

Oilfield Bulletin

Getting the Most Out of Existing Wells



Closing the gaps between current output and productive capacity is one of today's best opportunities to quickly enhance production and improve recovery. A unique innovative solutions and focused engineering well reviews help tap into potential productivity and increase oil and gas asset value.

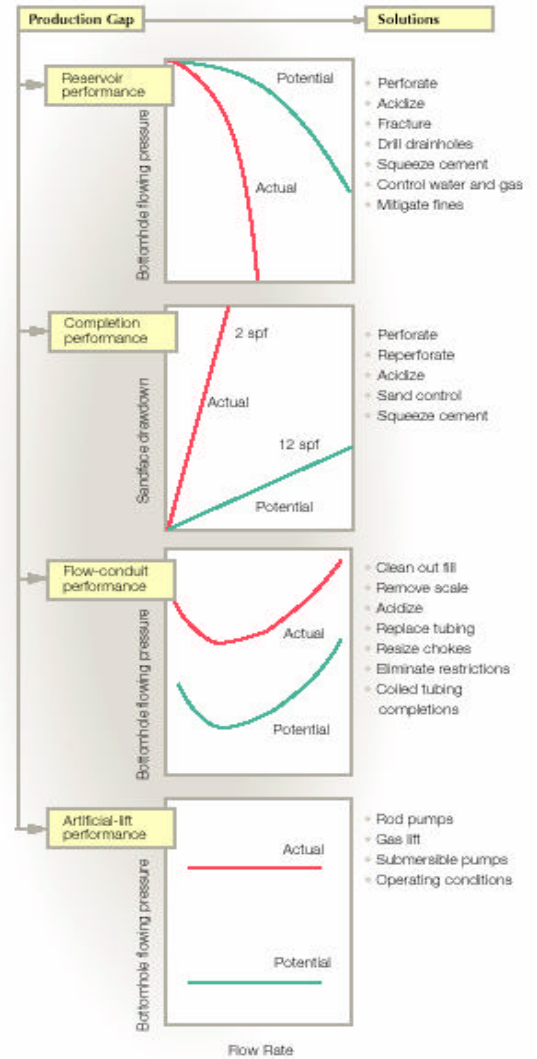
Established fields are the most likely places to find additional oil and gas output. Improving the performance of wells that are already producing is a cost-effective way to offset natural decline, extend field life and improve hydrocarbon recovery. Production enhancement (PE) efforts are aimed at evaluating wells and recommending ways to increase productivity. Effective well interventions and recompletions, therefore, are essential elements of this endeavor.

In daily operations, E&P companies often require specific production and reservoir engineering recommendations. Service companies can meet this need by helping to identify underperforming wells and then assist by providing customized solutions to improve production. Within WellSteer we perform well construction and single-service candidate recognition through field support. Requests for integrated solutions, optimized well designs, specialized well construction services and production engineering assistance are addressed by teams that are tailored for each situation. The PE mission is to optimize well productivity and increase oil and gas outputs at a pace that exceeds historic industry trends.

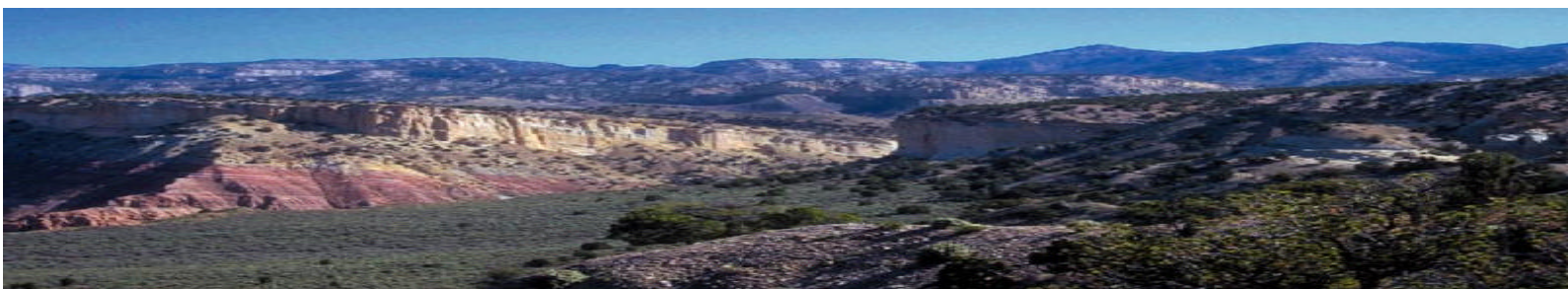
The Production Enhancement works outside of traditional transactions, interactions and work flow between operators and service companies. With permission and cooperation from clients, production specialists look at wells files and identify opportunities to increase production.

