

Project: Arapahoe County, CO (NAD 83)  
 Site: Sec. 15-T4S-R64W (Bison Pad)  
 Well: Bison 4-64 15-16-2BHZ (Restake 3)  
 Wellbore: Wellbore #1  
 Design: Rev D0



Bison Oil & Gas, L.L.C.

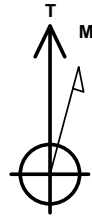


#### SECTION DETAILS

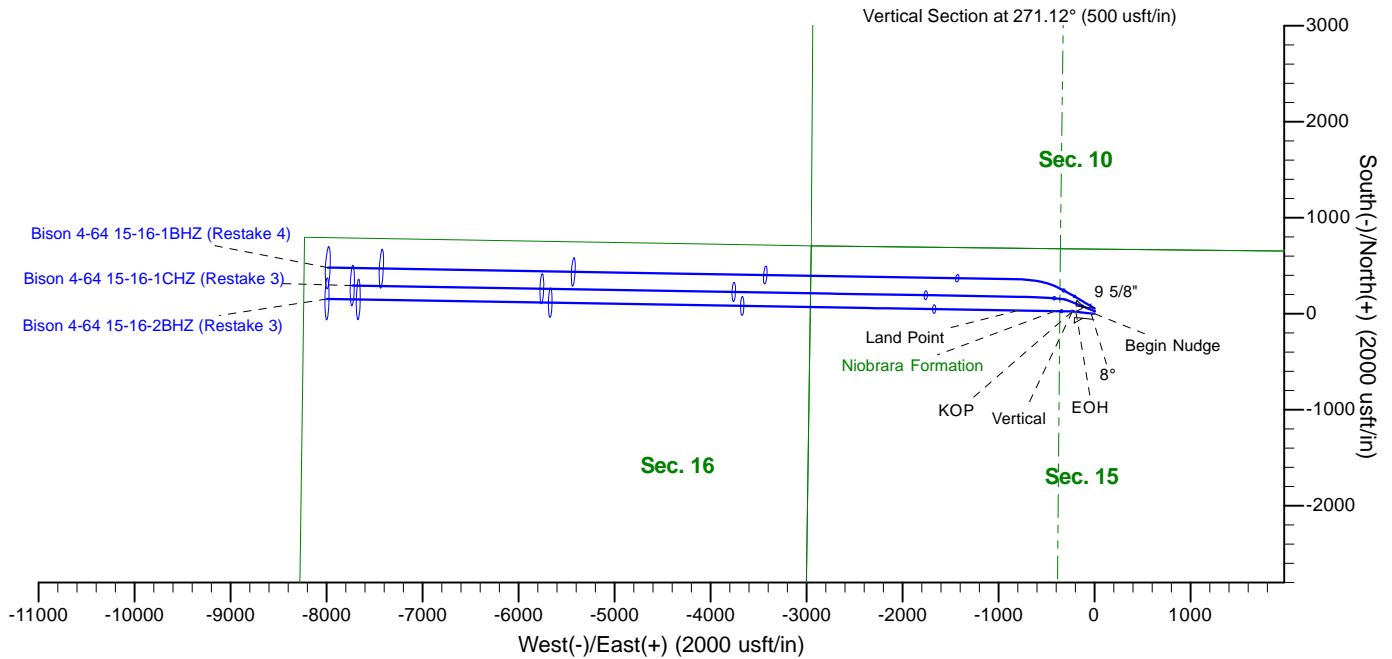
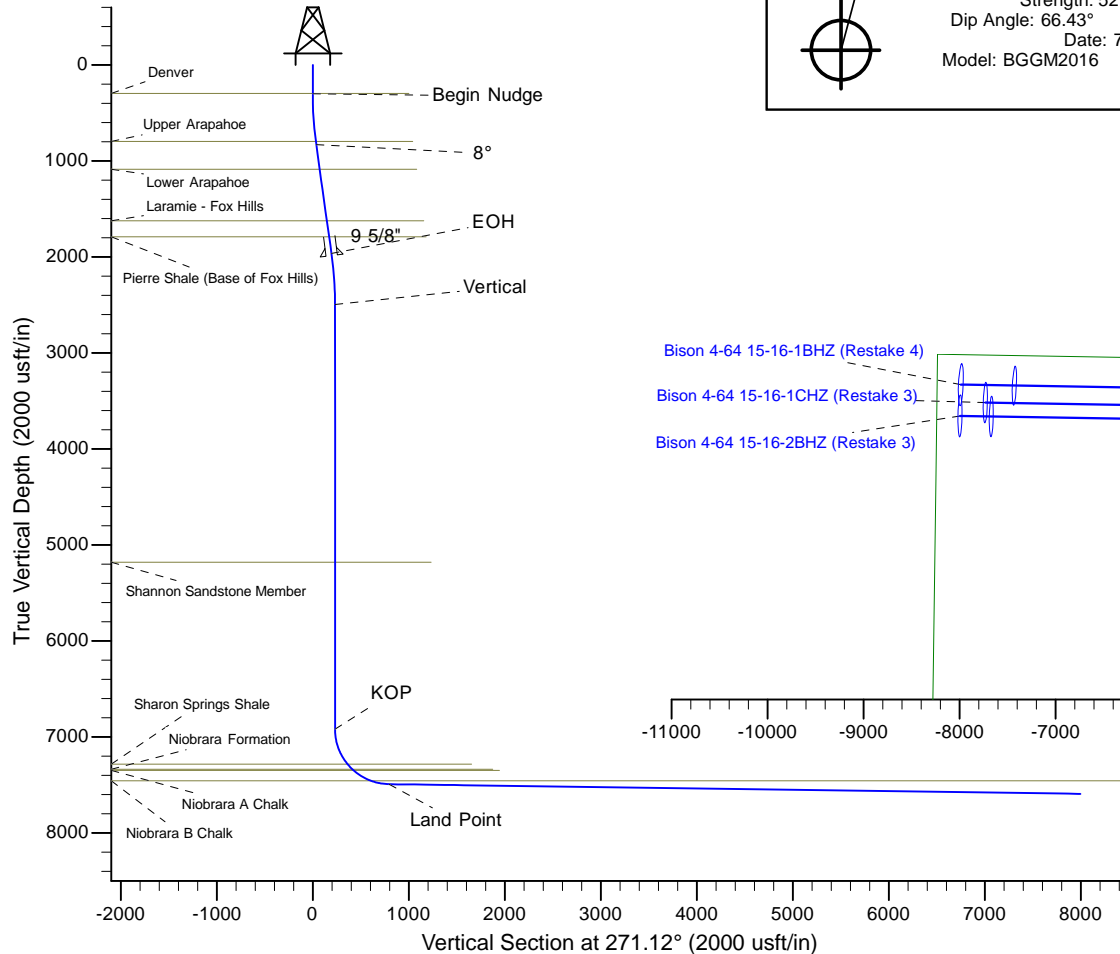
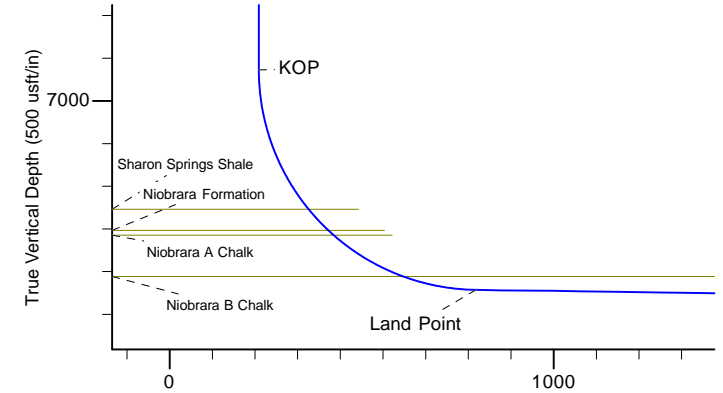
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VFace	Annotation
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	300.00	0.00	0.00	300.00	0.00	0.00	0.00	0.00	0.00	Begin Nudge
3	833.33	8.00	276.30	831.60	4.08	-36.95	1.50	276.30	37.02	8°
4	1975.33	8.00	276.30	1962.49	21.52	-194.92	0.00	195.31	195.31	EOH
5	2508.67	0.00	0.00	2494.09	25.60	-231.87	1.50	180.00	232.33	Vertical
6	6933.68	0.00	0.00	6919.10	25.60	-231.87	0.00	0.00	232.33	KOP
7	7825.68	89.20	270.96	7492.00	35.09	-796.75	10.00	270.96	797.28	Land Point
8	15026.37	89.20	270.96	7592.54	156.00	-7995.73	0.00	0.00	7997.25	BHL

