Enhanced oil recovery solutions

Improve production efficiently and sustainably with Dow ELEVATE™ Additives

As new oil discoveries dwindle and existing wells decline, Enhanced Oil Recovery (EOR) becomes crucial. Conventional methods leave significant oil behind. Dow pioneers advanced additives that improve EOR, maximizing field productivity with minimal environmental impact. Our robust R&D and global supply chain empower operators to stay competitive.

Supporting the energy transition

Dow's commitment to sustainability

Dow is committed to leading change within our industry and the markets we serve in pursuit of a fully sustainable economy. We are focused on ensuring that our operations have minimal environmental impact, that the value of our products is retained and used again and on extending our sustainable innovations to include our partners and customers.

Learn more about our integrated sustainability efforts at:
https://corporate.dow.com/en-us/science-and-sustainability.html

ELEVATE™
enhanced oil recovery additives by DOW

Boost productivity

Finding the most effective approach from lab to field

Maximize oil recovery with Dow's EOR expertise. Our ELEVATE™ offering tackles gas conformance, wettability alteration, and thermal EOR. We provide comprehensive solutions, from evaluation and implementation to develop complex products for EOR.

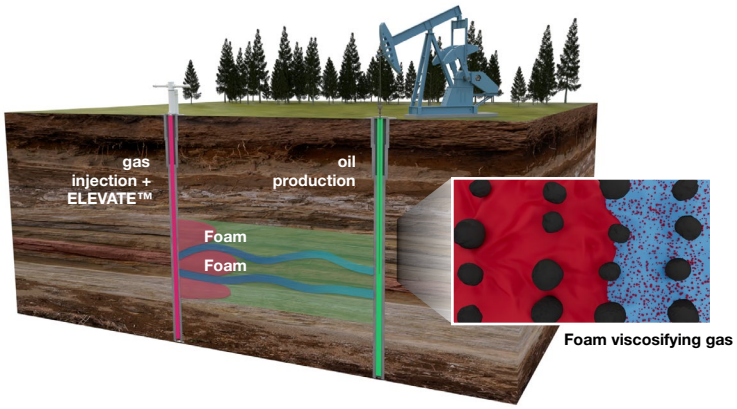
Gas Conformance Solutions

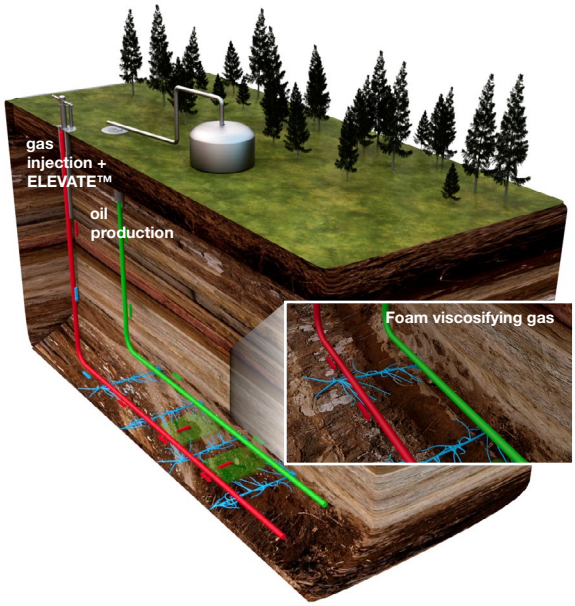
While gas injection (CO2, hydrocarbons, N2) offers a cost-effective and popular EOR method, its effectiveness is challenged by conformance issues due to low gas viscosity, gravity override and reservoir heterogeneity.

ELEVATE™ Gas Foam tackles EOR inefficiencies by ensuring uniform, efficient, and sustainable gas injection. Our injectable system works with both gas and water. This tailor-made solution penetrates deep into reservoirs with minimal loss and works for both conventional and unconventional applications. In unconventional fields, ELEVATE™ Foam generates within fractures, restricting gas breakthrough and maximizing oil recovery.

