

## Digital Oil Recovery™ Powered by Foroil

Accelerating production  
and maximizing value  
from brownfields



First-of-its-kind predictive solution rapidly determines the optimal field development program from over 15 million potential scenarios

### The new normal

The relentless focus on cost optimization combined with deferred capital spending has helped operators return to profitability and conserve cash. At the same time, however these measures have created a real risk to reserve replacement and future growth in production.

Executives can count on neither “easy oil” nor a significant secular recovery in prices over the planning horizon, leaving them with limited options to drive growth: they can invest in large, complex, long-cycle projects or focus on higher-operating-expense, short-cycle unconventional.

Some in the industry believe that digital technologies can help spur growth; however, the linkage between these digital technologies and the core value-creation levers of upstream companies—**more oil, lower costs, faster, with less risk**—either remains to be demonstrated or is highly complex to achieve.

### Digital Oil Recovery™: Maximizing brownfield operations

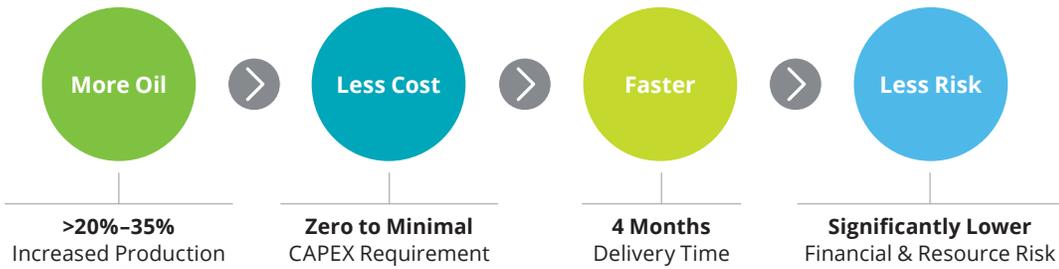
Conventional brownfields—oilfields with more than seven years’ operating history—still account for approximately 65 percent of global oil production. The recovery factor in these brownfields ranges from roughly 40-60 percent, leaving a significant amount of oil behind. Brownfields also often suffer from higher operating costs, declining production, aging equipment, and complex (and often neglected) subsurface dynamics. Traditional methods to redevelop brownfields are both time-consuming and expensive, yet the production benefits are often fleeting. These limitations render brownfield optimization programs low priority to most large operators. The industry desperately needs a new way of optimizing this massive category of producing assets.

Deloitte’s Digital Oil Recovery™ powered by FOROIL is a patented, innovative digital solution to help operators dramatically increase production and reserves from brownfields. It is an easily implementable, rapid, low-cost, and low-risk solution that creates immediate and substantial impact without the organizational and technical complexities inherent in traditional development methods.

Digital Oil Recovery™ uses existing production data, highly sophisticated advanced mathematics, reservoir physics, machine-learning algorithms, and massive parallel computing to create a truly optimized field development plan. The results of the optimization are generally in the range of 20% improvement in production with little to no incremental capital, and

the plans are developed within three to four months.

Digital Oil Recovery™ is a short-cycle, low-capital-investment production enhancement and optimization solution that creates significant growth upside for brownfields.

