

FORMATE MATTERS

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News and opinion from Cabot Specialty Fluids

www.formatebrines.com

New software analyses *true* brine costs



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The leading environmental consultancy, Gaia, developed BrineWise™. Pictured here from left to right is the development team: Ylva Gilbert, Dr. Piia Pessala, Dr. Tuomas Raivio, Dr. Iivo Vehviläinen and Anna Kumpulainen.

Innovative new software is now available to help analyse and compare the full operational and HSE costs of high-density brines used in HPHT completion and workover operations.

The true cost of brine is more than its purchase price. For instance, its hazard profile not only impacts on HSE risk and the cost of consent conditions, handling, transport and waste, but directly on rigtime as well. The question is: How can these factors be quantified and compared? Cabot Specialty Fluids commissioned Gaia Consulting of Finland to find out. The answer came back in the form of a new software tool, BrineWise™. Ylva Gilbert, creator of the software, explains, "BrineWise™ is an easy-to-use, Excel-based tool that analyses and totals all brine costs in completion and workover operations. Most importantly, BrineWise™ allows HSE risks to be costed in a systematic and consistent manner using input based on the individual oil company's experience and risk aversion policies. It's already been adopted by one major oil company and initial interest is very strong."

How does BrineWise™ work?

BrineWise™ is not based on rigid assumptions or statistics, but provides a flexible framework for complex calculations where the values of all variables are defined by the user. Cost factors are simply added or subtracted depending on the specific operation. Brine unit volume costs and sales terms from vendors' price lists form a base line for the assessment, together with the value of predicted fluid losses. The programme moves forward systematically to incorporate all relevant cost items.

Who's it for?

BrineWise™ is designed for asset managers, well construction engineers, fluid coordinators and HSE professionals. The programme is available free to operators. For your copy, please mail brinewise@cabot-corp.com or

Item	Brine Unit Volume Costs	Fluid Losses	Total Costs
Brine	100000	50000	150000
Fluid Losses	50000	100000	150000
Other Costs	50000	50000	100000
Total	200000	200000	400000

BrineWise™ is a user friendly and flexible tool based on Excel

call your local Cabot office for a demo. Contact details can be found on the website www.formatebrines.com.

FACT FILE

BrineWise™ is:

- Fast and systematic
- Easy-to-learn and simple-to-use – utilises an Excel platform
- Comprehensive – takes all costs into account, from purchase through to the brine's impact on production stream treatment
- Tailored to each operation – user chooses which variables to include or exclude
- Flexible – can be applied to all locations and brines (default location is Gulf of Mexico)
- Available to operators on free licence from Cabot Specialty Fluids

