

Upstream Energy





Safety and Environmental **Excellence**

As part of our commitment to the Responsible Care* program, Solenis has set a global goal of operating with zero incidents. We believe every job can be executed safely and with minimal impact on the environment.

Our dedication to achieve safety and environmental excellence starts with our corporate culture. We embrace the value of our people and the environment. This influences our safety and environmental decision-making — how we interact with each other, how safety and environmental issues are prioritized, and how our achievements in these areas are driven.

We continue to drive our vision for excellence in EH&S performance through our focus on clear communication of safety expectations. As an organization, we are committed to learning from incidents through root-cause analysis; improving our tools, management systems and the condition of our facilities; training and developing our employees; and promoting a culture that maintains EH&S as a core value.

This culture extends into every facility in which our employees operate. Our sales and service personnel are expected to actively partner with our upstream energy customers, participate in their safety programs and assume a leadership position in aspects of industry safety programs specifically designed for our products.

Because of our commitment to creating a world-class safety culture and to providing a workplace focused on safety, security and reduced environmental impact, Solenis has been recognized by EHS Today as one of America's Safest Companies.

Solving for Sustainability

Although increased productivity continues to be a main goal, governments, investors, and the public expect oil and gas service companies and operators to embrace sustainability and adopt greener practices. Supporting our customers in their sustainability journeys has, and will always be, central to our business. We partner with your team to understand your specific challenges and how we can leverage our solutions to help you improve hydrocarbon recovery while also reducing freshwater usage, increasing energy efficiency, and controlling waste.

A Broad Portfolio of Solutions — and Deep Expertise — for the Upstream Energy Market

For more than 100 years, Solenis has been dedicated to helping water-intensive industries operate more efficiently and profitably. This includes the upstream energy market. Our experts have worked with oil and gas service companies and operators in every region of the world, helping them overcome a range of complex challenges and maintain productivity by delivering innovative chemical technologies that improve operational efficiency, reduce water and energy use, protect manufacturing assets, and minimize environmental impact. We also provide advanced monitoring and control systems, expert support, and deep insights into the operational demands across the entire upstream energy value chain, including:

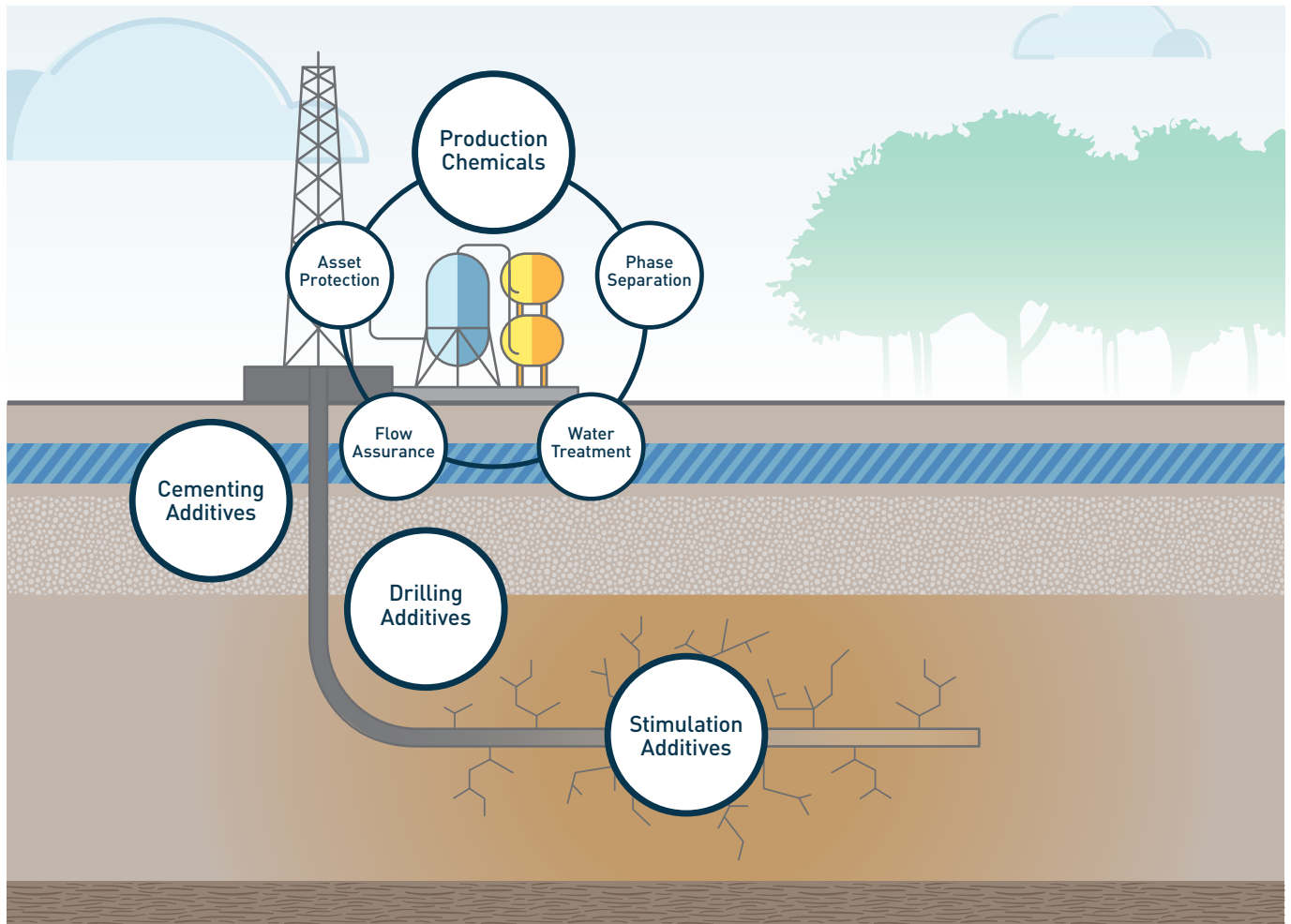
- Drilling
- Stimulation
- Cementing
- Production

