

NOV 01 2017

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COG OPERATING, LLC

Eddy /Lea County, NM (NAD27) NMEZ Burch Keely Unit

946H

30-015-44100

SL:487'FNL, 342'FEL, Sec 23/T17S/R29E/UnitA

PP:369'FNL,330'FEL, Sec 23/T17S/R29E/UnitA

BHL (Actual):344'FNL,30'FWL, Sec 23/T17S/R29E/UnitD

PLANNED BHL 350FNL10FWL SEC23/T17S/R29E/UnitD

**Please provide signature
page for directional survey**



Company: COG OPERATING, LLC
Project: Eddy /Lea County, NM (NAD27) NMEZ
Site: Burch Keely Unit 946H
Well: 946H SL 342'FEL, 487'FNL
Wellbore: Lateral
Design: Lateral PLANNED BHL 10'FWL, 350'FNL

Local Co-ordinate Reference: Well 946H SL 342'FEL, 487'FNL - Slot BKU946H
TVD Reference: 3602+18 @ 3620.00ft (Planning)
MD Reference: 3602+18 @ 3620.00ft (Planning)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: VON_EDM

Project	Eddy /Lea County, NM (NAD27) NMEZ		
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	Burch Keely Unit 946H,			
Site Position:		Northing:	664,278.00 ft	Latitude: 32° 49' 33.002 N
From:	Map	Easting:	590,888.00 ft	Longitude: 104° 2' 14.867 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.20 in	Grid Convergence: 0.16 °

Well	946H SL 342'FEL, 487'FNL - Slot BKU946H,			
Well Position	+N/-S	0.00 ft	Northing:	664,278.00 ft
	+E/-W	0.00 ft	Easting:	590,888.00 ft
Position Uncertainty	0.00 ft		Wellhead Elevation:	0.00 ft
			Ground Level:	3,602.00 ft

Wellbore	Lateral				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2015	05/10/17	7.23	60.54	48,254

Design	Lateral PLANNED BHL 10'FWL, 350'FNL				
Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.00	0.00	0.00	269.95	

Survey Program	Date	05/27/17			
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
25.00	995.00	Survey #1 (Lateral)	GYD_DP_MS	Gyrodata gyro-compassing and drop	
1,064.00	9,825.00	Survey #2 (Lateral)	MWD	MWD v3:standard declination	
9,885.00	9,885.00	Survey #3 (Lateral)	Projection	Projection	

Survey										
	Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	BKU 946H SL									
	25.00	0.13	237.74	25.00	-0.02	-0.02	0.02	0.52	0.52	0.00
	50.00	0.29	192.18	50.00	-0.09	-0.06	0.06	0.88	0.64	-182.24
	75.00	0.29	209.73	75.00	-0.21	-0.11	0.11	0.35	0.00	70.20
	100.00	0.26	212.11	100.00	-0.31	-0.17	0.17	0.13	-0.12	9.52
	125.00	0.29	166.22	125.00	-0.42	-0.18	0.18	0.86	0.12	-183.56
	150.00	0.20	128.52	150.00	-0.51	-0.13	0.13	0.72	-0.36	-150.80
	175.00	0.37	96.15	175.00	-0.55	-0.02	0.02	0.91	0.68	-129.48

