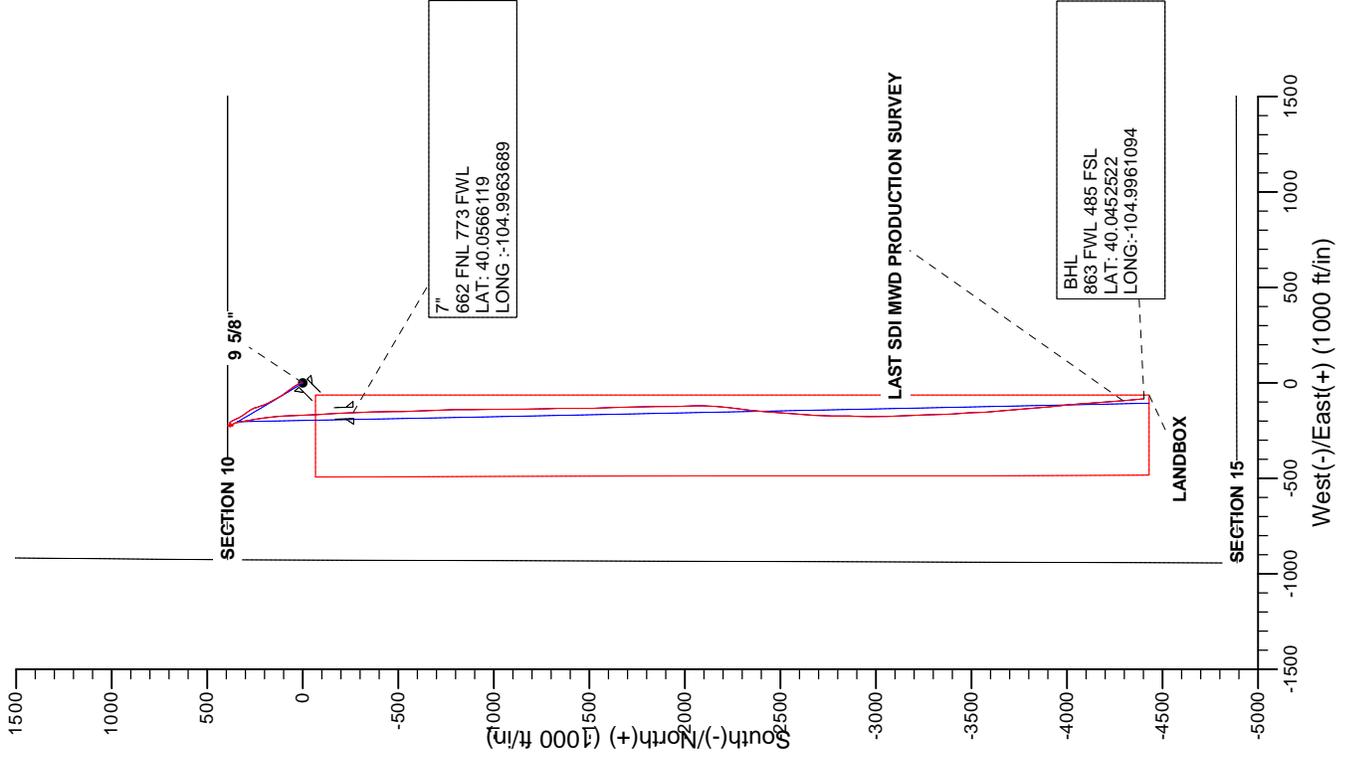
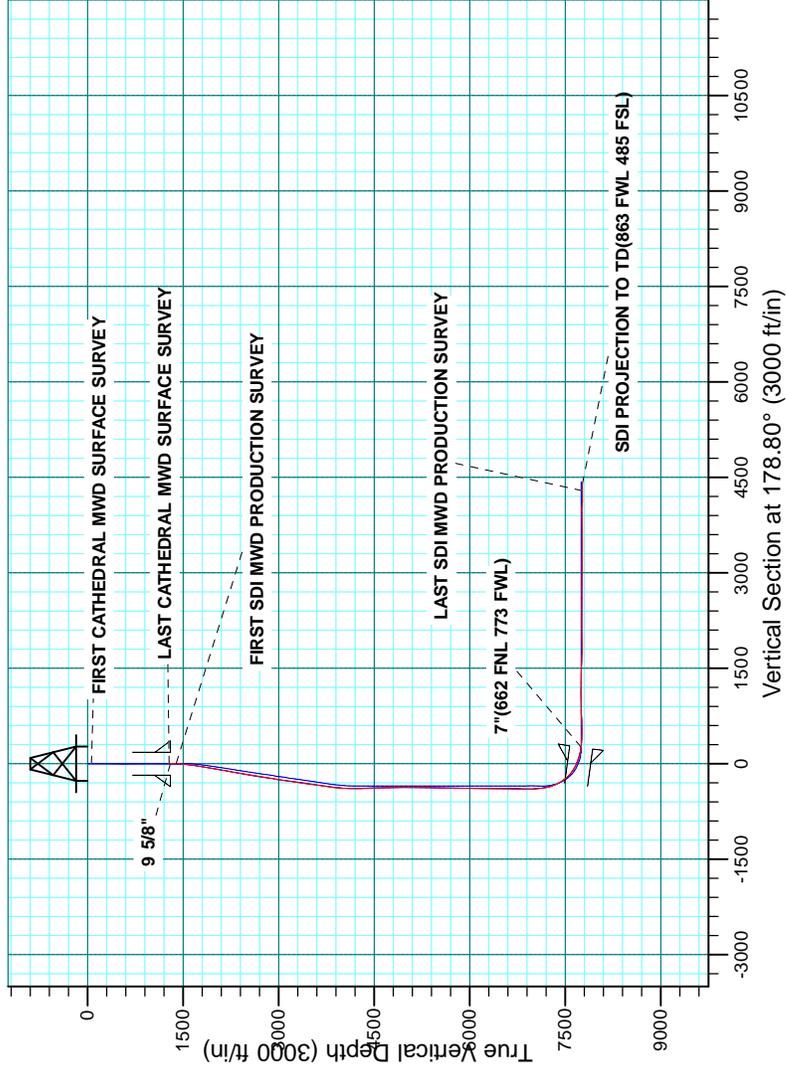


