Successful Primary Cementing Saves Chevron USD 12 Million in Gulf of Mexico

Case study: Preplanning results in successful primary cementing job, saving 3 days of rig time offshore Louisiana

Challenge
Optimize job parameters to avoid remedial squeeze job and NPT costs related to cementing.

Solution
Perform computer simulations using CemCADE* cementing design and evaluation software and WELLCLEAN II* engineering solution software to obtain accurate information about centralization, preflush volumes, fluids friction pressure hierarchy, and displacement flow rates.

Results
Saved an average of 3 days of rig time for each string and USD 12 million by eliminating the need for remedial jobs to be performed on the casing strings.

Planning ahead: A carefully engineered approach
During the planning phase of the No. 1 well in the Damascus field on Walker Ridge 581 in the Gulf of Mexico, Chevron met with Schlumberger engineers to focus on cementing best practices and to plan a carefully engineered approach to the cementing operations. The company wanted to optimize the cementing design to achieve complete zonal isolation and eliminate the need for expensive remedial squeeze jobs. As a result of these meetings, CemCADE and WELLCLEAN II computer simulations were used to

- optimize the centralizer designs for each casing and liner, making the best use of available centralizers
- engineer the spacer and cement slurries and volumes to optimize the density and friction pressure for mud removal.

Simulator software: Job design with no surprises for the drilling team
CemCADE software improves the success rate of primary cementing jobs and reduces well expenses by

- ensuring well security
- providing efficient mud removal
- optimizing centralization
- eliminating gas migration
- giving squeeze/no squeeze check
- reducing waiting-on-cement time.

The WELLCLEAN II simulator uses computational fluid dynamics to design the process of cement placement.

Cementing
The WELLCLEAN II simulator uses computational fluid dynamics to design the process of cement placement, optimizing the operation and achieving zonal isolation.

All cement densities and volumes were agreed on and all risks of lost returns were identified ahead of time and planned for. The casing was laser tallied to provide more accurate calculations of displacements. As a result, all plugs were bumped and all other pressure indicators needed at surface occurred within calculated volumes. Because the mud system had not been used before, a surfactant package was developed for optimal mud removal and reversing the emulsion of mud chemical washes and weighted spacers. Cementing best practices were agreed on in advance. With everything in place, there were no surprises for the drilling team when the job design was applied.

**Successful primary cement job: Rig savings of USD 12 million**

As a result of careful planning with information provided by CemCADE and WELLCLEAN II software, no rig time was necessary for remediation of primary cementing job failures. Four casing shoes were successfully drilled, with an average savings of 3 days for each string. By eliminating the expense of squeeze jobs, the total rig savings was approximately USD 12 million.