



CLASS V UIC STUDY FACT SHEET *GEOHERMAL DIRECT HEAT RETURN FLOW WELLS*

What is a geothermal direct heat return flow well?

Geothermal direct heat return flow wells are Class V underground injection control (UIC) wells that return geothermal fluids, which have been used to heat individual homes and/or communities or to provide heat to greenhouses, aquaculture, and other commercial and industrial processes, to the subsurface.

What types of fluids are injected into geothermal direct heat return flow wells?

The temperature and chemical characteristics of geothermal fluids used for heating vary substantially from site to site. In general, the composition of the geothermal fluids normally does not change appreciably as a result of use for heating, although traces of pump lubricating oil may be added in some cases.

Do injectate constituents exceed drinking water standards at the point of injection?

While some geothermal fluids are of drinking water quality, it is more common for concentrations of some constituents to exceed drinking water standards. Available data indicate that arsenic, boron, sulfate, and fluoride exceed primary drinking water standards or health advisory levels and that total dissolved solids, chloride, iron, manganese, and sulfate exceed secondary drinking water levels.

What are the characteristics of the injection zone of a geothermal direct heat return flow wells?

When geothermal fluids used for heating are reinjected into the subsurface following use (rather than discharged to surface water or used for drinking, irrigation, or livestock watering), they typically are reinjected into the same hydrothermal formation from which they were produced.

Are there any contamination incidents associated with geothermal direct heat return flow wells?

No documented cases of underground sources of drinking water contamination by geothermal direct heat return flow wells have been reported.

Are geothermal direct heat return flow wells vulnerable to spills or illicit discharges?

Typically, geothermal direct heat return flow wells are not vulnerable to illicit discharges because the geothermal fluids are handled in closed piping systems.

How many geothermal direct heat return flow wells exist in the United States?

There are 31 documented geothermal direct heat return flow wells and another 17 wells estimated to exist nationwide.

Where are geothermal direct heat return flow wells located within the United States?

These wells exist in as many as 11 states, although more than 80 percent of the documented wells are in only five states: OR (8), NV (7), UT (4), NM (4) and ID (3). The 17 estimated wells are in OR.

How are geothermal direct heat return flow wells regulated in states with the largest number of this type of well?

Permit by rule: ID (<18 ft deep)

Individual permit: CA, NM, NV, UT, OR, ID (≥18 ft deep)

Where can I obtain additional information on geothermal direct heat return flow wells?

For general information, contact the Safe Drinking Water Hotline, toll-free 800-426-4791. The Safe Drinking Water Hotline is open Monday through Friday, excluding federal holidays, from 9:00 a.m. to 5:30 p.m. Eastern Standard Time. For technical inquiries, contact Amber Moreen, Underground Injection Control Program, Office of Ground Water and Drinking Water (mail code 4606), EPA, 401 M Street, SW, Washington, D.C., 20460. Phone: 202-260-4891. E-mail: moreen.amber@epa.gov. The complete Class V UIC Study (EPA/816-R-99-014, September 1999), which includes a volume addressing geothermal direct heat return flow wells (Volume 18), can be found at <http://www.epa.gov/OGWDW/uic/cl5study.html>.