rawwater

Souring Services for the Oil & Gas Sector

Understanding if, when and to what extent a reservoir will sour is essential for cost-effective facilities management.

Our expertise in reservoir simulation and souring forecasting gives operators the confidence to make informed decisions relating to materials used, production strategies and chemical treatments.

Our investment in creating what is widely considered to be the world's most advanced pressurised bioreactor facility to study microbiological souring, has resulted in the equivalent of many hundreds of years' worth of souring data.

DynamicTVS©, our predictive oilfield reservoir souring tool, uses operational data from all phases of oil production to forecast hydrogen sulfide (H_2S) production over the lifetime of a reservoir.

Together, our considerable expertise, pressurised bioreactor data and souring modelling capability present operators with the opportunity to save millions of dollars.

SOURING SIMULATION

SOURING FORECASTING

WORKSHOPS & CONSULTANCY

www.rawwater.com

specialists in oilfield reservoir souring

Reservoir Souring Simulation

Our UK-based laboratories replicate the downhole world. Through the use of pressurised bioreactors, we design bespoke reservoir and waterflood simulations to help clients make the right commercial decisions.

We have been sub-culturing oilfield bacteria strains for more than 30 years and, since 2006, have operated an advanced bioreactor facility to study and evaluate microbiological souring in simulated reservoir conditions. At least 45 pressurised bioreactor columns, ranging from 25 cm to 4 meters in length, are in daily operation. To date, we have accrued more than 450 bioreactor years' worth of oilfield souring data — with information relevant to reservoirs across the globe.

Testing conditions within our bioreactor suites range from atmospheric pressure to 12,000 psig, with temperatures ranging from 5°C to just below the boiling point of water. This capability enables us to determine the efficacy of various biocides and water treatment regimens upon different microbial populations.

The data generated by our pressurised bioreactors cover a range of operating conditions, including accurate chemistries at pressure and temperature (P/T).

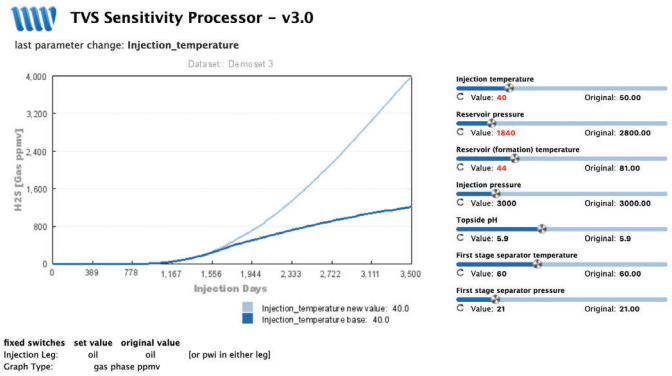
Our souring studies use crude oil and seawater samples from major oilfields globally. Ranging from large-scale joint industry projects (JIPs) to single-client activities, they last from a matter of weeks to a number of years. We have conducted 'Seriatim' series research for more than ten years.

Reservoir Souring Forecasting

DynamicTVS© (Thermal Viability Shell) is our predictive software modelling program for the forecasting of oilfield reservoir souring. The software can forecast a reservoir's propensity to sour in advance of well completion.

DynamicTVS© uses operational, planning and survey data taken from all stages of oil production, under any temperature and pressure conditions, to generate future profiles of hydrogen sulfide (H_2S).

Once a base profile for souring has been established, a real-time sensitivities processor is used to examine the effect of changes across multiple parameters. These include modifying inputs such as injection temperature, injection sulfate concentration and time to breakthrough of injected water.



Real-time sensitivities processor examines effects on H_2S production as parameters change

The DynamicTVS© model describes the cooling of an oil reservoir due to water-flooding, the opportunity for growth of sulfate-reducing microorganisms (SRM) in the cooled zone, the transport of the H_2S produced by the SRM to the producer and the downhole and topsides partitioning of the sulfide at specified pressures and temperatures.