| WELL DETAILS: BUFFALO 13N-15HZ | | | | | |
|--|-------|------------|------------|------------|--------------|
| GL 51.38 & KB 20 @ 5158.00ft (PRECISION 461) | | | | | |
| +N/-S | +E/-W | Northing | Eastng | Latitude | Longitude |
| 0.00 | 0.00 | 1264135.17 | 3141130.84 | 40.0573389 | -104.9958110 |

| PROJECT DETAILS: COLORADO NORTHERN ZONE - 83 | |
|--|---------------------------|
| Geodetic System: | US State Plane 1983 |
| Datum: | North American Datum 1983 |
| Ellipsoid: | GRS 1980 |
| Zone: | Colorado Northern Zone |
| Location: | SECTION 15 T1N R68W |
| System Datum: | Mean Sea Level |

| CASING DETAILS | |
|----------------|---------|
| TVD | Name |
| 1302.98 | MD |
| 7754.88 | 1303.00 |
| | 9 5/8" |
| | 7" |
| | 8150.00 |
| | 7" |
| | 7.000 |



| | | | |
|------------------|------------------------------|-------------------------------------|---|
| Company: | US ROCKIES REGION PLANNING | Local Co-ordinate Reference: | Well BUFFALO 13N-15HZ |
| Project: | COLORADO NORTHERN ZONE - 83 | TVD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Site: | BUFFALO & BADGER 4C-15HZ PAD | MD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Well: | BUFFALO 13N-15HZ | North Reference: | True |
| Wellbore: | OH | Survey Calculation Method: | Minimum Curvature |
| Design: | OH | Database: | Denver Sales |

| | | | |
|--------------------|--|----------------------|----------------|
| Project | COLORADO NORTHERN ZONE - 83, KERR MCGEE OIL & GAS ONSHORE LP | | |
| Map System: | US State Plane 1983 | System Datum: | Mean Sea Level |
| Geo Datum: | North American Datum 1983 | | |
| Map Zone: | Colorado Northern Zone | | |

| | | | | | |
|------------------------------|---|---------------------|-------------------|--------------------------|--------------|
| Site | BUFFALO & BADGER 4C-15HZ PAD, SECTION 15 T1N R68W | | | | |
| Site Position: | | Northing: | 1,264,136.65 usft | Latitude: | 40.0573420 |
| From: | Lat/Long | Easting: | 3,141,190.73 usft | Longitude: | -104.9955970 |
| Position Uncertainty: | 0.00 ft | Slot Radius: | 13.200 in | Grid Convergence: | 0.33 ° |

| | | | | | | |
|-----------------------------|-------------------------------------|---------|----------------------------|-------------------|----------------------|--------------|
| Well | BUFFALO 13N-15HZ, 393' FNL 929' FWL | | | | | |
| Well Position | +N/-S | 0.00 ft | Northing: | 1,264,135.17 usft | Latitude: | 40.0573389 |
| | +E/-W | 0.00 ft | Easting: | 3,141,130.84 usft | Longitude: | -104.9958110 |
| Position Uncertainty | | 0.00 ft | Wellhead Elevation: | 0.00 ft | Ground Level: | 5,138.00 ft |

| | | | | | |
|------------------|-------------------|--------------------|------------------------|----------------------|----------------------------|
| Wellbore | OH | | | | |
| Magnetics | Model Name | Sample Date | Declination (°) | Dip Angle (°) | Field Strength (nT) |
| | IGRF2015 | 6/5/2014 | 8.63 | 66.62 | 52,536 |

