



CASE STUDY

FBA Rapid Diagnostics and Rapid Lookbacks in the Permian Basin

CASE STUDY | PROJECT SUMMARY

[Subsurface Dynamics](#) was tasked with performing a comparison of frac efficacy and reservoir quality on two Permian Basin wells. The wells were part of a 10 well multi-bench pad, offsetting 2 Parent wells.

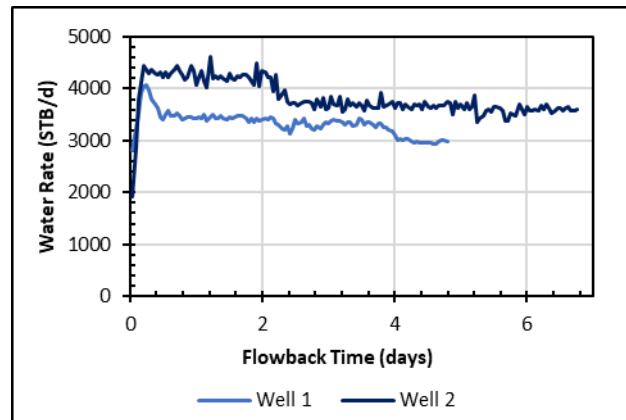
-  **CLIENT :** Confidential
-  **FIELD :** Midland Basin
-  **DATE :** 2023

CASE STUDY | PROJECT SCOPE

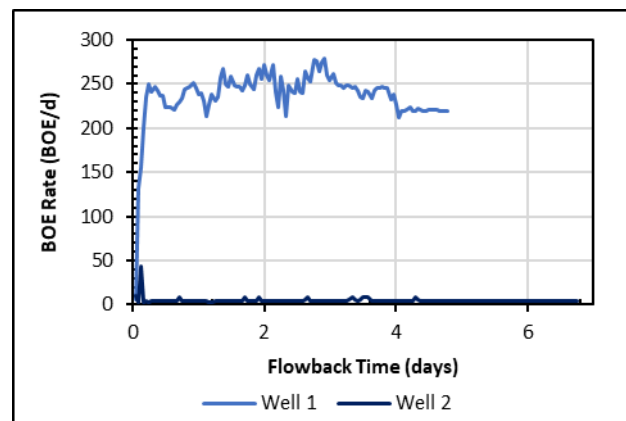
SSD utilized its proprietary [flowback analysis \(FBA\) workflow](#) and [software platform \(Athena FBA\)](#) to provide rapid, cost-effective diagnostics to differentiate between hydraulic fracture efficacy and reservoir quality. Analysis utilized typical post-frac production test data previously collected by the operator and therefore no additional field costs were associated with the analysis. Both wells had comparable pumped completions.

Well 1 had ~5 days of flowback data and produced significant hydrocarbon volumes, while Well 2 had ~7 days of flowback data and produced primarily water and small amount of gas.

