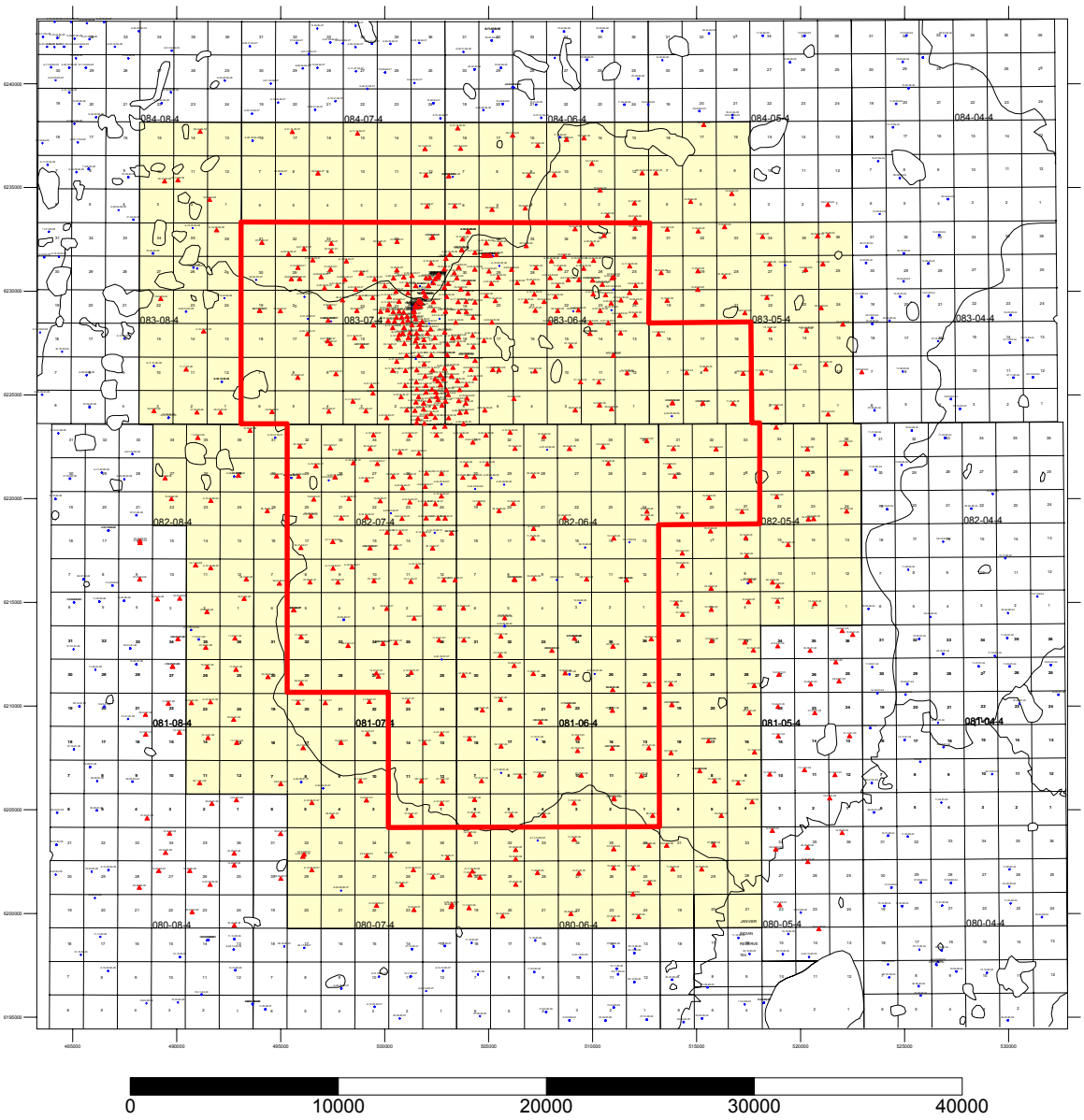


Figure G-1: Final Location Map. Yellow area includes buffer. Red Outline is Simulation Study Boundary. Wells use in Correlation Work denoted by Solid Red Triangles ▲.

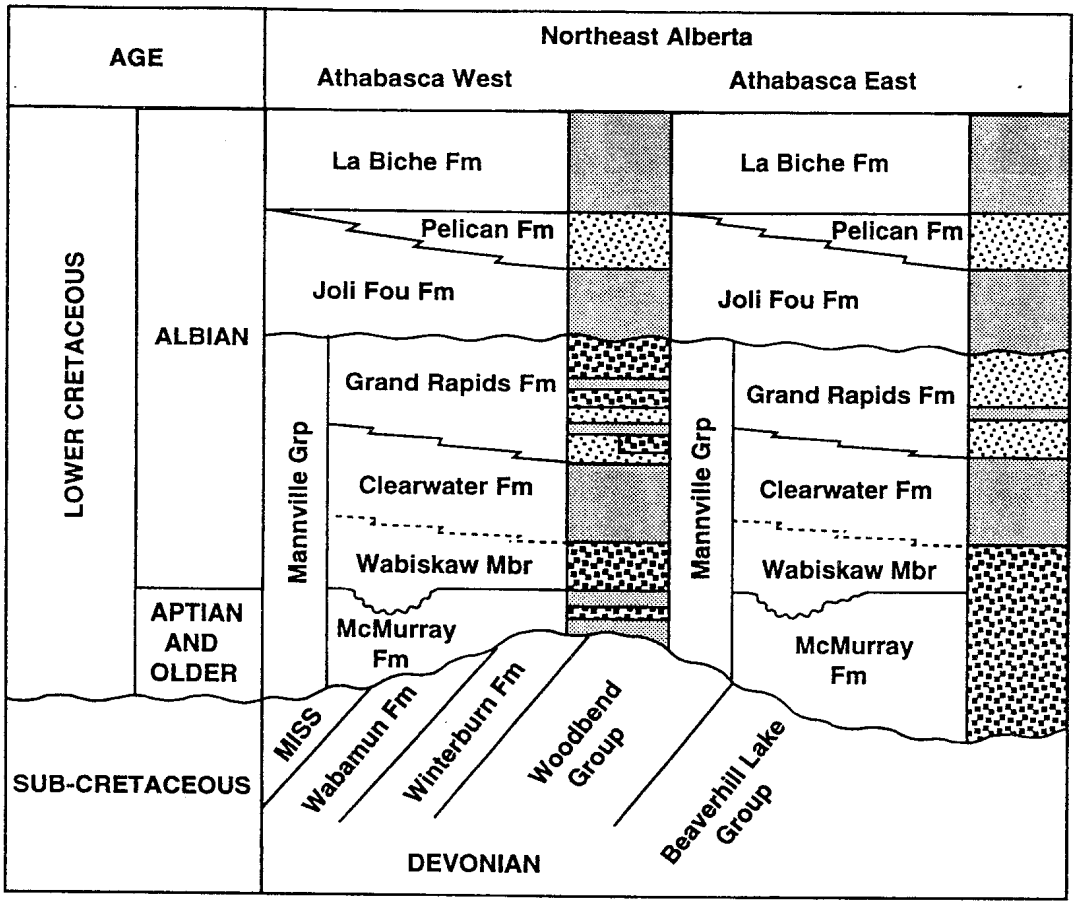


Figure G-2: Stratigraphic Column for the Athabasca Area (from Strobl et al., 1995).

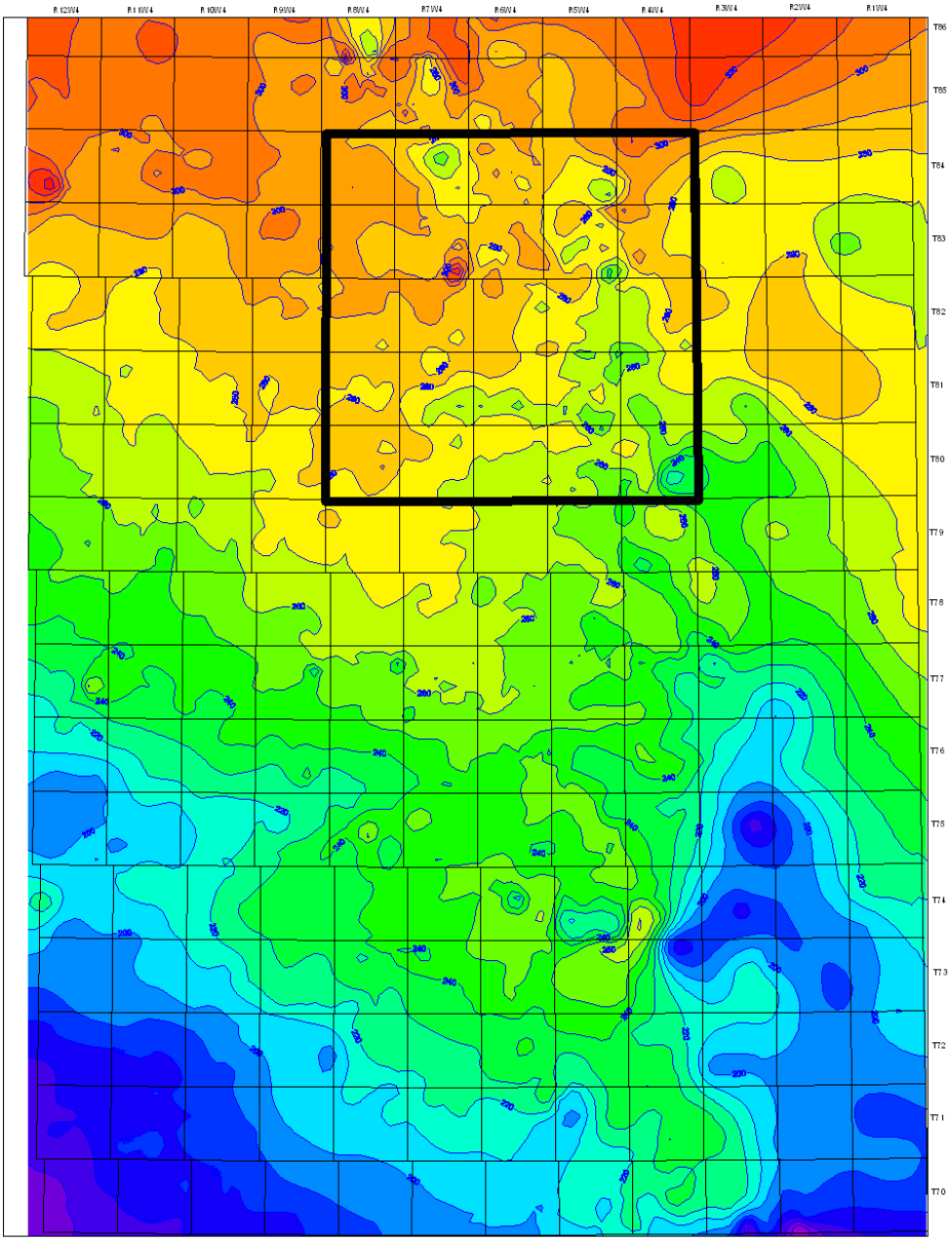


Figure G-3: Regional Structure of the top of McMurray Formation; Contoured from Public Data; High areas in hot colors – low areas in cold colors; Geological Study Area depicted in Figure G-1 (above) shown here in heavy black outline

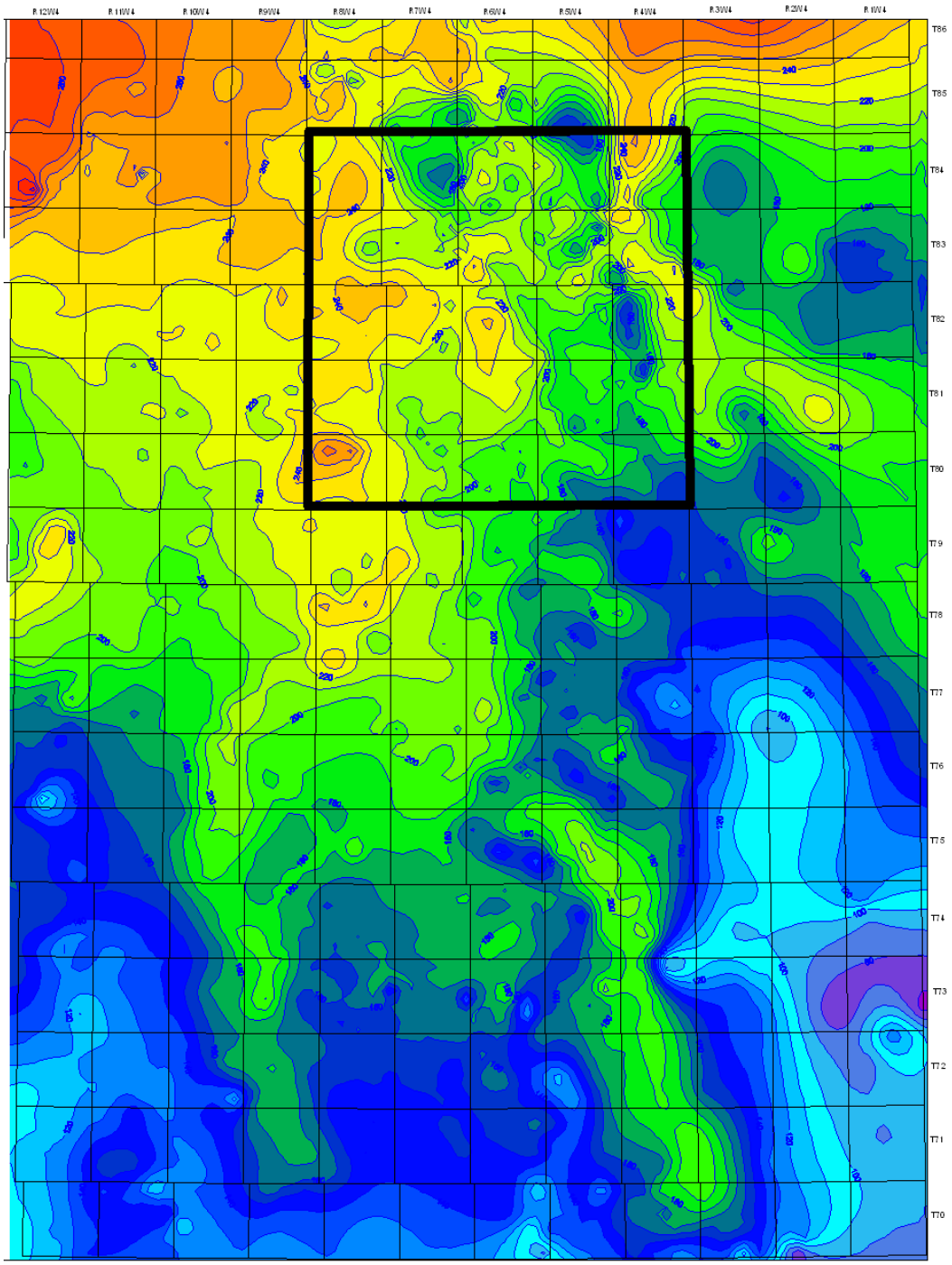


Figure G-4: Regional Structure of the top of Devonian; Contoured from Public Data; High areas in hot colors – low areas in cold colors; Geological Study Area depicted in Figure G-1 (above) shown here in heavy black outline.

