

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 35-T5S-R65W

Beaver 5-65 34-35 2H

Plan B (Pilot)

Plan: Rev B0

Sperry Drilling Services

Proposal Report

02 February, 2015

Well Coordinates: 1,636,075.51 N, 3,244,848.99 E (39° 34' 35.76" N, 104° 37' 52.86" W)

Ground Level: 6,086.60 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 73

Centered on Well Beaver 5-65 34-35 2H

KB 24 ft @ 6110.60usft (H&P 280)

N

True

API - US Survey Feet - Custom

HALLIBURTON

Project: Arapahoe County, Colorado
Site: Sec. 35-T5S-R65W
Well: Beaver 5-65 34-35 2H
Wellbore: Plan B (Pilot)
Plan: Rev B0

Conoco Phillips Company

HALLIBURTON
Sperry Drilling

SECTION DETAILS										
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSect	Target
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
2	2600.00	0.00	0.00	2600.00	0.00	0.00	0.00	0.00	0.00	
3	3453.33	12.80	195.57	3446.25	-91.44	-25.48	1.50	195.57	94.92	
4	6543.88	12.80	195.57	6460.00	-751.02	-209.26	0.00	0.00	779.63	
5	7397.22	0.00	0.00	7306.25	-842.46	-234.74	1.50	180.00	874.55	
6	8675.96	0.00	0.00	8585.00	-842.46	-234.74	0.00	0.00	874.55	

Plan: Rev B0 (Beaver 5-65 34-35 2H/Plan B (Pilot))