| | | | | | |
|--------------------------|------------------------------|-------------------|-------------------|----------------------|------|
| Design | OH | | | | |
| Audit Notes: | | | | | |
| Version: | 1.0 | Phase: | ACTUAL | Tie On Depth: | 0.00 |
| Vertical Section: | Depth From (TVD) (ft) | +N/-S (ft) | +E/-W (ft) | Direction (°) | |
| | 0.00 | 0.00 | 0.00 | 178.80 | |

| | | | | | |
|-----------------------|----------------|-----------------------------------|------------------|------------------------------|--|
| Survey Program | Date | 5/20/2015 | | | |
| From (ft) | To (ft) | Survey (Wellbore) | Tool Name | Description | |
| 14.00 | 1,287.00 | Survey #1 CATHEDRAL MWD SURFACE | MWD | MWD - Standard | |
| 1,391.00 | 12,295.00 | Survey #2 SDI MWD PRODUCTION (OH) | SDI MWD | SDI MWD - Standard ver 1.0.1 | |

| | | | | | | | | | | |
|---|------------------------|--------------------|----------------------------|-------------------|-------------------|------------------------------|--------------------------------|-------------------------------|------------------------------|------|
| Survey | | | | | | | | | | |
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | |
| 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 14.00 | 0.00 | 0.00 | 14.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 66.00 | 0.10 | 46.70 | 66.00 | 0.03 | 0.03 | -0.03 | 0.19 | 0.19 | 0.00 | |
| FIRST CATHEDRAL MWD SURFACE SURVEY | | | | | | | | | | |
| 176.00 | 0.30 | 278.50 | 176.00 | 0.14 | -0.18 | -0.14 | 0.34 | 0.18 | -116.55 | |
| 256.00 | 0.20 | 260.70 | 256.00 | 0.15 | -0.53 | -0.16 | 0.16 | -0.13 | -22.25 | |
| 336.00 | 0.30 | 238.40 | 336.00 | 0.02 | -0.84 | -0.03 | 0.17 | 0.13 | -27.88 | |
| 416.00 | 0.30 | 278.50 | 416.00 | -0.06 | -1.23 | 0.04 | 0.26 | 0.00 | 50.13 | |

| | | | |
|------------------|------------------------------|-------------------------------------|---|
| Company: | US ROCKIES REGION PLANNING | Local Co-ordinate Reference: | Well BUFFALO 13N-15HZ |
| Project: | COLORADO NORTHERN ZONE - 83 | TVD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Site: | BUFFALO & BADGER 4C-15HZ PAD | MD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Well: | BUFFALO 13N-15HZ | North Reference: | True |
| Wellbore: | OH | Survey Calculation Method: | Minimum Curvature |
| Design: | OH | Database: | Denver Sales |