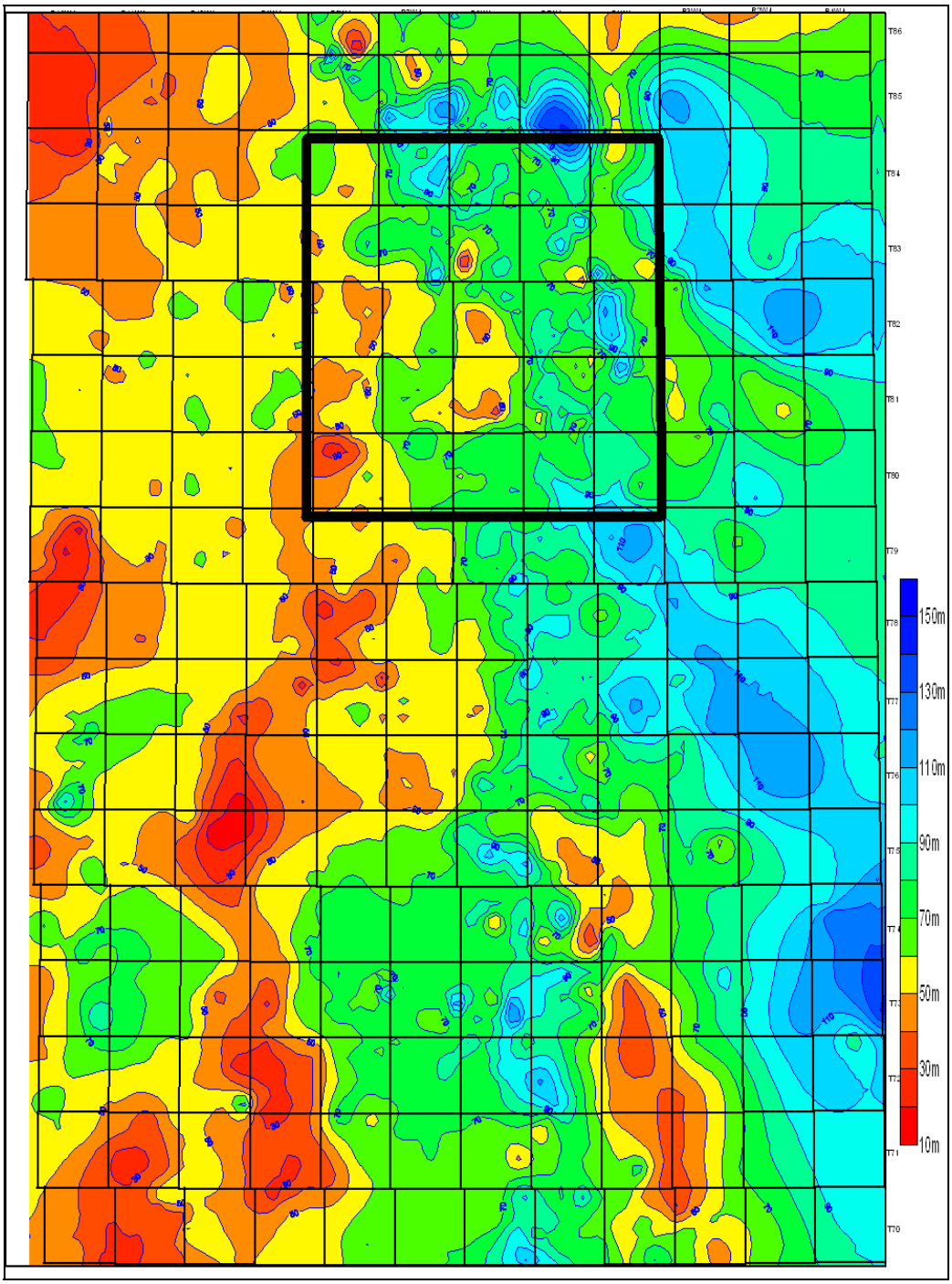


Figure G-5: Regional Isopach of the McMurray Formation; Contoured from Public Data; Thin areas in hot colors – thick areas in cold colors; Geological Study Area depicted in Figure G-1 (above) shown here in heavy black outline

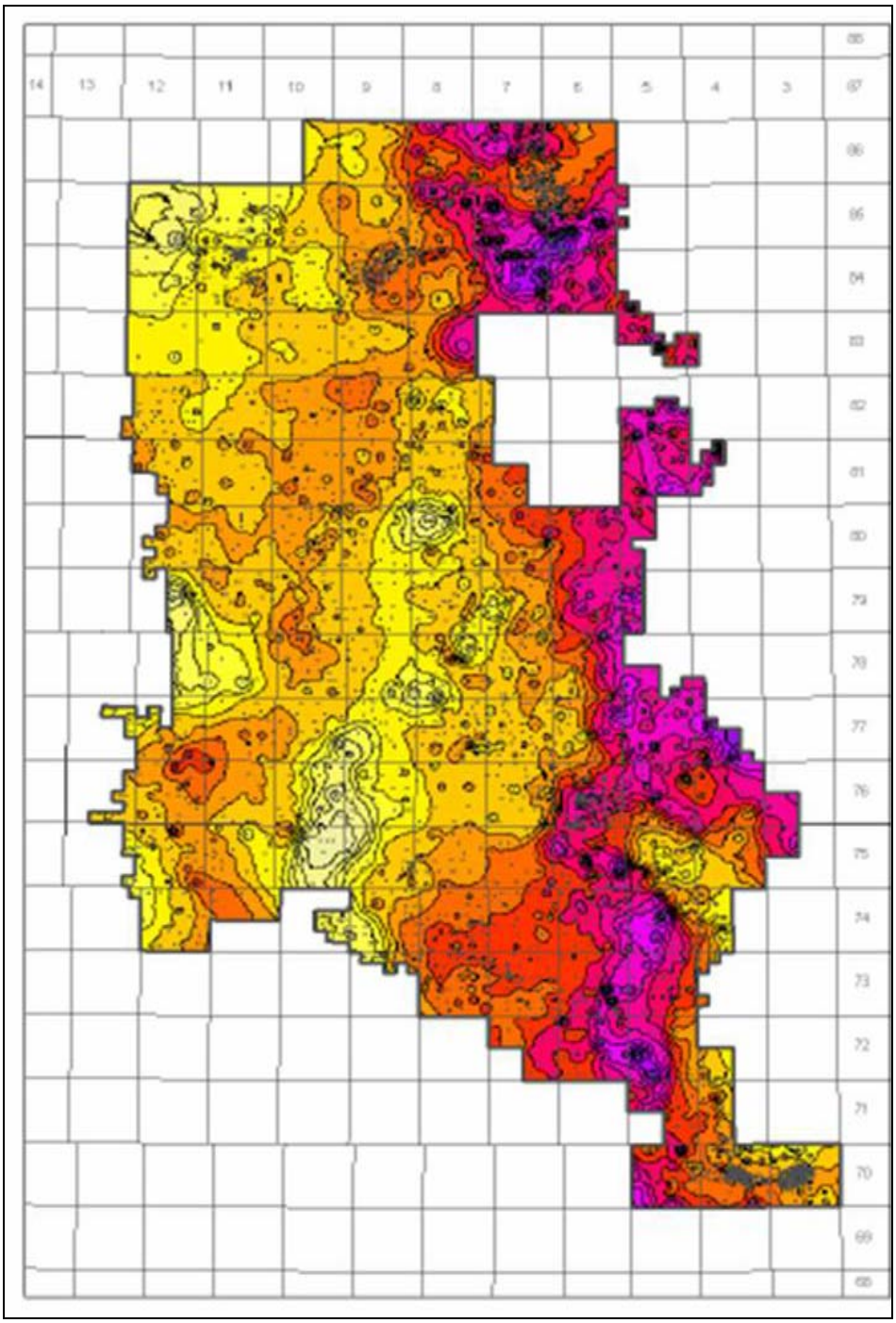


Figure G-6: Wabiskaw Marker to Paleozoic Isopach Map; (Fig. 4 from Alberta Energy and Utilities Board: "Athabasca Wabiskaw-McMurray Regional Geological Study," EUB Report 2003-A, December 31, 2003).

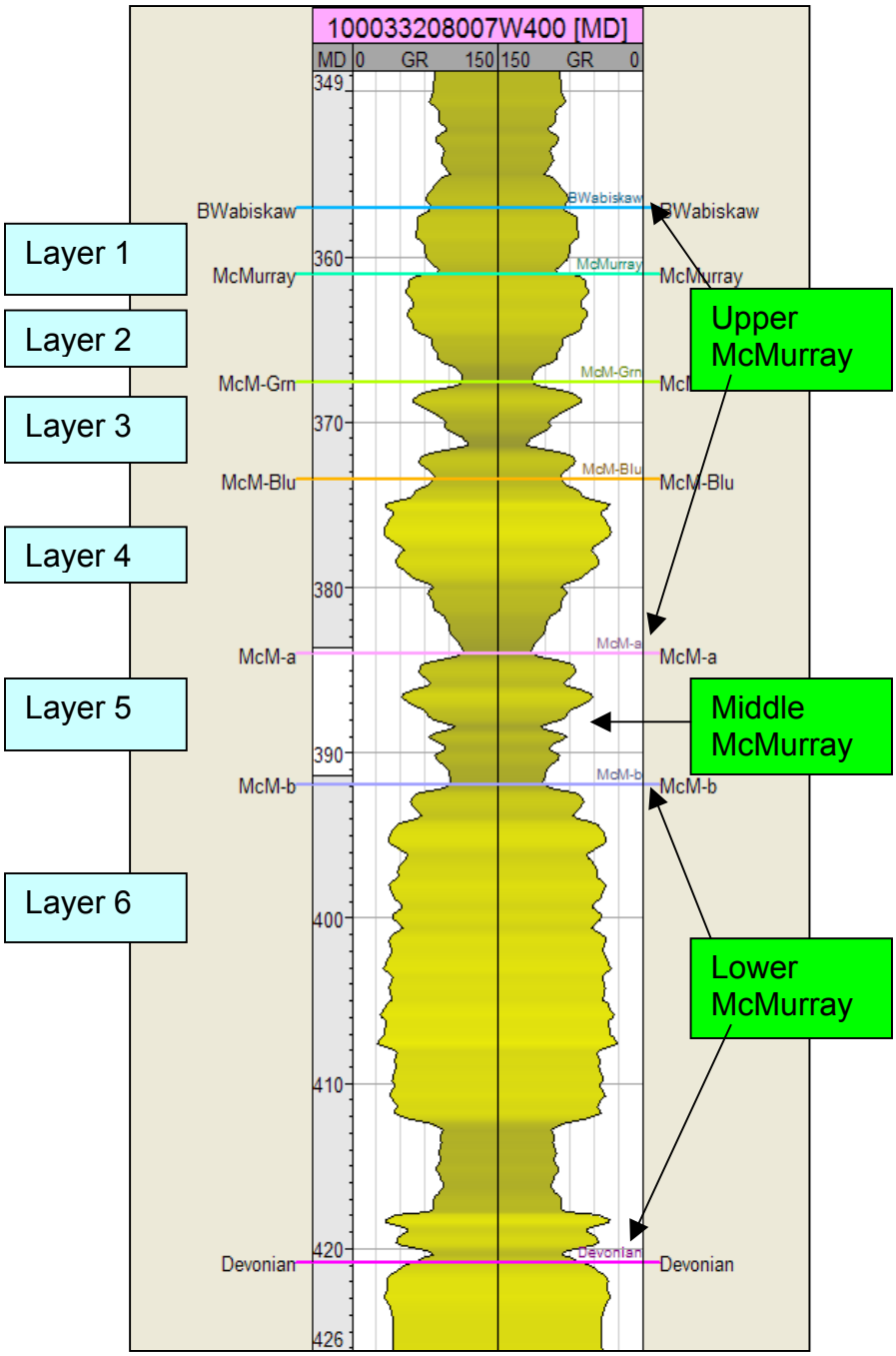


Figure G-7: A Typical Well (03-32-80-07) used for Regional Correlations; Figure displays stratigraphic nomenclature used in the study. Note the prominent coarsening-upward cycles in Layers 2 and 4.

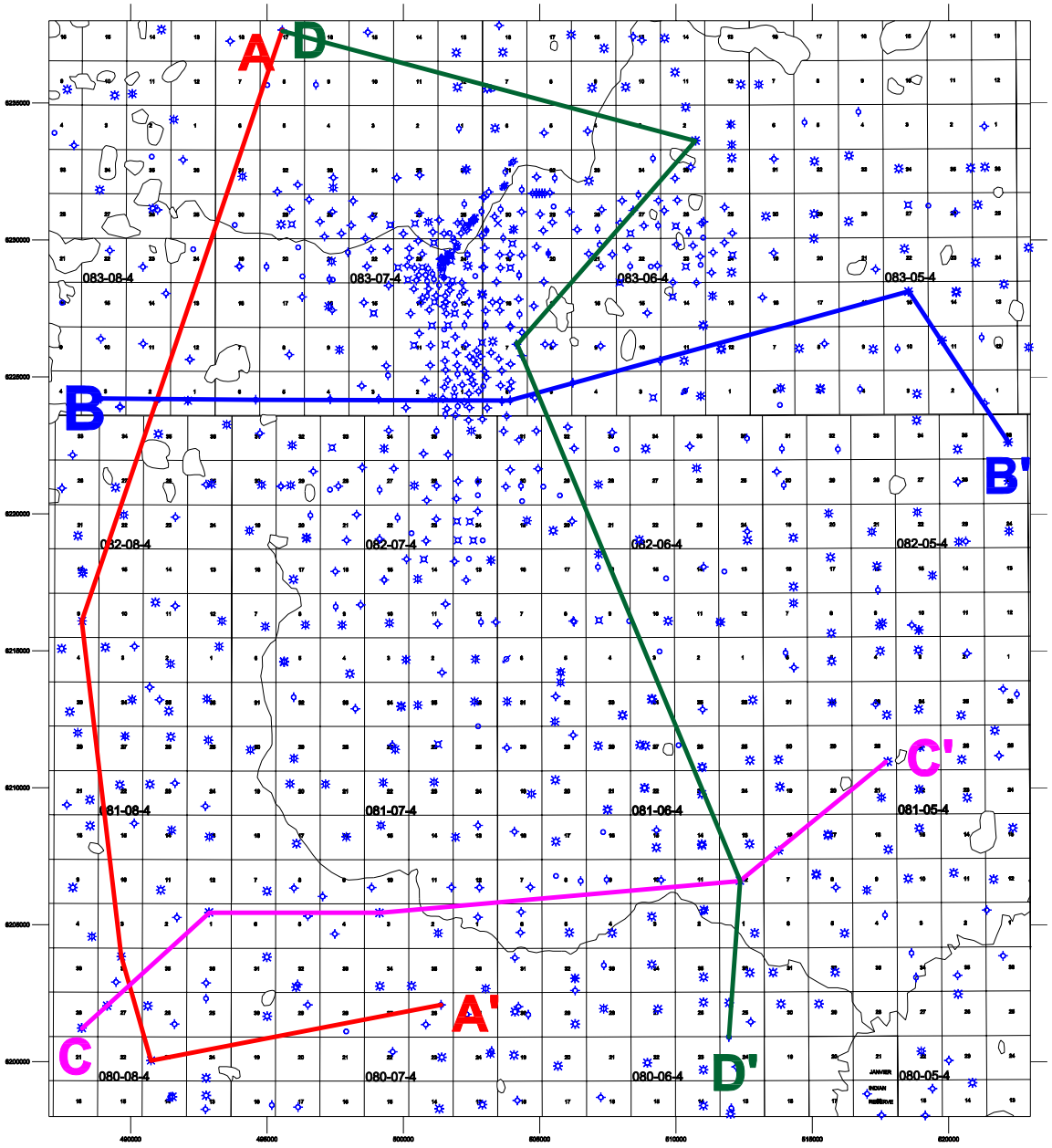


Figure G-8: Regional Index Map for Gamma Ray Correlation Cross Sections

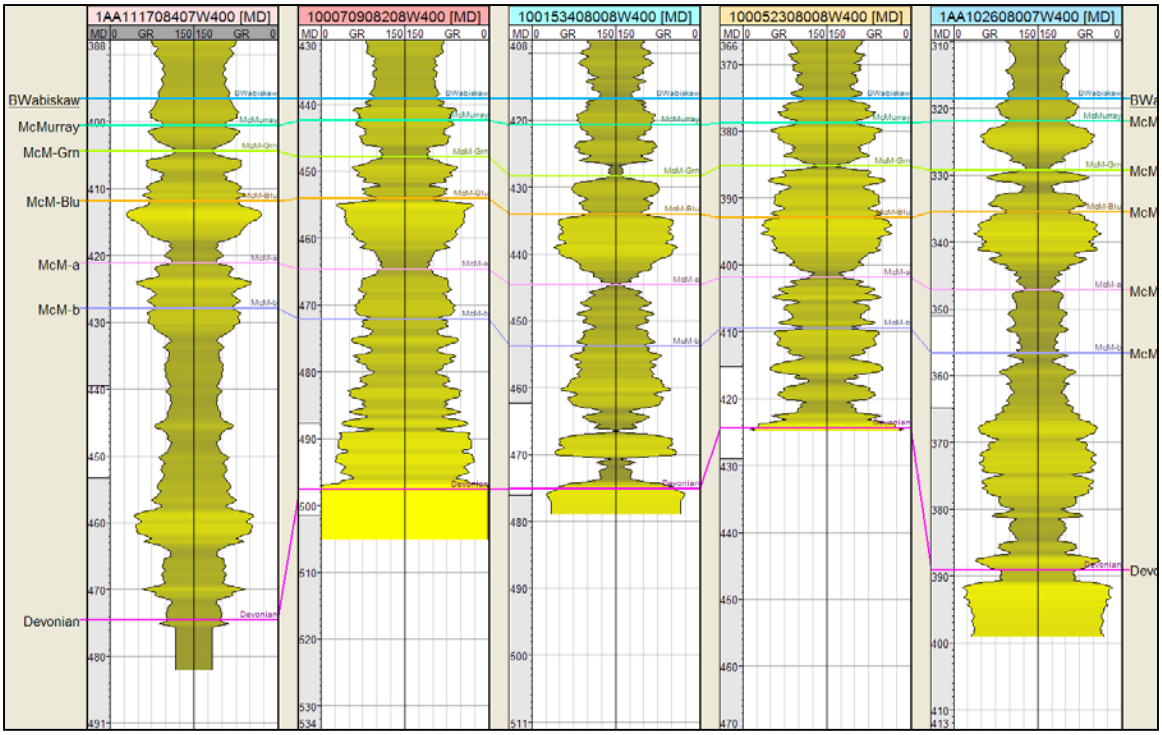


Figure G-9: Regional Cross Section A-A′; Distance between Endpoints approximately 40 km. See Figure G-8 for location of Cross Section.

