



EPW_RMP

CONCEPT WELL PLANNING - COLORADO (NAD83)

Herring Draw 1-33

Herring Draw 1-33

Herring Draw 1-33

Plan: Herring Draw 1-33

Standard Planning Report - Geographic

18 November, 2011





Shell EP

Planning Report - Geographic



Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well Herring Draw 1-33
Company:	EPW_RMP	TVD Reference:	WELL @ 6809.0ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	WELL @ 6809.0ft (Original Well Elev)
Site:	Herring Draw 1-33	North Reference:	Grid
Well:	Herring Draw 1-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Herring Draw 1-33		
Design:	Herring Draw 1-33		

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		Herring Draw 1-33			
Site Position:		Northing:	4,469,167.59 m	Latitude:	40° 20' 45.350 N
From:	Lat/Long	Easting:	287,164.57 m	Longitude:	107° 30' 21.442 W
Position Uncertainty:	1.0 ft	Slot Radius:	13.200 in	Grid Convergence:	-1.62

Well	Herring Draw 1-33, Horizontal Producer					
Well Position	+N/-S	0.0 ft	Northing:	4,469,167.59 m	Latitude:	40° 20' 45.350 N
	+E/-W	0.0 ft	Easting:	287,164.57 m	Longitude:	107° 30' 21.442 W
Position Uncertainty		0.0 ft	Wellhead Elevation:	6,796.0 ft	Ground Level:	6,796.0 ft

Wellbore	Herring Draw 1-33				
Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	BGGM2009	11/17/2011	10.15	66.54	52,764

Design	Herring Draw 1-33			
Audit Notes:				
Version:	Phase:	PROTOTYPE	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)
	0.0	0.0	0.0	37.28

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
0.0	0.00	0.00	0.0	0.0	0.0	0.00	0.00	0.00	0.00	
2,564.2	0.00	0.00	2,564.2	0.0	0.0	0.00	0.00	0.00	0.00	
3,647.5	65.00	30.36	3,429.6	475.7	278.7	6.00	6.00	0.00	30.36	
3,747.5	65.00	30.36	3,471.9	553.9	324.5	0.00	0.00	0.00	0.00	
4,492.2	84.00	30.36	3,670.0	1,170.3	685.6	2.55	2.55	0.00	0.00	Heel Target
4,566.9	84.37	31.85	3,677.6	1,233.9	723.9	2.05	0.50	2.00	75.89	
5,013.1	84.37	40.78	3,721.3	1,591.4	986.7	1.99	0.00	2.00	90.00	
7,957.4	84.37	40.78	4,010.0	3,810.1	2,900.5	0.00	0.00	0.00	0.00	Toe Target



