› SMART WELLS
COMPLETION TECHNOLOGY

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Smart Well Technology, or Smart Completion, refers to a complete system (surface - downhole) that allows continuous and real-time management of the reservoir and the fluids produced. The principle of this technology is to create a closed-control loop; therefore, data such as downhole temperature and pressure are sent to a real-time Programmable Logic Control (PLC). Subsequently, these data will be processed and analyzed with more precision in an intelligent platform or system, and thus generate a computer instruction for the management of the reservoir-well through a wireless communication control system.

Its specific application in the development of reservoirs and oil wells is mainly based on the optimization and production control, to maximize the oil recovery. An optimal smart well system should consider interlayer isolation, flow control, mechanical oil recovery, permanent monitoring and sand control. In this way, oil and gas production can be monitored and controlled in real time. The resulting real-time reconfiguration of the well structure will allow increased oil production and reduced operating costs.

SMART WELL ARCHITECTURE:

The system is mainly composed of two parts: surface and downhole equipment, including the Data Acquisition System (DAS) and Distributed Temperature System (DTS and Intelligent Panel View), which must be integrated by a data information transmission sub-system and a surface-downhole data analysis sub-system.

The system must be able to generate predictive trend curves and propose optimization alternatives in real time, which
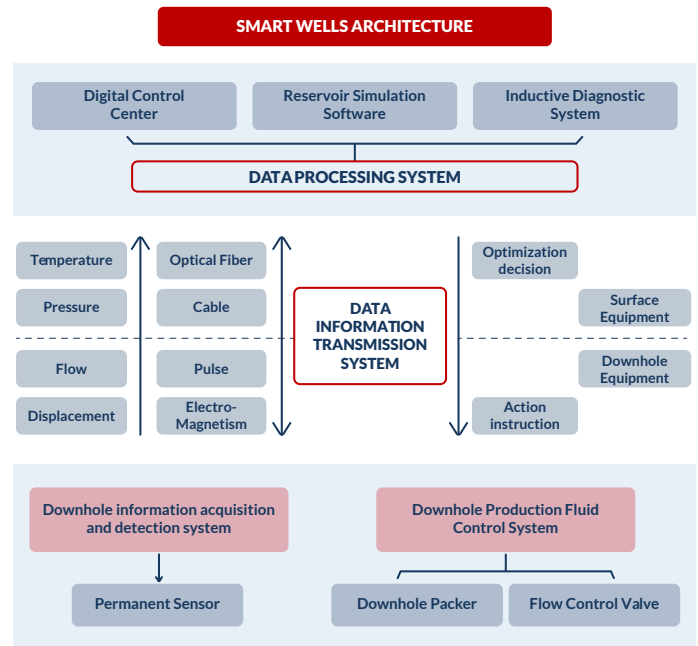
can be executed by the Central Control System (Artificial Intelligence), or derived for subsequent approval by the Reservoir Engineering and Well Production Team.

Smart completions can be effective in layered reservoirs as they are most efficient when the shale zones are continuous and the seal is impermeable. On the other hand, these systems are suitable for some wells that traverse safely sealed layers and to control pressure drop or water production in reservoirs with high contrasts of pressure, permeability and water cut. **The application of intelligent systems in Enhanced Oil Recovery (EOR) through Thermal Processes is very useful,** because it allows measuring the effectiveness of the project in terms of steam injection pressure, temperature, volume of fluid injected, and therefore the impact on the productivity and recovery factor.

The total cost of the intelligent completion system is generally higher than the cost of conventional systems, even the application of the key technologies requires a considerable initial investment; however, it is recoverable in the medium term due to the significant increase in oil recovery (greater than 85% over the initial production base).