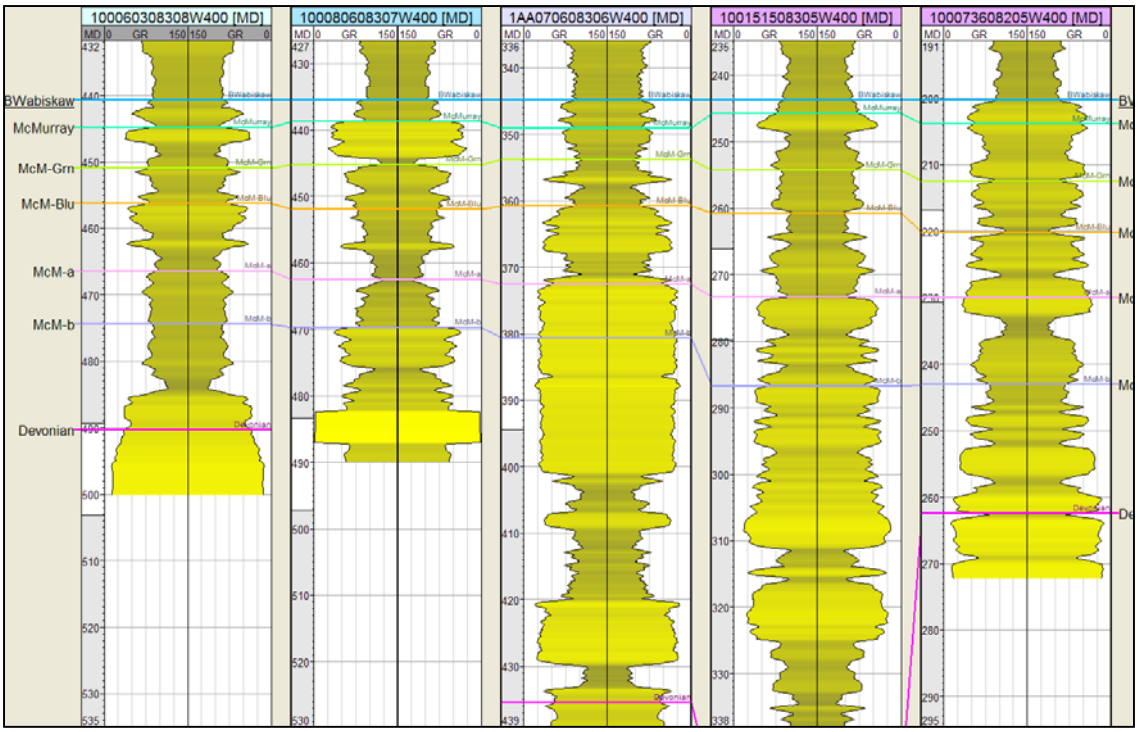


Figure G-10: Regional Cross Section B-B′; Distance between Endpoints approximately 35 km. See Figure G-8 for location of Cross Section.

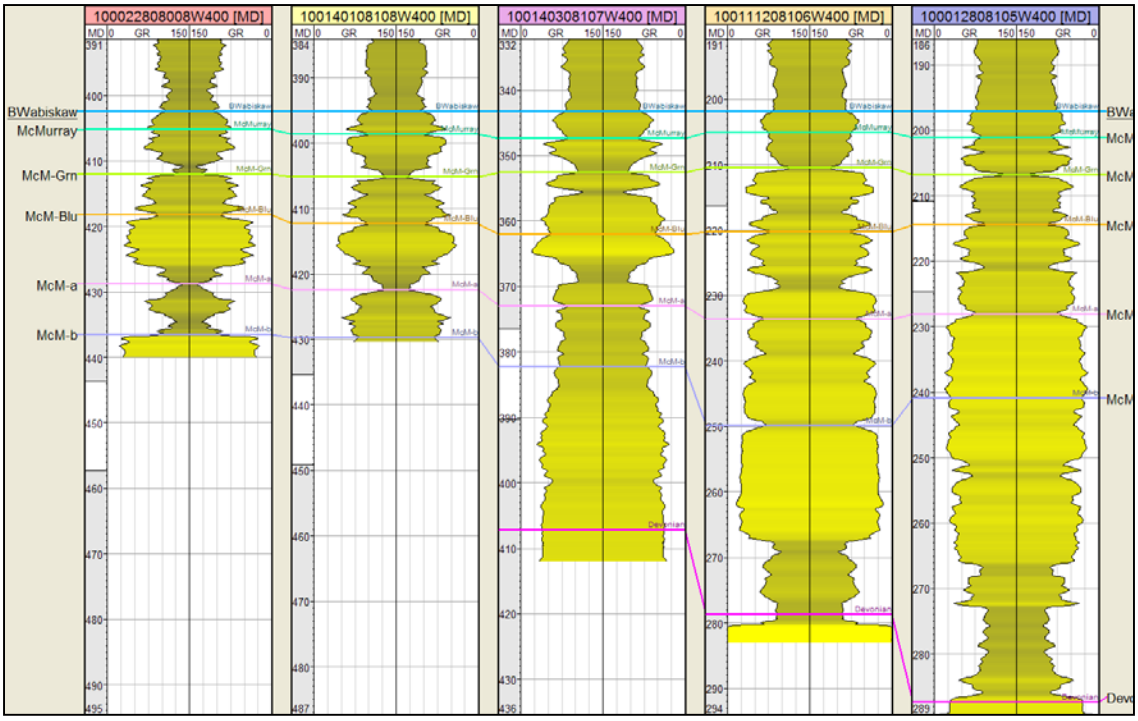


Figure G-11: Regional Cross Section C-C′; Distance between Endpoints approximately 30 km. See Figure G-8 for location of Cross Section.

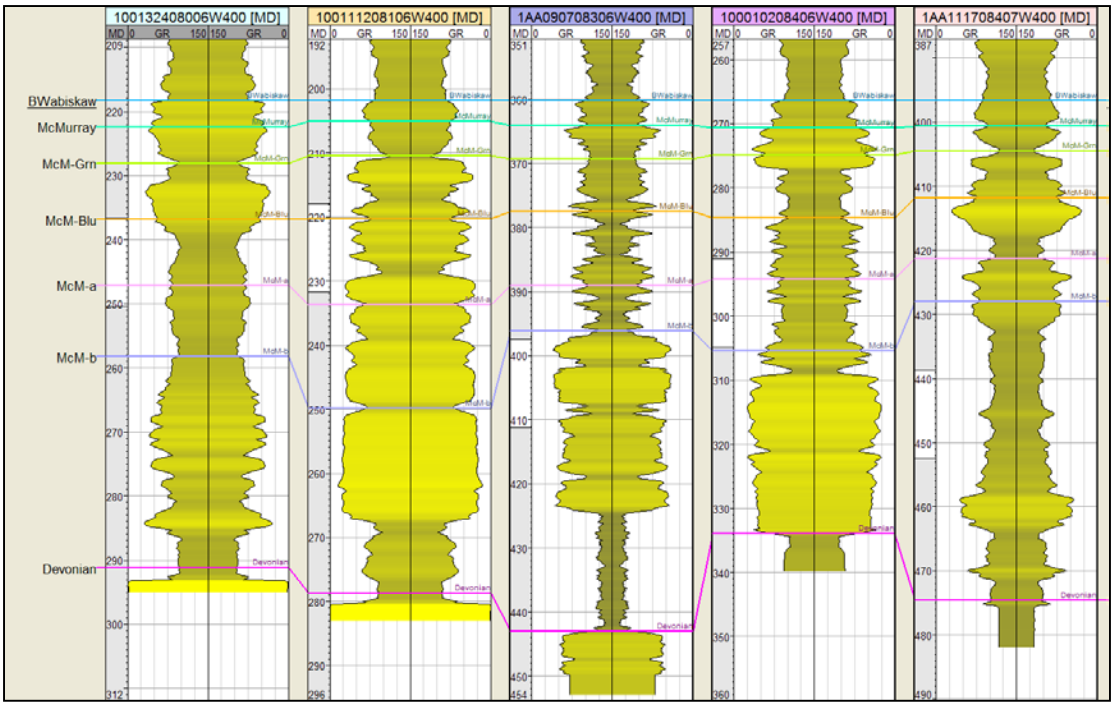
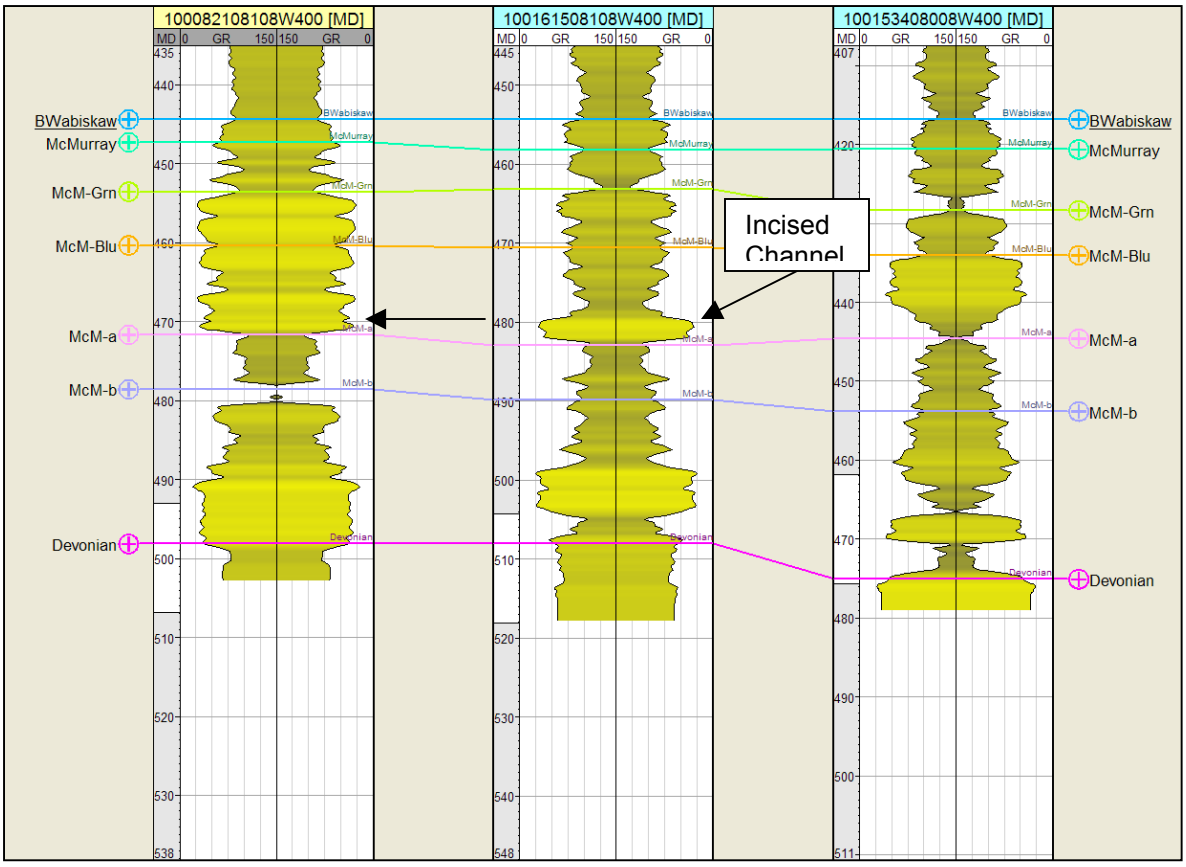


Figure G-12: Regional Cross Section D-D'; Distance between Endpoints approximately 40 km. See Figure G-8 for location of Cross Section.



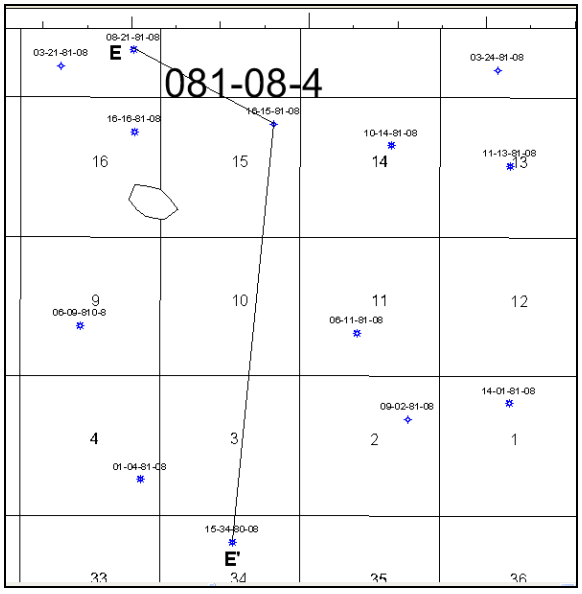
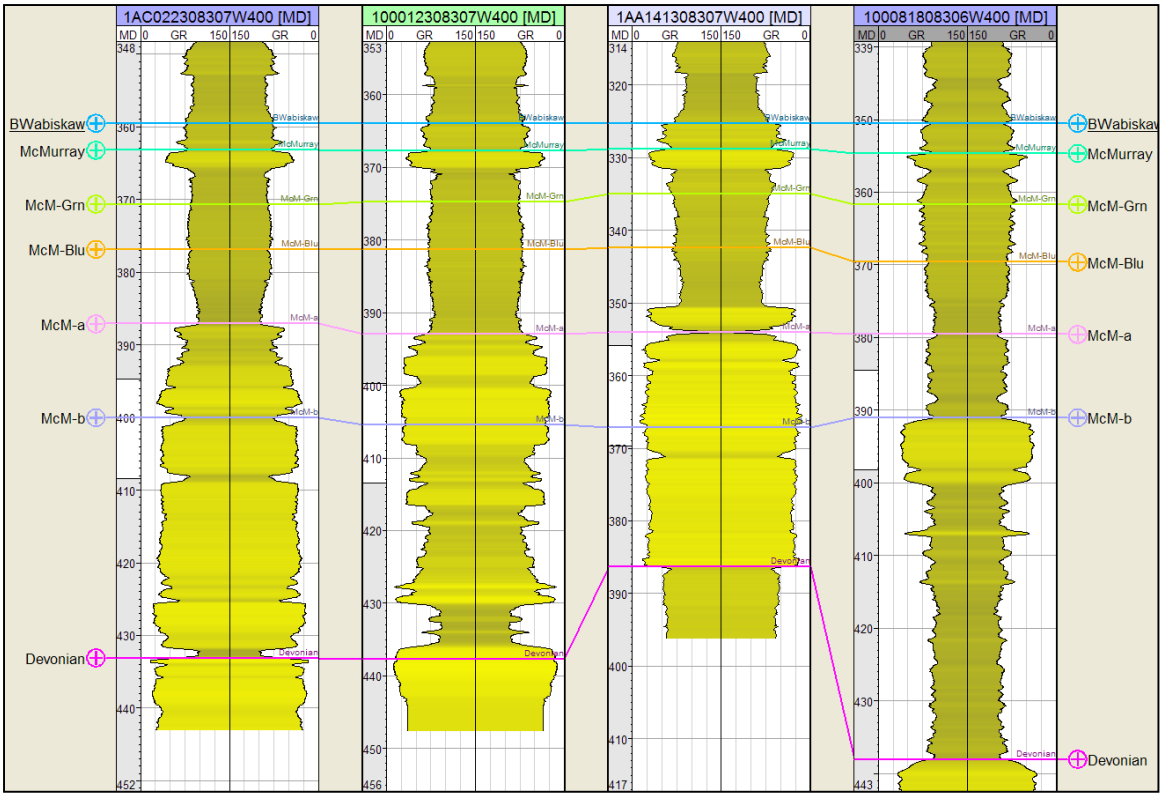


Figure G-13: Cross Section E-E′; Note incised channel (arrows) in base of Upward Coarsening Sequence.



