

# Conoco Phillips Company

Arapahoe County, Colorado

Sec. 12-T5S-R65W

State Harvard-1H

Plan A (Lateral)

Plan: Rev A1

## Sperry Drilling Services

### Proposal Report

02 November, 2013

Well Coordinates: 1,657,802.06 N, 3,249,865.88 E (39° 38' 10.00" N, 104° 36' 46.08" W)

Ground Level: 5,862.00 usft

Local Coordinate Origin:

Viewing Datum:

TVDs to System:

North Reference:

Unit System:

Geodetic Scale Factor Applied

Version: 5000.1 Build: 70

Centered on Well State Harvard-1H

KB 24 ft @ 5886.00usft (H&P 280)

N

True

API - US Survey Feet - Custom

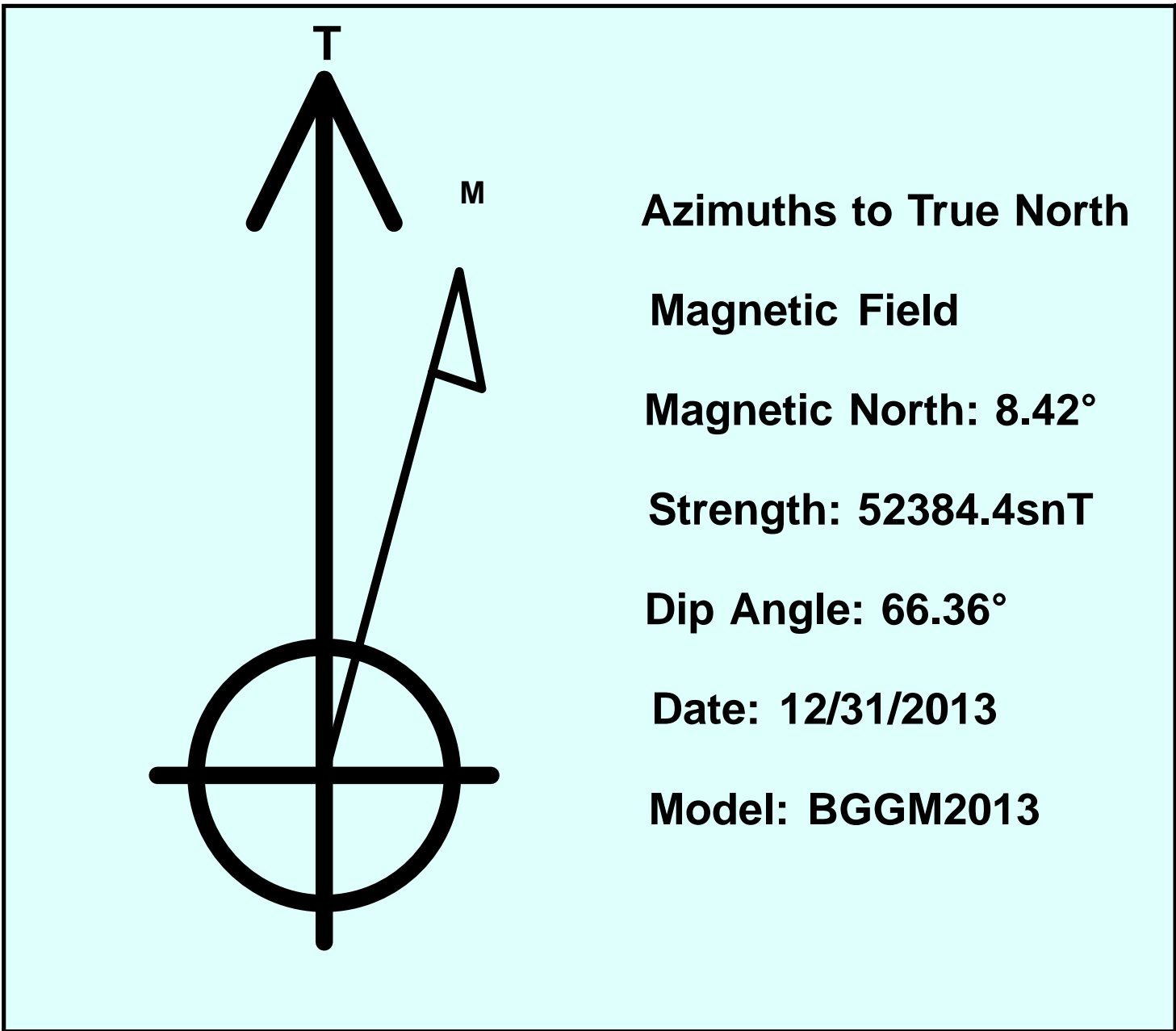
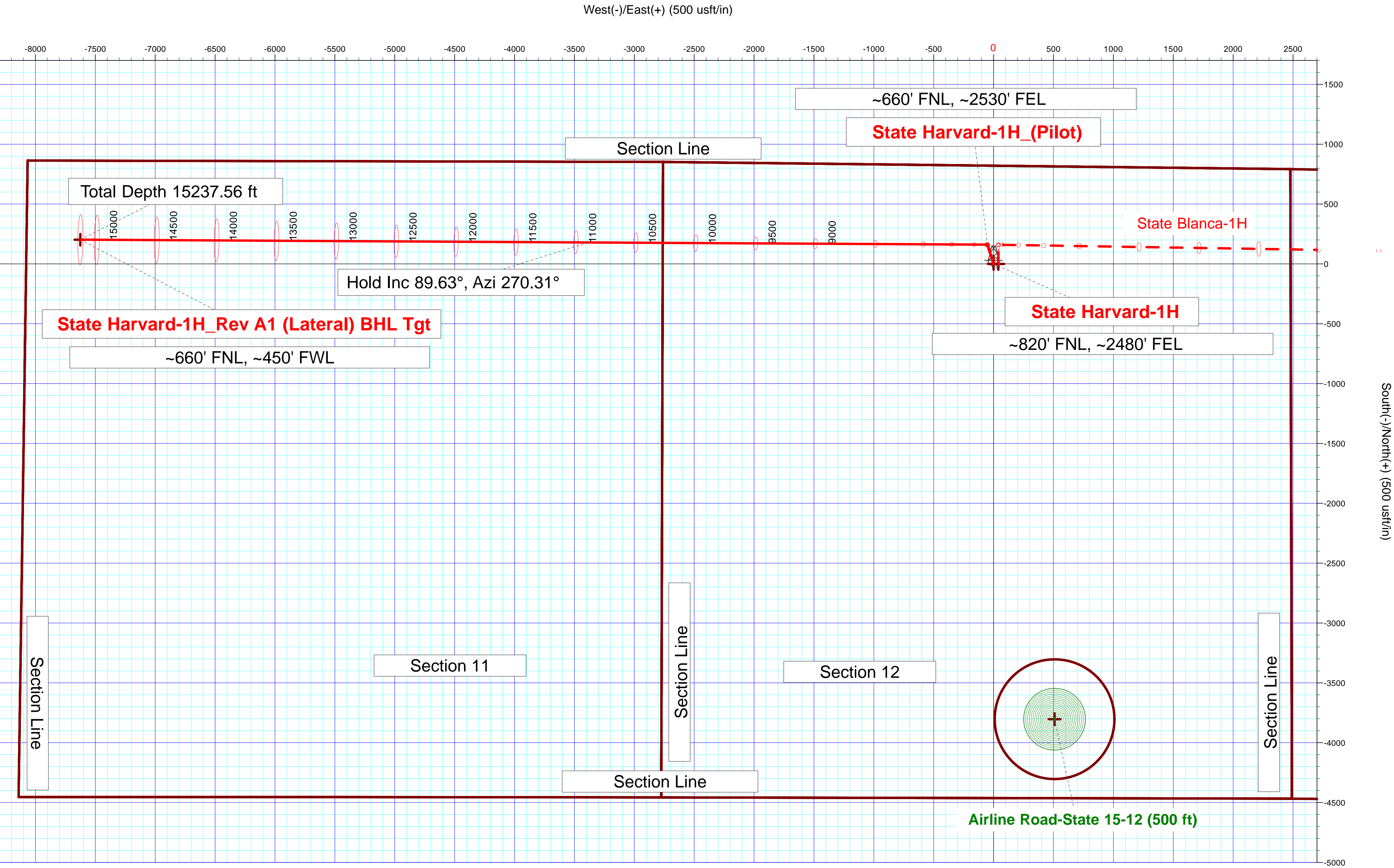
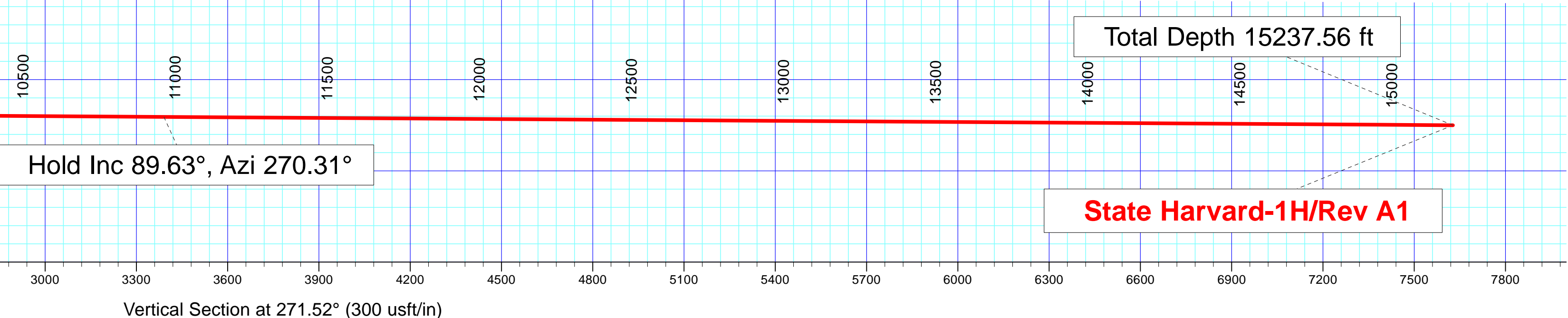
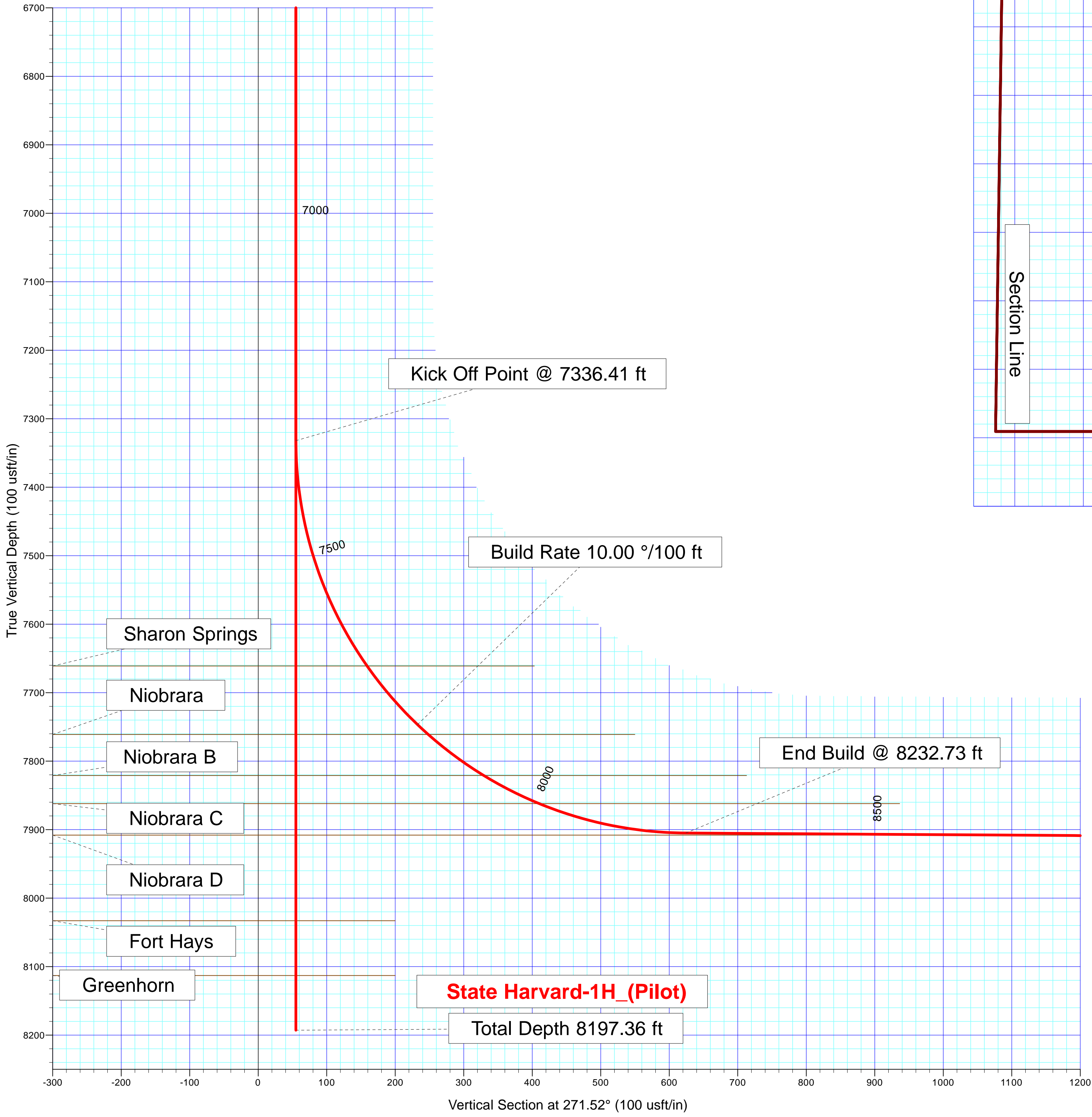
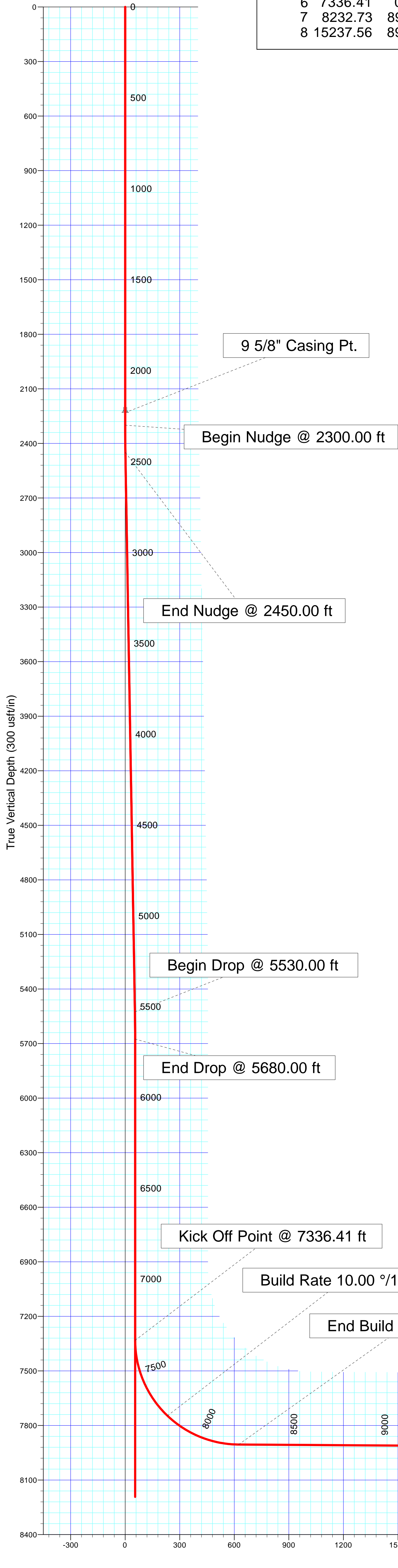
**HALLIBURTON**