#### WELL DETAILS: Bison 4-64 15-16-2BHZ (Restake 3)

+N/-S	+E/-W	Northing	Ground Level: Easting	5660.00	Latitude	Longitude
0.00	0.00	1684213.23	3271363.79	39.708012	-104.535477	



Azimuths to True North  
 Magnetic North: 8.29°  
 Magnetic Field  
 Strength: 52160.4snT  
 Dip Angle: 66.43°  
 Date: 7/18/2016  
 Model: BGGM2016



Plan: Rev D0 (Bison 4-64 15-16-2BHZ (Restake 3)/Wellbore #1)

Created By: Kyle Rickey

Date: 16:20, July 29 2016

Checked: \_\_\_\_\_

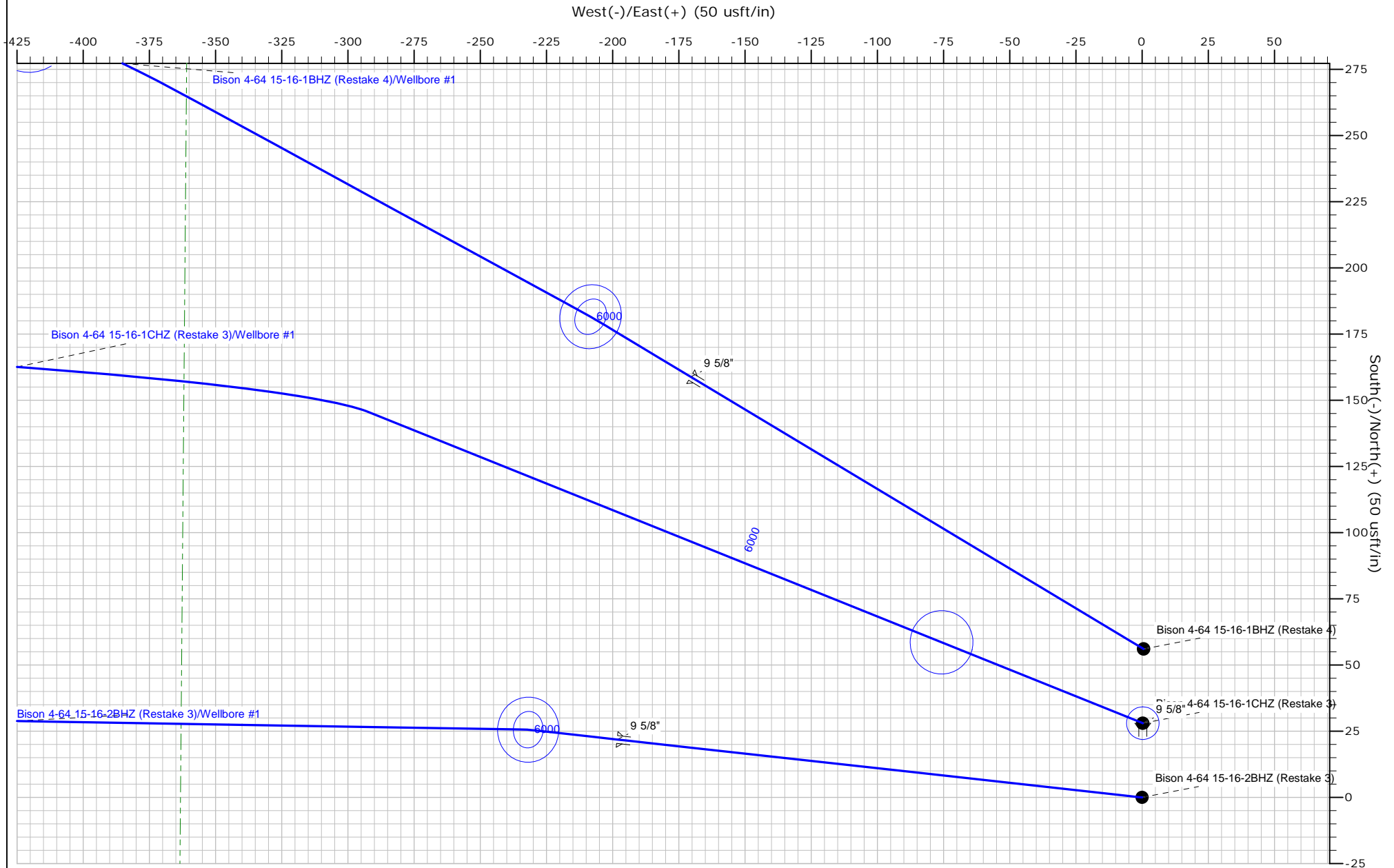
Date: \_\_\_\_\_

Project: Arapahoe County, CO (NAD 83)  
Site: Sec. 15-T4S-R64W (Bison Pad)  
Well: Bison 4-64 15-16-2BHZ (Restake 3)  
Wellbore: Wellbore #1  
Design: Rev D0



Bison Oil & Gas, L.L.C.

**HALLIBURTON**  
Sperry Drilling



GPL

# Bison Oil & Gas, L.L.C.

Arapahoe County, CO (NAD 83) Sec. 15-T4S-R64W (Bison Pad)

API#

Bison 4-64 15-16-2BHZ (Restake 3)

Wellbore #1

Plan: Rev D0

Please review plan for SCC Application or Non-Mag Spacing.

Highlighted plan sections are within the Short Collar Correction (SCC) Instability Zone

## Sperry Drilling Services

### Combo Report

29 July, 2016

Well Coordinates: 39° 42' 28.84" N  
104° 32' 07.72" W

North American Datum 1983  
Colorado Central Zone  
1,684,213.23 N  
3,271,363.79 E

Ground Level: 5,660.00 usft

Geodetic Scale Factor Applied

Local Coordinate Origin:

Centered on Well Bison 4-64 15-16-2BHZ (Restake 3)

Viewing Datum:

RKB = 25' @ 5685.00usft (GPL)

TVDs to System:

N

**North Reference:**

**True**

Unit System:

