

BEL

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OIRA Meeting

BSEE Proposed Well Control Rule

RIN 1014-AA11

March 24, 2016



Agenda

Introduction

Assessment of Four Specific Provisions

Economic Impact of the Proposed Rule

Other Challenges of the Proposed Rule

Recommendations



Opening Remarks

Introduction to Noble Energy

- Leading independent operator engaged in worldwide oil and gas exploration and production
- Gulf of Mexico (GOM) is one of our six core business areas
- Focus on Safety Culture and Performance

General support for the focus on offshore safety, but we are concerned that a number of prescriptive rules would add risk and lead to unintended consequences

- Some prescriptive provisions will have a significant impact on operations and costs without material benefit to the public, safety, or environment

Recommend the Proposed Rule be reevaluated to examine benefit vs. potential for unintended consequences that increase the risk of a safety event

- Complete assessment of safety and economic impact has not been possible due to the considerable lack of clarity in the Proposed Rule

Recommend a performance-based approach to keep pace with the historically evolving nature of exploration and development in the GOM

Drilling Margin – How do you want to operate?

Proposed Rule – 0.5 pound per gallon (ppg) fixed drilling margin

Unintended Consequences – Added Risks

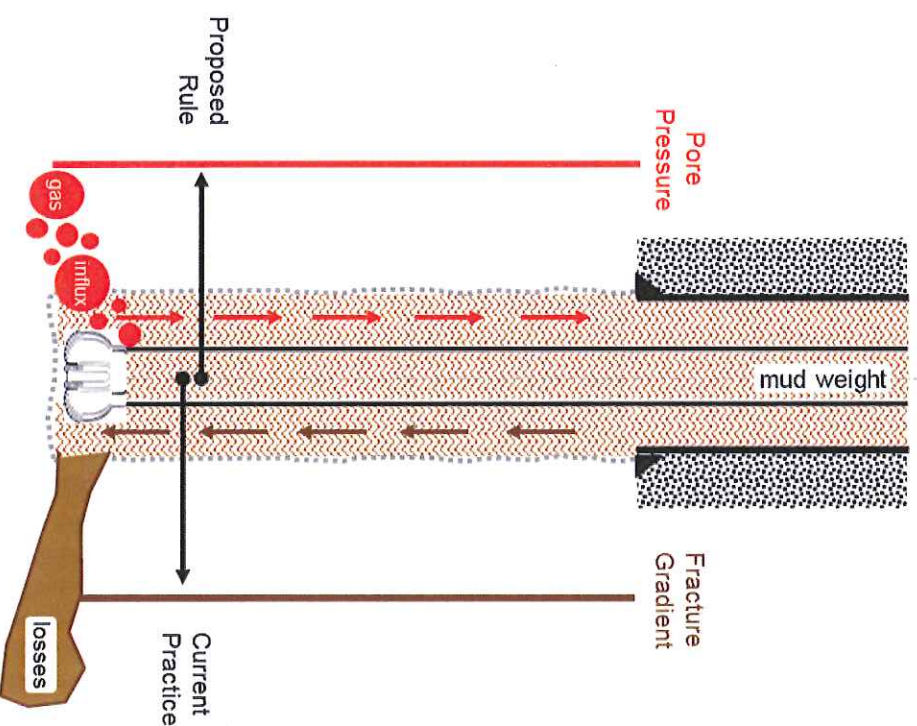
- Drive use of lower mud weights resulting in higher risk of kicks and well control event
- Additional casing strings increase well cost, downsize completion, and in some cases prevent getting to total depth (TD)
- Stranded reserves

Impact

- Wells could not be able to reach TD and/or could not be completed

Recommendation

- Remove requirement for a specific drilling margin and require instead that operators demonstrate and maintain a “safe drilling margin” based on a risk assessment of all available data for well control - seismic, geologic, well geometry, mud properties, engineering modeling information



Casing/Cementing – Weighted Fluid During Cement Setting Time

Proposed Rule

- Requires use of a weighted fluid to maintain an overbalanced hydrostatic pressure during the cement setting time

