Intelligent Completions® Keys to Success

Intelligent Completion technology has matured rapidly to become a widely accepted tool in the completion engineer's "toolkit." New reservoir and production models predict inflow and outflow characteristics and show how Intelligent Completion Systems can bring added value in applications. Baker Oil Tools offers this guide as a service to oil and gas producing companies who are considering Intelligent Completion Systems.

What qualifies a well as an Intelligent Completion?

Intelligent completions use real-time production and injection management systems to place process controls downhole and provide three basic functions:

1. Acquisition of downhole production and/or reservoir data
2. Analysis of data to optimize production
3. Remote control of flow.

What is the business case for using Intelligent Completion Systems?

Intelligent Completion Systems can change flow characteristics while minimizing interventions and their associated cost, risk and production downtime. This ability potentially can add millions of dollars to a well's net present value (NPV).

Although minimizing intervention is a significant benefit, intelligent well technologies can provide even more value by accelerating cash flow and increasing ultimate recovery.

Intelligent Completion Products and Services from Baker Oil Tools

- ☑ Inflow/outflow characterization
- ☑ Reservoir/production modeling
- ☑ Completion design and specification
- ☑ Detailed project management
- ☑ Valve specification and design
- ☑ Interface specification and management
- ☑ Sensor integration
- ☑ Surface and/or subsea control specification and design
- ☑ Sand control accommodation with Intelligent Completions
- ☑ Multilateral well design with Intelligent Completions
- ☑ Fluid loss control design with Intelligent Completions
- ☑ Hazard identification and mitigation

Intelligent Well Systems™ Flow Control

Components	BOT Offerings	Description	Actuated
Open/Close Sleeves	HCM	A basic surface controlled hydraulic operated sliding sleeve. Designed for low-end market applications.	Hydraulic
	HCM-Plus	The upgraded version of the basic HCM with enhanced features to facilitate stacked applications in higher-end market applications.	
	Shrouded HCM	A modified version of the HCM that enables remote control of tubing-to-tubing flow vs. standard annulus-to-tubing flow.	
Choking Sleeves	HCM-A	The choking version of the HCM-Plus. The HCM-A incorporates 6 choke positions in addition to full open and full close.	
	IPR	The all-electric infinitely adjustable choking valve. Up to twelve IPR's can be controlled & monitored on a single TEC from surface.	Electric
	Shrouded IPR	A shrouded version of the IPR that enables control of tubing-to-tubing flow vs. standard annulus-to-tubing flow.	
Accessories	Manifold	The downhole Manifold enables control of up to 7 HCM sliding sleeves through only 3 control lines from surface.	Hydraulic
	Single Line Switch	The Single Line Switch enables single control line operation of a balanced line sliding sleeve that normally requires 2 control lines for operation.	

Can my project afford intelligent well technology?

Absolutely. It is now possible to install a basic Intelligent Completion System for less than $100,000. Baker Oil Tools offers many choices based on the customer's application and desired functionality.

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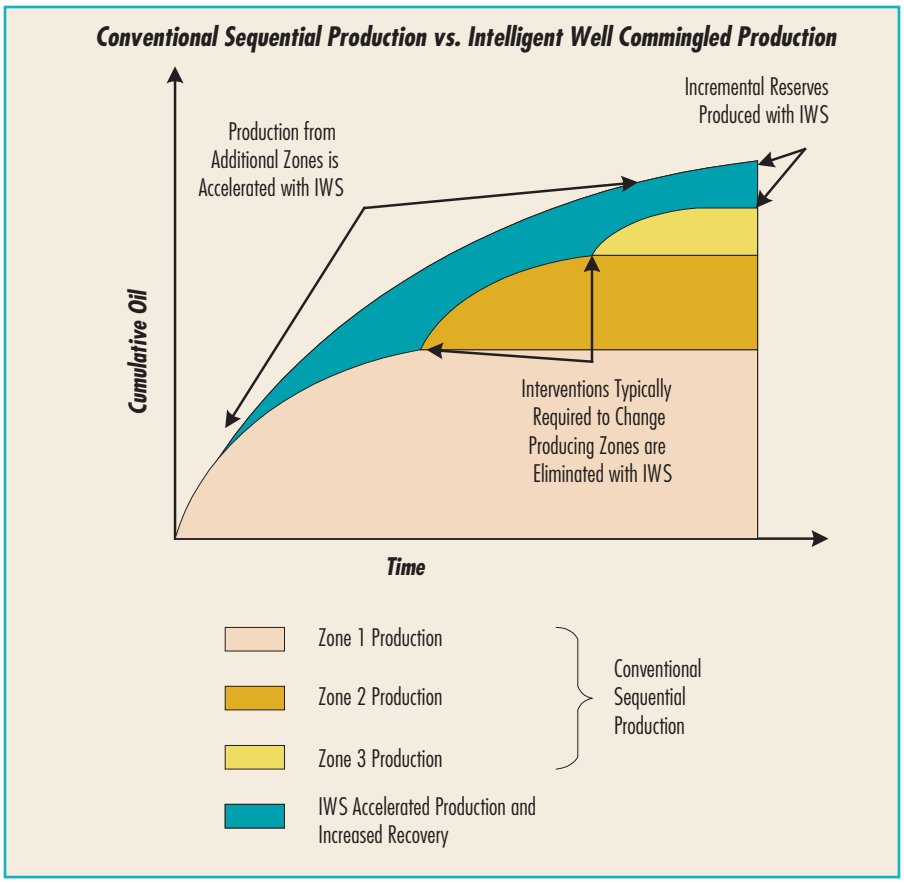
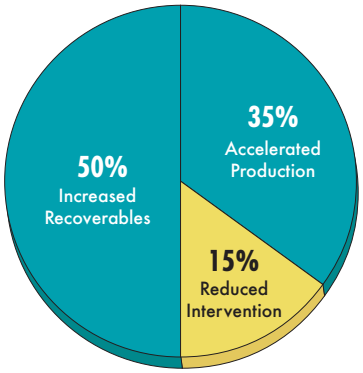


Comparison of net present value of a three-zone well operated under conventional intervention methods and with intelligently managed inflow control.

- Most Intelligent Completion Systems pay out in less than six months, as production and reservoir personnel apply the systems to manage the asset.
- Managing pressures between zones leads to faster payback on the asset and keeps the pipeline full.
- Permanent monitoring enables better production management decisions and can help increase recoverable reserves by up to 15%.



The value of intelligent wells goes far beyond reduced intervention.

How much intelligence do you need?

Desired functionality	System Components	Valve Example	Advantage
Access to zones below an electric submersible pump (ESP) in a land well	Surface-controlled sliding sleeve	InForce™ HCM Remote Controlled Sliding Sleeve (Hydraulic)	Economic method of achieving open/close functionality
Multi-zone selective flow control in offshore or deepwater application	Multiple surface-controlled sliding sleeves and feedthrough packers	InForce™ HCM-Plus Remote Controlled Sliding Sleeve (Hydraulic)	Open/Close functionality with additional system features
Pro-active production management	Multi-position choking valves, hydraulic switching devices, feedthrough packers and modified completion components	InForce™ HCM-A Remote Controlled Choke (Hydraulic)	Discreet choking functionality in multi-drop application
Fully Integrated Intelligent Completion System	Infinitely variable choking valves, venturi-style mass flowmeter, feedthrough packers, downhole wet-disconnect anchor, expansion joint, subsea connectors, and topside and subsea controller	InCharge™ Intelligent Completion System (Electric)	Infinitely variable choking valves with integrated sensors and only one wellhead penetration.

Where to go for more on Intelligent Completion Systems

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