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应用实例

声阻抗技术在泡沫水泥固井质量评价中的应用

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摘要 分析了泡沫水泥在固井工程方面应用的特点及传统水泥胶结测井（CBL）方法检测泡沫水泥固井质量的局限性。介绍了基于超声脉冲声阻抗测井的声阻抗差分技术的原理及应用的关键点。与常规水泥相比，泡沫水泥声阻抗值较低，用CBL中的常规声幅曲线评价泡沫水泥与套管的胶结质量,可能会得出错误的解释结果。利用超声脉冲声阻抗差分逻辑可以有效地区分泡沫水泥与流体，对第1界面作出准确评价。同时使用超声脉冲和CBL测井仪可以精确地确定水泥壳的胶结情况及水泥与套管、水泥与地层的胶结质量。用实例说明了基于超声脉冲声阻抗测井的声阻抗差分技术在检测泡沫水泥固井质量的应用效果。

关键词

泡沫水泥；声阻抗；谐振窗口；声阻抗差分逻辑

Application of acoustic impedance in quality evaluation on well cementation by foamed cement

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Abstract This paper analyzed the applications of foamed cement in well cementation and the limitations of cement bond log in quality assessment of well cementation by foamed cement, as well as discussed the key points in using impedance difference technique that is based on ultrasonic impedance log. The impedance of foamed cement is lower compared to conventional cement. It may lead to wrong results to assess the coupling between foamed cement and pipe from the amplitude of CBL. Ultrasonic impedance difference logic can differentiate foamed cement from fluid and accurately evaluate the first bonding interface. Practice showed that the combination of CBL and ultrasonic impedance log provides accurate information about the cementation of cement sheath and the coupling of the cement to pipe and formation.

Key words foamed cement; acoustic impedance; resonance window; differential logic of acoustic impedance

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