

DATING BRITTLE DEFORMATION AND HYDROCARBON EXPULSION IN THE UTICA SHALE OF THE MOHAWK VALLEY, NEW YORK STATE

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ABSTRACT

The objective of this project is to obtain ages for brittle deformation and hydrocarbon expulsion in the Utica Shale using Re-Os geochronology. The dates would represent the first radiometric ages for vein-filled fractures in the Ordovician Utica Shale in New York State. Sections of core will be sent to the Applied Isotope Research Program at Colorado State University where staff will perform Re-Os isotopic analysis on pyrite and bitumen within calcite veins.

Four samples have been selected for dating: a damage zone with normal motion kinematic indicators, a sub-vertical vein, a low angle vein, and a beef structure. The calcite-filled fractures will provide ages for deformation/vein-filling. The date from the beef structure represents the age of gas generation/ intraformational local hydrocarbon expulsion. If bitumen ages in veins are similar or younger than the beef structure, then the vein-filled fractures may be modeled as possible migration pathways for Utica-sourced hydrocarbons. The information will provide data for the construction of a hydrocarbon system that takes into account the timing of hydrocarbon generation and migration. There are currently no dated veins in the Utica Shale in New York State. Veins in the Utica Shale are assumed to be Taconian or Alleghanian, or they could be the result of Salinic, Acadian or multigenerational deformation. Dating the vein-filled fractures will allow me to assign ages to the brittle deformation events represented by the vein-filled fractures for the first time.

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