

ENGINEERING CALCS

Nasik

Cascade Creek 697-15-54

Cascade Creek 697-15-47

CC 697-15-47

Plan: CC 697-15-47 PLAN 1

Standard Planning Report - Geographic

12 February, 2014

Oxy
Planning Report - Geographic

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Project	Nasik, Planning		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Colorado Central 502		

Site		Cascade Creek 697-15-54, 16-54			
Site Position:		Northing:	625,361.65 ft	Latitude:	39° 31' 9.611 N
From:	Map	Easting:	1,238,150.52 ft	Longitude:	108° 12' 3.264 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.70 °

Well	Cascade Creek 697-15-47					
Well Position	+N/-S	0.00 ft	Northing:	625,324.63 ft	Latitude:	39° 31' 9.236 N
	+E/-W	0.00 ft	Easting:	1,238,121.20 ft	Longitude:	108° 12' 3.624 W
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	8,640.00 ft

Wellbore	CC 697-15-47				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/28/2014	10.11	65.65	51,950

Design	CC 697-15-47 PLAN 1			
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	243.26

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	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,350.00	15.00	243.26	1,341.46	-43.93	-87.17	2.00	2.00	0.00	243.26	
4,490.08	15.00	243.26	4,374.54	-409.66	-812.94	0.00	0.00	0.00	0.00	
5,240.08	0.00	0.00	5,116.00	-453.59	-900.11	2.00	-2.00	0.00	180.00	
9,253.07	0.00	0.00	9,129.00	-453.59	-900.11	0.00	0.00	0.00	0.00	697-15-47 BHL

