

Introduction

Most well owners, well designers, well drilling contractors and, certainly, Roscoe Moss Company share a common goal of constructing highly efficient wells that promote cost-effective, long-term service. This goal is most regularly achieved when the well is constructed with highly efficient well screens that are properly developed. However, after being put into operation some wells experience a noticeable decline in efficiency within a relatively short time. Experience has shown that often such changes occur when well screens become plugged by fine sediment or encrustations. This memorandum discusses these conditions and various methods that can be used to ameliorate their effects.

Well Efficiency

Well efficiency is defined as the ratio of actual specific capacity to the theoretical specific capacity. (Specific capacity is ratio of the production rate to the drawdown required for produce that yield.) A well that is highly efficient exhibits less drawdown and requires less energy to deliver the water to ground level, resulting in less cost to the owner. (The reader is referred to Technical Memorandum 005-1 which explains well efficiency and power costs.) However, when well screens become plugged with sediment or encrusted, the total open area of the screen is effectively reduced so that ground water is no longer available to freely enter the well. Pumping under these conditions, a well will usually exhibit greater drawdown (i.e., due to the increased head loss) and lower specific capacity.

Plugging Phenomenon

During the development phase of well construction, remnant drilling fluid and cuttings adhering to the well bore and filter pack are agitated and loosened so that they can be drawn into the well. Similarly, as development proceeds fine sediment (down to silt size) from the aquifer is also captured and pulled into the well with the net effect of enhancing the formation's permeability near the borehole wall. As a result, ground water flow from the aquifer is more easily accomplished.

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