| Survey | | | | | | | | | | |
|--|-----------------|-------------|---------------------|------------|------------|-----------------------|-------------------------|------------------------|-----------------------|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | |
| 496.00 | 0.60 | 266.70 | 495.99 | -0.06 | -1.85 | 0.02 | 0.39 | 0.38 | -14.75 | |
| 576.00 | 0.50 | 248.10 | 575.99 | -0.21 | -2.60 | 0.16 | 0.25 | -0.13 | -23.25 | |
| 656.00 | 0.40 | 254.90 | 655.99 | -0.41 | -3.19 | 0.35 | 0.14 | -0.13 | 8.50 | |
| 736.00 | 0.00 | 0.00 | 735.99 | -0.49 | -3.46 | 0.41 | 0.50 | -0.50 | 0.00 | |
| 816.00 | 0.20 | 110.20 | 815.99 | -0.53 | -3.33 | 0.46 | 0.25 | 0.25 | 0.00 | |
| 896.00 | 0.30 | 77.30 | 895.99 | -0.54 | -2.99 | 0.47 | 0.21 | 0.13 | -41.13 | |
| 976.00 | 0.40 | 84.30 | 975.99 | -0.46 | -2.51 | 0.41 | 0.14 | 0.13 | 8.75 | |
| 1,056.00 | 0.20 | 98.50 | 1,055.98 | -0.46 | -2.09 | 0.41 | 0.26 | -0.25 | 17.75 | |
| 1,216.00 | 0.50 | 82.30 | 1,215.98 | -0.40 | -1.13 | 0.38 | 0.20 | 0.19 | -10.13 | |
| 1,287.00 | 0.30 | 126.50 | 1,286.98 | -0.47 | -0.67 | 0.46 | 0.50 | -0.28 | 62.25 | |
| LAST CATHEDRAL MWD SURFACE SURVEY | | | | | | | | | | |
| 1,303.00 | 0.47 | 45.50 | 1,302.98 | -0.45 | -0.59 | 0.44 | 3.22 | 1.05 | -506.28 | |
| 9 5/8" | | | | | | | | | | |
| 1,391.00 | 3.23 | 15.19 | 1,390.93 | 2.19 | 0.32 | -2.19 | 3.22 | 3.14 | -34.44 | |
| FIRST SDI MWD PRODUCTION SURVEY | | | | | | | | | | |
| 1,481.00 | 4.88 | 357.69 | 1,480.70 | 8.47 | 0.83 | -8.45 | 2.27 | 1.83 | -19.44 | |
| 1,571.00 | 5.95 | 338.27 | 1,570.31 | 16.63 | -1.05 | -16.64 | 2.34 | 1.19 | -21.58 | |
| 1,660.00 | 7.04 | 327.39 | 1,658.74 | 25.51 | -5.70 | -25.62 | 1.84 | 1.22 | -12.22 | |
| 1,750.00 | 9.75 | 326.71 | 1,747.76 | 36.52 | -12.86 | -36.78 | 3.01 | 3.01 | -0.76 | |
| 1,840.00 | 12.49 | 324.62 | 1,836.07 | 50.83 | -22.68 | -51.30 | 3.08 | 3.04 | -2.32 | |
| 1,930.00 | 12.12 | 322.63 | 1,924.00 | 66.28 | -34.05 | -66.97 | 0.63 | -0.41 | -2.21 | |
| 2,020.00 | 11.92 | 322.79 | 2,012.03 | 81.19 | -45.40 | -82.12 | 0.23 | -0.22 | 0.18 | |
| 2,109.00 | 11.80 | 322.10 | 2,099.13 | 95.69 | -56.55 | -96.85 | 0.21 | -0.13 | -0.78 | |
| 2,199.00 | 11.69 | 331.10 | 2,187.25 | 110.93 | -66.61 | -112.30 | 2.04 | -0.12 | 10.00 | |
| 2,289.00 | 11.33 | 330.17 | 2,275.44 | 126.58 | -75.42 | -128.14 | 0.45 | -0.40 | -1.03 | |
| 2,379.00 | 10.83 | 328.54 | 2,363.76 | 141.47 | -84.23 | -143.20 | 0.66 | -0.56 | -1.81 | |
| 2,468.00 | 10.59 | 331.93 | 2,451.21 | 155.81 | -92.44 | -157.72 | 0.76 | -0.27 | 3.81 | |
| 2,558.00 | 10.16 | 332.20 | 2,539.74 | 170.13 | -100.03 | -172.19 | 0.48 | -0.48 | 0.30 | |
| 2,648.00 | 9.76 | 331.43 | 2,628.38 | 183.85 | -107.38 | -186.06 | 0.47 | -0.44 | -0.86 | |
| 2,738.00 | 10.62 | 341.75 | 2,716.97 | 198.43 | -113.63 | -200.77 | 2.24 | 0.96 | 11.47 | |
| 2,828.00 | 10.50 | 341.75 | 2,805.45 | 214.10 | -118.79 | -216.54 | 0.13 | -0.13 | 0.00 | |
| 2,917.00 | 9.78 | 340.41 | 2,893.06 | 228.92 | -123.87 | -231.46 | 0.85 | -0.81 | -1.51 | |
| 3,007.00 | 9.90 | 340.76 | 2,981.73 | 243.43 | -128.98 | -246.07 | 0.15 | 0.13 | 0.39 | |
| 3,097.00 | 9.44 | 334.90 | 3,070.45 | 257.41 | -134.66 | -260.18 | 1.21 | -0.51 | -6.51 | |
| 3,187.00 | 8.59 | 336.20 | 3,159.34 | 270.25 | -140.50 | -273.13 | 0.97 | -0.94 | 1.44 | |
| 3,276.00 | 9.63 | 324.36 | 3,247.23 | 282.38 | -147.52 | -285.41 | 2.40 | 1.17 | -13.30 | |
| 3,366.00 | 8.97 | 321.99 | 3,336.04 | 294.03 | -156.23 | -297.23 | 0.85 | -0.73 | -2.63 | |
| 3,456.00 | 9.74 | 327.83 | 3,424.85 | 306.00 | -164.61 | -309.38 | 1.36 | 0.86 | 6.49 | |
| 3,546.00 | 9.44 | 329.03 | 3,513.59 | 318.77 | -172.46 | -322.31 | 0.40 | -0.33 | 1.33 | |
| 3,636.00 | 8.52 | 328.90 | 3,602.49 | 330.81 | -179.70 | -334.50 | 1.02 | -1.02 | -0.14 | |
| 3,725.00 | 9.85 | 333.59 | 3,690.34 | 343.27 | -186.49 | -347.10 | 1.71 | 1.49 | 5.27 | |
| 3,815.00 | 8.82 | 335.59 | 3,779.15 | 356.45 | -192.77 | -360.41 | 1.20 | -1.14 | 2.22 | |