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Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well Herring Draw 1-33
Company:	EPW_RMP	TVD Reference:	WELL @ 6809.0ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	WELL @ 6809.0ft (Original Well Elev)
Site:	Herring Draw 1-33	North Reference:	Grid
Well:	Herring Draw 1-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Herring Draw 1-33		
Design:	Herring Draw 1-33		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (m)	Map Easting (m)	Latitude	Longitude
0.0	0.00	0.00	0.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
100.0	0.00	0.00	100.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
200.0	0.00	0.00	200.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
300.0	0.00	0.00	300.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
400.0	0.00	0.00	400.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
450.0	0.00	0.00	450.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
10 3/4"									
500.0	0.00	0.00	500.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
600.0	0.00	0.00	600.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
700.0	0.00	0.00	700.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
800.0	0.00	0.00	800.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
900.0	0.00	0.00	900.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,000.0	0.00	0.00	1,000.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,100.0	0.00	0.00	1,100.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,200.0	0.00	0.00	1,200.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,300.0	0.00	0.00	1,300.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,400.0	0.00	0.00	1,400.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,500.0	0.00	0.00	1,500.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,600.0	0.00	0.00	1,600.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,700.0	0.00	0.00	1,700.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,800.0	0.00	0.00	1,800.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
1,900.0	0.00	0.00	1,900.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,000.0	0.00	0.00	2,000.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,100.0	0.00	0.00	2,100.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,200.0	0.00	0.00	2,200.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,300.0	0.00	0.00	2,300.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,400.0	0.00	0.00	2,400.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,500.0	0.00	0.00	2,500.0	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,564.2	0.00	0.00	2,564.2	0.0	0.0	4,469,167.59	287,164.57	40° 20' 45.350 N	107° 30' 21.442 W
2,600.0	2.15	30.36	2,600.0	0.6	0.3	4,469,167.77	287,164.67	40° 20' 45.356 N	107° 30' 21.437 W
2,650.0	5.15	30.36	2,649.9	3.3	1.9	4,469,168.61	287,165.16	40° 20' 45.383 N	107° 30' 21.418 W
2,700.0	8.15	30.36	2,699.5	8.3	4.9	4,469,170.13	287,166.05	40° 20' 45.434 N	107° 30' 21.382 W
2,750.0	11.15	30.36	2,748.8	15.6	9.1	4,469,172.33	287,167.34	40° 20' 45.506 N	107° 30' 21.330 W
2,800.0	14.15	30.36	2,797.6	25.0	14.6	4,469,175.21	287,169.03	40° 20' 45.601 N	107° 30' 21.262 W
2,850.0	17.15	30.36	2,845.8	36.6	21.5	4,469,178.76	287,171.11	40° 20' 45.718 N	107° 30' 21.178 W
2,900.0	20.15	30.36	2,893.1	50.4	29.5	4,469,182.96	287,173.57	40° 20' 45.856 N	107° 30' 21.079 W
2,950.0	23.15	30.36	2,939.6	66.3	38.9	4,469,187.82	287,176.41	40° 20' 46.016 N	107° 30' 20.964 W
3,000.0	26.15	30.36	2,985.0	84.3	49.4	4,469,193.30	287,179.62	40° 20' 46.197 N	107° 30' 20.835 W
3,050.0	29.15	30.36	3,029.3	104.4	61.1	4,469,199.40	287,183.20	40° 20' 46.398 N	107° 30' 20.691 W
3,100.0	32.15	30.36	3,072.3	126.3	74.0	4,469,206.10	287,187.13	40° 20' 46.619 N	107° 30' 20.532 W
3,133.1	34.13	30.36	3,100.0	141.9	83.1	4,469,210.86	287,189.91	40° 20' 46.775 N	107° 30' 20.420 W
7-5/8"									
3,150.0	35.15	30.36	3,113.9	150.2	88.0	4,469,213.39	287,191.39	40° 20' 46.859 N	107° 30' 20.360 W
3,200.0	38.15	30.36	3,154.0	176.0	103.1	4,469,221.24	287,195.99	40° 20' 47.117 N	107° 30' 20.175 W
3,250.0	41.15	30.36	3,192.5	203.5	119.2	4,469,229.63	287,200.91	40° 20' 47.393 N	107° 30' 19.977 W
3,300.0	44.15	30.36	3,229.3	232.7	136.3	4,469,238.54	287,206.12	40° 20' 47.687 N	107° 30' 19.767 W
3,350.0	47.15	30.36	3,264.3	263.6	154.4	4,469,247.94	287,211.63	40° 20' 47.997 N	107° 30' 19.545 W
3,400.0	50.15	30.36	3,297.3	296.0	173.4	4,469,257.81	287,217.41	40° 20' 48.322 N	107° 30' 19.312 W
3,450.0	53.15	30.36	3,328.3	329.8	193.2	4,469,268.12	287,223.45	40° 20' 48.661 N	107° 30' 19.068 W
3,500.0	56.15	30.36	3,357.2	365.0	213.8	4,469,278.84	287,229.74	40° 20' 49.015 N	107° 30' 18.815 W
3,550.0	59.15	30.36	3,384.0	401.4	235.2	4,469,289.95	287,236.24	40° 20' 49.380 N	107° 30' 18.553 W
3,600.0	62.15	30.36	3,408.5	439.0	257.2	4,469,301.41	287,242.96	40° 20' 49.758 N	107° 30' 18.282 W
3,647.5	65.00	30.36	3,429.6	475.7	278.7	4,469,312.60	287,249.51	40° 20' 50.126 N	107° 30' 18.018 W



