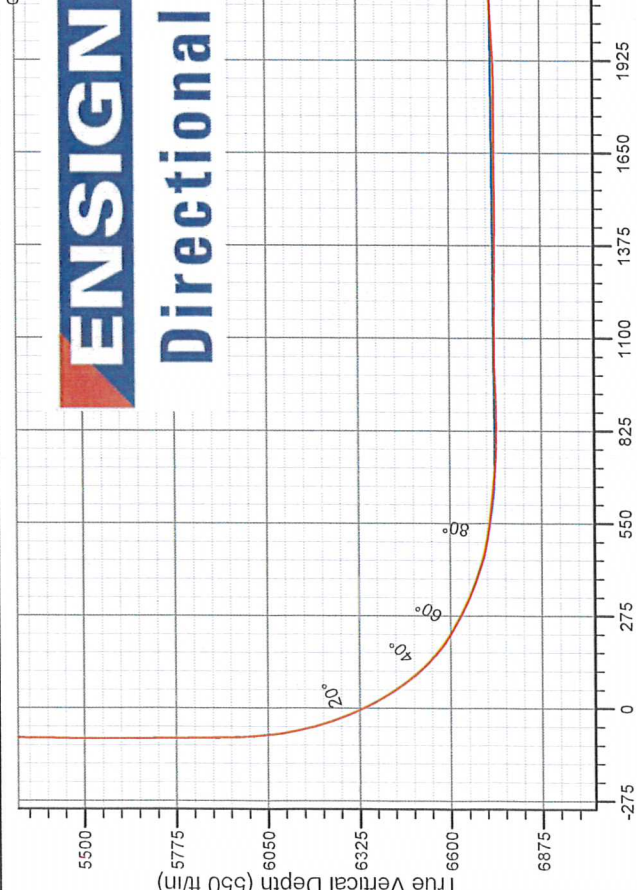
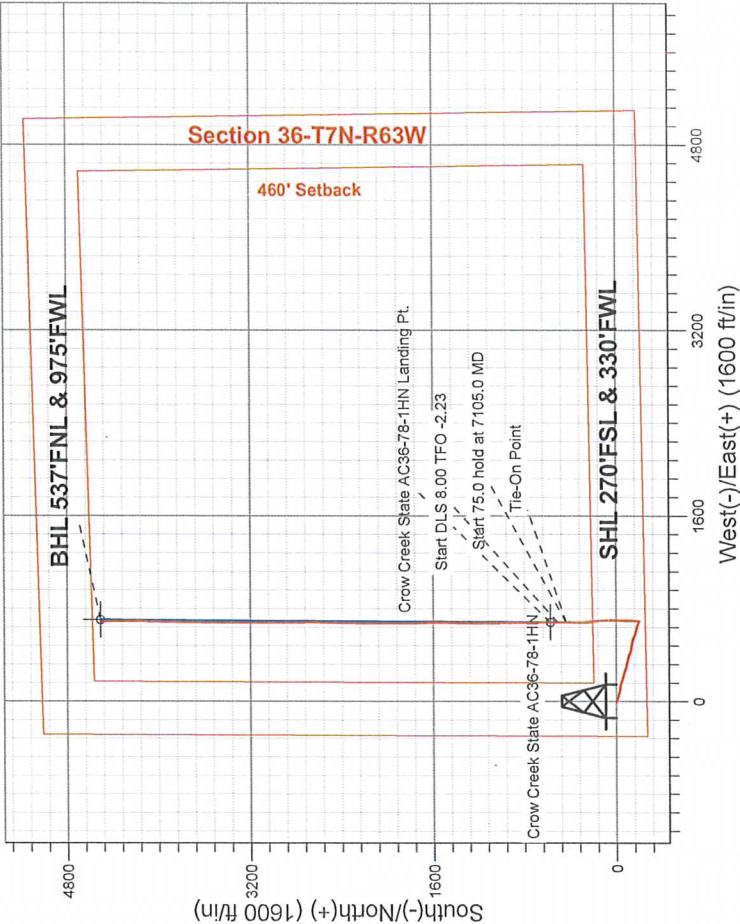


Noble Energy Inc.- Weld County, CO (Grid North)

