

Conoco Phillips Company

Arapahoe County, Colorado

Sec. 12-T5S-R65W

State Blanca-1H

Plan D

Design: Actual Field Surveys

Sperry Drilling Services

Standard Report

09 July, 2014

Well Coordinates: 1,657,802.42 N, 3,249,905.78 E (39° 38' 10.00" N, 104° 36' 45.57" 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 Blanca-1H

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

N

True

API - US Survey Feet - Custom

HALLIBURTON

Design Report for State Blanca-1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
2,209.00	0.89	146.64	2,208.67	-27.95	24.79	37.36	0.07
Tie-On to Gyro Surveys @ 2209.00 ft							
2,301.00	1.21	145.56	2,300.66	-29.35	25.73	39.03	0.35
First Sperry MWD Survey @ 2301.00 ft							
2,396.00	0.67	44.27	2,395.65	-29.78	26.69	39.98	1.57
2,491.00	2.43	356.86	2,490.61	-27.37	26.96	38.37	2.14
2,585.00	2.73	358.26	2,584.52	-23.14	26.79	35.09	0.33
2,679.00	3.28	356.21	2,678.39	-18.22	26.54	31.24	0.60
2,774.00	3.76	354.65	2,773.21	-12.41	26.07	26.58	0.52
2,868.00	3.99	354.05	2,866.99	-6.08	25.44	21.44	0.25
2,962.00	3.96	352.73	2,960.77	0.39	24.69	16.10	0.10
3,057.00	3.84	350.71	3,055.55	6.78	23.77	10.70	0.19
3,151.00	3.07	349.93	3,149.38	12.37	22.82	5.89	0.82
3,246.00	2.96	344.99	3,244.25	17.24	21.74	1.53	0.30
3,340.00	3.07	344.63	3,338.11	22.01	20.44	-2.90	0.12
3,434.00	3.10	344.97	3,431.98	26.89	19.12	-7.44	0.04
3,528.00	3.81	358.94	3,525.81	32.47	18.40	-12.08	1.17
3,623.00	4.12	0.52	3,620.58	39.04	18.37	-17.02	0.35
3,717.00	2.83	349.54	3,714.41	44.70	17.98	-21.51	1.54
3,812.00	2.73	349.63	3,809.30	49.23	17.15	-25.45	0.11
3,906.00	3.42	347.13	3,903.16	54.17	16.12	-29.83	0.75
4,001.00	3.66	344.23	3,997.98	59.85	14.66	-35.04	0.32
4,095.00	3.63	350.31	4,091.79	65.67	13.35	-40.27	0.41
4,190.00	3.59	352.01	4,186.60	71.58	12.43	-45.30	0.12
4,284.00	3.60	348.86	4,280.42	77.39	11.45	-50.30	0.21
4,379.00	3.57	347.61	4,375.23	83.20	10.24	-55.45	0.09
4,473.00	3.41	343.56	4,469.06	88.74	8.82	-60.54	0.31
4,568.00	3.20	2.45	4,563.90	94.10	8.13	-65.00	1.16
4,662.00	3.17	2.21	4,657.75	99.32	8.35	-68.77	0.03
4,757.00	3.14	350.34	4,752.61	104.51	8.01	-72.87	0.69
4,851.00	2.77	348.34	4,846.49	109.27	7.12	-77.02	0.41
4,946.00	2.72	5.64	4,941.38	113.76	6.88	-80.55	0.87
5,040.00	3.55	6.72	5,035.24	118.87	7.44	-84.00	0.89
5,134.00	3.38	359.11	5,129.07	124.53	7.73	-88.03	0.52
5,229.00	2.85	354.36	5,223.93	129.68	7.46	-92.07	0.62
5,323.00	2.44	353.60	5,317.83	134.00	7.01	-95.60	0.44
5,418.00	3.55	351.66	5,412.69	138.92	6.35	-99.71	1.17
5,512.00	3.77	351.68	5,506.50	144.85	5.48	-104.73	0.23
5,607.00	3.82	353.30	5,601.29	151.09	4.66	-109.94	0.12
5,701.00	3.73	355.67	5,695.09	157.25	4.07	-114.94	0.19
5,795.00	2.13	10.56	5,788.97	162.01	4.16	-118.45	1.87
5,890.00	0.98	69.45	5,883.93	164.03	5.24	-119.24	1.92
5,984.00	0.63	247.31	5,977.93	164.12	5.52	-119.12	1.71
6,079.00	0.86	251.82	6,072.92	163.69	4.36	-119.57	0.25
6,173.00	0.89	274.34	6,166.91	163.53	2.96	-120.38	0.36
6,268.00	0.61	238.85	6,261.90	163.32	1.79	-121.00	0.56
6,363.00	0.44	189.58	6,356.90	162.70	1.30	-120.86	0.49
6,457.00	0.69	155.81	6,450.90	161.83	1.47	-120.09	0.43
6,552.00	1.10	119.07	6,545.89	160.86	2.50	-118.69	0.72

