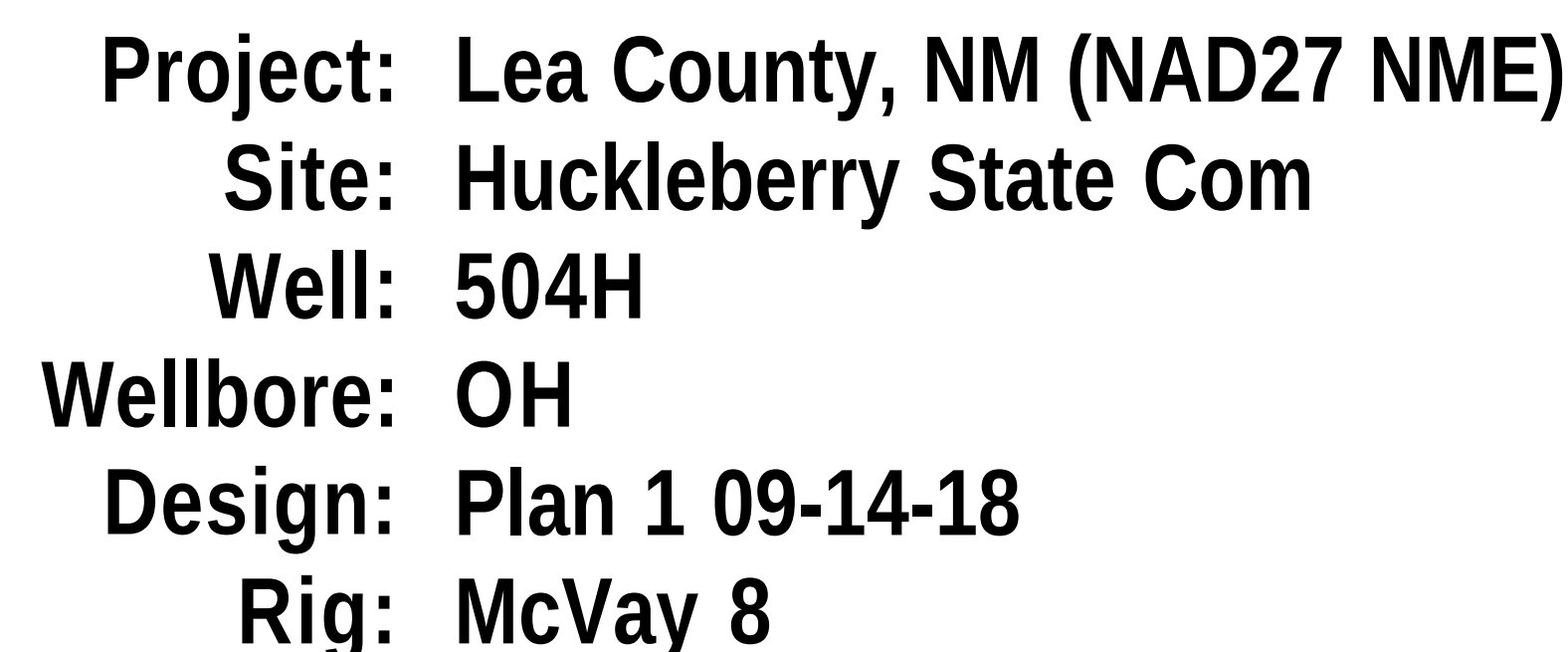
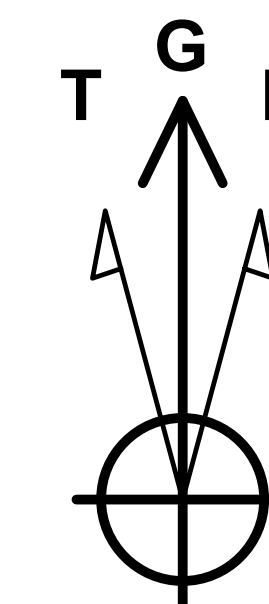


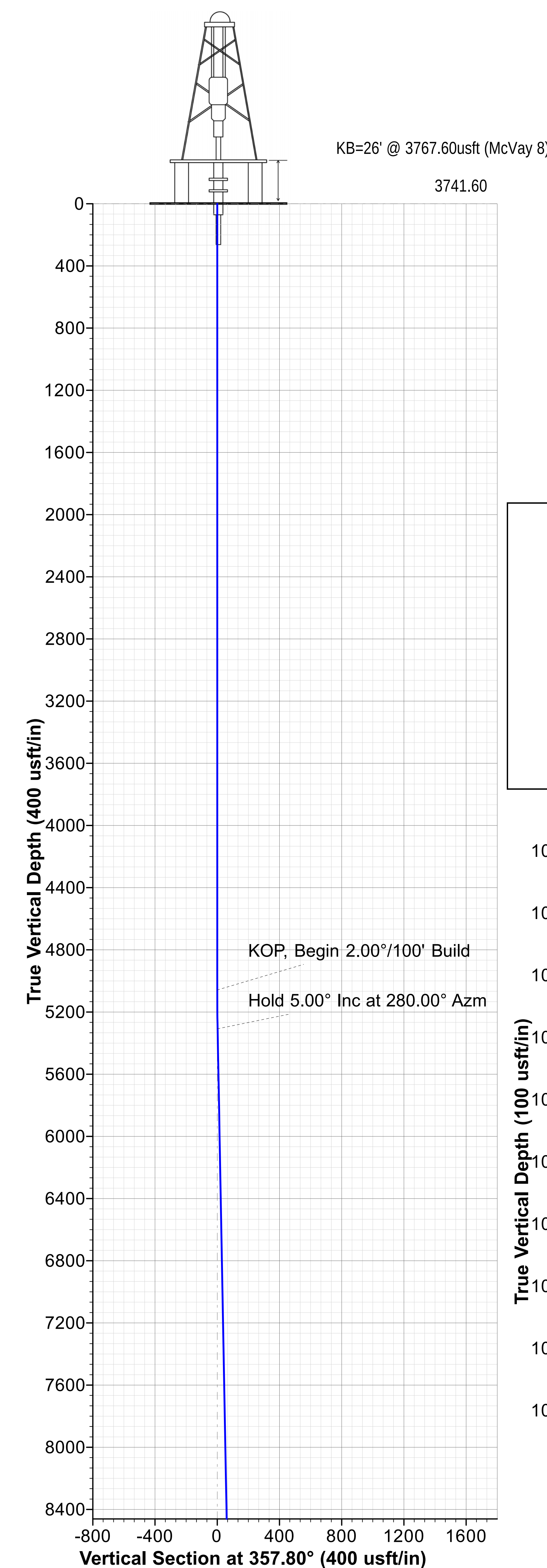


PHOENIX
TECHNOLOGY SERVICES



Azimuths to Grid North
True North: -0.41°
Magnetic North: 6.30°

**Magnetic Field
Strength: 48182.9snT
Dip Angle: 60.29°
Date: 9/13/2018
Model: MVHD**



WELL DETAILS						
3741.60						
+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	
0.00	0.00	530672.90	738552.80	32° 27' 23.60472 N	103° 33' 35.81403 W	

