



Project: Lea County, NM (NAD27 NME)
Site: Square Bill Federal Com
Well: 21Y
Wellbore: OH
Design: Plan 1 01-11-18
Rig: McVay 8



Azimuths to Grid North
True North: -8.49°
Magnetic North: 6.22°
Magnetic Field
Strength: 47866.8nT
Dip Angle: 59.80°
Date: 1/11/2018
Model: HDGM

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 21Y, Grid North
Latitude: 32° 4' 48.57482 N
Longitude: 103° 24' 2.03390 W
Grid East: 768907.00
Grid North: 394135.20
Scale Factor: 1.000

Geomagnetic Model: HDGM
Sample Date: 11-Jan-18
Magnetic Declination: 6.72°
Dip Angle from Horizontal: 59.80°
Magnetic Field Strength: 47867

To convert a Magnetic Direction to a Grid Direction, Add 6.22°
To convert a Magnetic Direction to a True Direction, Add 6.72° East
To convert a True Direction to a Grid Direction, Subtract 0.50°

FORMATION TOP DETAILS

TYDPath	MDPath	Formation	DipAngle	DipDir
1142.10	1142.10	Rustler		
1518.10	1518.10	TOS		
5043.10	5047.30	BOS		
5382.10	5387.01	Dewey (Lower)		
6382.10	6389.61	Cherry Canyon		
7944.10	7959.60	Brushy Canyon		
9240.10	9254.90	Bone Sprg (BSGL)		
9293.10	9308.03	LNFRD_SH		
9549.10	9564.74	U Avalon Sh		
10345.10	10402.82	FBSG_Sand		
10825.10	10844.19	SBSG_Sand		
12053.10	12078.82	TBSG_Sand		
12485.10	12520.07	WFMP		

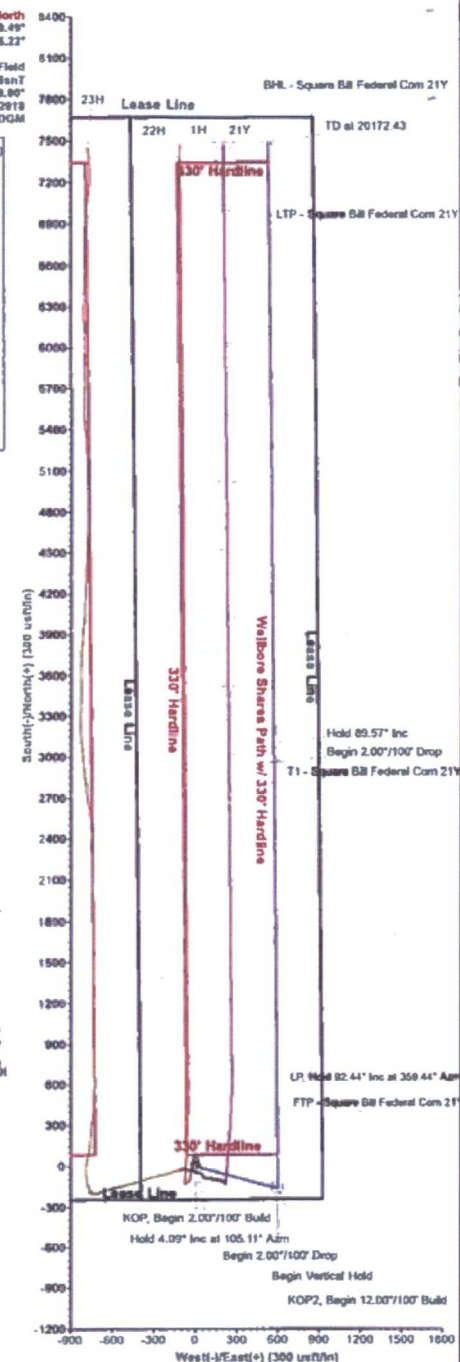
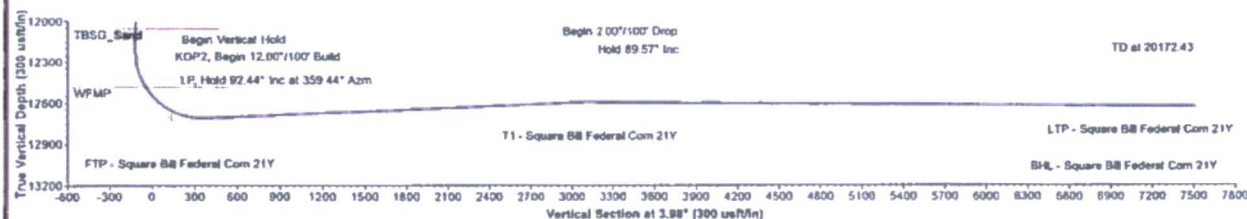
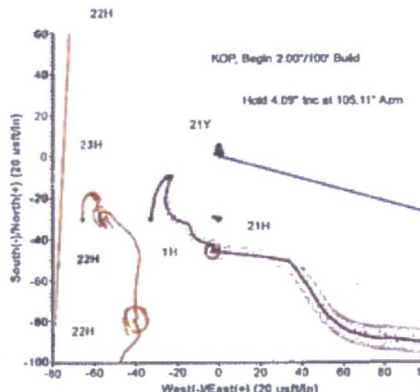
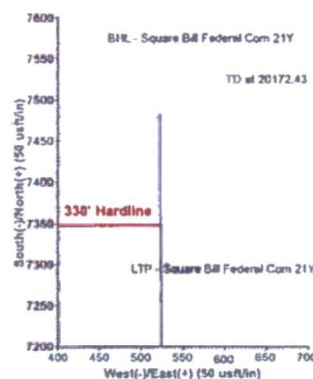
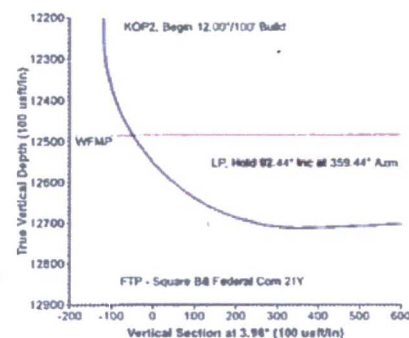
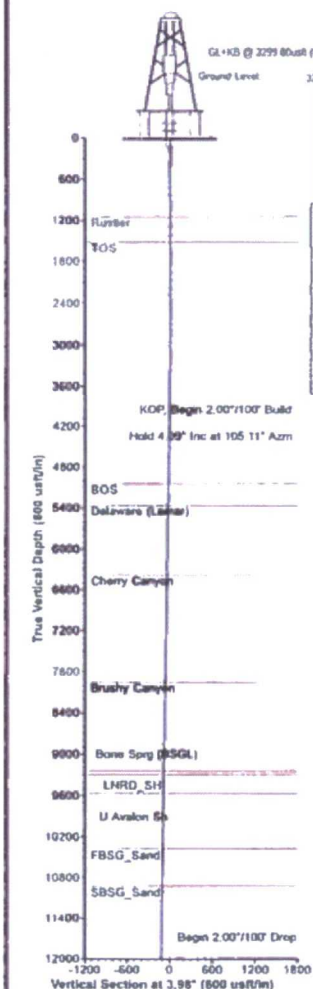
WELL DETAILS						
Ground Level	2273.80	Latitude	32° 4' 48.57482 N	Longitude	103° 24' 2.03390 W	
NAS	0.00	Easting	768907.00			
EA-W	0.00	Northing	394135.20			

