

# A New Environmentally – and Equipment-Friendly Blend for Well Stimulation, Matrix Acidizing and Acid Fracturing

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Technologies, LP



# Presentation Overview

- Hydrochloric Acid (HCL) History and Use in the Oil and Gas Industry
- Safety and Health Concerns of HCL
- Environmental Impacts
- Equipment Degradation
- UltraSeries HCL Replacement
- UltraSeries – How it works
- In-Lab Testing Results
- In-Field Testing Results



## History Of HCL Use in the Oil and Gas Industry



- HCL has been used in the oil and gas industry for formation stimulation in carbonate formations – to increase the rate that the formation will deliver hydrocarbons.
- Earliest Acid Treatment dates as far back as 1895 – Lima, OH



# Hydrochloric Acid Uses in Today's O&G Industry

- Well Stimulation
- Matrix Acidizing
- Acid Fracturing
- Hydraulic Fracturing Techniques
- Lateral Jetting
- Wellbore Clean Up



# HCL – Safety & Health Concerns

Corrosive Effect Can Cause Damage To:

- Human Tissue
- Respiratory Organs
- Eyes
- Skin
- Intestinal



# HCL = Toxic Substance

The U.S. EPA rates and regulates HCL as a toxic substance!



# HCL – Environmental Concerns

- Environmental Effects – HCL has a highly acute toxic effect on all life form
- Fresh Water Contamination
- Hydrogen Chloride (gas bi-product) carried into the air forms a component of ACID RAIN
- Photo-Chemical fog



# HCL – Equipment Degradation

- Corrosive effects on Equipment
- Break down (corrosion) of materials including seals, pumps, tanks, hoses, pipes and equipment



# Earthborn Clean UltraSeries Oil & Gas Specialty Fluids

- UltraFrack™
- UltraMatrix
- UltraComplete



# Earthborn Clean UltraSeries (HCL Replacement) Oil & Gas Specialty Fluids

- Safe
- Biodegradable
- Non-Toxic
- Earth Friendly
- Non-Flammable
- Non-Corrosive
- Effective



# UltraSeries

## How It Works

- UltraSeries Solutions incorporate surface tension relievers and buffers that dissolve the material into a molecular level. Once broken down they become suspended in the solution.
- pH of UltraSeries is less than 1
- Not an acid – Safe Organic Acid



# UltraSeries In-Lab Testing

- Rheological Testing
- Beaker Test
- Core Flood Testing
- Frack Fluid Compatibility Test (Ongoing)
- Conductivity Cell Testing (Ongoing)