Dec-Deg - API - US Survey Feet - Custom

Geodetic Scale Factor Applied

Version: 5000.1 Build: 72

Report Version: Midcon Combo v1.11

**HALLIBURTON**

## Plan Report for Bison 4-64 15-16-2BHZ (Restake 3) - Rev D0

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
0.00	0.00	0.00	0.00	0.00 N	0.00 E	1,684,213.23	3,271,363.79	0.00	0.00	
100.00	0.00	0.00	100.00	0.00 N	0.00 E	1,684,213.23	3,271,363.79	0.00	0.00	
200.00	0.00	0.00	200.00	0.00 N	0.00 E	1,684,213.23	3,271,363.79	0.00	0.00	
297.00	0.00	0.00	297.00	0.00 N	0.00 E	1,684,213.23	3,271,363.79	0.00	0.00	Denver
300.00	0.00	0.00	300.00	0.00 N	0.00 E	1,684,213.23	3,271,363.79	0.00	0.00	Begin Nudge
400.00	1.50	276.30	399.99	0.14 N	1.30 W	1,684,213.36	3,271,362.48	1.50	1.30	
500.00	3.00	276.30	499.91	0.57 N	5.20 W	1,684,213.75	3,271,358.58	1.50	5.21	
600.00	4.50	276.30	599.69	1.29 N	11.70 W	1,684,214.40	3,271,352.07	1.50	11.73	
700.00	6.00	276.30	699.27	2.30 N	20.80 W	1,684,215.31	3,271,342.96	1.50	20.84	
798.41	7.48	276.30	797.00	3.56 N	32.28 W	1,684,216.46	3,271,331.47	1.50	32.34	Upper Arapahoe
800.00	7.50	276.30	798.57	3.59 N	32.48 W	1,684,216.48	3,271,331.27	1.50	32.54	
833.33	8.00	276.30	831.60	4.08 N	36.95 W	1,684,216.92	3,271,326.80	1.50	37.02	8°
900.00	8.00	276.30	897.62	5.10 N	46.17 W	1,684,217.84	3,271,317.56	0.00	46.26	
1,000.00	8.00	276.30	996.65	6.62 N	60.00 W	1,684,219.22	3,271,303.71	0.00	60.12	
1,091.24	8.00	276.30	1,087.00	8.02 N	72.63 W	1,684,220.48	3,271,291.08	0.00	72.77	Lower Arapahoe
1,100.00	8.00	276.30	1,095.67	8.15 N	73.84 W	1,684,220.60	3,271,289.87	0.00	73.98	
1,200.00	8.00	276.30	1,194.70	9.68 N	87.67 W	1,684,221.98	3,271,276.02	0.00	87.84	
1,300.00	8.00	276.30	1,293.73	11.21 N	101.50 W	1,684,223.36	3,271,262.17	0.00	101.70	
1,400.00	8.00	276.30	1,392.75	12.73 N	115.34 W	1,684,224.74	3,271,248.32	0.00	115.56	
1,500.00	8.00	276.30	1,491.78	14.26 N	129.17 W	1,684,226.12	3,271,234.47	0.00	129.42	
1,600.00	8.00	276.30	1,590.81	15.79 N	143.00 W	1,684,227.50	3,271,220.62	0.00	143.28	
1,631.50	8.00	276.30	1,622.00	16.27 N	147.36 W	1,684,227.94	3,271,216.26	0.00	147.65	Laramie - Fox Hills
1,700.00	8.00	276.30	1,689.83	17.31 N	156.84 W	1,684,228.88	3,271,206.77	0.00	157.14	
1,800.00	8.00	276.30	1,788.86	18.84 N	170.67 W	1,684,230.26	3,271,192.93	0.00	171.01	
1,802.16	8.00	276.30	1,791.00	18.88 N	170.97 W	1,684,230.29	3,271,192.63	0.00	171.30	Pierre Shale (Base of Fox Hills)
1,900.00	8.00	276.30	1,887.89	20.37 N	184.50 W	1,684,231.64	3,271,179.08	0.00	184.87	
1,975.33	8.00	276.30	1,962.49	21.52 N	194.92 W	1,684,232.68	3,271,168.64	0.00	195.31	EOH
2,000.00	7.63	276.30	1,986.93	21.89 N	198.26 W	1,684,233.02	3,271,165.31	1.50	198.65	9 5/8"
2,100.00	6.13	276.30	2,086.20	23.20 N	210.16 W	1,684,234.20	3,271,153.39	1.50	210.58	
2,200.00	4.63	276.30	2,185.76	24.23 N	219.48 W	1,684,235.13	3,271,144.06	1.50	219.91	
2,300.00	3.13	276.30	2,285.53	24.97 N	226.21 W	1,684,235.81	3,271,137.32	1.50	226.65	
2,400.00	1.63	276.30	2,385.44	25.43 N	230.34 W	1,684,236.22	3,271,133.19	1.50	230.79	
2,500.00	0.13	276.30	2,485.42	25.60 N	231.86 W	1,684,236.37	3,271,131.66	1.50	232.32	
2,508.67	0.00	0.00	2,494.09	25.60 N	231.87 W	1,684,236.37	3,271,131.65	1.50	232.33	Vertical
2,600.00	0.00	0.00	2,585.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
2,700.00	0.00	0.00	2,685.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
2,800.00	0.00	0.00	2,785.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
2,900.00	0.00	0.00	2,885.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,000.00	0.00	0.00	2,985.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,100.00	0.00	0.00	3,085.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,200.00	0.00	0.00	3,185.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	

