

Recommendations for New Well Construction within The “Arsenic Advisory Area” of Northeastern Wisconsin

Shallow Aquifer Option: Attempt to complete a well within the Galena-Platteville Dolomite.

This option will avoid the arsenic-producing bedrock formations that lie below this upper aquifer. The Galena-Platteville Dolomite, also known as the Sinnipee Group, is the first bedrock layer encountered in the eastern portion of this “Advisory Area”. A well constructed under this option must only meet the minimum requirements of the State Private Well Construction Code (NR 812). The well will require 40 to 60 feet of casing depending on the depth to bedrock. This option may not be possible because this upper bedrock aquifer often does not produce enough water, even for a residential well. If this option is used and enough water is encountered, the lower open bedrock drillhole must not extend deeper than 10 feet above the base of the Galena-Platteville Dolomite.

Deeper Aquifer Option: Any bedrock well not constructed under the Shallow Aquifer Option above should be constructed with cement grouted casing extending at least 80 feet below the base of the Galena-Platteville Dolomite. If the St. Peter Sandstone extends deeper than 80 feet below the base of the Galena-Platteville Dolomite, the cement-grouted casing should be extended all the way through the St. Peter Sandstone. In many cases this Deeper Aquifer Option will necessitate cement-grouted casing extending to a depth anywhere from about 150 to 300 feet below the ground surface. The chances of a well, constructed under this option, producing water containing arsenic above the Drinking Water Standard (10 parts per billion) will be greatly reduced. Even if this goal is not achieved, the arsenic concentration of the water will likely be low enough to allow for the installation of treatment equipment that will remove arsenic efficiently and cost-effectively.

To increase the chances that a private well constructed under this option will not produce water containing high concentrations of arsenic; it should also be constructed with the following alternate construction methods and more stringent specifications for construction, grouting and disinfection:

Special Well Construction & Disinfection Specifications & Methods for the Deep Aquifer Option:

- The upper-enlarged drillhole should be constructed using rotary mud-circulation methods. Rotary-air methods may **not** be used for this purpose.
- The cement grout should be pumped into the annular space using either the 'Bradenhead' or the 'Grout Shoe' grouting method according to the requirements of the Private Well Code requirements of s. NR 812.20.
- The grout should be allowed to set for at least 72 hours before the construction of the lower bedrock drillhole is commenced.
- The lower open bedrock drillhole should be drilled using rotary-mud or “rotary-wash” drilling methods, i.e. rotary water-circulation methods or cable-tool drilling methods. Rotary-air methods should **not** be used for this purpose.
- Upon completion of the well, an approved additive-free liquid chlorine (sodium hypochlorite) product should be used to disinfect the well. Dry calcium hypochlorite products (granular or pellet type) must **not** be used. The chlorine solution should **not** have a concentration greater than 100 milligrams per liter (mg/l), and the contact time in the well should not be more than 30 minutes. After this time has elapsed, the solution should be thoroughly flushed out of the well with water, **not** with air.