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Survey

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200.00	0.19	122.29	200.00	-0.58	0.10	-0.10	0.87	-0.72	104.56
225.00	0.25	119.22	225.00	-0.63	0.18	-0.18	0.24	0.24	-12.28
250.00	0.09	154.71	250.00	-0.67	0.23	-0.23	0.74	-0.64	141.96
275.00	0.27	210.30	275.00	-0.74	0.21	-0.21	0.93	0.72	222.36
300.00	0.62	222.08	300.00	-0.89	0.09	-0.09	1.44	1.40	47.12
325.00	0.57	239.79	325.00	-1.05	-0.10	0.11	0.76	-0.20	70.84
350.00	0.37	255.82	350.00	-1.13	-0.29	0.29	0.95	-0.80	64.12
375.00	0.57	266.65	374.99	-1.16	-0.49	0.49	0.87	0.80	43.32
400.00	0.66	281.76	399.99	-1.14	-0.76	0.76	0.74	0.36	60.44
425.00	0.70	297.57	424.99	-1.04	-1.03	1.04	0.76	0.16	63.24
450.00	0.62	308.38	449.99	-0.89	-1.28	1.28	0.59	-0.32	43.24
475.00	0.76	311.16	474.99	-0.69	-1.51	1.51	0.58	0.56	11.12
500.00	0.74	327.22	499.99	-0.45	-1.72	1.72	0.84	-0.08	64.24
525.00	0.67	321.32	524.98	-0.20	-1.90	1.90	0.40	-0.28	-23.60
550.00	0.81	318.89	549.98	0.05	-2.11	2.11	0.57	0.56	-9.72
575.00	0.71	328.15	574.98	0.31	-2.30	2.30	0.63	-0.40	37.04
600.00	0.67	336.41	599.98	0.58	-2.44	2.44	0.43	-0.16	33.04
625.00	0.89	333.83	624.98	0.89	-2.59	2.59	0.89	0.88	-10.32
650.00	0.89	344.95	649.97	1.25	-2.72	2.72	0.69	0.00	44.48
675.00	0.94	356.23	674.97	1.64	-2.79	2.79	0.75	0.20	45.12
700.00	1.02	9.50	699.97	2.07	-2.76	2.76	0.96	0.32	53.08
725.00	0.97	20.57	724.96	2.48	-2.65	2.65	0.79	-0.20	44.28
750.00	0.88	25.93	749.96	2.85	-2.49	2.49	0.50	-0.36	21.44
775.00	1.09	32.07	774.96	3.23	-2.28	2.28	0.94	0.84	24.56
800.00	1.12	42.27	799.95	3.61	-1.99	1.99	0.79	0.12	40.80
825.00	1.11	50.87	824.95	3.94	-1.64	1.64	0.67	-0.04	34.40
850.00	1.33	51.12	849.94	4.28	-1.23	1.22	0.88	0.88	1.00
875.00	1.44	51.74	874.93	4.66	-0.76	0.75	0.44	0.44	2.48
900.00	1.22	47.77	899.93	5.03	-0.31	0.31	0.95	-0.88	-15.88
925.00	1.07	48.03	924.92	5.36	0.06	-0.06	0.60	-0.60	1.04
950.00	0.91	52.19	949.92	5.64	0.39	-0.39	0.70	-0.64	16.64
975.00	1.00	63.36	974.92	5.86	0.74	-0.75	0.83	0.36	44.68
995.00	0.98	69.84	994.91	6.00	1.06	-1.06	0.57	-0.10	32.40
1,064.00	0.93	45.16	1,063.90	6.60	2.01	-2.01	0.60	-0.07	-35.77
1,158.00	2.37	36.20	1,157.86	8.70	3.70	-3.70	1.55	1.53	-9.53
1,253.00	4.28	45.68	1,252.70	12.77	7.39	-7.41	2.09	2.01	9.98
1,347.00	6.86	52.51	1,346.25	18.63	14.36	-14.38	2.83	2.74	7.27
1,442.00	6.98	50.95	1,440.56	25.72	23.34	-23.37	0.23	0.13	-1.64
1,537.00	6.94	54.40	1,534.86	32.70	32.49	-32.52	0.44	-0.04	3.63
1,632.00	7.59	66.15	1,629.10	38.58	42.90	-42.93	1.70	0.68	12.37
1,727.00	7.27	79.09	1,723.31	42.25	54.54	-54.58	1.79	-0.34	13.62
1,821.00	6.38	79.14	1,816.64	44.36	65.51	-65.55	0.95	-0.95	0.05
1,916.00	7.45	73.61	1,910.95	47.10	76.60	-76.64	1.33	1.13	-5.82