Design Report for State Blanca-1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
6,646.00	0.67	212.72	6,639.88	159.96	2.99	-117.69	1.41
6,741.00	0.72	198.48	6,734.87	158.93	2.50	-117.24	0.19
6,835.00	1.09	76.75	6,828.86	158.57	3.19	-116.52	1.69
6,929.00	1.16	69.55	6,922.85	159.11	4.95	-115.75	0.17
7,024.00	0.14	93.11	7,017.84	159.44	5.96	-115.33	1.09
7,118.00	0.38	80.19	7,111.84	159.49	6.39	-115.08	0.26
7,182.00	0.57	76.71	7,175.84	159.60	6.91	-114.82	0.30
7,213.00	0.63	59.37	7,206.83	159.72	7.20	-114.71	0.61
7,245.00	1.55	80.06	7,238.83	159.88	7.78	-114.45	3.08
7,276.00	4.49	90.60	7,269.78	159.94	9.41	-113.42	9.61
7,308.00	7.03	90.15	7,301.62	159.93	12.62	-111.27	7.94
7,339.00	9.50	89.24	7,332.29	159.96	17.07	-108.34	7.98
7,370.00	12.16	87.45	7,362.74	160.13	22.89	-104.61	8.65
7,402.00	14.31	87.52	7,393.89	160.46	30.21	-99.99	6.72
7,433.00	16.17	90.28	7,423.80	160.60	38.36	-94.70	6.44
7,465.00	17.77	93.66	7,454.40	160.27	47.69	-88.26	5.87
7,496.00	20.27	93.72	7,483.71	159.62	57.77	-81.08	8.06
7,528.00	22.62	91.64	7,513.49	159.08	69.45	-72.93	7.72
7,559.00	25.61	89.29	7,541.78	158.99	82.11	-64.46	10.13
7,591.00	28.97	88.41	7,570.22	159.29	96.78	-54.95	10.58
7,622.00	32.29	90.00	7,596.89	159.50	112.57	-44.63	11.02
7,654.00	35.12	90.89	7,623.51	159.36	130.33	-32.74	8.98
7,685.00	37.63	91.38	7,648.46	158.99	148.70	-20.27	8.15
7,717.00	41.04	90.99	7,673.21	158.58	168.98	-6.51	10.68
7,748.00	44.69	89.38	7,695.93	158.52	190.06	7.53	12.29
7,780.00	47.91	87.81	7,718.04	159.09	213.19	22.44	10.67
7,811.00	51.23	86.85	7,738.14	160.20	236.76	37.25	10.97
7,843.00	54.57	86.85	7,757.44	161.60	262.24	53.11	10.44
7,874.00	57.76	87.87	7,774.70	162.78	287.95	69.29	10.65
7,906.00	60.42	89.23	7,791.13	163.47	315.40	86.99	9.08
7,937.00	62.39	90.27	7,805.97	163.59	342.61	104.96	7.00
7,969.00	64.39	91.04	7,820.30	163.26	371.22	124.19	6.61
8,000.00	67.04	91.60	7,833.05	162.61	399.47	143.42	8.71
8,032.00	70.21	91.68	7,844.71	161.75	429.25	163.82	9.91
8,063.00	73.46	91.77	7,854.38	160.87	458.69	184.02	10.49
8,095.00	75.91	92.40	7,862.83	159.74	489.53	205.32	7.89
8,127.00	78.37	92.87	7,869.95	158.31	520.69	227.07	7.82
8,158.00	80.94	93.14	7,875.52	156.71	551.14	248.47	8.33
8,189.00	84.25	92.32	7,879.51	155.25	581.84	269.94	10.99
8,221.00	87.16	91.31	7,881.91	154.24	613.73	291.86	9.62
8,253.00	88.83	90.65	7,883.03	153.69	645.71	313.48	5.61
8,284.00	89.63	90.27	7,883.44	153.44	676.70	334.24	2.86
8,321.00	90.80	90.19	7,883.30	153.29	713.70	358.90	3.17
8,384.00	92.53	90.56	7,881.47	152.88	776.67	400.99	2.81
8,479.00	91.24	91.65	7,878.35	151.05	871.60	465.35	1.78
8,573.00	90.99	91.24	7,876.52	148.68	965.55	529.47	0.51
8,668.00	90.68	91.53	7,875.13	146.38	1,060.51	594.20	0.45
8,762.00	91.73	91.75	7,873.16	143.69	1,154.45	658.54	1.14
8,856.00	90.56	91.36	7,871.28	141.14	1,248.40	722.79	1.31
8,951.00	89.63	90.98	7,871.12	139.20	1,343.38	787.26	1.06
9,046.00	90.31	91.17	7,871.17	137.42	1,438.36	851.62	0.74