Oxy
Planning Report - Geographic

Database:	HOPSP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
0.00	0.00	0.00	0.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
90.00	0.00	0.00	90.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
16" Conductor									
100.00	0.00	0.00	100.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
200.00	0.00	0.00	200.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
300.00	0.00	0.00	300.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
400.00	0.00	0.00	400.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
500.00	0.00	0.00	500.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
600.00	0.00	0.00	600.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
700.00	2.00	243.26	699.98	-0.79	-1.56	625,323.90	1,238,119.62	39° 31' 9.229 N	108° 12' 3.644 W
800.00	4.00	243.26	799.84	-3.14	-6.23	625,321.68	1,238,114.88	39° 31' 9.205 N	108° 12' 3.703 W
900.00	6.00	243.26	899.45	-7.06	-14.01	625,317.99	1,238,106.98	39° 31' 9.167 N	108° 12' 3.803 W
1,000.00	8.00	243.26	998.70	-12.55	-24.90	625,312.83	1,238,095.94	39° 31' 9.112 N	108° 12' 3.942 W
1,100.00	10.00	243.26	1,097.47	-19.59	-38.87	625,306.21	1,238,081.77	39° 31' 9.043 N	108° 12' 4.120 W
1,200.00	12.00	243.26	1,195.62	-28.17	-55.91	625,298.14	1,238,064.48	39° 31' 8.958 N	108° 12' 4.337 W
1,300.00	14.00	243.26	1,293.06	-38.29	-75.99	625,288.62	1,238,044.10	39° 31' 8.858 N	108° 12' 4.594 W
1,350.00	15.00	243.26	1,341.46	-43.93	-87.17	625,283.32	1,238,032.76	39° 31' 8.802 N	108° 12' 4.736 W
1,400.00	15.00	243.26	1,389.76	-49.75	-98.73	625,277.84	1,238,021.03	39° 31' 8.745 N	108° 12' 4.884 W
1,500.00	15.00	243.26	1,486.35	-61.40	-121.84	625,266.88	1,237,997.58	39° 31' 8.630 N	108° 12' 5.179 W
1,600.00	15.00	243.26	1,582.94	-73.05	-144.96	625,255.93	1,237,974.13	39° 31' 8.514 N	108° 12' 5.474 W
1,700.00	15.00	243.26	1,679.54	-84.69	-168.07	625,244.97	1,237,950.69	39° 31' 8.399 N	108° 12' 5.769 W
1,800.00	15.00	243.26	1,776.13	-96.34	-191.18	625,234.02	1,237,927.24	39° 31' 8.284 N	108° 12' 6.064 W
1,900.00	15.00	243.26	1,872.72	-107.99	-214.29	625,223.06	1,237,903.79	39° 31' 8.169 N	108° 12' 6.358 W
2,000.00	15.00	243.26	1,969.31	-119.64	-237.41	625,212.11	1,237,880.34	39° 31' 8.054 N	108° 12' 6.653 W
2,100.00	15.00	243.26	2,065.91	-131.28	-260.52	625,201.15	1,237,856.89	39° 31' 7.939 N	108° 12' 6.948 W
2,200.00	15.00	243.26	2,162.50	-142.93	-283.63	625,190.20	1,237,833.44	39° 31' 7.824 N	108° 12' 7.243 W
2,300.00	15.00	243.26	2,259.09	-154.58	-306.75	625,179.24	1,237,809.99	39° 31' 7.709 N	108° 12' 7.538 W
2,400.00	15.00	243.26	2,355.68	-166.22	-329.86	625,168.29	1,237,786.54	39° 31' 7.593 N	108° 12' 7.833 W
2,500.00	15.00	243.26	2,452.28	-177.87	-352.97	625,157.33	1,237,763.09	39° 31' 7.478 N	108° 12' 8.128 W
2,600.00	15.00	243.26	2,548.87	-189.52	-376.09	625,146.38	1,237,739.64	39° 31' 7.363 N	108° 12' 8.423 W
2,700.00	15.00	243.26	2,645.46	-201.17	-399.20	625,135.42	1,237,716.19	39° 31' 7.248 N	108° 12' 8.718 W
2,800.00	15.00	243.26	2,742.05	-212.81	-422.31	625,124.47	1,237,692.75	39° 31' 7.133 N	108° 12' 9.013 W
2,900.00	15.00	243.26	2,838.65	-224.46	-445.43	625,113.51	1,237,669.30	39° 31' 7.018 N	108° 12' 9.308 W
3,000.00	15.00	243.26	2,935.24	-236.11	-468.54	625,102.56	1,237,645.85	39° 31' 6.903 N	108° 12' 9.603 W
9 5/8"									
3,100.00	15.00	243.26	3,031.83	-247.75	-491.65	625,091.60	1,237,622.40	39° 31' 6.788 N	108° 12' 9.898 W
3,200.00	15.00	243.26	3,128.42	-259.40	-514.76	625,080.65	1,237,598.95	39° 31' 6.673 N	108° 12' 10.193 W
3,300.00	15.00	243.26	3,225.02	-271.05	-537.88	625,069.69	1,237,575.50	39° 31' 6.557 N	108° 12' 10.488 W
3,400.00	15.00	243.26	3,321.61	-282.70	-560.99	625,058.74	1,237,552.05	39° 31' 6.442 N	108° 12' 10.782 W
3,500.00	15.00	243.26	3,418.20	-294.34	-584.10	625,047.78	1,237,528.60	39° 31' 6.327 N	108° 12' 11.077 W
3,600.00	15.00	243.26	3,514.80	-305.99	-607.22	625,036.83	1,237,505.15	39° 31' 6.212 N	108° 12' 11.372 W
3,700.00	15.00	243.26	3,611.39	-317.64	-630.33	625,025.87	1,237,481.70	39° 31' 6.097 N	108° 12' 11.667 W
3,800.00	15.00	243.26	3,707.98	-329.29	-653.44	625,014.92	1,237,458.25	39° 31' 5.982 N	108° 12' 11.962 W
3,900.00	15.00	243.26	3,804.57	-340.93	-676.56	625,003.96	1,237,434.81	39° 31' 5.867 N	108° 12' 12.257 W
4,000.00	15.00	243.26	3,901.17	-352.58	-699.67	624,993.01	1,237,411.36	39° 31' 5.752 N	108° 12' 12.552 W
4,100.00	15.00	243.26	3,997.76	-364.23	-722.78	624,982.05	1,237,387.91	39° 31' 5.636 N	108° 12' 12.847 W
4,200.00	15.00	243.26	4,094.35	-375.87	-745.90	624,971.10	1,237,364.46	39° 31' 5.521 N	108° 12' 13.142 W
4,300.00	15.00	243.26	4,190.94	-387.52	-769.01	624,960.14	1,237,341.01	39° 31' 5.406 N	108° 12' 13.437 W
4,400.00	15.00	243.26	4,287.54	-399.17	-792.12	624,949.19	1,237,317.56	39° 31' 5.291 N	108° 12' 13.732 W
4,490.08	15.00	243.26	4,374.54	-409.66	-812.94	624,939.32	1,237,296.44	39° 31' 5.187 N	108° 12' 13.997 W
4,500.00	14.80	243.26	4,384.13	-410.81	-815.22	624,938.24	1,237,294.13	39° 31' 5.176 N	108° 12' 14.027 W
4,600.00	12.80	243.26	4,481.24	-421.54	-836.52	624,928.14	1,237,272.51	39° 31' 5.070 N	108° 12' 14.298 W
4,700.00	10.80	243.26	4,579.12	-430.75	-854.79	624,919.49	1,237,253.98	39° 31' 4.979 N	108° 12' 14.531 W
4,800.00	8.80	243.26	4,677.66	-438.41	-869.99	624,912.28	1,237,238.56	39° 31' 4.903 N	108° 12' 14.725 W

