

NORTHERN DELAWARE BASIN

LEA COUNTY, NM

BULLDOG

PICKELHAUBE ST #601H

OWB

Design: AWP

Standard Survey Report

06 January, 2020

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

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	BULLDOG		
Site Position:		Northing:	398,637.10 usft
From:	Map	Easting:	741,887.40 usft
Position Uncertainty:	0.0 usft	Slot Radius:	13-3/16 "
		Latitude:	32° 5' 36.820 N
		Longitude:	103° 33' 8.116 W
		Grid Convergence:	0.42 °

Well	PICKELHAUBE ST #601H, ACTIVE		
Well Position	+N/-S	0.0 usft	Northing: 430,478.40 usft
	+E/-W	0.0 usft	Easting: 781,752.60 usft
Position Uncertainty		3.0 usft	Wellhead Elevation: usft
			Latitude: 32° 10' 48.806 N
			Longitude: 103° 25' 21.610 W
			Ground Level: 3,387.0 usft

Wellbore	OWB		
Magnetics	Model Name	Sample Date	Declination (°)
	IGRF2015	9/9/2019	6.64
			Dip Angle (°) 60.02
			Field Strength (nT) 47,698.51924058

Design	AWP		
Audit Notes:			
Version:	1.0	Phase:	ACTUAL
		Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (usft)	+N/-S (usft)	+E/-W (usft)
	0.0	0.0	0.0
			Direction (°) 173.76

Survey Program	Date	1/6/2020		
From (usft)	To (usft)	Survey (Wellbore)	Tool Name	Description
103.0	1,266.0	MWD-SURFACE (OWB)	MWD	OWSG MWD - Standard
1,386.0	12,244.0	MWD-INTER (OWB)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction
12,275.0	17,733.0	MWD-CRV/LAT (OWB)	MWD+IFR1+FDIR	OWSG MWD + IFR1 + FDIR Correction

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)
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00
103.0	0.40	260.00	103.0	-0.1	-0.4	0.0	0.39	0.39	0.00
217.0	0.50	279.00	217.0	-0.1	-1.2	-0.1	0.16	0.09	16.67
307.0	0.70	324.90	307.0	0.5	-1.9	-0.7	0.56	0.22	51.00
397.0	0.50	337.00	397.0	1.3	-2.4	-1.5	0.26	-0.22	13.44
487.0	1.20	325.30	487.0	2.4	-3.1	-2.7	0.80	0.78	-13.00
577.0	0.80	295.10	577.0	3.4	-4.2	-3.9	0.72	-0.44	-33.56
666.0	0.70	214.10	666.0	3.3	-5.1	-3.8	1.10	-0.11	-91.01
754.0	0.80	267.70	754.0	2.8	-6.0	-3.4	0.78	0.11	60.91