Design Report for State Blanca-1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
9,141.00	91.05	91.96	7,870.04	134.83	1,533.32	916.57	1.14
9,235.00	90.12	91.30	7,869.08	132.15	1,627.27	980.91	1.21
9,330.00	90.12	91.12	7,868.89	130.15	1,722.25	1,045.44	0.19
9,425.00	90.86	91.91	7,868.07	127.64	1,817.21	1,110.33	1.14
9,519.00	90.31	90.61	7,867.11	125.57	1,911.18	1,174.23	1.50
9,614.00	90.68	91.69	7,866.29	123.66	2,006.16	1,238.68	1.20
9,709.00	90.49	89.84	7,865.32	122.39	2,101.14	1,302.65	1.96
9,803.00	90.43	88.69	7,864.57	123.60	2,195.13	1,364.12	1.23
9,898.00	90.19	90.34	7,864.05	124.40	2,290.12	1,426.55	1.76
9,993.00	90.31	90.89	7,863.64	123.38	2,385.11	1,490.34	0.59
10,088.00	90.62	90.12	7,862.87	122.55	2,480.11	1,554.00	0.87
10,183.00	89.81	89.80	7,862.51	122.61	2,575.10	1,616.99	0.92
10,278.00	90.49	89.62	7,862.26	123.09	2,670.10	1,679.67	0.74
10,372.00	89.45	89.47	7,862.31	123.84	2,764.10	1,741.48	1.12
10,467.00	90.00	89.19	7,862.77	124.95	2,859.09	1,803.68	0.65
10,562.00	90.37	91.31	7,862.46	124.54	2,954.08	1,867.02	2.27
10,657.00	91.30	91.42	7,861.08	122.27	3,049.05	1,931.73	0.99
10,752.00	90.99	91.15	7,859.18	120.14	3,144.00	1,996.33	0.43
10,847.00	91.67	91.25	7,856.97	118.16	3,238.95	2,060.82	0.72
10,942.00	89.38	92.07	7,856.10	115.40	3,333.90	2,125.89	2.56
11,036.00	89.20	91.90	7,857.27	112.15	3,427.84	2,190.65	0.26
11,131.00	89.51	92.02	7,858.34	108.90	3,522.78	2,256.08	0.35
11,226.00	90.31	91.69	7,858.49	105.82	3,617.73	2,321.39	0.91
11,320.00	90.56	91.29	7,857.77	103.38	3,711.69	2,385.57	0.50
11,415.00	89.20	90.47	7,857.97	101.92	3,806.68	2,449.69	1.67
11,509.00	90.37	91.37	7,858.33	100.41	3,900.66	2,513.18	1.57
11,604.00	89.81	91.17	7,858.18	98.31	3,995.64	2,577.78	0.63
11,698.00	90.00	90.55	7,858.33	96.89	4,089.63	2,641.20	0.69
11,792.00	91.48	90.54	7,857.12	96.00	4,183.61	2,704.23	1.57
11,887.00	91.17	90.80	7,854.92	94.89	4,278.58	2,768.08	0.43
11,981.00	92.72	90.77	7,851.73	93.60	4,372.52	2,831.37	1.65
12,076.00	92.41	90.68	7,847.48	92.40	4,467.41	2,895.24	0.34
12,170.00	91.79	90.61	7,844.03	91.34	4,561.34	2,958.36	0.66
12,265.00	91.61	91.23	7,841.22	89.82	4,656.29	3,022.50	0.68
12,359.00	90.56	91.29	7,839.44	87.75	4,750.25	3,086.39	1.12
12,454.00	90.80	91.40	7,838.31	85.52	4,845.21	3,151.08	0.28
12,548.00	91.36	91.10	7,836.54	83.47	4,939.18	3,214.96	0.68
12,643.00	91.11	91.36	7,834.49	81.43	5,034.13	3,279.49	0.38
12,737.00	91.48	91.35	7,832.37	79.21	5,128.08	3,343.50	0.39
12,832.00	90.68	90.93	7,830.57	77.32	5,223.04	3,407.92	0.95
12,926.00	90.62	90.81	7,829.51	75.90	5,317.03	3,471.35	0.14
13,021.00	90.00	91.32	7,828.99	74.13	5,412.01	3,535.70	0.85
13,115.00	91.30	91.25	7,827.93	72.02	5,505.98	3,599.63	1.38
13,210.00	90.74	89.89	7,826.24	71.08	5,600.95	3,663.36	1.55
13,304.00	90.31	90.09	7,825.38	71.09	5,694.95	3,725.72	0.50
13,398.00	91.48	89.91	7,823.91	71.09	5,788.94	3,788.08	1.26
13,493.00	90.49	90.18	7,822.27	71.02	5,883.92	3,851.17	1.08
13,587.00	89.75	90.57	7,822.08	70.40	5,977.92	3,914.00	0.89
13,681.00	91.79	91.43	7,820.81	68.76	6,071.89	3,977.58	2.36
13,776.00	89.81	90.79	7,819.49	66.92	6,166.86	4,041.97	2.19
13,870.00	90.43	90.85	7,819.29	65.58	6,260.85	4,105.35	0.66