DESIGN TARGET DETAILS						
Name	TYD	NAS	EA-W	Northing	Easting	Latitude
T1 - Square Bill Federal Com 21Y	12620.00	2967.82	564.88	397103.12	789471.96	32° 5' 17.89484 N
LTP - Square Bill Federal Com 21Y	12629.03	7348.24	522.37	401484.44	789428.37	32° 6' 1.25280 N
BPL - Square Bill Federal Com 21Y	12630.00	7478.40	521.00	401814.60	789428.00	32° 6' 2.54081 N
FTP - Square Bill Federal Com 21Y	12701.43	94.02	593.00	394229.22	789500.00	32° 4' 49.45440 N

SECTION DETAILS											
Sec	MD	Inc	Ap	TYD	NAS	EA-W	Dir	TFace	VSec	Target	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	KOP, Begin 2.00°/100' Build
2	3300.00	0.00	0.00	3300.00	0.00	0.00	0.00	0.00	0.00	0.00	Hold 4.09° Inc at 105.11° Azm
3	3504.36	4.09	105.11	3504.18	-1.80	7.83	2.00	105.11	-1.41	-1.41	Begin 2.00°/100' Drop
4	1182.48	4.09	105.11	11936.22	-158.85	588.34	0.00	0.00	-117.58	-117.58	Begin Vertical Hold
5	12196.83	0.00	0.00	12195.00	-160.75	595.38	2.00	180.00	-118.89	-118.89	KOP2, Begin 12.00°/100' Build
6	12256.83	0.00	0.00	12235.00	-160.75	595.38	0.00	0.00	-118.89	-118.89	LP, Hold 82.44° Inc at 359.44° Azm
7	13027.15	92.44	359.44	12712.63	337.00	590.54	12.00	359.44	377.22	377.22	T1 - Square Bill Federal Com 21Y
8	15680.58	92.44	359.44	12600.00	2967.82	564.88	0.00	0.00	3000.00	3000.00	Begin 2.00°/100' Drop
9	15803.81	89.57	359.44	12587.48	3111.11	563.59	2.00	-179.88	3142.75	3142.75	Hold 89.57° Inc
10	20172.43	89.57	359.44	12630.00	7478.40	521.00	0.00	0.00	7487.52	7487.52	BPL - Square Bill Federal Com 21Y

