	8,389.29	43.21	245.06	48.52	0.00	0.00	0.00
8,500.00	5.00	80.00	8,488.91	44.72	253.64	50.21	0.00	0.00	0.00
8,600.00	5.00	80.00	8,588.53	46.24	262.22	51.91	0.00	0.00	0.00
8,700.00	5.00	80.00	8,688.15	47.75	270.81	53.61	0.00	0.00	0.00
8,800.00	5.00	80.00	8,787.77	49.26	279.39	55.31	0.00	0.00	0.00
8,900.00	5.00	80.00	8,887.39	50.78	287.97	57.01	0.00	0.00	0.00
9,000.00	5.00	80.00	8,987.01	52.29	296.56	58.71	0.00	0.00	0.00
9,045.00	5.00	80.00	9,031.84	52.97	300.42	59.48	0.00	0.00	0.00
Begin 2.00°/100' Drop									
9,100.00	3.90	80.00	9,086.67	53.71	304.62	60.31	2.00	-2.00	0.00
9,200.00	1.90	80.00	9,186.54	54.59	309.60	61.29	2.00	-2.00	0.00
9,295.00	0.00	0.00	9,281.52	54.86	311.15	61.60	2.00	-2.00	0.00
Begin Vertical Hold									
9,300.00	0.00	0.00	9,286.52	54.86	311.15	61.60	0.00	0.00	0.00
9,400.00	0.00	0.00	9,386.52	54.86	311.15	61.60	0.00	0.00	0.00
9,500.00	0.00	0.00	9,486.52	54.86	311.15	61.60	0.00	0.00	0.00
9,600.00	0.00	0.00	9,586.52	54.86	311.15	61.60	0.00	0.00	0.00
9,700.00	0.00	0.00	9,686.52	54.86	311.15	61.60	0.00	0.00	0.00
9,800.00	0.00	0.00	9,786.52	54.86	311.15	61.60	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Planned 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)
9,887.48	0.00	0.00	9,874.00	54.86	311.15	61.60	0.00	0.00	0.00
KOP2, Begin 12.00°/100' Build									
9,900.00	1.50	359.54	9,886.52	55.03	311.15	61.76	12.00	12.00	0.00
9,925.00	4.50	359.54	9,911.48	56.34	311.14	63.07	12.00	12.00	0.00
9,950.00	7.50	359.54	9,936.34	58.95	311.12	65.69	12.00	12.00	0.00
9,975.00	10.50	359.54	9,961.03	62.86	311.09	69.60	12.00	12.00	0.00
10,000.00	13.50	359.54	9,985.48	68.06	311.05	74.79	12.00	12.00	0.00
10,025.00	16.50	359.54	10,009.63	74.53	311.00	81.26	12.00	12.00	0.00
10,050.00	19.50	359.54	10,033.40	82.26	310.93	88.98	12.00	12.00	0.00
10,075.00	22.50	359.54	10,056.74	91.22	310.86	97.94	12.00	12.00	0.00
10,100.00	25.50	359.54	10,079.57	101.39	310.78	108.10	12.00	12.00	0.00
10,125.00	28.50	359.54	10,101.85	112.73	310.69	119.45	12.00	12.00	0.00
10,150.00	31.50	359.54	10,123.49	125.23	310.59	131.94	12.00	12.00	0.00
10,175.00	34.50	359.54	10,144.46	138.85	310.48	145.55	12.00	12.00	0.00
10,200.00	37.50	359.54	10,164.68	153.54	310.37	160.24	12.00	12.00	0.00
10,225.00	40.50	359.54	10,184.11	169.27	310.24	175.96	12.00	12.00	0.00
10,250.00	43.50	359.54	10,202.68	186.00	310.11	192.68	12.00	12.00	0.00
10,275.00	46.50	359.54	10,220.36	203.68	309.97	210.35	12.00	12.00	0.00
10,300.00	49.50	359.54	10,237.08	222.25	309.82	228.92	12.00	12.00	0.00