Design Report for State Blanca-1H - Actual Field Surveys

Measured Depth (usft)	Inclination (°)	Azimuth (°)	Vertical Depth (usft)	+N/-S (usft)	+E/-W (usft)	Vertical Section (usft)	Dogleg Rate (°/100usft)
13,965.00	89.44	91.47	7,819.40	63.66	6,355.83	4,169.81	1.23
14,059.00	88.64	91.75	7,820.97	61.01	6,449.77	4,234.12	0.90
14,154.00	89.07	91.79	7,822.87	58.08	6,544.71	4,299.31	0.45
14,248.00	89.38	91.63	7,824.14	55.28	6,638.66	4,363.75	0.37
14,342.00	89.81	91.33	7,824.81	52.85	6,732.63	4,427.92	0.56
14,437.00	90.62	91.21	7,824.45	50.74	6,827.60	4,492.52	0.86
14,532.00	90.00	91.66	7,823.94	48.36	6,922.57	4,557.31	0.81
14,626.00	90.68	91.55	7,823.38	45.73	7,016.53	4,621.63	0.73
14,721.00	89.94	90.59	7,822.87	43.96	7,111.51	4,685.98	1.28
14,815.00	90.62	90.53	7,822.41	43.04	7,205.50	4,749.04	0.73
14,910.00	89.94	89.97	7,821.94	42.62	7,300.50	4,812.39	0.93
15,004.00	90.62	90.09	7,821.48	42.57	7,394.50	4,874.80	0.73
15,099.00	90.31	89.55	7,820.71	42.87	7,489.50	4,937.61	0.66
15,154.00	90.99	90.03	7,820.09	43.07	7,544.49	4,973.95	1.51
Final Sperry MWD Survey @ 15154.00 ft							
15,228.00	90.99	90.03	7,818.81	43.04	7,618.48	5,023.07	0.00
Straight Line Projection to TD @ 15228.00 ft							

Design Annotations

Measured Depth (usft)	Vertical Depth (usft)	Local Coordinates		Comment
		+N/-S (usft)	+E/-W (usft)	
2,209.00	2,208.67	-27.95	24.79	Tie-On to Gyro Surveys @ 2209.00 ft
2,301.00	2,300.66	-29.35	25.73	First Sperry MWD Survey @ 2301.00 ft
15,154.00	7,820.09	43.07	7,544.49	Final Sperry MWD Survey @ 15154.00 ft
15,228.00	7,818.81	43.04	7,618.48	Straight Line Projection to TD @ 15228.00 ft

Vertical Section Information

Angle Type	Target	Azimuth (°)	Origin Type	Origin		Start TVD (usft)
				+N/_S (usft)	+E/-W (usft)	
User	No Target (Freehand)	138.43	Slot	0.00	0.00	0.00

Survey tool program

From (usft)	To (usft)	Survey/Plan	Survey Tool
85.00	2,209.00	Surface_Gyro	NS-GYRO-MS
2,301.00	15,228.00	Vertical, Build, & Lateral_Sperry MWD Surveys	MWD

Casing Details