## Plan Report for Bison 4-64 15-16-2BHZ (Restake 3) - Rev D0

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
3,300.00	0.00	0.00	3,285.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,400.00	0.00	0.00	3,385.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,500.00	0.00	0.00	3,485.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,600.00	0.00	0.00	3,585.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,700.00	0.00	0.00	3,685.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,800.00	0.00	0.00	3,785.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
3,900.00	0.00	0.00	3,885.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,000.00	0.00	0.00	3,985.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,100.00	0.00	0.00	4,085.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,200.00	0.00	0.00	4,185.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,300.00	0.00	0.00	4,285.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,400.00	0.00	0.00	4,385.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,500.00	0.00	0.00	4,485.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,600.00	0.00	0.00	4,585.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,700.00	0.00	0.00	4,685.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,800.00	0.00	0.00	4,785.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
4,900.00	0.00	0.00	4,885.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,000.00	0.00	0.00	4,985.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,100.00	0.00	0.00	5,085.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,196.58	0.00	0.00	5,182.00	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	Shannon Sandstone Member
5,200.00	0.00	0.00	5,185.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,300.00	0.00	0.00	5,285.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,400.00	0.00	0.00	5,385.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,500.00	0.00	0.00	5,485.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,600.00	0.00	0.00	5,585.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,700.00	0.00	0.00	5,685.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,800.00	0.00	0.00	5,785.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
5,900.00	0.00	0.00	5,885.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,000.00	0.00	0.00	5,985.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,100.00	0.00	0.00	6,085.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,200.00	0.00	0.00	6,185.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,300.00	0.00	0.00	6,285.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,400.00	0.00	0.00	6,385.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,500.00	0.00	0.00	6,485.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,600.00	0.00	0.00	6,585.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,700.00	0.00	0.00	6,685.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,800.00	0.00	0.00	6,785.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,900.00	0.00	0.00	6,885.42	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	
6,933.68	0.00	0.00	6,919.10	25.60 N	231.87 W	1,684,236.37	3,271,131.65	0.00	232.33	KOP
7,000.00	6.63	270.96	6,985.28	25.66 N	235.71 W	1,684,236.39	3,271,127.82	10.00	236.16	
7,100.00	16.63	270.96	7,083.10	26.00 N	255.84 W	1,684,236.52	3,271,107.68	10.00	256.30	