Oxy
Planning Report - Geographic

Database:	HOPSP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Planned Survey										
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude	
4,900.00	6.80	243.26	4,776.73	-444.52	-882.11	624,906.54	1,237,226.26	39° 31' 4.843 N	108° 12' 14.880 W	
4,904.25	6.72	243.26	4,780.95	-444.74	-882.56	624,906.33	1,237,225.81	39° 31' 4.841 N	108° 12' 14.886 W	
Fort Union										
5,000.00	4.80	243.26	4,876.21	-449.06	-891.14	624,902.26	1,237,217.11	39° 31' 4.798 N	108° 12' 14.995 W	
5,100.00	2.80	243.26	4,975.98	-452.05	-897.06	624,899.45	1,237,211.10	39° 31' 4.768 N	108° 12' 15.071 W	
5,200.00	0.80	243.26	5,075.93	-453.46	-899.86	624,898.12	1,237,208.25	39° 31' 4.754 N	108° 12' 15.107 W	
5,240.08	0.00	0.00	5,116.00	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,300.00	0.00	0.00	5,175.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,400.00	0.00	0.00	5,275.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,500.00	0.00	0.00	5,375.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,600.00	0.00	0.00	5,475.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,700.00	0.00	0.00	5,575.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,800.00	0.00	0.00	5,675.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
5,900.00	0.00	0.00	5,775.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,000.00	0.00	0.00	5,875.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,100.00	0.00	0.00	5,975.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,172.62	0.00	0.00	6,048.55	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
Mesaverde Group Top										
6,200.00	0.00	0.00	6,075.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,300.00	0.00	0.00	6,175.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,373.08	0.00	0.00	6,249.01	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
Williams Fork ("base Ohio Creek")										
6,400.00	0.00	0.00	6,275.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,500.00	0.00	0.00	6,375.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,600.00	0.00	0.00	6,475.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,700.00	0.00	0.00	6,575.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,800.00	0.00	0.00	6,675.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
6,864.87	0.00	0.00	6,740.80	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
Williams Fork Shale Marker										
6,900.00	0.00	0.00	6,775.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,000.00	0.00	0.00	6,875.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,100.00	0.00	0.00	6,975.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,200.00	0.00	0.00	7,075.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,300.00	0.00	0.00	7,175.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,371.07	0.00	0.00	7,247.00	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
Continuous Top of Gas										
7,400.00	0.00	0.00	7,275.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,500.00	0.00	0.00	7,375.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,600.00	0.00	0.00	7,475.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,700.00	0.00	0.00	7,575.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,800.00	0.00	0.00	7,675.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
7,900.00	0.00	0.00	7,775.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,000.00	0.00	0.00	7,875.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,100.00	0.00	0.00	7,975.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,200.00	0.00	0.00	8,075.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,300.00	0.00	0.00	8,175.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,400.00	0.00	0.00	8,275.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,500.00	0.00	0.00	8,375.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,600.00	0.00	0.00	8,475.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,631.21	0.00	0.00	8,507.14	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
Cameo Coal										
8,700.00	0.00	0.00	8,575.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,800.00	0.00	0.00	8,675.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	
8,900.00	0.00	0.00	8,775.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W	

Oxy
Planning Report - Geographic

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (ft)	Map Easting (ft)	Latitude	Longitude
9,000.00	0.00	0.00	8,875.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W
9,002.36	0.00	0.00	8,878.29	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W
TD									
9,100.00	0.00	0.00	8,975.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W
9,200.00	0.00	0.00	9,075.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W
9,253.00	0.00	0.00	9,128.93	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W
4 1/2"									
9,253.07	0.00	0.00	9,129.00	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W

Design Targets									
Target Name - hit/miss target - Shape	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
CC 697-15-47 SRF - plan hits target center - Point	0.00	0.00	0.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
697-15-47 BHL - plan hits target center - Circle (radius 50.00)	0.00	0.00	9,129.00	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
90.00	90.00	16" Conductor	16.000	20.000	
3,000.00	2,935.24	9 5/8"	9.625	14.750	
9,253.00	9,128.93	4 1/2"	4.500	8.750	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,904.25	4,780.95	Fort Union		1.00	72.00
6,172.62	6,048.55	Mesaverde Group Top		1.00	56.00
6,373.08	6,249.01	Williams Fork ("base Ohio Creek")		2.00	4.00
6,864.87	6,740.80	Williams Fork Shale Marker		3.00	49.00
7,371.07	7,247.00	Continuous Top of Gas			
8,631.21	8,507.14	Cameo Coal		2.00	23.00
9,002.36	8,878.29	TD		3.00	47.00

