

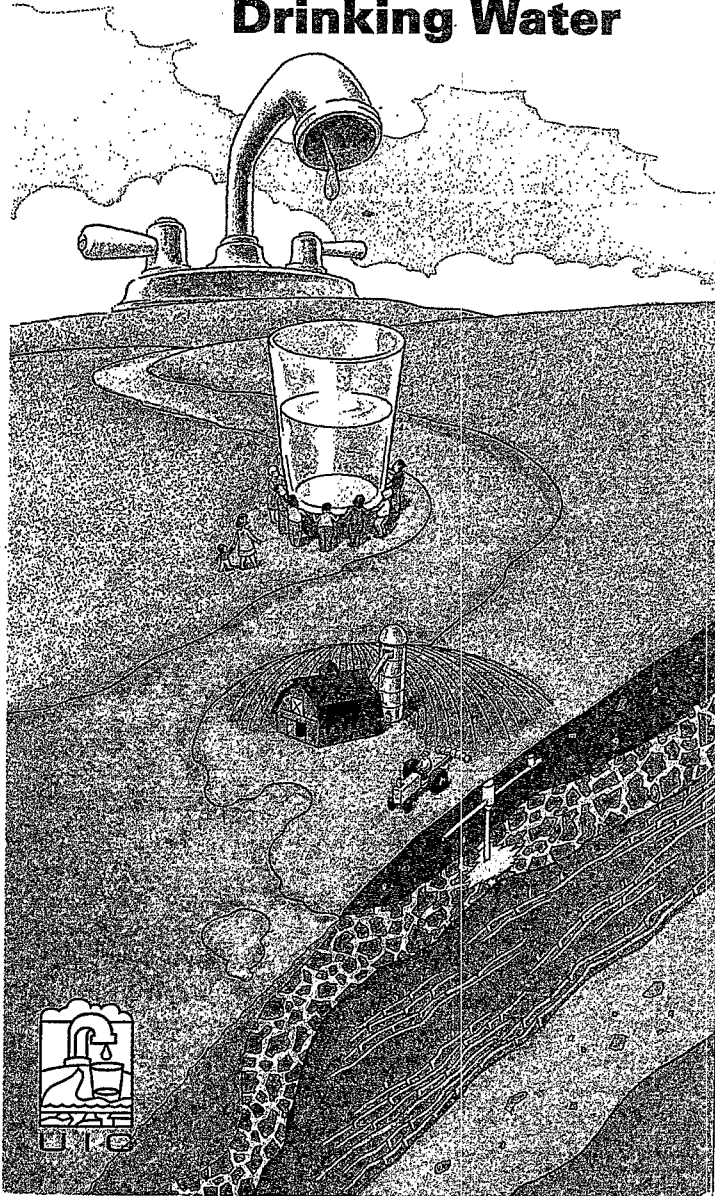
United States  
Environmental Protection  
Agency

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Office of Water (4602)



