



EPW_RMP

CONCEPT WELL PLANNING - COLORADO (NAD83)

North Castor Gulch 1-16

North Castor Gulch 1-16

North Castor Gulch 1-16

Plan: NCG 1-16

Standard Planning Report - Geographic

13 February, 2012





Shell EP

Planning Report - Geographic



Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well North Castor Gulch 1-16
Company:	EPW_RMP	TVD Reference:	KB @ 6997.90ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	KB @ 6997.90ft (Original Well Elev)
Site:	North Castor Gulch 1-16	North Reference:	Grid
Well:	North Castor Gulch 1-16	Survey Calculation Method:	Minimum Curvature
Wellbore:	North Castor Gulch 1-16		
Design:	NCG 1-16		

Project	CONCEPT WELL PLANNING - COLORADO (NAD83)		
Map System:	EPW NAD83	System Datum:	Mean Sea Level
Geo Datum:	NAD83 [1188_4269]		
Map Zone:	NAD83 / UTM 13N [1188_26913]		

Site	North Castor Gulch 1-16		
Site Position:		Northing:	14,680,243.23 usft
From:	Lat/Long	Easting:	914,925.05 usft
Position Uncertainty:	1.00 ft	Slot Radius:	13.200 in
		Latitude:	40° 23' 31.880 N
		Longitude:	107° 36' 19.411 W
		Grid Convergence:	-1.69 °

Well	North Castor Gulch 1-16		
Well Position	+N/-S	0.00 ft	Northing: 14,680,243.23 usft
	+E/-W	0.00 ft	Easting: 914,925.05 usft
Position Uncertainty	0.00 ft	Wellhead Elevation:	6,985.90 ft
		Latitude:	40° 23' 31.880 N
		Longitude:	107° 36' 19.411 W
		Ground Level:	6,985.90 ft

Wellbore	North Castor Gulch 1-16				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2009	1/11/2012	10.18	66.55	52,762

Design	NCG 1-16			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	210.19

Plan Sections										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)	TFO (°)	Target
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	
4,210.71	0.00	0.00	4,210.71	0.00	0.00	0.00	0.00	0.00	0.00	
5,056.86	55.00	210.49	4,932.77	-323.91	-190.71	6.50	6.50	0.00	210.49	
5,156.86	55.00	210.49	4,990.13	-394.49	-232.27	0.00	0.00	0.00	0.00	
5,527.99	90.00	210.49	5,100.00	-694.78	-409.08	9.43	9.43	0.00	0.00	NCG Heel Location
5,564.75	90.37	210.12	5,099.88	-726.52	-427.63	1.41	1.00	-1.00	-45.00	
5,782.54	92.55	210.12	5,094.35	-914.83	-536.88	1.00	1.00	0.00	0.00	
9,032.66	92.55	210.12	4,950.00	-3,723.29	-2,166.30	0.00	0.00	0.00	0.00	NCG Toe Location