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2,011.00	7.21	74.71	2,005.17	50.41	88.26	-88.31	0.29	-0.25	1.16
2,106.00	6.25	77.75	2,099.51	53.08	99.07	-99.11	1.08	-1.01	3.20
2,201.00	7.06	70.87	2,193.87	56.09	109.64	-109.68	1.19	0.85	-7.24
2,295.00	8.90	67.95	2,286.96	60.71	121.83	-121.89	2.00	1.96	-3.11
2,389.00	9.29	66.23	2,379.78	66.50	135.52	-135.57	0.51	0.41	-1.83
2,484.00	9.31	71.14	2,473.53	72.07	149.81	-149.87	0.84	0.02	5.17
2,578.00	9.18	73.75	2,566.31	76.63	164.20	-164.27	0.47	-0.14	2.78
2,673.00	9.23	74.84	2,660.09	80.74	178.83	-178.90	0.19	0.05	1.15
2,768.00	9.52	76.35	2,753.82	84.59	193.82	-193.89	0.40	0.31	1.59
2,863.00	7.75	82.87	2,847.74	87.24	207.81	-207.89	2.13	-1.86	6.86
2,958.00	6.06	75.96	2,942.05	89.25	219.03	-219.11	1.98	-1.78	-7.27
3,052.00	6.41	75.01	3,035.49	91.81	228.91	-228.99	0.39	0.37	-1.01
3,147.00	6.07	77.52	3,129.93	94.27	238.94	-239.02	0.46	-0.36	2.64
3,241.00	6.14	58.28	3,223.41	97.99	248.07	-248.15	2.17	0.07	-20.47
3,336.00	6.14	59.37	3,317.86	103.24	256.76	-256.85	0.12	0.00	1.15
3,431.00	6.43	60.60	3,412.29	108.44	265.77	-265.86	0.34	0.31	1.29
3,525.00	6.49	65.44	3,505.70	113.24	275.19	-275.28	0.58	0.06	5.15
3,620.00	6.58	67.64	3,600.08	117.54	285.10	-285.21	0.28	0.09	2.32
3,713.00	6.43	68.76	3,692.48	121.45	294.88	-294.99	0.21	-0.16	1.20
3,807.00	5.28	77.01	3,785.99	124.33	304.01	-304.11	1.51	-1.22	8.78
3,902.00	2.99	92.25	3,880.74	125.22	310.74	-310.85	2.65	-2.41	16.04
3,996.00	2.59	90.01	3,974.63	125.12	315.32	-315.42	0.44	-0.43	-2.38
4,091.00	1.52	78.55	4,069.57	125.37	318.70	-318.81	1.20	-1.13	-12.06
4,109.32	1.22	75.32	4,087.88	125.47	319.12	-319.23	1.70	-1.65	-17.62
BKU 946H Tgt									
4,186.00	0.36	339.44	4,164.55	125.90	319.83	-319.94	1.70	-1.12	-125.05
4,280.00	0.46	305.71	4,258.55	126.40	319.42	-319.53	0.27	0.11	-35.88
4,312.00	1.36	252.55	4,290.55	126.36	318.95	-319.06	3.58	2.81	-166.13
4,344.00	3.83	245.02	4,322.51	125.79	317.62	-317.73	7.78	7.72	-23.53
4,375.00	7.11	246.78	4,353.37	124.60	314.92	-315.03	10.59	10.58	5.68
4,407.00	10.84	253.52	4,384.97	122.96	310.21	-310.32	12.09	11.66	21.06
4,438.00	14.78	260.82	4,415.19	121.50	303.51	-303.61	13.72	12.71	23.55
4,470.00	18.70	263.13	4,445.83	120.24	294.38	-294.49	12.42	12.25	7.22
4,501.00	23.23	261.96	4,474.77	118.79	283.39	-283.49	14.67	14.61	-3.77
4,532.00	27.09	261.14	4,502.83	116.85	270.36	-270.46	12.50	12.45	-2.65
4,564.00	30.78	260.69	4,530.83	114.40	255.07	-255.17	11.55	11.53	-1.41
4,596.00	33.15	261.59	4,557.97	111.79	238.33	-238.43	7.55	7.41	2.81
4,627.00	35.93	263.45	4,583.51	109.52	220.91	-221.00	9.59	8.97	6.00
4,659.00	38.85	265.95	4,608.93	107.74	201.56	-201.66	10.28	9.13	7.81
4,690.00	43.15	267.23	4,632.32	106.54	181.27	-181.36	14.13	13.87	4.13
4,722.00	47.00	268.18	4,654.92	105.64	158.63	-158.73	12.21	12.03	2.97
4,753.00	47.70	269.89	4,675.92	105.25	135.84	-135.93	4.64	2.26	5.52
4,785.00	47.66	271.93	4,697.47	105.63	112.18	-112.27	4.72	-0.13	6.38
4,816.00	48.30	275.08	4,718.22	107.04	89.20	-89.29	7.83	2.06	10.16

