

Pre-Convention Field Trip #1: Sequence Stratigraphy, Facies Distribution, and Fault and Fracture Patterns of the Niobrara Formation, Front Range, Park Basins, and Laramie Basin, Colorado and Wyoming

- Dates:** Thursday, June 23 - Saturday, June 25.
- Leaders:** Edmund R. "Gus" Gustason, Enerplus Resources (USA) Corp; Marshall Deacon, Noble Energy Inc.; John Lorenz, Geoflight, LLC; and Steve Sonnenberg, Colorado School of Mines.
- Itinerary:** Depart Little America, Cheyenne, Wyoming on Thursday, June 23 at 8:00 am, and returns to Cheyenne on Saturday evening, June 25. Registrants must arrange for own transportation to Cheyenne, Wyoming.
- Fees:** \$425; after May 25th: \$495. Includes ground transportation, two nights lodging based on double occupancy, lunches and beverages in the field, one breakfast, one group dinner, and a guidebook.
- Limit:** 40

Description: Recent success with multi-stage fracs in long horizontal wells in the Denver and North Park basins has generated a lot of interest on the Niobrara Formation as an unconventional tight oil shale play or fractured shale play. There are many factors to consider when evaluating the Niobrara Formation in these basins, including lithofacies, rock properties such as porosity and permeability, geomechanical properties, in situ stress, organic enrichment, kerogen type, thermal maturity, and presence and/or absence of natural fractures.

The field trip will be a three-day, nomadic, clockwise tour of the best Niobrara outcrops along the Wyoming and Colorado Front Range and within South Park, Middle Park, North Park and Laramie basins. The focus will be on facies changes within a sequence stratigraphic framework, as well as fault and fracture types and patterns related to Laramide tectonics. Measured sections and their spectral gamma ray profiles will be tied to wire line logs from nearby wells. Data will also be presented on TOC, type and spatial distribution of organic matter, thermal maturity, mineralogy, and geomechanical properties. Long high-wall exposures in the CEMEX Lyons quarry will be used as a canvas backdrop for discussing horizontal wells.

Day 1 field trip stops include Niobrara outcrops near Fort Collins, Lyons, and Boulder, CO (central Denver Basin). Day 2 includes outcrops near Pueblo (southern Denver Basin), Fairplay (South Park), and Kremmling (Middle Park). Day 3 includes outcrops near Walden (North Park), Centennial and Wood Siding (Laramie Basin), and Horse Creek (northern Denver Basin).

Exploration and development geologists and engineers working on Niobrara gas shale, "tight oil" and/or fractured shale plays in the Rockies will want to attend this field trip. The field trip is part one of a rock-focused trilogy (field trip, core workshop and plenary session) on the Niobrara Formation. Be sure to look for linked core workshop, plenary session and other Niobrara events at the meeting.