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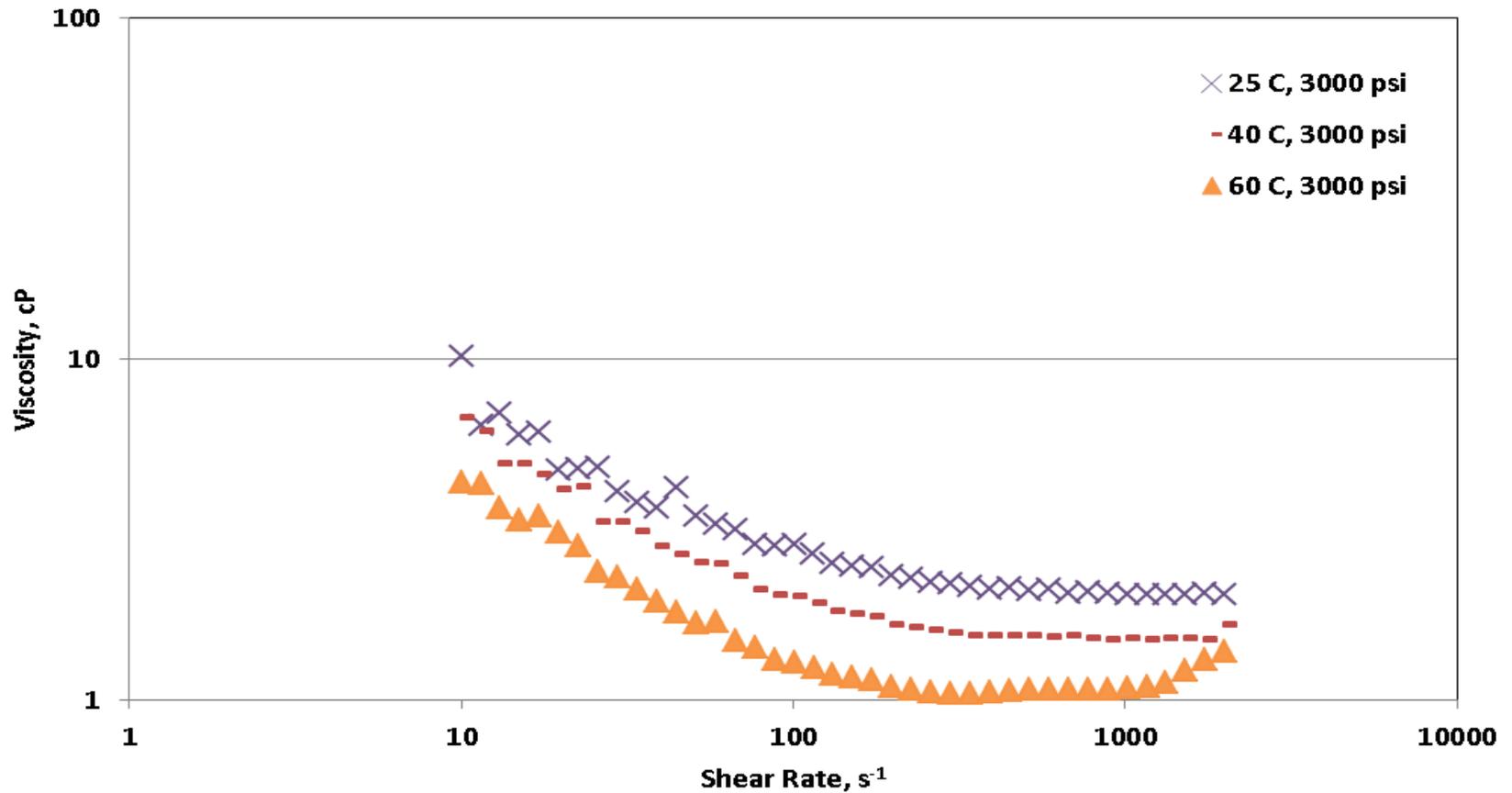
Prepared for the Annual Review Meeting of the Kansas  
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*April 15-16, 2013*