ENGINEERING CALCS

Nasik

Cascade Creek 697-15-54

Cascade Creek 697-15-47

CC 697-15-47

Plan: CC 697-15-47 PLAN 1

Standard Planning Report

12 February, 2014

Oxy

Planning Report

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Project	Nasik, Planning		
Map System:	US State Plane 1927 (Exact solution)	System Datum:	Mean Sea Level
Geo Datum:	NAD 1927 (NADCON CONUS)		
Map Zone:	Colorado Central 502		

Site		Cascade Creek 697-15-54, 16-54			
Site Position:		Northing:	625,361.65 ft	Latitude:	39° 31' 9.611 N
From:	Map	Easting:	1,238,150.52 ft	Longitude:	108° 12' 3.264 W
Position Uncertainty:	0.00 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.70 °

Well	Cascade Creek 697-15-47					
Well Position	+N/-S	-37.88 ft	Northing:	625,324.63 ft	Latitude:	39° 31' 9.236 N
	+E/-W	-28.21 ft	Easting:	1,238,121.20 ft	Longitude:	108° 12' 3.624 W
Position Uncertainty		0.00 ft	Wellhead Elevation:		Ground Level:	8,640.00 ft

Wellbore	CC 697-15-47				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	1/28/2014	10.11	65.65	51,950

Design	CC 697-15-47 PLAN 1			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.00
Vertical Section:	Depth From (TVD)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.00	0.00	0.00	243.26

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	
600.00	0.00	0.00	600.00	0.00	0.00	0.00	0.00	0.00	0.00	
1,350.00	15.00	243.26	1,341.46	-43.93	-87.17	2.00	2.00	0.00	243.26	
4,490.08	15.00	243.26	4,374.54	-409.66	-812.94	0.00	0.00	0.00	0.00	
5,240.08	0.00	0.00	5,116.00	-453.59	-900.11	2.00	-2.00	0.00	180.00	
9,253.07	0.00	0.00	9,129.00	-453.59	-900.11	0.00	0.00	0.00	0.00	697-15-47 BHL