Shell EP

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Company:	EPW_RMP	TVD Reference:	KB @ 6997.90ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	KB @ 6997.90ft (Original Well Elev)
Site:	North Castor Gulch 1-16	North Reference:	Grid
Well:	North Castor Gulch 1-16	Survey Calculation Method:	Minimum Curvature
Wellbore:	North Castor Gulch 1-16		
Design:	NCG 1-16		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
100.00	0.00	0.00	100.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
200.00	0.00	0.00	200.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
300.00	0.00	0.00	300.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
400.00	0.00	0.00	400.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
500.00	0.00	0.00	500.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
600.00	0.00	0.00	600.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
700.00	0.00	0.00	700.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
800.00	0.00	0.00	800.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
10 3/4"									
900.00	0.00	0.00	900.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,000.00	0.00	0.00	1,000.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,100.00	0.00	0.00	1,100.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,200.00	0.00	0.00	1,200.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,300.00	0.00	0.00	1,300.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,400.00	0.00	0.00	1,400.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,500.00	0.00	0.00	1,500.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,600.00	0.00	0.00	1,600.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,700.00	0.00	0.00	1,700.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,800.00	0.00	0.00	1,800.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
1,900.00	0.00	0.00	1,900.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,000.00	0.00	0.00	2,000.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,100.00	0.00	0.00	2,100.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,200.00	0.00	0.00	2,200.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,300.00	0.00	0.00	2,300.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,400.00	0.00	0.00	2,400.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,500.00	0.00	0.00	2,500.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,600.00	0.00	0.00	2,600.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,700.00	0.00	0.00	2,700.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,800.00	0.00	0.00	2,800.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
2,900.00	0.00	0.00	2,900.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,000.00	0.00	0.00	3,000.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,100.00	0.00	0.00	3,100.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,200.00	0.00	0.00	3,200.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,300.00	0.00	0.00	3,300.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,400.00	0.00	0.00	3,400.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,500.00	0.00	0.00	3,500.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,600.00	0.00	0.00	3,600.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,700.00	0.00	0.00	3,700.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,800.00	0.00	0.00	3,800.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
3,900.00	0.00	0.00	3,900.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
4,000.00	0.00	0.00	4,000.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
7 5/8"									
4,100.00	0.00	0.00	4,100.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
4,200.00	0.00	0.00	4,200.00	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
4,210.71	0.00	0.00	4,210.71	0.00	0.00	14,680,243.23	914,925.05	40° 23' 31.880 N	107° 36' 19.411 W
4,250.00	2.55	210.49	4,249.99	-0.75	-0.44	14,680,242.48	914,924.61	40° 23' 31.873 N	107° 36' 19.417 W
4,300.00	5.80	210.49	4,299.85	-3.89	-2.29	14,680,239.34	914,922.76	40° 23' 31.841 N	107° 36' 19.439 W
4,350.00	9.05	210.49	4,349.42	-9.46	-5.57	14,680,233.77	914,919.48	40° 23' 31.785 N	107° 36' 19.480 W
4,400.00	12.30	210.49	4,398.55	-17.45	-10.27	14,680,225.79	914,914.78	40° 23' 31.705 N	107° 36' 19.537 W
4,450.00	15.55	210.49	4,447.07	-27.82	-16.38	14,680,215.42	914,908.67	40° 23' 31.601 N	107° 36' 19.612 W
4,500.00	18.80	210.49	4,494.83	-40.54	-23.87	14,680,202.69	914,901.18	40° 23' 31.473 N	107° 36' 19.704 W
4,550.00	22.05	210.49	4,541.68	-55.58	-32.72	14,680,187.66	914,892.33	40° 23' 31.322 N	107° 36' 19.813 W



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Planning Report - Geographic



Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well North Castor Gulch 1-16
Company:	EPW_RMP	TVD Reference:	KB @ 6997.90ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	KB @ 6997.90ft (Original Well Elev)
Site:	North Castor Gulch 1-16	North Reference:	Grid
Well:	North Castor Gulch 1-16	Survey Calculation Method:	Minimum Curvature
Wellbore:	North Castor Gulch 1-16		
Design:	NCG 1-16		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
4,600.00	25.30	210.49	4,587.47	-72.88	-42.91	14,680,170.35	914,882.14	40° 23' 31.148 N	107° 36' 19.938 W
4,650.00	28.55	210.49	4,632.04	-92.39	-54.40	14,680,150.84	914,870.65	40° 23' 30.952 N	107° 36' 20.079 W
4,700.00	31.80	210.49	4,675.26	-114.05	-67.15	14,680,129.19	914,857.90	40° 23' 30.735 N	107° 36' 20.235 W
4,750.00	35.05	210.49	4,716.98	-137.78	-81.12	14,680,105.45	914,843.93	40° 23' 30.496 N	107° 36' 20.406 W
4,800.00	38.30	210.49	4,757.07	-163.51	-96.28	14,680,079.72	914,828.78	40° 23' 30.238 N	107° 36' 20.592 W
4,850.00	41.55	210.49	4,795.41	-191.16	-112.56	14,680,052.07	914,812.50	40° 23' 29.960 N	107° 36' 20.792 W
4,900.00	44.80	210.49	4,831.87	-220.64	-129.91	14,680,022.59	914,795.14	40° 23' 29.664 N	107° 36' 21.005 W
4,950.00	48.05	210.49	4,866.33	-251.86	-148.29	14,679,991.38	914,776.76	40° 23' 29.350 N	107° 36' 21.231 W
5,000.00	51.30	210.49	4,898.68	-284.70	-167.63	14,679,958.53	914,757.42	40° 23' 29.020 N	107° 36' 21.468 W
5,050.00	54.55	210.49	4,928.81	-319.08	-187.87	14,679,924.16	914,737.18	40° 23' 28.675 N	107° 36' 21.716 W
5,056.86	55.00	210.49	4,932.77	-323.91	-190.71	14,679,919.33	914,734.34	40° 23' 28.626 N	107° 36' 21.751 W
5,100.00	55.00	210.49	4,957.51	-354.36	-208.64	14,679,888.88	914,716.41	40° 23' 28.320 N	107° 36' 21.971 W
5,156.86	55.00	210.49	4,990.13	-394.49	-232.27	14,679,848.74	914,692.78	40° 23' 27.917 N	107° 36' 22.261 W
5,200.00	59.07	210.49	5,013.59	-425.68	-250.63	14,679,817.56	914,674.42	40° 23' 27.604 N	107° 36' 22.486 W
5,250.00	63.78	210.49	5,037.50	-463.50	-272.91	14,679,779.73	914,652.15	40° 23' 27.224 N	107° 36' 22.759 W
5,300.00	68.50	210.49	5,057.72	-502.90	-296.10	14,679,740.34	914,628.95	40° 23' 26.828 N	107° 36' 23.044 W
5,350.00	73.21	210.49	5,074.11	-543.59	-320.06	14,679,699.65	914,604.99	40° 23' 26.419 N	107° 36' 23.338 W
5,400.00	77.93	210.49	5,086.57	-585.31	-344.62	14,679,657.93	914,580.43	40° 23' 26.000 N	107° 36' 23.639 W
5,450.00	82.64	210.49	5,095.00	-627.76	-369.62	14,679,615.47	914,555.43	40° 23' 25.573 N	107° 36' 23.946 W
5,500.00	87.36	210.49	5,099.36	-670.67	-394.88	14,679,572.56	914,530.17	40° 23' 25.142 N	107° 36' 24.256 W
5,527.99	90.00	210.49	5,100.00	-694.78	-409.08	14,679,548.45	914,515.97	40° 23' 24.900 N	107° 36' 24.430 W
5,564.75	90.37	210.12	5,099.88	-726.52	-427.63	14,679,516.72	914,497.43	40° 23' 24.581 N	107° 36' 24.657 W
5,600.00	90.72	210.12	5,099.55	-757.01	-445.32	14,679,486.23	914,479.73	40° 23' 24.275 N	107° 36' 24.874 W
5,700.00	91.72	210.12	5,097.42	-843.48	-495.49	14,679,399.75	914,429.56	40° 23' 23.406 N	107° 36' 25.489 W
5,782.54	92.55	210.12	5,094.35	-914.83	-536.88	14,679,328.41	914,388.17	40° 23' 22.690 N	107° 36' 25.997 W