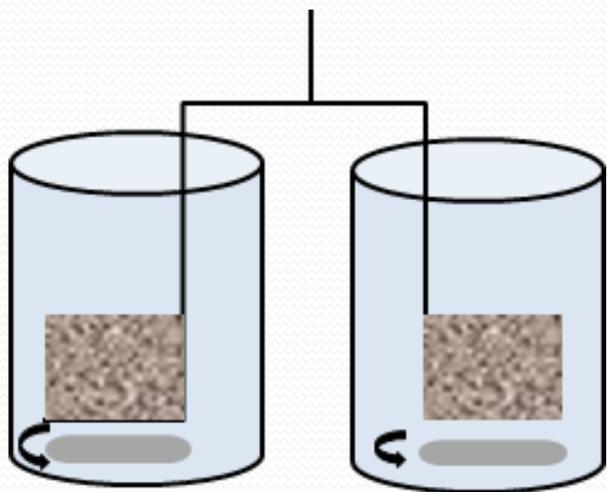


# In-Lab Testing

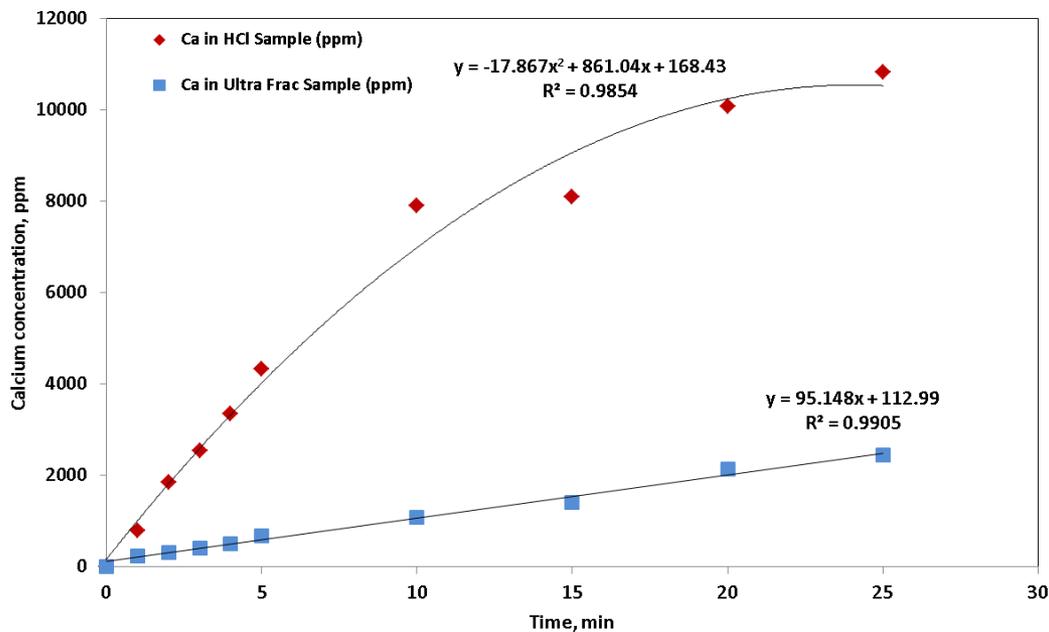
## Shearing – Viscosity Test – UltraFrack™ Fluid