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

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)
916.0	0.70	338.80	915.9	3.7	-7.5	-4.5	0.54	-0.06	43.89
977.0	0.50	261.00	976.9	4.0	-7.9	-4.8	1.26	-0.33	-127.54
1,022.0	0.40	52.80	1,021.9	4.0	-7.9	-4.9	1.94	-0.22	337.33
1,113.0	0.60	41.70	1,112.9	4.6	-7.4	-5.4	0.24	0.22	-12.20
1,158.0	0.60	12.60	1,157.9	5.0	-7.2	-5.7	0.67	0.00	-64.67
1,266.0	0.30	45.60	1,265.9	5.7	-6.8	-6.4	0.36	-0.28	30.56
1,386.0	0.83	41.10	1,385.9	6.6	-6.0	-7.2	0.44	0.44	-3.75
1,479.0	1.36	35.04	1,478.9	8.0	-5.0	-8.5	0.58	0.57	-6.52
1,574.0	0.84	12.02	1,573.9	9.6	-4.2	-10.0	0.71	-0.55	-24.23
1,668.0	1.16	10.46	1,667.9	11.2	-3.9	-11.6	0.34	0.34	-1.66
1,763.0	0.82	36.40	1,762.9	12.7	-3.3	-13.0	0.58	-0.36	27.31
1,858.0	0.94	28.25	1,857.8	14.0	-2.5	-14.2	0.18	0.13	-8.58
1,952.0	1.13	349.26	1,951.8	15.6	-2.3	-15.7	0.76	0.20	-41.48
2,046.0	0.94	5.88	2,045.8	17.2	-2.4	-17.4	0.38	-0.20	17.68
2,140.0	1.04	26.65	2,139.8	18.8	-1.9	-18.9	0.39	0.11	22.10
2,234.0	1.40	29.16	2,233.8	20.5	-1.0	-20.5	0.39	0.38	2.67
2,328.0	1.40	21.38	2,327.8	22.6	0.0	-22.5	0.20	0.00	-8.28
2,423.0	0.99	57.84	2,422.7	24.1	1.1	-23.9	0.89	-0.43	38.38
2,516.0	0.79	55.36	2,515.7	24.9	2.3	-24.5	0.22	-0.22	-2.67
2,609.0	1.16	29.69	2,608.7	26.1	3.3	-25.6	0.61	0.40	-27.60
2,704.0	0.52	64.79	2,703.7	27.1	4.2	-26.5	0.83	-0.67	36.95
2,800.0	0.87	44.80	2,799.7	27.8	5.1	-27.1	0.44	0.36	-20.82
2,895.0	0.92	68.23	2,894.7	28.6	6.3	-27.8	0.39	0.05	24.66
2,989.0	1.45	79.67	2,988.7	29.1	8.2	-28.0	0.61	0.56	12.17
3,083.0	1.38	94.17	3,082.6	29.2	10.5	-27.9	0.39	-0.07	15.43
3,177.0	2.10	117.69	3,176.6	28.4	13.1	-26.8	1.06	0.77	25.02
3,271.0	1.79	101.21	3,270.5	27.3	16.1	-25.4	0.68	-0.33	-17.53
3,365.0	2.37	96.56	3,364.5	26.8	19.4	-24.5	0.64	0.62	-4.95
3,460.0	1.60	106.33	3,459.4	26.2	22.7	-23.5	0.88	-0.81	10.28
3,554.0	1.51	128.54	3,553.4	25.0	24.9	-22.2	0.64	-0.10	23.63
3,648.0	2.67	127.71	3,647.3	22.9	27.6	-19.8	1.23	1.23	-0.88
3,742.0	2.07	151.50	3,741.2	20.1	30.1	-16.7	1.21	-0.64	25.31
3,837.0	1.52	144.18	3,836.2	17.5	31.7	-14.0	0.63	-0.58	-7.71
3,932.0	2.12	146.41	3,931.1	15.1	33.4	-11.3	0.64	0.63	2.35
4,026.0	1.94	143.35	4,025.1	12.3	35.3	-8.4	0.22	-0.19	-3.26
4,121.0	0.98	112.58	4,120.1	10.7	37.0	-6.6	1.27	-1.01	-32.39
4,215.0	1.46	32.28	4,214.0	11.4	38.4	-7.2	1.72	0.51	-85.43
4,308.0	1.30	41.64	4,307.0	13.2	39.7	-8.8	0.30	-0.17	10.06
4,403.0	0.85	25.95	4,402.0	14.7	40.8	-10.2	0.56	-0.47	-16.52
4,496.0	0.38	46.09	4,495.0	15.5	41.3	-10.9	0.55	-0.51	21.66
4,593.0	0.62	10.12	4,592.0	16.2	41.6	-11.6	0.40	0.25	-37.08
4,687.0	1.23	92.42	4,686.0	16.7	42.7	-12.0	1.38	0.65	87.55
4,781.0	2.14	105.45	4,779.9	16.2	45.4	-11.2	1.04	0.97	13.86