Shell EP

Planning Report - Geographic



Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well Herring Draw 1-33
Company:	EPW_RMP	TVD Reference:	WELL @ 6809.0ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	WELL @ 6809.0ft (Original Well Elev)
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Well:	Herring Draw 1-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Herring Draw 1-33		
Design:	Herring Draw 1-33		

Planned Survey									
Measured Depth (ft)	Inclination (°)	Azimuth (°)	Vertical Depth (ft)	+N/-S (ft)	+E/-W (ft)	Map Northing (m)	Map Easting (m)	Latitude	Longitude
3,700.0	65.00	30.36	3,451.8	516.8	302.7	4,469,325.11	287,256.84	40° 20' 50.539 N	107° 30' 17.723 W
3,747.5	65.00	30.36	3,471.9	553.9	324.5	4,469,336.43	287,263.47	40° 20' 50.912 N	107° 30' 17.456 W
3,800.0	66.34	30.36	3,493.5	595.2	348.7	4,469,349.01	287,270.84	40° 20' 51.326 N	107° 30' 17.159 W
3,900.0	68.89	30.36	3,531.6	675.0	395.4	4,469,373.33	287,285.09	40° 20' 52.127 N	107° 30' 16.584 W
4,000.0	71.44	30.36	3,565.5	756.1	443.0	4,469,398.07	287,299.58	40° 20' 52.942 N	107° 30' 16.000 W
4,100.0	73.99	30.36	3,595.2	838.5	491.2	4,469,423.18	287,314.29	40° 20' 53.769 N	107° 30' 15.408 W
4,200.0	76.54	30.36	3,620.7	922.0	540.1	4,469,448.61	287,329.19	40° 20' 54.607 N	107° 30' 14.807 W
4,300.0	79.10	30.36	3,641.8	1,006.3	589.5	4,469,474.32	287,344.24	40° 20' 55.453 N	107° 30' 14.200 W
4,400.0	81.65	30.36	3,658.5	1,091.4	639.3	4,469,500.24	287,359.43	40° 20' 56.307 N	107° 30' 13.588 W
4,492.2	84.00	30.36	3,670.0	1,170.3	685.6	4,469,524.30	287,373.53	40° 20' 57.100 N	107° 30' 13.020 W
4,500.0	84.04	30.52	3,670.8	1,177.0	689.5	4,469,526.34	287,374.72	40° 20' 57.167 N	107° 30' 12.972 W
4,566.9	84.37	31.85	3,677.6	1,233.9	723.9	4,469,543.68	287,385.22	40° 20' 57.739 N	107° 30' 12.548 W
4,600.0	84.37	32.52	3,680.8	1,261.8	741.5	4,469,552.19	287,390.58	40° 20' 58.019 N	107° 30' 12.331 W
4,700.0	84.37	34.52	3,690.6	1,344.8	796.5	4,469,577.48	287,407.32	40° 20' 58.854 N	107° 30' 11.652 W
4,800.0	84.37	36.52	3,700.4	1,425.8	854.3	4,469,602.17	287,424.95	40° 20' 59.670 N	107° 30' 10.936 W
4,900.0	84.37	38.52	3,710.2	1,504.7	914.9	4,469,626.22	287,443.42	40° 21' 0.467 N	107° 30' 10.182 W
5,000.0	84.37	40.52	3,720.0	1,581.5	978.2	4,469,649.62	287,462.72	40° 21' 1.242 N	107° 30' 9.393 W
5,013.1	84.37	40.78	3,721.3	1,591.4	986.7	4,469,652.64	287,465.31	40° 21' 1.343 N	107° 30' 9.287 W
5,100.0	84.37	40.78	3,729.8	1,656.8	1,043.2	4,469,672.60	287,482.52	40° 21' 2.005 N	107° 30' 8.582 W
5,200.0	84.37	40.78	3,739.6	1,732.2	1,108.2	4,469,695.57	287,502.34	40° 21' 2.767 N	107° 30' 7.770 W
5,300.0	84.37	40.78	3,749.4	1,807.6	1,173.2	4,469,718.54	287,522.15	40° 21' 3.530 N	107° 30' 6.959 W
5,400.0	84.37	40.78	3,759.2	1,882.9	1,238.2	4,469,741.51	287,541.96	40° 21' 4.292 N	107° 30' 6.147 W