# In Lab Testing Beaker Test

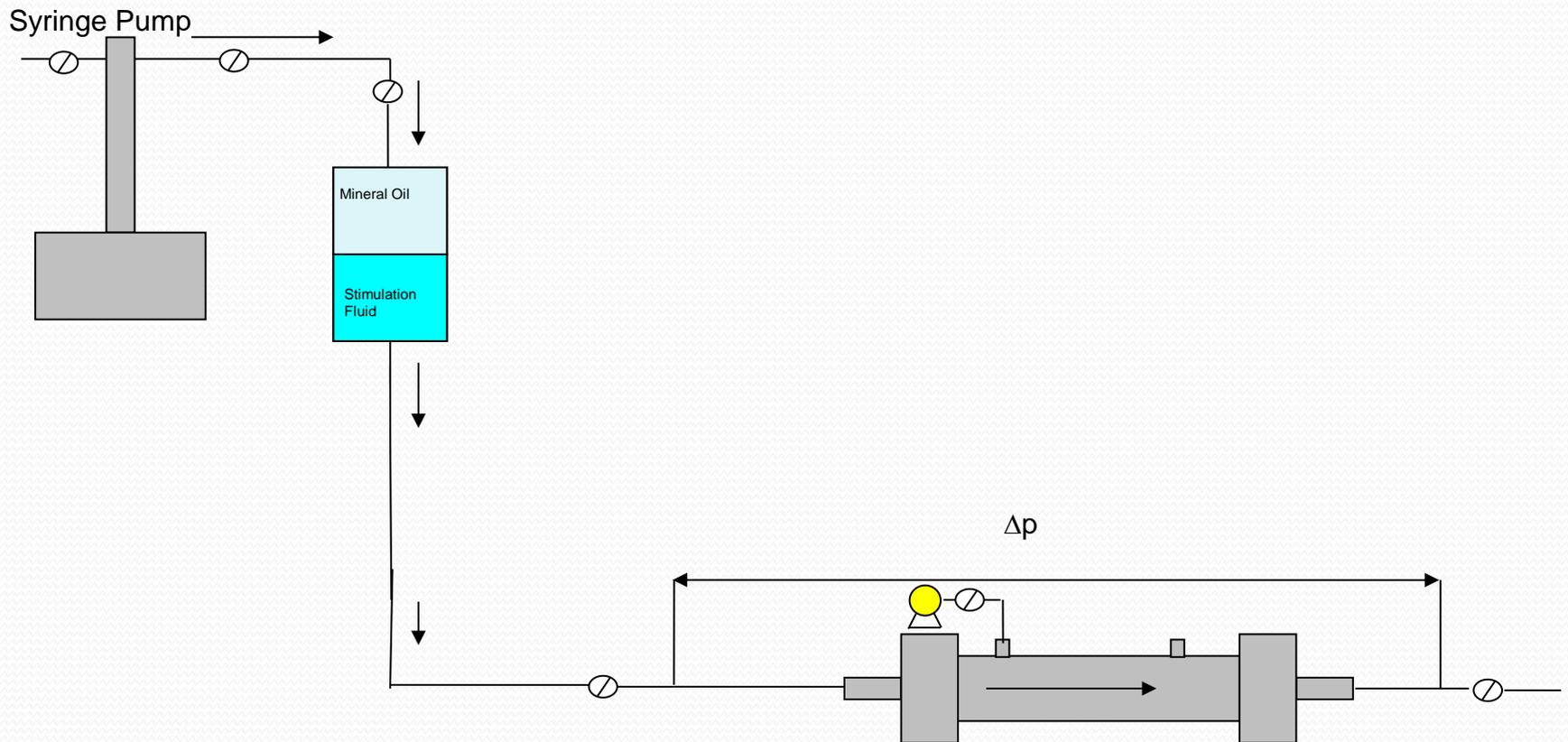


Schematic picture of the beaker test setup



Calcium concentration versus time for  
UltraFrack™ and 15% HCl reacting with  
limestone rock samples