Project: Arapahoe County, Colorado  
Site: Sec. 12-T5S-R65W  
Well: State Harvard-1H  
Wellbore: Plan A (Lateral)  
Plan: Rev A1

Conoco Phillips Company



SECTION DETAILS											
Sec	MD	Inc	Azi	TVD	+N/-S	+E/-W	Dleg	TFace	VSec	Target	
1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00		
2	2300.00	0.00	0.00	2300.00	0.00	0.00	0.00	0.00	0.00		
3	2450.00	3.00	342.50	2449.93	3.74	-1.18	2.00	342.50	1.28		
4	5530.00	3.00	342.50	5525.71	157.48	-49.65	0.00	0.00	53.82		
5	5680.00	0.00	0.00	5675.64	161.22	-50.83	2.00	180.00	55.10		
6	7336.41	0.00	0.00	7332.05	161.22	-50.83	0.00	0.00	55.10		
7	8232.73	89.63	270.31	7905.00	164.33	-620.10	10.00	270.31	624.25		
8	15237.56	89.63	270.31	7950.00	202.50	-7624.68	0.00	0.00	7627.37	State Harvard-1H_Rev A1 (Lateral) BHL Tgt	



Plan: Rev A1 (State Harvard-1H/Plan A (Lateral))	
Created By: Kansa B. Becker	Date: 13:46, November 02 2013
Checked: _____	Date: _____
Reviewed: _____	Date: _____
Approved: _____	Date: _____