10,325.00	52.50	359.54	10,252.81	241.68	309.66	248.34	12.00	12.00	0.00
10,350.00	55.50	359.54	10,267.50	261.90	309.50	268.55	12.00	12.00	0.00
10,375.00	58.50	359.54	10,281.12	282.87	309.33	289.51	12.00	12.00	0.00
10,400.00	61.50	359.54	10,293.62	304.52	309.16	311.15	12.00	12.00	0.00
10,425.00	64.50	359.54	10,304.96	326.79	308.98	333.41	12.00	12.00	0.00
10,450.00	67.50	359.54	10,315.13	349.62	308.80	356.24	12.00	12.00	0.00
10,475.00	70.50	359.54	10,324.09	372.96	308.61	379.57	12.00	12.00	0.00
10,500.00	73.50	359.54	10,331.81	396.73	308.43	403.33	12.00	12.00	0.00
10,525.00	76.50	359.54	10,338.28	420.88	308.23	427.46	12.00	12.00	0.00
10,550.00	79.50	359.54	10,343.47	445.33	308.04	451.91	12.00	12.00	0.00
10,575.00	82.50	359.54	10,347.38	470.02	307.84	476.58	12.00	12.00	0.00
10,600.00	85.50	359.54	10,349.99	494.88	307.64	501.43	12.00	12.00	0.00
10,625.00	88.50	359.54	10,351.30	519.84	307.44	526.39	12.00	12.00	0.00
10,629.17	89.00	359.54	10,351.39	524.01	307.41	530.55	12.00	12.00	0.00
LP, Hold 89.00° Inc at 359.54° Azm									
10,700.00	89.00	359.54	10,352.63	594.82	306.84	601.34	0.00	0.00	0.00
10,800.00	89.00	359.54	10,354.37	694.81	306.05	701.28	0.00	0.00	0.00
10,900.00	89.00	359.54	10,356.11	794.79	305.25	801.22	0.00	0.00	0.00
11,000.00	89.00	359.54	10,357.84	894.77	304.45	901.16	0.00	0.00	0.00
11,100.00	89.00	359.54	10,359.58	994.75	303.65	1,001.10	0.00	0.00	0.00
11,200.00	89.00	359.54	10,361.32	1,094.73	302.86	1,101.04	0.00	0.00	0.00
11,300.00	89.00	359.54	10,363.06	1,194.71	302.06	1,200.99	0.00	0.00	0.00
11,400.00	89.00	359.54	10,364.80	1,294.70	301.26	1,300.93	0.00	0.00	0.00
11,500.00	89.00	359.54	10,366.54	1,394.68	300.46	1,400.87	0.00	0.00	0.00
11,600.00	89.00	359.54	10,368.28	1,494.66	299.66	1,500.81	0.00	0.00	0.00
11,700.00	89.00	359.54	10,370.02	1,594.64	298.87	1,600.75	0.00	0.00	0.00
11,800.00	89.00	359.54	10,371.76	1,694.62	298.07	1,700.69	0.00	0.00	0.00
11,900.00	89.00	359.54	10,373.50	1,794.60	297.27	1,800.63	0.00	0.00	0.00
12,000.00	89.00	359.54	10,375.24	1,894.59	296.47	1,900.57	0.00	0.00	0.00
12,100.00	89.00	359.54	10,376.98	1,994.57	295.67	2,000.51	0.00	0.00	0.00
12,200.00	89.00	359.54	10,378.72	2,094.55	294.88	2,100.45	0.00	0.00	0.00
12,300.00	89.00	359.54	10,380.46	2,194.53	294.08	2,200.39	0.00	0.00	0.00
12,400.00	89.00	359.54	10,382.20	2,294.51	293.28	2,300.33	0.00	0.00	0.00
12,500.00	89.00	359.54	10,383.94	2,394.50	292.48	2,400.28	0.00	0.00	0.00
12,600.00	89.00	359.54	10,385.68	2,494.48	291.68	2,500.22	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Planned 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)
