Cleaning up

What do an oil reservoir and a dirty dinner plate have in common? Both could benefit from a few drops of detergent.

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Former IOR prizewinners

2003: Valhall Unit and operator BP for the life-of-field seismic project, installed on Valhall in the North Sea as the world's first full-scale facility for such surveys.

2002: No worthy candidate found.

2001: Statoil and Egil Sunde, for pioneering the use of bacteria to improve recovery from Norne. The Norwegian Sea field is the first where this method has been applied.

2000: Phillips Petroleum Company for pursuing studies and taking decisions on IOR projects for Ekofisk in the North Sea, even at times of low oil prices.

1999: Saga Petroleum, for using foam/detergent to block unwanted gas production and thereby improving oil recovery from Snorre in the North Sea.

1998: Norsk Hydro, for making oil production from Troll – Norway's largest crude producer in 2002 – a reality by committing to more than just gas output.

Imagine standing at the kitchen sink after a good hot dinner. You first rinse the dishes with cold water and remove some of the grease. The next step is hotter water, which gets rid of more.

You keep raising the water temperature and add washing-up liquid. Nearly all the grease has gone, but not all of it. To get the plates completely clean, you have to scrub with detergent and hot water.

What does this have to do with offshore production? Well, this approach to washing-up illustrates what often happens when trying to maximise the amount of oil recovered from a reservoir.

Pressure

When a well begins producing, a natural drop in pressure causes the oil to flow up to the wellhead. Reservoir pressure gradually declines, leaving a lot of oil behind when it finally gives out.

So new solutions and methods are needed to get out more of the resources. One way to do this is to pump water and/or gas into the reservoir to boost its pressure. Another is to drill more wells.

More advanced methods, which often cost more to apply, can improve recovery even further. One case involves injecting chemicals – which is where detergents come into the picture.

The principle is the same as dealing with the greasy dinner plates. Thanks to detergent, we can improve oil recovery beyond the level attainable with pressure support alone.

To be able to increase recovery from todays levels, more research is needed.

Pushing for IOR

The NPD's target is an average oil recovery factor of 50 per cent for fields on the Norwegian continental shelf. One of the agency's jobs is to push for this goal to be attained, and it accordingly works hard to encourage work on improving oil recovery (IOR).

To emphasise the importance of developing and enhancing such methods, the NPD established an IOR prize in 1998. This is awarded annually and has acquired great prestige.

The Gullfaks licence in the North Sea won the award in 2004, partly because operator Statoil and its partners – Petoro and Hydro – devoted many years to identifying resources which could yield profitable IOR projects.

Big potential

Many means exist for improving oil recovery. Apart from using detergents, carbon dioxide or air can be injected, a blowdown phase initiated, or bacterial growth encouraged in the reservoir.

Nevertheless, supplementary wells on existing fields probably offer the biggest potential. Technology development will be needed to increase the profitability of that approach – and such work is regarded as time-critical.