

Oil and Gas Well Drilling and Production in Pennsylvania

Pennsylvania has the proud heritage of being the first place in the world where a commercially successful well was drilled for oil production. Edwin Drake drilled the first well in 1859 in Venango County, near Titusville. Paraffin-based “Pennsylvania Grade” crude oil is renowned for its lubricating qualities. More than 350,000 oil and gas wells have been drilled in Pennsylvania since that time.

In Drake’s time, the main use for oil was to make kerosene for lamps and stoves. Now petroleum and natural gas fuel our modern world—providing transportation, heating, electricity, and petrochemicals for manufacturing. Natural gas is used mainly for heating buildings and producing electricity at power plants, but it also fuels some vehicle fleets.

In the late 1800s, Pennsylvania was the leading producer of oil in the United States. Now, oil production is a trickle compared to the rest of the nation. Pennsylvania remains a significant producer of natural gas in the northeastern United States and became a net exporter of gas in 2011.

In 2011, Pennsylvania produced about 2.7 million barrels of crude oil (1 barrel = 42 gallons) and 1.3 trillion cubic feet of natural gas. In 2012, the state produced more than 2 trillion cubic feet of natural gas. Most oil wells in the state produce only a few barrels of oil per week and average conventional gas well production is less than 13 Mcf (thousand cubic feet) of natural gas per day (that’s about enough gas to fuel one all-gas household for a month). Though production per well isn’t much, nationwide these stripper wells are an important part of our domestic energy supply because there are hundreds of thousands of stripper wells producing oil and gas in the United States. The development of unconventional gas wells has dramatically increased the state’s total production. Production reported from Marcellus Shale wells averages over 2,000 Mcf per day.

Oil and gas fields in Pennsylvania typically lie to the west and north of the Allegheny Front - that is, west and north of a line from Somerset County in the southwest to Bradford County in the north central part of the state. Recent interest in Marcellus Shale extends to the eastern border of the commonwealth as well. (See the Marcellus Shale map on the Oil and Gas Marcellus Web page.) Oil fields are generally limited to a swath from Washington and Beaver Counties on the Ohio border to Warren and McKean Counties on the New York border ([see DCNR Map 10](#)).

REGULATION

With passage of [The Oil and Gas Act](#) in 1984 (*58 P.S. §601.101 et seq.*), Pennsylvania modernized environmental controls and resource management for development of crude oil and natural gas. Like previous laws, this Act required that all new wells be permitted by the commonwealth before drilling. In addition, it required registration of any existing well not previously permitted and established bonding requirements for wells. The Department of Environmental Protection’s (DEP) Office of Oil and Gas Management develops and enforces regulations for the bonding, permitting, and identification of wells; environmental requirements for drilling operations, waste disposal, cementing and casing of wells; and proper plugging of wells upon abandonment. The commonwealth does not get involved in the regulation of production or wellhead sales and does not tax production or the value of oil and gas properties. Some county governments assess taxes on (projected revenues from) oil and gas property. In 2012, a new oil and gas act passed which updated the 1984 Act and addressed the development of unconventional gas resources in the state. The Act imposed an Impact Fee to be paid by operators for their unconventional gas wells and provides additional protections of private water supplies. The Impact Fee is collected and distributed by the Pennsylvania Public Utility Commission. More information on the Impact Fee can be found on the Commission’s Act 13 website.

PERMITTING

To drill a new oil or gas well in Pennsylvania, the operator must post a bond and get a well permit from DEP. In the permit application, the applicant must show the location, proximity to coal seams, distances from surface waters and water supplies. Technical staff in DEP’s regional offices review the permit application to determine whether the proposed well would cause environmental impacts or conflict with coal mine operations or well spacing requirements.

An oil and gas operator who plans to drill a group of wells that will disturb five or more acres over the life of the project must apply to DEP for a separate permit for storm water management. This “disturbed area” includes well sites and associated roads, pipelines, and storage areas to be constructed.

The affected surface landowner and coal deep-mine operator have the opportunity to file an objection about the location of the well. If DEP’s permitting staff find that no adverse impacts would result, the operator will receive a permit to drill the well.

OIL AND GAS WELL BONDS

Wells drilled in Pennsylvania after April 17, 1985, must be bonded. The bond is a financial incentive to ensure that the operator will adequately perform the drilling operations, address any water supply problems the drilling activity may cause, reclaim the well site, and properly plug the well upon abandonment. The bond amount for a single well is \$2,500; a blanket bond to cover any number of wells is \$25,000. For unconventional wells, bond is determined by the number of wells the operator has; and, ranges from \$10,000 per well up to a blanket bond covering all wells of \$600,000.

MONITORING

DEP Field Operations staff inspect well sites to ensure that the operator sites and drills the well according to the permit and applicable laws. DEP staff also investigate complaints where an oil or gas well or drilling activity may be causing environmental or public safety concerns, especially when contamination of a drinking water supply is suspected.

DEP inspects well sites from construction to reclamation to ensure that the site has proper erosion controls in place, and that any waste generated in drilling and completing the well was properly handled and disposed of. Also, well operators are required to submit a variety of reports regarding well drilling, completion, production, waste disposal, and well plugging. When called for, DEP employs aggressive enforcement against well operators to ensure that facilities are brought into compliance.

COMPLIANCE ASSISTANCE

In addition to permitting and enforcement, DEP's Oil and Gas Management Program staff works to instruct and advise well drillers and operators on best management practices and procedures for environmental controls and waste management. Compliance assistance helps to prevent future incidents of environmental damage. DEP's Oil and Gas staff hold workshops for industry and will meet with applicants as needed to address environmental matters before well site construction begins.

