Automating the well workover candidate identification process in one of Europe's largest onshore oil fields, Matzen

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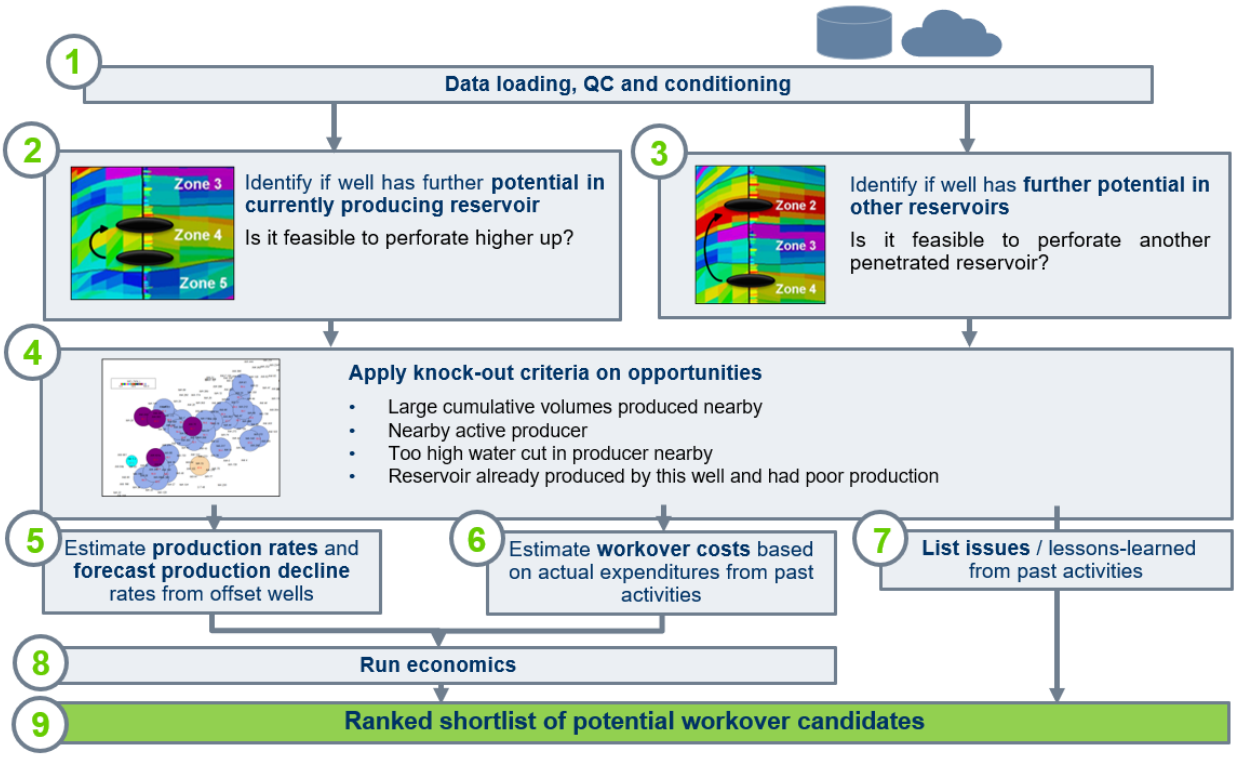
The Matzen field, a significant onshore oil and gas reservoir in the central Vienna basin, boasts over 70 years of production history, 3500 wells drilled, and cumulative production exceeding 516 million bbl oil and 1.1 Tcf of gas [R01]. As a mature brown field, optimizing recovery rates and minimizing declining production are paramount. This abstract introduces a proof-of-concept workflow designed to automate the identification of well workover candidates, aiming to enhance efficiency and effectiveness in the Matzen field.

The workflow utilizes extensive digitalization efforts in OMV, leveraging production, workover, economic, and spatial data. With 1057 active and temporarily shut-in wells producing from 435 individual reservoirs, manually identifying workover candidates becomes a daunting task. The presented in-house tool streamlines this process by automatically ranking opportunities based on volumetrics and financial metrics, providing a prioritized shortlist for subsurface engineers.

The method involves a multi-step workflow illustrated in Figure 1, starting with the extraction and conditioning of diverse datasets, including well location and meta-data, monthly production data, geological well tops, well perforations, economic data, and spatial information. Synchronization of datasets and achieving consistent data granularity are crucial prerequisites. The subsequent steps focus on calculating additional perforation potential, addressing remaining potential in currently active production units as well as in non-produced but penetrated production units, and testing candidates against user-defined knock-out criteria. Following steps estimate production rates, decline rates, workover costs, and potential production issues, culminating in the calculation of net present value (NPV). The final step involves ranking all identified opportunities, presenting a shortlist to subsurface engineers for validation.

The workflow utilizes Python to handle the complexity of diverse and comprehensive data gathered over decades. The tool showcases an 80% reduction in the time required for the subsurface team to identify promising workover candidates compared to manual processes. The workflows` complexity lies in managing decades of diverse data, ensuring consistency, and synchronizing datasets for seamless analysis. The resulting shortlist empowers subsurface engineers to proactively focus on economically attractive workover options, significantly improving decision-making in the mature Matzen field.

In conclusion, this proof-of-concept automation addresses the challenges of a mature oil field, demonstrating substantial time savings and improved decision support for subsurface engineers. The methodology and insights presented in this abstract can be applied to optimize workover candidate identification in similar mature fields with stacked reservoirs, contributing to enhanced operational efficiency in the oil and gas industry.



The principal steps of the workover candidate identification workflow, as described in the text.

References:

[R01] Fuchs, R. and Hamilton, W. , (2006), New Depositional Architecture for an Old Giant: The Matzen Field, Austria, The American Association of Petroleum Geologists, 84, https://doi.org/10.1306/985609M843069