ELEVATE™ foam conformance additives:

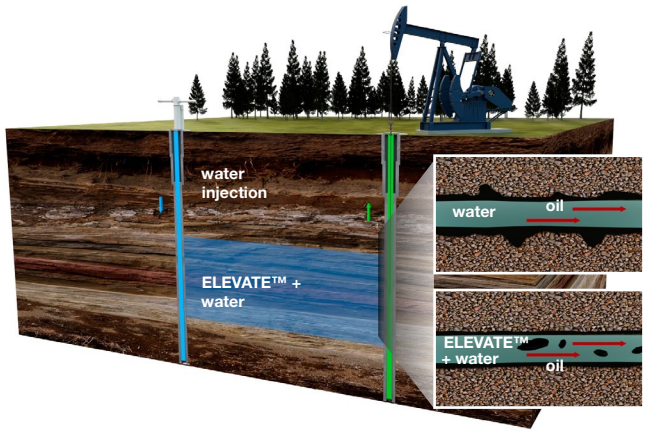
- Consist of surfactants that can be injected either in $scCO_2$ or brine
- Cover wide range of temperature and salinity
- Feature preferential foam generation in well swept zones and gas diversion to bypassed pay-zones
- Offer low surfactant adsorption on reservoir rock
- Do not impact topside production facilities
- Do not cause reservoir damage by emulsifying oil
- Can be winterized for cold or artic climates





Wettability Alteration Solutions

In carbonate reservoirs, the interplay between interfacial tension, capillary pressure, and rock wettability significantly impacts the effectiveness of injected fluids in displacing oil. Dow's ELEVATE™ series of surfactants addresses this challenge. Specifically designed for oil-wet carbonate reservoirs, these surfactants alter rock wettability, thereby enhancing injectivity and resulting in incremental oil recovery. Furthermore, the applicability of ELEVATE™ wettability alteration has been broadened to encompass hydraulically fractured reservoirs in shale and tight sandstone formations.

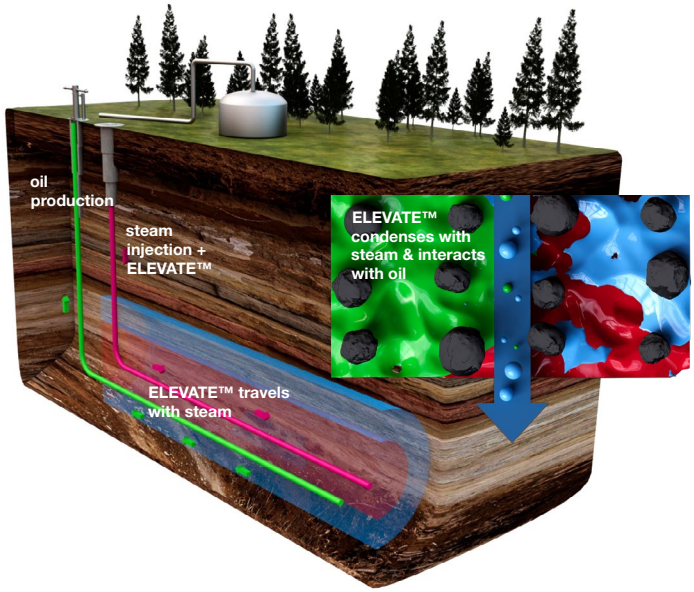


ELEVATE™ Wettability Alteration additives:

- Resist degradation at high temperatures and salinities
- Exhibit minimal adsorption in the reservoir formation
- Show minimal impact to topside processes
- Can be winterized for cold or artic climates

