The Cambrian Rogersville Shale: A Potential Unconventional Oil and Gas Reservoir in the Appalachian Basin

**Introduction**

Research by the Rome trough (formerly known as the Conasauga basin) indicates the potential of Cambrian shale formations, especially the Rogersville Shale, to be a significant unconventional hydrocarbon resource. The Rogersville Shale, deposited in a carbonate shelf environment, is known for its high total organic carbon (TOC) and hydrocarbon generation potential.

**Stratigraphic Framework**

Stratigraphic correlations indicate the Rogersville Shale extends across parts of eastern Kentucky, and includes in some instances the overlying Conasauga Group. The Rogersville Shale, along with the overlying Conasauga Group, records several cycles of progradation and transgression from east to west into the basin.

**Hydrocarbons and Source Rock**

Type Log, USSignal#1Elkhorn well, Johnson County, Kentucky

The Rogersville is the only significant Cambrian shale with sufficient organic carbon to generate hydrocarbons. Nolichucky and Pumpkin Valley samples were lean. Rock-Eval pyrolysis indicates the Rogersville is in the wet gas thermal maturity window (Tmax = 450-480°C).

**Organic Petrography**

Solid bitumen (B) is common in the Rogersville Shale, and reflectance of this material can be measured and used to estimate thermal maturity. Indicated levels of thermal maturity in the Rogersville range from Ro = 1.35 to 1.51.

**Unconventional Reservoir Potential**

• A viable Cambrian petroleum system exists in the App. Basin. The Rogersville Shale is a primary source interval. The Rogersville Shale is known for its high total organic carbon (TOC), and has generated gas & condensate.

**Conclusions**

The Rogersville Shale has sufficient organic carbon to be a potential unconventional oil and gas reservoir. The Rogersville Shale contains a reservoir quality section (McBride et al., 2018). The Rogersville Shale is likely to be the subject of further exploration and development, with the potential for significant oil and gas discoveries.