# Underground Injection Wells and Your Drinking Water

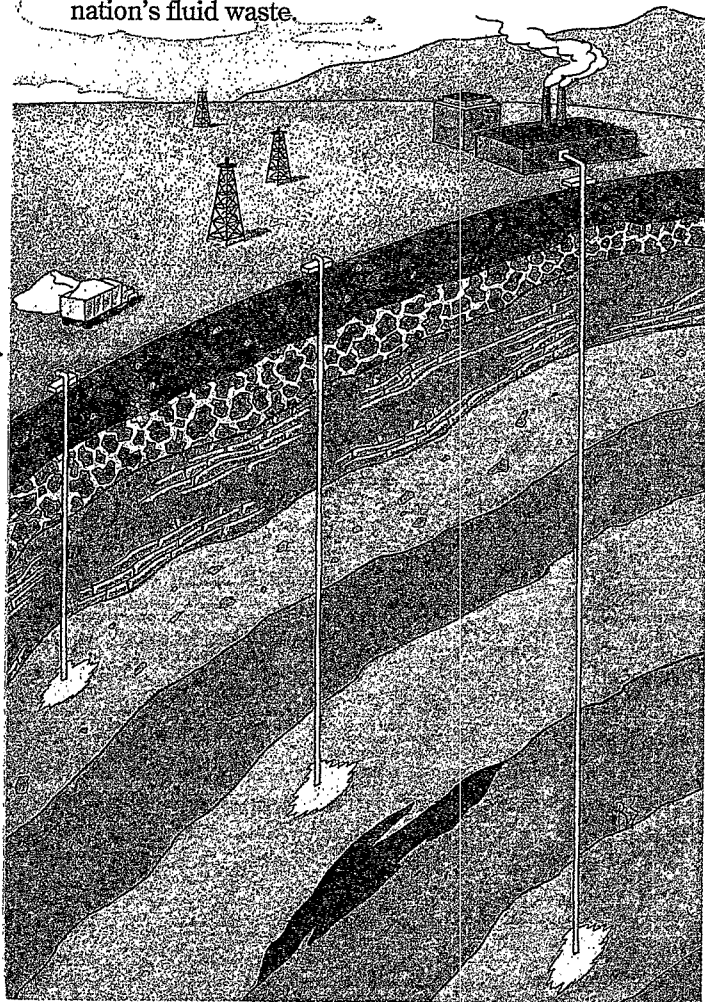


United States  
Environmental Protection Agency  
(4602)  
Washington, DC 20460

Official Business  
Penalty for Private Use  
\$300

**M**ore than 89 percent of U.S. public water supply systems draw some or all of their drinking water from sources found underground in rock, sand, and gravel. Ground water also feeds rivers, lakes, and streams used for drinking water. Ground water has no respect for state boundaries. It continually moves, sometimes recharging surface waters hundreds of miles away from where it started.

Most ground water used for drinking is located near the earth's surface and is easily contaminated. Of major concern is the potential contamination of underground sources of drinking water (USDW) by any of the hundreds of thousands of injection wells nationwide. Injection wells dispose of approximately 11 percent of the nation's fluid waste.



The U.S. Environmental Protection Agency (EPA) is working in partnership with state and local governments to prevent injection wells from contaminating your drinking water resources. You can help by learning about EPA's Underground Injection Control (UIC) program so that you can identify injection wells in your community that may contaminate your drinking water.

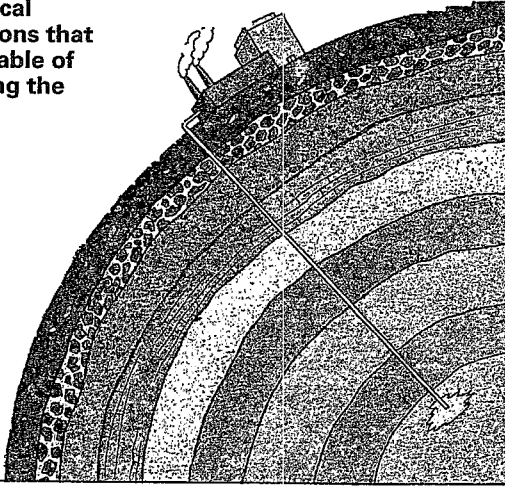
## What is An Underground Injection Well?

Basically, injection wells are man-made or improved "holes" in the ground, which are deeper than their widest surface dimension and are used to discharge or dispose of fluids underground. When properly sited, constructed, and operated, injection wells can be an effective and environmentally safe means of fluid waste disposal. There are many different types of injection wells, but they are all similar in their basic function. The Federal UIC program has grouped injection wells into five categories:

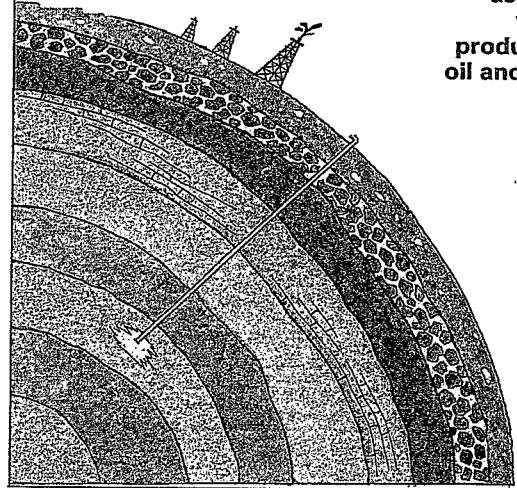
**Class I wells** are technologically sophisticated wells that inject large volumes of hazardous and non-hazardous wastes into deep, isolated rock formations that are separated from the lowermost USDW by many layers of impermeable clay and rock. Although most hazardous waste fluids are treated and released to surface waters, Class I wells account for 89 percent of the hazardous waste fluids disposed of on land. Still, Class I wells inject mostly non-hazardous waste. For example, while all of U.S. industry together injects approximately nine billion gallons of hazardous waste each year, one state alone injects 55 times that amount in non-hazardous wastes. Class I wells comprise less than one percent of all injection wells in the country.