| | | | |
|------------------|------------------------------|-------------------------------------|---|
| Company: | US ROCKIES REGION PLANNING | Local Co-ordinate Reference: | Well BUFFALO 13N-15HZ |
| Project: | COLORADO NORTHERN ZONE - 83 | TVD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Site: | BUFFALO & BADGER 4C-15HZ PAD | MD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Well: | BUFFALO 13N-15HZ | North Reference: | True |
| Wellbore: | OH | Survey Calculation Method: | Minimum Curvature |
| Design: | OH | Database: | Denver Sales |

| Survey | | | | | | | | | | |
|---------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-------------------------|------------------------|-----------------------|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | |
| 3,905.00 | 7.61 | 332.45 | 3,868.23 | 368.02 | -198.38 | -372.09 | 1.43 | -1.34 | -3.49 | |
| 3,995.00 | 5.93 | 323.24 | 3,957.60 | 377.03 | -203.91 | -381.22 | 2.22 | -1.87 | -10.23 | |
| 4,085.00 | 3.86 | 308.35 | 4,047.27 | 382.63 | -209.07 | -386.93 | 2.68 | -2.30 | -16.54 | |
| 4,174.00 | 2.93 | 275.84 | 4,136.12 | 384.72 | -213.69 | -389.11 | 2.36 | -1.04 | -36.53 | |
| 4,264.00 | 1.14 | 270.09 | 4,226.06 | 384.96 | -216.87 | -389.42 | 2.00 | -1.99 | -6.39 | |
| 4,354.00 | 1.38 | 141.55 | 4,316.05 | 384.11 | -217.09 | -388.57 | 2.53 | 0.27 | -142.82 | |
| 4,444.00 | 1.28 | 166.46 | 4,406.02 | 382.29 | -216.18 | -386.73 | 0.65 | -0.11 | 27.68 | |
| 4,533.00 | 1.54 | 176.80 | 4,495.00 | 380.13 | -215.88 | -384.56 | 0.41 | 0.29 | 11.62 | |
| 4,623.00 | 1.61 | 188.31 | 4,584.96 | 377.67 | -216.00 | -382.11 | 0.36 | 0.08 | 12.79 | |
| 4,713.00 | 1.41 | 182.99 | 4,674.93 | 375.31 | -216.24 | -379.76 | 0.27 | -0.22 | -5.91 | |
| 4,892.00 | 1.43 | 211.44 | 4,853.88 | 371.21 | -217.52 | -375.68 | 0.39 | 0.01 | 15.89 | |
| 4,982.00 | 1.47 | 212.68 | 4,943.85 | 369.28 | -218.73 | -373.77 | 0.06 | 0.04 | 1.38 | |
| 5,072.00 | 1.25 | 247.30 | 5,033.83 | 367.92 | -220.26 | -372.46 | 0.93 | -0.24 | 38.47 | |
| 5,162.00 | 1.38 | 259.30 | 5,123.80 | 367.34 | -222.23 | -371.92 | 0.34 | 0.14 | 13.33 | |
| 5,251.00 | 1.81 | 262.34 | 5,212.77 | 366.96 | -224.67 | -371.58 | 0.49 | 0.48 | 3.42 | |
| 5,341.00 | 1.26 | 342.69 | 5,302.75 | 367.71 | -226.38 | -372.37 | 2.25 | -0.61 | 89.28 | |
| 5,521.00 | 2.03 | 357.35 | 5,482.67 | 372.79 | -227.11 | -377.46 | 0.48 | 0.43 | 8.14 | |
| 5,611.00 | 1.66 | 346.40 | 5,572.62 | 375.65 | -227.49 | -380.33 | 0.57 | -0.41 | -12.17 | |
| 5,700.00 | 1.37 | 329.94 | 5,661.59 | 377.82 | -228.33 | -382.52 | 0.58 | -0.33 | -18.49 | |
| 5,790.00 | 1.56 | 326.68 | 5,751.56 | 379.78 | -229.54 | -384.50 | 0.23 | 0.21 | -3.62 | |
| 5,880.00 | 1.02 | 51.93 | 5,841.55 | 381.29 | -229.58 | -386.02 | 1.99 | -0.60 | 94.72 | |
| 5,970.00 | 1.23 | 70.10 | 5,931.53 | 382.12 | -228.04 | -386.81 | 0.46 | 0.23 | 20.19 | |
| 6,060.00 | 1.14 | 71.28 | 6,021.51 | 382.73 | -226.29 | -387.39 | 0.10 | -0.10 | 1.31 | |
| 6,150.00 | 1.08 | 37.29 | 6,111.49 | 383.69 | -224.93 | -388.32 | 0.72 | -0.07 | -37.77 | |
| 6,239.00 | 1.15 | 18.69 | 6,200.48 | 385.21 | -224.13 | -389.82 | 0.41 | 0.08 | -20.90 | |
| 6,329.00 | 0.42 | 119.23 | 6,290.47 | 385.90 | -223.55 | -390.50 | 1.44 | -0.81 | 111.71 | |
| 6,419.00 | 0.54 | 125.15 | 6,380.47 | 385.50 | -222.92 | -390.08 | 0.14 | 0.13 | 6.58 | |
| 6,509.00 | 0.57 | 354.23 | 6,470.47 | 385.70 | -222.62 | -390.28 | 1.12 | 0.03 | -145.47 | |
| 6,599.00 | 0.61 | 309.68 | 6,560.46 | 386.45 | -223.03 | -391.04 | 0.50 | 0.04 | -49.50 | |
| 6,688.00 | 1.27 | 327.60 | 6,649.45 | 387.58 | -223.92 | -392.19 | 0.80 | 0.74 | 20.13 | |
| 6,778.00 | 1.51 | 317.33 | 6,739.42 | 389.30 | -225.26 | -393.93 | 0.38 | 0.27 | -11.41 | |
| 6,868.00 | 1.38 | 20.81 | 6,829.40 | 391.18 | -225.68 | -395.82 | 1.69 | -0.14 | 70.53 | |
| 6,958.00 | 0.23 | 69.85 | 6,919.39 | 392.26 | -225.13 | -396.89 | 1.38 | -1.28 | 54.49 | |
| 7,048.00 | 1.11 | 178.12 | 7,009.39 | 391.45 | -224.93 | -396.07 | 1.34 | 0.98 | 120.30 | |
| 7,137.00 | 5.36 | 165.59 | 7,098.22 | 386.56 | -223.87 | -391.16 | 4.81 | 4.78 | -14.08 | |
| 7,227.00 | 11.51 | 159.81 | 7,187.21 | 374.05 | -219.72 | -378.57 | 6.89 | 6.83 | -6.42 | |
| 7,317.00 | 17.81 | 160.37 | 7,274.23 | 352.64 | -211.99 | -357.00 | 7.00 | 7.00 | 0.62 | |
| 7,407.00 | 24.02 | 168.46 | 7,358.28 | 321.69 | -203.69 | -325.88 | 7.59 | 6.90 | 8.99 | |
| 7,496.00 | 34.33 | 171.05 | 7,435.89 | 279.03 | -196.14 | -283.08 | 11.67 | 11.58 | 2.91 | |
| 7,586.00 | 39.17 | 169.71 | 7,507.98 | 225.97 | -187.11 | -229.83 | 5.45 | 5.38 | -1.49 | |
| 7,676.00 | 46.39 | 174.15 | 7,574.01 | 165.49 | -178.70 | -169.20 | 8.69 | 8.02 | 4.93 | |
| 7,766.00 | 57.74 | 177.18 | 7,629.26 | 94.83 | -173.49 | -98.44 | 12.89 | 12.61 | 3.37 | |

