



CLASS V UIC STUDY FACT SHEET *IN-SITU FOSSIL FUEL RECOVERY WELLS*

What is an in-situ fossil fuel recovery well?

In-situ fossil fuel recovery wells are used to facilitate in-situ conversion of a hydrocarbon resource into a gaseous or liquid form that can be extracted through production wells. Specifically, in-situ fossil fuel recovery wells are used to initiate and then to maintain and control combustion through injection of gases or ignition agents. There are three types of processes that may use in-situ fossil fuel recovery wells: in-situ combustion of tar sand deposits, underground coal gasification, and in-situ oil shale retorting. In-situ combustion of tar sand deposits has not been employed in the United States.

What types of fluids are injected into in-situ fossil fuel recovery wells?

The injectate may include air, oxygen, steam, carbon dioxide, or ignition agents.

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

Most of the injected materials are gases that are not likely to show exceedances of drinking water standards or health advisory levels. When ignition agents such as ammonium nitrate are injected, exceedances of drinking water standards and health advisory levels would be expected, but has not been documented.

What are the characteristics of the injection zone of an in-situ fossil fuel recovery well?

In-situ fossil fuel recovery wells inject into a hydrocarbon-containing unit, which is often a steeply inclined coal seam or oil shale deposit that is not practical to mine with conventional methods. Although injected gases generally do not introduce contaminants into the subsurface, injection may alter the characteristics of an underground source of drinking water (USDW), if the gases are allowed to contact a USDW, by changing the USDW's temperature or increasing the level of gas saturation.

Are there any contamination incidents associated with in-situ fossil fuel recovery wells?

Contamination of ground water resulting from in-situ fossil fuel recovery operations is well documented, to the extent that most, if not all, in-situ fossil fuel recovery operations initiated in the last 20 years appear to have caused some ground water contamination. The ground water is not contaminated with the injected materials, however. Rather, it is contaminated with combustion byproducts, such as benzene. At some sites, water containing benzene and other combustion byproducts, such as phenols, has migrated via fractures or other means from the reaction zone into nearby ground water.

Are in-situ fossil fuel recovery wells vulnerable to spills or illicit discharges?

Overall, in-situ fossil fuel recovery wells are not likely to receive spills or illicit discharges. The observed contamination problems are associated with in-situ fossil fuel recovery operations, rather than rare spills or accidents.

How many in-situ fossil fuel recovery wells exist in the United States?

There are no known active in-situ fossil fuel recovery wells in the United States.

Where are in-situ fossil fuel recovery wells located within the United States?

As stated above, there are no active in-situ fossil fuel recovery wells in the United States. In the past, such wells have operated primarily in WY and CO.

How are in-situ fossil fuel recovery wells regulated in states with the largest number of this type of well?

Individual permit: WY, CO

Where can I obtain additional information on in-situ fossil fuel recovery 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 in-situ fossil fuel recovery wells (Volume 13), can be found at <http://www.epa.gov/OGWDW/uic/cl5study.html>.