5,500.0	84.37	40.78	3,769.1	1,958.3	1,303.2	4,469,764.47	287,561.77	40° 21' 5.055 N	107° 30' 5.335 W
5,600.0	84.37	40.78	3,778.9	2,033.6	1,368.2	4,469,787.44	287,581.58	40° 21' 5.817 N	107° 30' 4.524 W
5,700.0	84.37	40.78	3,788.7	2,109.0	1,433.2	4,469,810.41	287,601.40	40° 21' 6.579 N	107° 30' 3.712 W
5,800.0	84.37	40.78	3,798.5	2,184.3	1,498.2	4,469,833.38	287,621.21	40° 21' 7.342 N	107° 30' 2.901 W
5,900.0	84.37	40.78	3,808.3	2,259.7	1,563.2	4,469,856.35	287,641.02	40° 21' 8.104 N	107° 30' 2.089 W
6,000.0	84.37	40.78	3,818.1	2,335.1	1,628.2	4,469,879.32	287,660.83	40° 21' 8.867 N	107° 30' 1.277 W
6,100.0	84.37	40.78	3,827.9	2,410.4	1,693.2	4,469,902.29	287,680.65	40° 21' 9.629 N	107° 30' 0.466 W
6,200.0	84.37	40.78	3,837.7	2,485.8	1,758.2	4,469,925.26	287,700.46	40° 21' 10.392 N	107° 29' 59.654 W
6,300.0	84.37	40.78	3,847.5	2,561.1	1,823.2	4,469,948.23	287,720.27	40° 21' 11.154 N	107° 29' 58.843 W
6,400.0	84.37	40.78	3,857.3	2,636.5	1,888.2	4,469,971.20	287,740.08	40° 21' 11.916 N	107° 29' 58.031 W
6,500.0	84.37	40.78	3,867.1	2,711.8	1,953.2	4,469,994.16	287,759.89	40° 21' 12.679 N	107° 29' 57.219 W
6,600.0	84.37	40.78	3,876.9	2,787.2	2,018.2	4,470,017.13	287,779.71	40° 21' 13.441 N	107° 29' 56.408 W
6,700.0	84.37	40.78	3,886.7	2,862.6	2,083.2	4,470,040.10	287,799.52	40° 21' 14.203 N	107° 29' 55.596 W
6,800.0	84.37	40.78	3,896.5	2,937.9	2,148.2	4,470,063.07	287,819.33	40° 21' 14.966 N	107° 29' 54.785 W
6,900.0	84.37	40.78	3,906.3	3,013.3	2,213.2	4,470,086.04	287,839.14	40° 21' 15.728 N	107° 29' 53.973 W
7,000.0	84.37	40.78	3,916.1	3,088.6	2,278.2	4,470,109.01	287,858.96	40° 21' 16.491 N	107° 29' 53.161 W
7,100.0	84.37	40.78	3,925.9	3,164.0	2,343.2	4,470,131.98	287,878.77	40° 21' 17.253 N	107° 29' 52.350 W
7,200.0	84.37	40.78	3,935.7	3,239.4	2,408.2	4,470,154.95	287,898.58	40° 21' 18.015 N	107° 29' 51.538 W
7,300.0	84.37	40.78	3,945.5	3,314.7	2,473.2	4,470,177.92	287,918.39	40° 21' 18.778 N	107° 29' 50.726 W
7,400.0	84.37	40.78	3,955.3	3,390.1	2,538.2	4,470,200.89	287,938.20	40° 21' 19.540 N	107° 29' 49.915 W
7,500.0	84.37	40.78	3,965.1	3,465.4	2,603.2	4,470,223.86	287,958.02	40° 21' 20.303 N	107° 29' 49.103 W
7,600.0	84.37	40.78	3,975.0	3,540.8	2,668.2	4,470,246.82	287,977.83	40° 21' 21.065 N	107° 29' 48.291 W
7,700.0	84.37	40.78	3,984.8	3,616.1	2,733.2	4,470,269.79	287,997.64	40° 21' 21.827 N	107° 29' 47.480 W
7,800.0	84.37	40.78	3,994.6	3,691.5	2,798.2	4,470,292.76	288,017.45	40° 21' 22.590 N	107° 29' 46.668 W
7,900.0	84.37	40.78	4,004.4	3,766.9	2,863.2	4,470,315.73	288,037.26	40° 21' 23.352 N	107° 29' 45.856 W
7,957.0	84.37	40.78	4,010.0	3,809.8	2,900.2	4,470,328.82	288,048.56	40° 21' 23.787 N	107° 29' 45.394 W
5 1/2"									
7,957.4	84.37	40.78	4,010.0	3,810.1	2,900.5	4,470,328.93	288,048.65	40° 21' 23.790 N	107° 29' 45.390 W



