

# STIMPRO

## Matrix acidizing design and analysis software

### Features

- Complete matrix acid design, simulation and scheduling
- Online graphics and reports include interface for production forecasting/ matching and economic analysis
- Real-time pressure data matching
- Transient pressure and skin calculation
- Comprehensive acid/additive database
- Preloaded libraries of stimulation fluids, lithologies and formations
- Paccaloni plots for treatment monitoring
- Foam and filter cake modeling and scheduling

### Benefits

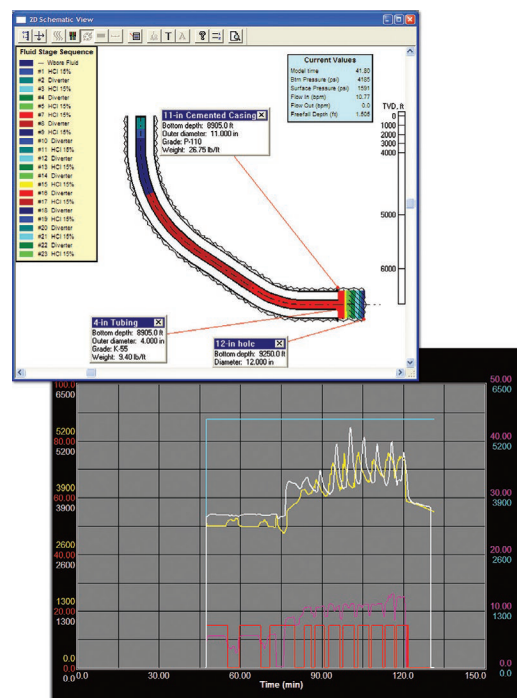
- Helps ensure effectiveness of stimulation design
- Provides real-time analysis to allow re-design of stimulation program at any point in well life
- Delivers continual monitoring of treatment effectiveness
- Helps increase production flow and reduces treatment costs
- Provides access to candidate stimulation fluids and acid/additives
- Enables precise carbonate acidizing and wormhole modeling
- Aids in enhancing future stimulation programs



The STIMPRO™ matrix acidizing design and analysis software enables the design, simulation and analysis of acid injection treatments below the fracture initiation pressure. It is an easy-to-use Windows-based, fully-integrated acidizing software effective for both carbonate and sandstone formations. In carbonates, an acidizing treatment is designed to dissolve the matrix, thus forming new channels (wormholes) that bypass damaged zones and provide clear flow. In sandstone, acidizing emphasizes dissolving particles that clog existing pore channels rather than creating new ones.

Practical utilization of actual treatment data is easy and can be utilized during or after the job. The advantage of using actual field data is that the user gains a better understanding of the well's response to stimulation, helping facilitate the optimization of future treatments.

The STIMPRO system features advanced software technology and a multi-tasking architecture that provides the user with a responsive and flexible interface. The results can be displayed while the model runs in the background, giving the ability to produce reports and plots as the job is being executed. In addition to the skin evolution generated by the STIMPRO acidizing models, the software also has the unique capacity to continually monitor and characterize the ever-changing skin factor while the job is being executed. This is accomplished via the transient pressure analysis theory using a Paccaloni plot.



STIMPRO software in use

The STIMPRO system models wellbore hydraulics, complicated geochemical reactions and heat transfer between the wellbore, reservoir and fluids. It can be used to simulate multi-layered reservoirs in deviated or horizontal wells. The STIMPRO system can be used with a separate program, DataAcq (included with STIMPRO), to collect treatment data in real-time for job analysis. A built-in reservoir simulator is used for design optimization, production forecasting and economic analysis.

## Operating modes

**Acidizing Design mode** produces treatment designs to mitigate any combination of these four damage types:

- Emulsions and wettability change
- Asphaltene and paraffin deposition
- Perforation and gravel pack damage
- Deep wellbore damage

After the user selects any or all of the four damage types, STIMPRO software generates an appropriate pump schedule for an effective treatment:

- Emulsions and wettability change, mutual solvent flush is needed instead of matrix acidizing.
- For asphaltene and paraffin deposition, aromatic solvent flush is needed rather than matrix acidizing.
- Perforation and gravel pack damage is considered to mainly result from zone compaction around perforations and the plugging of perforation tunnels or gravel packs by solids deposited from drilling or completion fluids. For this type of damage, well productivity can often be restored by an acidizing treatment with small acid volumes.
- Deep wellbore damage occurs when permeability is reduced in the near wellbore region by drilling or completion fluid solids, scales, clays and fines. This type of damage occurs deeper than the perforation and gravel pack damage

**Acidizing Analysis mode** is used before, during, and after the job once the treatment schedule has been determined. It allows the user to refine the treatment prior to pumping, monitor progress during the job and history match observed well response after pumping.

The STIMPRO system contains numerous reports, plots and investigative tools for matrix acid operations. Acidizing Analysis Mode is intended for detailed pre-treatment design and also for real-data analysis and history matching. The real-data analysis may be either in real-time, or post-job with previously acquired treatment data.

**Production Analysis mode** can be used to predict or history-match the production behavior of stimulated or unstimulated wells. STIMPRO passes the information from its acidizing model to the reservoir simulator where the effects of changing skin on well productivity are modeled. This is essential for evaluating success of past treatments and relevant economics of future treatments.

The unique features and powerful capabilities of the STIMPRO system allow quick design, analysis and optimization of acid jobs. The system facilitates modifications during job execution and assists in performing a complete post-job analysis. This results in lower treatment costs, increased production, and improved economics of acidizing treatments.

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