Measured Depth (usft)	Vertical Depth (usft)	Name	Casing Diameter (")	Hole Diameter (")
2,220.00	2,219.67	9 5/8"	9-5/8	13-1/2

Design Report for State Blanca-1H - Actual Field Surveys

Wellbore Targets

Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (usft)	+N/-S (usft)	+E/-W (usft)	Northing (usft)	Easting (usft)	Latitude	Longitude
Airline Road-State 15-	0.00	0.00	0.00	-3,801.45	486.85	1,654,005.99	3,250,429.72	39° 37' 32.430 N	104° 36' 39.348 W
- actual wellpath misses target center by 4396.71usft at 2209.00usft MD (2208.67 TVD, -27.95 N, 24.79 E)									
- Circle (radius 500.00)									
State Blanca-1H_SL	0.00	0.00	0.00	0.02	0.00	1,657,802.44	3,249,905.78	39° 38' 10.000 N	104° 36' 45.570 W
- actual wellpath misses target center by 2208.99usft at 2209.00usft MD (2208.67 TVD, -27.95 N, 24.79 E)									
- Polygon									
Point 1				0.00	792.36	2,437.65	1,658,618.56	3,252,335.52	
Point 2				0.00	-4,467.23	2,450.83	1,653,359.45	3,252,400.07	
Point 3				0.00	-4,491.98	5,075.09	1,653,360.34	3,255,024.39	
Point 4				0.00	-4,516.82	7,709.78	1,653,361.23	3,257,659.15	
Point 5				0.00	-1,910.15	7,731.81	1,655,967.94	3,257,655.72	
Point 6				0.00	696.16	7,754.40	1,658,574.29	3,257,652.85	
Point 7				0.00	741.03	5,115.74	1,658,593.39	3,255,013.93	
Point 8				0.00	792.36	2,437.65	1,658,618.56	3,252,335.52	
Point 9				0.00	852.13	-2,799.92	1,658,627.17	3,247,097.73	
Point 10				0.00	-4,456.99	-2,814.59	1,653,318.27	3,247,134.91	
Point 11				0.00	-4,467.23	2,450.83	1,653,359.45	3,252,400.07	
Texaco-Chandler St. o	0.00	0.00	0.00	-2,565.63	7,058.25	1,655,305.90	3,256,988.60	39° 37' 44.634 N	104° 35' 15.360 W
- actual wellpath misses target center by 7796.64usft at 2209.00usft MD (2208.67 TVD, -27.95 N, 24.79 E)									
- Circle (radius 500.00)									
State Blanca-1H_Rev	0.00	0.00	7,816.00	38.60	7,618.47	1,657,915.43	3,257,523.35	39° 38' 10.370 N	104° 35' 8.190 W
- actual wellpath misses target center by 5.25usft at 15228.00usft MD (7818.81 TVD, 43.04 N, 7618.48 E)									
- Point									