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

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)
4,875.0	2.41	111.73	4,873.9	15.0	48.9	-9.6	0.39	0.29	6.68
4,969.0	2.66	94.82	4,967.8	14.1	52.9	-8.2	0.84	0.27	-17.99
5,063.0	4.16	92.30	5,061.6	13.8	58.5	-7.3	1.60	1.60	-2.68
5,158.0	4.83	78.50	5,156.3	14.4	65.9	-7.2	1.33	0.71	-14.53
5,253.0	5.85	75.71	5,250.9	16.4	74.5	-8.2	1.11	1.07	-2.94
5,347.0	4.81	68.41	5,344.5	19.0	82.8	-9.9	1.32	-1.11	-7.77
5,441.0	4.32	56.36	5,438.2	22.5	89.4	-12.6	1.14	-0.52	-12.82
5,535.0	4.14	45.83	5,531.9	26.8	94.8	-16.3	0.85	-0.19	-11.20
5,629.0	4.28	45.50	5,625.7	31.6	99.7	-20.6	0.15	0.15	-0.35
5,724.0	4.89	54.08	5,720.4	36.5	105.5	-24.8	0.96	0.64	9.03
5,817.0	4.82	51.48	5,813.1	41.2	111.8	-28.8	0.25	-0.08	-2.80
5,913.0	4.96	52.11	5,908.7	46.3	118.2	-33.2	0.16	0.15	0.66
6,003.0	5.28	51.52	5,998.3	51.2	124.6	-37.4	0.36	0.36	-0.66
6,099.0	5.45	52.01	6,093.9	56.8	131.6	-42.2	0.18	0.18	0.51
6,194.0	5.23	51.43	6,188.5	62.3	138.5	-46.9	0.24	-0.23	-0.61
6,288.0	5.28	49.97	6,282.1	67.7	145.2	-51.5	0.15	0.05	-1.55
6,382.0	5.06	47.97	6,375.7	73.3	151.6	-56.4	0.30	-0.23	-2.13
6,476.0	4.78	49.70	6,469.4	78.6	157.7	-61.0	0.34	-0.30	1.84
6,569.0	5.18	55.38	6,562.0	83.5	164.1	-65.2	0.68	0.43	6.11
6,663.0	6.31	57.95	6,655.6	88.6	171.9	-69.4	1.23	1.20	2.73
6,757.0	5.95	55.97	6,749.0	94.1	180.4	-73.9	0.44	-0.38	-2.11
6,851.0	5.75	54.56	6,842.5	99.6	188.2	-78.5	0.26	-0.21	-1.50
6,946.0	5.63	53.57	6,937.1	105.1	195.9	-83.2	0.16	-0.13	-1.04
7,039.0	5.96	52.07	7,029.6	110.8	203.3	-88.0	0.39	0.35	-1.61
7,133.0	6.16	51.15	7,123.1	116.9	211.1	-93.3	0.24	0.21	-0.98
7,228.0	6.04	50.51	7,217.5	123.3	218.9	-98.8	0.15	-0.13	-0.67
7,323.0	5.76	48.47	7,312.0	129.6	226.4	-104.3	0.37	-0.29	-2.15
7,419.0	5.66	53.66	7,407.5	135.6	233.8	-109.4	0.55	-0.10	5.41
7,514.0	5.63	57.13	7,502.1	141.0	241.5	-113.9	0.36	-0.03	3.65
7,608.0	5.23	57.52	7,595.7	145.8	249.0	-117.8	0.43	-0.43	0.41
7,703.0	4.92	57.92	7,690.3	150.2	256.1	-121.5	0.33	-0.33	0.42
7,797.0	5.69	53.88	7,783.9	155.1	263.2	-125.6	0.91	0.82	-4.30
7,891.0	6.26	54.54	7,877.4	160.9	271.2	-130.4	0.61	0.61	0.70
7,985.0	5.77	57.99	7,970.9	166.3	279.4	-135.0	0.65	-0.52	3.67
8,080.0	5.57	56.89	8,065.4	171.4	287.3	-139.1	0.24	-0.21	-1.16
8,174.0	4.40	57.58	8,159.0	175.8	294.1	-142.8	1.25	-1.24	0.73
8,268.0	3.24	55.11	8,252.8	179.3	299.4	-145.7	1.25	-1.23	-2.63
8,363.0	3.15	58.54	8,347.7	182.2	303.8	-148.1	0.22	-0.09	3.61
8,458.0	3.84	64.05	8,442.5	184.9	308.9	-150.2	0.81	0.73	5.80
8,559.0	3.12	64.30	8,543.3	187.6	314.4	-152.3	0.71	-0.71	0.25
8,653.0	3.10	73.01	8,637.2	189.4	319.1	-153.6	0.50	-0.02	9.27
8,748.0	2.56	77.37	8,732.1	190.6	323.7	-154.3	0.61	-0.57	4.59
8,843.0	2.04	68.31	8,827.0	191.7	327.3	-155.0	0.67	-0.55	-9.54