Comparison of Flowback Water Rates



Comparison of Flowback Hydrocarbon Rates

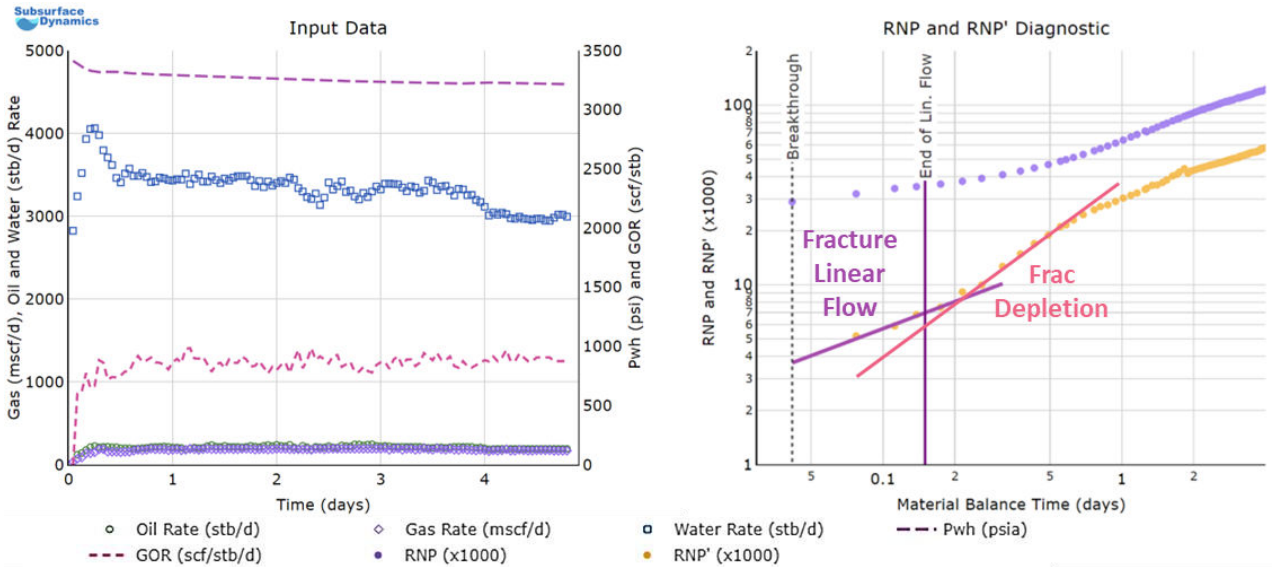


ABOUT SUBSURFACE DYNAMICS

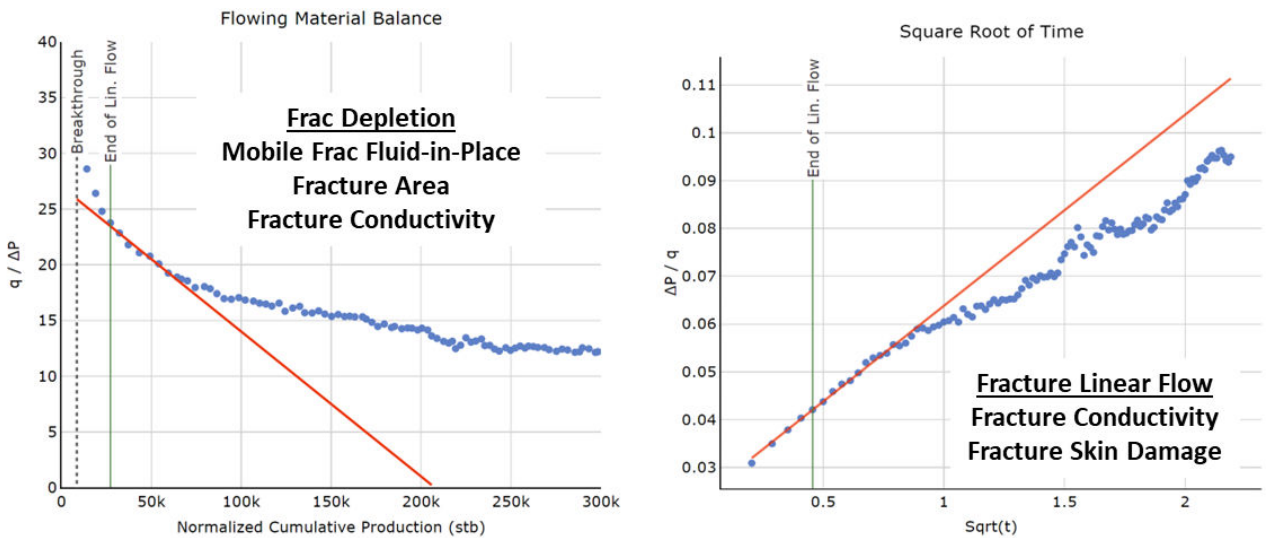
Subsurface Dynamics (SSD) is an independent Advanced Reservoir Engineering and Technology Development firm with extensive expertise in reservoir characterization, static modeling, dynamic simulation, integration, and optimization.

We provide a full spectrum of engineering services from data acquisition to final full field development programs and optimization.