OTHER ENVIRONMENTAL CONCERNS

Brine is the general term used for wastewater produced along with oil or gas; it can be very salty and therefore injurious to plants and aquatic life. Because of the small volumes of oil or gas from most wells and the sometimes large volumes of brine produced, the costs of proper waste handling and disposal can be the biggest factor in the cost of production. Finding low-cost methods of waste management is very important to the economics of oil and gas production in Pennsylvania, particularly for oil production. DEP's Bureau of Oil and Gas Planning and Program Management is working with the oil and gas industry and federal agencies to research effective, economical means for disposal of wastes resulting from drilling and production.

In recent years, DEP conducted research funded by the U.S. Environmental Protection Agency (EPA) to find effective methods of reclaiming unlined pits that were used to contain brine from oil wells, a historically common practice. Another project researched the environmental impacts of spreading gas well brine on dirt roads for dust suppression. This is a current common practice of reusing the brine in a beneficial way instead of disposal in a deep well or treatment plant. Evaluation of other waste management methods is ongoing - for example, using gas well brine to pre-wet road salt for de-icing. DEP also recently revised a general permit to provide regulatory clarity for treatment plants that do not discharge to waterways. Since then, the number of these facilities and their treatment capacities continue to increase, and recycling of brine has never been higher.

In the years before the need for well plugging was realized (or laws enforced) many oil and gas wells were abandoned without being properly plugged. This problem is especially acute in Pennsylvania because of the history of oil and gas production leaving thousands of abandoned wells, some dating from the 1800s. For most of the long abandoned wells, the responsible parties are also long gone. These wells are called orphan wells. Now, with funds derived from permit application fees and Pennsylvania's Growing Greener program, every year DEP plugs hundreds of abandoned or orphan wells that present safety or environmental hazards.

For more information about oil and gas drilling and production in Pennsylvania, please contact one of the regional offices or central office listed below. Production and well information reported by well operators is now available through the program's website.

For archival and geologic information, please contact:

PA Department of Conservation and Natural Resources
[Topographic and Geologic Survey](#)
400 Waterfront Drive
Pittsburgh, PA 15222-4745
Phone: 412-442-4235 Fax: 412-442-4298

Web link for directions: www.dcnr.state.pa.us/topogeo/about/index.aspx?tab=Locations#pitt

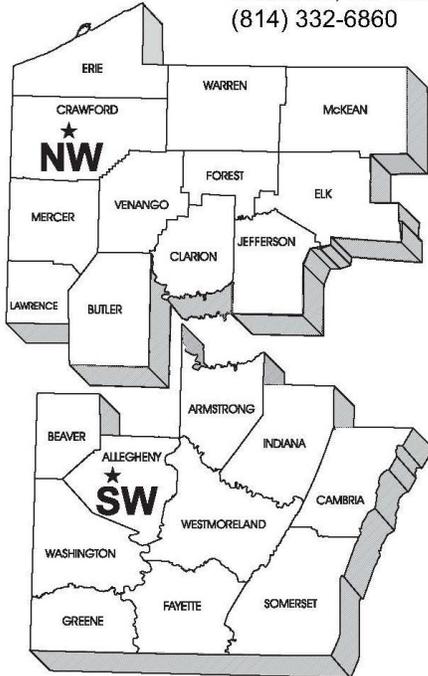
COMMONWEALTH OF PENNSYLVANIA - OIL & GAS OFFICES
DEPARTMENT OF ENVIRONMENTAL PROTECTION



Oil and Gas Districts

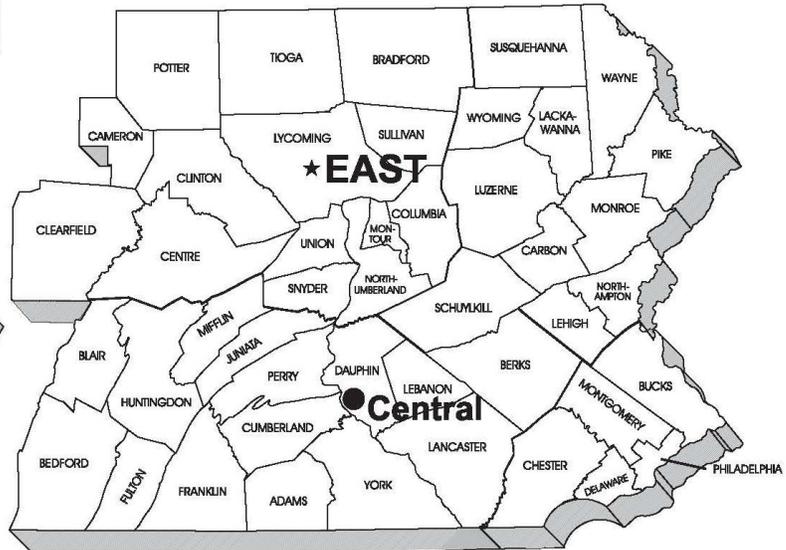
★ Northwest District

230 Chestnut Street
Meadville, PA 16335-3481
(814) 332-6860



★ Eastern District

208 West Third Street
Williamsport, PA 17701-6448
(570) 327-3636



★ Southwest District

400 Waterfront Drive
Pittsburgh, PA 15222-4745
(412) 442-4000

● Central Office

Bureau of Oil and Gas Planning and Program Management
PO Box 8765
Harrisburg, PA 17105-8765
(717) 772-2199

For more information, visit www.dep.state.pa.us, keyword: Oil and Gas.