

Opportunities to reduce the risk of loss of well control events

Claire Hick, Mark Bourne and Derrick O’Keeffe, NOPSEMA, Australia

Since the Macondo blowout with consequential loss of life and oil spill in 2010, substantial global industry effort has gone into improving *responses* to loss of well control (LOWC) events, such as capping stack initiatives. In parallel – and in some respects less visibly – significant work has been focused on the *prevention* of well control incidents (the left hand side of the LOWC “bow-tie” risk assessment). This article describes some initiatives being progressed by the National Offshore Petroleum Safety and Environmental Management Authority (NOPSEMA) with the aim of *preventing* LOWC events, thus reducing the risk of catastrophic safety and environment events during drilling activities.

Well construction – interface management

Oil companies, drilling contractors and their service companies have a common interest in the prevention of loss of well control events (LOWC) during drilling operations. A fundamental requirement to achieve this goal is ensuring the interfaces between the organisations are properly defined and managed, including clarity of roles and responsibilities and effective communication.

Deficiencies in interface management was identified as a causal factor in the Macondo blowout. As a result, the American Petroleum Institute (API) Bulletin 97 *Well Construction Interface Document Guidelines* (“API 97”) was published in 2013 outlining the key safety and environmental interfaces between the oil company and the drilling contractor. API 97 describes a Well Construction Interface Document (co-signed by both entities) as the mechanism for transferring well information and documenting the agreed approach on interface topics. API 97 implies it applies to the offshore drilling industry; one of the recommendations arising from the 2018 onshore USA Pryor Trust gas well blowout, fire and multiple fatalities was to update the bulletin to specify that it applies to both onshore and offshore drilling, reinforcing the potential value of API 97 in the reduction of drilling risks.

In Australia, there are three main regulatory permissioning documents required for a drilling activity: safety cases, well operations management plans and environment plans. These documents contain summaries of key oil company and drilling contractor plans and interface agreements to deliver safe and environmentally responsible outcomes. In addition, it is standard practice to prepare additional interface or bridging documents on more complex topics, such as well control or HPHT operating procedures.

While defining and documenting interfaces are very important tasks, the implementation of their contents is critical. Interface management should be an integral part of the management of work activities during the execution phase. Any change or deviation from the plan in the oil company’s or drilling contractor’s area of responsibility must be communicated promptly so that the risks can be properly managed. Drilling contractors play an essential role in well barrier installation, verification and maintenance and thus are empowered to ask questions and stop work if not satisfied about the management of well risks.

Well integrity guidance and standards – improvement opportunities

Standards, recommended practices and guidelines are an integral part of a regulator’s toolbox when assessing and monitoring a duty holder’s capability to effectively carry out well design, well construction, production/testing, well intervention, suspension and abandonment operations.

Following the Macondo (USA, 2010) and Montara (Australia, 2009) offshore blowouts, organisations such as the American Petroleum Institute (API), the International Association of Drilling Contractors (IADC), the International Association of Oil and Gas Producers (IOGP), the International Organization for Standardization (ISO), Norsk Søkkel Konkurransespesisjon (NORSOK) and Oil & Gas UK (OGUK) developed and updated standards and guidelines for well integrity to help industry avoid the costly mistakes of the past.

In conjunction with other International Regulator Forum (IRF) countries, NOPSEMA has been actively involved in identifying potential gaps in international industry standards and guidance related to well integrity and well control. NOPSEMA led an IRF working group that identified a number of potential gaps and opportunities for improvement, summarised in an article available on the IRF website since July 2017. The issues most closely related to well control were the limited guidance or standards on:

- Monitoring of wellbore indicators during drilling (such as real-time pore pressure prediction, fingerprinting at connections and interpreting gas indicators); and
- How subsurface personnel perform, communicate and apply pore pressure and fracture gradient (PPFG) predictive work.

As an example of existing work, the IADC Deepwater Well Control Guidelines 2nd Edition 2015 was found to be a good source of high-level guidance on PPFG uncertainty and kick tolerance calculations. NOPSEMA believes further work is required in a similar vein. Industry organisations have indicated an intention to pursue improvement opportunities in future work.

Recently, NOPSEMA has been working with the IRF on a “Problem Statement” that may guide potential improvements in risk management during drilling. Drawing upon regulatory perspectives and in consultation with the IOGP, a proposed Problem Statement entitled “Prevention of well control incidents, the case for industry guidelines” is being developed and assessed for high-level industry guidance. This Problem Statement proposes the following objectives for ongoing industry development:

- Systematic industry approach to pore pressure/fracture gradient prediction;
- Systematic work flows and key technical elements required for translating any new PPFG guideline into efficient and safe well designs; and
- Systematic implementation of existing relevant guidance on safe well operating envelopes.

Knowledge sharing

Sharing of knowledge and experience at a global scale is considered essential to reduce the incidence of loss of well control events. IOGP safety alerts (www.safetyzone.iogp.org) and IRF

articles (www.irfoffshoresafety.com) are examples of forums for sharing information about incidents or current issues. Freely available knowledge creates opportunities for faster learning and application to prevent risk events occurring and better mitigation should events occur.

For its part, NOPSEMA recognises the privileged position of regulators in having access to industry wide information and, where possible, collates and shares this information through publications, industry events and workshops. NOPSEMA seeks to apply the principle of “Find One, Fix Many” to quickly translate insights from the experience of one company to the entire industry. A recent example was NOPSEMA and other countries sharing good practices related to managing the health and safety risks on offshore facilities in the early stages of the COVID-19 pandemic. As Australia’s offshore energy regulator, NOPSEMA believes in the power of knowledge in the international industry. Sharing this learning can contribute to the greater body of work for the benefit of all, so NOPSEMA seeks to make its information freely available at: <https://www.nopsema.gov.au>.

Conclusion

The prevention of well control incidents is a common goal of industry and regulators. This article has described some actions in progress by NOPSEMA and other organisations that contribute towards this goal, namely:

- Increased focus by NOPSEMA on the definition and management of interfaces between titleholder and drilling contractors;
- Collaborating with other regulators and industry bodies to close gaps in international guidance or standards related to well control and well integrity; and
- Continuing to encourage sharing of knowledge and experience between organisations.

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