Well Name: Crow Creek State AC36-78-1HN  
Surface Location: Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W  
North American Datum 1983 , US State Plane 1983 , Colorado Northern Zone  
Ground Elevation: 4775.0  
+N/-S +E/-W Northing Easting Latitude Longitude Slot  
0.0 0.0 1435493.87 3307693.78 40.523560 -104.393170  
Precision 828 RKB - 16' WELL @ 4791.0ft (Precision 828 RKB - 16')

FINAL SURVEY

Projected Bottom Hole Location  
11182' MD 6646' TVD 4506' N & 4506' E of SHL  
94.3 degree Incl @ 359.0 degree AZM



Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63  
Crow Creek State AC36-78-1HN  
Wellbore #1  
7:33, October 07 2013

ANNOTATIONS

No annotation data is available.

LEGEND

- Crow Creek State AC36-78-1HN, Wellbore #1, Plan B - Rev 0 V0
- Wellbore #1
- Survey #1



## **Directional**

### **Noble Energy Inc.- Weld County, CO (Grid North)**

**Sec.36-T7N-R63W**

**Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W**

**Crow Creek State AC36-78-1HN**

**Wellbore #1**

**Design: Wellbore #1**

### **Standard Survey Report**

**20 December, 2013**



Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Crow Creek State AC36-78-1HN
Project:	Sec.36-T7N-R63W	TVD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Site:	Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W	MD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Well:	Crow Creek State AC36-78-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

Project	Sec.36-T7N-R63W, Weld County, CO		
Map System:	US State Plane 1983	System Datum:	Mean Sea Level
Geo Datum:	North American Datum 1983		Using Well Reference Point
Map Zone:	Colorado Northern Zone		Using geodetic scale factor

Site		Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W			
Site Position:		Northing:	1,435,493.88 ft	Latitude:	40.523560
From:	Lat/Long	Easting:	3,307,693.78 ft	Longitude:	-104.393170
Position Uncertainty:	0.0 ft	Slot Radius:	"	Grid Convergence:	0.72 °

Well		Crow Creek State AC36-78-1HN				
Well Position	+N/-S	0.0 ft	Northing:	1,435,493.87 ft	Latitude:	40.523560
	+E/-W	0.0 ft	Easting:	3,307,693.78 ft	Longitude:	-104.393170
Position Uncertainty		0.0 ft	Wellhead Elevation:	ft	Ground Level:	4,775.0 ft

Wellbore	Wellbore #1				
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Magnetics	Model Name	Sample Date	Declination (°)	Dip Angle (°)	Field Strength (nT)
	IGRF2010	9/12/2013	8.37	67.13	52,998

Design	Wellbore #1				
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Audit Notes:					
Version:	1.0	Phase:	ACTUAL	Tie On Depth:	0.0
Vertical Section:	Depth From (TVD) (ft)	+N/-S (ft)	+E/-W (ft)	Direction (°)	
	0.0	0.0	0.0	8.86	

Survey Program	Date 10/11/2013				
From (ft)	To (ft)	Survey (Wellbore)	Tool Name	Description	
318.0	591.0	Survey #1 (Wellbore #1)	Flexi-Shot	VES Flexi-Shot Tool	
658.0	11,182.0	Survey #2 (Wellbore #1)	MWD	MWD - Standard	

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)	
0.0	0.00	0.00	0.0	0.0	0.0	0.0	0.00	0.00	0.00	
318.0	0.30	211.30	318.0	-0.7	-0.4	-0.8	0.09	0.09	0.00	
591.0	0.00	349.50	591.0	-1.3	-0.8	-1.4	0.11	-0.11	0.00	
658.0	0.20	179.60	658.0	-1.4	-0.8	-1.5	0.30	0.30	0.00	
747.0	0.30	187.10	747.0	-1.8	-0.8	-1.9	0.12	0.11	8.43	
836.0	0.70	151.30	836.0	-2.5	-0.6	-2.6	0.55	0.45	-40.22	
926.0	0.30	198.40	926.0	-3.2	-0.4	-3.3	0.60	-0.44	52.33	
1,016.0	0.90	121.90	1,016.0	-3.8	0.1	-3.8	0.98	0.67	-85.00	
1,093.0	1.70	105.70	1,093.0	-4.5	1.7	-4.1	1.13	1.04	-21.04	
1,187.0	3.10	110.50	1,186.9	-5.7	5.5	-4.8	1.50	1.49	5.11	

