Aquifer Exemption Data

EPA's interactive Aquifer Exemption map allows users to view electronically, for the first time, aquifers that EPA approved for exemption under the Safe Drinking Water Act Underground Injection Control regulations. This interactive map brings together data previously available only in paper form or at the state level. The map and accompanying data can be used by states, businesses, communities, and others to view exempted aquifers in the United States, see accompanying aquifer exemption data like depths of injection, local geology, and injected fluid characteristics, and can assist with Underground Injection Control permit applications and approvals.

Background on Aquifer Exemptions

An aquifer is an underground body of rock that provides or could provide ground water to support people's needs. EPA exempts aquifers if the aquifer does not currently serve as a source of drinking water and will not serve as a source of drinking water in the future, based on certain criteria. Aquifer exemptions allow these underground sources of water to be used by energy and mining companies for oil or mineral extraction or disposal purposes in compliance with EPA's Underground Injection Control requirements. Figure 1 shows simplified scenarios where a well owner/operator or a state might request EPA to approve an aquifer exemption.

The process begins when EPA receives information about the aquifer proposed for exemption from a state agency or well owner or operator. EPA approves the aquifer exemption request if it meets the necessary criteria. Injection of fluids can begin only after EPA approves an aquifer exemption and an Underground Injection Control permit is granted.

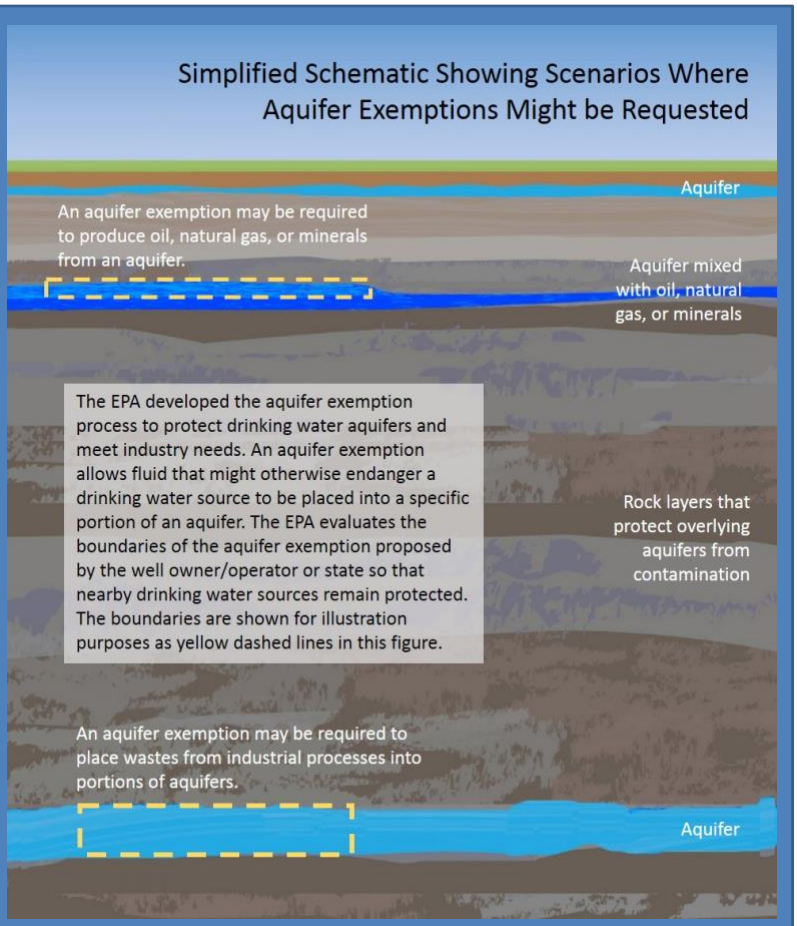

Figure 1. Simplified schematic showing scenarios where aquifer exemptions might be requested. The EPA evaluates proposed aquifer exemption boundaries where fluids may be injected while continuing to protect nearby drinking water sources. The boundaries are shown for illustration purposes as yellow dashed lines.

Summary of Data on Aquifer Exemptions in the US

There are more than 3,300 aquifer exemptions in the United States. The majority are located in Montana, Wyoming, Colorado, and Indian country, as shown in Figure 2.

California is engaged in a process to digitize existing aquifer exemption locations and is also currently reviewing numerous requests for new or expanded aquifer exemptions that they expect to submit to EPA for review. The EPA is also working closely with Texas to better understand the locations of some of their aquifer exemptions. As this work progresses, the aquifer exemptions in California and Texas will be added to the national dataset.