Oxy Planning Report

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
90.00	0.00	0.00	90.00	0.00	0.00	0.00	0.00	0.00	0.00
16" Conductor									
100.00	0.00	0.00	100.00	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
300.00	0.00	0.00	300.00	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
500.00	0.00	0.00	500.00	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
700.00	2.00	243.26	699.98	-0.79	-1.56	1.75	2.00	2.00	0.00
800.00	4.00	243.26	799.84	-3.14	-6.23	6.98	2.00	2.00	0.00
900.00	6.00	243.26	899.45	-7.06	-14.01	15.69	2.00	2.00	0.00
1,000.00	8.00	243.26	998.70	-12.55	-24.90	27.88	2.00	2.00	0.00
1,100.00	10.00	243.26	1,097.47	-19.59	-38.87	43.52	2.00	2.00	0.00
1,200.00	12.00	243.26	1,195.62	-28.17	-55.91	62.60	2.00	2.00	0.00
1,300.00	14.00	243.26	1,293.06	-38.29	-75.99	85.10	2.00	2.00	0.00
1,350.00	15.00	243.26	1,341.46	-43.93	-87.17	97.62	2.00	2.00	0.00
1,400.00	15.00	243.26	1,389.76	-49.75	-98.73	110.56	0.00	0.00	0.00
1,500.00	15.00	243.26	1,486.35	-61.40	-121.84	136.44	0.00	0.00	0.00
1,600.00	15.00	243.26	1,582.94	-73.05	-144.96	162.32	0.00	0.00	0.00
1,700.00	15.00	243.26	1,679.54	-84.69	-168.07	188.20	0.00	0.00	0.00
1,800.00	15.00	243.26	1,776.13	-96.34	-191.18	214.08	0.00	0.00	0.00
1,900.00	15.00	243.26	1,872.72	-107.99	-214.29	239.97	0.00	0.00	0.00
2,000.00	15.00	243.26	1,969.31	-119.64	-237.41	265.85	0.00	0.00	0.00
2,100.00	15.00	243.26	2,065.91	-131.28	-260.52	291.73	0.00	0.00	0.00
2,200.00	15.00	243.26	2,162.50	-142.93	-283.63	317.61	0.00	0.00	0.00
2,300.00	15.00	243.26	2,259.09	-154.58	-306.75	343.49	0.00	0.00	0.00
2,400.00	15.00	243.26	2,355.68	-166.22	-329.86	369.38	0.00	0.00	0.00
2,500.00	15.00	243.26	2,452.28	-177.87	-352.97	395.26	0.00	0.00	0.00
2,600.00	15.00	243.26	2,548.87	-189.52	-376.09	421.14	0.00	0.00	0.00
2,700.00	15.00	243.26	2,645.46	-201.17	-399.20	447.02	0.00	0.00	0.00
2,800.00	15.00	243.26	2,742.05	-212.81	-422.31	472.90	0.00	0.00	0.00
2,900.00	15.00	243.26	2,838.65	-224.46	-445.43	498.78	0.00	0.00	0.00
3,000.00	15.00	243.26	2,935.24	-236.11	-468.54	524.67	0.00	0.00	0.00
9 5/8"									
3,100.00	15.00	243.26	3,031.83	-247.75	-491.65	550.55	0.00	0.00	0.00
3,200.00	15.00	243.26	3,128.42	-259.40	-514.76	576.43	0.00	0.00	0.00
3,300.00	15.00	243.26	3,225.02	-271.05	-537.88	602.31	0.00	0.00	0.00
3,400.00	15.00	243.26	3,321.61	-282.70	-560.99	628.19	0.00	0.00	0.00
3,500.00	15.00	243.26	3,418.20	-294.34	-584.10	654.08	0.00	0.00	0.00
3,600.00	15.00	243.26	3,514.80	-305.99	-607.22	679.96	0.00	0.00	0.00
3,700.00	15.00	243.26	3,611.39	-317.64	-630.33	705.84	0.00	0.00	0.00
3,800.00	15.00	243.26	3,707.98	-329.29	-653.44	731.72	0.00	0.00	0.00
3,900.00	15.00	243.26	3,804.57	-340.93	-676.56	757.60	0.00	0.00	0.00
4,000.00	15.00	243.26	3,901.17	-352.58	-699.67	783.49	0.00	0.00	0.00
4,100.00	15.00	243.26	3,997.76	-364.23	-722.78	809.37	0.00	0.00	0.00
4,200.00	15.00	243.26	4,094.35	-375.87	-745.90	835.25	0.00	0.00	0.00
4,300.00	15.00	243.26	4,190.94	-387.52	-769.01	861.13	0.00	0.00	0.00
4,400.00	15.00	243.26	4,287.54	-399.17	-792.12	887.01	0.00	0.00	0.00
4,490.08	15.00	243.26	4,374.54	-409.66	-812.94	910.33	0.00	0.00	0.00
4,500.00	14.80	243.26	4,384.13	-410.81	-815.22	912.88	2.00	-2.00	0.00
4,600.00	12.80	243.26	4,481.24	-421.54	-836.52	936.73	2.00	-2.00	0.00
4,700.00	10.80	243.26	4,579.12	-430.75	-854.79	957.18	2.00	-2.00	0.00
4,800.00	8.80	243.26	4,677.66	-438.41	-869.99	974.21	2.00	-2.00	0.00

