An offshore oil rig is shown at sunset, with the sky transitioning from blue to orange. The rig's complex structure, including a tall derrick and various platforms, is silhouetted against the bright light. The ocean is visible in the foreground, reflecting the colors of the sky.

# SoleAcid<sup>®</sup>

Never risk conventional sandstone acidizing again!

The logo for PIC Chemicals features a stylized molecular structure with several white spheres of varying sizes connected by thin lines, representing atoms and bonds.

**PIC**  
Chemicals

# SoleAcid®

is a new paradigm that makes conventional sandstone acidizing systems obsolete.

## Increase Capacity

With the use of conventional sandstone acid, the risk of causing irreversible formation damage from acid insoluble reaction products, is often high enough that operators either will not use it, or use it as a last resort. Sandstone acid can also open pathways to water and lower permeable areas of the reservoirs, creating a differential high permeability thief zone that prevents future penetration of live acid into the more valuable hydrocarbons in the reservoir.

SoleAcid® has none of these risks and is compatible with any sandstone reservoir composition. It is usually spotted in the productive interval during the completion process. The acid then dissolves any damage to open pathways enabling access to otherwise hidden reserves. The acid can also remove drilling mud and clear blocked pore throats to increase capacity of every reservoir. The earlier SoleAcid® is applied in the well's life cycle, the greater the increase in capacity will be. (Fig. 1)

## Optimize the Health of Wells to Extend Economic Life

SoleAcid® provides a continuous wellness monitor with the ReNu two-step process. The first step establishes a compositional baseline that includes the most advanced crude oil, water, and produced solids microscopic analysis. The PIC Analytical Process measures subtle, discreet changes in the composition of produced fluid and solids over time. By tracking these changes, PIC can determine when wettability reversal begins to cause increased water production and fines trapping, as well as when water formed scale and silica fines begin to plug screens and perforations. The second step in the ReNu Process uses the early detection of changes to design custom chemical solutions. Low cost, small volume chemical treatments are then formulated to target the indicated early damage mechanisms. These treatments are usually pumped by local production personnel with lower rate and pressure rental pumps. This approach offers an economical alternative to the typical multi-million dollar end of life stimulation vessel jobs that are not an option with current prevailing oil prices.

SoleAcid's® designs are the most common constituent of these customized chemical treatments because silica fines plugging is the most frequent causal factor of early formation damage. However, treatments to restore wettability, remove organic deposition, scale removal and water shutoff are part of the process to maintain a well's economic health and extend the decline curve. (Fig. 1)

## The SoleAcid® story

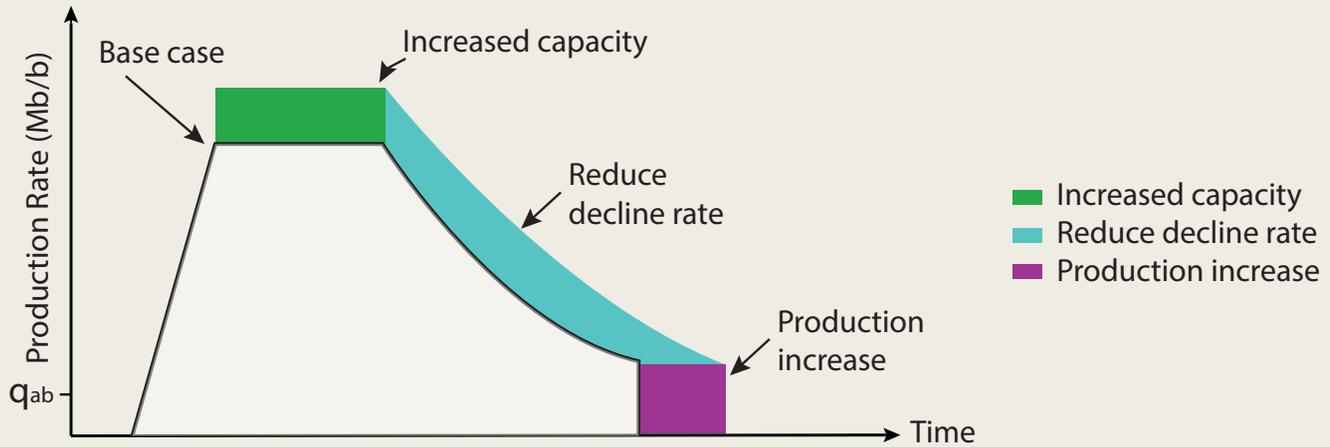
began with the objective of solving a major challenge facing deepwater operations. PIC scientists had envisioned an acid system that would be fully compatible with sandstone mineralogy at high temperature, but with sufficiently lower corrosivity that it could be pumped via chemical injection lines into hot deepwater wells.

