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CEMENT PULSATION TREATMENT IN WELLS

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ABSTRACT

Cement pulsation is a novel technology for enhancing zonal isolation by applying low frequency, hydraulic, pressure pulses to the wellhead immediately after cementing. The treatment maintains the slurry in a liquid state, which transmits hydrostatic pressure downhole, and keeps the well overbalanced thus preventing early gas flow after cementing.

The paper summarizes several stages in the development of cement pulsation technology including comparison to other methods, physical principles, process analysis, mathematical modeling, computer-aided design, laboratory testing, and field performance.

The paper supports published information on cement pulsation with data from research and field studies that was instrumental in developing the technology. Emphasis has been given to the analysis of the pulsation process, description of design model and software, and an updated account of field applications.

Described is the MS Windows software for pulsation design. Two examples demonstrate the computer-aided design. The examples show that the software could be used to find the pulse size and treatment duration for a constant-pressure treatment. Alternatively, a variable-pressure treatment with controlled treatment depth could be designed.

Data is presented from pulsation of over 80 wells in drilling areas notorious for early gas migration after cementing. Field applications of the technology in 80 wells provided significant evidence of the success of cement pulsation in preventing early gas leakage in cemented wells.

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