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

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)	
8,937.0	2.11	72.14	8,920.9	192.9	330.5	-155.8	0.17	0.07	4.07	
9,031.0	1.79	74.94	9,014.9	193.8	333.6	-156.4	0.36	-0.34	2.98	
9,125.0	1.80	79.24	9,108.8	194.5	336.4	-156.7	0.14	0.01	4.57	
9,219.0	1.64	79.26	9,202.8	195.0	339.2	-157.0	0.17	-0.17	0.02	
9,314.0	1.28	68.12	9,297.8	195.6	341.5	-157.4	0.48	-0.38	-11.73	
9,408.0	1.63	56.90	9,391.7	196.7	343.6	-158.2	0.48	0.37	-11.94	
9,504.0	1.30	56.39	9,487.7	198.1	345.7	-159.4	0.34	-0.34	-0.53	
9,598.0	0.92	74.70	9,581.7	198.9	347.3	-160.0	0.55	-0.40	19.48	
9,693.0	0.92	59.92	9,676.7	199.5	348.7	-160.4	0.25	0.00	-15.56	
9,788.0	0.80	44.88	9,771.7	200.3	349.8	-161.1	0.27	-0.13	-15.83	
9,883.0	0.62	54.46	9,866.6	201.1	350.7	-161.8	0.23	-0.19	10.08	
9,977.0	0.50	165.64	9,960.6	201.0	351.2	-161.6	0.99	-0.13	118.28	
10,072.0	0.69	185.59	10,055.6	200.0	351.3	-160.7	0.29	0.20	21.00	
10,166.0	1.20	192.57	10,149.6	198.5	351.0	-159.2	0.56	0.54	7.43	
10,261.0	1.02	228.07	10,244.6	197.0	350.1	-157.7	0.73	-0.19	37.37	
10,355.0	1.46	230.12	10,338.6	195.6	348.6	-156.6	0.47	0.47	2.18	
10,449.0	1.53	224.30	10,432.6	194.0	346.8	-155.1	0.18	0.07	-6.19	
10,542.0	2.02	223.55	10,525.5	191.9	344.8	-153.3	0.53	0.53	-0.81	
10,636.0	1.44	249.08	10,619.5	190.3	342.6	-151.9	1.01	-0.62	27.16	
10,731.0	1.81	280.93	10,714.4	190.1	340.0	-152.1	1.01	0.39	33.53	
10,824.0	1.99	311.67	10,807.4	191.5	337.3	-153.7	1.10	0.19	33.05	
10,919.0	3.88	348.14	10,902.3	195.7	335.4	-158.1	2.70	1.99	38.39	
11,015.0	3.69	347.66	10,998.0	201.9	334.1	-164.4	0.20	-0.20	-0.50	
11,109.0	5.02	1.02	11,091.8	209.0	333.5	-171.5	1.77	1.41	14.21	
11,204.0	4.66	14.53	11,186.4	216.9	334.6	-179.2	1.25	-0.38	14.22	
11,298.0	3.88	1.44	11,280.2	223.8	335.6	-186.0	1.32	-0.83	-13.93	
11,393.0	4.33	346.79	11,374.9	230.5	334.9	-192.7	1.20	0.47	-15.42	
11,487.0	4.24	352.09	11,468.7	237.4	333.6	-199.7	0.43	-0.10	5.64	
11,581.0	5.20	347.17	11,562.4	244.9	332.2	-207.4	1.11	1.02	-5.23	
11,677.0	5.06	11.97	11,658.0	253.3	332.1	-215.7	2.30	-0.15	25.83	
11,771.0	3.79	9.01	11,751.7	260.5	333.4	-222.7	1.37	-1.35	-3.15	
11,875.0	2.69	11.37	11,855.5	266.2	334.4	-228.3	1.07	-1.06	2.27	
11,968.0	1.43	20.77	11,948.5	269.5	335.3	-231.4	1.40	-1.35	10.11	
12,056.0	1.64	14.90	12,036.4	271.7	336.0	-233.6	0.30	0.24	-6.67	
12,213.0	0.85	80.71	12,193.4	274.1	337.7	-235.7	0.96	-0.50	41.92	
12,244.0	1.10	115.93	12,224.4	274.0	338.2	-235.6	2.05	0.81	113.61	
12,275.0	1.39	132.38	12,255.4	273.6	338.8	-235.2	1.48	0.94	53.06	
12,322.0	3.76	148.20	12,302.3	271.9	340.0	-233.3	5.22	5.04	33.66	
12,370.0	9.51	161.74	12,350.0	266.8	342.1	-228.0	12.33	11.98	28.21	
12,417.0	16.22	162.88	12,395.8	256.8	345.2	-217.8	14.29	14.28	2.43	
12,465.0	21.98	159.05	12,441.1	242.0	350.4	-202.5	12.27	12.00	-7.98	
12,505.1	26.16	158.28	12,477.7	226.8	356.4	-186.7	10.45	10.42	-1.92	
FTP @ 12505.1'MD / 12477.7'TVD										
12,512.0	26.88	158.17	12,483.9	223.9	357.5	-183.7	10.45	10.43	-1.59	