DESIGN TARGET DETAILS							
Name	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
FTP - Huckleberry State Com 504H	10757.00	473.00	-324.20	531145.90	738228.60	32° 27' 28.30833 N	103° 33' 39.55758 W
LTP - Huckleberry State Com 504H	10896.50	10367.20	-403.00	541040.10	738149.80	32° 29' 6.21796 N	103° 33' 39.64152 W
BHL - Huckleberry State Com 504H	10898.00	10497.20	-404.00	541170.10	738148.80	32° 29' 7.50439 N	103° 33' 39.64221 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	5058.00	0.00	0.00	5058.00	0.00	0.00	0.00	0.00	0.00		KOP, Begin 2.00°/100' Build
3	5308.00	5.00	280.00	5307.68	1.89	-10.74	2.00	280.00	2.30		Hold 5.00° Inc at 280.00° Azm
4	8798.00	5.00	280.00	8784.40	54.71	-310.29	0.00	0.00	66.60		Begin 2.00°/100' Drop
5	9048.00	0.00	0.00	9034.09	56.61	-321.02	2.00	180.00	68.91		Begin Vertical Hold
6	10295.91	0.00	0.00	10282.00	56.61	-321.02	0.00	0.00	68.91		KOP2, Begin 12.00°/100' Build
7	11039.28	89.20	359.54	10759.42	527.42	-324.77	12.00	359.54	539.52		LP, Hold 89.20° Inc at 359.54° Azm
8	21010.34	89.20	359.54	10898.00	10497.20	-404.00	0.00	0.00	10504.97	BHL - Huckleberry State Com 504H	TD at 21010.34