Thermal solutions

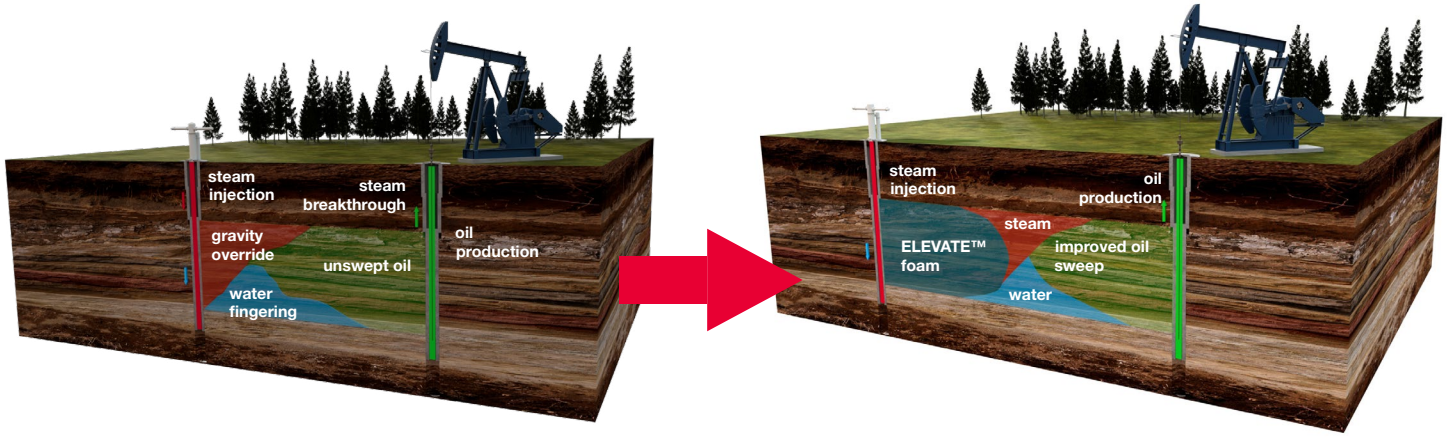
Steam-based thermal oil recovery methods are highly effective for boosting the production of heavy oils and bitumen. However, they encounter challenges related to conformance control and the limited solvency of water. Transferring heat efficiently throughout the reservoir can also be difficult. Dow has addressed these challenges by developing solutions tailored for high-temperature thermal environments.



Amid the demanding conditions characterized by high temperatures, Dow introduces a new generation of ELEVATE™ additives designed to enhance recovery in steam systems. Specifically tailored for steam flood and SAGD operations, Dow presents the ELEVATE™ steam foam conformance solution. Additionally, for SAGD systems, Dow has innovated high-temperature, volatile surface-active agents aimed at optimizing recovery rates and minimizing the steam-to-oil ratio (SOR).

ELEVATE™ Thermal additives:

- Resist degradation at high temperatures
- Exhibit minimal absorption in the reservoir formation
- Show minimal impact to topside processes and equipment, including boilers
- Can be winterized for cold or artic climates



Chemical solutions

Improvements to traditional water flooding can consist of full chemical EOR (CEOR) programs. There are many combinations of chemicals used in CEOR. The most common CEOR operations involve flooding a reservoir with either an alkaline-surfactant-polymer combination or an alkaline-polymer injection. These chemical injections interact with water in the reservoir, freeing the trapped oil and making it recoverable. Dow has a full product line of additives for CEOR, including co-solvents, co-surfactants, alkali agents and chelating agents.

ELEVATE™ CEOR additives:

- Improve phase stability
- Lower injection slug viscosity compared to viscous emulsions formed by synthetic surfactants alone, which have high surfactant retention and high-pressure gradients
- Increase residual oil recovery rate compared to viscous emulsions, which tend to stagnate in the reservoir