## Plan Report for Bison 4-64 15-16-2BHZ (Restake 3) - Rev D0

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
Depth (usft)	Inclination (°)	True Azimuth (°)	Depth (usft)	Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)	Rate (°/100usft)	Section (usft)	
7,200.00	26.63	270.96	7,175.94	26.62 N	292.65 W	1,684,236.75	3,271,070.87	10.00	293.12	
7,300.00	36.63	270.96	7,260.97	27.50 N	345.03 W	1,684,237.07	3,271,018.49	10.00	345.50	
7,326.68	39.30	270.96	7,282.00	27.78 N	361.43 W	1,684,237.17	3,271,002.08	10.00	361.91	Sharon Springs Shale
7,400.00	46.63	270.96	7,335.62	28.61 N	411.37 W	1,684,237.48	3,270,952.14	10.00	411.85	
7,402.01	46.83	270.96	7,337.00	28.64 N	412.84 W	1,684,237.49	3,270,950.67	10.00	413.32	Niobrara Formation
7,421.37	48.77	270.96	7,350.00	28.88 N	427.17 W	1,684,237.58	3,270,936.33	10.00	427.65	Niobrara A Chalk
7,500.00	56.63	270.96	7,397.61	29.93 N	489.66 W	1,684,237.96	3,270,873.84	10.00	490.15	
7,600.00	66.63	270.96	7,445.06	31.40 N	577.53 W	1,684,238.51	3,270,785.96	10.00	578.03	
7,632.21	69.85	270.96	7,457.00	31.91 N	607.44 W	1,684,238.69	3,270,756.05	10.00	607.94	Niobrara B Chalk
7,700.00	76.63	270.96	7,476.53	33.00 N	672.30 W	1,684,239.09	3,270,691.18	10.00	672.82	
7,800.00	86.63	270.96	7,491.07	34.66 N	771.10 W	1,684,239.70	3,270,592.37	10.00	771.63	
7,825.68	89.20	270.96	7,492.00	35.09 N	796.75 W	1,684,239.86	3,270,566.71	10.00	797.28	Land Point
7,900.00	89.20	270.96	7,493.04	36.33 N	871.06 W	1,684,240.32	3,270,492.40	0.00	871.60	
8,000.00	89.20	270.96	7,494.44	38.01 N	971.03 W	1,684,240.94	3,270,392.41	0.00	971.59	
8,100.00	89.20	270.96	7,495.83	39.69 N	1,071.01 W	1,684,241.55	3,270,292.42	0.00	1,071.58	
8,200.00	89.20	270.96	7,497.23	41.37 N	1,170.99 W	1,684,242.17	3,270,192.44	0.00	1,171.57	
8,300.00	89.20	270.96	7,498.62	43.05 N	1,270.96 W	1,684,242.79	3,270,092.45	0.00	1,271.56	
8,400.00	89.20	270.96	7,500.02	44.73 N	1,370.94 W	1,684,243.41	3,269,992.46	0.00	1,371.55	
8,500.00	89.20	270.96	7,501.42	46.41 N	1,470.91 W	1,684,244.03	3,269,892.47	0.00	1,471.54	
8,600.00	89.20	270.96	7,502.81	48.09 N	1,570.89 W	1,684,244.64	3,269,792.48	0.00	1,571.53	
8,700.00	89.20	270.96	7,504.21	49.77 N	1,670.87 W	1,684,245.26	3,269,692.50	0.00	1,671.52	
8,800.00	89.20	270.96	7,505.61	51.45 N	1,770.84 W	1,684,245.88	3,269,592.51	0.00	1,771.51	
8,900.00	89.20	270.96	7,507.00	53.13 N	1,870.82 W	1,684,246.50	3,269,492.52	0.00	1,871.50	
9,000.00	89.20	270.96	7,508.40	54.81 N	1,970.80 W	1,684,247.11	3,269,392.53	0.00	1,971.49	
9,100.00	89.20	270.96	7,509.79	56.49 N	2,070.77 W	1,684,247.73	3,269,292.55	0.00	2,071.48	
9,200.00	89.20	270.96	7,511.19	58.16 N	2,170.75 W	1,684,248.35	3,269,192.56	0.00	2,171.47	
9,300.00	89.20	270.96	7,512.59	59.84 N	2,270.72 W	1,684,248.97	3,269,092.57	0.00	2,271.46	
9,400.00	89.20	270.96	7,513.98	61.52 N	2,370.70 W	1,684,249.58	3,268,992.58	0.00	2,371.45	
9,500.00	89.20	270.96	7,515.38	63.20 N	2,470.68 W	1,684,250.20	3,268,892.60	0.00	2,471.44	
9,600.00	89.20	270.96	7,516.78	64.88 N	2,570.65 W	1,684,250.82	3,268,792.61	0.00	2,571.43	
9,700.00	89.20	270.96	7,518.17	66.56 N	2,670.63 W	1,684,251.44	3,268,692.62	0.00	2,671.42	
9,800.00	89.20	270.96	7,519.57	68.24 N	2,770.60 W	1,684,252.05	3,268,592.63	0.00	2,771.41	
9,900.00	89.20	270.96	7,520.96	69.92 N	2,870.58 W	1,684,252.67	3,268,492.65	0.00	2,871.40	
10,000.00	89.20	270.96	7,522.36	71.60 N	2,970.56 W	1,684,253.29	3,268,392.66	0.00	2,971.39	
10,100.00	89.20	270.96	7,523.76	73.28 N	3,070.53 W	1,684,253.91	3,268,292.67	0.00	3,071.38	
10,200.00	89.20	270.96	7,525.15	74.96 N	3,170.51 W	1,684,254.53	3,268,192.68	0.00	3,171.37	
10,300.00	89.20	270.96	7,526.55	76.64 N	3,270.49 W	1,684,255.14	3,268,092.70	0.00	3,271.36	
10,400.00	89.20	270.96	7,527.95	78.31 N	3,370.46 W	1,684,255.76	3,267,992.71	0.00	3,371.35	
10,500.00	89.20	270.96	7,529.34	79.99 N	3,470.44 W	1,684,256.38	3,267,892.72	0.00	3,471.34	
10,600.00	89.20	270.96	7,530.74	81.67 N	3,570.41 W	1,684,257.00	3,267,792.73	0.00	3,571.33	
10,700.00	89.20	270.96	7,532.13	83.35 N	3,670.39 W	1,684,257.61	3,267,692.75	0.00	3,671.32	