Your journey with Solenis begins with an experienced field specialist, who can recommend an integrated portfolio of process fluid chemistries, which can be premixed and delivered or formulated at the wellsite. Your field specialist is supported by a dedicated team

of application engineers and laboratory scientists, who collaborate to understand your unique challenges, whether your goal is to boost production, increase produced water reuse, optimize chemical consumption, or reduce carbon dioxide emissions. Working together, we can design a customized solution, oversee implementation, and troubleshoot emerging issues to deliver value as quickly as possible.

Just as important, we help you look beyond today's challenges to better prepare your operation for the future. This includes making strategic acquisitions that enhance our offering, which increases our technical capabilities. It also includes the discovery and development of new chemical treatment platforms and new monitoring and control equipment — all driven by customer needs and involving our customers at all stages of development. This approach has enabled us to introduce a continuous stream of innovative chemical and equipment solutions and, in turn, help our upstream energy customers achieve their operational and sustainability goals.





Leverage Our Expertise to **Gain a Competitive Edge**

Upstream energy companies are facing tremendous pressure to reduce costs and boost efficiencies. Not only are they limited by capital constraints and stressed supply chains, they are also managing a number of sustainability initiatives focused on greenhouse gas emissions and water and energy usage. Oil and gas service companies and operators must find innovative approaches, involving both breakthrough products and breakthrough thinking, to stay competitive in a rapidly changing landscape.

Solenis is a trusted partner to leading upstream energy companies around the world. We offer far more than specialty chemicals and process aids — we offer boots-on-the-ground experience, working side-by-side with oilfield engineers and drilling crews to solve the most demanding challenges across the entire upstream value chain. When we recommend a solution, it is designed for a customer's specific need and operating environment. Although every solution is different, most fall into general categories related to the main upstream steps:

Drilling and Cementing

- Decreasing costs for drilling and cementing operations

Stimulation

- Increasing or restoring well productivity by efficient stimulation treatment

Production

- Mitigating flow assurance and oil/water separation issues
- Optimizing produced water management and increasing water reuse and recycling
- Improving service effectiveness and efficiencies

Innovative Solutions for the Upstream Energy Market

Solenis offers a collection of truly differentiated process enhancement chemistries, so we are well-equipped to help oil and gas service companies and operators solve their most challenging process issues. In addition to a world-class manufacturing infrastructure, with 71 sites globally, we operate a network of advanced research and development facilities and Customer Application Laboratories, where our scientists explore new products and find synergies among existing products.

Our proven portfolio includes the following families of products. For a full list of products we offer, see the table below.

Drilling Additives

Our drilling additives help oil and gas service companies enhance drilling efficiency by optimizing the permeability of the reservoir to hydrocarbons, improving drilling system performance, controlling drilling solids, improving completion rates, and reducing bit balling in water-sensitive formations.

Cementing Additives

Solenis provides a range of cementing additives so oil and gas service companies can customize the chemistry and performance of their cement slurries to

fit the individual challenges of every well. Our team will work with your team to select the right additive and the right quantity to perform efficiently.

