CASE HISTORY

LOCATION: GULF OF MEXICO

STRESS-SHIELD™ Engineering Method

Deepwater Cementing with Returns

Customer Challenge

During deepwater cementing, lost returns commonly occur as a result of a typical narrow mud weight window. This occurrence can greatly compromise the needed zonal isolation and create a safety issue. Mud loss may even begin when casing is run into an open hole. In this case history, an operator's total mud loss in an immediately previous well was in the range of several millions of dollars.

STRESS-SHIELD Engineering Method/Solution

STRESS-SHIELD Engineering Method is a specially engineered process to strengthen the wellbore by converting mud or cement slurry to a non-fracturing fluid. This conversion is achieved by promoting the timely formation of a tight particulate seal for an incipient fracture to prevent its further growth. For robust conversion engineering at a rigsite, premium granular products, BaraShield™-663 and BaraShield™-664, are manufactured for a quantified fast fracture sealing capability at various concentrations. When a rock mechanics evaluation of a weak wellbore determines that a required level of fast sealing is needed, a minimum conversion concentration of these products in the mud or cement slurry is then predefined. At levels above this minimum concentration, the fluid can form a seal before the fracture opens too wide and become a non-fracturing fluid.

Because of frequent lost circulation during cementing in the Gulf of Mexico, STRESS-SHIELD Engineering Method was accepted by a major operator for application in a 21-in. subsalt section of a deepwater well. A volume of mud was first converted and quality controlled for the designed sealing capability with BaraShield-664. Next, before pulling out of the hole for running casing, the non-fracturing mud was pumped downhole through a complex BHA to cover the weak openhole wellbore below salt. No mud losses were observed while running casing. During cementing, another non-fracturing mud pill was pumped before the cement spacer. Once again, no mud losses or other issues were observed during cementing. The shoe was tested successfully and no squeeze was required. STRESS-SHIELD Engineering Method was also applied to the 16.5-in. hole section of the well. As a result of a misinterpreted high pore pressure value in real time, this hole section did not reach its designed total depth with a substantially greater mud weight that had consumed most of the available mud weight window. Even in such a challenging condition without increasing the concentration of BaraShield-664, no mud losses occurred while running the liner, and cementing was successfully accomplished with partial returns. Furthermore, full returns could have been achieved if a new and greater concentration of BaraShield-664 had been defined and implemented based on the changed condition.

In comparison with three previous wells drilled in the same area, this well applied with STRESS-SHIELD Engineering Method exhibited substantially reduced mud losses for these two hole sections.

Contact

For additional information about STRESS-SHIELD Engineering Method, contact Max Wang by phone at 281-450-4944 or by email at max.wang@sharp-rock.com or go to www.sharp-rock.us.

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