5,800.00	92.55	210.12	5,093.57	-929.92	-545.64	14,679,313.32	914,379.42	40° 23' 22.538 N	107° 36' 26.104 W
5,900.00	92.55	210.12	5,089.13	-1,016.33	-595.77	14,679,226.91	914,329.28	40° 23' 21.670 N	107° 36' 26.719 W
6,000.00	92.55	210.12	5,084.69	-1,102.74	-645.90	14,679,140.50	914,279.15	40° 23' 20.802 N	107° 36' 27.333 W
6,100.00	92.55	210.12	5,080.25	-1,189.15	-696.04	14,679,054.09	914,229.02	40° 23' 19.934 N	107° 36' 27.948 W
6,200.00	92.55	210.12	5,075.81	-1,275.56	-746.17	14,678,967.68	914,178.88	40° 23' 19.066 N	107° 36' 28.562 W
6,300.00	92.55	210.12	5,071.36	-1,361.97	-796.31	14,678,881.27	914,128.75	40° 23' 18.198 N	107° 36' 29.177 W
6,400.00	92.55	210.12	5,066.92	-1,448.38	-846.44	14,678,794.86	914,078.61	40° 23' 17.331 N	107° 36' 29.791 W
6,500.00	92.55	210.12	5,062.48	-1,534.79	-896.57	14,678,708.45	914,028.48	40° 23' 16.463 N	107° 36' 30.406 W
6,600.00	92.55	210.12	5,058.04	-1,621.20	-946.71	14,678,622.03	913,978.35	40° 23' 15.595 N	107° 36' 31.020 W
6,700.00	92.55	210.12	5,053.60	-1,707.61	-996.84	14,678,535.62	913,928.21	40° 23' 14.727 N	107° 36' 31.635 W
6,800.00	92.55	210.12	5,049.16	-1,794.02	-1,046.98	14,678,449.21	913,878.08	40° 23' 13.859 N	107° 36' 32.249 W
6,900.00	92.55	210.12	5,044.72	-1,880.44	-1,097.11	14,678,362.80	913,827.94	40° 23' 12.991 N	107° 36' 32.864 W
7,000.00	92.55	210.12	5,040.28	-1,966.85	-1,147.24	14,678,276.39	913,777.81	40° 23' 12.123 N	107° 36' 33.478 W
7,100.00	92.55	210.12	5,035.83	-2,053.26	-1,197.38	14,678,189.98	913,727.68	40° 23' 11.255 N	107° 36' 34.093 W
7,200.00	92.55	210.12	5,031.39	-2,139.67	-1,247.51	14,678,103.57	913,677.54	40° 23' 10.387 N	107° 36' 34.707 W
7,300.00	92.55	210.12	5,026.95	-2,226.08	-1,297.65	14,678,017.16	913,627.41	40° 23' 9.519 N	107° 36' 35.322 W
7,400.00	92.55	210.12	5,022.51	-2,312.49	-1,347.78	14,677,930.75	913,577.27	40° 23' 8.651 N	107° 36' 35.936 W
7,500.00	92.55	210.12	5,018.07	-2,398.90	-1,397.92	14,677,844.34	913,527.14	40° 23' 7.783 N	107° 36' 36.551 W
7,600.00	92.55	210.12	5,013.63	-2,485.31	-1,448.05	14,677,757.93	913,477.01	40° 23' 6.915 N	107° 36' 37.165 W
7,700.00	92.55	210.12	5,009.19	-2,571.72	-1,498.18	14,677,671.52	913,426.87	40° 23' 6.047 N	107° 36' 37.780 W
7,800.00	92.55	210.12	5,004.75	-2,658.13	-1,548.32	14,677,585.11	913,376.74	40° 23' 5.179 N	107° 36' 38.394 W
7,900.00	92.55	210.12	5,000.30	-2,744.55	-1,598.45	14,677,498.69	913,326.60	40° 23' 4.311 N	107° 36' 39.009 W
8,000.00	92.55	210.12	4,995.86	-2,830.96	-1,648.59	14,677,412.28	913,276.47	40° 23' 3.443 N	107° 36' 39.623 W
8,100.00	92.55	210.12	4,991.42	-2,917.37	-1,698.72	14,677,325.87	913,226.34	40° 23' 2.575 N	107° 36' 40.238 W
8,200.00	92.55	210.12	4,986.98	-3,003.78	-1,748.85	14,677,239.46	913,176.20	40° 23' 1.707 N	107° 36' 40.852 W
8,300.00	92.55	210.12	4,982.54	-3,090.19	-1,798.99	14,677,153.05	913,126.07	40° 23' 0.839 N	107° 36' 41.467 W
8,400.00	92.55	210.12	4,978.10	-3,176.60	-1,849.12	14,677,066.64	913,075.93	40° 22' 59.971 N	107° 36' 42.081 W
8,500.00	92.55	210.12	4,973.66	-3,263.01	-1,899.26	14,676,980.23	913,025.80	40° 22' 59.103 N	107° 36' 42.696 W
8,600.00	92.55	210.12	4,969.22	-3,349.42	-1,949.39	14,676,893.82	912,975.67	40° 22' 58.235 N	107° 36' 43.310 W