The acid would need to be weighted with high dissolving capability to fall across the productive zone and slowly dissolve silica fines plugging screens and perforations. As the industry targeted thin, laminated, lower permeable reservoirs, we discovered that SoleAcid® was an ideal solution to replace poor performing conventional acid systems.

The PIC Chemicals Division has completed over 100 SoleAcid® treatments on oil and gas wells achieving the highest economic success rate in decades.



# SoleAcid® Economics



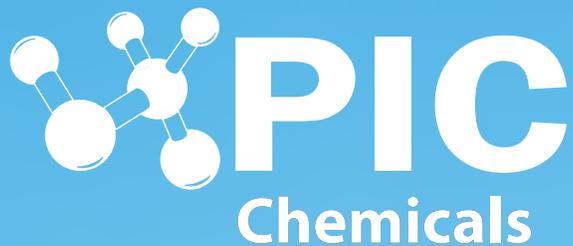
(Fig. 1) - Increase Capacity/ Extend Decline Curve

**SoleAcid® offers a Completely Safe, Cost-Effective Solution at any time to extend the Life Cycle of your well.**

- **> 95% economical success rate**
- **70% lower cost**
- **2 - 3 times longer treatment life**

## How it works:

Design Feature	Benefits
Azeotropic	<ul style="list-style-type: none"> <li>- Prevents mobilizing and transporting fines beyond the reach of dissolving acid</li> <li>- Lowers interfacial and surface tension to penetrate compacted damage</li> <li>- Causes SoleAcid® to behave more like a hydrocarbon and less like an aqueous acid</li> </ul>
Kinetically Controlled Acid Release	<ul style="list-style-type: none"> <li>- Delivers HF acid in increments of 0.23% acid concentrations to preferentially dissolve clays, silts, feldspar and fine sand</li> <li>- Can produce up to a total of 5% HF acid to dissolve extreme skin damage</li> <li>- Slower dissolution rate allows for better diverter performance and zonal coverage</li> <li>- Minimizes differential permeability effects to enable early preventive treatments</li> <li>- High Calcium tolerance</li> </ul>
Total Buffering and Chelation	<ul style="list-style-type: none"> <li>- Prevents the formation of insoluble acid reaction products from problematic ions such as calcium, aluminum, iron and potassium</li> </ul>
Contains NO HCl acid	<ul style="list-style-type: none"> <li>- Eliminates the risk of forming rigid film emulsions and asphaltene sludge</li> <li>- Reduces corrosion risk to minimum levels</li> <li>- Helps eliminate the need for acid flowback equipment services</li> </ul>
Nanosurfactants	<ul style="list-style-type: none"> <li>- Lowers the surface tension to 20 dynes/cm<sup>3</sup> and the interfacial tension to near zero</li> <li>- Continuously removes oil coating in a static condition to expose targeted silica damage</li> </ul>



## Products and Services

Production Optimization

Remedial Stimulation

Pipeline Services

EOR - BioZonyl

Water Shutoff

For more information:

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PICChemicals

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