



COLORADO

Division of Water Resources

Department of Natural Resources

Board of Examiners of Water Well Construction
and Pump Installation Contractors

February 7, 2022

Bulletin 2022-A Construction of Wells in the Dakota Group Aquifer

Purpose

The purpose of this Bulletin is to:

- identify geologic units within the Dakota Group aquifer and the extent of the aquifer
- illustrate the potential difficulties in identifying the required construction practice
- provide resources to licensed well contractors

Discussion

The Dakota Group aquifer (includes Dakota, Cheyenne, and Purgatoire aquifers as used in this Bulletin) is present along the Front Range, throughout the Eastern Plains, and in various areas on the Western Slope (see SP-53 Groundwater Atlas of Colorado, [Figure 6.8-2](#)). It exists at the surface along the Front Range on the western margin of the Denver Basin and covers much of the area in southeastern Colorado south of the Arkansas River (see [ON-010-11a Regional Sedimentary Aquifers](#)). The Dakota Group aquifer is also present at depth over much of the rest of the area, which can lead to difficulties in determining the aquifer type and required construction practices. Depending on the geologic framework, the Dakota Group aquifer could be considered a Type II (unconfined bedrock), Type I (penetrating a single confining layer), or Type I (penetrating multiple confining layers). In southeastern Colorado, where it is most widely developed, the Dakota can be the shallow-most aquifer at the surface or be found below one or more aquifers; including the Greenhorn Limestone, the Codell Sandstone, and the Fort Hays Limestone, **regardless of whether or not they are fully-saturated or produce significant quantities of water to wells.**

In the event a permit application identifies the Dakota or Dakota Group (Dakota and Cheyenne Sandstones) or Dakota Group (Dakota and Cheyenne Sandstones) as the proposed aquifer, staff from the Hydrogeology Section will determine the estimated depth and thickness of the aquifer, as well as identify the aquifer type and relevant construction rules. Copies of these evaluations are added to the permit file, while the aquifer depth intervals and construction requirements are added to the permit as notes. However, most permits for Dakota wells do not get this review because the applications do not identify the target aquifer. Permit staff have only recently started adding these permit notes **even when the permit does not identify the aquifer into which the well must be completed.** We would like to bring this to the attention of the contractors to prevent any violations of the Construction Rules. Furthermore, limiting the production of a well to a single aquifer and applying the techniques required by Rules 10.4.5.1, 10.4.5.2, or 10.4.6 as appropriate are the responsibility of the licensed water well contractor. **If you know the Dakota will be the source of water for a proposed well, we encourage drillers to indicate this on the well application so that estimated depths can be added to the permit.**



Since the Well Construction Rules were adopted on September 1, 2016, the Board of Examiners has filed allegations of incorrect well construction techniques and received complaints about other improperly constructed wells. Accordingly, the Board of Examiners has recently taken a renewed interest in evaluating well construction reports to ensure overlying aquifers are appropriately identified on lithologic logs and that wells are constructed in accordance with the appropriate well construction rules. Please be aware that wells in the Dakota aquifer, particularly in Water Division 2, will be closely reviewed.

Wells constructed within the Southern High Plains Designated Groundwater Basin have different construction requirements as they are allowed to be constructed within the “single geo-hydraulic system” (which includes the alluvium, Cheyenne, Dakota, Dockum, and Ogallala aquifers) and those construction requirements are described in detail in [BOE Policy 2017-3](#).

Bulletin

It is the responsibility of the licensed well contractor (Rule 10.1.2) to familiarize themselves with all conditions that may exist at the well location; including the geology of potential aquifers, confining layers, and anticipated water quality problems. If you are contracted to complete a well in the Dakota aquifer, you are required to comply with the applicable Construction Rules, whether or not the conditions of the permit specify the Dakota aquifer (or its interval). As previously stated, wells in the Dakota aquifer could be Type II, Type I (single confining unit), or Type I (multiple confining units) in the areas identified above. As such, the licensed contractor must be aware of the aquifer type and construct the well accordingly. **The purpose of this bulletin is not to enact new Well Construction Rules but rather to reinforce existing Rules.**

Dated February 7, 2022



_____,
Christopher J. Sanchez, PG, Chairperson
Board of Examiners of Water Well Construction
and Pump Installation Contractors

Helpful references

Barkmann, P.E., Broes, L.D., Palkovic, M.J., Hopkins, J.C., Swift Bird, K., Sebol, L.A., and Fitzgerald, F.C., 2020. “ON-010 Colorado Groundwater Atlas.” Geohydrology. Colorado Geological Survey, Golden, CO. <https://coloradogeologicalsurvey.org/water/colorado-groundwater-atlas/>

Banta, E.R., 1985. The Dakota Aquifer Near Pueblo, Colorado: Faults and Flow Patterns. USGS WRI-85-4186. <https://pubs.usgs.gov/wri/1985/4186/report.pdf>

Colorado Division of Water Resources:

Dakota/Cheyenne Aquifer - Determination Tool: <https://dwr.state.co.us/Tools/DakotaLocation>
Tool Boundary: Townships 12-23 South, Ranges 41-53 West

*Note: The Dakota Group Aquifer extends from “Top of Dakota” to “Base of Cheyenne”

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Colorado Geological Survey:

Groundwater Home Page: <https://coloradogeologicalsurvey.org/water/groundwater/>

County Geologic Maps: [Chaffee County](#) [Douglas County](#) [Elbert County](#) [Mesa County](#) [Park County](#)

Robson, S.G. and Banta, E.R., 1987. Geology and Hydrology of the Deep Bedrock Aquifers in Eastern Colorado. USGS WRI-85-4240. <https://pubs.er.usgs.gov/publication/wri854240>

Romero, J.C. and VanSlyke, G.D. The Dakota and Cheyenne Aquifers in the Cheyenne Wells - Las Animas Region, Colorado. DWR WRI-94-1. [Direct Download](#)

Topper, R., K. L. Spray, W. H. Bellis, J. L. Hamilton, and P. E. Barkmann. SP-53 Ground Water Atlas of Colorado. Special Publications, SP-53. Denver, CO: Colorado Geological Survey, Division of Minerals and Geology, Department of Natural Resources, 2003.
<https://coloradogeologicalsurvey.org/publications/colorado-groundwater-atlas/>

Vinckier, T.A., 1982. Hydrogeology of the Dakota Group Aquifer with Emphasis on the Radium-226 Content of Its Contained Ground Water, Canon City Embayment, Fremont and Pueblo Counties, Colorado. Colorado Geological Survey OF-82-03.
<https://store.coloradogeologicalsurvey.org/product/hydrogeology-dakota-group-aquifer-radium-226-ground-water-canon-city-fremont-pueblo-colorado/>

1:250,000 Geologic Quad Maps

Pueblo, https://ngmdb.usgs.gov/Prodesc/proddesc_3946.htm

Trinidad, https://ngmdb.usgs.gov/Prodesc/proddesc_9346.htm

La Junta, https://ngmdb.usgs.gov/Prodesc/proddesc_9348.htm

Lamar, https://ngmdb.usgs.gov/Prodesc/proddesc_9832.htm