



Geophysical Society of Pittsburgh



Proudly Presents Tuesday, January 10th, 2017

At

Cefalo's Restaurant, Carnegie, PA

Comparison of Geomechanics of the Microseismic Response in Organic Shales of West Virginia and west Texas

Erich Zorn

Department of Energy

Abstract: Using an innovative workflow incorporating microseismic attributes and geomechanical well logs, we have defined major geomechanical drivers of microseismic expression to understand reservoir stimulation response in an engineering/geological context. Microseismic data from hydraulically fractured Marcellus wells in PA and WV, and a Wolfcamp well in the Midland Basin, TX, were sampled vertically through the event cloud, crossing shale and other lithologies. We focused our analysis on the organic shale, creating pseudo-logs of moment magnitude (M_w), seismogenic b -value, and event count. The vertical moving-average sampling of microseismic data was completed such that the sample interval matched that of the geophysical well log. This technique creates robust microseismic logs that show subtle changes in microseismic properties and allow direct cross-plotting of microseismic versus geophysical logs. We chose five geomechanical properties to form the framework against which to interrogate the microseismic data: Young's modulus, Poisson's ratio, brittleness, λ - ρ , and μ - ρ . Additionally, we included natural gamma as a relative indicator of organic content. Having defined this microseismic-geomechanical cross-plot space, we derived insights into the response of these units during hydraulic fracturing. There is a meaningful link between microseismicity and the elastic properties of the host rock. In light of this dependence of stimulation potential on elastic properties, the calculation of microseismic pseudo-logs at stimulation sites and application of our cross-plot framework for microseismic-geomechanical analysis in unconventional shale will inform operators in planning and forecasting stimulation and production, respectively.



Biography: A Professional Geologist by education and practice, Erich spent 7 years in the engineering and consulting industry after earning his MS in Structural Geology. He returned to school in 2012 to earn a PhD with a focus in oil and gas geology and geophysics. His dissertation ended up being a study in the additional utility offered by microseismic data acquired during hydraulic fracturing in the Marcellus Shale, mainly focused upon integrating geology, seismology, geophysics, and mechanics to characterize reservoirs. During the course of his PhD, Erich completed two internships at Chevron ETC in Houston, working on fracture-induced anisotropy modelling, and received funding from the Department of Energy's National Energy Technology Laboratory, where he is currently a Post-Doctoral researcher. At NETL, Erich is involved in passive seismic monitoring of carbon sequestration, EOR, and hydraulic fracturing sites, and continues to work with microseismic data in search of new ways to squeeze out just a little bit more understanding.

Please RSVP using the PayPal link on the Geophysical Society of Pittsburgh website at: www.thegsp.org

Cost: \$35 Members, \$40 Non-members (\$20 for Students). Meeting Location: 428 Washington Ave, Carnegie, PA 15106 (412) 276-6600. Note the significant detour warning on page 2 of the newsletter.

January 10th, 2017 Agenda:

5:00 pm Social Hour (Beer and Wine)

6:00 pm Dinner Buffet

7:00 pm Lecture sponsored by:



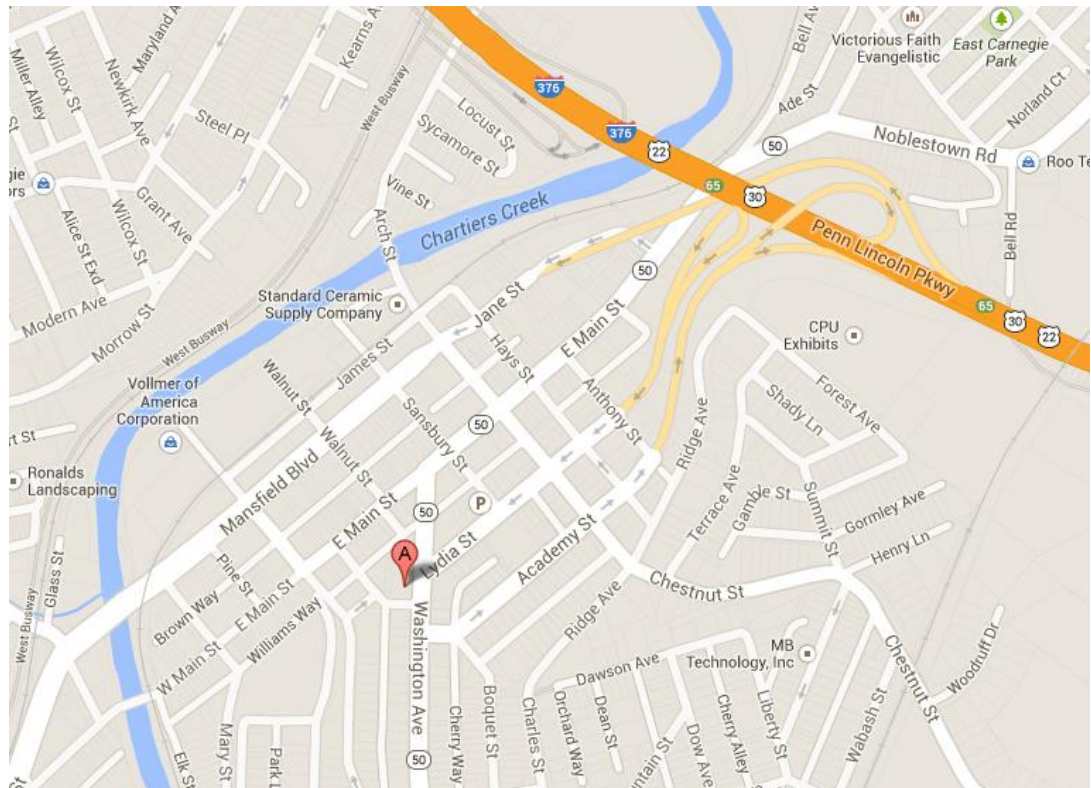
**U.S. DEPARTMENT OF
ENERGY**

To receive CEU certificate from this lecture please email: emily.mcclain@netl.doe.gov

This months lecture will be held at :

Cefalo's

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412.276.6600



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