LEGEND

- 1H, OH / Job# 61978, Plan 3 12-11-17 VO
- 1H, OH / Job# 61978, Surveys (McVay 8) VO
- 21H, OH / Job# 61979, Surveys (McVay 8) VO
- 23H, STD1 / Job #61978, Surveys (McVay 8) VO
- 22H, OH / Job# 61976, Surveys (McVay 8) VO
- 22H, OH / Job# 61977, Surveys (McVay 8) VO
- 22H, OH / Job# 61977, Plan 5 01-11-18 VO
- Plan 1 01-11-18





COG Operating LLC

**Lea County, NM (NAD27 NME)
Square Bill Federal Com
21Y**

OH

Plan: Plan 1 01-11-18

Standard Planning Report

11 January, 2018





Phoenix Technology Services LP
Planning Report



Database: Compass 5000 GCR
Company: COG Operating LLC
Project: Lea County, NM (NAD27 NME)
Site: Square Bill Federal Com
Well: 21Y
Wellbore: OH
Design: Plan 1 01-11-18

Local Co-ordinate Reference: Well 21Y
TVD Reference: GL+KB @ 3299.80usft (McVay 8)
MD Reference: GL+KB @ 3299.80usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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 Square Bill Federal Com

Site Position:	Map	Northing:	394,104.50 usft	Latitude:	32° 4' 48.27950 N
From:		Easting:	788,808.10 usft	Longitude:	103° 24' 3.18637 W
Position Uncertainty:	0.00 usft	Slot Radius:	13-3/16 "	Grid Convergence:	0.50 °

Well	21Y					
Well Position	+N-S	30.70 usft	Northing:	394,135.20 usft	Latitude:	32° 4' 48.57482 N
	+E-W	98.90 usft	Easting:	788,907.00 usft	Longitude:	103° 24' 2.03390 W
Position Uncertainty	0.00 usft	Wellhead Elevation:	0.00 usft	Ground Level:	3,273.80 usft	

Wellbore OH

Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	HDGM	1/11/2018	6.72	59.80	47,867

Design Plan 1 01-11-18

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	3.98

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	
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00	
3,504.36	4.09	105.11	3,504.18	-1.90	7.03	2.00	2.00	0.00	105.11	
11,952.48	4.09	105.11	11,930.82	-158.85	588.34	0.00	0.00	0.00	0.00	
12,156.83	0.00	0.00	12,135.00	-160.75	595.38	2.00	-2.00	0.00	180.00	
12,256.83	0.00	0.00	12,235.00	-160.75	595.38	0.00	0.00	0.00	0.00	
13,027.15	92.44	359.44	12,712.03	337.00	590.54	12.00	12.00	-0.07	359.44	
15,660.58	92.44	359.44	12,600.00	2,967.92	564.98	0.00	0.00	0.00	0.00	T1 - Square Bill Fex
15,803.81	89.57	359.44	12,597.49	3,111.11	563.59	2.00	-2.00	0.00	-179.96	
20,172.43	89.57	359.44	12,630.00	7,479.40	521.00	0.00	0.00	0.00	0.00	BHL - Square Bill F