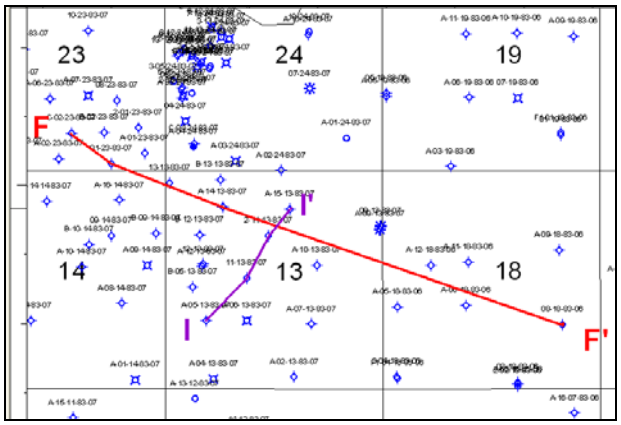
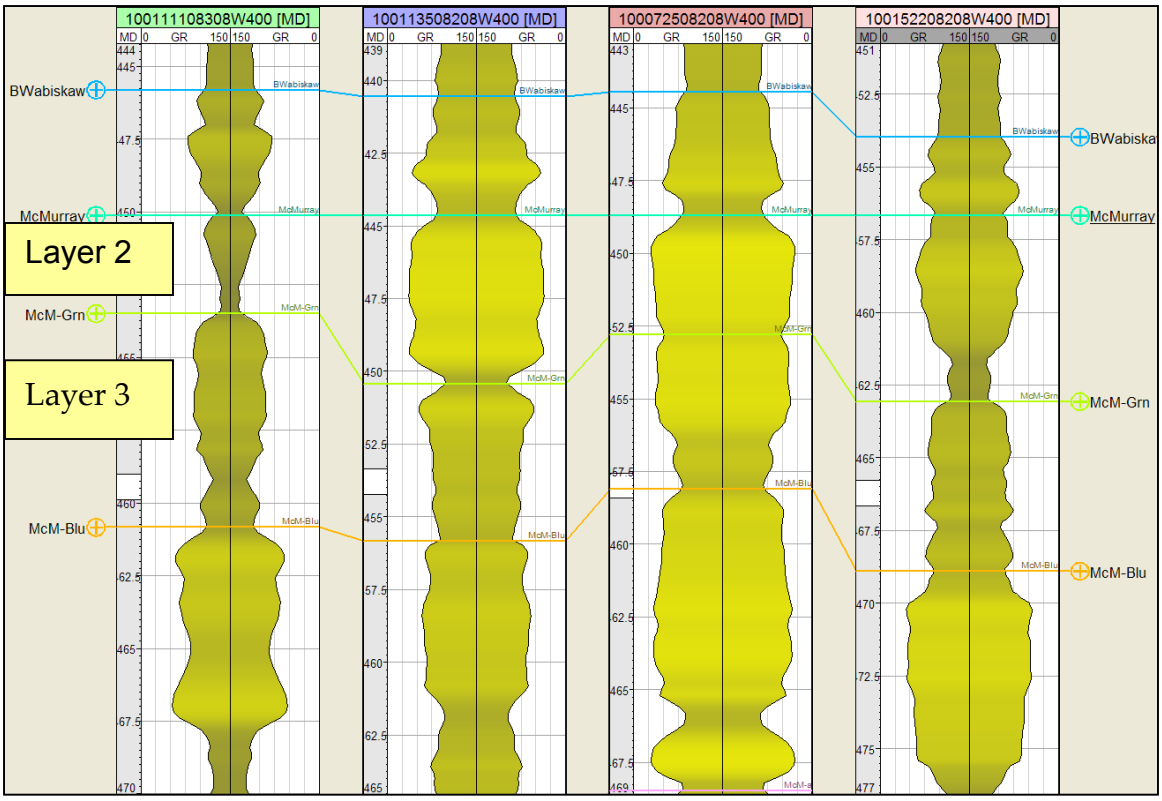


Figure G-14: Cross Section F-F′; Shale Channel along Depositional Strike; approximately 4 km.



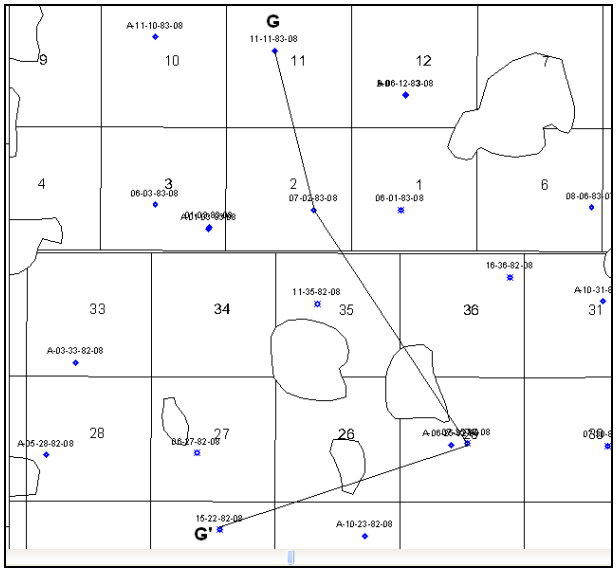
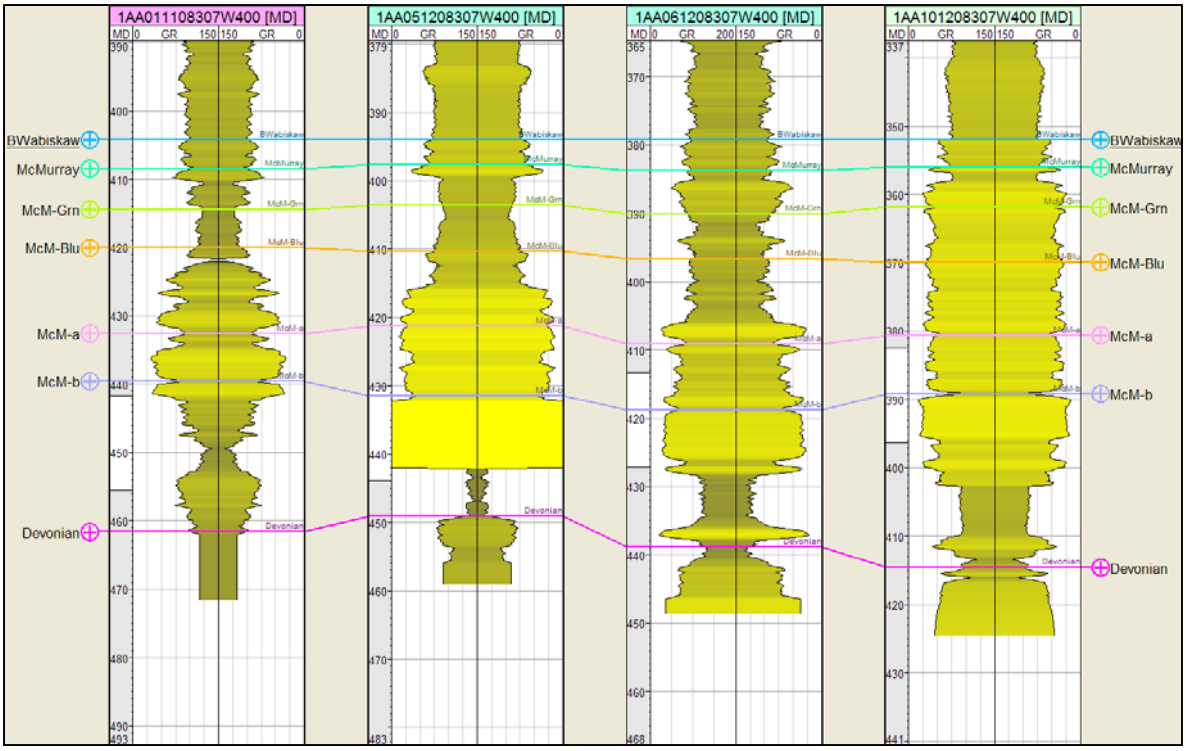


Figure G-15: Cross Section G-G'; Channel cutting of Layer 2 in 11-35-82-08 and 07-25-82-08 and Upper Part of Layer 3 in 07-25-82-08.



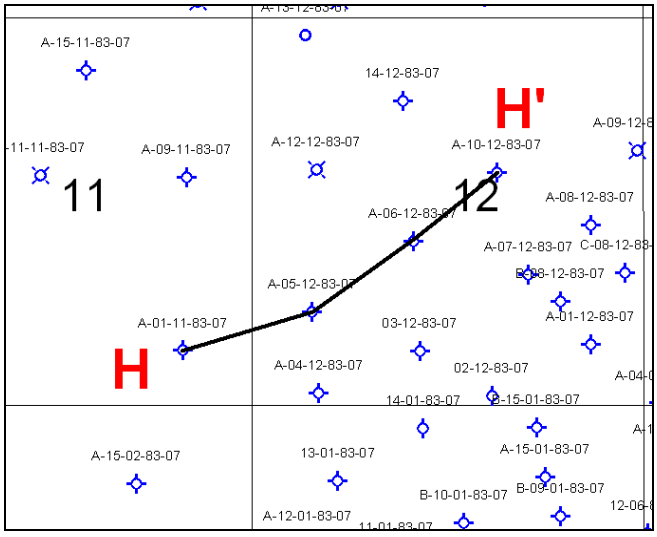
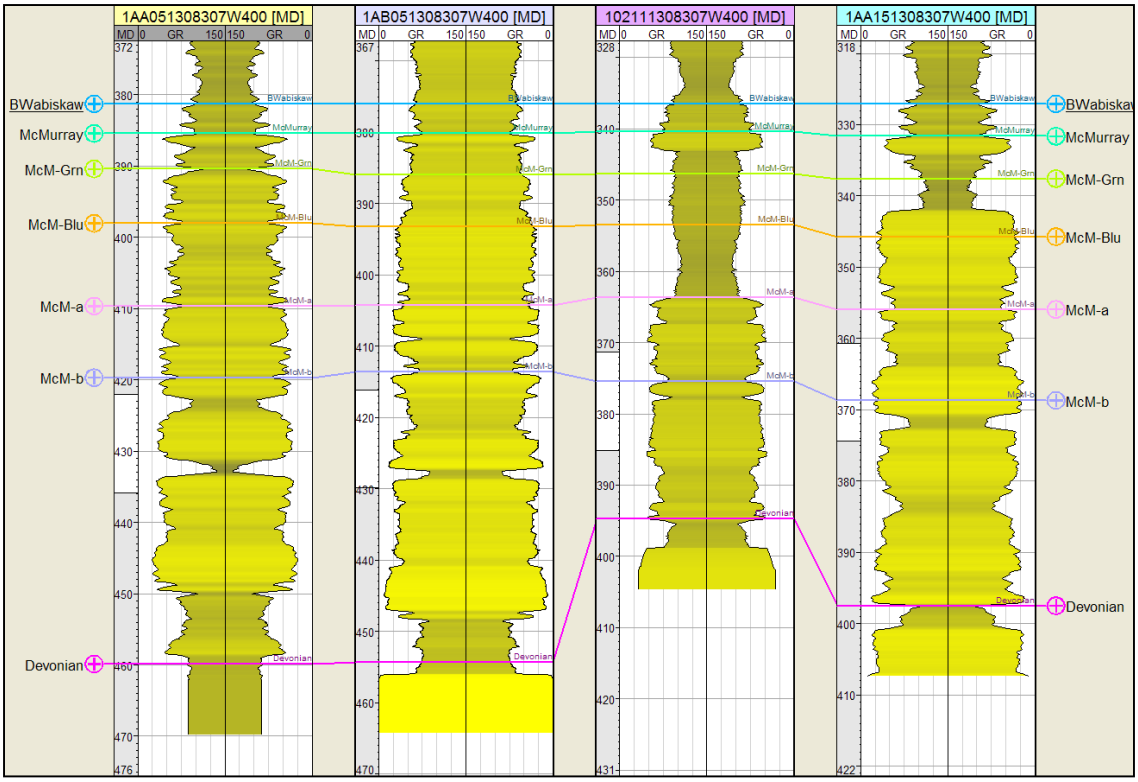


Figure G-16: Cross Section H-H'; Relationships of Sand and Shale Channels perpendicular to Depositional Strike; Note the gradational changes from dominantly shale to dominantly sand from left to right.



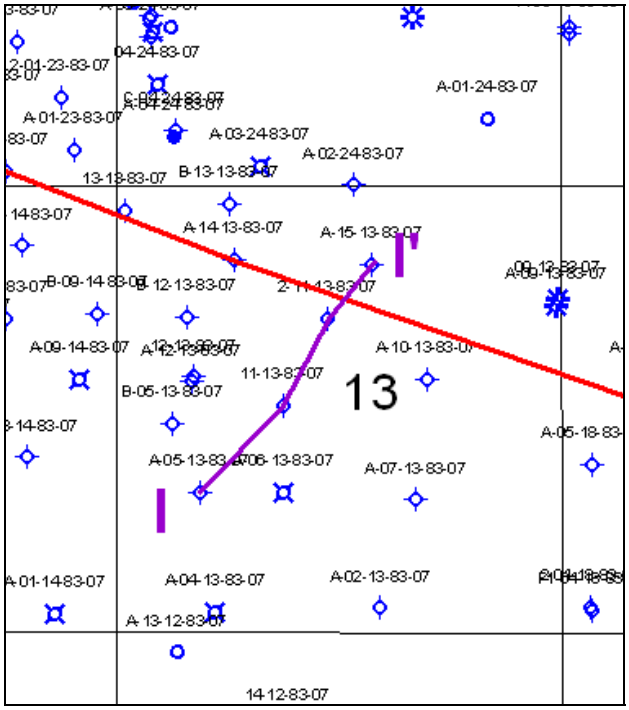
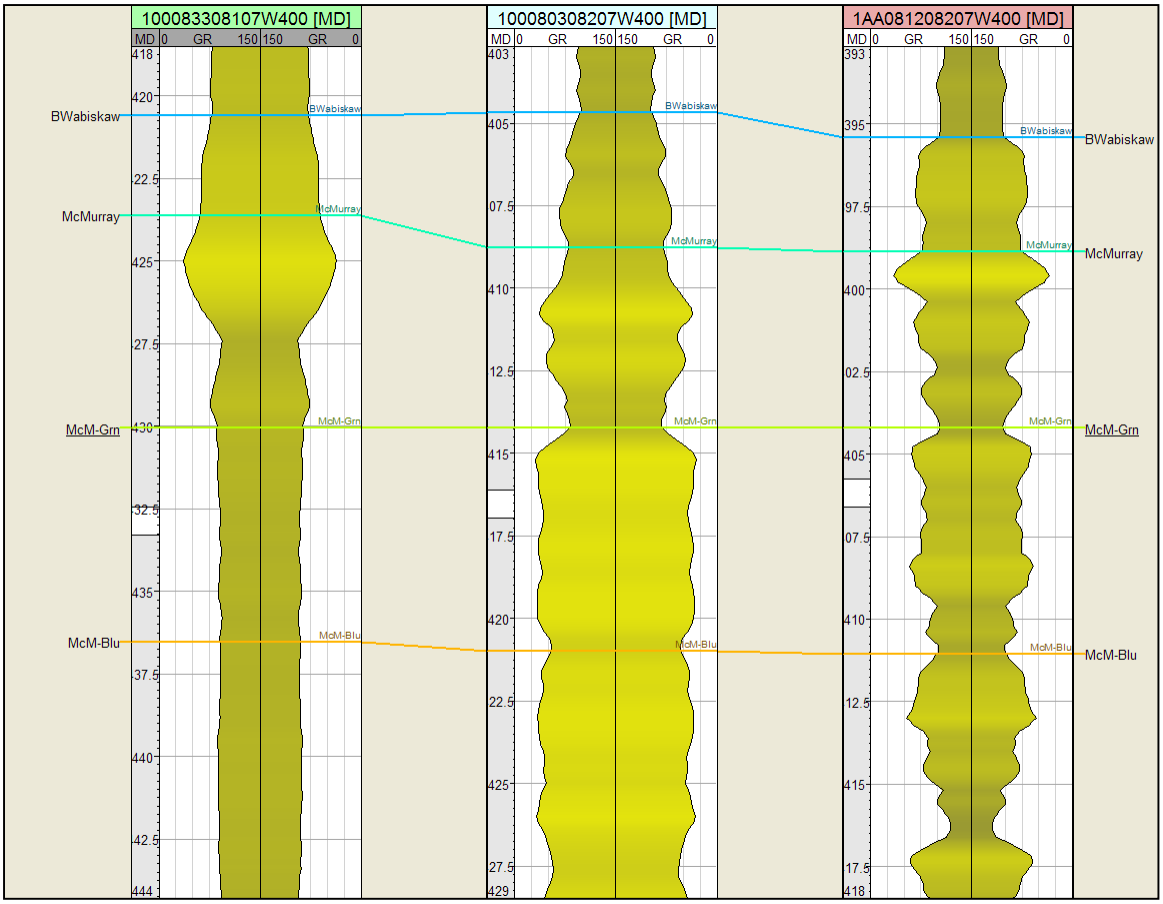


Figure G-17: Cross Section I-I'; Good example of rapid change from sand to shale channel in orientation normal to depositional strike.