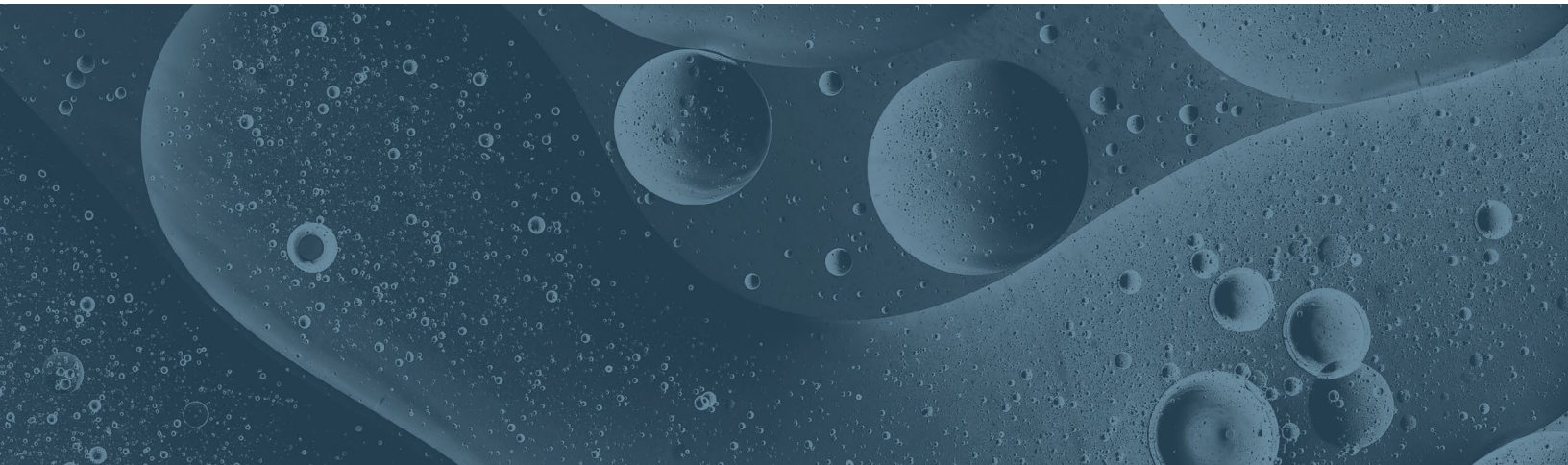
Innovation from lab to field

Working together to achieve more

The success of EOR methods depends heavily on the specific characteristics of each well or field. At Dow, we understand this variability. That's why we take a customized approach, partnering with you to tailor solutions to your unique needs. Our dedicated team offers comprehensive guidance, from identifying the ideal pilot site to implementing the solution across your entire field. Throughout this process, Dow specialists collaborate closely with you to pinpoint of the optimal ELEVATE™ additive, ensuring your project achieves maximum success.

Field selection	Identify pilot location	Chemistry and synthesis	Lab evaluation	Reservoir modeling	Field training	Full-scale implementation
Customer field • Field geology • Reservoir properties • Mechanism screen	*Identify pilot pattern location* • Identify flood patterns • Analysis of geologic model • Field constraints • Agree upon success criteria	*Chemistry development* • Chemistry selection • Surfactant phase behavior • Formulation for field suitability • Low adsorption • Measure interfacial properties	*Core flooding* • Surfactant phase behavior (HP) • Core flooding: - Surfactant adsorption - Foam strength - Wettability - High-temp foam - Oil response	*Reservoir modeling* • Baseline forecasting • Additive assisted EOR forecast • Injection optimization	*Field implementation* • Injection skid • Injection strategy • Measures of success: - Fluid response - Injection profile - Tracer test - Well test	*Full-scale implementation* • World-class supply management • Volume turnaround • Regulatory documentation • Strong ongoing R&D and technical support

Select the options and services that work best for your EOR project



Deep technical expertise and lab capabilities

Dow has developed rigorous internal laboratory evaluation processes and reservoir simulation capabilities to make implementation of pilot to commercial scale solutions more effective and efficient. The Dow EOR team also boast experience in pilot implementation for several technologies in various regions around the globe. Dow's EOR lab is capable of performing experiments under diverse reservoir conditions using:

- Core flood capabilities including gas, water, and steam injection
- PVT cells
- Phase behavior equipment
- Interfacial tension measurement equipment
- Contact angle measurement equipment

Product stewardship and safety

Dow has a fundamental concern for all who make, distribute, and use its products, and for the environment in which we live. This concern is the basis for our product stewardship philosophy by which we assess the safety, health, and environmental information on our products and then take appropriate steps to protect employee and public health and our environment. The success of our product stewardship program rests with every individual involved with Dow products – from the initial concept and research, to manufacture, use, sale, disposal, and recycle of each product.

Dow strongly encourages its customers to review both their manufacturing processes and their applications of Dow products from the standpoint of human health and environmental quality to ensure that Dow products are not used in ways for which they are not intended or tested. Dow personnel are available to answer your questions and to provide reasonable technical support.

Dow product literature, including safety data sheets, should be consulted prior to use of Dow products. Current safety data sheets are available from Dow.

Making EOR more energy efficient

The energy transition is a multi-decade journey to lower the carbon emissions of our energy sources. Dow ELEVATE™ Additives offer producers an efficient way to recover more oil and supply energy to power the modern world.

Dow additives boost production at oil wells enabling customers to improve efficiency, and lower the carbon emissions of production. ELEVATE™ additives are typically biodegradable, pose no bioaccumulation, and have low to no toxicity. Using our technology, you can expect:

- Increased oil production
- Reduced energy use
- Reduced water use

Work with team Dow today.
Contact us

Dow

US

Toll Free	800 441 4DOW
	989 832 1542

International

Europe / Middle East	+ 800 36 94 63 67
Italy	+ 800 783 825
Asia / Pacific	+ 800 77 76 77 76
	+ 60 37 958 3392
South Africa	+ 800 99 5078

dow.com

24567-7099

Form No. 812-00414-01-0424 S2D