## Plan Report for State Harvard-1H - Rev A1

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
1,881.00	0.00	0.00	1,881.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Fox Hills										
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
2,031.00	0.00	0.00	2,031.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Pierre Shale										
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
2,231.00	0.00	0.00	2,231.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
9 5/8" Casing Pt.										
2,300.00	0.00	0.00	2,300.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Begin Nudge @ 2300.00 ft										
2,400.00	2.00	342.50	2,399.98	1.66	-0.52	0.57	2.00	2.00	0.00	342.50
2,450.00	3.00	342.50	2,449.93	3.74	-1.18	1.28	2.00	2.00	0.00	0.00
End Nudge @ 2450.00 ft										
2,500.00	3.00	342.50	2,499.86	6.24	-1.97	2.13	0.00	0.00	0.00	0.00
2,600.00	3.00	342.50	2,599.73	11.23	-3.54	3.84	0.00	0.00	0.00	0.00
2,700.00	3.00	342.50	2,699.59	16.22	-5.12	5.54	0.00	0.00	0.00	0.00
2,800.00	3.00	342.50	2,799.45	21.21	-6.69	7.25	0.00	0.00	0.00	0.00
2,900.00	3.00	342.50	2,899.31	26.21	-8.26	8.96	0.00	0.00	0.00	0.00
3,000.00	3.00	342.50	2,999.18	31.20	-9.84	10.66	0.00	0.00	0.00	0.00
3,100.00	3.00	342.50	3,099.04	36.19	-11.41	12.37	0.00	0.00	0.00	0.00
3,200.00	3.00	342.50	3,198.90	41.18	-12.98	14.07	0.00	0.00	0.00	0.00
3,300.00	3.00	342.50	3,298.77	46.17	-14.56	15.78	0.00	0.00	0.00	0.00
3,400.00	3.00	342.50	3,398.63	51.16	-16.13	17.48	0.00	0.00	0.00	0.00
3,500.00	3.00	342.50	3,498.49	56.15	-17.71	19.19	0.00	0.00	0.00	0.00
3,600.00	3.00	342.50	3,598.36	61.15	-19.28	20.90	0.00	0.00	0.00	0.00
3,700.00	3.00	342.50	3,698.22	66.14	-20.85	22.60	0.00	0.00	0.00	0.00
3,800.00	3.00	342.50	3,798.08	71.13	-22.43	24.31	0.00	0.00	0.00	0.00
3,900.00	3.00	342.50	3,897.94	76.12	-24.00	26.01	0.00	0.00	0.00	0.00
4,000.00	3.00	342.50	3,997.81	81.11	-25.57	27.72	0.00	0.00	0.00	0.00
4,100.00	3.00	342.50	4,097.67	86.10	-27.15	29.42	0.00	0.00	0.00	0.00
4,200.00	3.00	342.50	4,197.53	91.09	-28.72	31.13	0.00	0.00	0.00	0.00
4,300.00	3.00	342.50	4,297.40	96.08	-30.30	32.84	0.00	0.00	0.00	0.00
4,400.00	3.00	342.50	4,397.26	101.08	-31.87	34.54	0.00	0.00	0.00	0.00
4,500.00	3.00	342.50	4,497.12	106.07	-33.44	36.25	0.00	0.00	0.00	0.00
4,600.00	3.00	342.50	4,596.98	111.06	-35.02	37.95	0.00	0.00	0.00	0.00
4,700.00	3.00	342.50	4,696.85	116.05	-36.59	39.66	0.00	0.00	0.00	0.00
4,800.00	3.00	342.50	4,796.71	121.04	-38.16	41.36	0.00	0.00	0.00	0.00

## Plan Report for State Harvard-1H - Rev A1

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	3.00	342.50	4,896.57	126.03	-39.74	43.07	0.00	0.00	0.00	0.00
5,000.00	3.00	342.50	4,996.44	131.02	-41.31	44.78	0.00	0.00	0.00	0.00
5,100.00	3.00	342.50	5,096.30	136.02	-42.89	46.48	0.00	0.00	0.00	0.00
5,200.00	3.00	342.50	5,196.16	141.01	-44.46	48.19	0.00	0.00	0.00	0.00
5,300.00	3.00	342.50	5,296.03	146.00	-46.03	49.89	0.00	0.00	0.00	0.00
5,400.00	3.00	342.50	5,395.89	150.99	-47.61	51.60	0.00	0.00	0.00	0.00
5,500.00	3.00	342.50	5,495.75	155.98	-49.18	53.30	0.00	0.00	0.00	0.00
5,530.00	3.00	342.50	5,525.71	157.48	-49.65	53.82	0.00	0.00	0.00	0.00
<b>Begin Drop @ 5530.00 ft</b>										
5,600.00	1.60	342.50	5,595.65	160.16	-50.50	54.73	2.00	-2.00	0.00	180.00