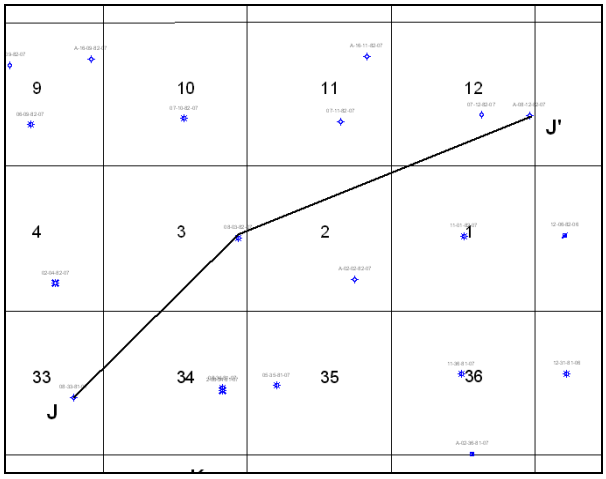
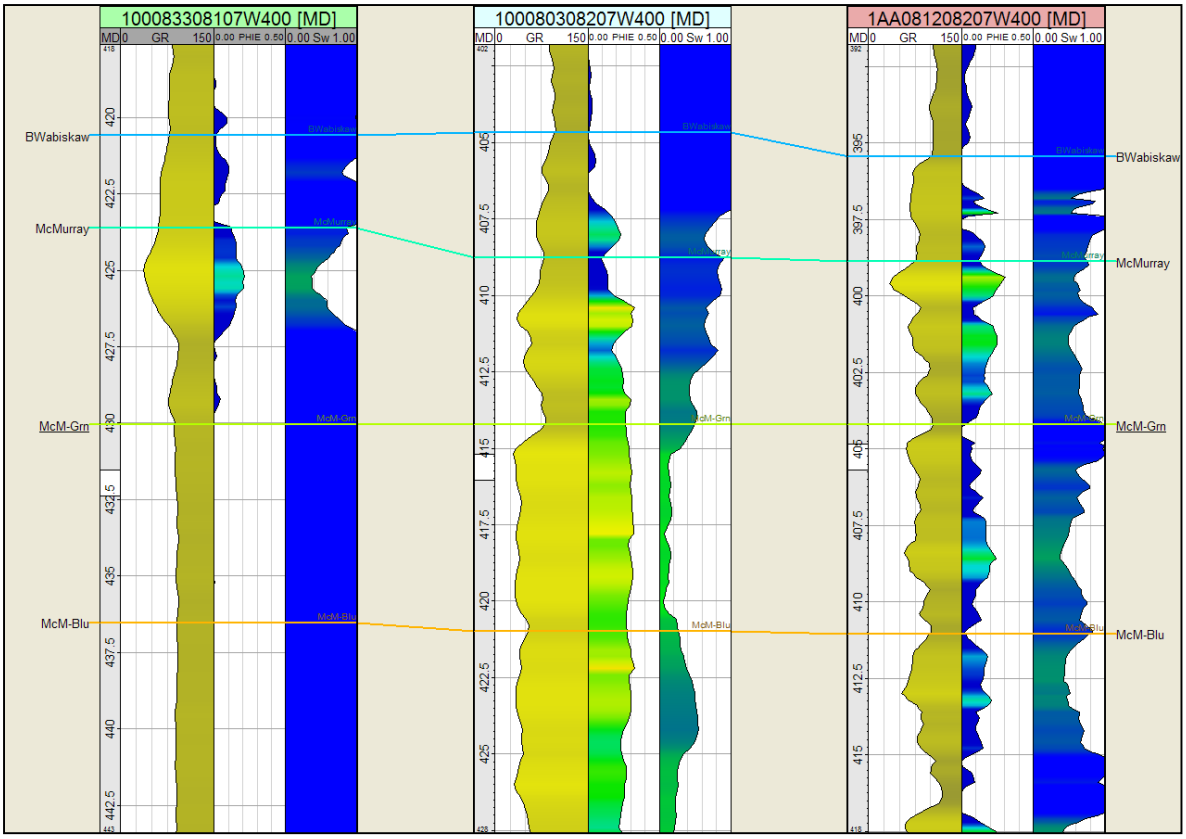


Figure G-18: Cross Section J-J'; Shale channel on left to sand channel (middle) to complex mixture of incisement and original coarsening-upward cycles (right).



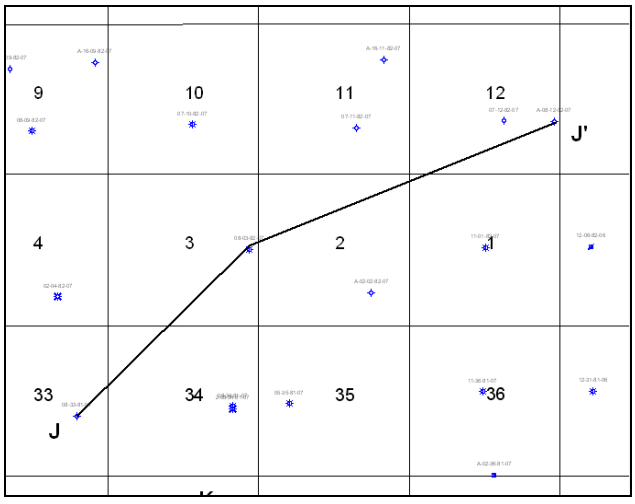
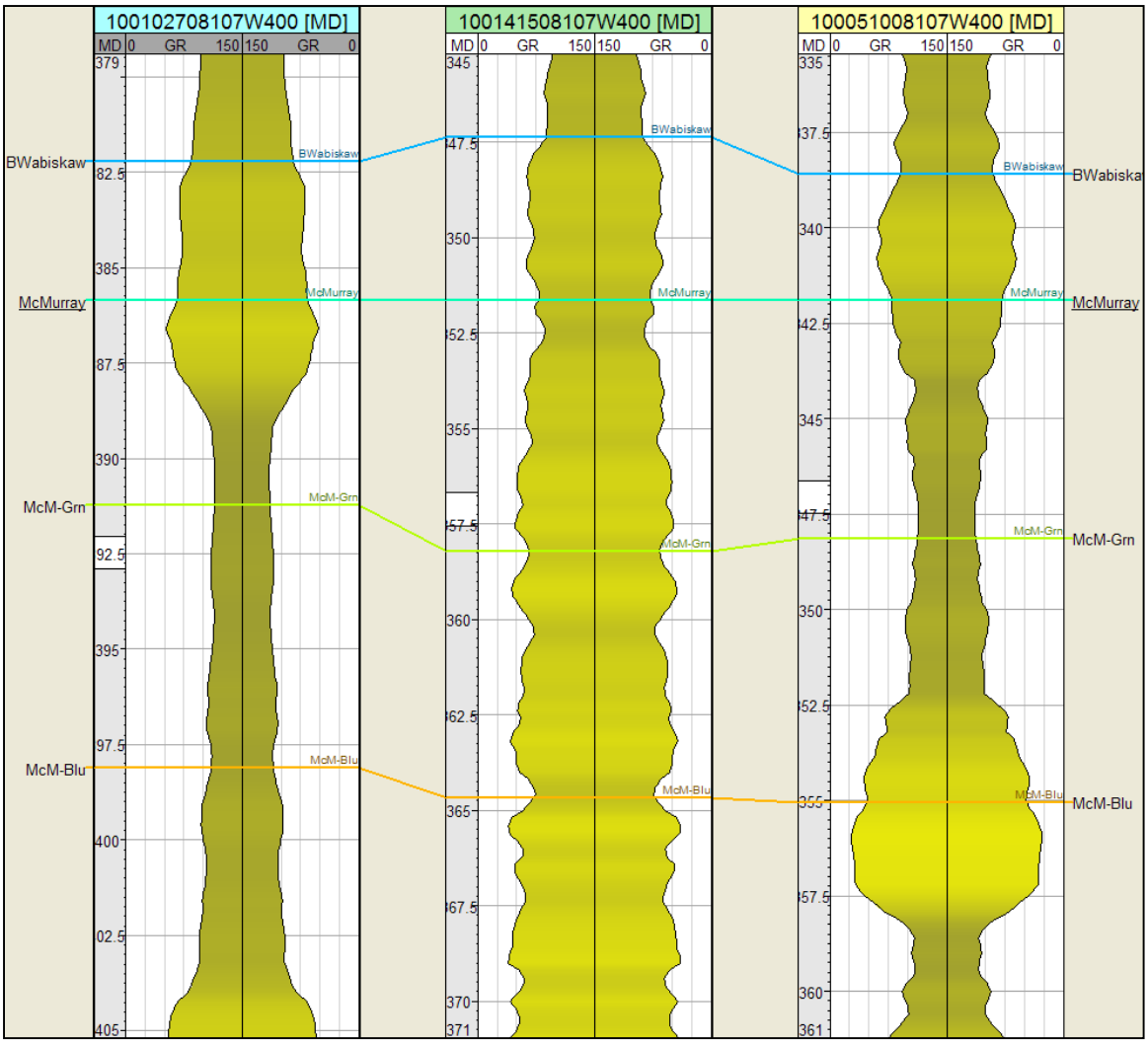


Figure G-19: Cross Section J-J′; Same wells as previous figure but with results traces displayed. Compare the saturation profiles of each well versus GR profile.



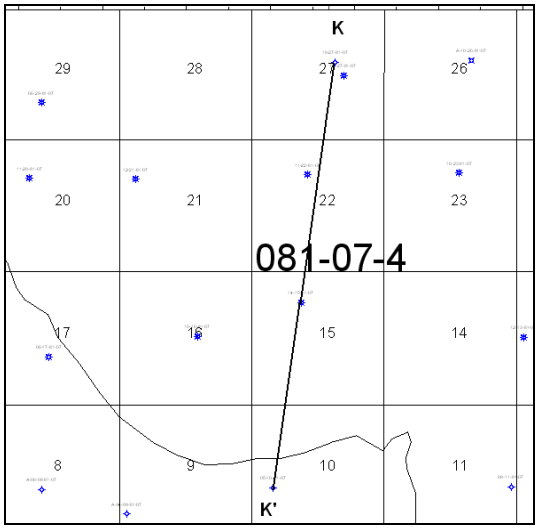
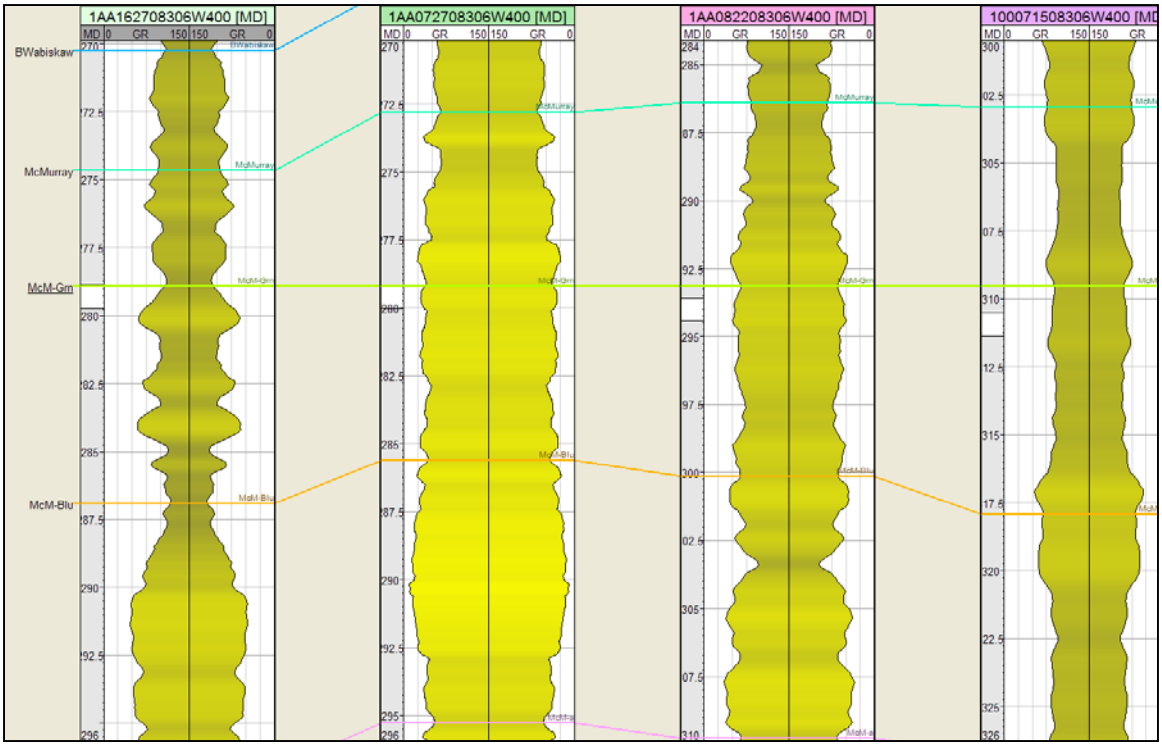


Figure G-20: Cross Section K-K'; Note graphic differences in GR profiles between wells in area with low well density. Well control in such areas is insufficient to capture the details of local stratigraphic changes.



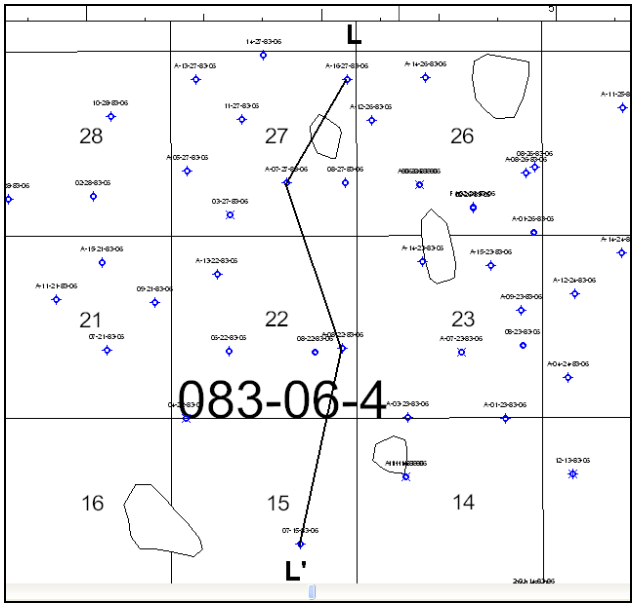
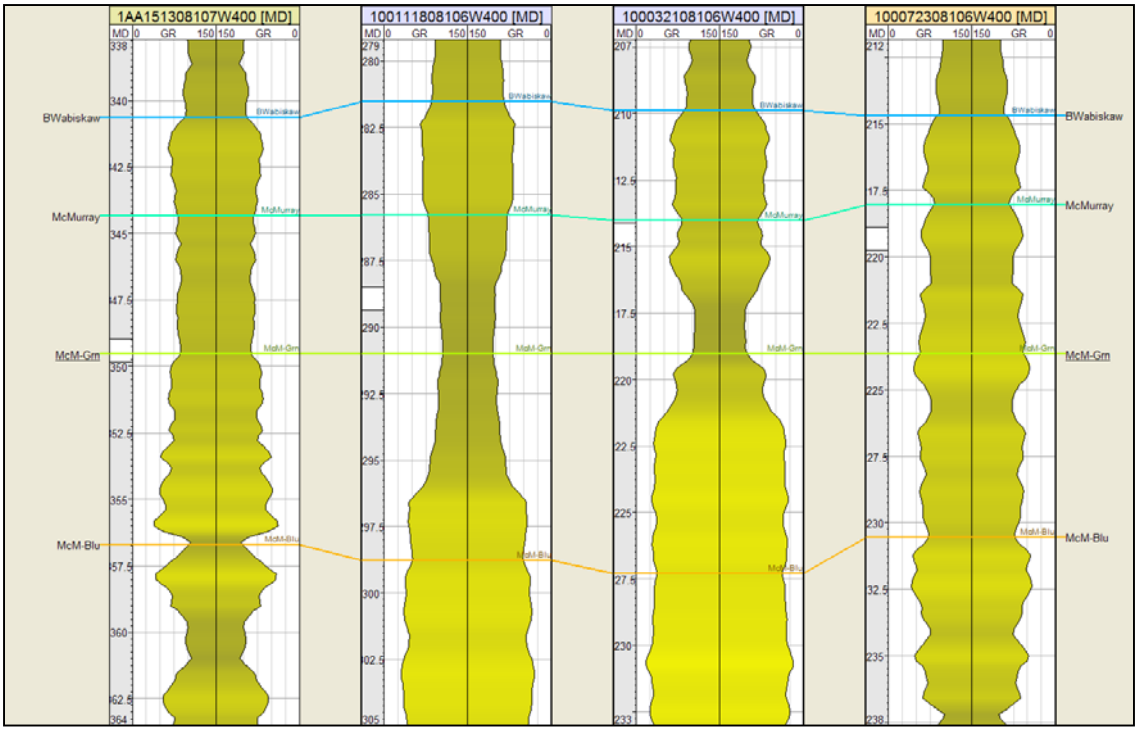


Figure G-21: Cross Section L-L'; This section is a good example showing how markers carry through several sections despite significant facies differences from well to well.