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 504H, Grid North

Latitude: 32° 27' 23.60472 N
Longitude: 103° 33' 35.81403 V

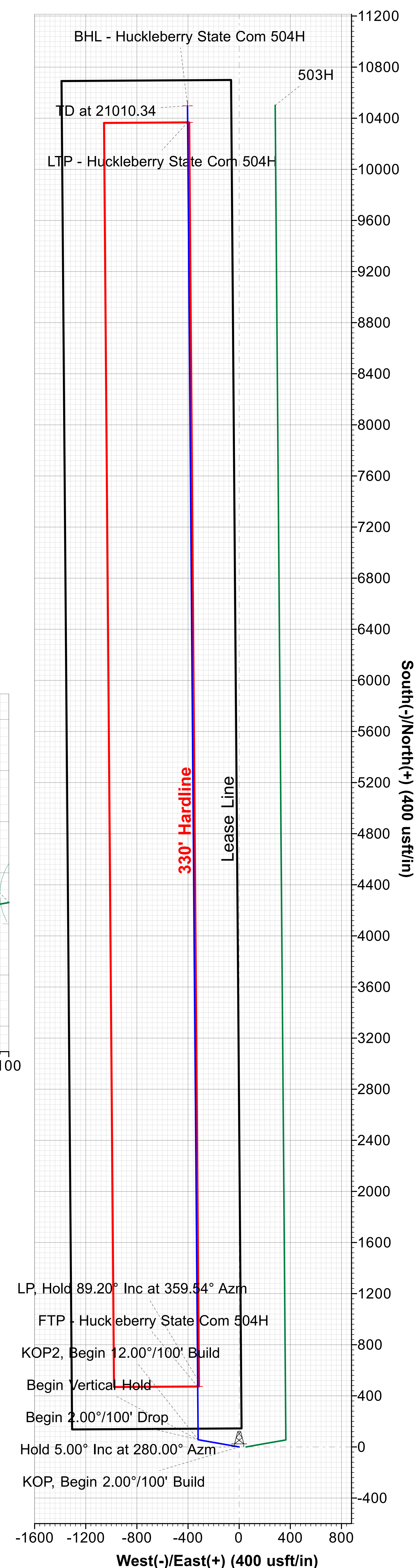
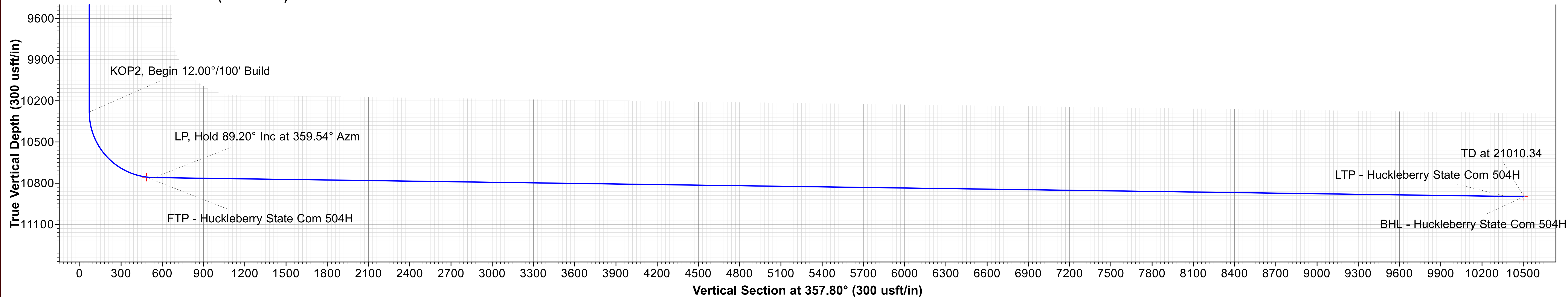