# Injection Well Relationship to USDWs

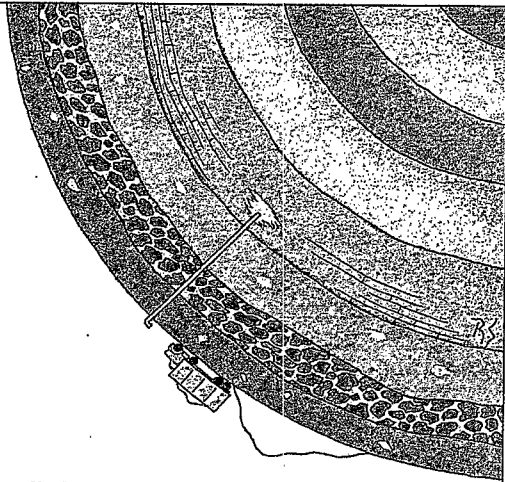
**Class I wells**  
inject hazardous  
or non-hazardous  
wastes into  
geological  
formations that  
are capable of  
confining the  
fluids



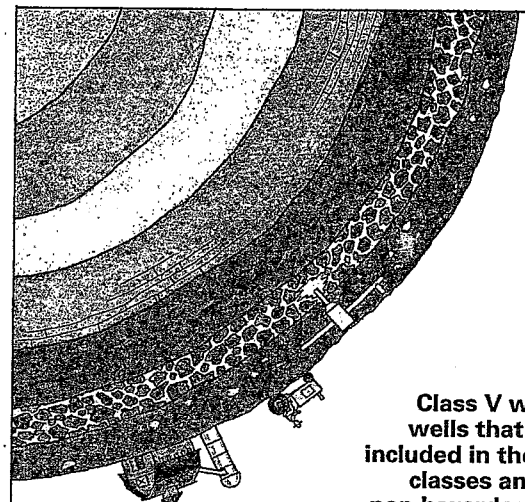
**Class II wells**  
inject waste  
fluids  
associated  
with the  
production of  
oil and natural  
gas



**Class III wells** inject fluids  
to extract minerals from  
underground



**Class V wells** are  
wells that are not  
included in the above  
classes and inject  
non-hazardous fluids  
into or above an  
underground source  
of drinking water



**Class II wells** inject fluids associated with oil and natural gas production. Most of the injected fluid is brine that is produced when oil and gas are extracted from the earth (about 10 barrels of brine for every barrel of oil). The brine is reinjected to increase production, or for disposal. Some Class II wells are used to store hydrocarbon products. Class II wells inject 300 billion gallons of fluid each year. They comprise 41 percent of U.S. injection wells.

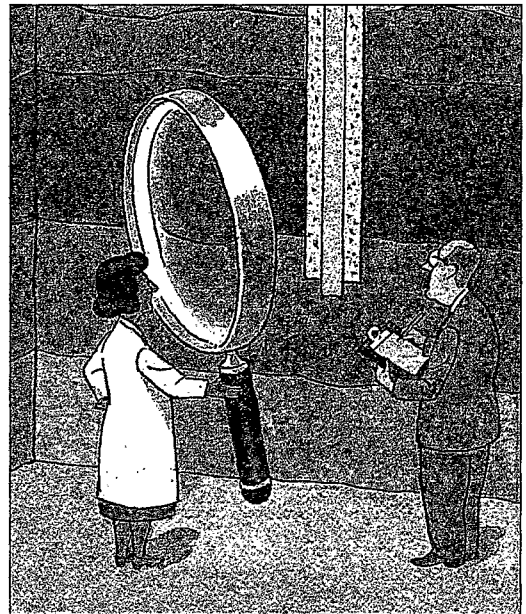
**Class III wells** inject super-hot steam or water into mineral formations, which dissolves or loosens minerals, which are then pumped to the surface and extracted. Generally, the fluid is treated and reinjected into the same formation. More than 50 percent of the salt and 80 percent of the uranium extracted in the U.S. is produced this way. Class III wells comprise eight percent of injection wells in the U.S.

