

SPE SYMPOSIUM: DECOMMISSIONING & ABANDONMENT

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A Subsurface Data Driven Approach To Improving Efficiencies In Decommissioning

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Abstract:

Objectives/Scope: Over 380 fields in Asia Pacific are expected to cease production over the next decade, presenting operators with a multi-billion dollar burden for the decommissioning of rigs, platforms and old infrastructure. The largest capital expenditure in decommissioning - accounting for 50% of costs - is on well plugging and abandonment (P&A) workflows.

Methods, Procedures, Process: Traditional P&A methods and governance have remained largely unchanged. Regulators dictate safe and environmentally compliant abandonment operations, but their guidelines do not always articulate how these processes should be implemented, resulting in mismatch between regulatory requirements and a particular wells specific technical needs. We propose a process to augment P&A planning by utilising integrated study of regional and local geologies, which control the distribution of subsurface fluids and pressures, with historical well data and standardised petrophysics workflows to ultimately guide the placement and number of well plugs.

Results, Observations, Conclusions: We consider the complex effects of production and injection on reservoir state, pressure and stress throughout a field's lifecycle. Designing a well abandonment program to deal with virgin formation pressures may not be effective. Pore pressures may become depleted and/or recharged potentially leading to fault reactivation. Overburden may compact, and thermal changes may also occur. We examine the nature and sealing capacity of shales. Prediction of whether they will squeeze and provide self-healing annular barriers is essential information to consider, particularly if there have been any previous abandonment issues. Assessment of gas in the overburden formations via review of well reports, drilling histories and logging data such as pulsed neutron logs is also integrated.

Novel/Additive Information: A case study from the North Sea is presented as this is a mature area for oil and gas with numerous successful fields now entering the final stages of production and requiring a P&A strategy.

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