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Crow Creek State AC36-78-1HN
Project:	Sec.36-T7N-R63W	TVD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Site:	Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W	MD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Well:	Crow Creek State AC36-78-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

### 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)
1,282.0	4.30	110.70	1,281.7	-7.9	11.2	-6.1	1.26	1.26	0.21
1,377.0	5.60	108.40	1,376.3	-10.6	18.9	-7.6	1.38	1.37	-2.42
1,472.0	6.80	104.90	1,470.8	-13.5	28.8	-8.9	1.32	1.26	-3.68
1,567.0	8.20	102.90	1,565.0	-16.5	40.8	-10.0	1.50	1.47	-2.11
1,662.0	9.70	107.90	1,658.8	-20.5	55.0	-11.7	1.78	1.58	5.26
1,757.0	10.50	106.40	1,752.3	-25.4	70.9	-14.1	0.89	0.84	-1.58
1,851.0	9.70	101.50	1,844.9	-29.4	86.9	-15.6	1.25	-0.85	-5.21
1,946.0	10.60	104.90	1,938.4	-33.2	103.2	-16.9	1.14	0.95	3.58
2,058.0	10.40	97.50	2,048.5	-37.2	123.2	-17.8	1.22	-0.18	-6.61
2,147.0	9.10	102.20	2,136.2	-39.7	138.0	-18.0	1.71	-1.46	5.28
2,237.0	10.00	104.20	2,225.0	-43.1	152.6	-19.1	1.07	1.00	2.22
2,327.0	10.40	110.10	2,313.6	-47.8	167.8	-21.4	1.24	0.44	6.56
2,417.0	10.10	104.70	2,402.1	-52.6	183.0	-23.8	1.12	-0.33	-6.00
2,507.0	10.00	100.30	2,490.7	-56.0	198.3	-24.8	0.86	-0.11	-4.89
2,597.0	10.40	102.80	2,579.3	-59.2	214.0	-25.6	0.66	0.44	2.78
2,687.0	9.80	105.90	2,667.9	-63.1	229.2	-27.1	0.90	-0.67	3.44
2,777.0	10.20	109.60	2,756.6	-67.9	244.1	-29.5	0.84	0.44	4.11
2,866.0	10.30	108.90	2,844.1	-73.1	259.1	-32.3	0.18	0.11	-0.79
2,956.0	10.20	109.40	2,932.7	-78.4	274.2	-35.2	0.15	-0.11	0.56
3,046.0	10.40	111.00	3,021.3	-83.9	289.3	-38.4	0.39	0.22	1.78
3,136.0	10.40	103.50	3,109.8	-88.7	304.8	-40.7	1.50	0.00	-8.33
3,226.0	10.10	103.30	3,198.3	-92.4	320.4	-42.0	0.34	-0.33	-0.22
3,316.0	9.70	103.60	3,287.0	-96.0	335.4	-43.3	0.45	-0.44	0.33