## Plan Report for Bison 4-64 15-16-2BHZ (Restake 3) - Rev D0

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
10,800.00	89.20	270.96	7,533.53	85.03 N	3,770.37 W	1,684,258.23	3,267,592.76	0.00	3,771.31	
10,900.00	89.20	270.96	7,534.93	86.71 N	3,870.34 W	1,684,258.85	3,267,492.77	0.00	3,871.30	
11,000.00	89.20	270.96	7,536.32	88.39 N	3,970.32 W	1,684,259.47	3,267,392.78	0.00	3,971.29	
11,100.00	89.20	270.96	7,537.72	90.07 N	4,070.29 W	1,684,260.08	3,267,292.80	0.00	4,071.28	
11,200.00	89.20	270.96	7,539.11	91.75 N	4,170.27 W	1,684,260.70	3,267,192.81	0.00	4,171.27	
11,300.00	89.20	270.96	7,540.51	93.43 N	4,270.25 W	1,684,261.32	3,267,092.82	0.00	4,271.26	
11,400.00	89.20	270.96	7,541.91	95.11 N	4,370.22 W	1,684,261.94	3,266,992.83	0.00	4,371.25	
11,500.00	89.20	270.96	7,543.30	96.79 N	4,470.20 W	1,684,262.55	3,266,892.85	0.00	4,471.24	
11,600.00	89.20	270.96	7,544.70	98.46 N	4,570.18 W	1,684,263.17	3,266,792.86	0.00	4,571.23	
11,700.00	89.20	270.96	7,546.10	100.14 N	4,670.15 W	1,684,263.79	3,266,692.87	0.00	4,671.22	
11,800.00	89.20	270.96	7,547.49	101.82 N	4,770.13 W	1,684,264.41	3,266,592.88	0.00	4,771.21	
11,900.00	89.20	270.96	7,548.89	103.50 N	4,870.10 W	1,684,265.03	3,266,492.90	0.00	4,871.20	
12,000.00	89.20	270.96	7,550.28	105.18 N	4,970.08 W	1,684,265.64	3,266,392.91	0.00	4,971.19	
12,100.00	89.20	270.96	7,551.68	106.86 N	5,070.06 W	1,684,266.26	3,266,292.92	0.00	5,071.18	
12,200.00	89.20	270.96	7,553.08	108.54 N	5,170.03 W	1,684,266.88	3,266,192.93	0.00	5,171.17	
12,300.00	89.20	270.96	7,554.47	110.22 N	5,270.01 W	1,684,267.50	3,266,092.95	0.00	5,271.16	
12,400.00	89.20	270.96	7,555.87	111.90 N	5,369.98 W	1,684,268.11	3,265,992.96	0.00	5,371.15	
12,500.00	89.20	270.96	7,557.27	113.58 N	5,469.96 W	1,684,268.73	3,265,892.97	0.00	5,471.14	
12,600.00	89.20	270.96	7,558.66	115.26 N	5,569.94 W	1,684,269.35	3,265,792.98	0.00	5,571.13	
12,700.00	89.20	270.96	7,560.06	116.94 N	5,669.91 W	1,684,269.97	3,265,693.00	0.00	5,671.12	
12,800.00	89.20	270.96	7,561.45	118.62 N	5,769.89 W	1,684,270.58	3,265,593.01	0.00	5,771.11	
12,900.00	89.20	270.96	7,562.85	120.29 N	5,869.87 W	1,684,271.20	3,265,493.02	0.00	5,871.09	
13,000.00	89.20	270.96	7,564.25	121.97 N	5,969.84 W	1,684,271.82	3,265,393.03	0.00	5,971.08	
13,100.00	89.20	270.96	7,565.64	123.65 N	6,069.82 W	1,684,272.44	3,265,293.05	0.00	6,071.07	
13,200.00	89.20	270.96	7,567.04	125.33 N	6,169.79 W	1,684,273.06	3,265,193.06	0.00	6,171.06	
13,300.00	89.20	270.96	7,568.44	127.01 N	6,269.77 W	1,684,273.67	3,265,093.07	0.00	6,271.05	
13,400.00	89.20	270.96	7,569.83	128.69 N	6,369.75 W	1,684,274.29	3,264,993.08	0.00	6,371.04	
13,500.00	89.20	270.96	7,571.23	130.37 N	6,469.72 W	1,684,274.91	3,264,893.10	0.00	6,471.03	
13,600.00	89.20	270.96	7,572.62	132.05 N	6,569.70 W	1,684,275.53	3,264,793.11	0.00	6,571.02	
13,700.00	89.20	270.96	7,574.02	133.73 N	6,669.67 W	1,684,276.14	3,264,693.12	0.00	6,671.01	
13,800.00	89.20	270.96	7,575.42	135.41 N	6,769.65 W	1,684,276.76	3,264,593.13	0.00	6,771.00	
13,900.00	89.20	270.96	7,576.81	137.09 N	6,869.63 W	1,684,277.38	3,264,493.15	0.00	6,870.99	
14,000.00	89.20	270.96	7,578.21	138.77 N	6,969.60 W	1,684,278.00	3,264,393.16	0.00	6,970.98	
14,100.00	89.20	270.96	7,579.61	140.44 N	7,069.58 W	1,684,278.61	3,264,293.17	0.00	7,070.97	
14,200.00	89.20	270.96	7,581.00	142.12 N	7,169.56 W	1,684,279.23	3,264,193.18	0.00	7,170.96	
14,300.00	89.20	270.96	7,582.40	143.80 N	7,269.53 W	1,684,279.85	3,264,093.20	0.00	7,270.95	
14,400.00	89.20	270.96	7,583.79	145.48 N	7,369.51 W	1,684,280.47	3,263,993.21	0.00	7,370.94	
14,500.00	89.20	270.96	7,585.19	147.16 N	7,469.48 W	1,684,281.08	3,263,893.22	0.00	7,470.93	
14,600.00	89.20	270.96	7,586.59	148.84 N	7,569.46 W	1,684,281.70	3,263,793.23	0.00	7,570.92	
14,700.00	89.20	270.96	7,587.98	150.52 N	7,669.44 W	1,684,282.32	3,263,693.24	0.00	7,670.91	
14,800.00	89.20	270.96	7,589.38	152.20 N	7,769.41 W	1,684,282.94	3,263,593.26	0.00	7,770.90	