Database:	EDM_UA_Production	Local Co-ordinate Reference:	Well Herring Draw 1-33
Company:	EPW_RMP	TVD Reference:	WELL @ 6809.0ft (Original Well Elev)
Project:	CONCEPT WELL PLANNING - COLORADO (NAD83)	MD Reference:	WELL @ 6809.0ft (Original Well Elev)
Site:	Herring Draw 1-33	North Reference:	Grid
Well:	Herring Draw 1-33	Survey Calculation Method:	Minimum Curvature
Wellbore:	Herring Draw 1-33		
Design:	Herring Draw 1-33		

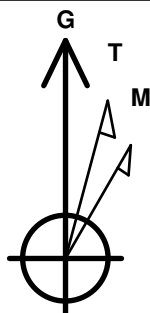
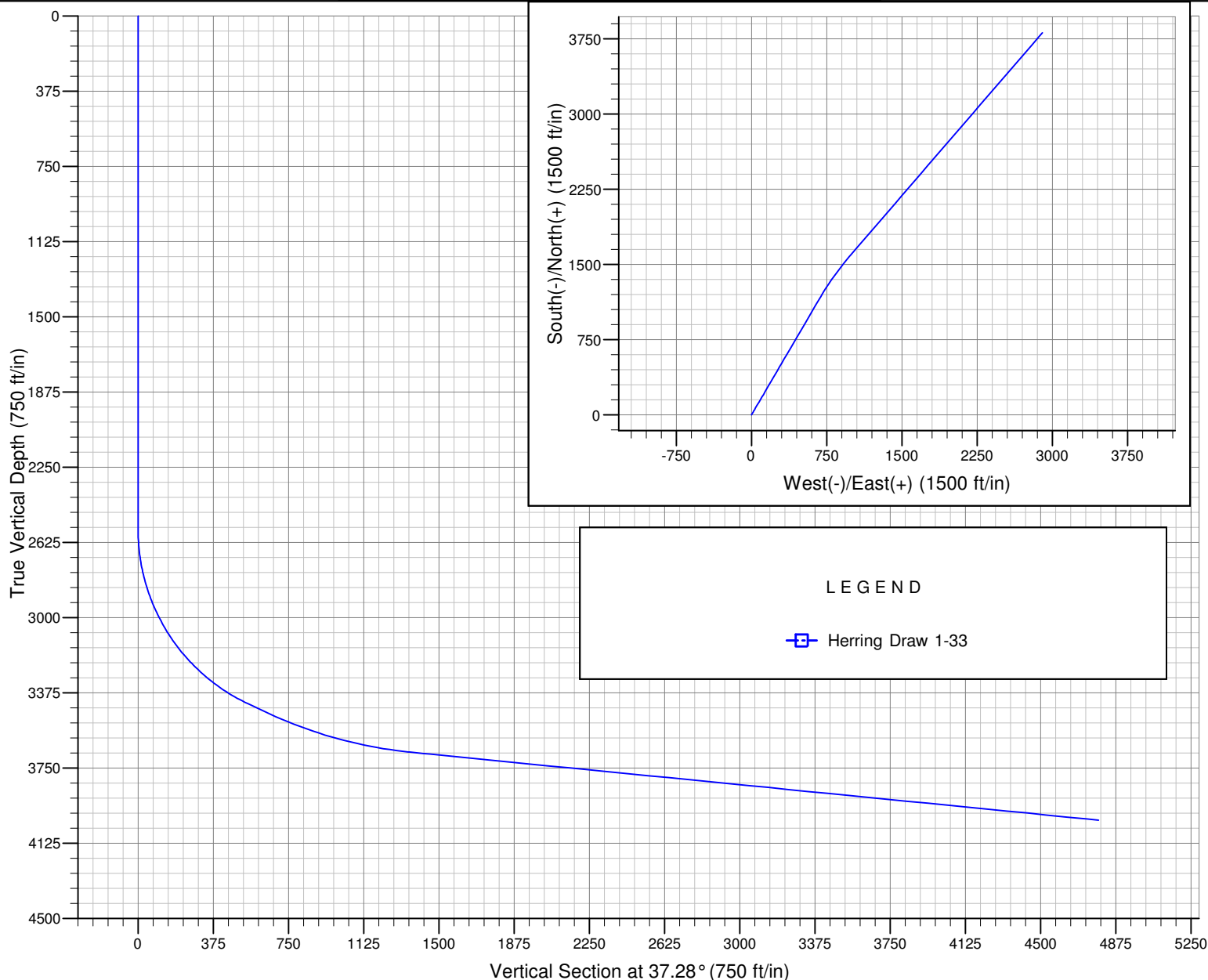
Design Targets									
Target Name	Dip Angle	Dip Dir.	TVD	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude
- hit/miss target	(°)	(°)	(ft)	(ft)	(ft)	(m)	(m)		
- Shape									
Heel Target	0.00	360.00	3,670.0	1,170.3	685.6	4,469,524.30	287,373.53	40° 20' 57.100 N	107° 30' 13.020 W
- plan hits target center									
- Point									
Toe Target	0.00	360.00	4,010.0	3,810.1	2,900.5	4,470,328.93	288,048.65	40° 21' 23.790 N	107° 29' 45.390 W
- plan hits target center									
- Point									

