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Big Data Fracturing Fluid Best Practices Study Including Chemical - Rock Interactions in the Duvernay Formation

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Summary (All headings should be Arial 12pt bold)

- The scope was to collect all of the detailed fracturing information while comparing it to the production impacts using various optional chemical additives from all suppliers on the market. In order to compare the production impacts of the chemicals, these were done in several different stages and methods to prevent any data tendencies issues. The first was to compare the production without any regard to the frac/completions designs, which isn't the preferred way but often done as a first step to show initial results to guild the study requiring a deeper dives such as done in this study. Using all the other fracturing information including the style of completion, number of stages, lateral length, frac fluid type and volume, proppant type and volume, etc, the production impact is shown when one group of wells using one optional chemicals is compared to another group of wells without the optional chemical. .

Theory / Method / Workflow

- Traditionally all technical conference papers will stop with this "apples to apples" comparison, however in furthering our own learning to do something novel we collected the subtype of each individual chemical, the supplier, and the concentration of the chemical in the fracturing fluid. As an observation we noticed that every combination of chemical, subtype and concentration or use across the board, which allowed for new analysis that had never been done before. When the types of chemicals were identified as having some or no production impact, the highest impacting chemical analysis compared the subtype of the chemical basic makeup. In addition for the first time, the concentration of chemicals which in the lab has a varied result with better results with higher chemical concentrations, the empirical results from field applications has never been collected to optimize these chemicals' loadings. This study has a tremendous economic impact to increased ROI by either identifying the best incremental production being left behind, or by saving costs of uneconomic additives.

Results, Observations, Conclusions

- Clay control had a 52.3% incremental impact on production at 5 years.

- Unconventional surfactants had a high impact on incremental 5 year production with an average of 61.4%. Microemulsions also known as nano-surfactants had the highest impact.

- Scale inhibitor even though the theoretically needed, had no discernible production benefits after analyzing the production comparisons even after 5 years or more.

Novel/Additive Information

- No work has been done in determining the concentration of optional additives, and the subtypes of each additive.
- This was work completed by frac engineers, reservoir engineers, and field operations experts.

Acknowledgements

References

Reference Style (use Arial 9pt normal)