Shell EP

Planning Report - Geographic



Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well North Castor Gulch 1-16
Company:	EPW_RMP	TVD Reference:	KB @ 6997.90ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	KB @ 6997.90ft (Original Well Elev)
Site:	North Castor Gulch 1-16	North Reference:	Grid
Well:	North Castor Gulch 1-16	Survey Calculation Method:	Minimum Curvature
Wellbore:	North Castor Gulch 1-16		
Design:	NCG 1-16		

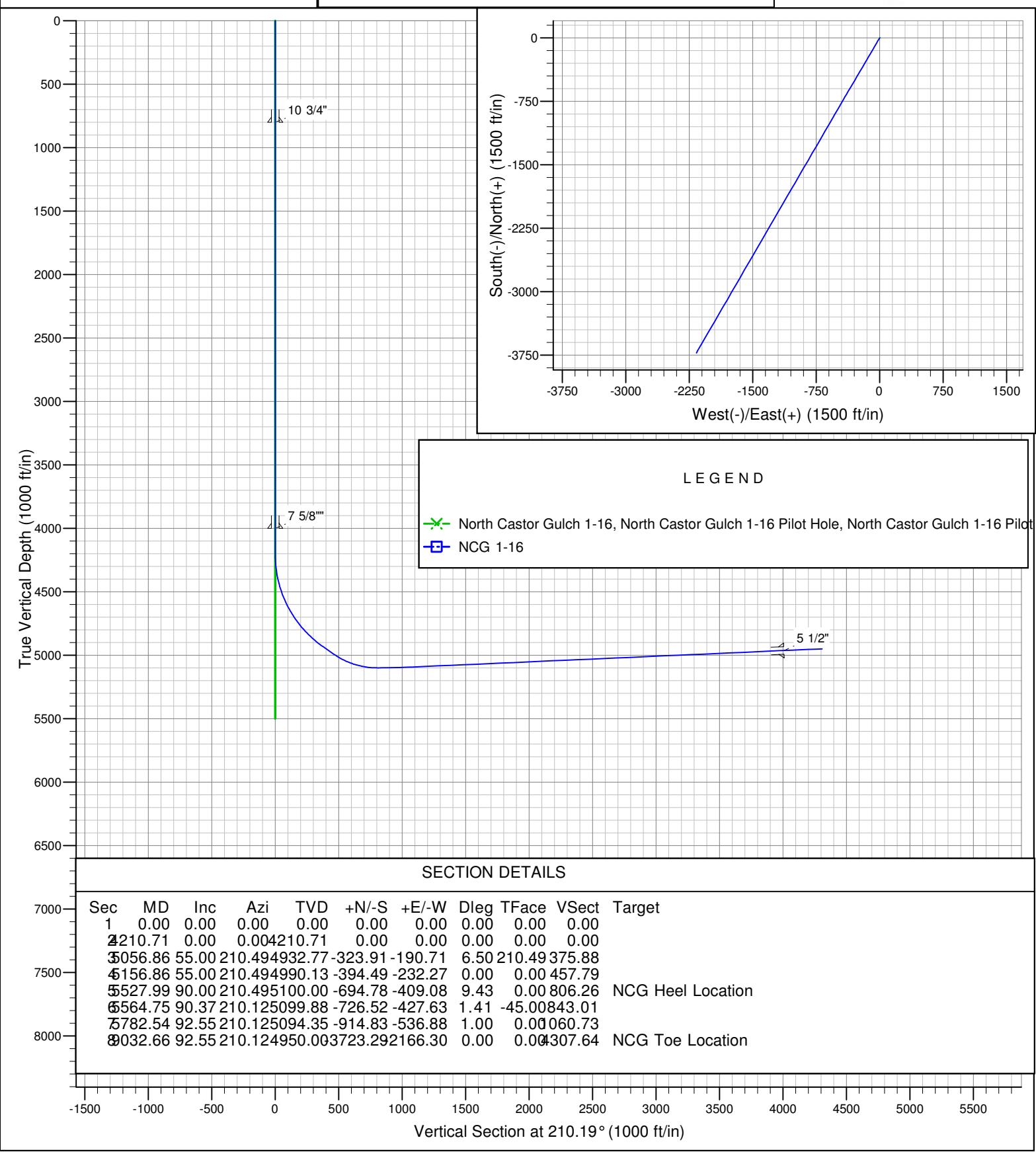
Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (usft)	Map Easting (usft)	Latitude	Longitude
8,700.00	92.55	210.12	4,964.77	-3,435.83	-1,999.52	14,676,807.41	912,925.53	40° 22' 57.367 N	107° 36' 43.924 W
8,732.00	92.55	210.12	4,963.35	-3,463.48	-2,015.57	14,676,779.76	912,909.49	40° 22' 57.090 N	107° 36' 44.121 W
5 1/2"									
8,800.00	92.55	210.12	4,960.33	-3,522.24	-2,049.66	14,676,721.00	912,875.40	40° 22' 56.499 N	107° 36' 44.539 W
8,900.00	92.55	210.12	4,955.89	-3,608.65	-2,099.79	14,676,634.59	912,825.26	40° 22' 55.631 N	107° 36' 45.153 W
9,000.00	92.55	210.12	4,951.45	-3,695.07	-2,149.93	14,676,548.18	912,775.13	40° 22' 54.763 N	107° 36' 45.768 W
9,032.66	92.55	210.12	4,950.00	-3,723.29	-2,166.30	14,676,519.95	912,758.76	40° 22' 54.480 N	107° 36' 45.968 W