Casing Points					
Measured Depth	Vertical Depth	Name	Casing Diameter	Hole Diameter	
(ft)	(ft)		(in)	(in)	
450.0	450.0	10 3/4"	10.750	12.250	
3,133.1	3,100.0	7-5/8"	7.750	12.250	
7,957.0	4,010.0	5 1/2"	5.500	8.500	

Site: Herring Draw 1-33
Well: Herring Draw 1-33
Wellbore: Herring Draw 1-33

SITE DETAILS: Herring Draw 1-33

Site Centre Latitude: 40° 20' 45.350 N
Longitude: 107° 30' 21.442 W
Positional Uncertainty: 1.0
Convergence: -1.62
Local North: Grid



Azimuths to Grid North
True North: 1.62°
Magnetic North: 11.77°
Magnetic Field
Strength: 52764.4snT
Dip Angle: 66.54°
Date: 11/17/2011
Model: BGGM2009

WFU Herring Draw 1-33

T5N,R90W, SEC 33

Wellbore Diagram

Updated 11/17/2011

Location Section 31 Township 5N Range 90W Moffat County, CO

Unit Williams For Unit

Elevation 6796' GL

API Number: Pending

6808' KB

Target: Niobrara

Surface Section

Hole: 13-1/2"
Depth: 450' MD
Casing: 10-3/4" 40.5# J-55, ST&C
Cement Top: Surface
Mud Weight: 8.4 ppg