Phoenix Technology Services LP Planning Report



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Local Co-ordinate Reference: Well 21Y
TVD Reference: GL+KB @ 3299.80usft (McVay 8)
MD Reference: GL+KB @ 3299.80usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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
3,300.00	0.00	0.00	3,300.00	0.00	0.00	0.00	0.00	0.00	0.00
KOP, Begin 2.00°/100' Build									
3,400.00	2.00	105.11	3,399.98	-0.45	1.68	-0.34	2.00	2.00	0.00
3,500.00	4.00	105.11	3,499.84	-1.82	6.74	-1.35	2.00	2.00	0.00
3,504.36	4.09	105.11	3,504.18	-1.90	7.03	-1.41	2.00	2.00	0.00
Hold 4.09° Inc at 105.11° Azm									
3,600.00	4.09	105.11	3,599.58	-3.68	13.61	-2.72	0.00	0.00	0.00
3,700.00	4.09	105.11	3,699.33	-5.53	20.50	-4.10	0.00	0.00	0.00
3,800.00	4.09	105.11	3,799.07	-7.39	27.38	-5.47	0.00	0.00	0.00
3,900.00	4.09	105.11	3,898.82	-9.25	34.26	-6.85	0.00	0.00	0.00
4,000.00	4.09	105.11	3,998.57	-11.11	41.14	-8.22	0.00	0.00	0.00
4,100.00	4.09	105.11	4,098.31	-12.97	48.02	-9.60	0.00	0.00	0.00
4,200.00	4.09	105.11	4,198.06	-14.82	54.90	-10.97	0.00	0.00	0.00
4,300.00	4.09	105.11	4,297.80	-16.68	61.78	-12.35	0.00	0.00	0.00
4,400.00	4.09	105.11	4,397.55	-18.54	68.66	-13.72	0.00	0.00	0.00
4,500.00	4.09	105.11	4,497.29	-20.40	75.54	-15.10	0.00	0.00	0.00
4,600.00	4.09	105.11	4,597.04	-22.25	82.42	-16.47	0.00	0.00	0.00
4,700.00	4.09	105.11	4,696.79	-24.11	89.31	-17.85	0.00	0.00	0.00
4,800.00	4.09	105.11	4,796.53	-25.97	96.19	-19.22	0.00	0.00	0.00
4,900.00	4.09	105.11	4,896.28	-27.83	103.07	-20.60	0.00	0.00	0.00
5,000.00	4.09	105.11	4,996.02	-29.69	109.95	-21.97	0.00	0.00	0.00
5,100.00	4.09	105.11	5,095.77	-31.54	116.83	-23.35	0.00	0.00	0.00
5,200.00	4.09	105.11	5,195.51	-33.40	123.71	-24.73	0.00	0.00	0.00
5,300.00	4.09	105.11	5,295.26	-35.26	130.59	-26.10	0.00	0.00	0.00
5,400.00	4.09	105.11	5,395.01	-37.12	137.47	-27.48	0.00	0.00	0.00
5,500.00	4.09	105.11	5,494.75	-38.98	144.35	-28.85	0.00	0.00	0.00
5,600.00	4.09	105.11	5,594.50	-40.83	151.23	-30.23	0.00	0.00	0.00
5,700.00	4.09	105.11	5,694.24	-42.69	158.11	-31.60	0.00	0.00	0.00
5,800.00	4.09	105.11	5,793.99	-44.55	165.00	-32.98	0.00	0.00	0.00
5,900.00	4.09	105.11	5,893.73	-46.41	171.88	-34.35	0.00	0.00	0.00
6,000.00	4.09	105.11	5,993.48	-48.26	178.76	-35.73	0.00	0.00	0.00
6,100.00	4.09	105.11	6,093.23	-50.12	185.64	-37.10	0.00	0.00	0.00
6,200.00	4.09	105.11	6,192.97	-51.98	192.52	-38.48	0.00	0.00	0.00
6,300.00	4.09	105.11	6,292.72	-53.84	199.40	-39.85	0.00	0.00	0.00
6,400.00	4.09	105.11	6,392.46	-55.70	206.28	-41.23	0.00	0.00	0.00
6,500.00	4.09	105.11	6,492.21	-57.55	213.16	-42.60	0.00	0.00	0.00
6,600.00	4.09	105.11	6,591.95	-59.41	220.04	-43.98	0.00	0.00	0.00
6,700.00	4.09	105.11	6,691.70	-61.27	226.92	-45.35	0.00	0.00	0.00
6,800.00	4.09	105.11	6,791.45	-63.13	233.81	-46.73	0.00	0.00	0.00
6,900.00	4.09	105.11	6,891.19	-64.99	240.69	-48.10	0.00	0.00	0.00
7,000.00	4.09	105.11	6,990.94	-66.84	247.57	-49.48	0.00	0.00	0.00
7,100.00	4.09	105.11	7,090.68	-68.70	254.45	-50.85	0.00	0.00	0.00
7,200.00	4.09	105.11	7,190.43	-70.56	261.33	-52.23	0.00	0.00	0.00
7,300.00	4.09	105.11	7,290.17	-72.42	268.21	-53.61	0.00	0.00	0.00
7,400.00	4.09	105.11	7,389.92	-74.27	275.09	-54.98	0.00	0.00	0.00
7,500.00	4.09	105.11	7,489.67	-76.13	281.97	-56.36	0.00	0.00	0.00
7,600.00	4.09	105.11	7,589.41	-77.99	288.85	-57.73	0.00	0.00	0.00
7,700.00	4.09	105.11	7,689.16	-79.85	295.73	-59.11	0.00	0.00	0.00
7,800.00	4.09	105.11	7,788.90	-81.71	302.61	-60.48	0.00	0.00	0.00
7,900.00	4.09	105.11	7,888.65	-83.56	309.50	-61.86	0.00	0.00	0.00
8,000.00	4.09	105.11	7,988.39	-85.42	316.38	-63.23	0.00	0.00	0.00
8,100.00	4.09	105.11	8,088.14	-87.28	323.26	-64.61	0.00	0.00	0.00
8,200.00	4.09	105.11	8,187.89	-89.14	330.14	-65.98	0.00	0.00	0.00