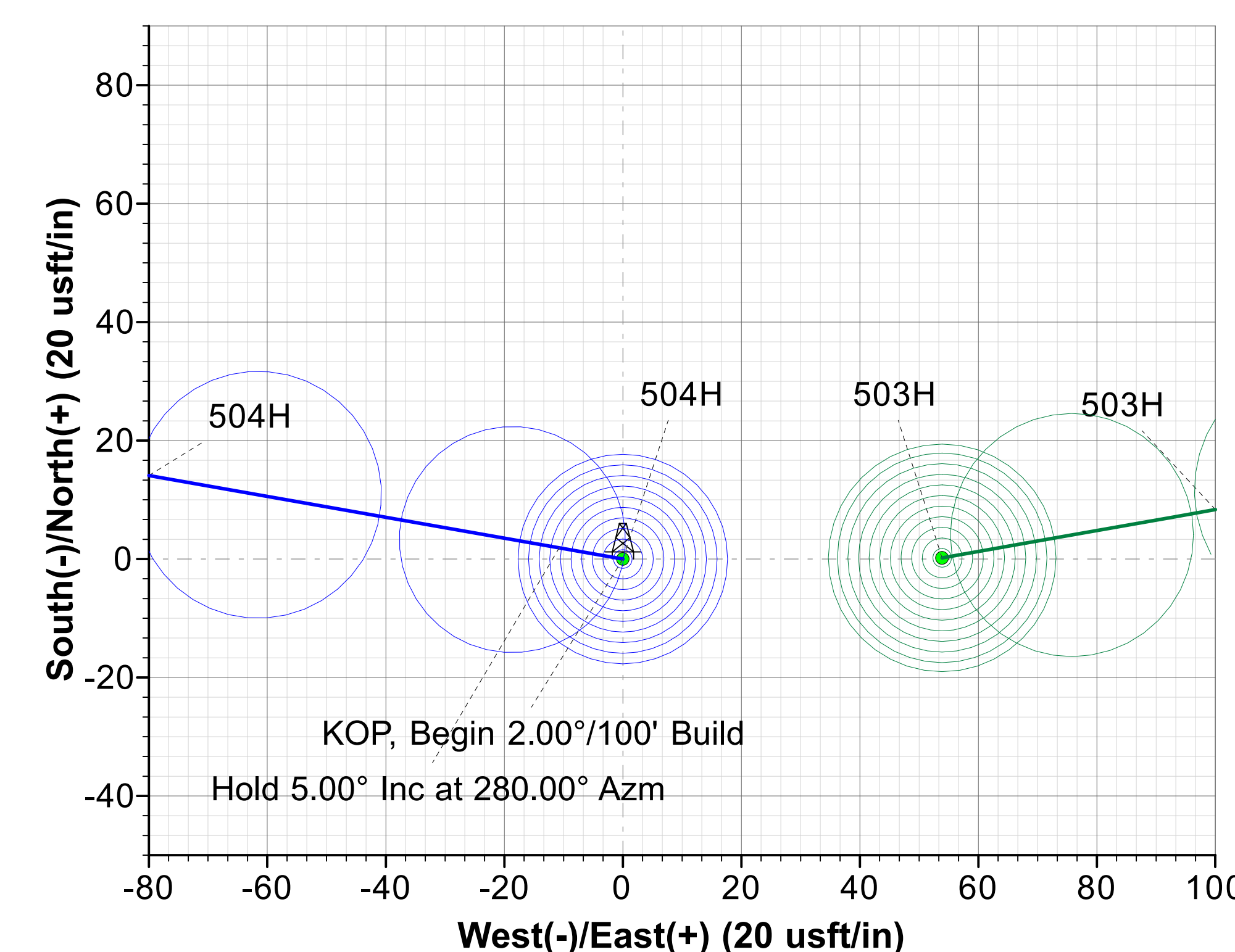
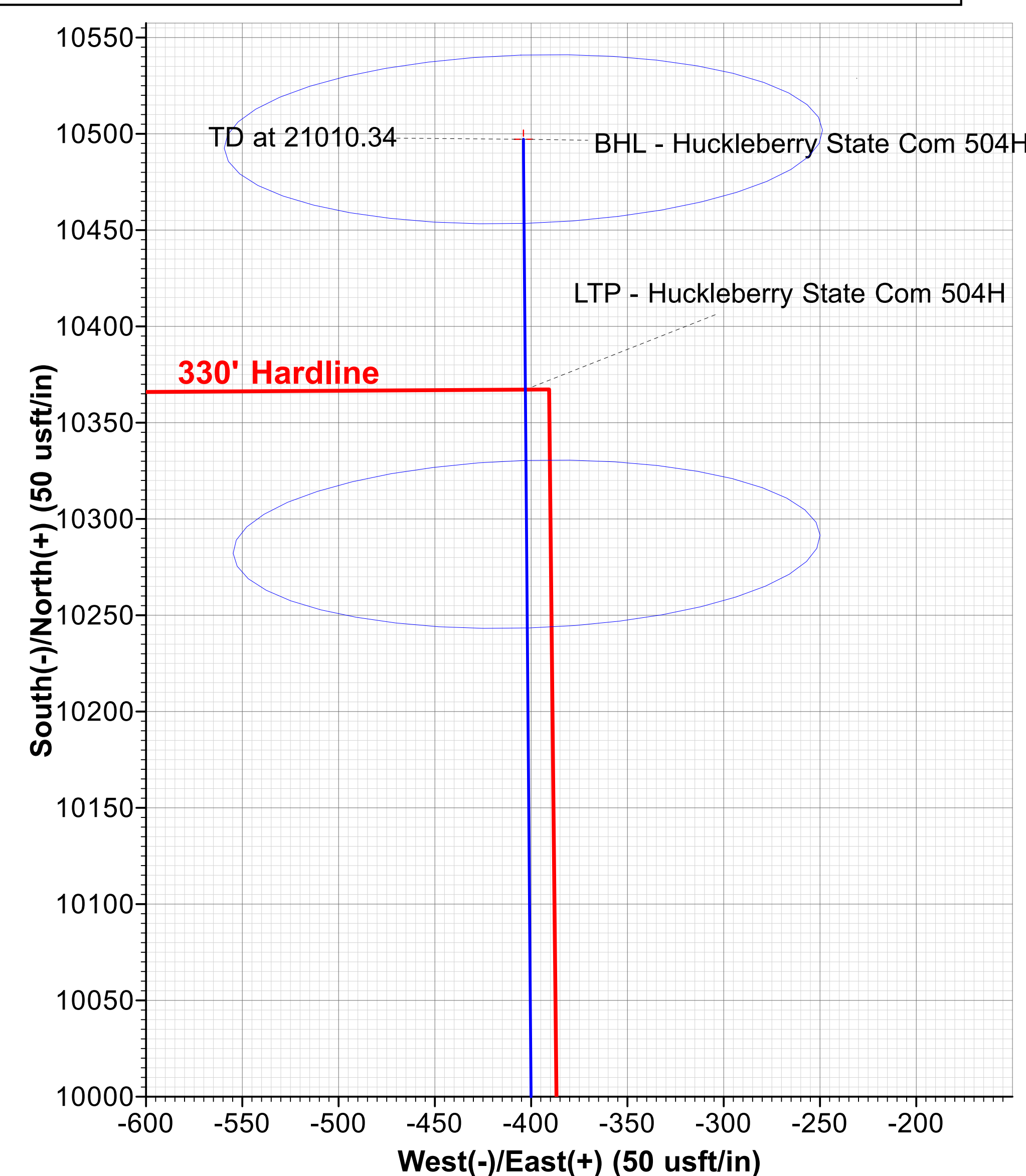
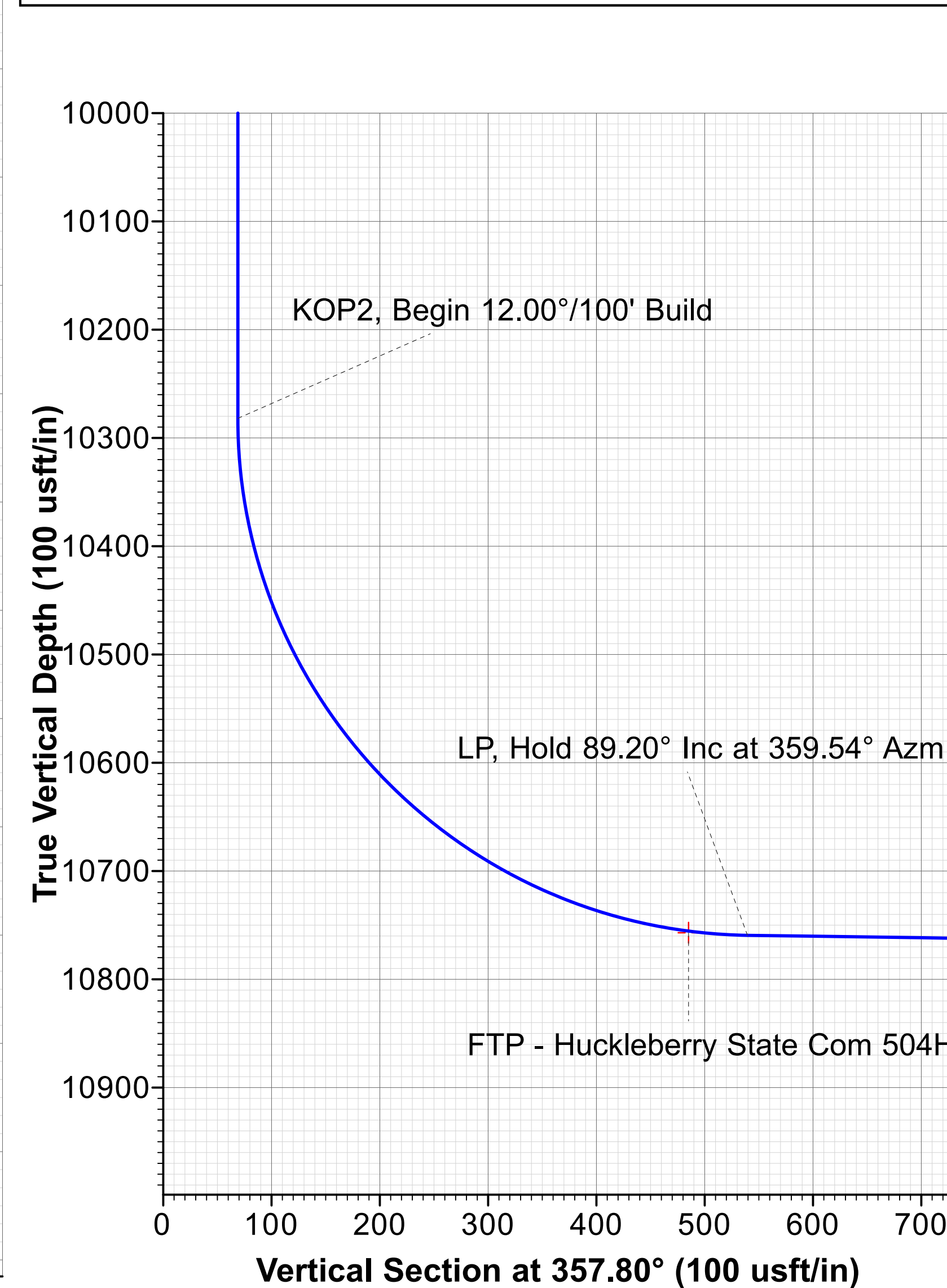
Grid East: 738552.80
Grid North: 530672.90
Scale Factor: 1.000