| | | | |
|------------------|------------------------------|-------------------------------------|---|
| Company: | US ROCKIES REGION PLANNING | Local Co-ordinate Reference: | Well BUFFALO 13N-15HZ |
| Project: | COLORADO NORTHERN ZONE - 83 | TVD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Site: | BUFFALO & BADGER 4C-15HZ PAD | MD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Well: | BUFFALO 13N-15HZ | North Reference: | True |
| Wellbore: | OH | Survey Calculation Method: | Minimum Curvature |
| Design: | OH | Database: | Denver Sales |

| Survey | | | | | | | | | | |
|----------------------------|-----------------|-------------|---------------------|------------|------------|-----------------------|-------------------------|------------------------|-----------------------|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | |
| 7,855.00 | 64.87 | 177.93 | 7,671.96 | 16.88 | -170.17 | -20.44 | 8.05 | 8.01 | 0.84 | |
| 7,945.00 | 71.03 | 176.79 | 7,705.73 | -66.40 | -166.32 | 62.90 | 6.94 | 6.84 | -1.27 | |
| 8,035.00 | 75.18 | 176.70 | 7,731.88 | -152.36 | -161.43 | 148.95 | 4.61 | 4.61 | -0.10 | |
| 8,108.00 | 79.14 | 177.52 | 7,748.10 | -223.43 | -157.84 | 220.07 | 5.53 | 5.42 | 1.12 | |
| 8,150.00 | 82.29 | 177.85 | 7,754.88 | -264.84 | -156.17 | 261.51 | 7.54 | 7.50 | 0.78 | |
| 7"(662 FNL 773 FWL) | | | | | | | | | | |
| 8,233.00 | 88.52 | 178.48 | 7,761.52 | -347.49 | -153.52 | 344.20 | 7.54 | 7.50 | 0.76 | |
| 8,322.00 | 90.23 | 177.85 | 7,762.49 | -436.44 | -150.67 | 433.18 | 2.05 | 1.92 | -0.71 | |
| 8,412.00 | 89.83 | 178.83 | 7,762.45 | -526.40 | -148.06 | 523.18 | 1.18 | -0.44 | 1.09 | |
| 8,502.00 | 90.54 | 178.84 | 7,762.16 | -616.38 | -146.23 | 613.18 | 0.79 | 0.79 | 0.01 | |
| 8,592.00 | 91.51 | 178.26 | 7,760.55 | -706.33 | -143.96 | 703.16 | 1.26 | 1.08 | -0.64 | |
| 8,681.00 | 91.48 | 179.02 | 7,758.23 | -795.28 | -141.84 | 792.13 | 0.85 | -0.03 | 0.85 | |
| 8,771.00 | 91.85 | 178.34 | 7,755.61 | -885.21 | -139.77 | 882.09 | 0.86 | 0.41 | -0.76 | |
| 8,861.00 | 91.91 | 179.85 | 7,752.66 | -975.15 | -138.35 | 972.04 | 1.68 | 0.07 | 1.68 | |
| 8,951.00 | 90.17 | 179.84 | 7,751.02 | -1,065.13 | -138.11 | 1,062.01 | 1.93 | -1.93 | -0.01 | |
| 9,040.00 | 90.37 | 179.79 | 7,750.60 | -1,154.13 | -137.82 | 1,150.99 | 0.23 | 0.22 | -0.06 | |
| 9,130.00 | 88.52 | 179.40 | 7,751.48 | -1,244.12 | -137.19 | 1,240.97 | 2.10 | -2.06 | -0.43 | |