Created By: Kansa B. Becker

Date: 17:17, February 02 2015

Checked: _____

Date: _____

Reviewed: _____

Date: _____

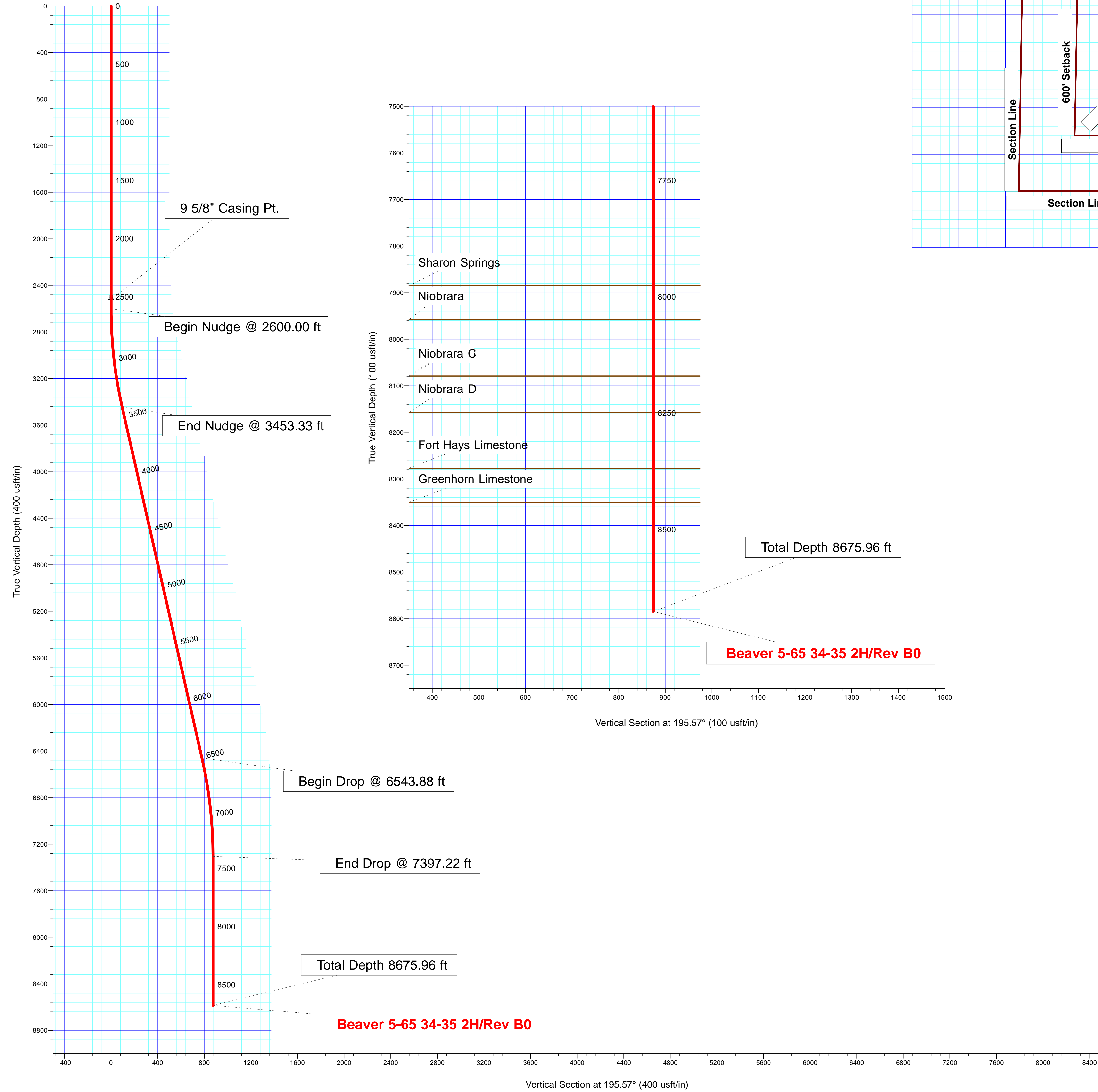
Approved: _____

Date: _____

T

M

Azimuths to True North
Magnetic Field
Magnetic North: 8.35°
Strength: 52196.8snT
Dip Angle: 66.28°
Date: 1/29/2015
Model: BGGM2014



True Vertical Depth (100 usft/in)

7500

7600

7700

7800

7900

8000

8100

8200

8300

8400

8500

8600

8700

Sharon Springs

Niobrara

Niobrara C

Niobrara D

Fort Hays Limestone

Greenhorn Limestone

Total Depth 8675.96 ft

Beaver 5-65 34-35 2H/Rev B0

Vertical Section at 195.57° (100 usft/in)

400

500

600

700

800

900

1000

1100

1200

1300

1400

1500

Vertical Section at 195.57° (400 usft/in)