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

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)
12,559.0	27.56	161.08	12,525.7	203.8	365.0	-162.9	3.18	1.45	6.19
12,606.0	34.68	165.70	12,565.9	180.5	371.8	-139.0	15.97	15.15	9.83
12,651.0	46.23	168.26	12,600.1	152.1	378.3	-110.1	25.93	25.67	5.69
12,682.0	55.68	169.03	12,619.6	128.5	383.0	-86.1	30.54	30.48	2.48
12,693.0	58.60	169.61	12,625.6	119.4	384.8	-76.9	26.91	26.55	5.27
12,724.0	67.10	168.48	12,639.7	92.4	390.0	-49.4	27.61	27.42	-3.65
12,755.0	70.83	168.49	12,650.9	64.0	395.8	-20.6	12.03	12.03	0.03
12,786.0	74.76	168.02	12,660.0	35.0	401.8	8.8	12.76	12.68	-1.52
12,818.0	79.89	167.91	12,667.0	4.5	408.3	39.9	16.03	16.03	-0.34
12,850.0	83.00	168.94	12,671.8	-26.5	414.7	71.4	10.23	9.72	3.22
12,881.0	85.38	168.50	12,674.9	-56.7	420.7	102.1	7.81	7.68	-1.42
12,912.0	88.41	168.10	12,676.6	-87.0	427.0	132.9	9.86	9.77	-1.29
12,975.0	92.07	167.91	12,676.4	-148.6	440.1	195.6	5.82	5.81	-0.30
13,068.0	89.86	168.44	12,674.8	-239.7	459.1	288.1	2.44	-2.38	0.57
13,162.0	89.35	170.10	12,675.4	-332.0	476.6	381.8	1.85	-0.54	1.77
13,256.0	89.62	173.03	12,676.3	-425.0	490.4	475.7	3.13	0.29	3.12
13,350.0	91.59	175.46	12,675.3	-518.5	499.8	569.7	3.33	2.10	2.59
13,445.0	91.74	178.84	12,672.5	-613.3	504.6	664.5	3.56	0.16	3.56
13,538.0	93.66	180.15	12,668.1	-706.2	505.4	756.9	2.50	2.06	1.41
13,632.0	89.46	178.26	12,665.6	-800.1	506.7	850.5	4.90	-4.47	-2.01
13,727.0	89.72	179.18	12,666.3	-895.1	508.8	945.1	1.01	0.27	0.97
13,821.0	89.32	178.60	12,667.1	-989.1	510.6	1,038.7	0.75	-0.43	-0.62
13,916.0	88.76	178.86	12,668.6	-1,084.0	512.7	1,133.3	0.65	-0.59	0.27
14,011.0	89.42	179.51	12,670.2	-1,179.0	514.1	1,227.9	0.98	0.69	0.68
14,105.0	86.79	180.98	12,673.3	-1,273.0	513.7	1,321.2	3.20	-2.80	1.56
14,197.0	89.12	179.71	12,676.5	-1,364.9	513.1	1,412.6	2.88	2.53	-1.38
14,291.0	90.16	179.36	12,677.1	-1,458.9	513.9	1,506.1	1.17	1.11	-0.37
14,386.0	89.18	177.75	12,677.7	-1,553.8	516.3	1,600.7	1.98	-1.03	-1.69
14,477.0	90.25	176.89	12,678.1	-1,644.7	520.5	1,691.6	1.51	1.18	-0.95
14,573.0	91.12	179.11	12,677.0	-1,740.7	523.9	1,787.3	2.48	0.91	2.31
14,667.0	91.68	179.47	12,674.7	-1,834.6	525.0	1,880.8	0.71	0.60	0.38
14,761.0	90.30	179.20	12,673.1	-1,928.6	526.1	1,974.4	1.50	-1.47	-0.29
14,856.0	91.55	179.27	12,671.5	-2,023.6	527.4	2,068.9	1.32	1.32	0.07
14,950.0	90.25	180.32	12,670.1	-2,117.6	527.7	2,162.4	1.78	-1.38	1.12
15,044.0	90.04	180.53	12,669.8	-2,211.6	527.0	2,255.7	0.32	-0.22	0.22
15,139.0	90.72	180.88	12,669.2	-2,306.6	525.9	2,350.0	0.81	0.72	0.37
15,234.0	90.51	180.85	12,668.2	-2,401.5	524.4	2,444.3	0.22	-0.22	-0.03
15,328.0	88.68	179.23	12,668.8	-2,495.5	524.4	2,537.7	2.60	-1.95	-1.72
15,423.0	89.52	179.62	12,670.3	-2,590.5	525.3	2,632.3	0.97	0.88	0.41
15,517.0	90.07	179.42	12,670.7	-2,684.5	526.1	2,725.8	0.62	0.59	-0.21
15,612.0	90.43	180.23	12,670.2	-2,779.5	526.4	2,820.3	0.93	0.38	0.85
15,706.0	92.53	180.34	12,667.8	-2,873.5	525.9	2,913.6	2.24	2.23	0.12
15,800.0	90.08	180.00	12,665.7	-2,967.4	525.7	3,007.0	2.63	-2.61	-0.36

