



May 1, 2017

## **POLICY 2017-2**

### **WELLS CONSTRUCTED INTO TYPE I AQUIFERS (CONFINED) OVERLAIN BY A TYPE III AQUIFER (ALLUVIAL/COLLUVIAL)**

#### **INTRODUCTION**

The Board of Examiners of Water Well Construction and Pump Installation Contractors recently enacted a new rule, Rule 10.4.6.3, in the Well Construction Rules (Rules) (2 CCR 402-2, 9/1/2016). The rule requires wells completed in a Type II aquifer (unconfined bedrock aquifer) that penetrate through a Type III aquifer (unconsolidated aquifer) must fully isolate the entire Type III aquifer interval with grout or driven steel casing. The draft rules originally presented at the March 2017 Rulemaking Hearing required wells completed in Type I aquifers to be constructed with steel casing and grouted from the top of the production zone to the top of the well. Subsequent revisions to the draft rules, which were adopted in the final rules, allowed some Type I wells to be constructed with the minimum required surface grout and open annulus below. These revisions cause inconsistencies between Rules 10.4.5 and 10.4.6 regarding the sealing of the entire Type III interval overlying a bedrock aquifer.

#### **DISCUSSION**

Continued and accelerated development of groundwater resources of deeper confined (Type I) aquifers, and the likelihood that aquifers will increasingly be used for underground storage and recovery, require minimum construction standards that will ensure that wells are constructed to withdraw water from only the authorized zone of production and to prevent leakage to and from the surface and between aquifers through the borehole. Different ownership of waters in adjacent aquifers, the associated administration of separate water sources, and the potential for cross-contamination of adjacent aquifers through the borehole dictate that the construction of wells into and through Type I aquifers must be accomplished using appropriate materials installed according to specified procedures. Obtaining a permanent grout seal between aquifers is essential in preventing the unnecessary loss of hydrostatic pressure in a confined aquifer and is necessary for the administration of water rights from the confined aquifer. Information that would allow drillers to accurately determine the depth of confining layers is not always available or reliable, therefore the best approach to protect groundwater resources is to grout from the top of the production zone back up to the depth required by Rule 10.4.5.2. In addition, grouting through overlying aquifers and

confining layers protects the integrity of the well casing from poor water quality and corrosion.

Rule 10.4.5.1c addresses wells constructed in Type I aquifers where the borehole penetrates only one confining layer. The casing must be grouted from the base of the confining layer up to at least 60 feet above the base of the confining layer. Rule 10.4.5.1e requires at least 39 feet of grout at the top of the well.

An example helps to illustrate the inconsistency between the current rules for Type I aquifers and Type II aquifers with respect to isolating overlying unconsolidated Type III aquifer material:

The scenario is a situation where a 100 ft thick Type III aquifer overlies a 100 ft thick Type II aquifer, which in turn, overlies 40 ft clay/shale layer confining a Type I aquifer below. The production target is the Type I aquifer. Under current rules, construction of this well only requires annular grout from 0 to 39 ft below ground surface (bgs) and from 180 to 240 ft bgs. This construction leaves an open annulus from 39 ft to 180 ft bgs, which crosses the boundary between the Type III and Type II aquifers and allows groundwater from different aquifers to intermingle freely through the open annular space.

Rule 10.4.6.3 requires wells completed in a Type II aquifer (unconfined bedrock aquifer) that penetrate through a Type III aquifer (unconsolidated aquifer) must fully isolate the entire Type III aquifer interval with grout or driven steel casing. The policy instituted herein will maintain consistency between Type I and Type II aquifer wells that are overlain by Type III aquifers.

## POLICY

The Board of Examiners requires that all wells completed in Type I aquifers that penetrate through a Type III aquifer (including the unconfined aquifer of the San Luis Valley per Policy 2003-3) must fully isolate the entire Type III aquifer with grout or driven steel casing.

Dated this 1 day of May 2017



Theresa Jehn-Dellaport, Chairperson  
Board of Examiners of Water Well Construction and  
Pump Installation Contractors