Oxy Planning Report

Database:	HOPSPP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
4,900.00	6.80	243.26	4,776.73	-444.52	-882.11	987.78	2.00	-2.00	0.00
4,904.25	6.72	243.26	4,780.95	-444.74	-882.56	988.28	2.00	-2.00	0.00
Fort Union									
5,000.00	4.80	243.26	4,876.21	-449.06	-891.14	997.89	2.00	-2.00	0.00
5,100.00	2.80	243.26	4,975.98	-452.05	-897.06	1,004.52	2.00	-2.00	0.00
5,200.00	0.80	243.26	5,075.93	-453.46	-899.86	1,007.66	2.00	-2.00	0.00
5,240.08	0.00	0.00	5,116.00	-453.59	-900.11	1,007.94	2.00	-2.00	0.00
5,300.00	0.00	0.00	5,175.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
5,400.00	0.00	0.00	5,275.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
5,500.00	0.00	0.00	5,375.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
5,600.00	0.00	0.00	5,475.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
5,700.00	0.00	0.00	5,575.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
5,800.00	0.00	0.00	5,675.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
5,900.00	0.00	0.00	5,775.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,000.00	0.00	0.00	5,875.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,100.00	0.00	0.00	5,975.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,172.62	0.00	0.00	6,048.55	-453.59	-900.11	1,007.94	0.00	0.00	0.00
Mesaverde Group Top									
6,200.00	0.00	0.00	6,075.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,300.00	0.00	0.00	6,175.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,373.08	0.00	0.00	6,249.01	-453.59	-900.11	1,007.94	0.00	0.00	0.00
Williams Fork ("base Ohio Creek")									
6,400.00	0.00	0.00	6,275.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,500.00	0.00	0.00	6,375.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,600.00	0.00	0.00	6,475.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,700.00	0.00	0.00	6,575.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,800.00	0.00	0.00	6,675.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
6,864.87	0.00	0.00	6,740.80	-453.59	-900.11	1,007.94	0.00	0.00	0.00
Williams Fork Shale Marker									
6,900.00	0.00	0.00	6,775.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,000.00	0.00	0.00	6,875.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,100.00	0.00	0.00	6,975.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,200.00	0.00	0.00	7,075.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,300.00	0.00	0.00	7,175.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,371.07	0.00	0.00	7,247.00	-453.59	-900.11	1,007.94	0.00	0.00	0.00
Continuous Top of Gas									
7,400.00	0.00	0.00	7,275.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,500.00	0.00	0.00	7,375.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,600.00	0.00	0.00	7,475.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,700.00	0.00	0.00	7,575.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,800.00	0.00	0.00	7,675.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
7,900.00	0.00	0.00	7,775.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,000.00	0.00	0.00	7,875.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,100.00	0.00	0.00	7,975.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,200.00	0.00	0.00	8,075.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,300.00	0.00	0.00	8,175.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,400.00	0.00	0.00	8,275.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,500.00	0.00	0.00	8,375.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,600.00	0.00	0.00	8,475.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,631.21	0.00	0.00	8,507.14	-453.59	-900.11	1,007.94	0.00	0.00	0.00
Cameo Coal									
8,700.00	0.00	0.00	8,575.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
8,800.00	0.00	0.00	8,675.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00

