There are many definitions of intelligent completions, but the one I find most apt is a well completion that enables remote monitoring and control of the well inflow without physical intervention to optimize production and reservoir management.

Before the late 1980s, when intelligent completions were introduced into our industry, data collection or well intervention had to be carried out by introducing tools from the surface using wireline or coiled tubing. However, a number of factors drove us to seek more cost-effective ways of obtaining well data and downhole intervention without shutting down production.

As we developed the capacity to drill in increasingly deep water, opening up new reserves, we had to find more innovative, cost-effective means of well intervention. The high upfront costs and the loss of revenue resulting from shutting these wells in just to obtain well data had a huge impact on the revenue stream of companies.

Another factor that encouraged application of intelligent completions is that, during penetration of many stacked reservoirs, operators saw that it was cost-effective to complete as many of the horizons as possible in one go but to retain the flexibility to manage which zones could be brought into production without incurring the expense of a rig or rigless intervention. In addition, many authorities were becoming more flexible in allowing cummingle of production from different reservoirs.

The opportunities encouraged many service companies to develop new types of completions, either alone or in collaboration with other companies. The equipment already existed, but needed to be repackaged for the new application that was required (Dochtary 2001). In designing intelligent completions, oilfield operators specified a number of requirements relating to reliability, ability to segregate inflow, minimal impact on existing well equipment, and the ability to integrate with current technology.

Over the years, new technologies have enabled real-time surveillance of wells and real-time control of inflow of reservoir fluids or the injection into reservoirs for pressure maintenance. Surveillance is achieved using modern electronic devices, while real-time control of inflow of reservoir fluids or the injection into reservoirs for pressure maintenance had to be carried out by introducing tools from the surface using wireline or coiled tubing. However, a number of factors

As with most new technologies, the first intelligent completions were basic, and wells required only low-density transmission for flow, temperature, and pressure data. However, over time, data requirements increased, and this has led to greater

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use of communication packages that can handle more data and do so over increasing distances (Furlow 2000).

The seemingly independent technologies of control devices, power transmission, and communications have been brought together to provide integrated systems that can lead to more economic extraction of hydrocarbons in a safe manner. We will continue to seek to achieve more with less. JPT

References