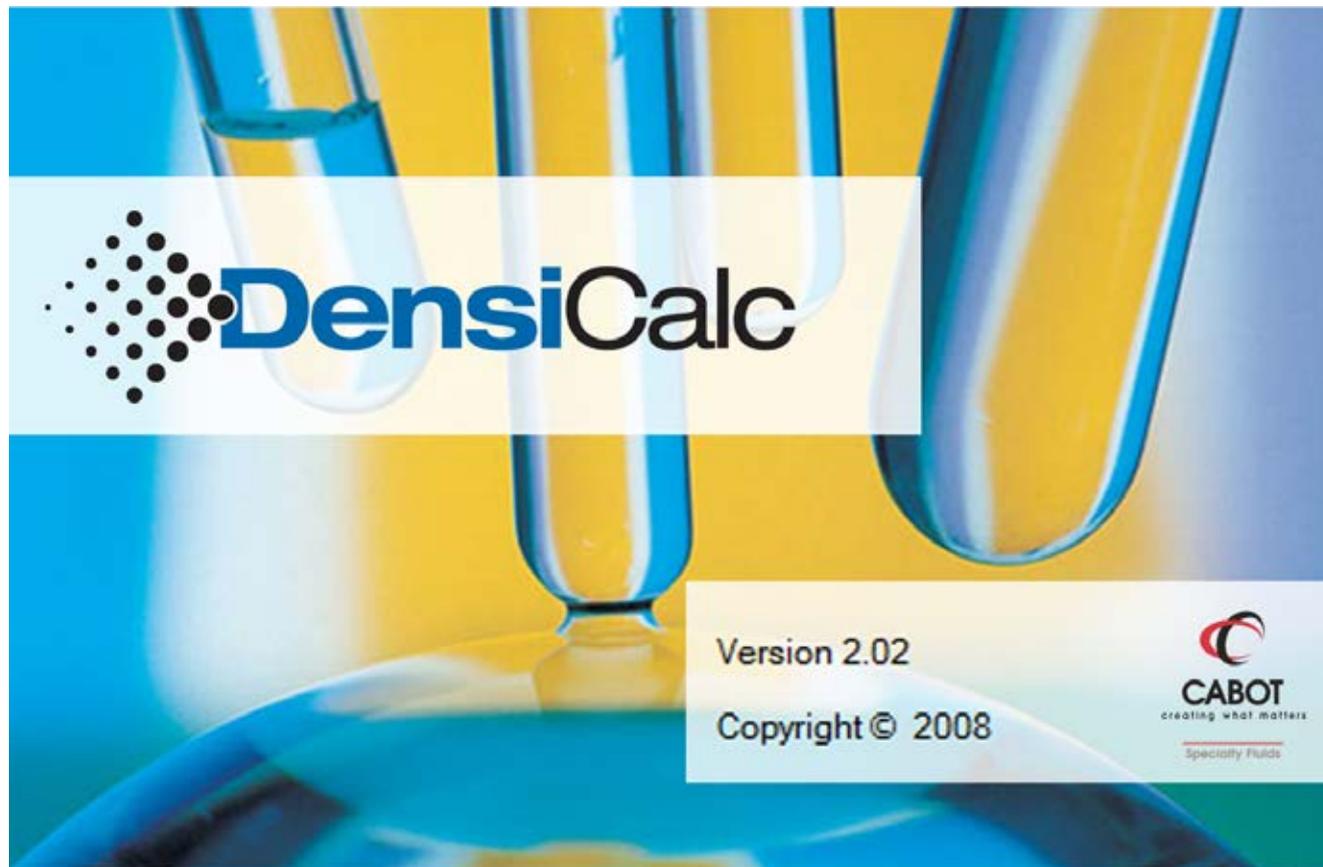
New website launched! Take a look – go to: www.formatebrines.com



Get the Formate Technical Manual at www.formatebrines.com/manual

Formate Manual news

Faster downloads, revised chapters and a new section on crystallisation temperatures of formates. That's the news on the ever-expanding Formate Technical Manual. Author and R&D Manager at Cabot Specialty Fluids, Siv Howard, says "The new section on crystallisation temperature explores TCT and PCT in formate brines – how to measure them, how to apply them in the field and how crystallisation temperature can be lowered."



DensiCalc™ is used for calculating surface and downhole pressures

DensiCalc™ does the work for you

Cabot Specialty Fluids has launched a new and improved version of its formate fluid density calculation tool.

DensiCalc™ 2.02, utilises surface density readings to calculate:

- 1) The average fluid density over the length of the wellbore.
- 2) The average density of the fluid in the riser (if offshore).
- 3) The bottom hole pressure exerted by the entire fluid column.

- 4) The pressure exerted at the sea floor level by the brine column in the riser (if offshore).
- 5) The density of the fluid at standard temperature conditions (15.6°C/60°F).

This improved version of DensiCalc™ has two important new features:

- The complete formate brine density range from 1.01 to 2.30 s.g./8.34 to 19.20 ppg is now covered
- In offshore use it allows calculation of the

effect of sea temperature gradients on brine fluid in the riser

The software has been custom-built using known PVT data and successfully validated in the field against a PLT log. It is available free of charge from Cabot Specialty Fluids. Just download your copy from www.formatebrines.com/densicalc or send an email to Siv_Howard@cabot-corp.com.

PEOPLE



Bob Frost

New Lab Manager

Bob Frost (42) joins Cabot Specialty Fluids as Laboratory Manager covering the Aberdeen and Norway labs.

Bob has over 20 years' experience in analytical chemistry for the Scottish Environment Protection Agency and several commercial analytical testing labs. He's already putting this experience to good use. He says, "The two labs have seen an increase in workload as our business has expanded and I'm enjoying the challenge of developing new formulations and supporting Cabot's research programme."

Bob is married with two children, aged eight and ten, and lives in Aberdeen.



PHOTO: SCANPIX

Who needs Kryptonite when you've got cesium?

DID YOU KNOW?

Was Superman on cesium?

