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Modification of water injection monitoring for evaluation of hydraulic fracturing efficiency[1] TIEN N. PHAN, MORTEZA DEJAM, Department of Petroleum Engineering, University of Wyoming, 1000 E. University Avenue, Laramie, WY 82071-2000, USA, MOHAMMADREZA KAMYAB, Corva AI, LLC, 16285 Park Ten Pl, Ste 210, Houston, TX 77084, USA — Measuring hydraulic fracturing efficiency is not a trivial task in the absence of production data. The traditional diagnostic plots for Hall Integral (HI) and derivative Hall Integral (dHI) against cumulative water injection allow for interpretation of plugging and fracturing behavior in injection wells. In this study, we adapt this method by including instantaneous shut-in pressure and cumulative slurry volume to understand fracturing efficiency. Increasing fracturing efficiency occurs when dHI is decreasing relative to cumulative slurry volume. We compute the change of dHI for all stages of data. Features extracted from our diagnostic plots like intercept, slope, and integral of dHI are correlated with computed fracture volume and half-length from microseismic data obtained in one hydraulically fractured well in Midland basin. The interpretation from correlation matrix allows us to identify which features can be used as qualitative predictors of fracturing efficiency. Using full stages of data, our derived parameters provide the implication on which stages should generate greater fracture volumes along the lateral of one single horizontal well. This study can improve the decision-making process for on-site evaluation of stage design.

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