5,680.00	0.00	0.00	5,675.64	161.22	-50.83	55.10	2.00	-2.00	0.00	180.00
<b>End Drop @ 5680.00 ft</b>										
5,700.00	0.00	0.00	5,695.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
5,800.00	0.00	0.00	5,795.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
5,900.00	0.00	0.00	5,895.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,000.00	0.00	0.00	5,995.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,100.00	0.00	0.00	6,095.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,200.00	0.00	0.00	6,195.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,300.00	0.00	0.00	6,295.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,400.00	0.00	0.00	6,395.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,500.00	0.00	0.00	6,495.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,600.00	0.00	0.00	6,595.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,700.00	0.00	0.00	6,695.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,800.00	0.00	0.00	6,795.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
6,900.00	0.00	0.00	6,895.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
7,000.00	0.00	0.00	6,995.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
7,100.00	0.00	0.00	7,095.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
7,200.00	0.00	0.00	7,195.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
7,300.00	0.00	0.00	7,295.64	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
7,336.41	0.00	0.00	7,332.05	161.22	-50.83	55.10	0.00	0.00	0.00	0.00
<b>Kick Off Point @ 7336.41 ft</b>										
7,400.00	6.36	270.31	7,395.51	161.24	-54.36	58.62	10.00	10.00	0.00	270.31
7,500.00	16.36	270.31	7,493.43	161.35	-74.03	78.29	10.00	10.00	0.00	0.00
7,600.00	26.36	270.31	7,586.44	161.55	-110.40	114.65	10.00	10.00	0.00	0.00
7,686.79	35.04	270.31	7,661.00	161.79	-154.67	158.91	10.00	10.00	0.00	0.00
<b>Sharon Springs</b>										
7,700.00	36.36	270.31	7,671.73	161.83	-162.38	166.62	10.00	10.00	0.00	0.00
7,800.00	46.36	270.31	7,746.69	162.19	-228.37	232.60	10.00	10.00	0.00	0.00
<b>Build Rate 10.00 °/100 ft</b>										
7,821.15	48.47	270.31	7,761.00	162.28	-243.94	248.17	10.00	10.00	0.00	0.00
<b>Niobrara</b>										
7,900.00	56.36	270.31	7,809.05	162.62	-306.38	310.59	10.00	10.00	0.00	0.00
7,922.22	58.58	270.31	7,821.00	162.72	-325.11	329.31	10.00	10.00	0.00	0.00
<b>Niobrara B</b>										
8,000.00	66.36	270.31	7,856.92	163.09	-394.03	398.22	10.00	10.00	0.00	0.00
8,013.00	67.66	270.31	7,862.00	163.16	-405.99	410.18	10.00	10.00	0.00	0.00
<b>Niobrara C</b>										
8,100.00	76.36	270.31	7,888.85	163.61	-488.66	492.83	10.00	10.00	0.00	0.00
8,200.00	86.36	270.31	7,903.85	164.15	-587.40	591.55	10.00	10.00	0.00	0.00
8,232.73	89.63	270.31	7,905.00	164.33	-620.10	624.25	10.00	10.00	0.00	0.00
<b>End Build @ 8232.73 ft</b>										
8,300.00	89.63	270.31	7,905.43	164.69	-687.37	691.50	0.00	0.00	0.00	0.00
8,400.00	89.63	270.31	7,906.07	165.24	-787.37	791.48	0.00	0.00	0.00	0.00
8,500.00	89.63	270.31	7,906.71	165.78	-887.37	891.45	0.00	0.00	0.00	0.00
8,600.00	89.63	270.31	7,907.36	166.33	-987.36	991.43	0.00	0.00	0.00	0.00
8,700.00	89.63	270.31	7,908.00	166.87	-1,087.36	1,091.41	0.00	0.00	0.00	0.00
8,700.30	89.63	270.31	7,908.00	166.87	-1,087.66	1,091.71	0.00	0.00	0.00	0.00
<b>Niobrara D</b>										