Unintended Consequences – Added Risks

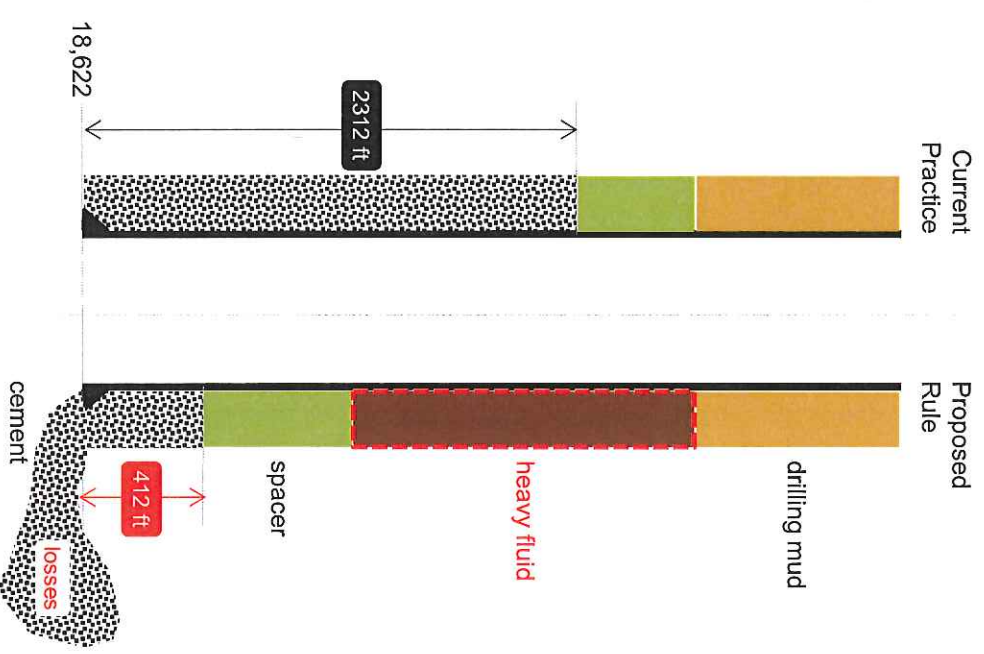
- Significantly increases risk of lost returns during cement job due to heavy fluids exceeding fracture gradient – lower top of cement and ineffective mud removal leading to channeling which adds risks and decreases well integrity
- Both can lead to compromised primary cement jobs and require remedial squeeze events that adds additional unintended risk

Impact

- Increase in well costs due to remedial work
- In combination with other requirements, will make wells uneconomic

Recommendation

- Remove requirement from the proposed rule, leverage industry best practices such as API Standard 65-2, 2nd edition



Production Packer – Kill Weight Fluid Above Packer

Proposed Rule

- Prescriptive requirement of “kill weight” packer fluids to maintain overbalance against reservoir pressures

Unintended Consequences – Added Risks

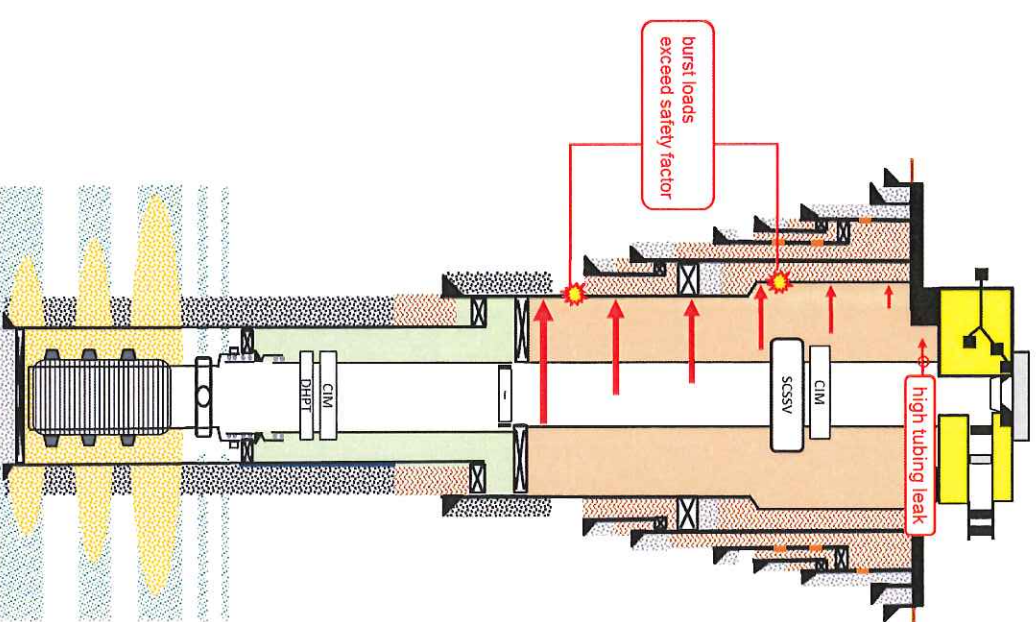
- Could cause higher stress states (higher burst & collapse loads)
- Provides little to no barrier benefit
- Increases HSE risk associated with higher weight fluids (zinc)

Impact

- Loss of reserves and revenue

Recommendation

- Remove requirement from the proposed rule and require operator to justify packer fluid selection and packer setting depth which will ensure well integrity for life of well operations including production, intervention and abandonment.