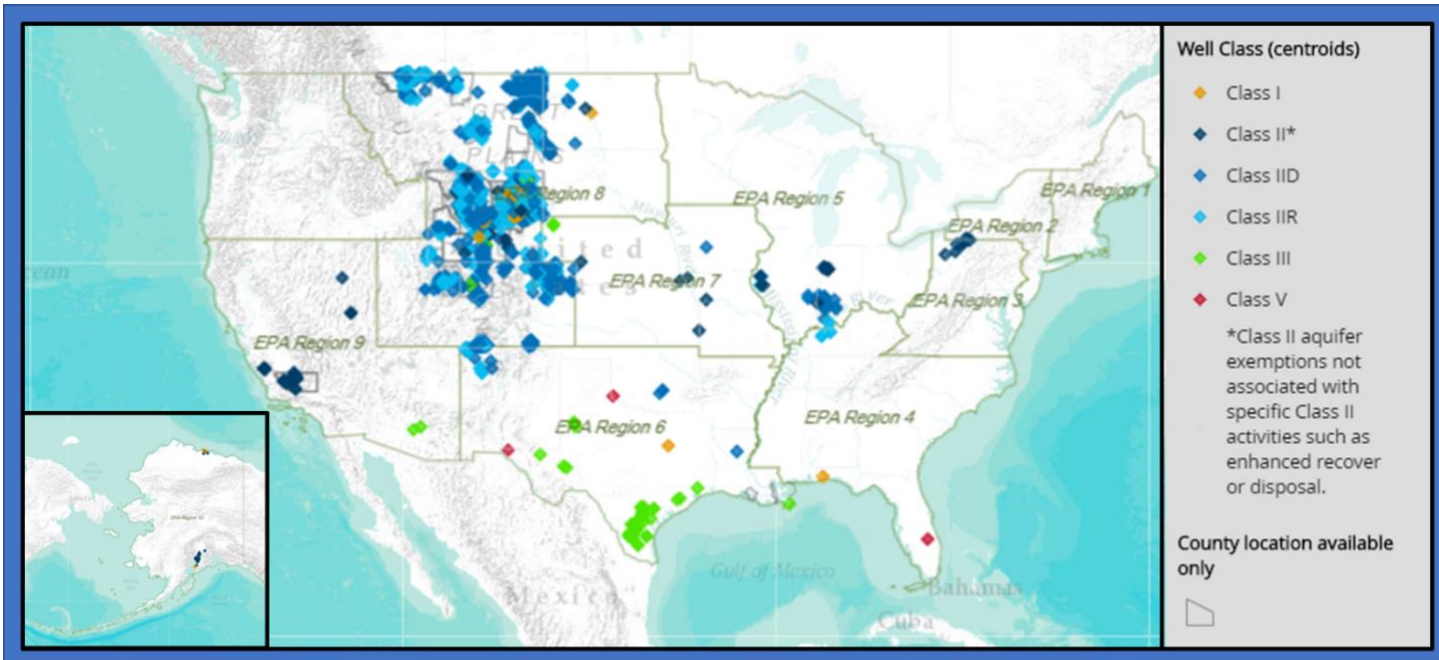

Figure 2. The EPA approved approximately 3,300 aquifer exemptions as of November 2018. The map shows a point for the center of each aquifer exemption or a county outline for those exemptions with imprecise locational information. Points are color coded by the class of injection proposed to inject into the exempted aquifer. Locations of aquifer exemptions in California and Texas will be updated as information becomes available.

Injection Activities Associated with Exempted Aquifers

Aquifer exemptions requested to date are usually associated with three of the six classes of injection wells regulated by the EPA Underground Injection Control program. About 95 percent of aquifer exemptions are associated with Class II wells for injection of fluids related to oil and gas production. Almost two-thirds of aquifer exemptions associated with Class II wells are for enhanced oil or gas recovery (Class IIR) and one-third are for disposal of wastewater (Class IID). A small percentage of the aquifer exemptions are not associated with specific Class II activities such as enhanced recovery or disposal; those aquifer exemptions are designated Class II rather than Class IID or Class IIR. About three percent of aquifer exemptions are associated with Class III wells, which assist in recovering minerals such as uranium and salts. The remainder are associated with Class I wells used to inject non-hazardous industrial wastes and other fluids.

Aquifer Exemption Depth

The shallowest depths of the exempted aquifers range from hundreds to thousands of feet below ground surface. About two percent of aquifer exemptions are 500 feet or less below the surface at the shallowest point; most are between 1,000 and 9,000 feet deep. Some are over 10,000 feet deep. In some cases, there is more than one exempted aquifer at the same location, but at different depths and in different bodies of rock.

For comparison, the depths of private drinking water wells measured across the United States ranged from six feet to 1,500 feet below ground surface with an average depth of 172 feet.[1] The depths of public drinking water well depths ranged from fifteen to 3,534 feet, with an average depth of 577 feet, below ground surface.[2]

[1]DeSimone, LA, Hamilton, PA, Gilliom, RJ. 2009. Data from *Quality of water from domestic wells in principal aquifers of the United States, 1991-2004*. US Geological Survey.
[2]Toccalino, PL, Hopple, JA. 2010. Data from *The quality of our Nation's waters—Quality of water from public-supply wells in the United States, 1993-2007*. US Geological Survey.

Aquifer Exemption Boundaries

The boundary of an aquifer exemption contains the portion of the aquifer that may be affected by the injection activity. Aquifer exemption boundaries are determined in a variety of ways. Some aquifer exemptions are defined as a radius (typically ¼ or ½ mile) around the well associated with the exemption and are circular. Others are defined by one or more grids in the Public Land Survey System and are squares or combinations of squares. Exemption boundaries can also be irregularly shaped and follow the dimensions of an aquifer, oil or gas field, or mining area. The exemption areas range in size from thousands of square feet to more than a thousand square miles. About 70% percent of exemption areas are ¼ mi radius around the injection well or smaller. Underground sources of drinking water in the surrounding area continue to be protected from endangerment under the Safe Drinking Water Act.

For More Information

For additional information on aquifer exemptions, including the requirements at 40 CFR 146.4, see https://www.epa.gov/uic/aquifer-exemptions-underground-injection-control-program.

For additional information on the UIC program, see https://www.epa.gov/uic.

To download the geospatial file and related materials, visit https://www.epa.gov/uic/aquifer-exemptions-map.

For information on specific aquifer exemptions, contact the EPA Regional Office that approved the aquifer exemption; contact information is available at https://www.epa.gov/uic.

To contact EPA with questions or comments about aquifer exemptions, please visit https://www.epa.gov/dwstandardsregulations/forms/contact-us-about-drinking-water-contaminants-standards-and-regulations.