Optimization of Hydraulic Fracturing Performance in the Fractured Utica Shale of Northeastern United States, J. Paktinat, Joe Pinkhouse, and Jeff Little, Universal Well Services, Meadville, PA 16335 javad.paktinat@univwell.com; Gary G. Lash, SUNY-Fredonia, Department of Geosciences, Fredonia, NY 15767; and Michael A. Forgione, Great Lakes Energy Partners LLC, Carlton, PA 16311

The primary purpose of stimulating fractured shale reservoirs is the extension of the drainage radius via creation of a long fracture sand pack that connects with natural fractures, thereby establishing a flow channel network to the wellbore. However, there is limited understanding of a successful method capable of stimulating Utica shale reservoirs. Indeed, most attempts to date have yielded undesirable results. This could be due to several factors, including formation composition (40 percent dilemmatic), entry pressure, and premature pad fluid leak-off. Furthermore, stimulation of Utica shale reservoirs with acid alone has not been successful due to the plugging of pore throats by post acid fines and sludge. This treatment method leads to a fracture length and drainage radius less than expected, resulting in poor well productivity.

This study describes new methods of stimulating Utica shale utilizing an in situ acid treatment to dissolve dolomite while reducing entry pressures, followed by gelled acid, and finally with crosslinked fracturing treatment. Application of multi-phase surfactant to reduce emulsion tendencies and improve leak-off is also addressed. These treatments were tested by use of parallel Utica shale plates and 6-foot-long Utica shale packed columns. Leak-off efficiencies and adsorption properties of surfactant treatments were investigated by the injecting of treatment fluids into the Utica shale packed column.

The results of this study demonstrate exceptional stimulation penetration, leak-off efficiencies, well cleanup improvements that can be used to optimize fracturing treatments of fractured Utica shale reservoirs in the Appalachian Basin.