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MD Reference: GL+KB @ 3299.80usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
8,300.00	4.09	105.11	8,287.63	-91.00	337.02	-67.36	0.00	0.00	0.00
8,400.00	4.09	105.11	8,387.38	-92.85	343.90	-68.73	0.00	0.00	0.00
8,500.00	4.09	105.11	8,487.12	-94.71	350.78	-70.11	0.00	0.00	0.00
8,600.00	4.09	105.11	8,586.87	-96.57	357.66	-71.48	0.00	0.00	0.00
8,700.00	4.09	105.11	8,686.61	-98.43	364.54	-72.86	0.00	0.00	0.00
8,800.00	4.09	105.11	8,786.36	-100.29	371.42	-74.23	0.00	0.00	0.00
8,900.00	4.09	105.11	8,886.10	-102.14	378.30	-75.61	0.00	0.00	0.00
9,000.00	4.09	105.11	8,985.85	-104.00	385.19	-76.98	0.00	0.00	0.00
9,100.00	4.09	105.11	9,085.60	-105.86	392.07	-78.36	0.00	0.00	0.00
9,200.00	4.09	105.11	9,185.34	-107.72	398.95	-79.73	0.00	0.00	0.00
9,300.00	4.09	105.11	9,285.09	-109.57	405.83	-81.11	0.00	0.00	0.00
9,400.00	4.09	105.11	9,384.83	-111.43	412.71	-82.49	0.00	0.00	0.00
9,500.00	4.09	105.11	9,484.58	-113.29	419.59	-83.86	0.00	0.00	0.00
9,600.00	4.09	105.11	9,584.32	-115.15	426.47	-85.24	0.00	0.00	0.00
9,700.00	4.09	105.11	9,684.07	-117.01	433.35	-86.61	0.00	0.00	0.00
9,800.00	4.09	105.11	9,783.82	-118.86	440.23	-87.99	0.00	0.00	0.00
9,900.00	4.09	105.11	9,883.56	-120.72	447.11	-89.36	0.00	0.00	0.00
10,000.00	4.09	105.11	9,983.31	-122.58	454.00	-90.74	0.00	0.00	0.00
10,100.00	4.09	105.11	10,083.05	-124.44	460.88	-92.11	0.00	0.00	0.00
10,200.00	4.09	105.11	10,182.80	-126.30	467.76	-93.49	0.00	0.00	0.00
10,300.00	4.09	105.11	10,282.54	-128.15	474.64	-94.86	0.00	0.00	0.00
10,400.00	4.09	105.11	10,382.29	-130.01	481.52	-96.24	0.00	0.00	0.00
10,500.00	4.09	105.11	10,482.04	-131.87	488.40	-97.61	0.00	0.00	0.00
10,600.00	4.09	105.11	10,581.78	-133.73	495.28	-98.99	0.00	0.00	0.00
10,700.00	4.09	105.11	10,681.53	-135.58	502.16	-100.36	0.00	0.00	0.00
10,800.00	4.09	105.11	10,781.27	-137.44	509.04	-101.74	0.00	0.00	0.00
10,900.00	4.09	105.11	10,881.02	-139.30	515.92	-103.11	0.00	0.00	0.00
11,000.00	4.09	105.11	10,980.76	-141.16	522.80	-104.49	0.00	0.00	0.00
11,100.00	4.09	105.11	11,080.51	-143.02	529.69	-105.86	0.00	0.00	0.00
11,200.00	4.09	105.11	11,180.26	-144.87	536.57	-107.24	0.00	0.00	0.00
11,300.00	4.09	105.11	11,280.00	-146.73	543.45	-108.62	0.00	0.00	0.00
11,400.00	4.09	105.11	11,379.75	-148.59	550.33	-109.99	0.00	0.00	0.00
11,500.00	4.09	105.11	11,479.49	-150.45	557.21	-111.37	0.00	0.00	0.00
11,600.00	4.09	105.11	11,579.24	-152.31	564.09	-112.74	0.00	0.00	0.00
11,700.00	4.09	105.11	11,678.98	-154.16	570.97	-114.12	0.00	0.00	0.00
11,800.00	4.09	105.11	11,778.73	-156.02	577.85	-115.49	0.00	0.00	0.00
11,900.00	4.09	105.11	11,878.48	-157.88	584.73	-116.87	0.00	0.00	0.00
11,952.48	4.09	105.11	11,930.82	-158.85	588.34	-117.59	0.00	0.00	0.00
Begin 2.00°/100' Drop									
12,000.00	3.14	105.11	11,978.25	-159.63	591.23	-118.17	2.00	-2.00	0.00
12,100.00	1.14	105.11	12,078.17	-160.61	594.83	-118.89	2.00	-2.00	0.00
12,156.83	0.00	0.00	12,135.00	-160.75	595.38	-118.99	2.00	-2.00	0.00
Begin Vertical Hold									
12,256.83	0.00	0.00	12,235.00	-160.75	595.38	-118.99	0.00	0.00	0.00
KOP2, Begin 12.00°/100' Build									
12,300.00	5.18	359.44	12,278.11	-158.80	595.36	-117.05	12.00	12.00	0.00
12,400.00	17.18	359.44	12,376.03	-139.45	595.17	-97.76	12.00	12.00	0.00
12,500.00	29.18	359.44	12,467.79	-100.16	594.79	-58.59	12.00	12.00	0.00
12,600.00	41.18	359.44	12,549.38	-42.65	594.23	-1.26	12.00	12.00	0.00
12,700.00	53.18	359.44	12,617.22	30.56	593.52	71.73	12.00	12.00	0.00
12,800.00	65.18	359.44	12,668.36	116.28	592.69	157.18	12.00	12.00	0.00
12,900.00	77.18	359.44	12,700.56	210.75	591.77	251.36	12.00	12.00	0.00
13,000.00	89.18	359.44	12,712.42	309.86	590.81	350.16	12.00	12.00	0.00



