Ground Water & Underground Injection Control

Key Message

The success of the deep well Underground Injection Control (UIC) program in isolating massive volumes of pollutants from underground sources of drinking water and other parts of the ecosystem has led some national policy makers to assume that no additional funding is needed, even though new challenges and responsibilities continue to be added to the program.

The two most serious challenges and responsibilities confronting the UIC program today are:

- Some types of shallow injection wells, such as motor vehicle waste disposal wells, large-capacity cesspools, stormwater drainage wells, and some types of septic wells, continue to be among the most neglected sources of ground water contamination in the country.
- Technologies necessary for the management of residuals from water treatment and for the geosequestration of carbon dioxide (CO_2) will require very large numbers of new injection wells, far exceeding present program resource capabilities.

Without additional funding, federal and state UIC programs will not be able to eliminate the harmful impacts of high-risk types of shallow injection wells, nor maximize the benefits of safe underground injection to enable new technologies for providing safe drinking water and environmental protection.

why the UIC program matters to ground water…

Underground injection refers to the placement of fluids into the subsurface through a well bore. The federal UIC Program, designed to prevent contamination of underground sources of drinking water (USDWs), covers wells used to inject a wide range of fluids, including oilfield brines; industrial, manufacturing, pharmaceutical, and municipal wastes; and water for solution mining. A "mature" regulatory" program suggests that the major processes are working smoothly, the principal issues are well understood, and significant problems encountered have been solved. While this is the case for Class I, II, III, and IV UIC well types, the Class V part of the UIC program has not kept pace with the rest of the program.

Photo: Lindsay Taliaferro, Ohio EPA.

The threat to Underground Sources of Drinking Water (USDWs) posed by Class V wells is inherent in their general shallowness and the fact that they are often located over aquifers. Contamination incidents tend to be associated with the most prevalent of the high-risk types of Class V wells.

Ground Water and *Underground Injection Control*

Treated municipal wastewater is pumped more than 3,000 feet deep underground through a Class I injection well in South Florida.

Recommended Actions

To Congress:

- Increase annual funding for the national UIC program to at least $56 million to allow for more reasonable regulation of current UIC facilities, and provide additional funding for new injection streams that require safe management.

To USEPA:

- Revise the current injection well classification scheme to make it more consistent with current and future program needs and to provide greater flexibility for cost-efficient regulation of new injection streams.

Class I

Isolating hazardous, industrial, and municipal waste through deep injection.

U.S. facilities produce billions of gallons of hazardous, industrial and municipal waste every year. Some of the waste is injected deep below any drinking water source, protecting the public.

In the 30 years of the SDWA, Class I wells have isolated more than ***4 trillion gallons of waste fluid***—the amount of water that flows down the Mississippi River into the Gulf of Mexico every 17 days.

Class II

Preserving drinking water resources by injecting oil and gas production waste.

Each barrel of oil produced in the U.S. includes an average of about 10 barrels of produced water (brine). Most brine, about 24 billion barrels annually, is injected into oil and gas bearing formations to increase production. This practice preserves streams and rivers and protects USDWs.

In the 30 years of the SDWA, Class II wells have injected nearly ***720 billion barrels of brine***—enough barrels to stretch from Earth to Mars about 10 times.

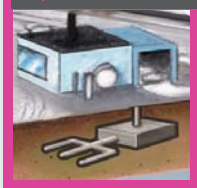
Class III

Minimizing environmental impacts from solution mining operations.

Solution mining operations produce 50% of the salt used in the U.S., as well as uranium, copper, and sulfur. These injection wells provide needed minerals while limiting the impact on the environment.

In the 30 years of the SDWA, Class II wells have safely mined ***330 million tons of salt***, or enough salt to fill a salt shaker 7 times higher than the Statue of Liberty.

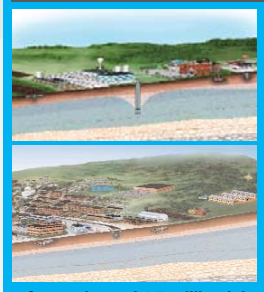
Class IV



Preventing ground water contamination by prohibiting the shallow injection of hazardous waste (except as part of an authorized cleanup).

Shallow injection wells used by large and small businesses to dispose of radioactive waste threaten drinking water resources. About 50% of Americans rely on ground water for drinking water, and the need for safe, reliable sources in the future is increasing. Therefore, Class IV injection is prohibited outside approved remediation programs.

Class V



Managing the injection of all other fluids to prevent contamination of drinking water resources.

More than 600,000 shallow injection wells are used for disposal, ground water storage, and prevention of salt-water intrusion. When properly managed, these wells offer communities an option for wastewater disposal.

In the 30 years of the SDWA, the Class V Program has ***identified and managed more than 300,000 of an estimated 1.5 million injection wells.*** The challenge for the future is to identify the remaining wells and work with their owners to keep injection safe.

TOTAL INJECTION WELL NUMBERS (approximate)

- *Class I: 488 wells (121 hazardous, 255 nonhazardous, 112 municipal)*
  [Texas World Operations, Class I Inventory of the U.S., September 2006]
- *Class II: ~167,000 wells* [www.epa.gov]
- *Class III: ~20,000 wells*
  [Subsurface Technology, Inc. Class III Well Inventory, January 2004]
- *Class IV: Banned for other than EPA-approved remediation purposes*
- *Class V: ~1.5 million wells (projected inventory)*
  [GWPC Class V Inventory, The Cadmus Group, 2004]

• Underground injection is used to isolate more than 50% of the liquid hazardous waste and a large percentage of the nonhazardous industrial liquid waste generated in the United States. As the UIC program transitions from its origin in the early 1980s, it is experiencing significant new changes that are creating the kinds of problems that might be described as regulatory growing pains, symptomatic of fast or uneven growth that outstrips supporting resources.

This summary sheet is taken from the "Underground Injection Control" chapter of the Ground Water Protection Council's (GWPC) *Ground Water Report to the Nation: A Call to Action*. Contact GWPC for the full report.

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