## Plan Report for Bison 4-64 15-16-2BHZ (Restake 3) - Rev D0

Measured Depth (usft)	Inclination (°)	True Azimuth (°)	Vertical Depth (usft)	Local Coordinates		Map Coordinates		Dogleg Rate (°/100usft)	Vertical Section (usft)	Comments
				Northing (usft)	Easting (usft)	Northing (usft)	Easting (usft)			
14,900.00	89.20	270.96	7,590.77	153.88 N	7,869.39 W	1,684,283.56	3,263,493.27	0.00	7,870.89	
15,000.00	89.20	270.96	7,592.17	155.56 N	7,969.36 W	1,684,284.17	3,263,393.28	0.00	7,970.88	
15,026.37	89.20	270.96	7,592.54	156.00 N	7,995.73 W	1,684,284.34	3,263,366.91	0.00	7,997.25	BHL

### Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
300.00	300.00	0.00	0.00	Begin Nudge
833.33	831.60	4.08	-36.95	8°
1,975.33	1,962.49	21.52	-194.92	EOH
2,508.67	2,494.09	25.60	-231.87	Vertical
6,933.68	6,919.10	25.60	-231.87	KOP
7,825.68	7,492.00	35.09	-796.75	Land Point
15,026.37	7,592.54	156.00	-7,995.73	BHL

### Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Bison 4-64 15-16-2BHZ (Restake 3) BHL (Rev 1)	271.12	Slot	0.00	0.00	0.00

### Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	15,026.26	Rev D0	MWD

### Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,000.00	1,986.93	9 5/8"	9-5/8	12-1/4



## Plan Report for Bison 4-64 15-16-2BHZ (Restake 3) - Rev D0

### Formation Details

Measured Depth (usft)	Vertical Depth (usft)	TVDSS (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
297.00	297.00	-5,388.00	Denver		0.00	
798.41	797.00	-4,888.00	Upper Arapahoe		0.00	
1,091.24	1,087.00	-4,598.00	Lower Arapahoe		0.00	
1,631.50	1,622.00	-4,063.00	Laramie - Fox Hills		0.00	
1,802.16	1,791.00	-3,894.00	Pierre Shale (Base of Fox Hills)		0.00	
5,196.58	5,182.00	-503.00	Shannon Sandstone Member		0.00	
7,326.68	7,282.00	1,597.00	Sharon Springs Shale		0.00	
7,402.01	7,337.00	1,652.00	Niobrara Formation		0.00	
7,421.37	7,350.00	1,665.00	Niobrara A Chalk		0.00	
7,632.21	7,457.00	1,772.00	Niobrara B Chalk		0.00	

### Design Targets

Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
Bison 4-64 15-16-2BHZ (Restake 3) BHL (Rev 1) (Moved 11' S)	0.00	0.00	0.00	156.00	-7,995.73	1,684,284.34	3,263,366.91	39.708437	-104.563896
- plan misses target center by 7591.80usft at 14920.36usft MD (7591.06 TVD, 154.22 N, -7889.75 E)									
- Point									

### Directional Difficulty Index

Average Dogleg over Survey:	0.70 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 7,826.40 usft
Net Tortousity applicable to Plans:	0.70 °/100usft	Directional Difficulty Index:	6.431

### Audit Info

**North Reference Sheet for Sec. 15-T4S-R64W (Bison Pad) - Bison 4-64 15-16-2BHZ (Restake 3) - Wellbore #1**

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference.

Vertical Depths are relative to RKB = 25' @ 5685.00usft (GPL). Northing and Easting are relative to Bison 4-64 15-16-2BHZ (Restake 3)

Coordinate System is US State Plane 1983, Colorado Central Zone using datum North American Datum 1983, ellipsoid GRS 1980

Projection method is Lambert Conformal Conic (2 parallel)

Central Meridian is -105.500000°, Longitude Origin:0.000000°, Latitude Origin:39.750000°

False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99999196

Grid Coordinates of Well: 1,684,213.23 usft N, 3,271,363.79 usft E

Geographical Coordinates of Well: 39° 42' 28.84" N, 104° 32' 07.72" W

Grid Convergence at Surface is: 0.61°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,026.37usft  
the Bottom Hole Displacement is 7,997.25usft in the Direction of 271.12° ( True).

Magnetic Convergence at surface is: -7.68° (18 July 2016, , BGGM2016)