# Core-Flooding Setup In Lab Testing

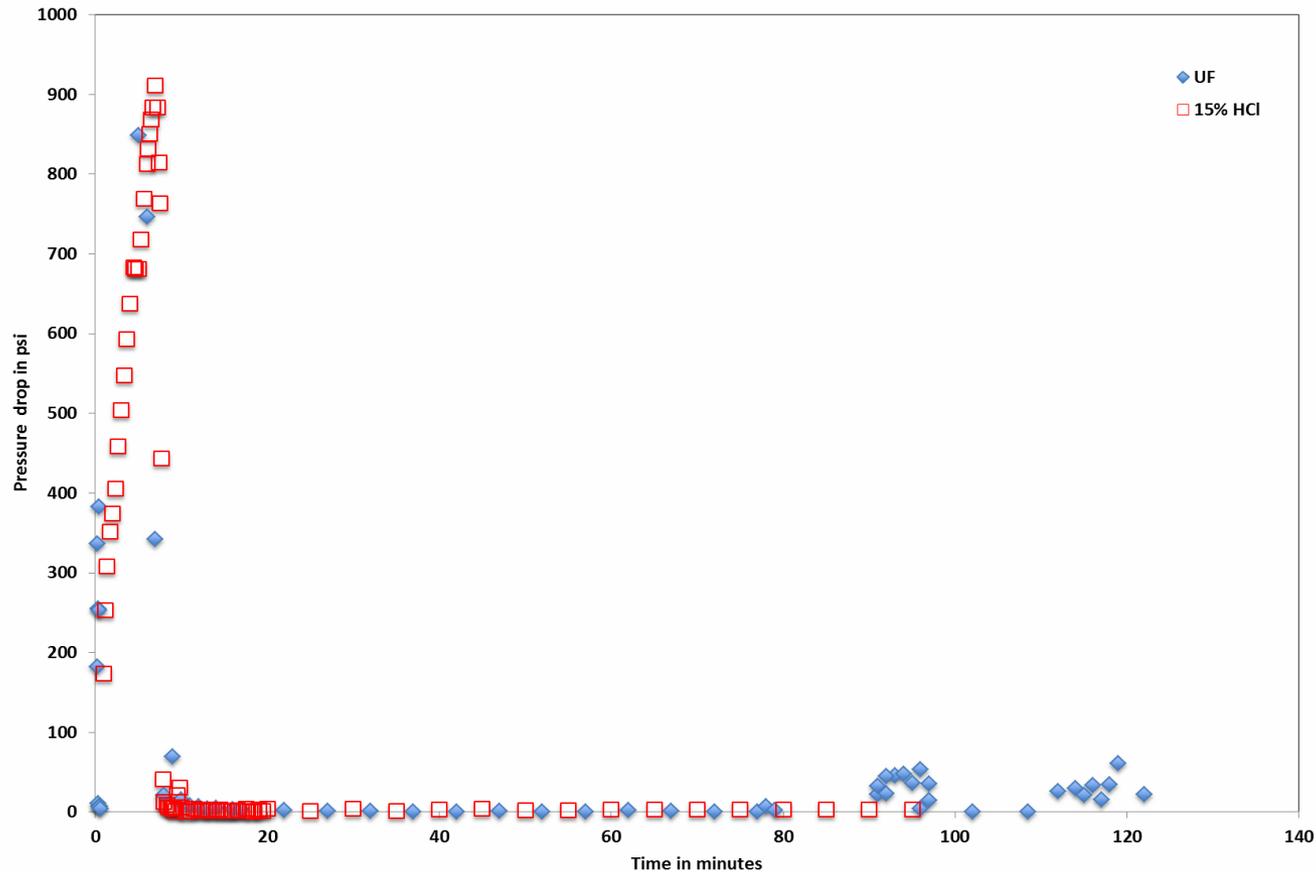


Schematic picture of the core-flooding setup.

# In-Lab Testing

## Core Flood Testing

Pressure Drop Vs. Time in minutes



Pressure drop vs. time during core-flooding with 15% HCl and UltraFrack™ at 25 °C.

## Cores pics of HCL used in core-flood Testing



## Core pics. Of UltraFrack used in core-flood Testing



Fluid	k (before), mD	K (after), mD	k ratio	P (max), PSI
UltraFrack	.39	32.25	82.69231	848
15% HCL	.46	32.25	70.1087	911

# UltraSeries

## Summary

### In-Lab Results

- Core-floods using HCl and UltraSeries were performed at 25 °C. The results showed higher permeability for the core that was treated with UltraSeries compared to the core that was treated using HCL
- Rheology tests: A shear-thinning behavior was observed for UltraSeries
- Beaker tests: UltraSeries dissolves the same mass and volumes of limestone rock samples with slower reaction rates and leaves fewer residues compared to HCl. UltraSeries products stay effective for much longer than HCL

# In-Lab Testing

## What Does It Mean

- Longevity of UltraSeries makes it more favorable for long or multi-stage fractures.
- Slower reaction reduces formation damage.
- More efficient break through creates more permeability in carbonate formations.



# Further Testing In-Lab

- Conductivity Cell Testing – Acid Fracking
- Fluid-Loss Testing
- More core-flood testing
- Hydraulic Fracturing Models



# In Field Testing Overview



August 14, 2012 – Morris, OK - First application of UltraSeries (Backside Treatment) – Initial increase in production from  $<.25$  bopd to 2.75 bopd

# Ellis County Kansas – Backside Treatment

550 Gallon Backside Treatment Near Munjor, KS, Ellis County



Increase in production from 10 BOPD to 42 BOPD

# UltraSeries In Lateral Jetting



Lateral Jetting Procedures were done on well in Sheridan Co. KS and Rice Co. KS. Successful completion with 300% and 400% production increase respectively!

# Quote From Daniel Ackwith CEO

“Our main focus and goal is to replace toxic chemicals (such as HCL and H<sub>2</sub>SO<sub>4</sub>) with an aggressive, safe, non-toxic and earth friendly version that will outperform the toxic versions. There are many additional benefits that enhance productivity for the customer and/or applicator”

Daniel Ackwith, CEO of 101<sup>st</sup> Earthborn Environmental Technologies, LP.



# Acknowledgements

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