Current well performance is analyzed. Pressure, net pay, permeability and skin, or formation damage is determined. Potential well output is calculated and the best services are recommended. Results of these well interventions are then systematically evaluated after implementation.

Proactive well intervention does not involve extensive field studies or exhaustive reservoir evaluations. The heart of these efforts is an engineering calculation and innovative methodology based on single-well production system analysis from reservoir boundaries to the wellbore sand face, across the perforations and up the production tubing. Any restrictions, such as safety valves, chokes, surface facilities and flowlines, can be included in this type of analysis.



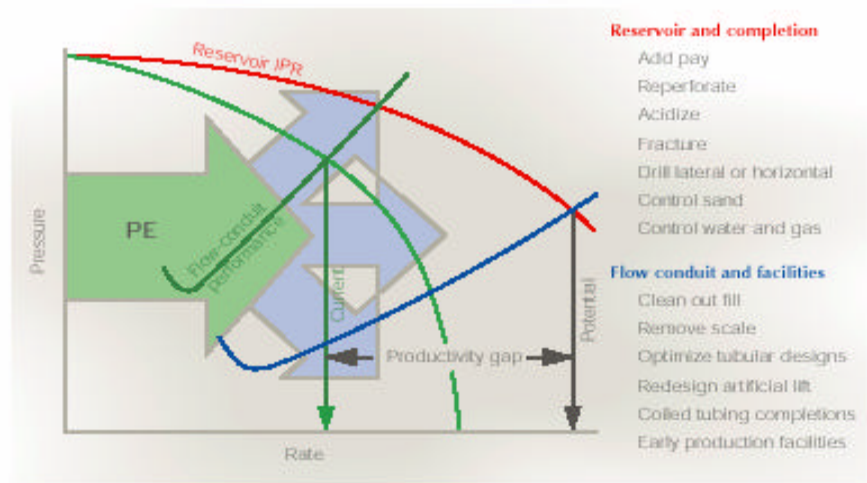
The components of well performance



Production Enhancement

Opportunities to enhance production—untapped primary, secondary and tertiary recovery—are abundant. On average, less than 35% of original hydrocarbons in place are recovered from millions of wells worldwide. These remaining reserves represent one of the best opportunities for operators to improve production, hence the current drive by NNPC and DPR, the regulatory arm of Nigeria oil and gas sector commitments to tap this resources if the country is to meet its current drive to increase production and boost Nigeria OPEC increase drive. This potential oil and gas outputs is fertile ground for prospecting. The PE portion of this prize, realizing an incremental 5% increase nominally from just one out of then wells for example, could yield billions of barrels in additional production and reserves.

Because porous formations act as filters, most wells become damaged, or develop a significant “skin”, at some time during the drilling and production life cycle. Skin is a zone of reduced permeability around the wellbore that causes an excessive pressure drop across the completion face and limits fluid flow from the reservoir. Formation damage is a natural consequence of well drilling, completion activities and production flow. Drilling and completion fluids, crude oil, formation water deposit clay particles, formation fines, asphalttenes, paraffin and scales that can block rock pore space and reduce matrix permeability.



Closing single-well performance gaps. The objective of production enhancement is to identify and close gaps between current well output and production potential. This goal is accomplished by applying solutions and services that moves reservoir inflow performance curves (IPR) up and to the right, and move flow-conduit performance curves down and to the right.

Untapped reserves, formation damage and wells that need modern, full-service tune-ups are the factors that combine to make many assets, some with significant remaining reserves, ripe for auction blocks or abandonment. There are even more wells and reservoirs that still produce economically which have additional potentials waiting to be identified. The answers to this is production enhancement, using new technology, modern techniques, improved tools and better fluids systems to enhance the well performances.

Recently as well as in the past, the industry concentrated primarily on exploration, drilling, well construction and field operations, assigning lower priorities to production engineering and well performance optimization. Initial flush production, limited production quotas and government-regulated allowables meant that many

Wells were produced at rates far below their true potential.

Completions did not have to be optimized if wells were producing their allocated volumes. The only way to obtain higher allowables and increase production was to drill more wells. As a result, optimal completions were not always a priority. With few exceptions, however, the days of drilling into giant, prolific, near-darcy-permeability reservoirs are gone. Allowables, quotas and production limits are becoming a thing of the past; target reservoir is more complex, smaller and tighter. Many existing fields are in the mature stages of their production life cycle; and older fields need more attention to maintain output and identify overlooked opportunities.

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