-400

0

400

800

1200

1600

2000

2400

2800

3200

3600

4000

4400

4800

5200

5600

6000

6400

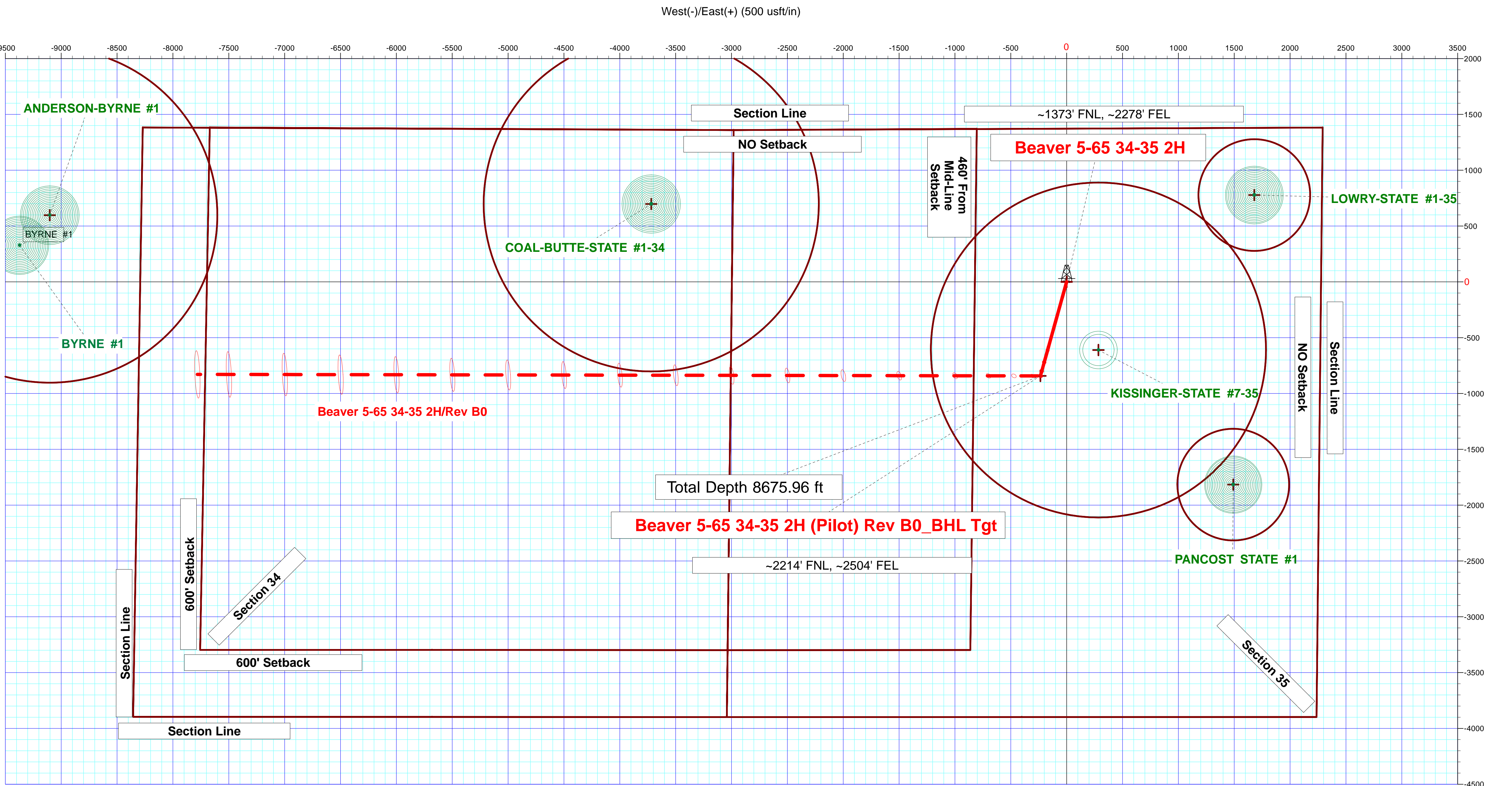
6800

7200

7600

8000

8400



Section Line

NO Setback

460' From Mid-Line Setback

Section Line

NO Setback

Section Line

600' Setback

Section 34

600' Setback

Section Line

Section 35

ANDERSON-BYRNE #1

BYRNE #1

COAL-BUTTE-STATE #1-34

Beaver 5-65 34-35 2H/Rev B0

Total Depth 8675.96 ft

Beaver 5-65 34-35 2H (Pilot) Rev B0_BHL Tgt

~2214' FNL, ~2504' FEL

~1373' FNL, ~2278' FEL

Beaver 5-65 34-35 2H

KISSINGER-STATE #7-35

PANCOST STATE #1

LOWRY-STATE #1-35

South(-)/North(+) (500 usft/in)