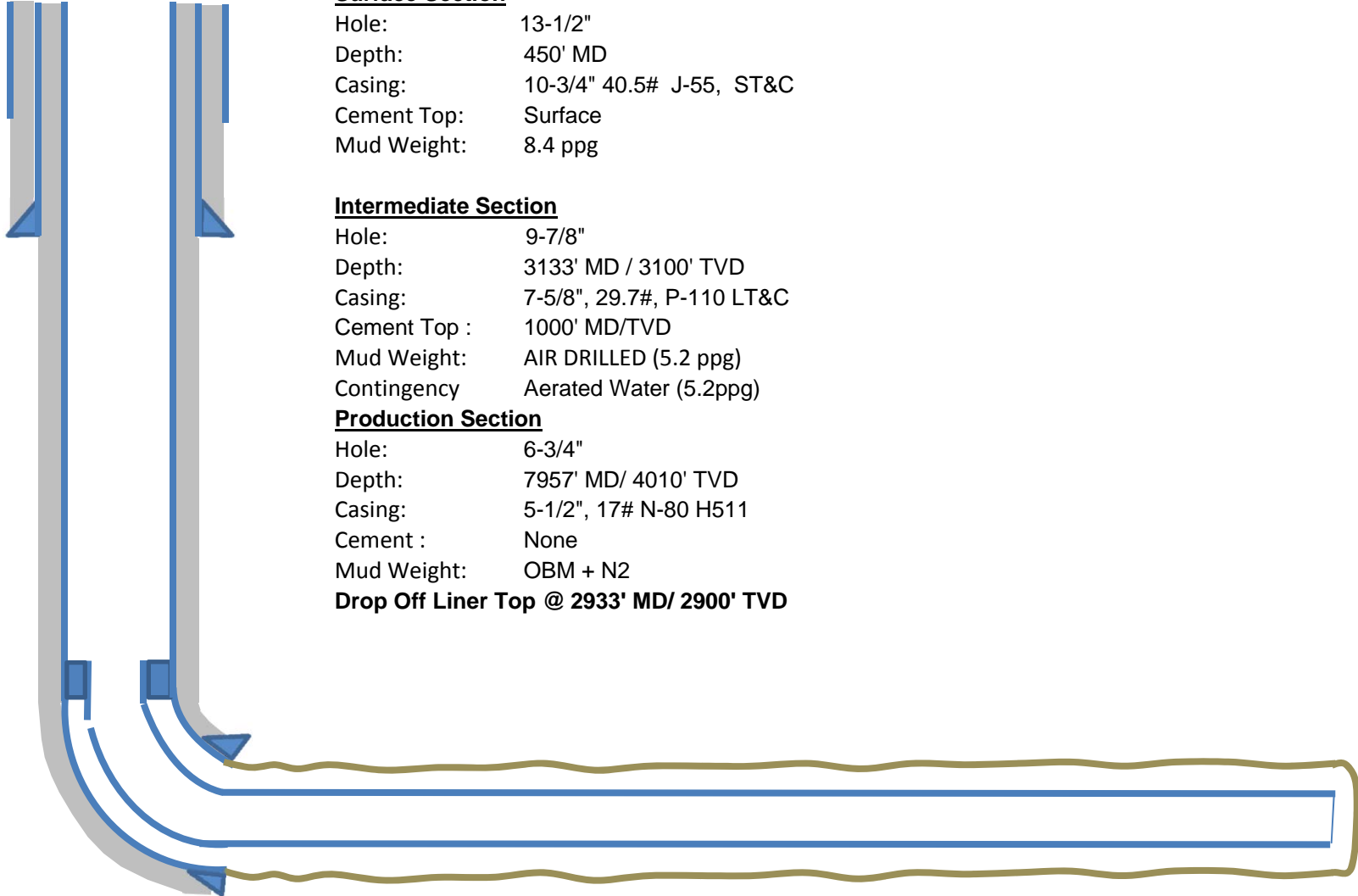
Intermediate Section

Hole: 9-7/8"
Depth: 3133' MD / 3100' TVD
Casing: 7-5/8", 29.7#, P-110 LT&C
Cement Top : 1000' MD/TVD
Mud Weight: AIR DRILLED (5.2 ppg)
Contingency Aerated Water (5.2ppg)

Production Section

Hole: 6-3/4"
Depth: 7957' MD/ 4010' TVD
Casing: 5-1/2", 17# N-80 H511
Cement : None
Mud Weight: OBM + N2

Drop Off Liner Top @ 2933' MD/ 2900' TVD



Drilling and Completion Plan – Horizontal Hole

This well is a “toe-up” horizontal well. 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.

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 workover rig or the drilling rig, each with a BOP package and a kill weight completion fluid system. Fracing or additional stimulation methods are not anticipated to be necessary. The surface pump unit will initially be a rental system to test the well, with a permanent pump jack unit being installed at a later date.