| 9,220.00 | 89.29 | 178.87 | 7,753.20 | -1,334.09 | -135.83 | 1,330.96 | 1.04 | 0.86 | -0.59 | |
| 9,310.00 | 90.44 | 179.09 | 7,753.41 | -1,424.08 | -134.22 | 1,420.95 | 1.30 | 1.28 | 0.24 | |
| 9,399.00 | 87.49 | 178.97 | 7,755.02 | -1,513.04 | -132.72 | 1,509.93 | 3.32 | -3.31 | -0.13 | |
| 9,489.00 | 86.41 | 177.87 | 7,759.80 | -1,602.88 | -130.24 | 1,599.80 | 1.71 | -1.20 | -1.22 | |
| 9,579.00 | 88.39 | 178.61 | 7,763.89 | -1,692.73 | -127.48 | 1,689.69 | 2.35 | 2.20 | 0.82 | |
| 9,669.00 | 89.56 | 178.73 | 7,765.50 | -1,782.69 | -125.39 | 1,779.68 | 1.31 | 1.30 | 0.13 | |
| 9,759.00 | 91.48 | 179.56 | 7,764.68 | -1,872.68 | -124.05 | 1,869.67 | 2.32 | 2.13 | 0.92 | |
| 9,848.00 | 91.81 | 178.53 | 7,762.13 | -1,961.63 | -122.57 | 1,958.63 | 1.21 | 0.37 | -1.16 | |
| 9,938.00 | 89.77 | 179.77 | 7,760.88 | -2,051.60 | -121.23 | 2,048.61 | 2.65 | -2.27 | 1.38 | |
| 10,028.00 | 89.90 | 183.07 | 7,761.14 | -2,141.56 | -123.46 | 2,138.50 | 3.67 | 0.14 | 3.67 | |
| 10,118.00 | 89.36 | 186.39 | 7,761.72 | -2,231.24 | -130.88 | 2,228.01 | 3.74 | -0.60 | 3.69 | |
| 10,208.00 | 89.63 | 186.77 | 7,762.52 | -2,320.64 | -141.19 | 2,317.18 | 0.52 | 0.30 | 0.42 | |
| 10,298.00 | 89.90 | 185.86 | 7,762.89 | -2,410.09 | -151.09 | 2,406.40 | 1.05 | 0.30 | -1.01 | |
| 10,387.00 | 89.09 | 182.58 | 7,763.67 | -2,498.84 | -157.64 | 2,494.99 | 3.80 | -0.91 | -3.69 | |
| 10,477.00 | 90.10 | 184.52 | 7,764.31 | -2,588.66 | -163.21 | 2,584.67 | 2.43 | 1.12 | 2.16 | |
| 10,567.00 | 90.17 | 182.66 | 7,764.10 | -2,678.48 | -168.85 | 2,674.35 | 2.07 | 0.08 | -2.07 | |
| 10,747.00 | 89.66 | 181.24 | 7,764.36 | -2,858.37 | -174.97 | 2,854.07 | 0.84 | -0.28 | -0.79 | |
| 10,926.00 | 89.73 | 179.48 | 7,765.32 | -3,037.35 | -176.10 | 3,033.00 | 0.98 | 0.04 | -0.98 | |
| 11,016.00 | 89.63 | 177.73 | 7,765.82 | -3,127.32 | -173.91 | 3,122.99 | 1.95 | -0.11 | -1.94 | |
| 11,106.00 | 89.93 | 177.68 | 7,766.16 | -3,217.25 | -170.30 | 3,212.98 | 0.34 | 0.33 | -0.06 | |
| 11,196.00 | 89.80 | 177.77 | 7,766.38 | -3,307.18 | -166.73 | 3,302.96 | 0.18 | -0.14 | 0.10 | |
| 11,285.00 | 89.80 | 177.43 | 7,766.69 | -3,396.10 | -163.00 | 3,391.94 | 0.38 | 0.00 | -0.38 | |
| 11,375.00 | 90.17 | 176.23 | 7,766.71 | -3,485.96 | -158.03 | 3,481.88 | 1.40 | 0.41 | -1.33 | |
| 11,465.00 | 89.97 | 176.37 | 7,766.60 | -3,575.77 | -152.22 | 3,571.80 | 0.27 | -0.22 | 0.16 | |
| 11,555.00 | 90.07 | 175.53 | 7,766.57 | -3,665.55 | -145.86 | 3,661.69 | 0.94 | 0.11 | -0.93 | |