Phoenix Technology Services LP
Planning Report



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Project: Lea County, NM (NAD27 NME)
Site: Square Bill Federal Corn
Well: 21Y
Wellbore: OH
Design: Plan 1 01-11-18

Local Co-ordinate Reference: Well 21Y
TVD Reference: GL+KB @ 3299.80usft (McVay 8)
MD Reference: GL+KB @ 3299.80usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

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)
13,027.15	92.44	359.44	12,712.03	337.00	590.54	377.22	12.00	12.00	0.00
LP, Hold 92.44° Inc at 359.44° Azm									
13,100.00	92.44	359.44	12,708.93	409.78	589.83	449.78	0.00	0.00	0.00
13,200.00	92.44	359.44	12,704.68	509.69	588.86	549.37	0.00	0.00	0.00
13,300.00	92.44	359.44	12,700.43	609.59	587.89	648.97	0.00	0.00	0.00
13,400.00	92.44	359.44	12,696.17	709.50	586.92	748.56	0.00	0.00	0.00
13,500.00	92.44	359.44	12,691.92	809.40	585.95	848.16	0.00	0.00	0.00
13,600.00	92.44	359.44	12,687.66	909.30	584.98	947.76	0.00	0.00	0.00
13,700.00	92.44	359.44	12,683.41	1,009.21	584.01	1,047.35	0.00	0.00	0.00
13,800.00	92.44	359.44	12,679.15	1,109.11	583.04	1,146.95	0.00	0.00	0.00
13,900.00	92.44	359.44	12,674.90	1,209.02	582.07	1,246.54	0.00	0.00	0.00
14,000.00	92.44	359.44	12,670.65	1,308.92	581.10	1,346.14	0.00	0.00	0.00
14,100.00	92.44	359.44	12,666.39	1,408.83	580.13	1,445.73	0.00	0.00	0.00
14,200.00	92.44	359.44	12,662.14	1,508.73	579.16	1,545.33	0.00	0.00	0.00
14,300.00	92.44	359.44	12,657.88	1,608.64	578.19	1,644.93	0.00	0.00	0.00
14,400.00	92.44	359.44	12,653.63	1,708.54	577.22	1,744.52	0.00	0.00	0.00
14,500.00	92.44	359.44	12,649.37	1,808.45	576.25	1,844.12	0.00	0.00	0.00
14,600.00	92.44	359.44	12,645.12	1,908.35	575.28	1,943.71	0.00	0.00	0.00
14,700.00	92.44	359.44	12,640.87	2,008.26	574.30	2,043.31	0.00	0.00	0.00
14,800.00	92.44	359.44	12,636.61	2,108.16	573.33	2,142.91	0.00	0.00	0.00
14,900.00	92.44	359.44	12,632.36	2,208.07	572.36	2,242.50	0.00	0.00	0.00
15,000.00	92.44	359.44	12,628.10	2,307.97	571.39	2,342.10	0.00	0.00	0.00
15,100.00	92.44	359.44	12,623.85	2,407.88	570.42	2,441.69	0.00	0.00	0.00
15,200.00	92.44	359.44	12,619.59	2,507.78	569.45	2,541.29	0.00	0.00	0.00
15,300.00	92.44	359.44	12,615.34	2,607.69	568.48	2,640.88	0.00	0.00	0.00
15,400.00	92.44	359.44	12,611.09	2,707.59	567.51	2,740.48	0.00	0.00	0.00
15,500.00	92.44	359.44	12,606.83	2,807.50	566.54	2,840.08	0.00	0.00	0.00
15,600.00	92.44	359.44	12,602.58	2,907.40	565.57	2,939.67	0.00	0.00	0.00
15,660.58	92.44	359.44	12,600.00	2,967.92	564.98	3,000.01	0.00	0.00	0.00
Begin 2.00°/100' Drop									
15,700.00	91.65	359.44	12,598.59	3,007.32	564.60	3,039.28	2.00	-2.00	0.00
15,800.00	89.65	359.44	12,597.46	3,107.30	563.62	3,138.95	2.00	-2.00	0.00
15,803.81	89.57	359.44	12,597.49	3,111.11	563.59	3,142.75	2.00	-2.00	0.00
Hold 89.57° Inc									
15,900.00	89.57	359.44	12,598.20	3,207.29	562.65	3,238.64	0.00	0.00	0.00
16,000.00	89.57	359.44	12,598.95	3,307.28	561.68	3,338.32	0.00	0.00	0.00
16,100.00	89.57	359.44	12,599.69	3,407.28	560.70	3,438.00	0.00	0.00	0.00
16,200.00	89.57	359.44	12,600.43	3,507.27	559.73	3,537.68	0.00	0.00	0.00
16,300.00	89.57	359.44	12,601.18	3,607.26	558.75	3,637.37	0.00	0.00	0.00
16,400.00	89.57	359.44	12,601.92	3,707.25	557.78	3,737.05	0.00	0.00	0.00
16,500.00	89.57	359.44	12,602.67	3,807.25	556.80	3,836.73	0.00	0.00	0.00
16,600.00	89.57	359.44	12,603.41	3,907.24	555.83	3,936.42	0.00	0.00	0.00
16,700.00	89.57	359.44	12,604.16	4,007.23	554.85	4,036.10	0.00	0.00	0.00
16,800.00	89.57	359.44	12,604.90	4,107.22	553.88	4,135.78	0.00	0.00	0.00
16,900.00	89.57	359.44	12,605.64	4,207.22	552.90	4,235.47	0.00	0.00	0.00
17,000.00	89.57	359.44	12,606.39	4,307.21	551.93	4,335.15	0.00	0.00	0.00
17,100.00	89.57	359.44	12,607.13	4,407.20	550.95	4,434.83	0.00	0.00	0.00
17,200.00	89.57	359.44	12,607.88	4,507.19	549.98	4,534.52	0.00	0.00	0.00
17,300.00	89.57	359.44	12,608.62	4,607.19	549.00	4,634.20	0.00	0.00	0.00
17,400.00	89.57	359.44	12,609.37	4,707.18	548.03	4,733.88	0.00	0.00	0.00
17,500.00	89.57	359.44	12,610.11	4,807.17	547.05	4,833.56	0.00	0.00	0.00
17,600.00	89.57	359.44	12,610.85	4,907.16	546.08	4,933.25	0.00	0.00	0.00
17,700.00	89.57	359.44	12,611.60	5,007.16	545.10	5,032.93	0.00	0.00	0.00



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Design: Plan 1 01-11-18

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MD Reference: GL+KB @ 3299.80usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Planned Survey