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4,848.00	48.85	276.20	4,739.39	109.40	65.32	-65.42	3.14	1.72	3.50
4,879.00	49.18	276.22	4,759.72	111.93	42.06	-42.16	1.07	1.06	0.06
4,911.00	49.49	276.74	4,780.58	114.67	17.94	-18.04	1.57	0.97	1.63
4,942.00	49.94	276.38	4,800.62	117.37	-5.55	5.45	1.70	1.45	-1.16
4,946.00	50.14	276.32	4,803.19	117.71	-8.60	8.50	5.10	4.97	-1.53
Wellpath Crosses 330°HL @ Heel									
4,974.00	51.53	275.90	4,820.87	120.02	-30.18	30.08	5.10	4.97	-1.50
5,005.00	55.16	275.42	4,839.38	122.47	-54.93	54.82	11.78	11.71	-1.55
5,037.00	57.45	274.02	4,857.13	124.66	-81.46	81.35	8.03	7.16	-4.38
5,068.00	60.13	272.67	4,873.19	126.20	-107.92	107.81	9.41	8.65	-4.35
5,100.00	62.87	272.19	4,888.46	127.39	-136.02	135.91	8.66	8.56	-1.50
5,132.00	66.13	271.74	4,902.23	128.38	-164.88	164.77	10.27	10.19	-1.41
5,163.00	69.51	270.33	4,913.94	128.89	-193.58	193.46	11.69	10.90	-4.55
5,194.00	73.61	269.20	4,923.74	128.77	-222.98	222.87	13.67	13.23	-3.65
5,226.00	77.92	268.62	4,931.61	128.18	-253.98	253.87	13.58	13.47	-1.81
5,257.00	82.06	266.44	4,936.99	126.86	-284.47	284.36	15.04	13.35	-7.03
5,289.00	85.28	269.08	4,940.52	125.62	-316.25	316.14	12.98	10.06	8.25
5,320.00	88.27	270.86	4,942.27	125.60	-347.19	347.08	11.22	9.65	5.74
5,323.03	88.39	271.01	4,942.35	125.65	-350.22	350.11	6.32	3.90	4.97
BKU 946H LP p1									
5,352.00	89.52	272.45	4,942.88	126.53	-379.17	379.06	6.32	3.91	4.97
5,383.00	90.11	272.66	4,942.98	127.91	-410.14	410.03	2.02	1.90	0.68
5,421.00	90.84	273.08	4,942.67	129.81	-448.09	447.98	2.22	1.92	1.11
5,516.00	90.33	273.04	4,941.70	134.88	-542.95	542.83	0.54	-0.54	-0.04
5,611.00	90.02	271.27	4,941.41	138.45	-637.88	637.76	1.89	-0.33	-1.86
5,705.00	89.67	269.09	4,941.66	138.75	-731.87	731.75	2.35	-0.37	-2.32
5,800.00	90.65	269.01	4,941.40	137.17	-826.86	826.74	1.04	1.03	-0.08
5,895.00	91.23	269.54	4,939.84	135.97	-921.84	921.72	0.83	0.61	0.56
5,990.00	90.08	269.65	4,938.75	135.30	-1,016.83	1,016.71	1.22	-1.21	0.12
6,085.00	89.64	269.95	4,938.99	134.97	-1,111.83	1,111.71	0.56	-0.46	0.32
6,179.00	91.48	269.31	4,938.07	134.36	-1,205.81	1,205.70	2.07	1.96	-0.68
6,274.00	91.09	269.52	4,935.94	133.39	-1,300.79	1,300.67	0.47	-0.41	0.22
6,368.00	91.01	269.97	4,934.21	132.97	-1,394.77	1,394.65	0.49	-0.09	0.48
6,463.00	90.46	270.23	4,932.99	133.14	-1,489.76	1,489.64	0.64	-0.58	0.27
6,558.00	89.82	270.27	4,932.76	133.55	-1,584.76	1,584.64	0.67	-0.67	0.04
6,653.00	91.39	269.51	4,931.76	133.37	-1,679.75	1,679.63	1.84	1.65	-0.80
6,747.00	89.64	269.31	4,930.91	132.40	-1,773.74	1,773.62	1.87	-1.86	-0.21
6,842.00	91.35	269.32	4,930.09	131.27	-1,868.72	1,868.61	1.80	1.80	0.01
6,937.00	90.46	269.15	4,928.59	130.00	-1,963.70	1,963.59	0.95	-0.94	-0.18
7,031.00	90.47	269.15	4,927.83	128.61	-2,057.69	2,057.58	0.01	0.01	0.00
7,126.00	91.25	269.13	4,926.40	127.18	-2,152.67	2,152.55	0.82	0.82	-0.02
7,221.00	92.37	271.10	4,923.40	127.37	-2,247.61	2,247.50	2.38	1.18	2.07
7,316.00	92.29	271.10	4,919.54	129.19	-2,342.52	2,342.40	0.08	-0.08	0.00