Production Packer – Packer Set Within Cemented Interval

Proposed Rule

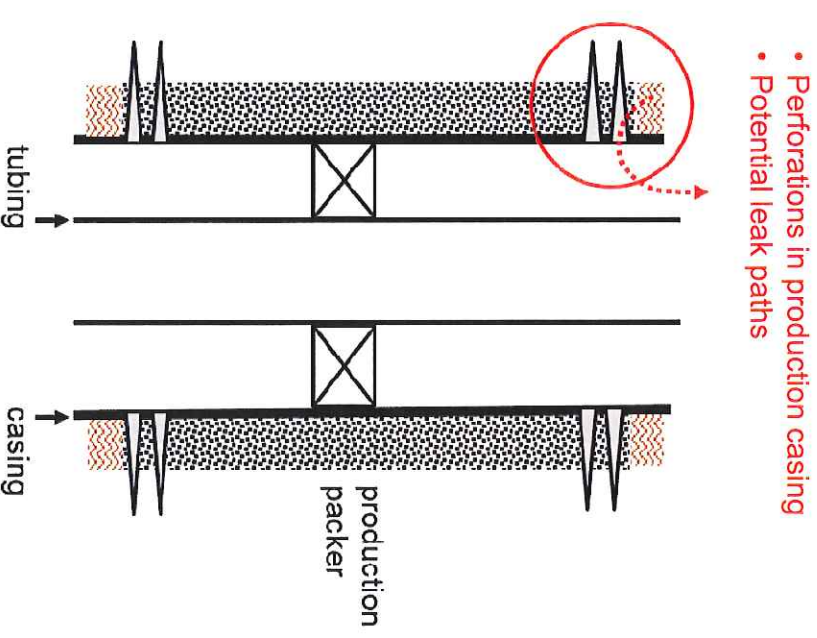
- Prescriptive requirement to set production packer within a cemented section of production casing

Unintended Consequences – Added Risks

- Strict adherence to this practice would require remedial (“squeeze”) cementing - perforating holes in casing
- Likely outcome - a reduction in well integrity
- Significantly adds operational risk and cost
- Worst case – loss of well or sidetrack, suboptimal completion design (loss of rate and reserves)

Recommendation

- Remove requirement from the proposed rule and require operator to justify the packer setting depth which will ensure well integrity for life of well operations including production, intervention and abandonment.



Economic Impact

Proposed rule affects project economics

- 30-40% increase in well costs - \$30 - \$40 million per well (an average \$100 million per year)
- From pre-drill perspective, average decrease in rate of return $\pm 5\%$ - which is significant
- Stranded reserves due to wells or projects deemed uneconomic
- Capital investment will shift out of GOM and out of the U.S.

Total impact to Noble and to the taxpayer is significant

- Reduction of royalties
- Fewer and lower bids on GOM blocks
- Risk to jobs
- Security of energy supply

Performance-based rule is critical to keep pace with evolving challenges of future development and preserving the competitiveness of the GOM

Other Challenges

Uncertain regulatory environment challenges project sanctioning and the ability to develop long-term business strategies for activity and investment

- Cannot approve projects/plans on the hope of alternate compliance
- Need for significant clarifications and guidance development
- Uncertain timeframe for developing required technology and capability

Unable to fully assess economics; direct well costs may be significantly underestimated

- Unnecessary remedial work/compromised production
- Lack of boundary conditions; unclear on intent or requirement
- Requirement for technological capabilities that do not exist

Implementation concerns

- Ambiguous terminology utilized in prescriptive requirements
- Inconsistencies between BSEE District Interpretations
- Adequately trained agency staff to manage increased agency involvement as per the rule
- In the short term, industry investment may slow until business environment becomes more clear and predictable

GOM will become less competitive for investment

Recommendations

Recommend a performance-based approach to rulemaking and avoid prescription

- Prescriptive approaches reduce innovation, can generate unintended consequences, and provide a false sense of security for the regulator
- Focus should be on the desired outcome of safety performance with flexibility for approaches
- Hybrid approaches lead to confusion for the regulated community

BSEE reevaluate the benefit of the Proposed Rule versus the potential for unintended consequences that increase the risk of a safety event occurring offshore

- Remove provisions that add significant loss of revenues to both operators and government without adding material benefit to the public, safety, or environment
- Preserve the competitiveness of the Gulf of Mexico, particularly for independents

Delay implementation of those sections that require guidance development

- Difficult to interpret, implement and make sound business decisions
- Develop guidance collaboratively with industry experts