HISTORY
An E&P company operating in the DJ Basin of Colorado was performing horizontal multi-stage slickwater completions on a multi well pad. Using plug and perf completion technique they were targeting the Niobrara formation and required acid to help breakdown the formation and initiate fracture propagation. Historically 15% HCL acid has been used to accomplish this.

PROPOSAL
Typically, 15% HCl acid is the most dangerous chemical on site in volume during fracturing operations. “Hydrochloric Acid (and its fumes) will damage respiratory organs (irreversible), eyes, skin, and intestines and can cause death in some cases”. HCR-7000® Modified Acid™ was selected as a far safer, more environmentally friendly and technically advanced acid system for spearhead breakdown applications.

OPERATIONS
~4800 gals was delivered to location. The frac pump was tied into the acid truck so that the HCR could be pumped on the fly and diluted with a 2-1 water-acid ratio to yield a 33% HCR dilution. 500gal of the blended acid was pumped down the wellbore and then displaced to perfs with frac water. Once acid reached the perfs an immediate pressure drop was observed, all frac pumps were brought on-line to pre-engineered rates and stage operations commenced.

RESULTS
A significant pressure drop was observed as the acid reached the perfs and it was noted that breakdowns looked very similar to 15% HCl that they had previously pumped on this pad. Both the Service Company and Operator were very happy with the performance and ease of use of the acid all while utilizing a technically advanced, safer and more environmentally friendly product that is Non-Regulated for ground transport in the USA. As many operations are near populated areas removing the risks associated with 15% HCl on-site are invaluable.

VALUE
By pumping HCR-7000 on location both the E&P and Pumping Company were able to use an acid that has an inherent safety profile that helps to minimize or eliminate the extremely dangerous properties associated with 15% HCl.

- Non-Corrosive to dermal tissue (3rd party testing)
- Low-Vapor Pressure effect (fuming)
- Low-Toxicity
- Readily Biodegradable OECD-306

Along with the safety aspect of the acid there is also the technical advantages it brings to the operations

- Low corrosion properties – < 0.02lb/ft² for +24hrs
  - Pump acid with wireline BHA (save time and water)
  - If surface equipment failures occur no need to flush acid out of wellbore
- Hauled as a concentrate and diluted on location (Non-Regulated by ground in USA)
  - Ability to adjust acid strength for tougher breakdowns
  - Less acid trucks on the road (landowner optics)
  - Class one product (chemicals will not separate out over time)
  - Can dilute with available water (produced/sea water/fresh)
CHARTS

~1975 PSI Pressure Relief

Stage 1 of 23

>2000 PSI Pressure Relief

Stage 1 of 23