Company: COG OPERATING, LLC
Project: Eddy /Lea County, NM (NAD27) NMEZ
Site: Burch Keely Unit 946H
Well: 946H SL 342'FEL, 487'FNL
Wellbore: Lateral
Design: Lateral PLANNED BHL 10'FWL, 350'FNL

Local Co-ordinate Reference: Well 946H SL 342'FEL, 487'FNL - Slot BKU946H
TVD Reference: 3602+18 @ 3620.00ft (Planning)
MD Reference: 3602+18 @ 3620.00ft (Planning)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: VON_EDM

Survey

Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
7,411.00	91.23	270.91	4,916.62	130.86	-2,437.46	2,437.34	1.13	-1.12	-0.20
7,505.00	90.76	270.69	4,914.99	132.17	-2,531.43	2,531.32	0.55	-0.50	-0.23
7,600.00	90.63	270.85	4,913.84	133.45	-2,626.42	2,626.30	0.22	-0.14	0.17
7,695.00	91.56	271.37	4,912.02	135.29	-2,721.38	2,721.26	1.12	0.98	0.55
7,789.00	90.82	271.02	4,910.07	137.25	-2,815.34	2,815.22	0.87	-0.79	-0.37
7,884.00	90.73	271.48	4,908.79	139.32	-2,910.31	2,910.18	0.49	-0.09	0.48
7,979.00	90.59	271.62	4,907.69	141.89	-3,005.27	3,005.14	0.21	-0.15	0.15
8,073.00	90.41	269.52	4,906.87	142.82	-3,099.25	3,099.13	2.24	-0.19	-2.23
8,168.00	90.03	269.39	4,906.51	141.92	-3,194.25	3,194.12	0.42	-0.40	-0.14
8,263.00	90.50	269.70	4,906.07	141.16	-3,289.24	3,289.12	0.59	0.49	0.33
8,358.00	92.01	270.31	4,903.99	141.17	-3,384.22	3,384.09	1.71	1.59	0.64
8,452.00	91.77	270.42	4,900.89	141.77	-3,478.16	3,478.04	0.28	-0.26	0.12
8,547.00	91.60	270.30	4,898.09	142.37	-3,573.12	3,572.99	0.22	-0.18	-0.13
8,642.00	91.41	270.17	4,895.60	142.76	-3,668.09	3,667.96	0.24	-0.20	-0.14
8,736.00	91.33	270.50	4,893.35	143.31	-3,762.06	3,761.93	0.36	-0.09	0.35
8,831.00	91.46	270.93	4,891.04	144.49	-3,857.02	3,856.89	0.47	0.14	0.45
8,925.00	90.76	270.73	4,889.22	145.85	-3,950.99	3,950.87	0.77	-0.74	-0.21
9,020.00	90.57	270.09	4,888.11	146.53	-4,045.98	4,045.86	0.70	-0.20	-0.67
9,115.00	90.19	269.19	4,887.48	145.94	-4,140.98	4,140.85	1.03	-0.40	-0.95
9,209.00	89.95	268.92	4,887.37	144.39	-4,234.97	4,234.84	0.38	-0.26	-0.29
9,304.00	89.57	269.96	4,887.77	143.46	-4,329.96	4,329.83	1.17	-0.40	1.09
9,398.00	89.88	269.84	4,888.22	143.29	-4,423.96	4,423.83	0.35	0.33	-0.13
9,492.00	90.42	269.38	4,887.97	142.65	-4,517.96	4,517.83	0.75	0.57	-0.49
9,586.24	90.70	269.95	4,887.26	142.22	-4,591.19	4,591.07	0.87	0.38	0.78
BKU 946H PBHL p3									
9,565.27	90.70	269.95	4,887.26	142.22	-4,591.22	4,591.10	0.00	0.00	0.00
BKU 946H PBHL p4									
9,586.00	90.78	270.11	4,886.99	142.24	-4,611.95	4,611.82	0.87	0.38	0.78
Wellpath Crosses 330'HL @ Toe									
9,681.00	88.76	269.16	4,887.37	141.63	-4,706.94	4,706.81	2.35	-2.13	-1.00
9,776.00	89.14	269.18	4,889.11	140.25	-4,801.91	4,801.79	0.40	0.40	0.02
9,825.00	89.31	269.10	4,889.77	139.52	-4,850.90	4,850.78	0.38	0.35	-0.16
9,865.27	89.31	269.10	4,890.26	138.89	-4,891.17	4,891.04	0.00	0.00	0.00
BKU 946H PBHL p2									
9,885.00	89.31	269.10	4,890.50	138.58	-4,910.89	4,910.77	0.00	0.00	0.00
TD @ 30.4'FWL, 344.0'FNL - BKU 946H PBHL opt - BKU 946H BHL - BKU 946H PBHL - BKU 946H PBHL p5									