-2000

-1500

-1000

-500

0

500

1000

1500

2000

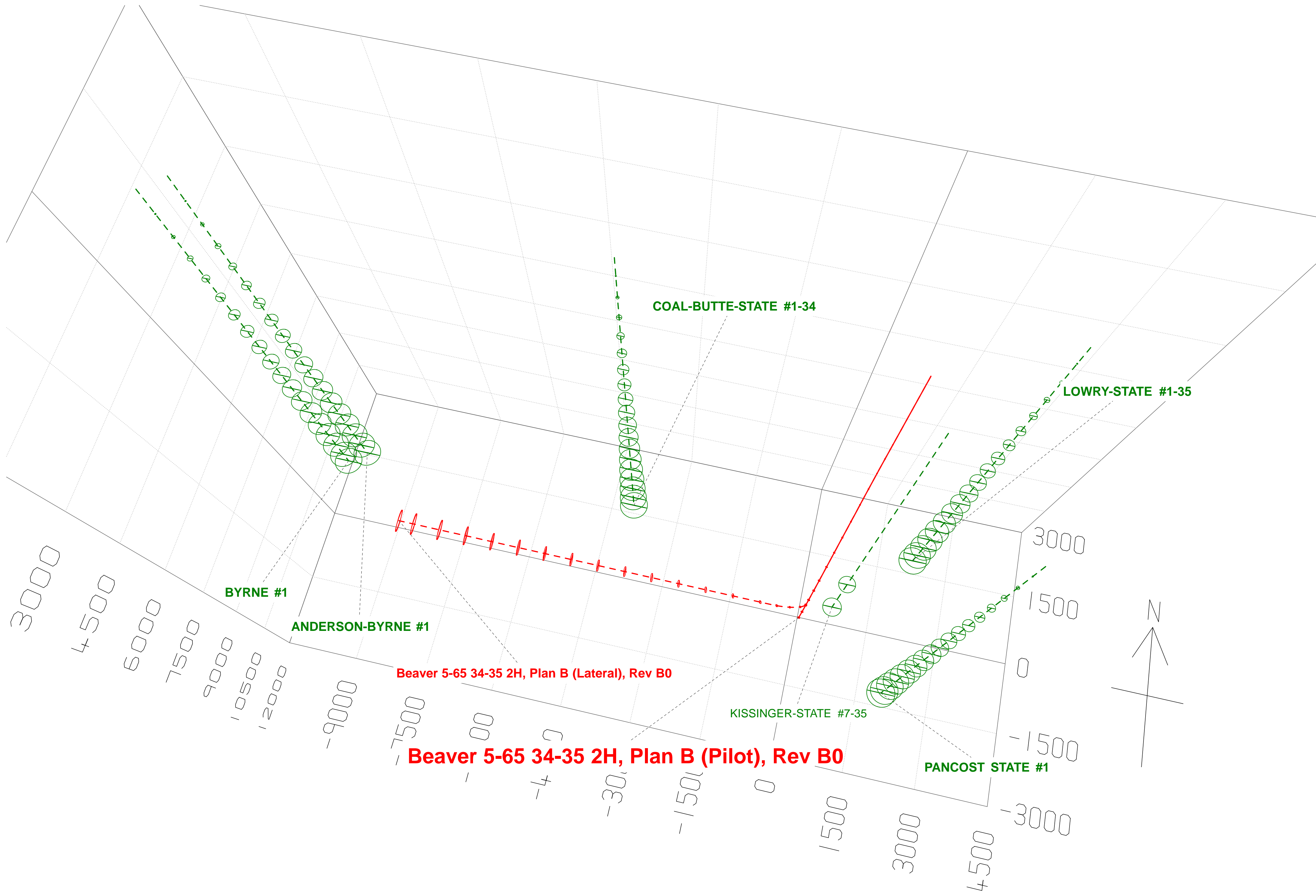
2500

3000

3500

4000

4500



Plan Report for Beaver 5-65 34-35 2H - Rev B0

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)	Toolface Azimuth (°)
0.00	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	0.00
200.00	0.00	0.00	200.00	0.00	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	0.00
400.00	0.00	0.00	400.00	0.00	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	0.00
600.00	0.00	0.00	600.00	0.00	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	0.00
800.00	0.00	0.00	800.00	0.00	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	0.00
1,000.00	0.00	0.00	1,000.00	0.00	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	0.00
1,200.00	0.00	0.00	1,200.00	0.00	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	0.00
1,400.00	0.00	0.00	1,400.00	0.00	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	0.00
1,600.00	0.00	0.00	1,600.00	0.00	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	0.00
1,800.00	0.00	0.00	1,800.00	0.00	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	0.00
2,000.00	0.00	0.00	2,000.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,054.00	0.00	0.00	2,054.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills										
2,100.00	0.00	0.00	2,100.00	0.00	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	0.00
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2,321.00	0.00	0.00	2,321.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale										
2,400.00	0.00	0.00	2,400.00	0.00	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	0.00
2,521.00	0.00	0.00	2,521.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Surface Casing - 9 5/8" Casing Pt.										