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)	Bulld Rate (°/100usft)	Turn Rate (°/100usft)
17,800.00	89.57	359.44	12,612.34	5,107.15	544.13	5,132.61	0.00	0.00	0.00
17,900.00	89.57	359.44	12,613.09	5,207.14	543.15	5,232.30	0.00	0.00	0.00
18,000.00	89.57	359.44	12,613.83	5,307.13	542.18	5,331.98	0.00	0.00	0.00
18,100.00	89.57	359.44	12,614.58	5,407.13	541.20	5,431.66	0.00	0.00	0.00
18,200.00	89.57	359.44	12,615.32	5,507.12	540.23	5,531.35	0.00	0.00	0.00
18,300.00	89.57	359.44	12,616.06	5,607.11	539.25	5,631.03	0.00	0.00	0.00
18,400.00	89.57	359.44	12,616.81	5,707.10	538.28	5,730.71	0.00	0.00	0.00
18,500.00	89.57	359.44	12,617.55	5,807.10	537.30	5,830.39	0.00	0.00	0.00
18,600.00	89.57	359.44	12,618.30	5,907.09	536.33	5,930.08	0.00	0.00	0.00
18,700.00	89.57	359.44	12,619.04	6,007.08	535.35	6,029.76	0.00	0.00	0.00
18,800.00	89.57	359.44	12,619.79	6,107.07	534.38	6,129.44	0.00	0.00	0.00
18,900.00	89.57	359.44	12,620.53	6,207.07	533.40	6,229.13	0.00	0.00	0.00
19,000.00	89.57	359.44	12,621.27	6,307.06	532.43	6,328.81	0.00	0.00	0.00
19,100.00	89.57	359.44	12,622.02	6,407.05	531.45	6,428.49	0.00	0.00	0.00
19,200.00	89.57	359.44	12,622.76	6,507.04	530.48	6,528.18	0.00	0.00	0.00
19,300.00	89.57	359.44	12,623.51	6,607.04	529.50	6,627.86	0.00	0.00	0.00
19,400.00	89.57	359.44	12,624.25	6,707.03	528.53	6,727.54	0.00	0.00	0.00
19,500.00	89.57	359.44	12,625.00	6,807.02	527.56	6,827.23	0.00	0.00	0.00
19,600.00	89.57	359.44	12,625.74	6,907.01	526.58	6,926.91	0.00	0.00	0.00
19,700.00	89.57	359.44	12,626.48	7,007.01	525.61	7,026.59	0.00	0.00	0.00
19,800.00	89.57	359.44	12,627.23	7,107.00	524.63	7,126.27	0.00	0.00	0.00
19,900.00	89.57	359.44	12,627.97	7,206.99	523.66	7,225.96	0.00	0.00	0.00
20,000.00	89.57	359.44	12,628.72	7,306.98	522.68	7,325.64	0.00	0.00	0.00
20,100.00	89.57	359.44	12,629.46	7,406.98	521.71	7,425.32	0.00	0.00	0.00
20,172.43	89.57	359.44	12,630.00	7,479.40	521.00	7,497.52	0.00	0.00	0.00
TD at 20172.43									

Design Targets

Target Name

- hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
T1 - Square Bill Feder - plan hits target center - Point	0.00	0.00	12,600.00	2,967.92	564.98	397,103.12	789,471.98	32° 5' 17.89484 N 03° 23' 55.16897 W	
LTP - Square Bill Fed - plan misses target center by 0.10usft at 20042.26usft MD (12629.03 TVD, 7349.24 N, 522.27 E) - Point	0.00	0.00	12,629.03	7,349.24	522.37	401,484.44	789,429.37	32° 6' 1.25280 N 03° 23' 55.22280 W	
BHL - Square Bill Fed - plan hits target center - Point	0.00	0.00	12,630.00	7,479.40	521.00	401,614.60	789,428.00	32° 6' 2.54091 N 03° 23' 55.22563 W	
FTP - Square Bill Fed - plan misses target center by 39.58usft at 12797.83usft MD (12667.45 TVD, 114.30 N, 592.71 E) - Point	0.00	0.00	12,701.43	94.02	593.00	394,229.22	789,500.00	32° 4' 49.45440 N 03° 23' 55.13280 W	



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MD Reference: GL+KB @ 3299.80usft (McVay 8)
North Reference: Grid
Survey Calculation Method: Minimum Curvature

Formations

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,142.10	1,142.10	Rustler			
1,518.10	1,518.10	TOS			
5,047.20	5,043.10	BOS			
5,367.01	5,362.10	Delaware (Lamar)			
6,389.61	6,382.10	Cherry Canyon			
7,959.60	7,948.10	Brushy Canyon			
9,254.90	9,240.10	Bone Sprg (BSGL)			
9,308.03	9,293.10	LNRD_SH			
9,584.74	9,569.10	U Avalon Sh			
10,402.82	10,385.10	FBSG_Sand			
10,944.19	10,925.10	SBSG_Sand			
12,076.92	12,055.10	TBSG_Sand			
12,520.07	12,485.10	WFMP			

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
3,300.00	3,300.00	0.00	0.00	KOP, Begin 2.00°/100' Build
3,504.36	3,504.18	-1.90	7.03	Hold 4.09° Inc at 105.11° Azm
11,952.48	11,930.82	-158.85	588.34	Begin 2.00°/100' Drop
12,156.83	12,135.00	-160.75	595.38	Begin Vertical Hold
12,256.83	12,235.00	-160.75	595.38	KOP2, Begin 12.00°/100' Build
13,027.15	12,712.03	337.00	590.54	LP, Hold 92.44° Inc at 359.44° Azm
15,660.58	12,600.00	2,967.92	564.98	Begin 2.00°/100' Drop
15,803.81	12,597.49	3,111.11	563.59	Hold 89.57° Inc
20,172.43	12,630.00	7,479.40	521.00	TD at 20172.43