WELL 1 | RAW DATA AND DIAGNOSTIC PLOTS



WELL 1 | FRACSEED

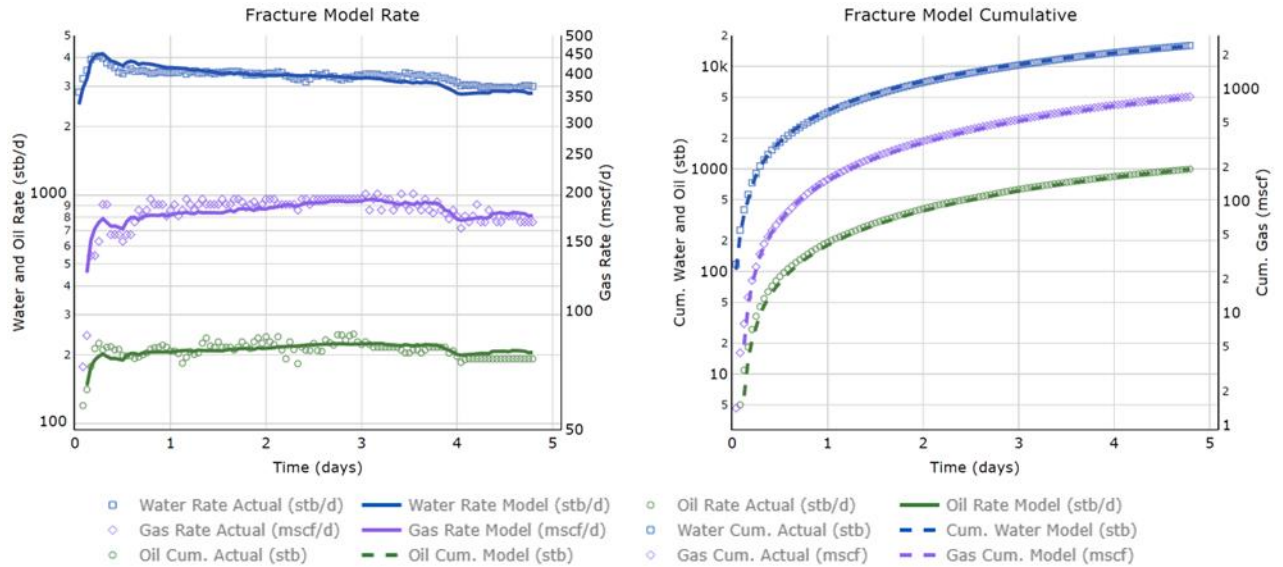


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WELL 1 | FRACSOLVE



WELL 1 and WELL 2 | RESULTS COMPARISON

	Well 1	Well 2
Fracture Conductivity	Base	-28%
Fracture Skin Damage	Base	+30%
Conductive Frac Area/Frac	Base	+14%
SRV Permeability	Base	-25%
Total Quality ($F_c \times A_f \times \sqrt{k_{SRV}}$)	Base	-29%

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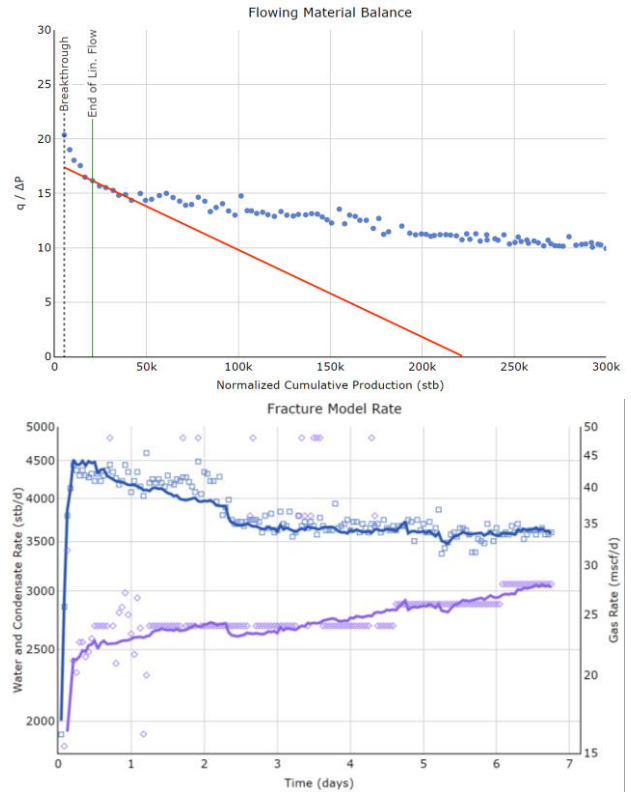
CASE STUDY | RESULTS

- The FBA diagnostic highlights the variability in achieved completion parameters with the same design for wells on the pad. An assessment of long-term productivity indicates that both executed frac parameters and reservoir heterogeneity are key drivers to well performance in the play.
- The analysis identified the degree of reservoir heterogeneity anticipated over short distances within the asset. This detailed well-by-well assessment can be used to significantly improve the resolution of reservoir mapping, which is typically limited to a small number of vertical control points. Understanding reservoir quality is critical for selecting a fit-for purpose design for a given location to maximize productivity and prevent over-capitalization.
- Study provided critical insights into well performance and optimal completion design at a fraction of the cost of fully integrated analysis.

ABOUT ATHENA FBA



Well 2 Flowback Analysis



[FBA is a state-of-the-art technique providing rapid diagnostics and rapid lookbacks to help you get ahead of capital spending.](#) Without incurring additional field costs, it provides critical insights 6-12 months sooner than conventional methods.

[Athena FBA is a streamlined, simple to use cloud-based software package that is integrated into SSD's AETHEN.IO platform.](#) AETHEN.IO was developed with a focus on data integration, automation and producing high quality outputs from typical engineering workflows, with limited manpower and intervention.

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