## Plan Report for State Harvard-1H - Rev A1

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 (°)
8,800.00	89.63	270.31	7,908.64	167.42	-1,187.35	1,191.38	0.00	0.00	0.00	0.00
8,900.00	89.63	270.31	7,909.28	167.96	-1,287.35	1,291.36	0.00	0.00	0.00	0.00
9,000.00	89.63	270.31	7,909.93	168.51	-1,387.35	1,391.33	0.00	0.00	0.00	0.00
9,100.00	89.63	270.31	7,910.57	169.05	-1,487.34	1,491.31	0.00	0.00	0.00	0.00
9,200.00	89.63	270.31	7,911.21	169.60	-1,587.34	1,591.28	0.00	0.00	0.00	0.00
9,300.00	89.63	270.31	7,911.85	170.14	-1,687.34	1,691.26	0.00	0.00	0.00	0.00
9,400.00	89.63	270.31	7,912.50	170.69	-1,787.33	1,791.23	0.00	0.00	0.00	0.00
9,500.00	89.63	270.31	7,913.14	171.23	-1,887.33	1,891.21	0.00	0.00	0.00	0.00
9,600.00	89.63	270.31	7,913.78	171.78	-1,987.33	1,991.19	0.00	0.00	0.00	0.00
9,700.00	89.63	270.31	7,914.42	172.32	-2,087.32	2,091.16	0.00	0.00	0.00	0.00
9,800.00	89.63	270.31	7,915.07	172.87	-2,187.32	2,191.14	0.00	0.00	0.00	0.00
9,900.00	89.63	270.31	7,915.71	173.41	-2,287.32	2,291.11	0.00	0.00	0.00	0.00
10,000.00	89.63	270.31	7,916.35	173.96	-2,387.31	2,391.09	0.00	0.00	0.00	0.00
10,100.00	89.63	270.31	7,916.99	174.50	-2,487.31	2,491.06	0.00	0.00	0.00	0.00
10,200.00	89.63	270.31	7,917.64	175.05	-2,587.30	2,591.04	0.00	0.00	0.00	0.00
10,300.00	89.63	270.31	7,918.28	175.59	-2,687.30	2,691.02	0.00	0.00	0.00	0.00
10,400.00	89.63	270.31	7,918.92	176.14	-2,787.30	2,790.99	0.00	0.00	0.00	0.00
10,500.00	89.63	270.31	7,919.56	176.68	-2,887.29	2,890.97	0.00	0.00	0.00	0.00
10,600.00	89.63	270.31	7,920.21	177.23	-2,987.29	2,990.94	0.00	0.00	0.00	0.00
10,700.00	89.63	270.31	7,920.85	177.77	-3,087.29	3,090.92	0.00	0.00	0.00	0.00
10,800.00	89.63	270.31	7,921.49	178.32	-3,187.28	3,190.89	0.00	0.00	0.00	0.00
10,900.00	89.63	270.31	7,922.13	178.86	-3,287.28	3,290.87	0.00	0.00	0.00	0.00
11,000.00	89.63	270.31	7,922.77	179.41	-3,387.28	3,390.85	0.00	0.00	0.00	0.00
Hold Inc 89.63°, Azi 270.31°										
11,100.00	89.63	270.31	7,923.42	179.95	-3,487.27	3,490.82	0.00	0.00	0.00	0.00
11,200.00	89.63	270.31	7,924.06	180.49	-3,587.27	3,590.80	0.00	0.00	0.00	0.00
11,300.00	89.63	270.31	7,924.70	181.04	-3,687.27	3,690.77	0.00	0.00	0.00	0.00
11,400.00	89.63	270.31	7,925.34	181.58	-3,787.26	3,790.75	0.00	0.00	0.00	0.00
11,500.00	89.63	270.31	7,925.99	182.13	-3,887.26	3,890.72	0.00	0.00	0.00	0.00
11,600.00	89.63	270.31	7,926.63	182.67	-3,987.26	3,990.70	0.00	0.00	0.00	0.00
11,700.00	89.63	270.31	7,927.27	183.22	-4,087.25	4,090.68	0.00	0.00	0.00	0.00
11,800.00	89.63	270.31	7,927.91	183.76	-4,187.25	4,190.65	0.00	0.00	0.00	0.00
11,900.00	89.63	270.31	7,928.56	184.31	-4,287.24	4,290.63	0.00	0.00	0.00	0.00
12,000.00	89.63	270.31	7,929.20	184.85	-4,387.24	4,390.60	0.00	0.00	0.00	0.00
12,100.00	89.63	270.31	7,929.84	185.40	-4,487.24	4,490.58	0.00	0.00	0.00	0.00
12,200.00	89.63	270.31	7,930.48	185.94	-4,587.23	4,590.55	0.00	0.00	0.00	0.00
12,300.00	89.63	270.31	7,931.13	186.49	-4,687.23	4,690.53	0.00	0.00	0.00	0.00
12,400.00	89.63	270.31	7,931.77	187.03	-4,787.23	4,790.50	0.00	0.00	0.00	0.00
12,500.00	89.63	270.31	7,932.41	187.58	-4,887.22	4,890.48	0.00	0.00	0.00	0.00
12,600.00	89.63	270.31	7,933.05	188.12	-4,987.22	4,990.46	0.00	0.00	0.00	0.00
12,700.00	89.63	270.31	7,933.70	188.67	-5,087.22	5,090.43	0.00	0.00	0.00	0.00
12,800.00	89.63	270.31	7,934.34	189.21	-5,187.21	5,190.41	0.00	0.00	0.00	0.00
12,900.00	89.63	270.31	7,934.98	189.76	-5,287.21	5,290.38	0.00	0.00	0.00	0.00
13,000.00	89.63	270.31	7,935.62	190.30	-5,387.21	5,390.36	0.00	0.00	0.00	0.00
13,100.00	89.63	270.31	7,936.27	190.85	-5,487.20	5,490.33	0.00	0.00	0.00	0.00
13,200.00	89.63	270.31	7,936.91	191.39	-5,587.20	5,590.31	0.00	0.00	0.00	0.00
13,300.00	89.63	270.31	7,937.55	191.94	-5,687.19	5,690.29	0.00	0.00	0.00	0.00
13,400.00	89.63	270.31	7,938.19	192.48	-5,787.19	5,790.26	0.00	0.00	0.00	0.00
13,500.00	89.63	270.31	7,938.84	193.03	-5,887.19	5,890.24	0.00	0.00	0.00	0.00
13,600.00	89.63	270.31	7,939.48	193.57	-5,987.18	5,990.21	0.00	0.00	0.00	0.00
13,700.00	89.63	270.31	7,940.12	194.12	-6,087.18	6,090.19	0.00	0.00	0.00	0.00
13,800.00	89.63	270.31	7,940.76	194.66	-6,187.18	6,190.16	0.00	0.00	0.00	0.00
13,900.00	89.63	270.31	7,941.41	195.21	-6,287.17	6,290.14	0.00	0.00	0.00	0.00
14,000.00	89.63	270.31	7,942.05	195.75	-6,387.17	6,390.12	0.00	0.00	0.00	0.00
14,100.00	89.63	270.31	7,942.69	196.30	-6,487.17	6,490.09	0.00	0.00	0.00	0.00
14,200.00	89.63	270.31	7,943.33	196.84	-6,587.16	6,590.07	0.00	0.00	0.00	0.00
14,300.00	89.63	270.31	7,943.98	197.39	-6,687.16	6,690.04	0.00	0.00	0.00	0.00
14,400.00	89.63	270.31	7,944.62	197.93	-6,787.16	6,790.02	0.00	0.00	0.00	0.00
14,500.00	89.63	270.31	7,945.26	198.48	-6,887.15	6,889.99	0.00	0.00	0.00	0.00
14,600.00	89.63	270.31	7,945.90	199.02	-6,987.15	6,989.97	0.00	0.00	0.00	0.00