Is Superman science fiction or science fact? Well, it seems the claim that he can fly faster than light could be correct – if he was flying through cesium vapour. Scientists from the NEC Research Institute in Princeton may have found a challenger to Kryptonite – and one that's found a lot closer to home. In 2000, particle physicists at NEC sent a pulse of laser light through cesium vapour so fast that it left the chamber before it had even fully entered it. The pulse travelled 310 times faster than if the chamber was a vacuum, showing that light can travel much faster than ever thought possible. The secret is in the cesium. Light's properties are changed

when passing through the vapour allowing it to exit the chamber so fast.

So, will we be booking tickets on the time travel express any time soon? Well, as the effect is possible only because light has no mass, the answer has to be "no". However, this research could help develop highly advanced computers that carry information in light particles.

Reference: Gain-assisted superluminal light propagation, Wang, Kuzmich and Dogariu, Letters to Nature, Nature 406, p. 277-279, 20 July 2000.

Curiouser and curiouser!

There were more than enough unexplainable events for Alice during her adventures in Wonderland. Those who have worked in drilling long enough tend to know a little of how she must have felt. There are often incidents that are hard to explain. We've seen a few of them, but here's a field case history that has us (and the operator) stumped – so we thought we'd ask readers of Formate Matters for their help!

Perforating in cesium formate brine – a curious case history

The efficacy of cesium formate brines as perforating fluids in HPHT wells is described in a number of SPE papers¹⁾. The brines are usually formulated as kill pills, using fluid loss control additives, and the typical fluid losses to the formation during and after perforating are around 12 to 14 bbl.

One particular perforating operation stands out from the others because in this instance the operator chose to use a straight 1.86 s.g./15.5 ppg cesium formate brine, rather than a formulated kill pill, and yet still only lost 14 bbl of clear fluid into the formation.

The background

The well in question was initially drilled in 1985 and re-entered in 1995 to appraise the reservoir through a Drill Stem Test (DST). The results indicated significant recoverable reserves of gas and condensate within a reservoir environment of 10,798 psi, a BHST of 136°C/277°F and permeability of around 20 mD. The short well test showed a flow of 45 mmscf/day of gas and 2,900 bbl of condensate from a 248 ft/75.6 m interval. The well was then killed by a bullheading operation with oil-based mud prior to temporary abandonment.

The re-perforation was conducted in cesium formate brine over a decade later at 825 psi



Fourteen barrels of clear fluid was lost to the formation – but why not more?

overbalance, and without the use of kill pills or any other blocking technologies. Just 14 bbl of cesium formate brine were lost to the formation and, on a 50% choke, the well delivered at a tubing-constrained rate of 79 mmscf/day with 7,000 bbl/day of condensate. A spokesman from the operator stated that this production rate was "...significantly above expectations and proves that no skin damage to the well has occurred."

The big question

While it is good to report that this application supports the widely held view that wells drilled or perforated in cesium formate fluids deliver good results the question remains... *why so little loss of brine on perforating?*

If you have any thoughts we'd love to hear them. The first person to provide the most technically compelling and likely explanation for this phenomenon, as judged by a panel

of technical staff from Cabot Specialty Fluids, will receive a US\$100 gift voucher for Amazon.com. Please mail your suggestion (or any questions) to formatematters@cabot-corp.com. Closure date is 1 May 2009. For a full set of rules please send a mail to the above email address. Thank you for your help!

1) See the following: OTC 19242 (Rhum), SPE 105733 (Kvitebjørn), SPE 84910 (Visund), SPE 97694 (Braemar).

MEET US AT THESE EVENTS

Cabot Specialty Fluids will be presenting a number of papers over the next few months. Come and see us!

23-25 March

SPE Americas E&P Environmental & Safety Conference, San Antonio, Texas.

Paper (alternate): "New tool assists informed purchasing decisions based on overall cost and HSE risk potential of well construction fluids", SPE 120488 (Gaia Consulting)

20-22 April

2009 International Symposium on Oilfield Chemistry, The Woodlands, Texas.

Paper: "Formate Brines for HPHT well control – New insights into the role and importance of the carbonate/bicarbonate additive package", SPE 121550

27-29 May

8th SPE European Formation Damage Conference, Scheveningen, The Netherlands.

Paper: "Observations on gas permeability measurements under HPHT conditions in core materials exposed to cesium formate brine", SPE 121649

