

Introduction

Over the years, the practices of water well design and water well construction have evolved considerably from a time when cable tool drilling was the state-of-the-art approach and well designs were uncomplicated. In today's water well industry, well designers and contractors are able to take advantage of advanced technologies of drilling, construction, and materials that are presently available. They routinely combine complex drilling methods with highly durable and corrosion resistant materials to install wells in varied hydrogeologic and water quality conditions. Despite the marked advancements within the industry, however, one constant has been the fact that well owners continue to expect that their completed facilities will provide efficient, productive, and long-term service. Such expectations are both natural and reasonable. Yet, they are only achievable if after construction the well is properly developed and then later redeveloped periodically during its useful life.

At the time of construction, the key development objectives are: 1) to remove remnant drilling fluid and cuttings from the borehole wall, formation, filter pack and well screen; and 2) to create an optimum interface between the filter pack and the water-bearing formation. For filter pack wells, well development also consolidates and stabilizes the filter pack material.

Later, during its operation, it is common for a well to experience a decline in efficiency and/or production. When this happens, it should be redeveloped by mechanical and/or chemical treatment methods in order to improve its efficiency and productivity.

Whether during initial development or follow-up redevelopment, it is essential to carefully monitor the well's response over time. It is simply not enough to assume that a well can be developed (or redeveloped) within a fixed number of hours. The proper approach is to carefully monitor the well's responses in real-time and discontinue the work when the well's performance has been restored to a satisfactory level. How that monitoring can be performed is explained in this memorandum.

Development Methods

Well development (and redevelopment) methods are categorized as either mechanical methods or chemical methods. Mechanical methods include: bailing, swabbing with a surge block or dual-swab, airlift pumping, jetting, and pumping with a test pump. Generally, wells are developed initially by swabbing and bailing followed by a period of airlift pumping and/or jetting. The final stage of mechanical developing is usually pumping with a test pump.

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