Geomagnetic Model: MVHD
Sample Date: 13-Sep-18
Magnetic Declination: 6.72°
Dip Angle from Horizontal: 60.29°
Magnetic Field Strength: 48182.87908202nT

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

- 501H, OH, Plan 1 09-14-18 V0
— 503H, 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

504H

OH

Plan: Plan 1 09-14-18

Standard Planning Report

14 September, 2018



Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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	504H					
Well Position	+N/-S	-6.90 usft	Northing:	530,672.90 usft	Latitude:	32° 27' 23.60472 N
	+E/-W	-1,348.90 usft	Easting:	738,552.80 usft	Longitude:	103° 33' 35.81403 W
Position Uncertainty		0.00 usft	Wellhead Elevation:		Ground Level:	3,741.60 usft

Wellbore	OH				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	MVHD	9/13/2018	6.72	60.29	48,182.87908202

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	357.80

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	
5,058.00	0.00	0.00	5,058.00	0.00	0.00	0.00	0.00	0.00	0.00	
5,308.00	5.00	280.00	5,307.68	1.89	-10.74	2.00	2.00	0.00	280.00	
8,798.00	5.00	280.00	8,784.40	54.71	-310.29	0.00	0.00	0.00	0.00	
9,048.00	0.00	0.00	9,034.09	56.61	-321.02	2.00	-2.00	0.00	180.00	
10,295.92	0.00	0.00	10,282.00	56.61	-321.02	0.00	0.00	0.00	0.00	
11,039.28	89.20	359.54	10,759.42	527.42	-324.77	12.00	12.00	-0.06	359.54	
21,010.34	89.20	359.54	10,898.00	10,497.20	-404.00	0.00	0.00	0.00	0.00	BHL - Huckleberry Str



Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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
5,058.00	0.00	0.00	5,058.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100' Build									
5,100.00	0.84	280.00	5,100.00	0.05	-0.30	0.07	2.00	2.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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)	
5,200.00	2.84	280.00	5,199.94	0.61	-3.47	0.74	2.00	2.00	0.00	
5,308.00	5.00	280.00	5,307.68	1.89	-10.74	2.30	2.00	2.00	0.00	
Hold 5.00° Inc at 280.00° Azm										
5,400.00	5.00	280.00	5,399.33	3.29	-18.63	4.00	0.00	0.00	0.00	
5,500.00	5.00	280.00	5,498.95	4.80	-27.22	5.84	0.00	0.00	0.00	
5,600.00	5.00	280.00	5,598.57	6.31	-35.80	7.68	0.00	0.00	0.00	
5,700.00	5.00	280.00	5,698.19	7.83	-44.38	9.53	0.00	0.00	0.00	
5,800.00	5.00	280.00	5,797.81	9.34	-52.96	11.37	0.00	0.00	0.00	
5,900.00	5.00	280.00	5,897.43	10.85	-61.55	13.21	0.00	0.00	0.00	
6,000.00	5.00	280.00	5,997.05	12.37	-70.13	15.05	0.00	0.00	0.00	
6,100.00	5.00	280.00	6,096.67	13.88	-78.71	16.90	0.00	0.00	0.00	
6,200.00	5.00	280.00	6,196.29	15.39	-87.30	18.74	0.00	0.00	0.00	
6,300.00	5.00	280.00	6,295.91	16.91	-95.88	20.58	0.00	0.00	0.00	
6,400.00	5.00	280.00	6,395.53	18.42	-104.46	22.42	0.00	0.00	0.00	
6,500.00	5.00	280.00	6,495.15	19.93	-113.05	24.27	0.00	0.00	0.00	
6,600.00	5.00	280.00	6,594.77	21.45	-121.63	26.11	0.00	0.00	0.00	
6,700.00	5.00	280.00	6,694.39	22.96	-130.21	27.95	0.00	0.00	0.00	
6,800.00	5.00	280.00	6,794.01	24.47	-138.80	29.79	0.00	0.00	0.00	
6,900.00	5.00	280.00	6,893.62	25.99	-147.38	31.64	0.00	0.00	0.00	
7,000.00	5.00	280.00	6,993.24	27.50	-155.96	33.48	0.00	0.00	0.00	
7,100.00	5.00	280.00	7,092.86	29.01	-164.55	35.32	0.00	0.00	0.00	
7,200.00	5.00	280.00	7,192.48	30.53	-173.13	37.16	0.00	0.00	0.00	
7,300.00	5.00	280.00	7,292.10	32.04	-181.71	39.01	0.00	0.00	0.00	
7,400.00	5.00	280.00	7,391.72	33.55	-190.30	40.85	0.00	0.00	0.00	
7,500.00	5.00	280.00	7,491.34	35.07	-198.88	42.69	0.00	0.00	0.00	
7,600.00	5.00	280.00	7,590.96	36.58	-207.46	44.53	0.00	0.00	0.00	
7,700.00	5.00	280.00	7,690.58	38.09	-216.05	46.38	0.00	0.00	0.00	
7,800.00	5.00	280.00	7,790.20	39.61	-224.63	48.22	0.00	0.00	0.00	
7,900.00	5.00	280.00	7,889.82	41.12	-233.21	50.06	0.00	0.00	0.00	
8,000.00	5.00	280.00	7,989.44	42.63	-241.79	51.90	0.00	0.00	0.00	
8,100.00	5.00	280.00	8,089.06	44.15	-250.38	53.74	0.00	0.00	0.00	
8,200.00	5.00	280.00	8,188.68	45.66	-258.96	55.59	0.00	0.00	0.00	
8,300.00	5.00	280.00	8,288.30	47.18	-267.54	57.43	0.00	0.00	0.00	
8,400.00	5.00	280.00	8,387.92	48.69	-276.13	59.27	0.00	0.00	0.00	
8,500.00	5.00	280.00	8,487.54	50.20	-284.71	61.11	0.00	0.00	0.00	
8,600.00	5.00	280.00	8,587.16	51.72	-293.29	62.96	0.00	0.00	0.00	
8,700.00	5.00	280.00	8,686.78	53.23	-301.88	64.80	0.00	0.00	0.00	
8,798.00	5.00	280.00	8,784.40	54.71	-310.29	66.60	0.00	0.00	0.00	
Begin 2.00°/100' Drop										
8,800.00	4.96	280.00	8,786.39	54.74	-310.46	66.64	2.00	-2.00	0.00	
8,900.00	2.96	280.00	8,886.15	55.94	-317.26	68.10	2.00	-2.00	0.00	
9,000.00	0.96	280.00	8,986.09	56.54	-320.63	68.82	2.00	-2.00	0.00	
9,048.00	0.00	0.00	9,034.09	56.61	-321.02	68.91	2.00	-2.00	0.00	
Begin Vertical Hold										
9,100.00	0.00	0.00	9,086.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,200.00	0.00	0.00	9,186.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,300.00	0.00	0.00	9,286.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,400.00	0.00	0.00	9,386.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,500.00	0.00	0.00	9,486.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,600.00	0.00	0.00	9,586.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,700.00	0.00	0.00	9,686.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,800.00	0.00	0.00	9,786.09	56.61	-321.02	68.91	0.00	0.00	0.00	
9,900.00	0.00	0.00	9,886.09	56.61	-321.02	68.91	0.00	0.00	0.00	

Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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)
10,000.00	0.00	0.00	9,986.09	56.61	-321.02	68.91	0.00	0.00	0.00
10,100.00	0.00	0.00	10,086.09	56.61	-321.02	68.91	0.00	0.00	0.00
10,200.00	0.00	0.00	10,186.09	56.61	-321.02	68.91	0.00	0.00	0.00
10,295.92	0.00	0.00	10,282.00	56.61	-321.02	68.91	0.00	0.00	0.00
KOP2, Begin 12.00°/100' Build									
10,300.00	0.49	359.54	10,286.09	56.62	-321.02	68.93	12.00	12.00	0.00
10,325.00	3.49	359.54	10,311.07	57.49	-321.03	69.79	12.00	12.00	0.00
10,350.00	6.49	359.54	10,335.97	59.67	-321.05	71.97	12.00	12.00	0.00
10,375.00	9.49	359.54	10,360.72	63.14	-321.08	75.44	12.00	12.00	0.00
10,400.00	12.49	359.54	10,385.26	67.91	-321.11	80.20	12.00	12.00	0.00
10,425.00	15.49	359.54	10,409.52	73.95	-321.16	86.24	12.00	12.00	0.00
10,450.00	18.49	359.54	10,433.42	81.25	-321.22	93.55	12.00	12.00	0.00
10,475.00	21.49	359.54	10,456.92	89.80	-321.29	102.09	12.00	12.00	0.00
10,500.00	24.49	359.54	10,479.93	99.56	-321.37	111.85	12.00	12.00	0.00
10,525.00	27.49	359.54	10,502.40	110.51	-321.45	122.79	12.00	12.00	0.00
10,550.00	30.49	359.54	10,524.26	122.63	-321.55	134.90	12.00	12.00	0.00
10,575.00	33.49	359.54	10,545.46	135.87	-321.65	148.14	12.00	12.00	0.00
10,600.00	36.49	359.54	10,565.94	150.21	-321.77	162.47	12.00	12.00	0.00
10,625.00	39.49	359.54	10,585.64	165.59	-321.89	177.85	12.00	12.00	0.00
10,650.00	42.49	359.54	10,604.51	181.99	-322.02	194.24	12.00	12.00	0.00
10,675.00	45.49	359.54	10,622.50	199.35	-322.16	211.59	12.00	12.00	0.00
10,700.00	48.49	359.54	10,639.55	217.63	-322.30	229.86	12.00	12.00	0.00
10,725.00	51.49	359.54	10,655.62	236.77	-322.46	249.00	12.00	12.00	0.00
10,750.00	54.49	359.54	10,670.66	256.73	-322.61	268.95	12.00	12.00	0.00
10,775.00	57.49	359.54	10,684.65	277.45	-322.78	289.66	12.00	12.00	0.00
10,800.00	60.49	359.54	10,697.52	298.88	-322.95	311.08	12.00	12.00	0.00
10,825.00	63.49	359.54	10,709.26	320.94	-323.12	333.13	12.00	12.00	0.00
10,850.00	66.49	359.54	10,719.83	343.60	-323.30	355.78	12.00	12.00	0.00
10,875.00	69.49	359.54	10,729.20	366.77	-323.49	378.94	12.00	12.00	0.00
10,900.00	72.49	359.54	10,737.34	390.41	-323.68	402.56	12.00	12.00	0.00
10,925.00	75.49	359.54	10,744.24	414.43	-323.87	426.58	12.00	12.00	0.00
10,950.00	78.49	359.54	10,749.86	438.79	-324.06	450.93	12.00	12.00	0.00
10,975.00	81.49	359.54	10,754.21	463.40	-324.26	475.53	12.00	12.00	0.00
11,000.00	84.49	359.54	10,757.26	488.21	-324.45	500.33	12.00	12.00	0.00
11,025.00	87.49	359.54	10,759.01	513.15	-324.65	525.25	12.00	12.00	0.00
11,039.28	89.20	359.54	10,759.42	527.42	-324.77	539.52	12.00	12.00	0.00
LP, Hold 89.20° Inc at 359.54° Azm									
11,100.00	89.20	359.54	10,760.26	588.13	-325.25	600.21	0.00	0.00	0.00
11,200.00	89.20	359.54	10,761.65	688.12	-326.04	700.15	0.00	0.00	0.00
11,300.00	89.20	359.54	10,763.04	788.11	-326.84	800.09	0.00	0.00	0.00
11,400.00	89.20	359.54	10,764.43	888.09	-327.63	900.04	0.00	0.00	0.00
11,500.00	89.20	359.54	10,765.82	988.08	-328.43	999.98	0.00	0.00	0.00
11,600.00	89.20	359.54	10,767.21	1,088.07	-329.22	1,099.92	0.00	0.00	0.00
11,700.00	89.20	359.54	10,768.60	1,188.06	-330.02	1,199.87	0.00	0.00	0.00
11,800.00	89.20	359.54	10,769.99	1,288.04	-330.81	1,299.81	0.00	0.00	0.00
11,900.00	89.20	359.54	10,771.38	1,388.03	-331.61	1,399.76	0.00	0.00	0.00
12,000.00	89.20	359.54	10,772.77	1,488.02	-332.40	1,499.70	0.00	0.00	0.00
12,100.00	89.20	359.54	10,774.16	1,588.00	-333.19	1,599.64	0.00	0.00	0.00
12,200.00	89.20	359.54	10,775.55	1,687.99	-333.99	1,699.59	0.00	0.00	0.00
12,300.00	89.20	359.54	10,776.94	1,787.98	-334.78	1,799.53	0.00	0.00	0.00
12,400.00	89.20	359.54	10,778.33	1,887.97	-335.58	1,899.48	0.00	0.00	0.00
12,500.00	89.20	359.54	10,779.72	1,987.95	-336.37	1,999.42	0.00	0.00	0.00
12,600.00	89.20	359.54	10,781.11	2,087.94	-337.17	2,099.36	0.00	0.00	0.00
12,700.00	89.20	359.54	10,782.50	2,187.93	-337.96	2,199.31	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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)
12,800.00	89.20	359.54	10,783.89	2,287.91	-338.76	2,299.25	0.00	0.00	0.00
12,900.00	89.20	359.54	10,785.28	2,387.90	-339.55	2,399.19	0.00	0.00	0.00
13,000.00	89.20	359.54	10,786.67	2,487.89	-340.35	2,499.14	0.00	0.00	0.00
13,100.00	89.20	359.54	10,788.06	2,587.88	-341.14	2,599.08	0.00	0.00	0.00
13,200.00	89.20	359.54	10,789.45	2,687.86	-341.94	2,699.03	0.00	0.00	0.00
13,300.00	89.20	359.54	10,790.84	2,787.85	-342.73	2,798.97	0.00	0.00	0.00
13,400.00	89.20	359.54	10,792.23	2,887.84	-343.53	2,898.91	0.00	0.00	0.00
13,500.00	89.20	359.54	10,793.62	2,987.83	-344.32	2,998.86	0.00	0.00	0.00
13,600.00	89.20	359.54	10,795.01	3,087.81	-345.11	3,098.80	0.00	0.00	0.00
13,700.00	89.20	359.54	10,796.40	3,187.80	-345.91	3,198.74	0.00	0.00	0.00
13,800.00	89.20	359.54	10,797.79	3,287.79	-346.70	3,298.69	0.00	0.00	0.00
13,900.00	89.20	359.54	10,799.18	3,387.77	-347.50	3,398.63	0.00	0.00	0.00
14,000.00	89.20	359.54	10,800.57	3,487.76	-348.29	3,498.58	0.00	0.00	0.00
14,100.00	89.20	359.54	10,801.96	3,587.75	-349.09	3,598.52	0.00	0.00	0.00
14,200.00	89.20	359.54	10,803.35	3,687.74	-349.88	3,698.46	0.00	0.00	0.00
14,300.00	89.20	359.54	10,804.74	3,787.72	-350.68	3,798.41	0.00	0.00	0.00
14,400.00	89.20	359.54	10,806.13	3,887.71	-351.47	3,898.35	0.00	0.00	0.00
14,500.00	89.20	359.54	10,807.52	3,987.70	-352.27	3,998.29	0.00	0.00	0.00
14,600.00	89.20	359.54	10,808.91	4,087.68	-353.06	4,098.24	0.00	0.00	0.00
14,700.00	89.20	359.54	10,810.30	4,187.67	-353.86	4,198.18	0.00	0.00	0.00
14,800.00	89.20	359.54	10,811.69	4,287.66	-354.65	4,298.13	0.00	0.00	0.00
14,900.00	89.20	359.54	10,813.08	4,387.65	-355.44	4,398.07	0.00	0.00	0.00
15,000.00	89.20	359.54	10,814.47	4,487.63	-356.24	4,498.01	0.00	0.00	0.00
15,100.00	89.20	359.54	10,815.86	4,587.62	-357.03	4,597.96	0.00	0.00	0.00
15,200.00	89.20	359.54	10,817.25	4,687.61	-357.83	4,697.90	0.00	0.00	0.00
15,300.00	89.20	359.54	10,818.64	4,787.59	-358.62	4,797.84	0.00	0.00	0.00
15,400.00	89.20	359.54	10,820.03	4,887.58	-359.42	4,897.79	0.00	0.00	0.00
15,500.00	89.20	359.54	10,821.42	4,987.57	-360.21	4,997.73	0.00	0.00	0.00
15,600.00	89.20	359.54	10,822.81	5,087.56	-361.01	5,097.68	0.00	0.00	0.00
15,700.00	89.20	359.54	10,824.20	5,187.54	-361.80	5,197.62	0.00	0.00	0.00
15,800.00	89.20	359.54	10,825.59	5,287.53	-362.60	5,297.56	0.00	0.00	0.00
15,900.00	89.20	359.54	10,826.97	5,387.52	-363.39	5,397.51	0.00	0.00	0.00
16,000.00	89.20	359.54	10,828.36	5,487.50	-364.19	5,497.45	0.00	0.00	0.00
16,100.00	89.20	359.54	10,829.75	5,587.49	-364.98	5,597.39	0.00	0.00	0.00
16,200.00	89.20	359.54	10,831.14	5,687.48	-365.78	5,697.34	0.00	0.00	0.00
16,300.00	89.20	359.54	10,832.53	5,787.47	-366.57	5,797.28	0.00	0.00	0.00
16,400.00	89.20	359.54	10,833.92	5,887.45	-367.36	5,897.23	0.00	0.00	0.00
16,500.00	89.20	359.54	10,835.31	5,987.44	-368.16	5,997.17	0.00	0.00	0.00
16,600.00	89.20	359.54	10,836.70	6,087.43	-368.95	6,097.11	0.00	0.00	0.00
16,700.00	89.20	359.54	10,838.09	6,187.42	-369.75	6,197.06	0.00	0.00	0.00
16,800.00	89.20	359.54	10,839.48	6,287.40	-370.54	6,297.00	0.00	0.00	0.00
16,900.00	89.20	359.54	10,840.87	6,387.39	-371.34	6,396.95	0.00	0.00	0.00
17,000.00	89.20	359.54	10,842.26	6,487.38	-372.13	6,496.89	0.00	0.00	0.00
17,100.00	89.20	359.54	10,843.65	6,587.36	-372.93	6,596.83	0.00	0.00	0.00
17,200.00	89.20	359.54	10,845.04	6,687.35	-373.72	6,696.78	0.00	0.00	0.00
17,300.00	89.20	359.54	10,846.43	6,787.34	-374.52	6,796.72	0.00	0.00	0.00
17,400.00	89.20	359.54	10,847.82	6,887.33	-375.31	6,896.66	0.00	0.00	0.00
17,500.00	89.20	359.54	10,849.21	6,987.31	-376.11	6,996.61	0.00	0.00	0.00
17,600.00	89.20	359.54	10,850.60	7,087.30	-376.90	7,096.55	0.00	0.00	0.00
17,700.00	89.20	359.54	10,851.99	7,187.29	-377.69	7,196.50	0.00	0.00	0.00
17,800.00	89.20	359.54	10,853.38	7,287.27	-378.49	7,296.44	0.00	0.00	0.00
17,900.00	89.20	359.54	10,854.77	7,387.26	-379.28	7,396.38	0.00	0.00	0.00
18,000.00	89.20	359.54	10,856.16	7,487.25	-380.08	7,496.33	0.00	0.00	0.00
18,100.00	89.20	359.54	10,857.55	7,587.24	-380.87	7,596.27	0.00	0.00	0.00

Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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)	
18,200.00	89.20	359.54	10,858.94	7,687.22	-381.67	7,696.21	0.00	0.00	0.00	
18,300.00	89.20	359.54	10,860.33	7,787.21	-382.46	7,796.16	0.00	0.00	0.00	
18,400.00	89.20	359.54	10,861.72	7,887.20	-383.26	7,896.10	0.00	0.00	0.00	
18,500.00	89.20	359.54	10,863.11	7,987.18	-384.05	7,996.05	0.00	0.00	0.00	
18,600.00	89.20	359.54	10,864.50	8,087.17	-384.85	8,095.99	0.00	0.00	0.00	
18,700.00	89.20	359.54	10,865.89	8,187.16	-385.64	8,195.93	0.00	0.00	0.00	
18,800.00	89.20	359.54	10,867.28	8,287.15	-386.44	8,295.88	0.00	0.00	0.00	
18,900.00	89.20	359.54	10,868.67	8,387.13	-387.23	8,395.82	0.00	0.00	0.00	
19,000.00	89.20	359.54	10,870.06	8,487.12	-388.03	8,495.76	0.00	0.00	0.00	
19,100.00	89.20	359.54	10,871.45	8,587.11	-388.82	8,595.71	0.00	0.00	0.00	
19,200.00	89.20	359.54	10,872.84	8,687.09	-389.61	8,695.65	0.00	0.00	0.00	
19,300.00	89.20	359.54	10,874.23	8,787.08	-390.41	8,795.60	0.00	0.00	0.00	
19,400.00	89.20	359.54	10,875.62	8,887.07	-391.20	8,895.54	0.00	0.00	0.00	
19,500.00	89.20	359.54	10,877.01	8,987.06	-392.00	8,995.48	0.00	0.00	0.00	
19,600.00	89.20	359.54	10,878.40	9,087.04	-392.79	9,095.43	0.00	0.00	0.00	
19,700.00	89.20	359.54	10,879.79	9,187.03	-393.59	9,195.37	0.00	0.00	0.00	
19,800.00	89.20	359.54	10,881.18	9,287.02	-394.38	9,295.31	0.00	0.00	0.00	
19,900.00	89.20	359.54	10,882.57	9,387.01	-395.18	9,395.26	0.00	0.00	0.00	
20,000.00	89.20	359.54	10,883.96	9,486.99	-395.97	9,495.20	0.00	0.00	0.00	
20,100.00	89.20	359.54	10,885.35	9,586.98	-396.77	9,595.15	0.00	0.00	0.00	
20,200.00	89.20	359.54	10,886.74	9,686.97	-397.56	9,695.09	0.00	0.00	0.00	
20,300.00	89.20	359.54	10,888.13	9,786.95	-398.36	9,795.03	0.00	0.00	0.00	
20,400.00	89.20	359.54	10,889.52	9,886.94	-399.15	9,894.98	0.00	0.00	0.00	
20,500.00	89.20	359.54	10,890.91	9,986.93	-399.94	9,994.92	0.00	0.00	0.00	
20,600.00	89.20	359.54	10,892.30	10,086.92	-400.74	10,094.86	0.00	0.00	0.00	
20,700.00	89.20	359.54	10,893.69	10,186.90	-401.53	10,194.81	0.00	0.00	0.00	
20,800.00	89.20	359.54	10,895.08	10,286.89	-402.33	10,294.75	0.00	0.00	0.00	
20,900.00	89.20	359.54	10,896.47	10,386.88	-403.12	10,394.70	0.00	0.00	0.00	
21,000.00	89.20	359.54	10,897.86	10,486.86	-403.92	10,494.64	0.00	0.00	0.00	
21,010.34	89.20	359.54	10,898.00	10,497.20	-404.00	10,504.97	0.00	0.00	0.00	
TD at 21010.34										