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

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)	
15,895.0	90.20	179.78	12,665.4	-3,062.4	525.8	3,101.4	0.26	0.13	-0.23	
15,989.0	90.27	177.96	12,665.1	-3,156.4	527.7	3,195.1	1.94	0.07	-1.94	
16,084.0	88.84	177.69	12,665.8	-3,251.3	531.3	3,289.8	1.53	-1.51	-0.28	
16,176.0	88.44	178.50	12,668.0	-3,343.3	534.4	3,381.5	0.98	-0.43	0.88	
16,271.0	88.63	179.57	12,670.4	-3,438.2	536.0	3,476.1	1.14	0.20	1.13	
16,365.0	89.68	179.14	12,671.8	-3,532.2	537.0	3,569.6	1.21	1.12	-0.46	
16,459.0	90.55	179.11	12,671.6	-3,626.2	538.5	3,663.2	0.93	0.93	-0.03	
16,554.0	90.50	179.90	12,670.7	-3,721.2	539.3	3,757.7	0.83	-0.05	0.83	
16,646.0	89.13	180.57	12,671.0	-3,813.2	538.9	3,849.2	1.66	-1.49	0.73	
16,741.0	90.24	180.87	12,671.6	-3,908.2	537.7	3,943.5	1.21	1.17	0.32	
16,836.0	88.70	179.58	12,672.4	-4,003.2	537.3	4,037.8	2.11	-1.62	-1.36	
16,930.0	89.69	179.65	12,673.8	-4,097.1	538.0	4,131.3	1.06	1.05	0.07	
17,024.0	90.89	179.57	12,673.3	-4,191.1	538.6	4,224.8	1.28	1.28	-0.09	
17,119.0	87.95	179.31	12,674.2	-4,286.1	539.5	4,319.4	3.11	-3.09	-0.27	
17,213.0	88.02	179.27	12,677.5	-4,380.1	540.7	4,412.9	0.09	0.07	-0.04	
17,306.0	88.84	178.88	12,680.1	-4,473.0	542.2	4,505.4	0.98	0.88	-0.42	
17,401.0	89.21	179.90	12,681.7	-4,568.0	543.2	4,600.0	1.14	0.39	1.07	
17,495.0	88.97	179.27	12,683.2	-4,662.0	543.9	4,693.5	0.72	-0.26	-0.67	
17,590.0	89.81	178.37	12,684.2	-4,756.9	545.8	4,788.1	1.30	0.88	-0.95	
17,676.0	90.11	176.83	12,684.3	-4,842.9	549.4	4,873.9	1.82	0.35	-1.79	
LAST MWD @ 17676'MD										
17,685.9	90.11	176.83	12,684.3	-4,852.7	550.0	4,883.8	0.00	0.00	0.00	
LTP @ 17685.9'MD / 12684.3'TVD										