## Plan Report for State Harvard-1H - Rev A1

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 (°)
14,700.00	89.63	270.31	7,946.55	199.57	-7,087.15	7,089.95	0.00	0.00	0.00	0.00
14,800.00	89.63	270.31	7,947.19	200.11	-7,187.14	7,189.92	0.00	0.00	0.00	0.00
14,900.00	89.63	270.31	7,947.83	200.66	-7,287.14	7,289.90	0.00	0.00	0.00	0.00
15,000.00	89.63	270.31	7,948.47	201.20	-7,387.13	7,389.87	0.00	0.00	0.00	0.00
15,100.00	89.63	270.31	7,949.12	201.75	-7,487.13	7,489.85	0.00	0.00	0.00	0.00
15,200.00	89.63	270.31	7,949.76	202.29	-7,587.13	7,589.82	0.00	0.00	0.00	0.00
15,237.56	89.63	270.31	7,950.00	202.50	-7,624.68	7,627.37	0.00	0.00	0.00	0.00
Total Depth 15237.56 ft										

Plan Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,300.00	2,300.00	0.00	0.00	Begin Nudge @ 2300.00 ft
2,450.00	2,449.93	3.74	-1.18	End Nudge @ 2450.00 ft
5,530.00	5,525.71	157.48	-49.65	Begin Drop @ 5530.00 ft
5,680.00	5,675.64	161.22	-50.83	End Drop @ 5680.00 ft
7,336.41	7,332.05	161.22	-50.83	Kick Off Point @ 7336.41 ft
7,800.00	7,746.69	162.19	-228.37	Build Rate 10.00 °/100 ft
8,232.73	7,905.00	164.33	-620.10	End Build @ 8232.73 ft
11,000.00	7,922.77	179.41	-3,387.28	Hold Inc 89.63°, Azi 270.31°
15,237.56	7,950.00	202.50	-7,624.68	Total Depth 15237.56 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
Target	State Harvard-1H_Rev A1 (Lateral) BHL Tgt	271.52	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
0.00	2,231.00	Rev A1	NSG-CT_D/P
2,231.00	15,237.56	Rev A1	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,231.00	2,231.00	9 5/8" Casing Pt.	9-5/8	13-1/2

## Plan Report for State Harvard-1H - Rev A1

### Formation Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Lithology	Dip (°)	Dip Direction (°)
1,881.00	1,881.00	Fox Hills			
2,031.00	2,031.00	Pierre Shale			
7,686.79	7,661.00	Sharon Springs			
7,821.15	7,761.00	Niobrara			
7,922.22	7,821.00	Niobrara B			
8,013.00	7,862.00	Niobrara C			
8,700.30	7,908.00	Niobrara D			

### Targets associated with this wellbore

Target Name	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Shape
Airline Road-State 15-12 (500 ft)	0.00	-3,803.40	509.07	Circle
State Harvard-1H_SL	0.00	0.00	0.00	Polygon
State Blanca-1H_SL	0.00	0.00	39.90	Polygon
Texaco-Chandler St. of CO 'AB' 2 (500 ft)	0.00	-2,530.74	7,106.44	Circle
State Harvard-1H_Rev A1 (Lateral) BHL Tgt	7,950.00	202.50	-7,624.68	Point

### Directional Difficulty Index

Average Dogleg over Survey:	0.63 °/100usft	Maximum Dogleg over Survey:	10.00 °/100usft at 8,232.73 usft
Net Tortousity applicable to Plans:	0.63 °/100usft	Directional Difficulty Index:	6.391

### Audit Info

North Reference Sheet for Sec. 12-T5S-R65W - State Harvard-1H - Plan A (Lateral)

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 @ 5886.00usft (H&P 280). Northing and Easting are relative to State Harvard-1H  
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: 0.99997945

Grid Coordinates of Well: 1,657,802.06 usft N, 3,249,865.88 usft E  
Geographical Coordinates of Well: 39° 38' 10.00" N, 104° 36' 46.08" W  
Grid Convergence at Surface is: 0.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,237.56usft  
the Bottom Hole Displacement is 7,627.37usft in the Direction of 271.52° ( True).  
Magnetic Convergence at surface is: -7.86° (31 December 2013, , BGGM2013)