3,406.0	9.20	104.20	3,375.8	-99.6	349.8	-44.5	0.57	-0.56	0.67
3,495.0	9.60	103.60	3,463.6	-103.1	363.9	-45.8	0.46	0.45	-0.67
3,585.0	9.50	105.90	3,552.3	-106.9	378.3	-47.4	0.44	-0.11	2.56
3,675.0	10.60	110.00	3,641.0	-111.7	393.2	-49.9	1.46	1.22	4.56
3,765.0	11.30	111.70	3,729.3	-117.8	409.2	-53.4	0.86	0.78	1.89
3,855.0	12.70	107.50	3,817.3	-124.1	426.8	-56.9	1.83	1.56	-4.67
3,945.0	12.00	103.30	3,905.3	-129.2	445.4	-59.1	1.26	-0.78	-4.67
4,034.0	11.20	98.50	3,992.5	-132.6	462.9	-59.7	1.41	-0.90	-5.39
4,124.0	11.10	97.50	4,080.8	-135.0	480.1	-59.5	0.24	-0.11	-1.11
4,214.0	9.90	97.70	4,169.2	-137.2	496.4	-59.1	1.33	-1.33	0.22
4,304.0	10.10	100.10	4,257.9	-139.6	511.8	-59.1	0.51	0.22	2.67
4,394.0	9.10	103.50	4,346.6	-142.7	526.5	-59.9	1.28	-1.11	3.78
4,484.0	9.30	108.70	4,435.5	-146.7	540.3	-61.7	0.95	0.22	5.78
4,573.0	9.90	114.90	4,523.2	-152.2	554.1	-65.0	1.34	0.67	6.97
4,663.0	10.60	113.30	4,611.8	-158.7	568.7	-69.2	0.84	0.78	-1.78
4,753.0	11.30	107.00	4,700.1	-164.6	584.7	-72.6	1.54	0.78	-7.00
4,843.0	11.30	107.30	4,788.4	-169.8	601.6	-75.1	0.07	0.00	0.33
4,933.0	10.50	106.80	4,876.8	-174.8	617.9	-77.5	0.90	-0.89	-0.56
5,023.0	10.50	106.10	4,965.3	-179.4	633.6	-79.7	0.14	0.00	-0.78
5,113.0	8.80	102.80	5,054.0	-183.2	648.2	-81.2	1.99	-1.89	-3.67
5,202.0	7.60	107.70	5,142.1	-186.5	660.4	-82.6	1.56	-1.35	5.51
5,292.0	6.90	116.80	5,231.4	-190.7	670.9	-85.2	1.49	-0.78	10.11
5,382.0	4.70	112.80	5,320.9	-194.6	679.2	-87.7	2.48	-2.44	-4.44
5,472.0	3.50	113.50	5,410.7	-197.1	685.1	-89.3	1.33	-1.33	0.78
5,562.0	2.60	112.60	5,500.5	-199.0	689.5	-90.5	1.00	-1.00	-1.00
5,651.0	1.20	99.20	5,589.5	-199.9	692.3	-91.0	1.64	-1.57	-15.06
5,741.0	0.60	333.90	5,679.5	-199.7	693.0	-90.6	1.80	-0.67	-139.22
5,831.0	0.80	343.90	5,769.5	-198.6	692.6	-89.6	0.26	0.22	11.11
5,921.0	0.80	1.70	5,859.5	-197.4	692.5	-88.4	0.28	0.00	19.78
5,966.0	0.70	353.10	5,904.5	-196.8	692.4	-87.9	0.33	-0.22	-19.11



Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Crow Creek State AC36-78-1HN
Project:	Sec.36-T7N-R63W	TVD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Site:	Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W	MD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Well:	Crow Creek State AC36-78-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

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)
6,011.0	1.10	343.10	5,949.5	-196.1	692.3	-87.2	0.95	0.89	-22.22
6,055.0	3.50	357.50	5,993.4	-194.4	692.1	-85.5	5.57	5.45	32.73
6,100.0	5.70	2.90	6,038.3	-190.8	692.1	-81.9	4.98	4.89	12.00
6,145.0	7.80	5.00	6,083.0	-185.5	692.5	-76.7	4.70	4.67	4.67
6,190.0	10.70	7.10	6,127.4	-178.3	693.3	-69.4	6.49	6.44	4.67
6,235.0	13.80	6.10	6,171.3	-168.8	694.4	-59.9	6.90	6.89	-2.22
6,280.0	16.90	2.60	6,214.7	-157.0	695.3	-48.0	7.19	6.89	-7.78
6,325.0	20.00	2.20	6,257.4	-142.7	695.9	-33.9	6.89	6.89	-0.89
6,370.0	23.00	2.00	6,299.3	-126.3	696.5	-17.5	6.67	6.67	-0.44
6,415.0	25.80	1.70	6,340.2	-107.7	697.1	0.9	6.23	6.22	-0.67
6,460.0	28.90	1.70	6,380.2	-87.0	697.7	21.4	6.89	6.89	0.00
6,505.0	32.10	3.10	6,419.0	-64.2	698.6	44.1	7.28	7.11	3.11
6,550.0	35.60	3.60	6,456.3	-39.2	700.1	69.1	7.80	7.78	1.11
6,595.0	39.30	1.50	6,492.1	-11.9	701.3	96.3	8.70	8.22	-4.67
6,640.0	44.70	359.40	6,525.5	18.2	701.5	126.0	12.40	12.00	-4.67
6,685.0	50.20	356.90	6,555.9	51.4	700.4	158.6	12.89	12.22	-5.56
6,730.0	55.60	354.80	6,583.1	87.1	697.8	193.5	12.56	12.00	-4.67
6,774.0	60.10	355.00	6,606.5	124.2	694.5	229.7	10.23	10.23	0.45
6,819.0	62.80	355.00	6,628.0	163.6	691.0	268.1	6.00	6.00	0.00
6,864.0	65.50	355.40	6,647.6	204.0	687.6	307.4	6.05	6.00	0.89
6,909.0	68.40	356.20	6,665.2	245.2	684.6	347.7	6.65	6.44	1.78
6,954.0	69.90	357.60	6,681.2	287.2	682.3	388.9	4.42	3.33	3.11
6,999.0	74.00	359.00	6,695.2	330.0	681.1	430.9	9.58	9.11	3.11
7,044.0	78.50	359.90	6,705.9	373.7	680.7	474.0	10.19	10.00	2.00
7,055.0	79.80	0.50	6,707.9	384.5	680.7	484.7	12.98	11.82	5.45
7,142.0	83.00	0.80	6,720.9	470.5	681.7	569.8	3.69	3.68	0.34
7,232.0	84.40	0.10	6,730.8	559.9	682.4	658.3	1.74	1.56	-0.78
7,245.6	84.81	0.10	6,732.1	573.5	682.4	671.7	3.03	3.03	0.00
Crow Creek State AC36-78-1HN Landing Pt.									
7,321.0	87.10	0.10	6,737.4	648.7	682.5	746.1	3.03	3.03	0.00
7,411.0	90.30	359.40	6,739.4	738.7	682.1	834.9	3.64	3.56	-0.78
7,501.0	91.50	359.20	6,738.0	828.6	681.0	923.6	1.35	1.33	-0.22
7,591.0	92.40	358.90	6,735.0	918.6	679.6	1,012.3	1.05	1.00	-0.33
7,681.0	89.30	358.20	6,733.6	1,008.5	677.3	1,100.8	3.53	-3.44	-0.78
7,771.0	89.50	358.50	6,734.6	1,098.5	674.7	1,189.3	0.40	0.22	0.33
7,860.0	90.40	359.90	6,734.7	1,187.5	673.4	1,277.0	1.87	1.01	1.57
7,950.0	88.30	359.00	6,735.7	1,277.4	672.6	1,365.8	2.54	-2.33	-1.00
8,040.0	90.40	2.90	6,736.7	1,367.4	674.1	1,454.9	4.92	2.33	4.33
8,130.0	90.30	2.20	6,736.1	1,457.3	678.1	1,544.3	0.79	-0.11	-0.78
8,220.0	89.90	1.90	6,736.0	1,547.3	681.3	1,633.7	0.56	-0.44	-0.33
8,310.0	89.90	357.50	6,736.1	1,637.2	680.8	1,722.5	4.89	0.00	-4.89
8,399.0	89.80	357.60	6,736.4	1,726.2	677.0	1,809.8	0.16	-0.11	0.11
8,489.0	91.60	359.20	6,735.3	1,816.1	674.5	1,898.3	2.68	2.00	1.78
8,579.0	93.90	359.70	6,731.0	1,906.0	673.6	1,987.0	2.62	2.56	0.56
8,669.0	93.00	0.10	6,725.5	1,995.8	673.5	2,075.7	1.09	-1.00	0.44
8,759.0	92.90	0.30	6,720.9	2,085.7	673.8	2,164.6	0.25	-0.11	0.22
8,849.0	92.70	1.50	6,716.5	2,175.6	675.2	2,253.6	1.35	-0.22	1.33
8,939.0	91.60	1.50	6,713.1	2,265.5	677.6	2,342.8	1.22	-1.22	0.00
9,029.0	90.20	1.00	6,711.7	2,355.5	679.5	2,432.0	1.65	-1.56	-0.56
9,118.0	90.50	0.60	6,711.2	2,444.4	680.8	2,520.1	0.56	0.34	-0.45
9,208.0	90.30	1.00	6,710.6	2,534.4	682.0	2,609.2	0.50	-0.22	0.44
9,298.0	89.80	0.10	6,710.5	2,624.4	682.9	2,698.3	1.14	-0.56	-1.00