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (usft)	Easting (usft)	Latitude	Longitude
- hit/miss target									
- Shape									
NCG Toe Location	0.00	0.00	4,950.00	-3,723.29	-2,166.30	14,676,519.95	912,758.76	40° 22' 54.480 N	107° 36' 45.968 W
- plan hits target center									
- Point									
NCG Heel Location	0.00	0.00	5,100.00	-694.78	-409.08	14,679,548.45	914,515.97	40° 23' 24.900 N	107° 36' 24.430 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
800.00	800.00	10 3/4"	10.750	12.250	
4,000.00	4,000.00	7 5/8"	7.625	9.875	
8,732.00	4,963.35	5 1/2"	5.500	6.750	

Project: SWAN COLORADO (NAD83)
Site: North Castor Gulch 1-16
Well: North Castor Gulch 1-16
Wellbore: North Castor Gulch 1-16
Design: NCG 1-16

SITE DETAILS: North Castor Gulch 1-16
Site Centre Latitude: 40° 23' 31.880 N
Longitude: 107° 36' 19.411 W
Positional Uncertainty: 1.00
Convergence: -1.69
Local North: Grid



North Castor Gulch 1-16

T5N, R91W, SEC16
Wellbore Diagram

Updated: 2/9/2012
Location: Section 16 Township 5N Range 91W Moffat County, Colorado
Unit: Williams Fork Unit
API Number: Pending Elevation: 6986 GL
Target Zone: Niobrara Shale 6998 KB

Surface Section:

Hole: 13-1/2"
Depth: 800' MD/TVD
Casing: 10-3/4" 40.5# J-55, ST&C
Cement Top: Surface

Intermediate Section

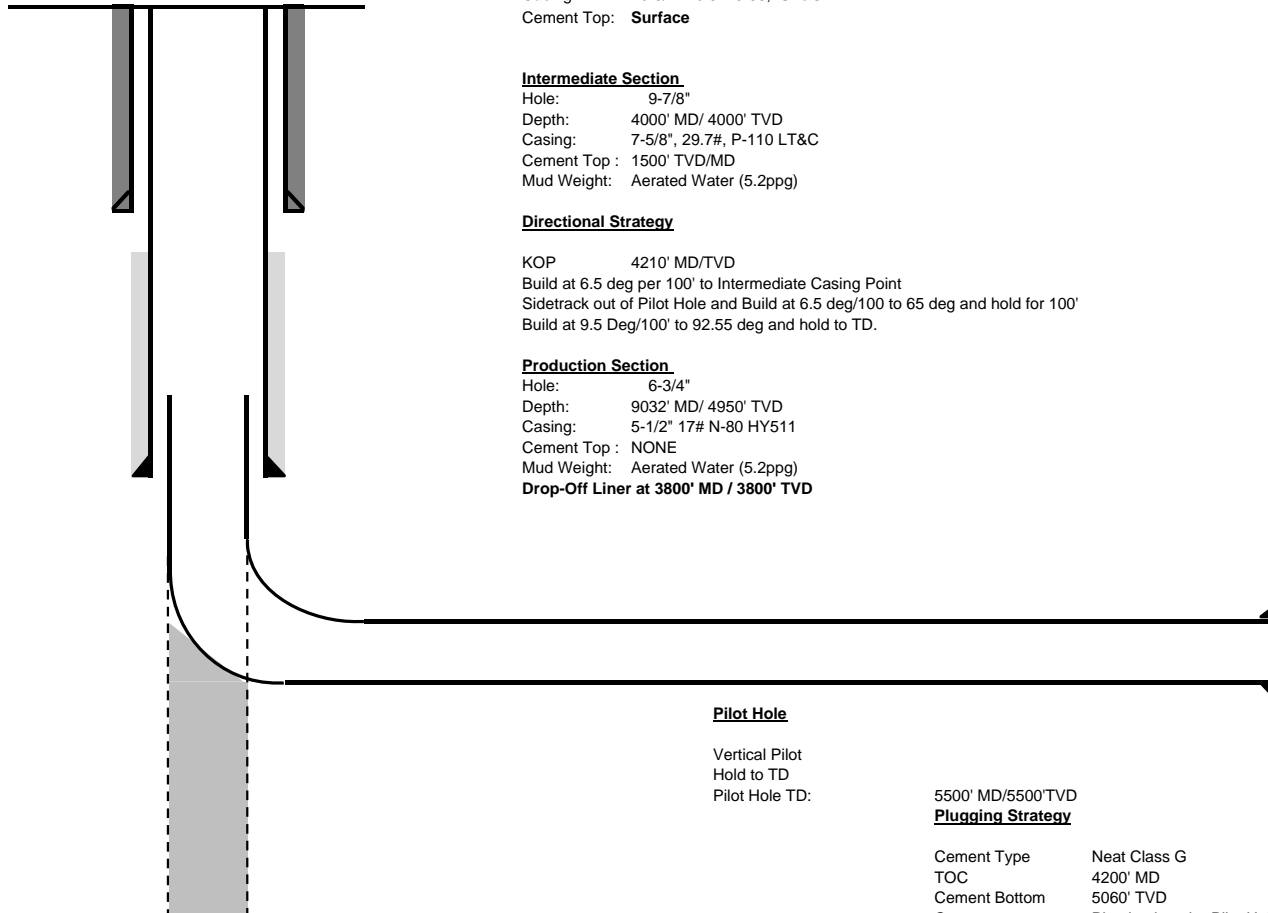
Hole: 9-7/8"
Depth: 4000' MD/ 4000' TVD
Casing: 7-5/8", 29.7#, P-110 LT&C
Cement Top : 1500' TVD/MD
Mud Weight: Aerated Water (5.2ppg)