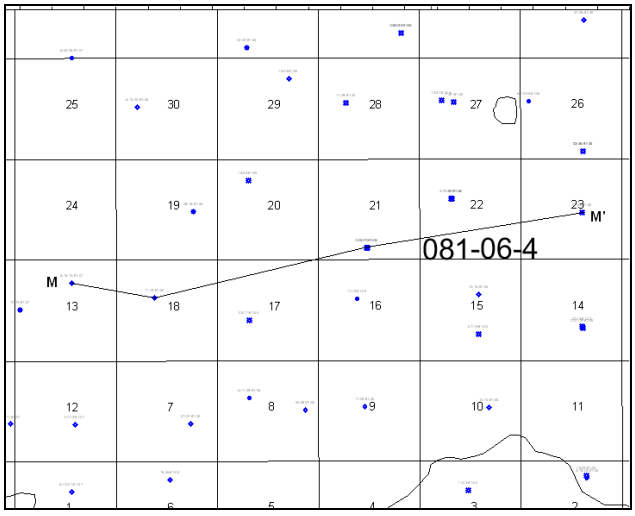
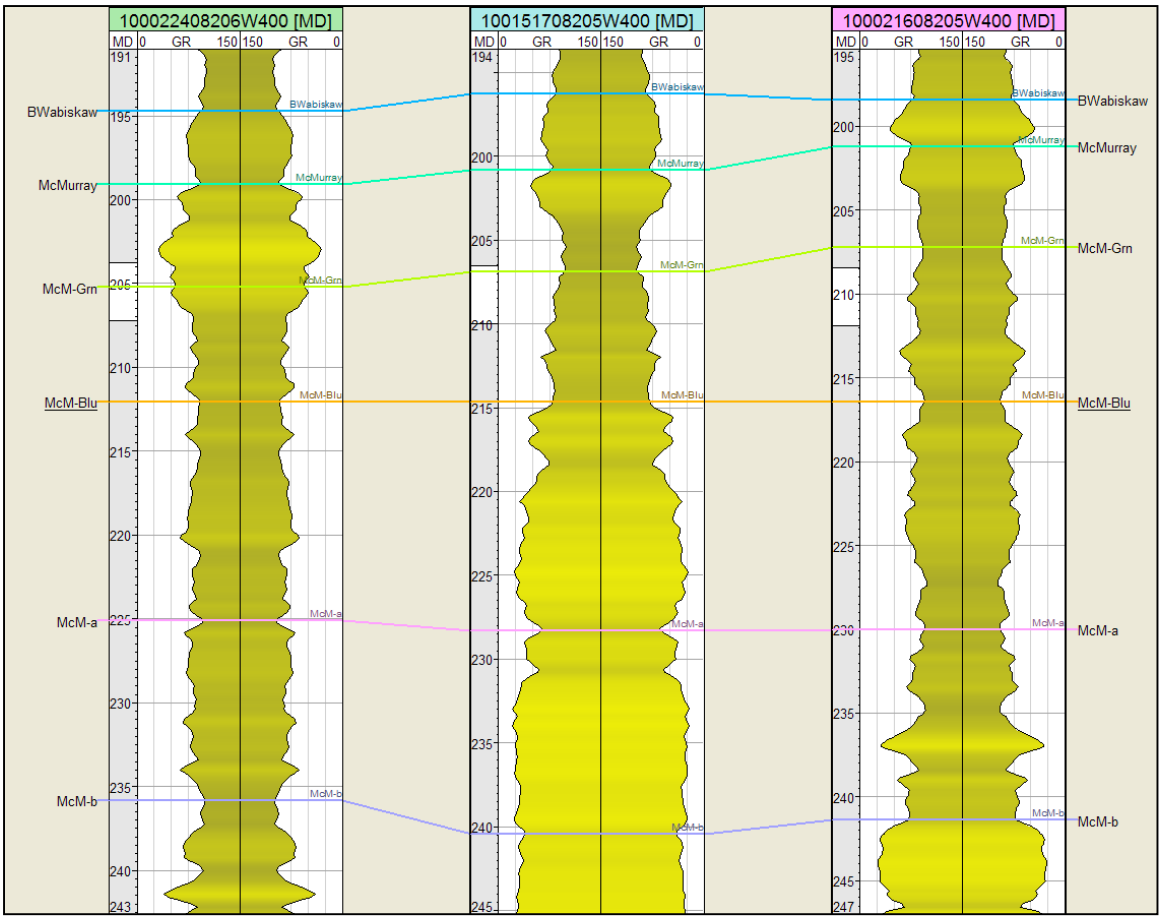


Figure G-22: Cross Section M-M'; Flattened on the "Green" marker. Note the thickness and variation of the incised channel fill below the "green" marker.



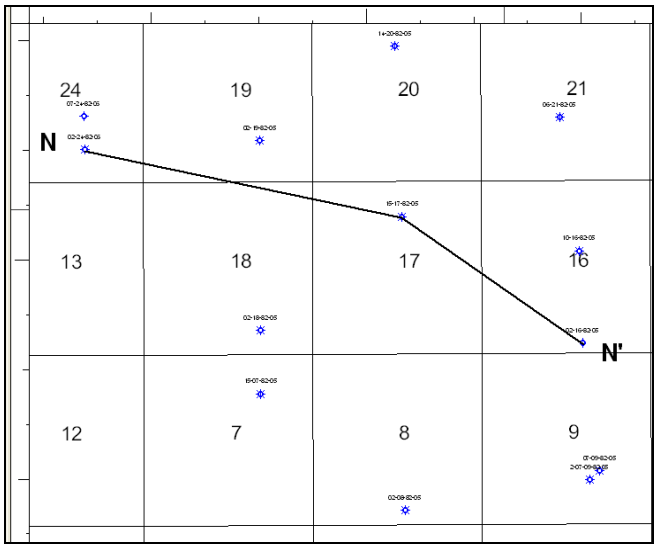
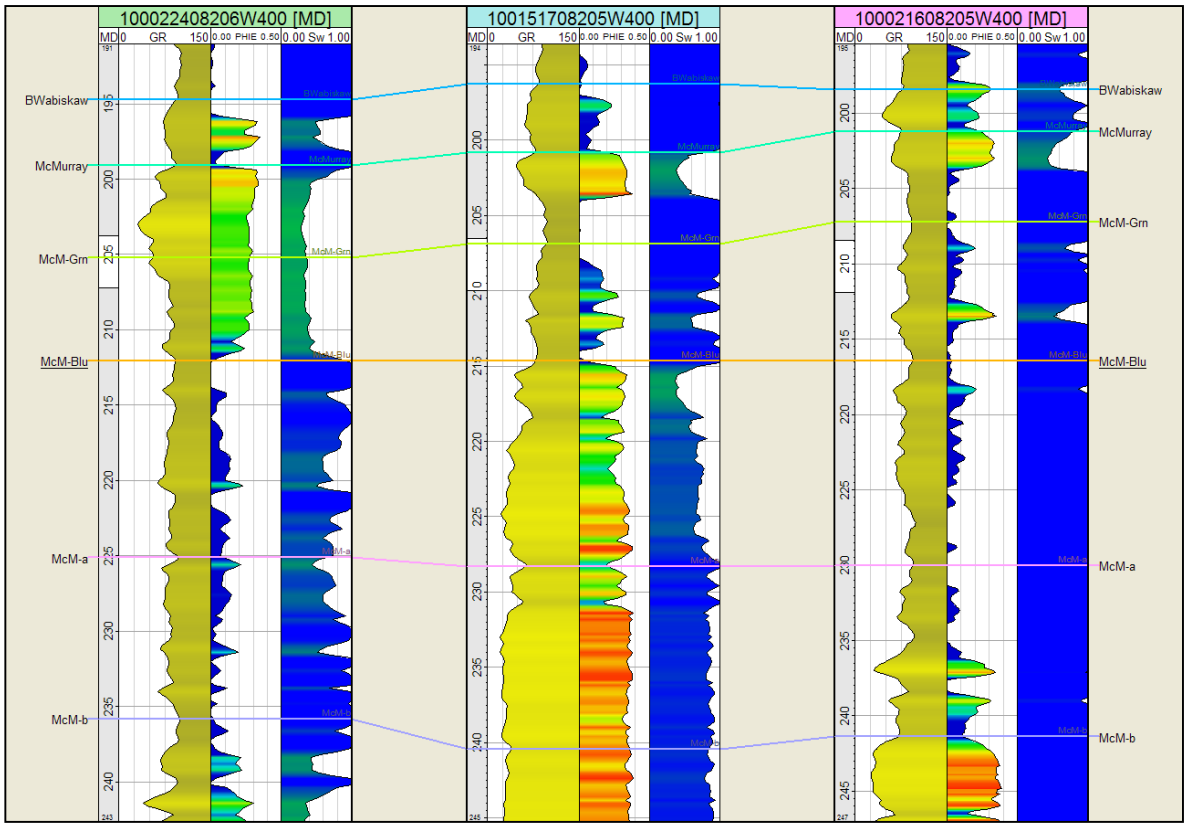


Figure G-23: Cross Section N-N′; Flattened on the "blue" marker. Middle well shows thick channel sands



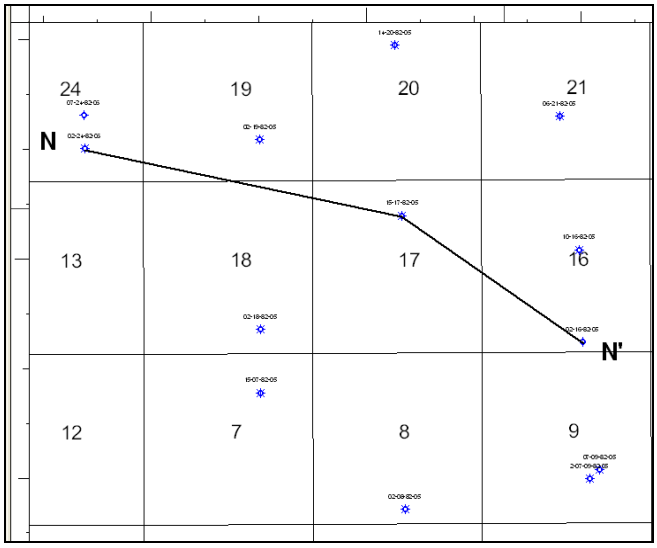
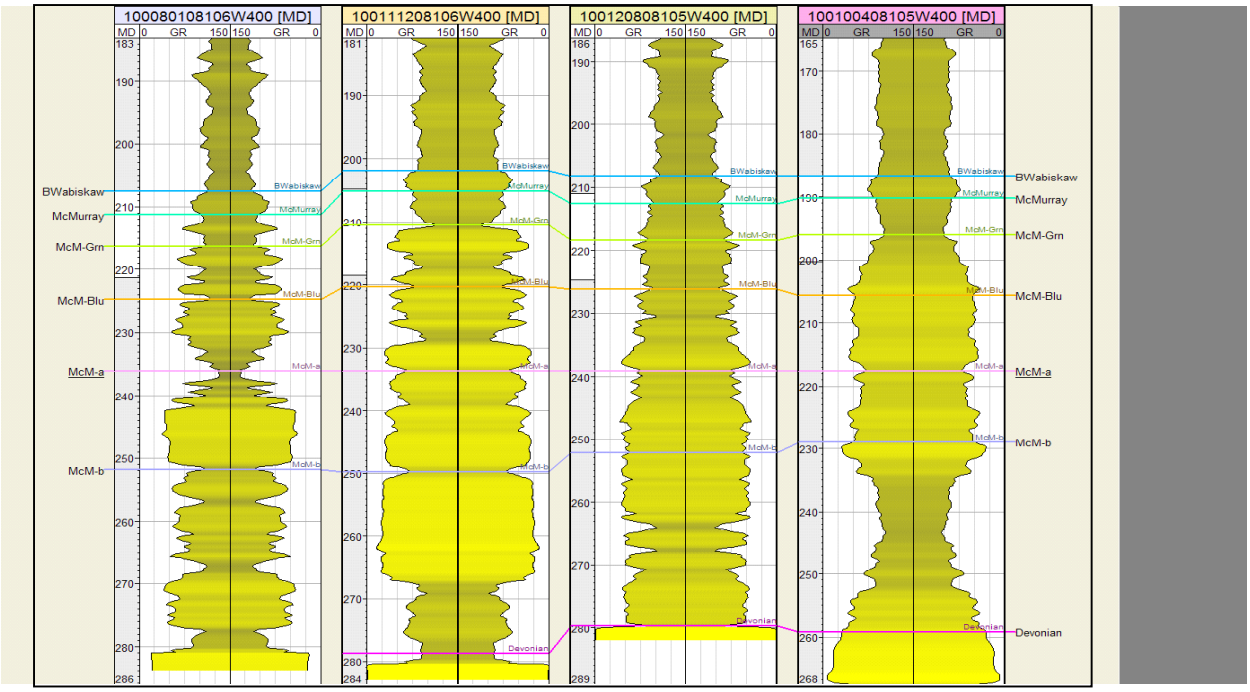


Figure G-24: Cross Section N-N′; The same section as previous figure, showing results traces. Note the quality of the reservoir sands in the middle well versus the other two. This shows how well the GR predicts reservoir quality.



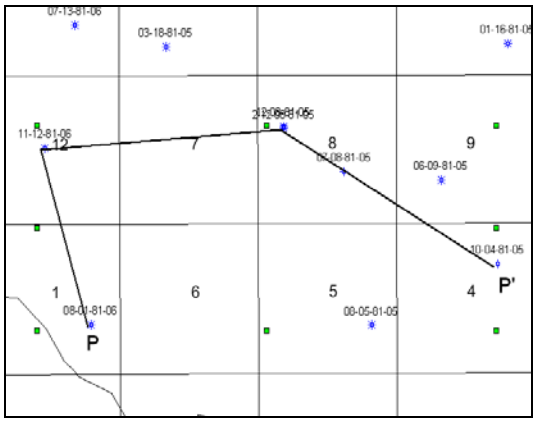


Figure G-25: Cross Section P-P′; A good example showing progressive incision in Layer 4 from left to right and replacement of coarsening-upward section by channel fill.

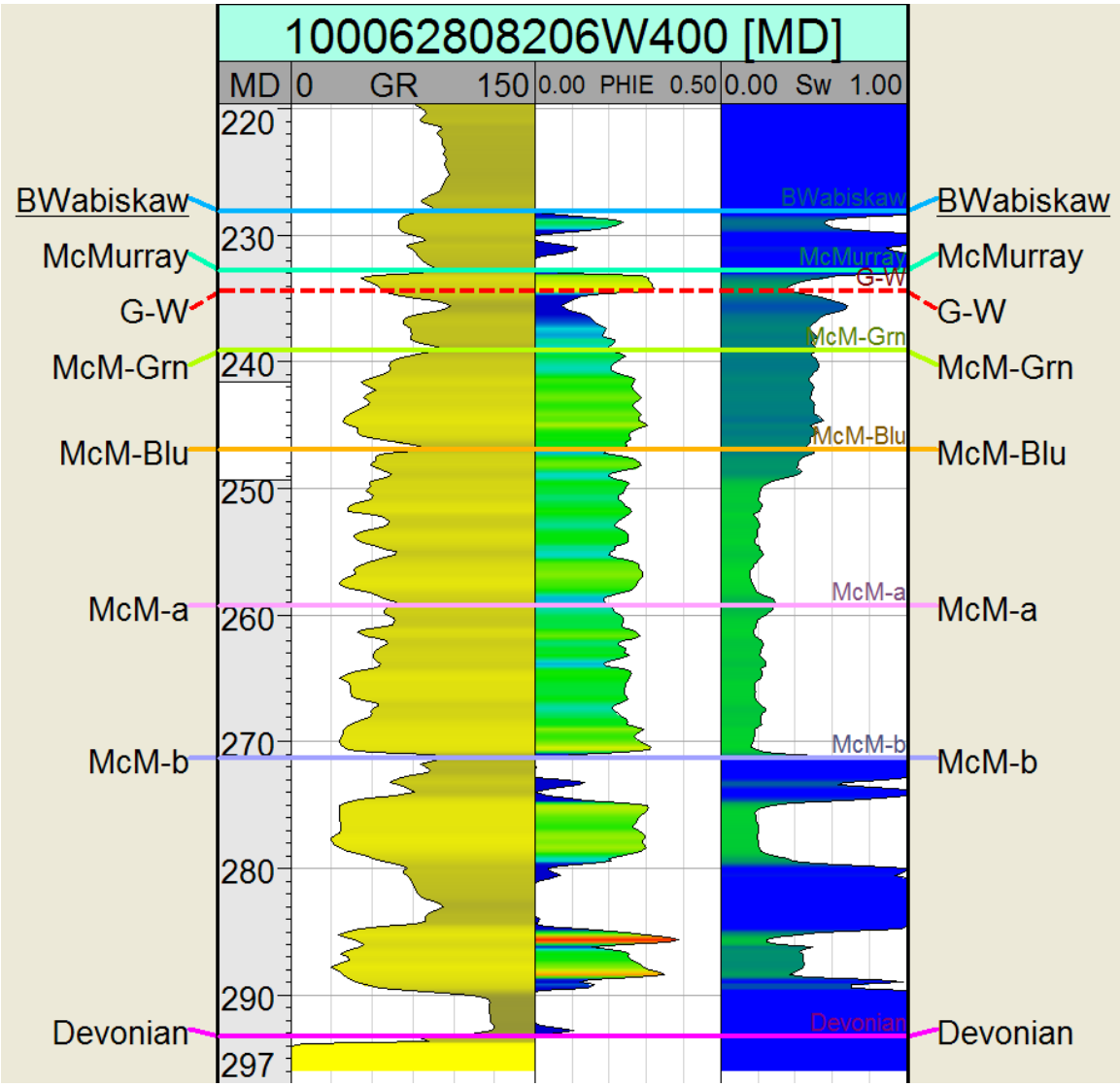
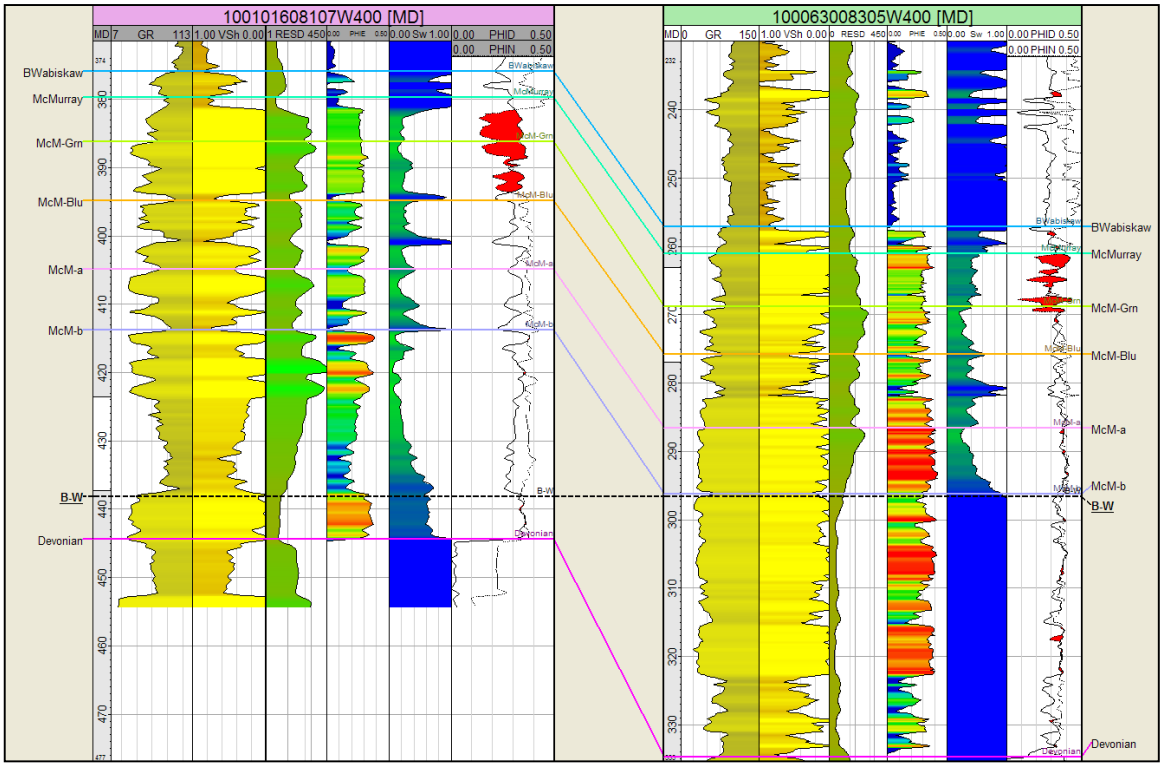