12,700.00	89.00	359.54	10,387.42	2,594.46	290.89	2,600.16	0.00	0.00	0.00
12,800.00	89.00	359.54	10,389.16	2,694.44	290.09	2,700.10	0.00	0.00	0.00
12,900.00	89.00	359.54	10,390.90	2,794.42	289.29	2,800.04	0.00	0.00	0.00
13,000.00	89.00	359.54	10,392.64	2,894.40	288.49	2,899.98	0.00	0.00	0.00
13,100.00	89.00	359.54	10,394.38	2,994.39	287.70	2,999.92	0.00	0.00	0.00
13,200.00	89.00	359.54	10,396.12	3,094.37	286.90	3,099.86	0.00	0.00	0.00
13,300.00	89.00	359.54	10,397.86	3,194.35	286.10	3,199.80	0.00	0.00	0.00
13,400.00	89.00	359.54	10,399.60	3,294.33	285.30	3,299.74	0.00	0.00	0.00
13,500.00	89.00	359.54	10,401.34	3,394.31	284.50	3,399.68	0.00	0.00	0.00
13,600.00	89.00	359.54	10,403.08	3,494.29	283.71	3,499.63	0.00	0.00	0.00
13,700.00	89.00	359.54	10,404.82	3,594.28	282.91	3,599.57	0.00	0.00	0.00
13,800.00	89.00	359.54	10,406.56	3,694.26	282.11	3,699.51	0.00	0.00	0.00
13,900.00	89.00	359.54	10,408.30	3,794.24	281.31	3,799.45	0.00	0.00	0.00
14,000.00	89.00	359.54	10,410.04	3,894.22	280.51	3,899.39	0.00	0.00	0.00
14,100.00	89.00	359.54	10,411.78	3,994.20	279.72	3,999.33	0.00	0.00	0.00
14,200.00	89.00	359.54	10,413.52	4,094.18	278.92	4,099.27	0.00	0.00	0.00
14,300.00	89.00	359.54	10,415.26	4,194.17	278.12	4,199.21	0.00	0.00	0.00
14,400.00	89.00	359.54	10,417.00	4,294.15	277.32	4,299.15	0.00	0.00	0.00
14,500.00	89.00	359.54	10,418.74	4,394.13	276.53	4,399.09	0.00	0.00	0.00
14,600.00	89.00	359.54	10,420.48	4,494.11	275.73	4,499.03	0.00	0.00	0.00
14,700.00	89.00	359.54	10,422.22	4,594.09	274.93	4,598.97	0.00	0.00	0.00
14,800.00	89.00	359.54	10,423.96	4,694.07	274.13	4,698.92	0.00	0.00	0.00
14,900.00	89.00	359.54	10,425.70	4,794.06	273.33	4,798.86	0.00	0.00	0.00
15,000.00	89.00	359.54	10,427.44	4,894.04	272.54	4,898.80	0.00	0.00	0.00
15,100.00	89.00	359.54	10,429.18	4,994.02	271.74	4,998.74	0.00	0.00	0.00
15,200.00	89.00	359.54	10,430.92	5,094.00	270.94	5,098.68	0.00	0.00	0.00
15,300.00	89.00	359.54	10,432.66	5,193.98	270.14	5,198.62	0.00	0.00	0.00
15,400.00	89.00	359.54	10,434.40	5,293.96	269.34	5,298.56	0.00	0.00	0.00
15,500.00	89.00	359.54	10,436.14	5,393.95	268.55	5,398.50	0.00	0.00	0.00
15,600.00	89.00	359.54	10,437.88	5,493.93	267.75	5,498.44	0.00	0.00	0.00
15,700.00	89.00	359.54	10,439.62	5,593.91	266.95	5,598.38	0.00	0.00	0.00
15,800.00	89.00	359.54	10,441.36	5,693.89	266.15	5,698.32	0.00	0.00	0.00
15,900.00	89.00	359.54	10,443.10	5,793.87	265.36	5,798.26	0.00	0.00	0.00
16,000.00	89.00	359.54	10,444.84	5,893.85	264.56	5,898.21	0.00	0.00	0.00
