

Case study: Gulf of Mexico, United States

Dual Premier packers isolated leak in unsupported casing in deepwater HP/HT well, saved loss of wellbore

A customer with a high-pressure/high-temperature (HP/HT) deepwater well in the Gulf of Mexico discovered a leak in the casing string which resulted in an inadequate cement job. The leak would not allow a successful test of the casing prior to completion and would not allow the sand control packer or barrier valve to be tested after installation. The unsupported casing also meant that the production packer may be put into a load that would yield the casing and invalidate the packer envelope.

The customer contacted Baker Hughes for a solution to complete this well and indicated the well would likely not be able to be recovered via a sidetrack operation. This meant Baker Hughes engineers needed to devise an economic solution or risk losing the wellbore.

Baker Hughes engineers extensively modeled the unsupported packer scenarios to determine a new load rating envelope that would gain approval from the Bureau of Safety and Environmental Enforcement (BSEE). Due to the HP/HT nature of this reservoir, any barrier devices or changes to the barriers must be approved by a third-party consultant prior to BSEE approval.

The optimal tool for this unique operation was the **Premier™ production packer**, the industry standard for gas tight hydraulic-set, large-bore, removable production packers. The Premier packer combines the performance of a permanent packer with the conveniences of a retrievable packer.

Engineers designed a dummy sub that allowed two Premier packers to be conveyed in the isolation string, sealing the casing leak above and below with blank pipe. A dual sealbore tool was also developed to enable the two Premier packers to be set simultaneously and then tested. This solution satisfied the BSEE requirement and the operation progressed to field deployment.

After field personnel ran and stung the isolation string into the lower completion, a ball was dropped to enable the Premier packers to be set hydraulically. After the packers were set, the **high-rate SC-XP™ setting tool** was disengaged from the isolation string and positioned into test position. This second position enabled the lower completion sand control packer, barrier valve, production seals, and Premier packer to be tested to satisfaction.

With the lower and isolation string in place and tested, the upper completion was then run as originally planned. The only difference in this upper completion was the new load envelope for the Premier production packer.

Baker Hughes engineers and field personnel conducted this successful installation with flawless execution. The predictable performance of the Premier packers and the SC-XP setting tool salvaged a wellbore that would otherwise have been abandoned, laying the foundation for the customer's future operations and saving tens of millions of dollars in loss.

Challenges

- Overcome casing leak that resulted in:
 - Unsupported casing at production depth
 - Untestable sand control packer and barrier valve
- Avoid risk of losing entire wellbore

Results

- Developed dummy sub that enabled two Premier packers to seal simultaneously above and below the casing leak with blank pipe
- Isolated casing leak and enabled future production
- Recovered the well, saving potentially tens of millions of dollars
- Experienced no health, safety and environmental (HSE) issues or nonproductive time (NPT)