17,733.0	90.11	176.83	12,684.2	-4,899.8	552.6	4,930.8	0.00	0.00	0.00	
PTD @ 17733'MD										

Design Targets										
Target Name	- hit/miss target	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
PBHL (PICKELHAUBE)	- actual wellpath misses target center by 17.0usft at 17733.0usft MD (12684.2 TVD, -4899.8 N, 552.6 E)	0.00	359.50	12,682.0	-4,902.8	536.0	425,575.60	782,288.60	32° 10' 0.246 N	103° 25' 15.857 W
	- Rectangle (sides W100.0 H5,130.8 D20.0)									
FTP (PICKELHAUBE)	- actual wellpath misses target center by 164.1usft at 12670.3usft MD (12612.8 TVD, 137.8 N, 381.2 E)	0.00	0.00	12,695.0	227.8	491.1	430,706.20	782,243.70	32° 10' 51.018 N	103° 25' 15.874 W
	- Circle (radius 50.0)									
LTP (PICKELHAUBE)	- actual wellpath misses target center by 17.9usft at 17685.1usft MD (12684.3 TVD, -4852.0 N, 549.9 E)	0.00	0.00	12,695.0	-4,852.8	535.6	425,625.60	782,288.20	32° 10' 0.741 N	103° 25' 15.857 W
	- Point									

Concho Resources LLC

Survey Report

Company:	NORTHERN DELAWARE BASIN	Local Co-ordinate Reference:	Well PICKELHAUBE ST #601H
Project:	LEA COUNTY, NM	TVD Reference:	KB=31' @ 3418.0usft (Precision 106)
Site:	BULLDOG	MD Reference:	KB=31' @ 3418.0usft (Precision 106)
Well:	PICKELHAUBE ST #601H	North Reference:	Grid
Wellbore:	OWB	Survey Calculation Method:	Minimum Curvature
Design:	AWP	Database:	edm

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
12,505.1	12,477.7	226.8	356.4	FTP @ 12505.1'MD / 12477.7'TVD
17,676.0	12,684.3	-4,842.9	549.4	LAST MWD @ 17676'MD
17,685.9	12,684.3	-4,852.7	550.0	LTP @ 17685.9'MD / 12684.3'TVD
17,733.0	12,684.2	-4,899.8	552.6	PTD @ 17733'MD

Checked By: _____ Approved By: _____ Date: _____