| | | | |
|------------------|------------------------------|-------------------------------------|---|
| Company: | US ROCKIES REGION PLANNING | Local Co-ordinate Reference: | Well BUFFALO 13N-15HZ |
| Project: | COLORADO NORTHERN ZONE - 83 | TVD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Site: | BUFFALO & BADGER 4C-15HZ PAD | MD Reference: | GL 5138 & KB 20 @ 5158.00ft (PRECISION 461) |
| Well: | BUFFALO 13N-15HZ | North Reference: | True |
| Wellbore: | OH | Survey Calculation Method: | Minimum Curvature |
| Design: | OH | Database: | Denver Sales |

| Survey | | | | | | | | | | |
|--|-----------------|-------------|---------------------|------------|------------|-----------------------|-------------------------|------------------------|-----------------------|--|
| Measured Depth (ft) | Inclination (°) | Azimuth (°) | Vertical Depth (ft) | +N/-S (ft) | +E/-W (ft) | Vertical Section (ft) | Dogleg Rate (°/100usft) | Build Rate (°/100usft) | Turn Rate (°/100usft) | |
| 11,645.00 | 89.73 | 175.77 | 7,766.73 | -3,755.29 | -139.04 | 3,751.55 | 0.46 | -0.38 | 0.27 | |
| 11,734.00 | 90.10 | 174.70 | 7,766.86 | -3,843.98 | -131.64 | 3,840.38 | 1.27 | 0.42 | -1.20 | |
| 11,824.00 | 89.80 | 174.59 | 7,766.94 | -3,933.58 | -123.24 | 3,930.14 | 0.36 | -0.33 | -0.12 | |
| 11,914.00 | 89.63 | 174.90 | 7,767.38 | -4,023.20 | -115.00 | 4,019.91 | 0.39 | -0.19 | 0.34 | |
| 12,004.00 | 89.40 | 175.53 | 7,768.15 | -4,112.89 | -107.49 | 4,109.73 | 0.75 | -0.26 | 0.70 | |
| 12,094.00 | 89.33 | 175.74 | 7,769.14 | -4,202.62 | -100.64 | 4,199.59 | 0.25 | -0.08 | 0.23 | |
| 12,183.00 | 89.97 | 174.94 | 7,769.69 | -4,291.32 | -93.41 | 4,288.43 | 1.15 | 0.72 | -0.90 | |
| LAST SDI MWD PRODUCTION SURVEY | | | | | | | | | | |
| 12,295.00 | 89.97 | 174.94 | 7,769.75 | -4,402.89 | -83.54 | 4,400.17 | 0.00 | 0.00 | 0.00 | |
| SDI PROJECTION TO TD(863 FWL 485 FSL) | | | | | | | | | | |

| Casing Points | | | | | | |
|---------------------|---------------------|---------------------|----------------------|--------------------|--|--|
| Measured Depth (ft) | Vertical Depth (ft) | Name | Casing Diameter (in) | Hole Diameter (in) | | |
| 1,303.00 | 1,302.98 | 9 5/8" | 9.625 | 13.500 | | |
| 8,150.00 | 7,754.88 | 7"(662 FNL 773 FWL) | 7.000 | 8.750 | | |

| Design Annotations | | | | | |
|---------------------|---------------------|-------------------|------------|---------------------------------------|--|
| Measured Depth (ft) | Vertical Depth (ft) | Local Coordinates | | Comment | |
| | | +N/-S (ft) | +E/-W (ft) | | |
| 66.00 | 66.00 | 0.03 | 0.03 | FIRST CATHEDRAL MWD SURFACE SURVEY | |
| 1,287.00 | 1,286.98 | -0.47 | -0.67 | LAST CATHEDRAL MWD SURFACE SURVEY | |
| 1,391.00 | 1,390.93 | 2.19 | 0.32 | FIRST SDI MWD PRODUCTION SURVEY | |
| 12,183.00 | 7,769.69 | -4,291.32 | -93.41 | LAST SDI MWD PRODUCTION SURVEY | |
| 12,295.00 | 7,769.75 | -4,402.89 | -83.54 | SDI PROJECTION TO TD(863 FWL 485 FSL) | |

Checked By: _____ Approved By: _____ Date: _____