

Actual Fracture Length Determination Using a Technique for Shale Fracturing Data Analysis in Real Time

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Abstract : The moving reference point (MRP) technique has been used in the analyses of the first three stages of two fracturing jobs. The results obtained verify the proposition that a hydraulic fracture in shale grows in spurts rather than in a continuous pattern as originally interpreted by Nolte-Smith technique. Rather than a continuous Mode I fracture that is followed by Mode II, III or IV fractures, these fracture modes could alternate throughout the pumping period. It is also shown that the Nolte-Smith time parameter plot can be very helpful in identifying the presence of natural fractures that have been intersected by the hydraulic fracture. In addition, with the aid of a fracture length-time plot generated from any fracture simulation that matches the data, the distance from the wellbore to the natural fractures, which also translates to the actual fracture length for the stage, can be determined. An algorithm for this technique is developed. This procedure was used for the first 9 minutes of the simulated frac job data. It was observed that after 7mins, the actual fracture length is about 150ft, instead of 250ft predicted by the simulator output. This difference gets larger as the analysis proceeds.

Keywords : shale, fracturing, reservoir, simulation, frac-length, moving-reference-point

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