

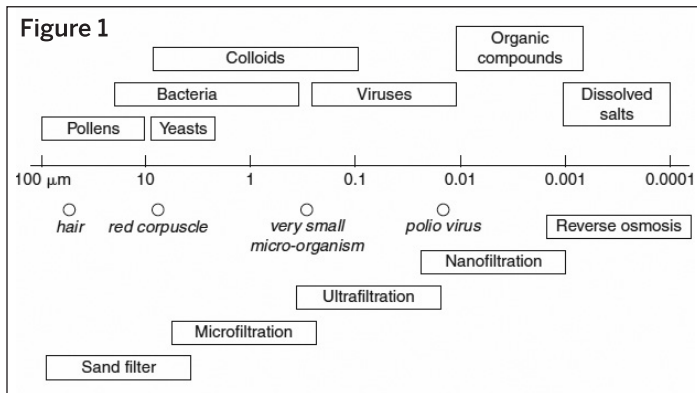


COLLOIDAL CLAY IN WELL WATER

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WHAT IS IT?

Over the years, many individuals have mentioned to me that their well water is plagued by colloidal clay. I thought it's time that I spent some time discussing this subject with you. Colloidal clay makes well water appear cloudy, even muddy in appearance. A colloid is a very small particle that does not readily settle out, and tends to stay suspended in solution. Figure 1 shows the size of colloids in relation to other microscopic particles.



WHERE IS IT FOUND?

Wells that have issues with cloudy water in New York are typically completed in bedrock. In these wells, the source of these colloid particles may be from formations such as shale that have a high amount of silt and clay. Shale-rich rocks are widespread across the Southern Tier, the Catskills, and various other regions. In some wells, the colloids are found in weathered zones in crystalline rocks such as those found in the Adirondacks. In yet other wells, the source of colloidal clay is surface water or shallow soil water which has infiltrated into the well due to poor well construction.

WELL FIXES

Upon completion of the well bore hole, the driller should develop the well to remove fine-grained particles. Development is best accomplished through surging. In surging, water is forcefully moved into and out of the well bore. If pumping alone is used to develop a well, the movement of water is only in one direction and fine particles are not as effectively removed. Well contractors should develop the well until the well water is clear. If you have a

well with colloidal clay, find out how the well was developed and for how long.

In some instances, wells never adequately clear or become cloudy at certain pumping rates. If this is the case, it is important to determine if there are particular zones in the bedrock borehole that are contributing to the turbidity. It may be possible, for instance, to do a video camera inspection of your well in order to determine if shallow water is coming into the well from where the casing is seated in the bedrock. If cloudy water is only produced at certain rates, a pumping test should be considered to try to document the presence of undeveloped zones. Perhaps the well pump is not sized properly or the pump is not correctly placed. If further well development is unsuccessful, seals can sometimes be installed to prevent the fine-grained sediment from entering the well.

WATER TREATMENT

If the water well contractor cannot correct the colloidal clay issue in the well, the only other option is treatment. In the traditional water treatment technique, the well water is coagulated with the addition of a flocculant (such as aluminum sulfate) and then filtered through a standard filter. The World Health Organization does not recommend residential flocculation and clay removal due to the equipment and training in chemical application that is necessary.

To avoid coagulation for residential or very small water systems, ultrafiltration is recommended. Ultrafiltration membrane filters remove particles down to less than 0.015 microns. Such systems not only effectively remove colloidal clay particles, but also bacteria, giardia lamblia, cryptosporidium, etc. Literature on such systems indicates a filter cartridge life of typically 12 to 18 months based upon a backwash process that is controlled by a programmable timer system.

CLOSING

I hope that this article has proven to be helpful in somewhat clarifying this cloudy issue. Unfortunately, colloidal clay is an issue that can be very difficult to predict and even harder to correct. 💧💧💧