Paper Number: 4464

## Numerical study on lag time correction of cuttings in Songliao Basin Drilling Project

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## **Abstract:**

In this paper, hydrodynamic of drilling fluid and cuttings in SK-2 well of Songliao Basin Drilling Project (SBDP) has been studied numerically for correcting lag time of drill cutting. Computational fluid dynamics numerical simulation with Eulerian Granular approach was applied to investigate the drill cutting transport velocity through the annulus. Firstly, two 3D-geometric models of annulus were built, one for casing section (323 mm outer and 140 mm inner diameter, 10 m long) and another for uncased section (311 mm outer and 140 mm inner diameter, 10 m long). The drill fluid characteristics, such as pump capacity, mud density and rheological properties were consistent with the parameters used in SK-2 well. Then, with considering the size and shape factor of cuttings, the cutting slip velocities were calculated. The slip velocity is the relative velocity between cuttings and drilling fluid. Finally, one can use the lag time of cutting to fix the accuracy of cutting logging. Lag time of cuttings increased as cutting size increased. For  $\phi$ 2 mm mudstone round cuttings, the slid velocities in this study range from 4.6 cm/s to 5.6 cm/s, and the lag time of cuttings should be corrected by adding 5~7%, about 10~14 minutes in 4500 m depth of SK-2 well.

## References:

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