16,100.00	89.00	359.54	10,446.58	5,993.84	263.76	5,998.15	0.00	0.00	0.00
16,200.00	89.00	359.54	10,448.32	6,093.82	262.96	6,098.09	0.00	0.00	0.00
16,300.00	89.00	359.54	10,450.06	6,193.80	262.16	6,198.03	0.00	0.00	0.00
16,400.00	89.00	359.54	10,451.80	6,293.78	261.37	6,297.97	0.00	0.00	0.00
16,500.00	89.00	359.54	10,453.54	6,393.76	260.57	6,397.91	0.00	0.00	0.00
16,600.00	89.00	359.54	10,455.28	6,493.74	259.77	6,497.85	0.00	0.00	0.00
16,700.00	89.00	359.54	10,457.02	6,593.73	258.97	6,597.79	0.00	0.00	0.00
16,800.00	89.00	359.54	10,458.76	6,693.71	258.17	6,697.73	0.00	0.00	0.00
16,900.00	89.00	359.54	10,460.50	6,793.69	257.38	6,797.67	0.00	0.00	0.00
17,000.00	89.00	359.54	10,462.24	6,893.67	256.58	6,897.61	0.00	0.00	0.00
17,100.00	89.00	359.54	10,463.98	6,993.65	255.78	6,997.55	0.00	0.00	0.00
17,200.00	89.00	359.54	10,465.72	7,093.63	254.98	7,097.50	0.00	0.00	0.00
17,300.00	89.00	359.54	10,467.46	7,193.62	254.19	7,197.44	0.00	0.00	0.00
17,400.00	89.00	359.54	10,469.20	7,293.60	253.39	7,297.38	0.00	0.00	0.00
17,500.00	89.00	359.54	10,470.94	7,393.58	252.59	7,397.32	0.00	0.00	0.00
17,600.00	89.00	359.54	10,472.68	7,493.56	251.79	7,497.26	0.00	0.00	0.00
17,700.00	89.00	359.54	10,474.42	7,593.54	250.99	7,597.20	0.00	0.00	0.00
17,800.00	89.00	359.54	10,476.16	7,693.52	250.20	7,697.14	0.00	0.00	0.00
17,900.00	89.00	359.54	10,477.90	7,793.51	249.40	7,797.08	0.00	0.00	0.00
18,000.00	89.00	359.54	10,479.64	7,893.49	248.60	7,897.02	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Planned 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)
18,100.00	89.00	359.54	10,481.38	7,993.47	247.80	7,996.96	0.00	0.00	0.00
18,200.00	89.00	359.54	10,483.12	8,093.45	247.00	8,096.90	0.00	0.00	0.00
18,300.00	89.00	359.54	10,484.86	8,193.43	246.21	8,196.85	0.00	0.00	0.00
18,400.00	89.00	359.54	10,486.60	8,293.41	245.41	8,296.79	0.00	0.00	0.00
18,500.00	89.00	359.54	10,488.34	8,393.40	244.61	8,396.73	0.00	0.00	0.00
18,600.00	89.00	359.54	10,490.08	8,493.38	243.81	8,496.67	0.00	0.00	0.00
18,700.00	89.00	359.54	10,491.82	8,593.36	243.02	8,596.61	0.00	0.00	0.00
18,800.00	89.00	359.54	10,493.56	8,693.34	242.22	8,696.55	0.00	0.00	0.00
18,900.00	89.00	359.54	10,495.30	8,793.32	241.42	8,796.49	0.00	0.00	0.00
19,000.00	89.00	359.54	10,497.04	8,893.30	240.62	8,896.43	0.00	0.00	0.00
19,100.00	89.00	359.54	10,498.78	8,993.29	239.82	8,996.37	0.00	0.00	0.00
19,200.00	89.00	359.54	10,500.52	9,093.27	239.03	9,096.31	0.00	0.00	0.00
19,300.00	89.00	359.54	10,502.26	9,193.25	238.23	9,196.25	0.00	0.00	0.00