Company: COG OPERATING, LLC
Project: Eddy /Lea County, NM (NAD27) NMEZ
Site: Burch Keely Unit 946H
Well: 946H SL 342'FEL, 487'FNL
Wellbore: Lateral
Design: Lateral PLANNED BHL 10'FWL, 350'FNL

Local Co-ordinate Reference: Well 946H SL 342'FEL, 487'FNL - Slot BKU946H
TVD Reference: 3602+18 @ 3620.00ft (Planning)
MD Reference: 3602+18 @ 3620.00ft (Planning)
North Reference: Grid
Survey Calculation Method: Minimum Curvature
Database: VON_EDM

Design Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
BKU 946H SL - actual wellpath hits target center - Point	0.00	0.00	0.00	0.00	0.00	664,278.00	590,888.00	32° 49' 33.002 N	104° 2' 14.867 W
BKU 946H BHL - actual wellpath misses target center by 0.01ft at 9885.00ft MD (4890.50 TVD, 138.58 N, -4910.89 E) - Point	0.00	0.01	4,890.50	138.58	-4,910.89	664,416.58	585,977.11	32° 49' 34.505 N	104° 3' 12.415 W

Design Annotations

Measured Depth (ft)	Vertical Depth (ft)	Local Coordinates		Comment
		+N/-S (ft)	+E/-W (ft)	
4,946.00	4,803.19	117.71	-8.60	Wellpath Crosses 330'HL @ Heel
9,586.00	4,886.99	142.24	-4,611.95	Wellpath Crosses 330'HL @ Toe
9,885.00	4,890.50	138.58	-4,910.89	TD @ 30.4'FWL, 344.0'FNL