Company:	Noble Energy Inc.- Weld County, CO (Grid North)	Local Co-ordinate Reference:	Well Crow Creek State AC36-78-1HN
Project:	Sec.36-T7N-R63W	TVD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Site:	Crow Creek State AC36-78-1HN Pad Sec.36-T7N-R63W	MD Reference:	WELL @ 4791.0ft (Precision 828 RKB - 16')
Well:	Crow Creek State AC36-78-1HN	North Reference:	Grid
Wellbore:	Wellbore #1	Survey Calculation Method:	Minimum Curvature
Design:	Wellbore #1	Database:	Landmark

### 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)
9,388.0	90.40	359.90	6,710.3	2,714.4	682.9	2,787.2	0.70	0.67	-0.22
9,478.0	91.20	359.00	6,709.1	2,804.4	682.0	2,876.0	1.34	0.89	-1.00
9,568.0	91.70	359.00	6,706.8	2,894.4	680.5	2,964.6	0.56	0.56	0.00
9,658.0	92.20	359.70	6,703.7	2,984.3	679.4	3,053.3	0.96	0.56	0.78
9,748.0	91.60	359.60	6,700.7	3,074.3	678.9	3,142.1	0.68	-0.67	-0.11
9,838.0	90.50	0.30	6,699.1	3,164.2	678.8	3,231.0	1.45	-1.22	0.78
9,928.0	90.60	0.60	6,698.2	3,254.2	679.5	3,320.1	0.35	0.11	0.33
10,018.0	90.20	359.90	6,697.6	3,344.2	679.9	3,409.0	0.90	-0.44	-0.78
10,108.0	90.30	359.70	6,697.2	3,434.2	679.6	3,497.9	0.25	0.11	-0.22
10,198.0	91.10	0.50	6,696.1	3,524.2	679.8	3,586.9	1.26	0.89	0.89
10,288.0	90.70	0.50	6,694.7	3,614.2	680.5	3,675.9	0.44	-0.44	0.00
10,377.0	91.30	0.80	6,693.1	3,703.2	681.5	3,764.0	0.75	0.67	0.34
10,467.0	91.90	1.30	6,690.6	3,793.1	683.2	3,853.1	0.87	0.67	0.56
10,557.0	93.10	1.00	6,686.7	3,883.0	685.0	3,942.2	1.37	1.33	-0.33
10,646.0	92.40	1.70	6,682.4	3,971.9	687.1	4,030.3	1.11	-0.79	0.79
10,737.0	92.40	1.20	6,678.6	4,062.8	689.4	4,120.5	0.55	0.00	-0.55
10,826.0	92.80	0.80	6,674.6	4,151.7	690.9	4,208.6	0.64	0.45	-0.45
10,916.0	94.40	359.90	6,668.9	4,241.5	691.5	4,297.4	2.04	1.78	-1.00
11,006.0	95.70	359.00	6,661.0	4,331.1	690.6	4,385.8	1.75	1.44	-1.00
11,096.0	95.10	358.90	6,652.5	4,420.7	689.0	4,474.1	0.68	-0.67	-0.11
11,124.0	94.30	359.00	6,650.2	4,448.6	688.5	4,501.6	2.88	-2.86	0.36
11,179.1	94.30	359.00	6,646.1	4,503.6	687.5	4,555.7	0.00	0.00	0.00
Crow Creek State AC36-78-1HN BHL 535'FNL & 990'FWL									
11,182.0	94.30	359.00	6,645.9	4,506.5	687.5	4,558.6	0.00	0.00	0.00

Checked By: \_\_\_\_\_ Approved By: \_\_\_\_\_ Date: \_\_\_\_\_