19,400.00	89.00	359.54	10,504.00	9,293.23	237.43	9,296.19	0.00	0.00	0.00
19,500.00	89.00	359.54	10,505.74	9,393.21	236.63	9,396.14	0.00	0.00	0.00
19,600.00	89.00	359.54	10,507.48	9,493.19	235.83	9,496.08	0.00	0.00	0.00
19,700.00	89.00	359.54	10,509.22	9,593.18	235.04	9,596.02	0.00	0.00	0.00
19,800.00	89.00	359.54	10,510.96	9,693.16	234.24	9,695.96	0.00	0.00	0.00
19,900.00	89.00	359.54	10,512.70	9,793.14	233.44	9,795.90	0.00	0.00	0.00
20,000.00	89.00	359.54	10,514.44	9,893.12	232.64	9,895.84	0.00	0.00	0.00
20,100.00	89.00	359.54	10,516.18	9,993.10	231.85	9,995.78	0.00	0.00	0.00
20,200.00	89.00	359.54	10,517.92	10,093.08	231.05	10,095.72	0.00	0.00	0.00
20,300.00	89.00	359.54	10,519.66	10,193.07	230.25	10,195.66	0.00	0.00	0.00
20,400.00	89.00	359.54	10,521.40	10,293.05	229.45	10,295.60	0.00	0.00	0.00
20,500.00	89.00	359.54	10,523.14	10,393.03	228.65	10,395.54	0.00	0.00	0.00
20,606.99	89.00	359.54	10,525.00	10,500.00	227.80	10,502.47	0.00	0.00	0.00
TD at 20606.99									

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
FTP - Huckleberry State - hit/miss target - Shape - Point	0.00	0.00	10,350.00	476.60	306.40	531,149.70	738,913.10	32° 27' 28.29686 N	103° 33' 31.56887 W
- plan misses target center by 2.26usft at 10581.83usft MD (10348.23 TVD, 476.80 N, 307.79 E)									
LTP - Huckleberry State - plan misses target center by 0.26usft at 20476.97usft MD (10522.74 TVD, 10370.00 N, 228.84 E) - Point	0.00	0.00	10,523.00	10,370.00	228.80	541,043.10	738,835.50	32° 29' 6.19845 N	103° 33' 31.63647 W
BHL - Huckleberry State - plan hits target center - Point	0.00	0.00	10,525.00	10,500.00	227.80	541,173.10	738,834.50	32° 29' 7.48488 N	103° 33' 31.63712 W

Database:	USA Compass	Local Co-ordinate Reference:	Well 503H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3769.90usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3769.90usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	503H	Survey Calculation Method:	Minimum Curvature
Wellbore:	OH		
Design:	Plan 1 09-14-18		

Plan Annotations				
Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
5,420.00	5,420.00	0.00	0.00	KOP, Begin 2.00°/100' Build
5,670.00	5,669.68	1.89	10.74	Hold 5.00° Inc at 80.00° Azm
9,045.00	9,031.84	52.97	300.42	Begin 2.00°/100' Drop
9,295.00	9,281.52	54.86	311.15	Begin Vertical Hold
9,887.48	9,874.00	54.86	311.15	KOP2, Begin 12.00°/100' Build
10,629.17	10,351.39	524.01	307.41	LP, Hold 89.00° Inc at 359.54° Azm
20,606.99	10,525.00	10,500.00	227.80	TD at 20606.99