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	0.00	0.00	10,757.00	473.00	-324.20	531,145.90	738,228.60	32° 27' 28.30834 N	103° 33' 39.55759 W	
- plan misses target center by 1.45usft at 10984.87usft MD (10755.57 TVD, 473.17 N, -324.33 E)										
- Point										
LTP - Huckleberry State	0.00	0.00	10,896.50	10,367.20	-403.00	541,040.10	738,149.80	32° 29' 6.21796 N	103° 33' 39.64152 W	
- plan misses target center by 0.31usft at 20880.33usft MD (10896.19 TVD, 10367.20 N, -402.97 E)										
- Point										
BHL - Huckleberry State	0.00	0.00	10,898.00	10,497.20	-404.00	541,170.10	738,148.80	32° 29' 7.50439 N	103° 33' 39.64221 W	
- plan hits target center										
- Point										

Database:	USA Compass	Local Co-ordinate Reference:	Well 504H
Company:	COG Operating LLC	TVD Reference:	KB=26' @ 3767.60usft (McVay 8)
Project:	Lea County, NM (NAD27 NME)	MD Reference:	KB=26' @ 3767.60usft (McVay 8)
Site:	Huckleberry State Com	North Reference:	Grid
Well:	504H	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)	
5,058.00	5,058.00	0.00	0.00	KOP, Begin 2.00°/100' Build
5,308.00	5,307.68	1.89	-10.74	Hold 5.00° Inc at 280.00° Azm
8,798.00	8,784.40	54.71	-310.29	Begin 2.00°/100' Drop
9,048.00	9,034.09	56.61	-321.02	Begin Vertical Hold
10,295.92	10,282.00	56.61	-321.02	KOP2, Begin 12.00°/100' Build
11,039.28	10,759.42	527.42	-324.77	LP, Hold 89.20° Inc at 359.54° Azm
21,010.34	10,898.00	10,497.20	-404.00	TD at 21010.34