Oxy

Planning Report

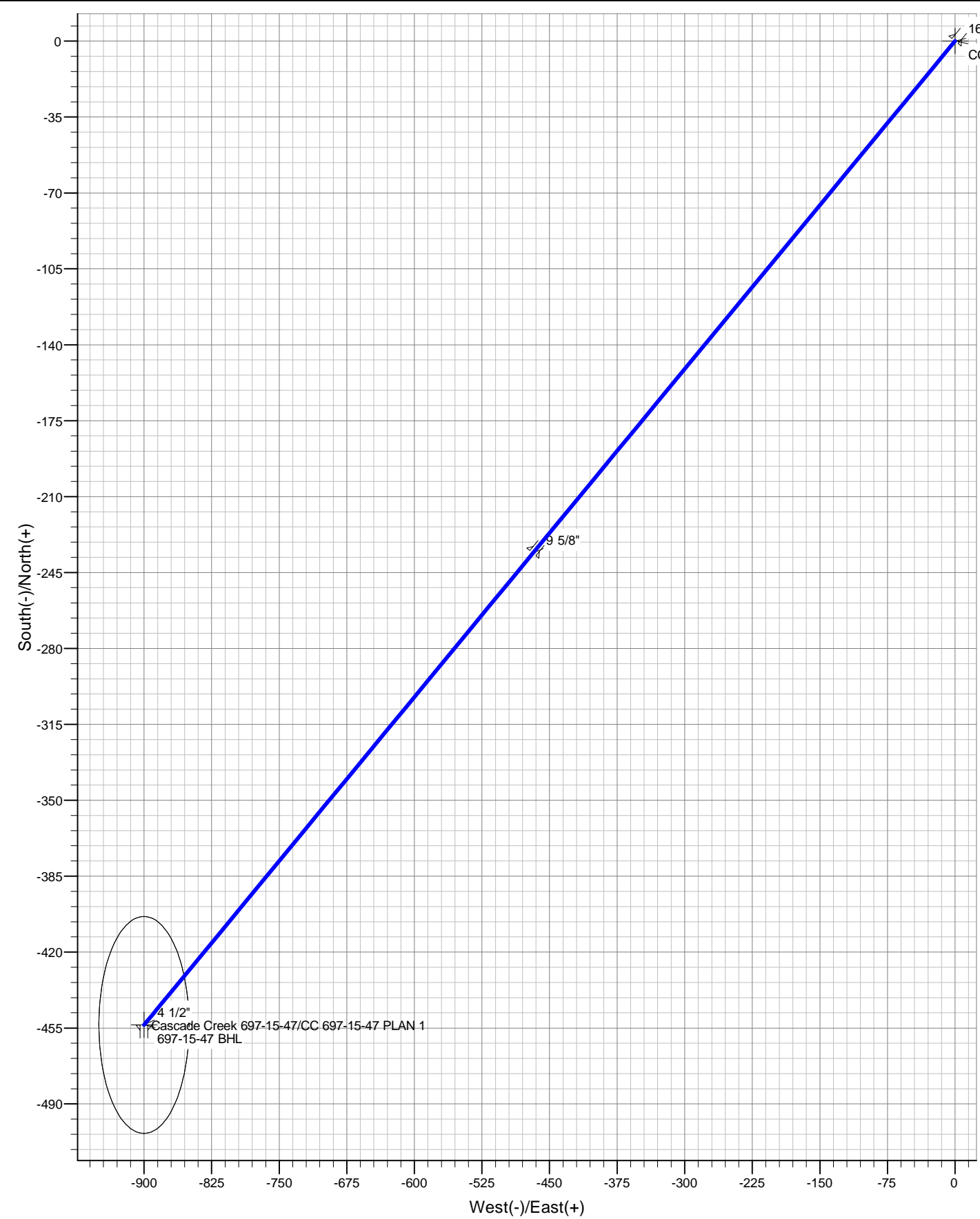
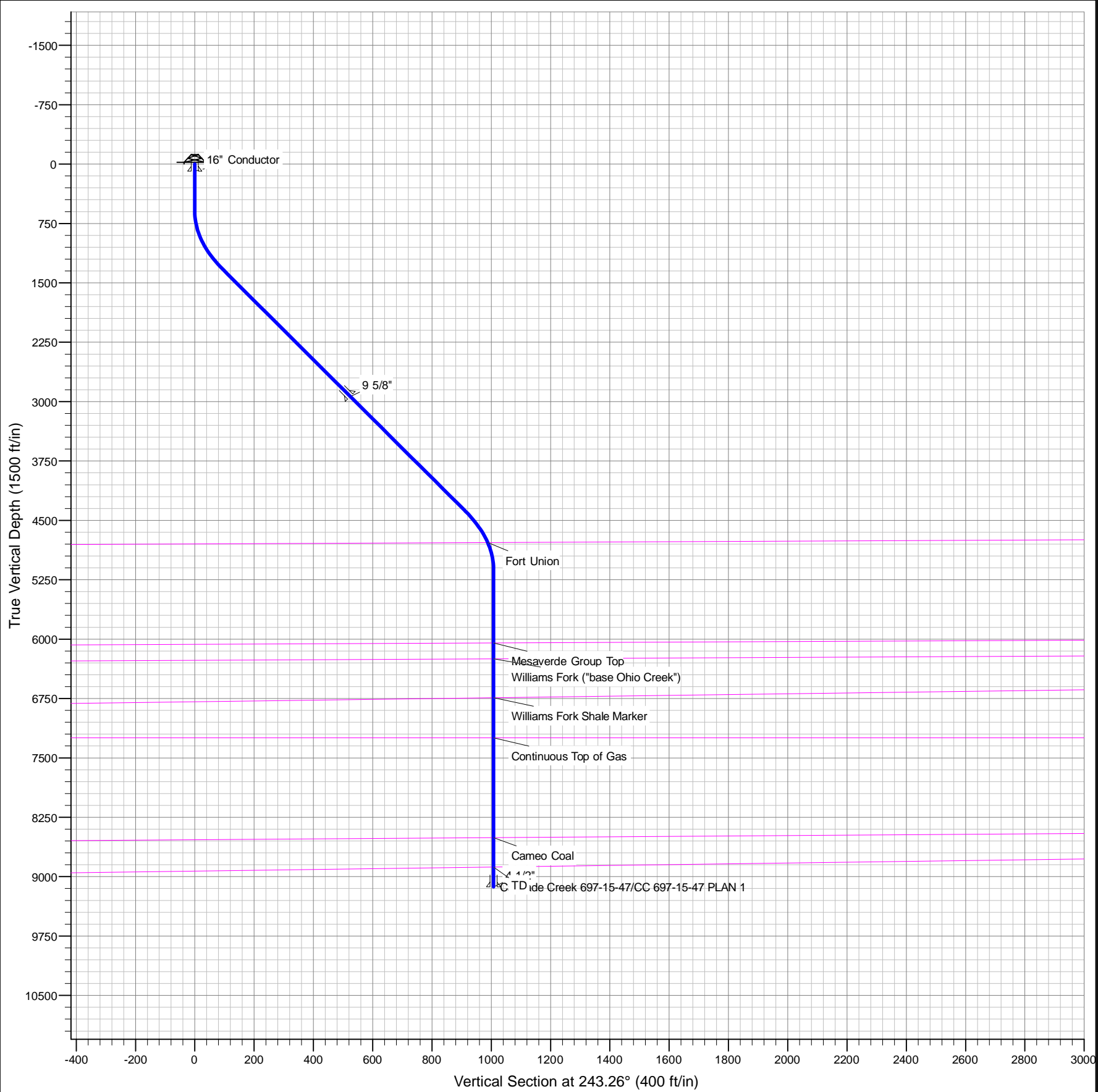
Database:	HOPSPP	Local Co-ordinate Reference:	Well Cascade Creek 697-15-47
Company:	ENGINEERING CALCS	TVD Reference:	WELL @ 8665.00ft (Original Well Elev)
Project:	Nasik	MD Reference:	WELL @ 8665.00ft (Original Well Elev)
Site:	Cascade Creek 697-15-54	North Reference:	True
Well:	Cascade Creek 697-15-47	Survey Calculation Method:	Minimum Curvature
Wellbore:	CC 697-15-47		
Design:	CC 697-15-47 PLAN 1		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Vertical Section (ft)	Dogleg Rate (°/100ft)	Build Rate (°/100ft)	Turn Rate (°/100ft)
8,900.00	0.00	0.00	8,775.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
9,000.00	0.00	0.00	8,875.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
9,002.36	0.00	0.00	8,878.29	-453.59	-900.11	1,007.94	0.00	0.00	0.00
TD									
9,100.00	0.00	0.00	8,975.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
9,200.00	0.00	0.00	9,075.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
9,253.00	0.00	0.00	9,128.93	-453.59	-900.11	1,007.94	0.00	0.00	0.00
4 1/2"									
9,253.07	0.00	0.00	9,129.00	-453.59	-900.11	1,007.94	0.00	0.00	0.00

