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An Assessment of Research Gaps Related to Deep Water Wellbore Integrity

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In order for a deep-water wellbore to uphold its integrity under high pressure - high temperature conditions, the wellbore must possess complete zonal isolation while surrounded in an extreme environment. Highly variable temperature and pressure ranges, shallow flow zones, as well as potentially corrosive fluids and gasses all present unique challenges to the job of the cement which maintains that zonal isolation. As such, alternative options to mainstream choices often present themselves as attractive avenues of discovery.

As it is of utmost importance to maintain structural integrity under HPHT conditions, cement slurries are pumped downhole to provide zonal isolation and structural support to offshore wells. The wellbore system potentially faces a variety of temperature and pressure fluctuations from the immediate onset. These fluctuations may affect the hydration properties of the cement. It is also important to consider the chemical interactions that the cement may have at the rock-cement interface where potential degradation or annulus gaps may occur further risking a decrease in zonal isolation. This presentation intends to review some of the important issues regarding zonal isolation in HPHT conditions and to highlight critical knowledge gaps in order to generate important research questions.

References

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