Figure G-26: Typical Well (06-28-82-06) with Results Traces, which include Calibrated Gamma Ray (GR), Effective Porosity (PhiE), and Water Saturation (Sw) with Posted Layer Tops and Fluid Contacts.



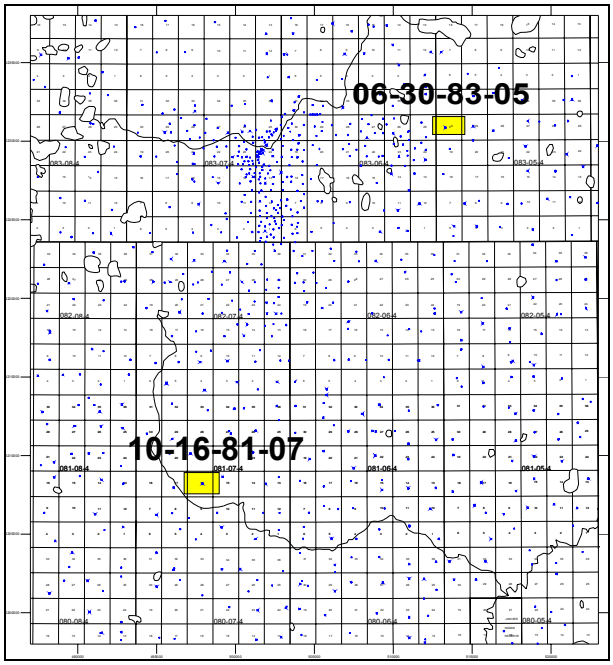
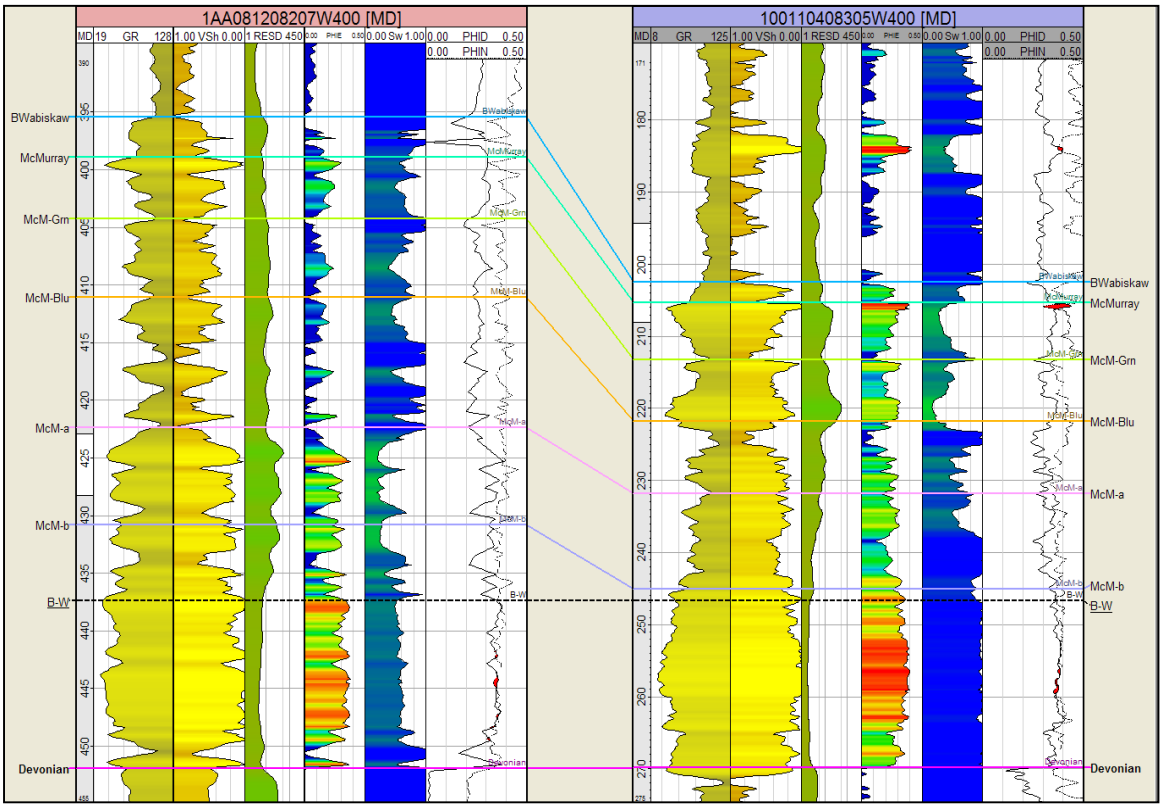


Figure G-27: Bitumen-Water Contacts in two Surmont Wells. The well on the right contains a true basal bitumen-water contact (Rt = <3 ohms) with calculated Sw of 100% in good quality sands. Contrast with well on the left, where Rt = >10 ohms and Sw is averaging 60%+.



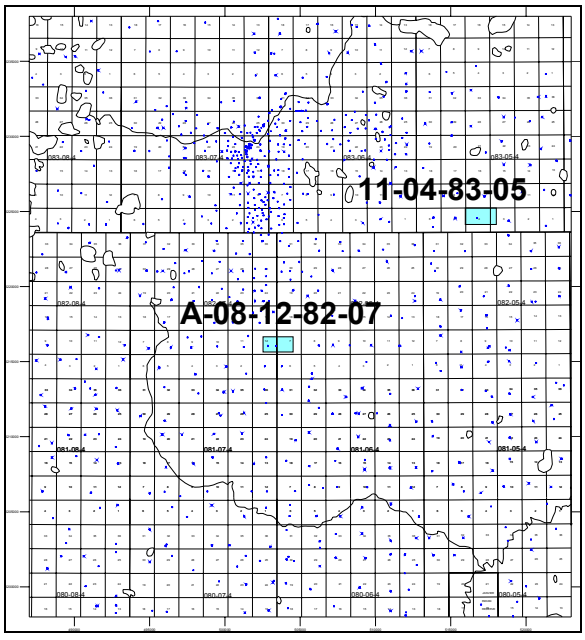
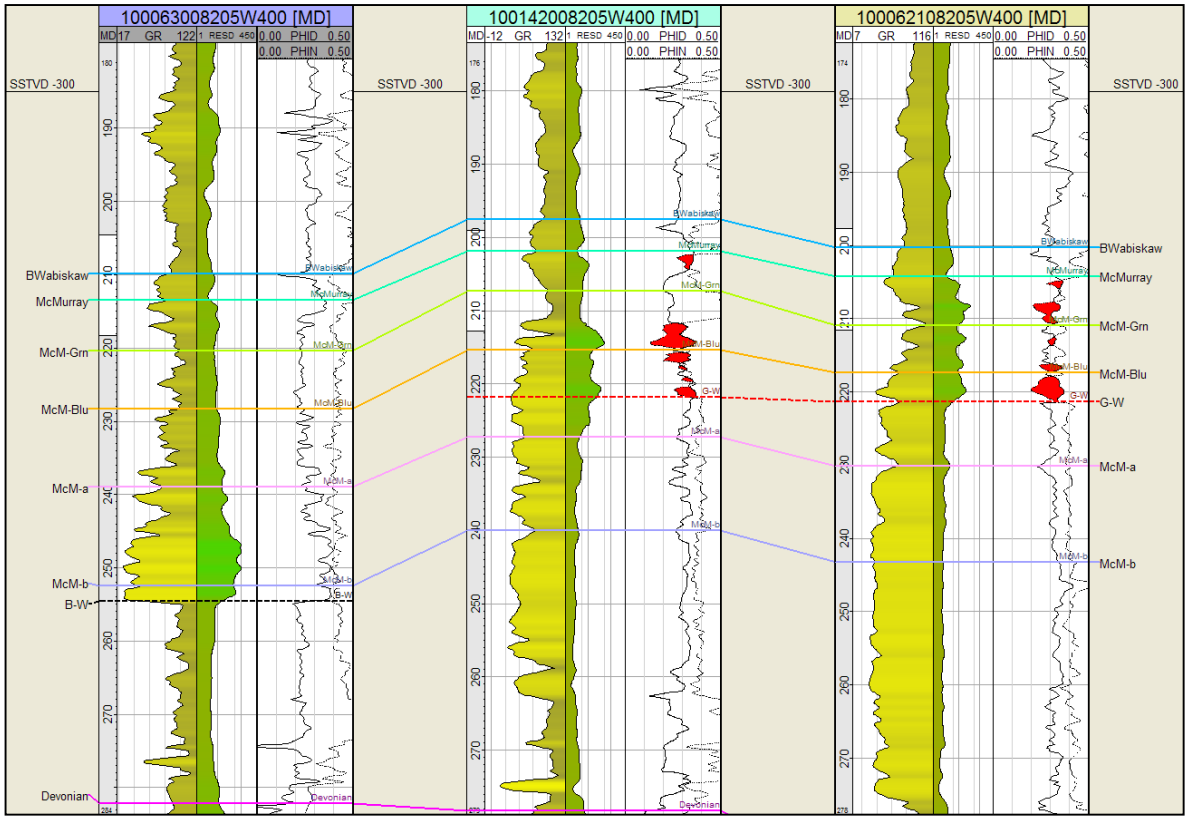


Figure G-28: Bitumen-Water Contacts in two Surmont Wells. The well on the right contains a true basal bitumen-water contact (Rt = <3 ohms) with calculated Sw approaching 100% in good quality sands. Contrast with well on the left, where Rt = >10 ohms and Sw is averaging 60%+.



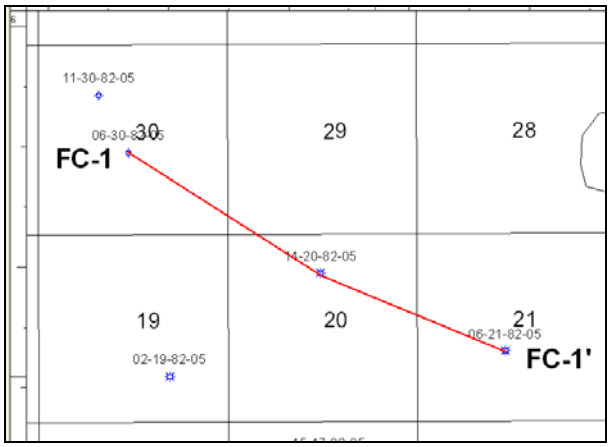
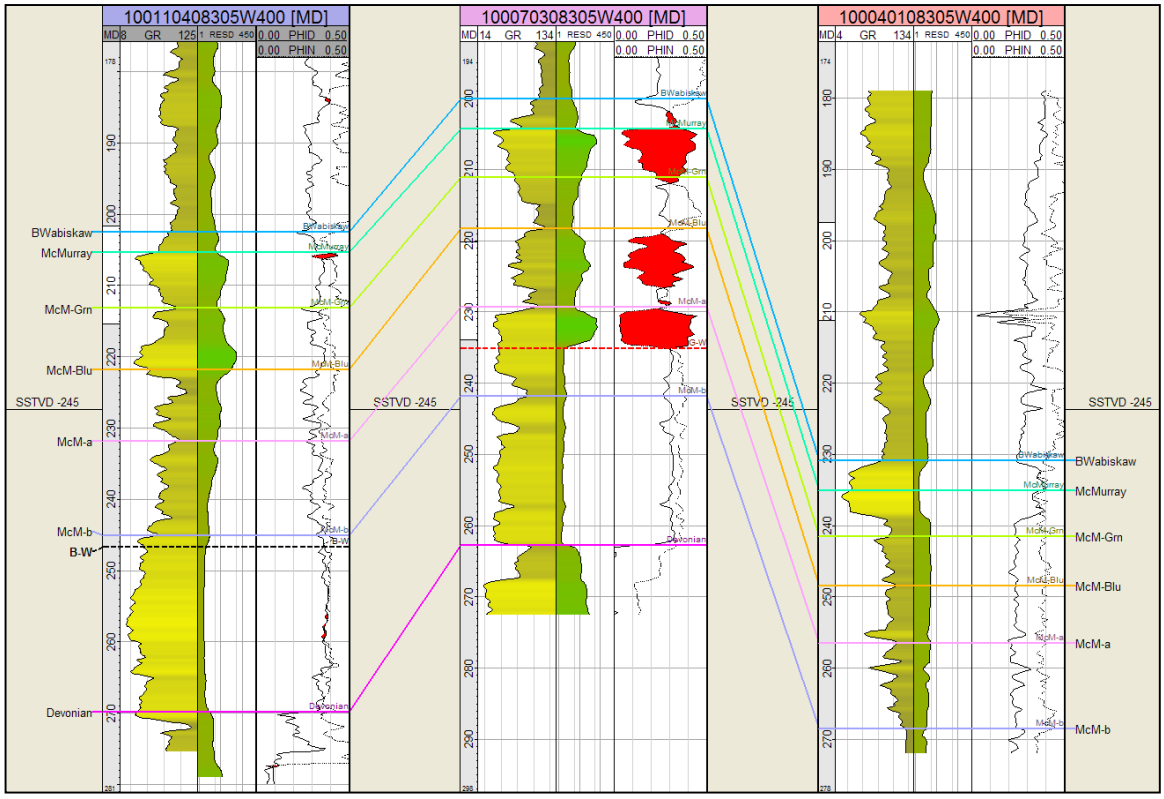


Figure G-29: Cross Section FC-1 to FC-1'; Flattened on Structural Datum TVDSS (-300); Bitumen-Water Contact in 06-30-82-05 is absent in Wells to East at same Elevation. Note Gas-Water Contacts in Red and Gas Column (in red fill) from Neutron-Density Crossover.