**Class IV wells** inject hazardous or radioactive wastes into or above USDWs. These wells are banned under the UIC program because they directly threaten the quality of underground sources of drinking water.

**Class V wells** employ injection practices which are not included in the other classes. Some Class V wells are technologically advanced wastewater disposal systems used by industry, but most are "low-tech" holes in the ground. Generally, they are shallow and rely on gravity to drain or "inject" liquid waste into the ground. Examples of Class V wells include dry wells that collect surface water runoff and industrial, commercial, and utility disposal wells. In general, Class V waste disposal wells are located in rural and/or unsewered areas where people depend on ground water for their drinking water. Their simple construction provides little or no protection against possible ground water contamination, so it is important to control what goes into them. Class V wells comprise 50 percent of the injection wells in the U.S.

## How Does the UIC Program Protect Your Drinking Water?

Injection wells may threaten ground water resources if the injection fluids do not stay within the well and the intended injection zone. EPA tries to mitigate the risks associated with underground injection by establishing effective regulatory programs. For Classes I, II, and III wells, the regulatory program consists of ensuring that the wells



are properly sited, constructed, and operated to prevent ground water contamination. Because Class V wells generally are simply constructed and inject above or directly into USDWs, EPA must control the types of wastes operators are allowed to inject. For example, injection of industrial process waste into shallow Class V wells can contaminate your drinking water.

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**Under the UIC Program, EPA and  
the states regulate more than  
400,000 injection wells.**

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The UIC program applies to injection well owners and operators on Federal facilities, Indian Lands, and on all U.S. land and territories. Most states, working in partnership with EPA, administer their own UIC programs. If a state cannot administer the program, or chooses not to do so, EPA administers the program directly. The UIC program encourages voluntary compliance through education and technical assistance, but penalizes owners and operators of injection wells who violate UIC requirements.

### **How Can You Help?**

Federal and state UIC programs help protect drinking water resources, but must have local support. Local governments and citizens themselves often are in the best position (and have the greatest incentive) to ensure that injection wells do not endanger USDWs, public health, and the environment. To find out more about the UIC program and what you can do to protect your drinking water, contact your EPA Regional Office.



For information contact:

#### **Region 1**

Ground Water Management Section  
John F. Kennedy Federal Building  
One Congress Street  
Boston, MA 02203 (617)565-3615

#### **Region 2**

Underground Injection Control Section  
26 Federal Plaza, Room 853  
New York, NY 10278 (212)264-1547

#### **Region 3**

Underground Injection Control Section  
841 Chestnut Building (3WM43)  
Philadelphia, PA 1910 (215)597-9928

#### **Region 4**

Underground Injection Control Section  
(GWP-3)  
345 Courtland Street N.E.  
Atlanta, GA 30365 (404)347-3379

#### **Region 5**

Underground Injection Control Section  
(WD-17J)  
77 W. Jackson Street  
Chicago, IL 60604 (312)886-1492

#### **Region 6**

Underground Injection Control Program  
(6W-SE)  
1445 Ross Avenue  
Dallas, TX 75202-2733 (214)655-7160 or  
(214)655-7165

#### **Region 7**

Underground Injection Control Section  
726 Minnesota Avenue  
Kansas City, KS 66101 (913)551-7369

#### **Region 8**

UIC Program/Enforcement Section  
(8WM-DW)  
999 18th Street - Suite 500  
Denver, CO 80202-2466 (303)293-1413

#### **Region 9**

Source Water Protection Section (W-6-2)  
75 Hawthorne Street  
San Francisco, CA 94105 (415)744-1838

#### **Region 10**

Ground Water Section (WD-133)  
1200 Sixth Avenue  
Seattle, WA 98101 (206)553-1369