2,600.00	0.00	0.00	2,600.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 2600.00 ft										
2,700.00	1.50	195.57	2,699.99	-1.26	-0.35	1.31	1.50	1.50	0.00	195.57
2,800.00	3.00	195.57	2,799.91	-5.04	-1.41	5.23	1.50	1.50	0.00	0.00
2,900.00	4.50	195.57	2,899.69	-11.34	-3.16	11.77	1.50	1.50	0.00	0.00
3,000.00	6.00	195.57	2,999.27	-20.16	-5.62	20.92	1.50	1.50	0.00	0.00
3,100.00	7.50	195.57	3,098.57	-31.48	-8.77	32.68	1.50	1.50	0.00	0.00
3,200.00	9.00	195.57	3,197.54	-45.30	-12.62	47.03	1.50	1.50	0.00	0.00
3,300.00	10.50	195.57	3,296.09	-61.61	-17.17	63.96	1.50	1.50	0.00	0.00
3,400.00	12.00	195.57	3,394.16	-80.41	-22.40	83.47	1.50	1.50	0.00	0.00
3,453.33	12.80	195.57	3,446.25	-91.44	-25.48	94.92	1.50	1.50	0.00	0.00
End Nudge @ 3453.33 ft										
3,500.00	12.80	195.57	3,491.76	-101.40	-28.25	105.26	0.00	0.00	0.00	0.00
3,600.00	12.80	195.57	3,589.27	-122.74	-34.20	127.42	0.00	0.00	0.00	0.00
3,700.00	12.80	195.57	3,686.79	-144.08	-40.15	149.57	0.00	0.00	0.00	0.00
3,800.00	12.80	195.57	3,784.30	-165.42	-46.09	171.73	0.00	0.00	0.00	0.00
3,900.00	12.80	195.57	3,881.82	-186.77	-52.04	193.88	0.00	0.00	0.00	0.00
4,000.00	12.80	195.57	3,979.33	-208.11	-57.99	216.04	0.00	0.00	0.00	0.00
4,100.00	12.80	195.57	4,076.85	-229.45	-63.93	238.19	0.00	0.00	0.00	0.00
4,200.00	12.80	195.57	4,174.36	-250.79	-69.88	260.35	0.00	0.00	0.00	0.00
4,300.00	12.80	195.57	4,271.88	-272.13	-75.83	282.50	0.00	0.00	0.00	0.00
4,400.00	12.80	195.57	4,369.39	-293.48	-81.77	304.66	0.00	0.00	0.00	0.00
4,500.00	12.80	195.57	4,466.91	-314.82	-87.72	326.81	0.00	0.00	0.00	0.00
4,600.00	12.80	195.57	4,564.42	-336.16	-93.67	348.96	0.00	0.00	0.00	0.00
4,700.00	12.80	195.57	4,661.94	-357.50	-99.61	371.12	0.00	0.00	0.00	0.00
4,800.00	12.80	195.57	4,759.45	-378.84	-105.56	393.27	0.00	0.00	0.00	0.00

