I would like to use this space, again, to encourage you, as authors, to submit your (conference) papers to SPE Drilling & Completion. It is a convenient, web-based process (please see http://www.spe.org/authors/peer-review/, where you will find a wealth of supporting information “at your fingertips”), which is easily done via your author account at https://mc.manuscriptcentral.com/spedc (please remember to have the required information about all coauthors handy).

If you should think that such a “call for papers” is simply one of the standard text elements in an executive editor’s “toolbox” (and “may be considered only token gestures” as Gerald Verbeek, the last peer-review editor of Oil & Gas Facilities nicely phrased it in his February 2014 executive summary), (he and) I assure you it is certainly not only that, because a decent number of manuscript submissions is, and remains, indispensable for the long-term health of any journal.

While I am aware that the “motivational power” of my words might be insufficient to make you write a paper, I hope to be able to reach at least those among you who are just unsure, and—gently—nudge you toward submitting an existing paper for peer review. Please continue to keep the manuscripts coming!

Now, let’s move on to our papers, which are hoped to offer some useful ideas worth considering in the context of your own wells.

**Completion.** In some wells, propellants are used to stimulate the near-wellbore region. Once ignited, their deflagration rapidly releases a gas volume, and this highly dynamic pressure increase is meant to result in formation breakdown and multi-fracturing. Our first paper in this issue is very well suited to improve the understanding for working with propellants (as not all of us use them on a daily basis) because it presents a respective large-scale experiment conducted in a polyaxial test frame.

*Experimental Investigation of Propellant Fracturing in a Large Sandstone Block* starts with a detailed description of the experimental setup (30×30×54-in. Colton Sandstone block under confining stresses with 2-in. wellbore under pressure) and discusses the pressure response recorded at six different locations [faster pressure buildup (1.5 ms vs. 35 ms) to higher values, compared with a “first-generation” propellant tested in 2006 under almost identical conditions]. The tested block was split open afterward, showing a dominant planar fracture in the direction perpendicular to the minimum horizontal stress. The experiment confirmed the validity of fracture-regime boundaries from the cited pressure rise-time calculations (here: planar-fracturing region) and can serve as useful input for modeling software. Considering differences in propellant behavior, the authors conclude with a clear recommendation to first define the objectives before selecting any propellant to achieve same. Or, in my simple terms: “There are horses for courses.”

If your wells need hydraulic-fracturing treatments for economic production, you are possibly also concerned about fracture and formation impairment from the stimulation fluid. For these aspects, our next paper can provide some helpful ideas because it presents a thorough laboratory study of the effects the addition of silica (SiO2) nanoparticles (NP, 20 nm) can have on rheological parameters and filtration behavior of the four tested fracturing fluids [surfactant-based (SBF) or viscoelastic surfactant; polymeric (guar); and SBF-polymer blends—all based on 4 wt% KCl brine].

*Effect of Silica Nanoparticles on the Rheological Properties and Filtration Performance of Surfactant-Based and Polymeric Fracturing Fluids and Their Blends* first provides an overview of previous research, mainly in the field of NP for fluid-loss control, followed by the experimental setup and procedures. The effects of different NP concentrations (0.058, 0.24, 0.4 wt%) and temperatures [75–175°F (24–79°C)] on shear response (apparent viscosity), viscoelastic properties (elastic and viscous modulus, power-law parameters), and filtration performance are presented and discussed, including a comparison of fluid cost/barrel. In these investigations, a blend of 75/25 vol% SBF/polymer solution with 0.058 wt% SiO2 NP content looked most promising, and, in subsequent optimizations, the NP concentration could be further reduced to 0.002 wt% at comparable fluid loss and lower cost. You might want to consider NP, especially if thinking formation damage from the currently used fracturing fluid could be an issue.
Drilling. For all colleagues responsible for “making hole,” our next paper should make for interesting reading because it presents one bit manufacturer’s approach to extend the life of a polycrystalline-diamond-compact (PDC) bit by appropriately designed backup cutters. Backup cutters provide an additional (second) cutting layer meant to “take over” once the primary cutters are worn to a certain degree; but, at the same time, the backup should also not engage too early, preserving its functionality—and the bit’s rate of penetration (ROP).

In A New Method of Backup-Cutter Layout To Extend Bit Life Without Sacrificing Rate of Penetration, definitions for parameters such as critical depth of cut (CDOC), penetration per revolution (PPR), underexposure, and active and passive cutter are provided, and cutter wear is predicted with a proprietary model before the conditions required for a backup cutter to become an active one are discussed. Two field cases compare 9½-in. and 6½-in. bit performances (new vs. previous design) when run in similar well conditions (footage doubled at similar ROP with better dull gradings afterwards). The authors conclude that the backup cutters’ CDOC should be smaller than bit PPR to avoid them contacting rock prematurely (ROP!). To allow for it to become active, a backup cutter needs to be located rotationally behind its primary cutter by >150°. Perhaps you might want to contemplate testing such a design for its potential to save a round-trip (and another PDC bit)?