Directional Strategy

KOP 4210' MD/TVD
Build at 6.5 deg per 100' to Intermediate Casing Point
Sidetrack out of Pilot Hole and Build at 6.5 deg/100' to 65 deg and hold for 100'
Build at 9.5 Deg/100' to 92.55 deg and hold to TD.

Production Section

Hole: 6-3/4"
Depth: 9032' MD/ 4950' TVD
Casing: 5-1/2" 17# N-80 HY511
Cement Top : NONE
Mud Weight: Aerated Water (5.2ppg)
Drop-Off Liner at 3800' MD / 3800' TVD



Pilot Hole

Vertical Pilot
Hold to TD
Pilot Hole TD:

5500' MD/5500'TVD

Plugging Strategy

Cement Type	Neat Class G
TOC	4200' MD
Cement Bottom	5060' TVD
Comments:	Plug back entire Pilot Hole to previous casing string. Dress off plug until MWD readings allow for an open hole sidetrack. This is estimated at 4200' MD

Drilling and Completion Plan – Pilot and Horizontal Hole

This well is a “toe-up” horizontal well with a pilot hole. See attached directional plan for well.

The surface hole will be 13-1/2” with a 10-3/4” casing cemented from the bottom to the surface. The intermediate hole will be a 9-7/8” with a 7-5/8” casing. The production section will be a 6-3/4” hole with a 5-1/2” casing. Depths of casing strings will vary by hole and are detailed on Form 2. All casing will be new, range 3 casing.

After setting 7-5/8” intermediate casing on this well, a vertical or near-vertical pilot hole will be drilled penetrating the Niobrara, into the underlying Carlisle formation. After obtaining appropriate geological data from the pilot hole, the main lateral borehole will be sidetracked away from the pilot hole and drilled to TD.

The purpose of the pilot hole is to obtain subsurface data that cannot easily be obtained in the horizontal production section. The pilot hole provides the following:

- Wellbore for obtaining core samples
- The near-vertical trajectory of pilot hole is preferred for open hole logs over the toe-up horizontal section
- Formation data obtained from the pilot hole greatly improves accuracy of depth control during drilling of the subsequent horizontal section.

Subsequent to obtaining all necessary subsurface data from pilot hole, the pilot hole will be plugged back with cement and an open-hole sidetrack will be performed to drill the lateral portion of the wellbore.

Completion of the main horizontal (lateral) borehole will consist of an open-hole section covered by a perforated or slotted liner run to the well TD by the drilling rig. The producing interval will be the Niobrara Formation and will start below the intermediate casing string set point near the top of the Niobrara Formation. If drilling with casing is required, a contingency will be to perforate the liner once landed in the well.

Artificial lift will consist of a sucker rod and pump jack system. The tubing will be run near the low spot of the well, the “heel”, and anchored above the producing interval. The sucker rods will be run with the pump set near the end of the tubing. All tubing and sucker rod equipment will be run with a BOP package and a kill weight completion fluid system. The well will be initially swabbed for fluid clean up and flow testing. Frac'ing or additional reservoir stimulation methods are not anticipated to be necessary.