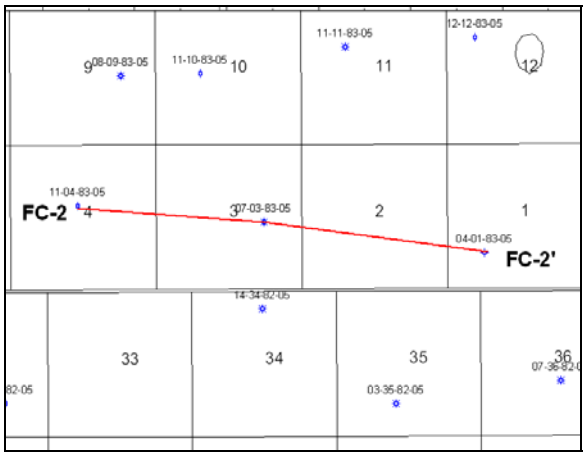
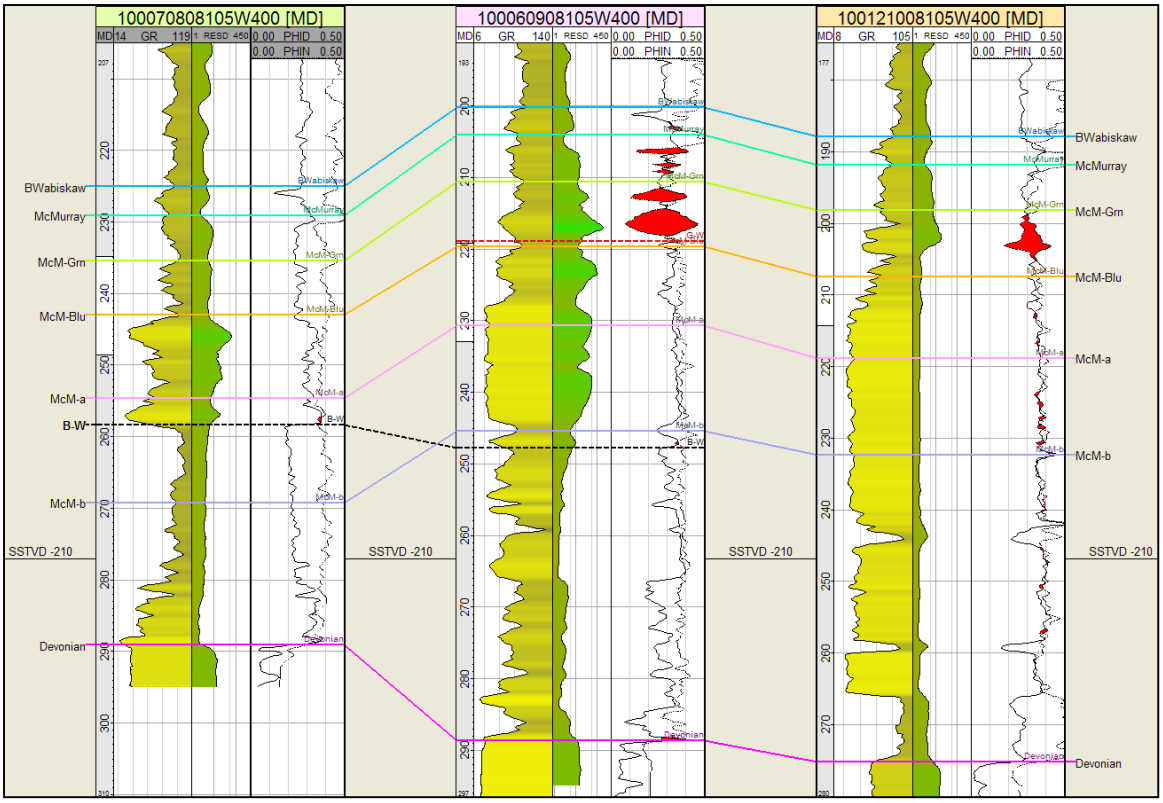


Figure G-30: Cross Section FC-2 to FC-2′; Flattened on Structural Datum TVDSS (-245); Bitumen-Water Contact in 11-04-83-05 is absent in Wells to East at same Elevation. Note Gas-Water Contact in Red and Gas Column (in red fill) from Neutron-Density Crossover.



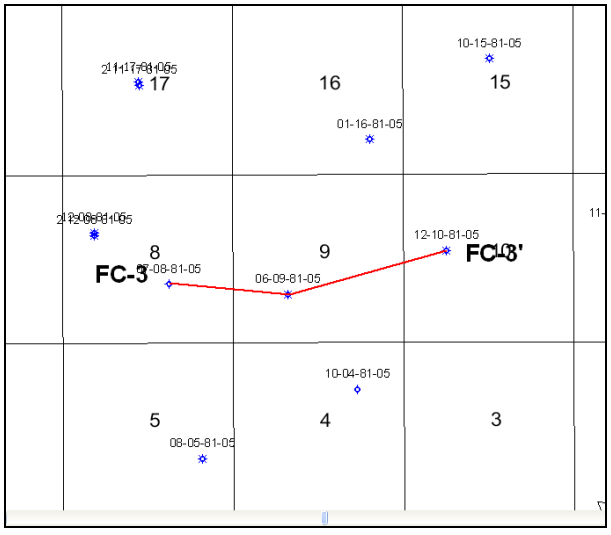
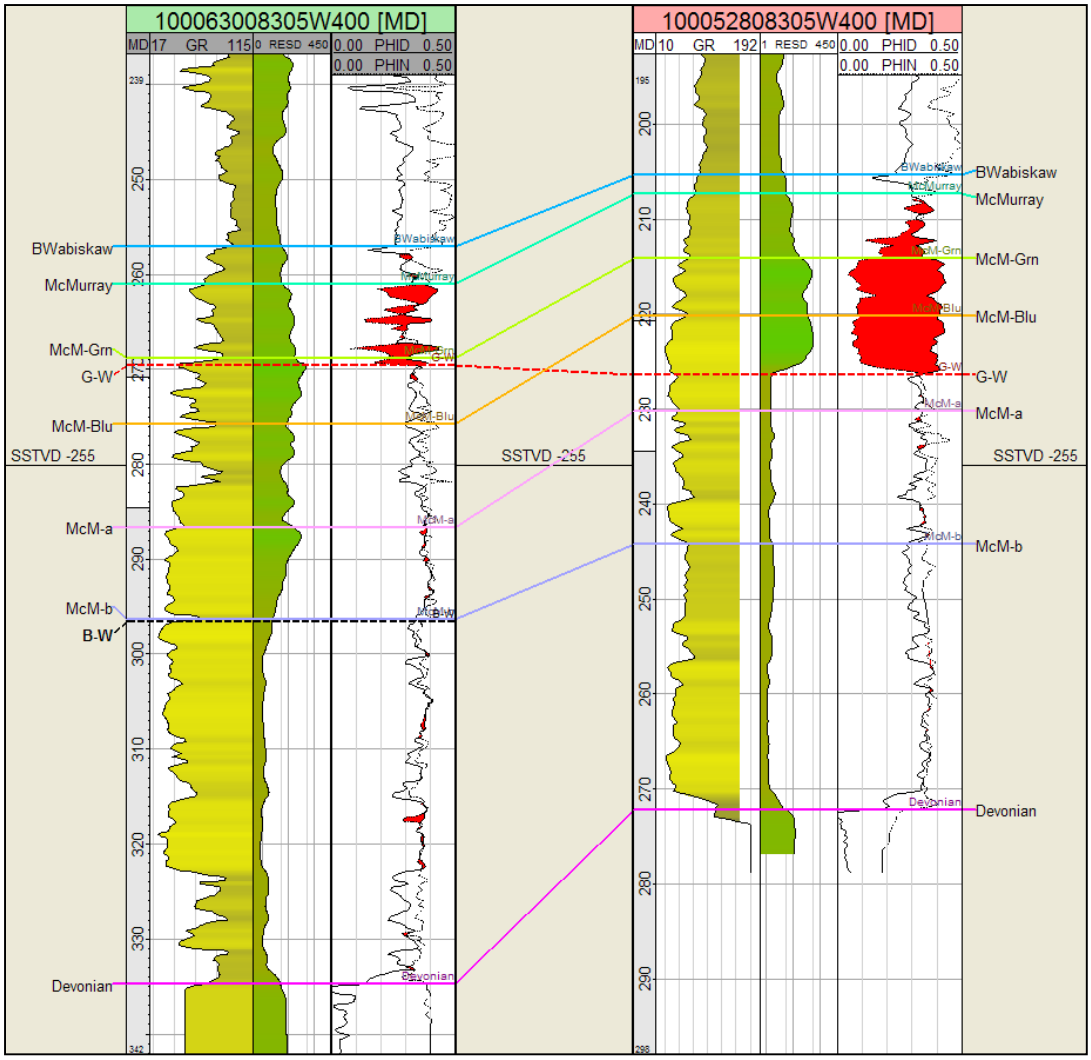


Figure G-31: Cross Section FC-3 to FC-3′; Flattened on Structural Datum TVDSS (-210); Bitumen-Water Contact in 07-08-81-05 and 06-09-81-05 is absent in Well to East at same Elevation. Note Gas-Water Contact in Red and Gas Column (in red fill) from Neutron-Density Crossover.



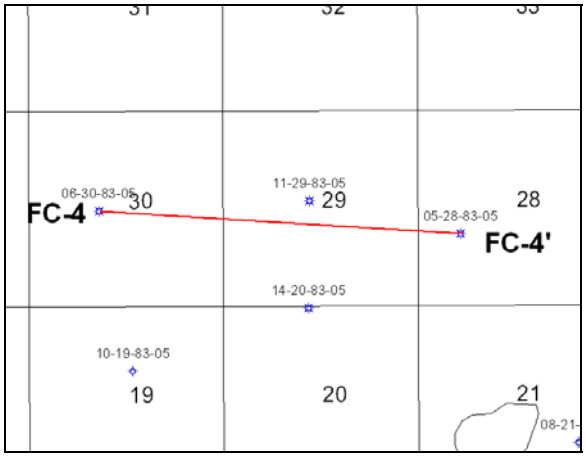


Figure G-32: Cross Section FC-4 to FC-4'; Flattened on Structural Datum TVDSS (-255); Bitumen-Water Contact in 06-30-83-05 is absent in Well to East at same Elevation. Note Gas-Water Contacts in Red and Gas Column (in red fill) from Neutron-Density Crossover.

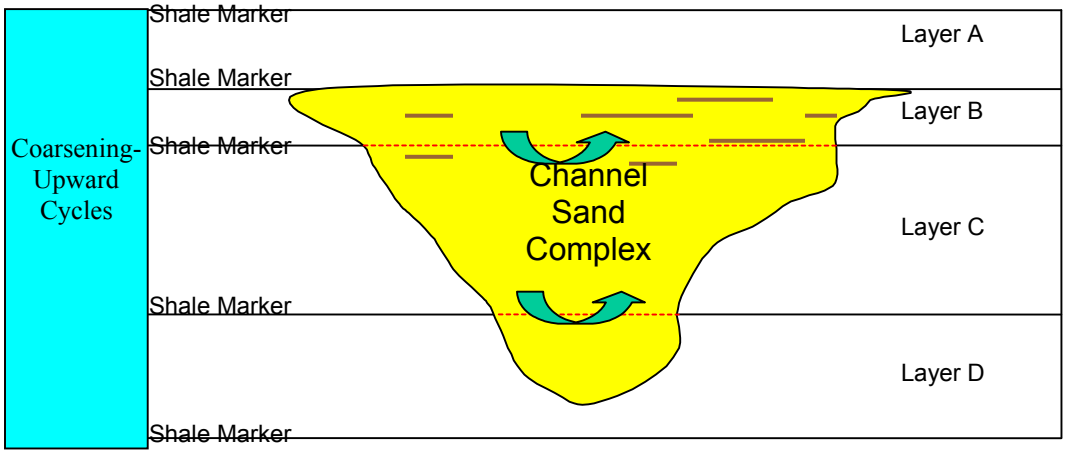


Figure G-33: Diagrammatic Cross Section of Sandstone Filled Channel Complex incised in Coarsening-Upward Cycles; Note the constraints on fluid flow in the non-channel areas by the continuous shale markers (barriers) versus discontinuous shale "baffles" (Brown Lines) within channel column. The dashed Red Lines represent layer boundaries

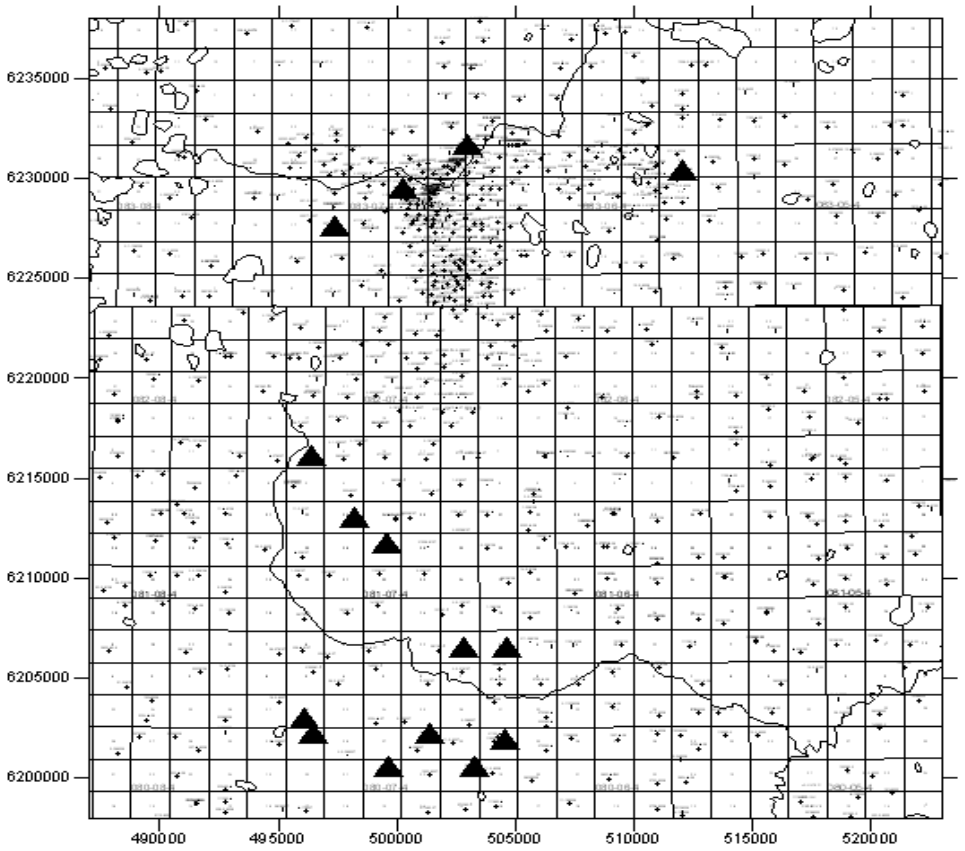


Figure G-34: Index Map showing Locations of Described Cores.

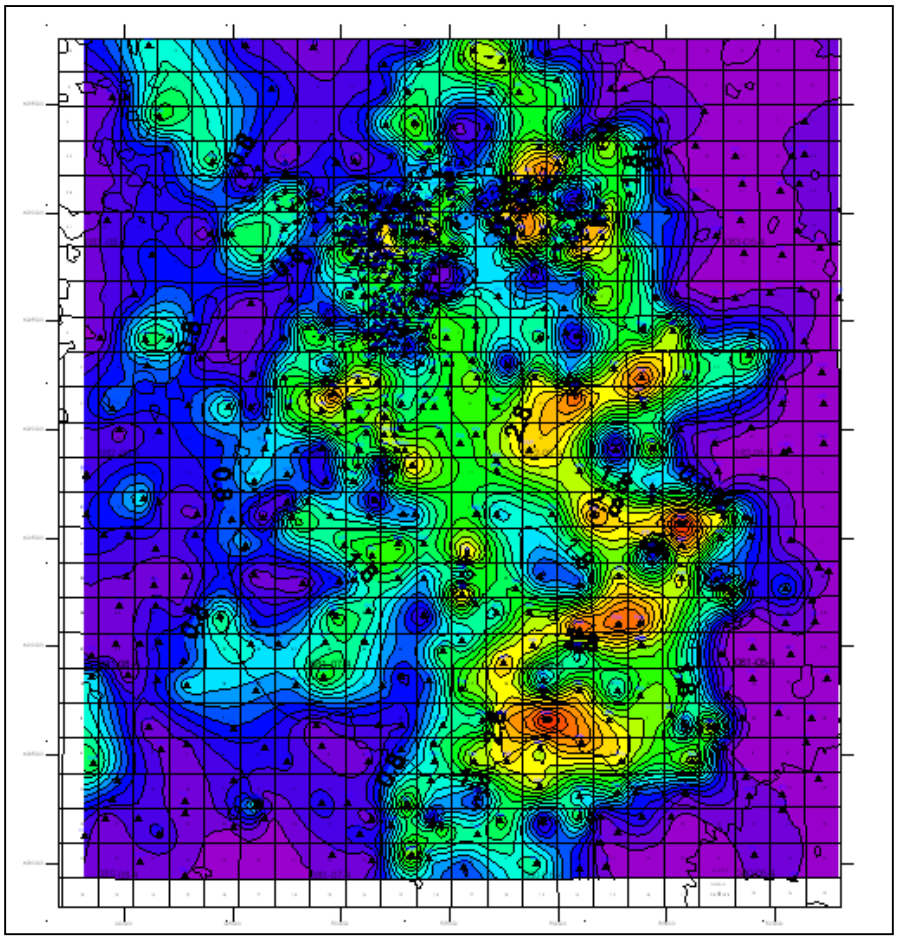


Figure G-35: Layer 4 - HPV; Note the sinuous line on the east side separating Blue and Purple colours; This is approximately the position of the basal bitumen-water contact.