Our next paper is highly recommended for all colleagues concerned with hole cleaning (i.e., cuttings transport). While there is certainly no shortage of related literature, authors often use (very) different boundary conditions, which limits a meaningful comparison of their results. Therefore, the authors advocate here for developing a standardized set of study conditions, as is performed in other industries (i.e., for wind turbines).

Cuttings-Transport Modeling—Part 1: Specification of Benchmark Parameters With a Norwegian-Continental-Shelf Perspective provides an overview of the different investigation approaches used [experimental, real-time drilling models (1D/mechanistic), computational fluid dynamics], and shares an impressive review of the existing literature. After explaining how the proposed case-parameter sets were derived (for a wellbore and a subsection of it), they are illustrated by an example (8½-in. hole section, drilling ahead, public data from offshore Norway) and compared with the parameters researchers used in some previous cuttings-transport studies. The authors conclude with a strong recommendation to have a data base with (anonymized) reference-parameter sets and benchmark cases publicly available, which would allow researchers focusing on the operating points of highest relevance for the industry and improve the comparison of cuttings-transport study results. Although such a data base would not “come for free,” personally, I think we could all benefit from sharing more data, as can be seen in regions where it is mandated by the regulator.

For the well designers amongst us, our next paper is a must read because it proposes a new tubular-design ellipse dependent on backup pressure (internal for collapse and external for burst), which would allow integration into one single graph, avoiding separate plots for the API TR5C3 (2015) collapse-resistance equations (internal-pressure dependent). As an additional benefit, you will also get a decent overview of the history of API (2015) collapse-equations development.

New Tubular-Design Ellipse With Backup Pressure starts with the API collapse history and how it can be linked to von Mises’ work (1913); shares the origin of “legacy ellipses” (ellipse and circle of plasticity, triaxial collapse, and burst); introduces the new, proposed ellipse for a 7-in. 26-lbm/ft P-110 casing; and compares it with the collapse calculations according to API TR5C3 (2008, 2015). For 3½-, 95/8-, and 20-in. pipes, all four quadrants are displayed with superimposed API ratings and a well-design example with specific load cases is provided (more details in the paper’s appendix). It is shown that the proposed ellipse (drawn with differential pressure on the ordinate and axial principal stress plus backup pressure on the abscissa) is exact for collapse, burst, and axial loads. The authors also discuss aspects like safety factor calculations (conventional vs. vector approach), or the potential benefits of displaying load resistance as a circle (different coordinates, though) instead of an ellipse. In my view, a solid piece of work, which—if adopted—can help to improve the accuracy of tubular-stress analysis.

With our sixth paper in this issue, we stay in the area of well design, now focusing on subsea wells and their inherent risk of annular pressure buildup (APB) from trapped fluids, which is a result of being usually inaccessible for pressure management. This paper shares the APB-mitigation techniques currently applied in one Gulf of Mexico deepwater oil field, replacing the use of nitrified foam spacers (C-annulus), rupture disks (C- and B-annuli), or syntactic foam (B-annulus) with their respective disadvantages, especially during well construction.

Advancements in Annular-Pressure-Buildup Mitigation for Thunder Horse Wells first describes the previous well design to cater for APB risks, before sharing alternatives: (1) top-down cementing to completely fill the annular space with cement (stage and squeeze cementing, design considerations, and two examples); (2) port collar for pressure equalization (ISO V0 rated, opened after production barriers are in place, design and operational considerations); and (3) mud (SBM) specific PVT correlation for thermal expansion under pressure (actual
laboratory results compared to an approximation with diesel). It is concluded that these techniques—together with an integrated design approach—led to well designs without any indications for APB so far (production startup 2013) and added some alternatives to the “toolbox” available for APB-risk mitigation. Some food for thought for your upcoming subsea wells?

Just pumping the desired volume of cement slurry is, unfortunately, often insufficient to achieve the required zonal isolation. One of the reasons why cement sheath integrity could be compromised is gas ingress during the hydration stage, after hydrostatic pressure is (partially) lost. Therefore, our next paper presents a newly developed laboratory test cell with an (artificial) sandstone formation (wellbore-simulation chamber, WSC) to evaluate gas-migration potential under representative downhole conditions.

A Newly Developed Wellbore-Simulation Apparatus To Study Performance of Oilwell Cements begins with an overview of (commercially) available cement-hydration analyzers (large-scale pilot simulators, bench-type, and high-pressure/high-temperature devices) and discusses potential issues affecting their measurement results. It then describes the developed WSC’s components (device, artificial formation, monitoring system), explains advantages in measurement scope, and shares the testing protocol (with additional procedures in the paper’s appendix) and calibration-test results in detail. The authors conclude that the WSC can be used to differentiate the effects of formation permeability, cement type, curing temperature, or CaCl2-based accelerators on the slurry’s pore-pressure reduction during the early gelation of cement hydration and discuss which other investigations could also be performed under in-situ conditions. In my view, an interesting alternative for slurry tests under less conservative conditions (= closer to reality) than in some of the existing analyzers.

That’s it for this second issue in 2018. On behalf of the entire Editorial Review Committee, I thank you for your continued support of SPE Drilling & Completion.

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