Design Targets									
Target Name	Dip Angle (°)	Dip Dir. (°)	TVD (ft)	+N/-S (ft)	+E/-W (ft)	Northing (ft)	Easting (ft)	Latitude	Longitude
- hit/miss target									
- Shape									
CC 697-15-47 SRF	0.00	0.00	0.00	0.00	0.00	625,324.63	1,238,121.20	39° 31' 9.236 N	108° 12' 3.624 W
- plan hits target center									
- Point									
697-15-47 BHL	0.00	0.00	9,129.00	-453.59	-900.11	624,898.00	1,237,208.00	39° 31' 4.753 N	108° 12' 15.110 W
- plan hits target center									
- Circle (radius 50.00)									

Casing Points					
Measured Depth (ft)	Vertical Depth (ft)	Name	Casing Diameter (in)	Hole Diameter (in)	
90.00	90.00	16" Conductor	16.000	20.000	
3,000.00	2,935.24	9 5/8"	9.625	14.750	
9,253.00	9,128.93	4 1/2"	4.500	8.750	

Formations					
Measured Depth (ft)	Vertical Depth (ft)	Name	Lithology	Dip (°)	Dip Direction (°)
4,904.25	4,780.95	Fort Union		1.00	72.00
6,172.62	6,048.55	Mesaverde Group Top		1.00	56.00
6,373.08	6,249.01	Williams Fork ("base Ohio Creek")		2.00	4.00
6,864.87	6,740.80	Williams Fork Shale Marker		3.00	49.00
7,371.07	7,247.00	Continuous Top of Gas			
8,631.21	8,507.14	Cameo Coal		2.00	23.00
9,002.36	8,878.29	TD		3.00	47.00



Plan: CC 697-15-47 PLAN 1 (Cascade Creek 697-15-47/CC 697-15-47)			
Created By: Oxy	Date: 14:26, February 12 2014	Name	CC 697-15-47
Checked: _____	Date: _____	697-15-47	697-15-47
Reviewed: _____	Date: _____	697-15-47	697-15-47
Approved: _____	Date: _____	697-15-47	697-15-47

DESIGN TARGET DETAILS									
TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Shape		
CC 697-15-47	0.00	0.00	625324.63	1238121.20	39° 31' 9.236 N	108° 12' 3.624 W	Point		
697-15-47	0.00	-453.59	624898.00	1237208.00	39° 31' 4.753 N	108° 12' 15.110 W	Circle (Radius: 50.00)		
697-15-47	0.00	-453.59	624898.00	1237208.00	39° 31' 4.753 N	108° 12' 15.110 W	Circle (Radius: 50.00)		

T

M

Azimuths to True North

Magnetic North: 10.11°

Magnetic Field

Strength: 51950.4snT

Dip Angle: 65.65°

Date: 1/28/2014

Model: IGRF2010