Directional Difficulty Index

Average Dogleg over Survey:	1.28 °/100usft	Maximum Dogleg over Survey:	12.29 °/100usft at 7,748.00 usft
Net Tortousity applicable to Plans:	0.62 °/100usft	Directional Difficulty Index:	6.473

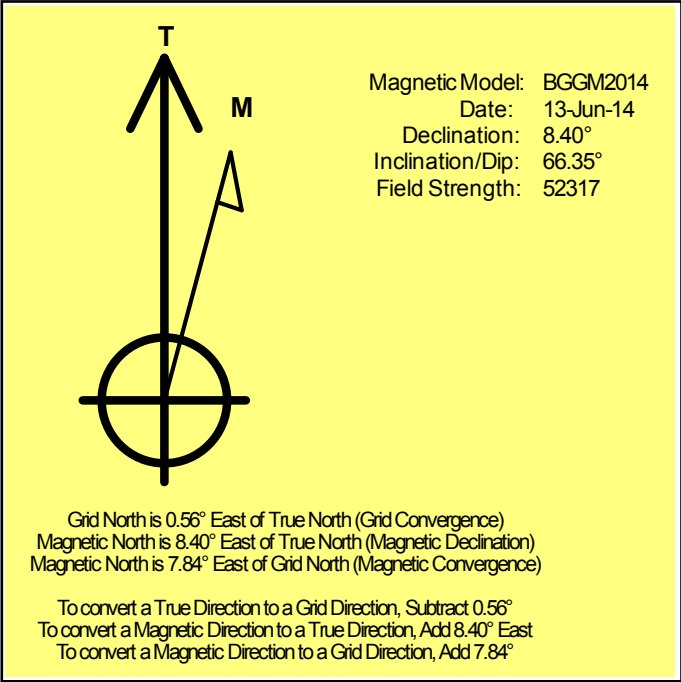
Audit Info

North Reference Sheet for Sec. 12-T5S-R65W - State Blanca-1H - Plan D

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 Blanca-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° 30' 0.000 W°, 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: 1,657,802.42 usft N, 3,249,905.78 usft E
Geographical Coordinates of Well: 39° 38' 10.00" N, 104° 36' 45.57" W
Grid Convergence at Surface is: 0.56°

Based upon Minimum Curvature type calculations, at a Measured Depth of 15,228.00usft
the Bottom Hole Displacement is 7,618.60usft in the Direction of 89.68° (True).
Magnetic Convergence at surface is: -7.84° (13 June 2014, , BGGM2014)



Project: Arapahoe County, Colorado

Site: Sec. 12-T5S-R65W

Well: State Blanca-1H

Conoco Phillips Company

HALLIBURTON

Sperry Drilling

LEGEND

- State Blanca-1H, Plan D, Rev D0
- State Blanca-1H, Surface_Gyro
- Actual Field Surveys