Plan Report for Beaver 5-65 34-35 2H - Rev B0

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)	Toolface Azimuth (°)
4,900.00	12.80	195.57	4,856.97	-400.18	-111.51	415.43	0.00	0.00	0.00	0.00
5,000.00	12.80	195.57	4,954.48	-421.53	-117.45	437.58	0.00	0.00	0.00	0.00
5,100.00	12.80	195.57	5,052.00	-442.87	-123.40	459.74	0.00	0.00	0.00	0.00
5,200.00	12.80	195.57	5,149.51	-464.21	-129.35	481.89	0.00	0.00	0.00	0.00
5,300.00	12.80	195.57	5,247.03	-485.55	-135.29	504.05	0.00	0.00	0.00	0.00
5,400.00	12.80	195.57	5,344.54	-506.89	-141.24	526.20	0.00	0.00	0.00	0.00
5,500.00	12.80	195.57	5,442.06	-528.24	-147.19	548.36	0.00	0.00	0.00	0.00
5,600.00	12.80	195.57	5,539.57	-549.58	-153.13	570.51	0.00	0.00	0.00	0.00
5,700.00	12.80	195.57	5,637.09	-570.92	-159.08	592.67	0.00	0.00	0.00	0.00
5,800.00	12.80	195.57	5,734.60	-592.26	-165.03	614.82	0.00	0.00	0.00	0.00
5,900.00	12.80	195.57	5,832.12	-613.60	-170.97	636.98	0.00	0.00	0.00	0.00
6,000.00	12.80	195.57	5,929.63	-634.94	-176.92	659.13	0.00	0.00	0.00	0.00
6,100.00	12.80	195.57	6,027.15	-656.29	-182.87	681.29	0.00	0.00	0.00	0.00
6,200.00	12.80	195.57	6,124.66	-677.63	-188.81	703.44	0.00	0.00	0.00	0.00
6,300.00	12.80	195.57	6,222.18	-698.97	-194.76	725.60	0.00	0.00	0.00	0.00
6,400.00	12.80	195.57	6,319.69	-720.31	-200.71	747.75	0.00	0.00	0.00	0.00
6,500.00	12.80	195.57	6,417.21	-741.65	-206.65	769.91	0.00	0.00	0.00	0.00
6,543.88	12.80	195.57	6,460.00	-751.02	-209.26	779.63	0.00	0.00	0.00	0.00
Begin Drop @ 6543.88 ft										
6,600.00	11.96	195.57	6,514.81	-762.61	-212.49	791.66	1.50	-1.50	0.00	-180.00
6,700.00	10.46	195.57	6,612.90	-781.33	-217.71	811.10	1.50	-1.50	0.00	180.00
6,800.00	8.96	195.57	6,711.47	-797.58	-222.24	827.96	1.50	-1.50	0.00	180.00
6,900.00	7.46	195.57	6,810.44	-811.33	-226.07	842.24	1.50	-1.50	0.00	-180.00
7,000.00	5.96	195.57	6,909.75	-822.58	-229.20	853.92	1.50	-1.50	0.00	180.00
7,100.00	4.46	195.57	7,009.34	-831.32	-231.64	862.99	1.50	-1.50	0.00	180.00
7,200.00	2.96	195.57	7,109.12	-837.55	-233.38	869.46	1.50	-1.50	0.00	180.00
7,300.00	1.46	195.57	7,209.05	-841.27	-234.41	873.31	1.50	-1.50	0.00	180.00
7,397.22	0.00	0.00	7,306.25	-842.46	-234.74	874.55	1.50	-1.50	0.00	180.00
End Drop @ 7397.22 ft										
7,400.00	0.00	0.00	7,309.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
7,500.00	0.00	0.00	7,409.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
7,600.00	0.00	0.00	7,509.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
7,700.00	0.00	0.00	7,609.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
7,800.00	0.00	0.00	7,709.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
7,900.00	0.00	0.00	7,809.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
7,975.96	0.00	0.00	7,885.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Sharon Springs										
8,000.00	0.00	0.00	7,909.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,048.96	0.00	0.00	7,958.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Niobrara										
8,100.00	0.00	0.00	8,009.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,169.96	0.00	0.00	8,079.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Niobrara B										
8,171.96	0.00	0.00	8,081.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Niobrara C										
8,200.00	0.00	0.00	8,109.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,247.96	0.00	0.00	8,157.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Niobrara D										
8,300.00	0.00	0.00	8,209.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,367.96	0.00	0.00	8,277.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Fort Hays Limestone										
8,400.00	0.00	0.00	8,309.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,440.96	0.00	0.00	8,350.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Greenhorn Limestone										
8,500.00	0.00	0.00	8,409.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,600.00	0.00	0.00	8,509.04	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
8,675.96	0.00	0.00	8,585.00	-842.46	-234.74	874.55	0.00	0.00	0.00	0.00
Total Depth 8675.96 ft										