DynamicTVS© and our pressurised bioreactor suites provide complementary technologies. Forecasts from the modelling program are used to confirm the findings of our pressurised bioreactor studies: bioreactor data is fed back into DynamicTVS©, making it the industry benchmark for H_2S forecasting in oilfield reservoirs.

We are leading experts in souring management. We can conduct research at temperatures and pressures that mimic specific oilfields and help operators determine the most cost-effective treatment.

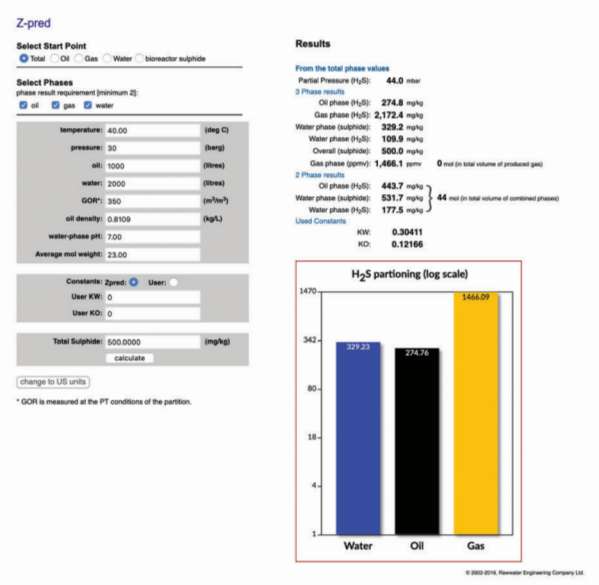
Additional Services

Enhanced Oil Recovery (EOR)

We are at the forefront of EOR technology — the use of specialised techniques to increase the quantity and value of the produced oil. We have developed an extensive understanding of increased oil recovery through our pressurised bioreactor studies and are able to advise on the most cost-effective way of controlling H_2S.

Z-Pred

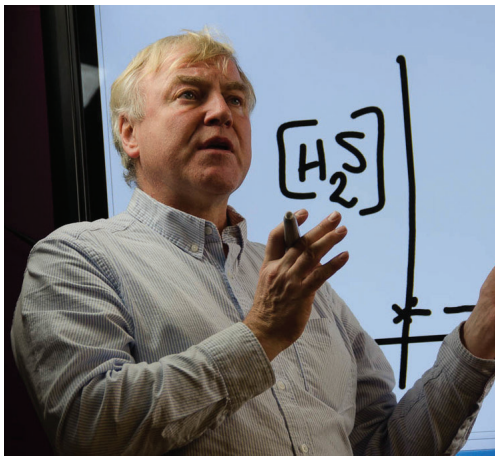
Our sulfide partitioning calculator, Z-Pred provides calculation of the partitioning of H_2S in all wellstream fluid phases for both two-phase and three-phase systems under defined downhole and topsides conditions. The software also forms part of the modules used in DynamicTVS©.



Z-Pred H_2S partitioning calculator

Workshops, Training and Consultancy

With unrivalled knowledge of the design and materials used across injection and production wells, we provide workshops, training courses and consultancy services in the fields of souring, water chemistry and souring control. Workshops and training are available at venues globally. We also assist academia with consultancy services regarding H_2S issues, water chemistry and souring control.



Rawwater founder and MD, Professor Robert Eden, PhD

Our workshops include:

Souring Control

Different reservoirs have different souring propensities as a result of the microbial population, water injection chemistry and the physical downhole conditions. This workshop aims to provide a better understanding of oilfield reservoir souring.

DynamicTVS© and Souring Forecasting

Accurately forecasting the extent to which a reservoir can support biological sulfide production is vital in calculating treatment costs. Our souring forecasting workshops introduce DynamicTVS© to enable clients to run their own sour gas planning scenarios.

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