

FC Fast Connect HT Wellhead System Saves PetroMiranda USD 1.2 Million in One Year in Heavy Oil Field, Venezuela

Custom wellhead system withstands high temperatures and reduces installation, drilling, and completion time

CHALLENGE

Provide PetroMiranda in Venezuela a wellhead that can

- withstand the high temperatures and corrosive environments of heavy oil wells.
- optimize rig time.
- eliminate the use of expansion joints.

SOLUTION

Engineer the FC* fast connect HT wellhead system to satisfy all PetroMiranda's requirements.

RESULTS

- Delivered a custom wellhead system rated 650 degF.
- Reduced wellhead installation time by 67%, saving USD 1.2 million annually.
- Shortened completion time by up to 50% and reduced the time to production.
- Eliminated the need for expansion joints.

"Since we began operation of PetroMiranda with the Cameron Fast Connect 3,000 psi wellhead in 2013, we have achieved an accelerated oil production of about 2,400 bbl/day; to date we have carried out drilling operations with zero incidents."

Jesus Nuñez
 Drilling Superintendent
 PetroMiranda

PetroMiranda needed robust wellheads for heavy oil wells

PetroMiranda was about to start operations in the heavy oil belt of Venezuela and wanted to maximize drilling and completion efficiency. The choice of wellhead was critical because of the high temperatures associated with thermal recovery of heavy oil via techniques such as steam-assisted gravity drainage (SAGD), steam flooding, cyclic steam injection, and electric downhole cable heating.

In addition to a "Y" temperature classification and "PR1" performance requirement, the wellhead was required to

- absorb up to 1 ft of tubing elongation, thus eliminating the use of an expansion joint
- optimize installation time.



PetroMiranda used the FC fast connect HT wellhead system—custom engineered for heavy oil operations—on all its heavy oil wells in Venezuela because of the system's ability to withstand corrosive environments and temperatures up to 650 degF, reduce installation time, and eliminate the need for expansion joints.



Cameron designed the FC wellhead system to meet all operator's criteria

To satisfy the operator's requirements, Cameron engineers in Maracaibo, Venezuela, developed the FC fast connect HT wellhead system, rated 0–650 degF at a maximum pressure of 3,000 psi. Special software simulated rigorous testing at high temperatures before the physical wellhead system was manufactured. A unique feature of this custom wellhead system is that the thermal expansion takes place internally through the casing hanger, eliminating the use of expansion joints.

Designed for both high- and low-temperature applications, FC wellhead system components are installed through the BOP stack, minimizing rig time. A segmented landing base with holes facilitates observation of returns and performance of top job cementing, resulting in further time savings. An internal backpressure valve helps to ensure well control while the drilling rig moves off location.

Cameron leveraged its ongoing R&D, as well as extensive experience in designing seals for custom applications, and worked with PetroMiranda to design robust seals for the FC wellhead system that would withstand the extreme temperatures and corrosive environments expected. Stringent qualification tests and validations were carried out to ensure the quality and performance consistency of the seals.

Customer saved USD 1.2 million in one year

Wellhead installation time was just 8 hours instead of the 24 hours typically required for a conventional wellhead—a 67% reduction. For the 40 wells planned for the year, at a rig rate of USD 45,000/day the shorter installation time represented a savings of USD 1.2 million. In addition, the FC wellhead system enabled PetroMiranda to reduce completion time from 40 days to 20–30 days per well. As a result, the operator elected to use the FC system on all its heavy oil wells.

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