Stimulation Additives

Our stimulation portfolio includes an extensive range of specialty chemicals intended to augment and support the stimulation process, leading to restored or improved well productivity and better recovery of oil and gas from target formations.

Production Chemicals

Solenis offers a broad portfolio of chemistries to assist customers across the three critical aspects of oil and gas production: flow improvement, asset integrity, and phase separation. All of our solutions can be customized to sustain oil production in a range of operating environments.

Produced Water Treatment

To help our customers achieve their environmental and operational objectives, Solenis offers one of the most advanced and comprehensive product lines for produced water treatment along with a wide range of customer-focused services that help ensure the optimum performance of produced water systems.

Product Portfolio for Upstream Energy

Antifoams	Drag Reducers	Friction Reducers	Scale Inhibitors
Bentonite Extenders	Emulsion Breakers	Gelling Agents	Shale Inhibitors
Corrosion Inhibitors	Flocculants	Paraffin Dispersants	Thinners
Defoamers	Fluid Loss Control Agents	Pour Point Depressants	Water Shutoff Agents

Research and Development

At Solenis, almost two-thirds of our annual technology investment supports the discovery and development of new chemical treatment platforms and new monitoring and control equipment. We actively pursue both near- and long-term technologies to address the unmet needs of our customers and involve our customers at all stages of development. This approach has enabled us to introduce a continuous stream of innovative chemical and equipment solutions and, in turn, help our customers improve their operational efficiency and product quality.

This R&D activity rests in the capable hands of hundreds of highly qualified professionals, who work at key centers located strategically around the globe. Some of our most exciting innovations have direct impact on the day-to-day operations of oil and gas service companies and operators.

High-Brine Friction Reducers

Solenis has developed friction reducers specifically for hydraulic fracturing applications using high-brine waters. The product reduces drag, allowing greater volumes of liquid to be moved with less back pressure and pumping energy. Notably, the product activates quickly with a high peak friction reduction, maintains performance with minimal degradation, and is stable to -20 °C (-4 °F).

Organic Coagulants for Produced Water

Injected at a cost-effective dosage, our newest Praesto™ organic coagulants are able to control the oil and solid content in produced water, allowing our customers to increase produced water reuse up to

100% while ensuring they achieve specified quality standards in the discharge water. These coagulants are also effective in treating seawater for reinjection into the oilfield wells.

Thermally Stable Scale Inhibitor

Our latest scale inhibitor is an active polymer with a high thermal stability, making it suitable for the hottest oil wells. It provides exceptional performance to control calcium carbonate deposits at cost-effective concentrations. Plus, it has a high tolerance to heavy metals, is environmentally benign and will not biodegrade. Concentration of active polymer components in the water can be measured and monitored at the wellsite via an established and reliable analytical method.





Solenis™ Cloud

Solenis Cloud is a secure online platform that centralizes essential technical, sustainability, and business data in a single, easy-to-access location. Technical Performance Dashboards display performance scores of critical systems to provide at-a-glance visual indicators for rapid decision-making. As site operators and Solenis support professionals review the data, they can communicate and collaborate in real time — even when teams are separated by time and distance. And robust alert and alarm features send notifications of system upsets or exceptions directly to stakeholders' smartphones so issues can be quickly addressed.

OnGuard™ Analyzers

OnGuard analyzers are an integral component of our monitoring and control platform. When used in conjunction with our process and water treatment chemistries, these technologies ensure the optimal performance of your treated systems. This product family includes the 3B Analyzer for the earliest detection and most accurate measurement of biofilm growth; the 3H Analyzer for accurate and real-time measurement of micro levels of scale; and the 3S Analyzer for accurate scale measurement and advanced warning of potential upset conditions like fouling factor changes.



Beyond Innovation

While Solenis is committed to pioneering new chemistries and programs, we also recognize the tremendous effort — and collaboration — required to bring these innovations to the market. That's why we support our R&D function with a network of analytical and applications-focused teams.

Analytical Science: The Analytical Science group at Solenis is the heart of the company's effort to turn breakthroughs in chemical and biological science into products that can be commercialized for the marketplace. Solenis maintains its largest analytical science laboratory in Wilmington, Delaware.

Applications Development: Our Applications Development group helps develop technical packages for new product offerings and transfer technology from one market to another. Solenis has applications development personnel at regional laboratory facilities around the world.

Customer Analytical Laboratories: Regional laboratories have been established to provide timely water analysis and product screening for customers. These laboratories are also able to develop testing procedures to provide customized product, equipment, or process recommendations.

To learn more about how Solenis can help address your toughest challenges and more, please visit [solenis.com](https://www.solenis.com)



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