

## Liquid Unloading of Wells with Scaled Perforation via Batch Foamers

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**Abstract :** Foam assisted lift technology is proven across the industry to provide efficient deliquification in gas wells. Such deliquification is typically achieved by delivering the foamer chemical downhole via capillary strings. In highly liquid loaded wells where capillary strings are not readily available, foamer can be delivered via batch injection or bull-heading. The latter techniques differ from the former in that cap strings allow for liquid to be unloaded continuously, whereas foamer batches require that periodic batching be conducted for the liquid to be unloaded. Although batch injection allows for liquid to be unloaded in wells with suitable water to gas (WGR) ratio and condensate to gas (CGR) ratio without well intervention for capillary string installation, this technique comes with its own set of challenges - for foamer to de-liquify liquids, the chemical needs to reach perforation locations where gas bubbling is observed. In highly scaled perforation zones in certain wells, foamer delivered in batches is unable to reach the gas bubbling zone, thus achieving poor lift efficiency. This paper aims to discuss the techniques and challenges for unloading liquid via batch injection in scaled perforation wells X and Y, whose WGR is 6bbl/MMscf, whose scale build-up is observed at the bottom of perforation interval, whose water column is 400 feet, and whose 'bubbling zone' is less than 100 feet. Variables such as foamer Z dosage, batching technique, and well flow control valve opening times are manipulated during the duration of the trial to achieve maximum liquid unloading and gas rates. During the field trial, the team has found optimal values between the three aforementioned parameters for best unloading results, in which each cycle's gas and liquid rates are compared with baselines with similar flowing tubing head pressures (FTHP). It is discovered that amongst other factors, a good agitation technique is a primary determinant for efficient liquid unloading. An average increment of 2MMscf/d against an average production of 4MMscf/d at stable FTHP is recorded during the trial.

**Keywords :** foam, foamer, gas lift, liquid unloading, scale, batch injection

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