Checked By: _____ Approved By: _____ Date: _____

COG OPERATING, LLC

Project: Eddy /Lea County, NM (NAD27) NMEZ

Site: Burch Keely Unit 946H

Well: 946H SL 342'FEL, 487'FNL

Wellbore: Lateral

Design: Lateral PLANNED BHL 10'FWL, 350'FNL

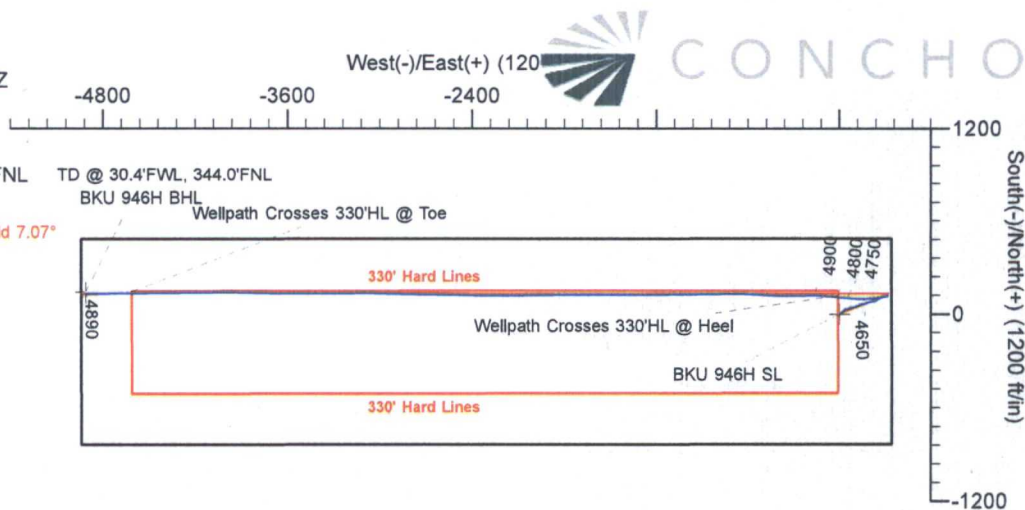
TD @ 30.4'FWL, 344.0'FNL

BKU 946H BHL

Wellpath Crosses 330'HL @ Toe

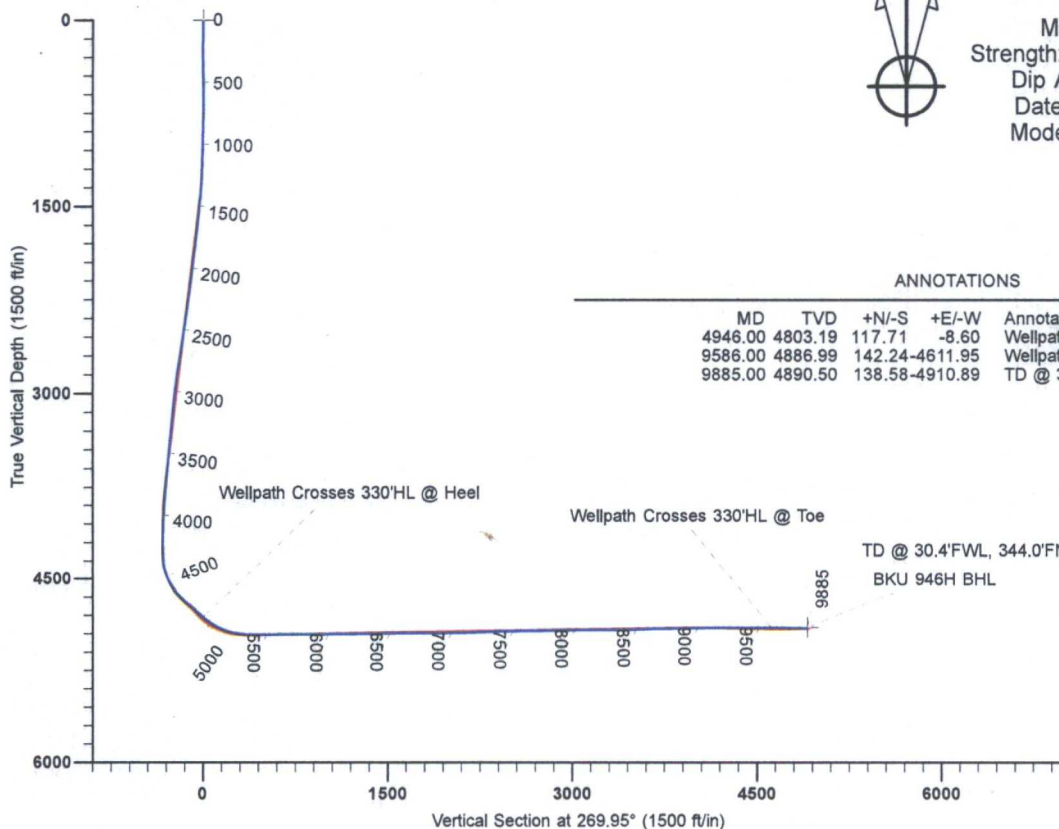
To convert a Magnetic Direction to a Grid Direction, Add 7.07°

3602+18 @ 3620.00ft (Planning)
NAD 1927 (NADCON CONUS)



Azimuths to Grid North
True North: -0.16°
Magnetic North: 7.07°

Magnetic Field
Strength: 48254.4snT
Dip Angle: 60.54°
Date: 05/10/2017
Model: IGRF2015



ANNOTATIONS

MD	TVD	+N/-S	+E/-W	Annotation
4946.00	4803.19	117.71	-8.60	Wellpath Crosses 330'HL @ Heel
9586.00	4886.99	142.24	-4611.95	Wellpath Crosses 330'HL @ Toe
9885.00	4890.50	138.58	-4910.89	TD @ 30.4'FWL, 344.0'FNL

TARGET DETAILS

Name	TVD	+N/-S	+E/-W	Northing	Easting	Shape
BKU 946H SL	0.00	0.00	0.00	664278.00	590888.00	Point
BKU 946H BHL	4890.50	138.58	-4910.89	664416.58	585977.11	Point

Design: Lateral PLANNED BHL 10'FWL, 350'FNL (946H SL 342'FEL, 487'FNL/Lateral)

Created By: Mekka Williams
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10:45, May 27 2017

VON DIRECTIONAL
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