Plan Report for Beaver 5-65 34-35 2H - Rev B0

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,600.00	2,600.00	0.00	0.00	Begin Nudge @ 2600.00 ft
3,453.33	3,446.25	-91.44	-25.48	End Nudge @ 3453.33 ft
6,543.88	6,460.00	-751.02	-209.26	Begin Drop @ 6543.88 ft
7,397.22	7,306.25	-842.46	-234.74	End Drop @ 7397.22 ft
8,675.96	8,585.00	-842.46	-234.74	Total Depth 8675.96 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/-S (usft)	+E/-W (usft)	
Target	Beaver 5-65 34-35 2H (Pilot) Rev B0_BHL Tgt	195.57	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	2,521.00	Rev B0	NS-GYRO-MS
2,521.00	8,675.96	Rev B0	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,521.00	2,521.00	9 5/8" Casing Pt.	9-5/8	13-1/2

Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
2,054.00	2,054.00	Fox Hills			
2,321.00	2,321.00	Pierre Shale			
2,521.00	2,521.00	Surface Casing			
7,975.96	7,885.00	Sharon Springs			
8,048.96	7,958.00	Niobrara			
8,169.96	8,079.00	Niobrara B			
8,171.96	8,081.00	Niobrara C			
8,247.96	8,157.00	Niobrara D			
8,367.96	8,277.00	Fort Hays Limestone			
8,440.96	8,350.00	Greenhorn Limestone			

Plan Report for Beaver 5-65 34-35 2H - Rev B0

Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
PANCOST STATE #1_SB	0.00	-1,815.78	1,491.28	Circle
Beaver 5-65 34-35 2H_SB	0.00	0.00	0.00	Polygon
COAL-BUTTE-STATE #1-34_SB	0.00	697.84	-3,718.25	Circle
KISSINGER-STATE #7-35_SB	0.00	-610.12	284.71	Circle
Beaver 5-65 34-35 2H_SL	0.00	0.00	0.00	Polygon
LOWRY-STATE #1-35_SB	0.00	777.76	1,679.99	Circle
ANDERSON-BYRNE #1_SB	0.00	597.19	-9,102.16	Circle
Beaver 5-65 34-35 2H (Pilot) Rev B0_BHL Tgt	8,585.00	-842.46	-234.74	Point

Directional Difficulty Index

Average Dogleg over Survey:	0.30 °/100usft	Maximum Dogleg over Survey:	1.50 °/100usft at 3,453.33 usft
Net Tortousity applicable to Plans:	0.30 °/100usft	Directional Difficulty Index:	4.728

Audit Info

North Reference Sheet for Sec. 35-T5S-R65W - Beaver 5-65 34-35 2H - Plan B
(Pilot)

All data is in US Feet unless otherwise stated. Directions and Coordinates are relative to True North Reference .
Vertical Depths are relative to KB 24 ft @ 6110.60usft (H&P 280). Northing and Easting are relative to Beaver 5-65 34-35 2H
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 -105.50°, Longitude Origin:0° 0' 0.000 E°, Latitude Origin:39° 45' 0.000 N°
False Easting: 3,000,000.00usft, False Northing: 1,000,000.00usft, Scale Reduction: 0.99997030

Grid Coordinates of Well: 1,636,075.51 usft N, 3,244,848.99 usft E
Geographical Coordinates of Well: 39° 34' 35.76" N, 104° 37' 52.86" W
Grid Convergence at Surface is: 0.55°

Based upon Minimum Curvature type calculations, at a Measured Depth of 8,675.96usft
the Bottom Hole Displacement is 874.55usft in the Direction of 195.57° (True).
Magnetic Convergence at surface is: -7.80° (29 January 2015, , BGGM2014)

