

DEP Fact Sheet

COMMONWEALTH OF PENNSYLVANIA • DEPARTMENT OF ENVIRONMENTAL PROTECTION
OIL AND GAS MANAGEMENT PROGRAM

INJECTION WELLS FOR DISPOSAL AND ENHANCED RECOVERY

Enhanced Recovery Injection Wells

Two types of injection wells are used in oil and gas operations in Pennsylvania. Each type is used for a particular purpose.

The first and most common is an injection well used to enhance production or stimulate production from other wells. An enhanced recovery injection well may be a formerly productive well whose production has decreased over time or a well specifically drilled as an injection well. This type of injection well is used to inject fluid into the oil producing rock displacing oil towards a second well where the oil is extracted. When the fluid injected into the well is water, the practice is commonly referred to as "water flooding."

In Pennsylvania water flooding is thought to have first occurred by accident in the late 1870s. Fresh water entered an oil producing sand on the Columbia Oil Company property along Oil Creek in Venango County as a result of pulling pipe during well abandonment or deterioration of the seed bags placed around the tubing to keep fresh water from entering the oil sand. The flooding of the oil sand was first noticed on adjoining lands when wells there increased in oil production. By the early 1890s some intentional water flooding was occurring in the Bradford Oil Field.

Because Pennsylvania law at that time required plugging of abandoned and dry holes to prevent water from entering the oil and gas sands, the flooding was done secretly. In 1921, a special act was passed legalizing the flooding practice in the Bradford Oil Field and certain other specifically named sands. The act was amended in 1923 and again in 1929 to add other sands to the list. Over the years several thousand enhanced recovery injection wells have been drilled in Pennsylvania. Only a few hundred now remain.

Disposal Injection Wells

The second type of injection well is for disposal of fluids produced along with oil or gas. These fluids may be nearly freshwater or water high in chloride called "brine." This water, or brine, is produced with oil and gas and is pumped back into the ground into rocks that can contain

these fluids. There is no discharge onto the land surface or into nearby surface waterways. Care also is taken to ensure that underground sources of drinking water are not affected when these fluids are pumped back into the ground.

Several successful disposal wells are operating in Pennsylvania. The history of underground disposal shows that it is a practical, safe and effective method for disposing of fluids from oil and gas production. Industry organizations like the American Petroleum Institute, interstate organizations like the Interstate Oil and Gas Compact Commission and state agencies such as the Pennsylvania Department of Environmental Protection (DEP) prefer injection wells to other means of wastewater disposal because the wastewater is returned to where it originated, thus eliminating the need to find an alternate disposal location.

The best locations for developing successful disposal wells are depleted oil or gas fields that have sufficient permeability to accept large volumes of water or brine. However, unplugged abandoned wells in the proximity of the disposal well location must first be located and plugged. In addition, many of these depleted fields have been converted into natural gas storage reservoirs.

Two permits are needed for an injection well: a well permit from DEP and an Underground Injection Control (UIC) permit from the U.S. Environmental Protection Agency. Information on obtaining these two permits is contained in Chapter VIII of the "Oil and Gas Wastewater Permitting Manual" and in Section 78.18 of the rules and regulations.

Prior to preparation and submission of an injection well application, the applicant should arrange a preliminary technical conference with the oil and gas staff at the appropriate DEP regional office. Federal requirements for injection wells can be obtained from the U.S. Environmental Protection Agency, Region III, Safe Drinking Water Branch, 841 Chestnut Building, Philadelphia, PA 19107, or by calling 215-566-5445.

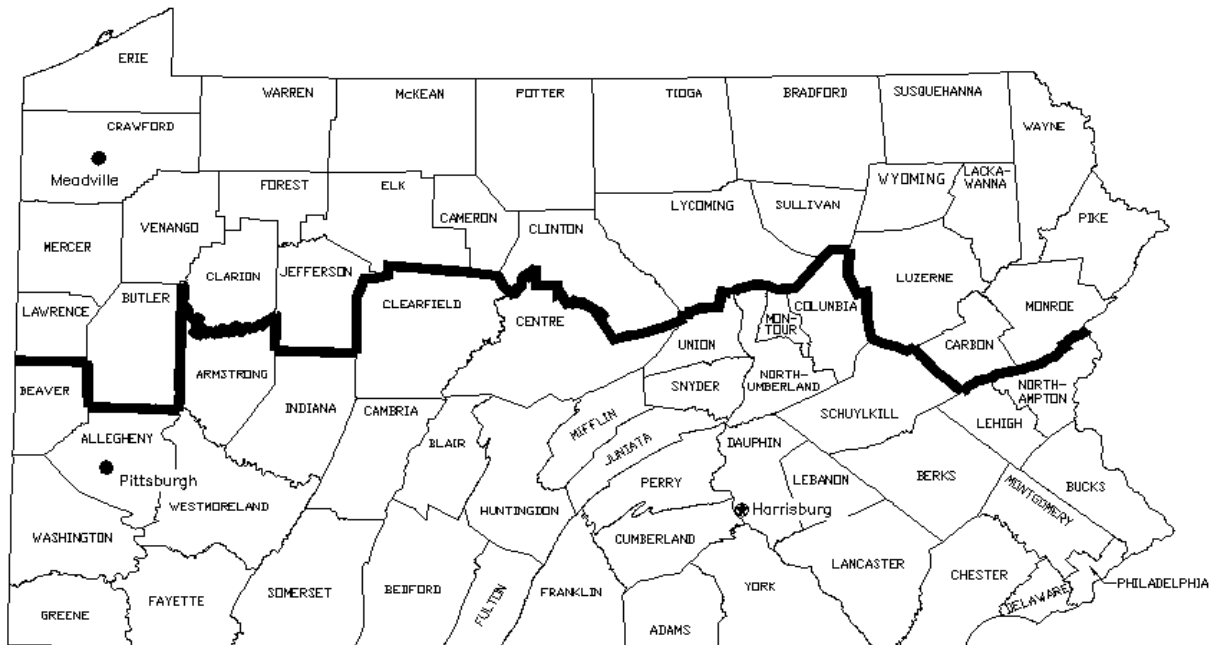
More information on injection wells is available from the DEP offices listed below.

PA Department of Environmental Protection
Bureau of Oil and Gas Management
P.O. Box 8765
Harrisburg, PA 17105-8765
Phone: (717) 772-2199
FAX: (717) 772-2291

PA Department of Environmental Protection
Oil and Gas Regional Manager
Southwest Regional Office
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Phone: (412) 442-4024
FAX: (412) 442-4328

PA Department of Environmental Protection
Oil and Gas Regional Manager
Northwest Regional Office
230 Chestnut Street
Meadville, PA 16335
Phone: (814) 332-6860
FAX: (814) 332-6121

**PENNSYLVANIA DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF OIL AND GAS MANAGEMENT**



● REGIONAL OFFICES

This fact sheet and related environmental information are available electronically via Internet. For more information, visit us through the Pennsylvania homepage at www.state.pa.us or visit DEP directly at <http://www.dep.state.pa.us> (choose Subject/Oil and Gas Management).