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ANALYSIS OF VARIOUS WATER QUALITY ZONE TESTING METHODS - CASE STUDIES AND RESULTS

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ABSTRACT: Poor water quality in wells, whether naturally occurring or due to anthropogenic causes, is a common problem throughout New Mexico and the southwest. As easily obtainable groundwater becomes increasingly rare, municipalities and other users are often forced to seek deeper or more difficult to utilize water sources that typically exhibit poorer water quality characteristics. Infrastructure and O&M costs associated with treating poor quality water can be extremely high. These costs can be reduced by utilizing exploratory drilling and testing programs to determine water quality zonation within or between aquifer(s) and designing production wells that provide the highest quality water possible. Case studies from four municipal exploratory well drilling projects will be presented that examine four methods of testing wells to determine water quality in exploratory borings, exploratory wells, and production wells. Three of the projects were conducted in exploratory wells completed in Rio Grande Rift sediments and one was conducted in a well completed in the Yeso/San Andres Paleozoic carbonate aquifer. Constituents of concern in the case studies included nitrate and bacteria in shallow aquifers, and arsenic, fluoride, total dissolved solids, uranium/gross alpha, iron, and manganese in deeper aquifers. Exploratory drilling methods discussed include gravel envelope testing, open-hole straddle packer testing, cased-hole straddle packer testing, and down-hole sampling in a pumping production well. In each of the four case studies, utilization of an exploratory drilling and testing program resulted in improved water quality in the completed production well and significantly lower long-term treatment requirements.

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