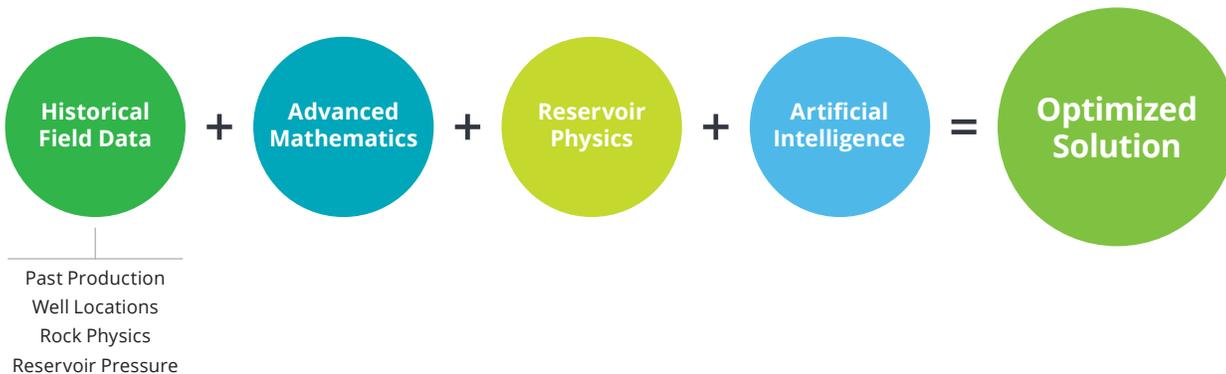


**How it's different**

Digital Oil Recovery™ started from the premise that the robust history of production data from brownfields tells the story of how complex reservoirs behave over time. However, traditional methods of reservoir characterization needed to be supplemented with advanced mathematical techniques to understand the dynamics of reservoir behavior. Digital Oil Recovery™ combines reservoir physics to advanced mathematical algorithms and artificial intelligence to quickly, reliably and accurately tell the story of reservoir behavior. Its objective is not to reconstruct the subsurface reservoir model, but to complement that model with a behavioral model based on past dynamics that is accurate and predictive.

Once the model is built, Digital Oil Recovery™ uses large, parallel computing power to scan the massive and complex solution space — running tens of millions of scenarios overnight to identify an effective production solution for the given financial, operational and resource constraints.

Since development plans are based on the actual history of field responses, they are much more accurate, less risky, and easier to run than traditional field development processes.



### Delivering value to Oil & Gas companies

Maximizing production and reserves from brownfields with minimal investments provides oil & gas executives with a new and needed option to impact earnings, capital plans, dividends, and share price.

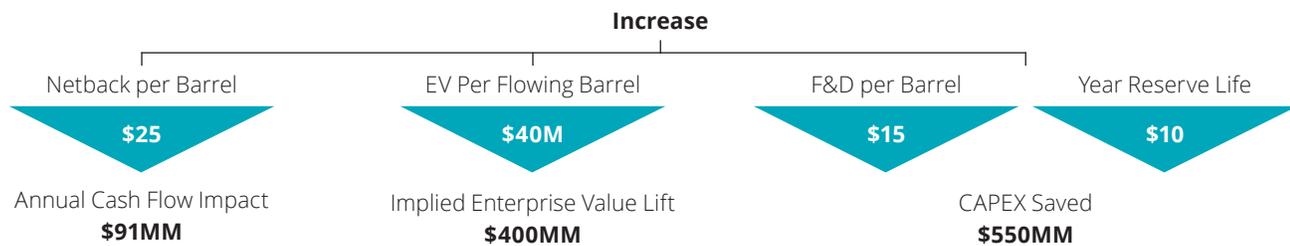
### Financial statement view

Major global, national, and independent oil companies have successfully deployed Digital Oil Recovery™ technology on dozens of programs worldwide and additional programs are ramping up. Production increases of over 20 percent have been realized with no incremental capital, while moderate capex investments have yielded 35+ percent production increases.

#### Apply Digital Oil Recovery™ to fields with 50,000 bbl/day of production.

Digital Oil Recovery™ increases production by 20% with no incremental capital investment based on an optimized field development plan

#### 50M bbl/d Base Production + 20% Production Increase 3.7MM Barrel Annual Production Increase



Digital Oil Recovery™ isn't "mere analytics;" it is a patented and tested oil recovery technique that rapidly delivers increased production and reserves at dramatically reduced capex/bbl.

## The Deloitte difference

Deloitte is constantly expanding its digital ecosystem, seeking value-creating solutions for its clients. Digital Oil Recovery™ brings together FOROIL's patented, proven production-forecasting and field development engines with Deloitte's broad array of digital consulting and implementation services to assist oil companies in making the most capital-efficient decisions at the field, portfolio, and corporate level.

## Let's talk

Learn more about how Digital Oil Recovery™ can help you produce more oil, for less dollars, faster and with less risk.

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## Sources:

### Recovery factor:

<https://www.bp.com/en/global/corporate/bp-magazine/innovations/the-recovery-factor.html>  
<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3866386/>

### Mature production:

Rystad Database (2017 production, accessed 6 November). Numerator: mature conventional (2010 and prior) denominator: all crude

# FOROIL

## About FOROIL

FOROIL offers a brownfield development planning and optimization service based on proven production forecasting and optimization platform technology. Our goal is to help oil and gas operators increase production and reserves at the lowest possible unit cost through affordable field projects that deliver implementable plans with 10X to 100X return on incremental investment. FOROIL technology offers asset managers insights that cannot be obtained from conventional geoscience modeling and reservoir simulation tools

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