

Federal and state permitting of underground injection wells in Pennsylvania

The oil and gas industry in Pennsylvania has made significant strides in recycling water in recent years. Since 2010, wastewater recycling has increased from 4.6 million barrels to more than 7.8 million barrels per year, according to a 2015 Pennsylvania Department of Environmental Protection, Bureau of Waste Management presentation on water recycling and oil and gas waste.

Given fluctuating market conditions, alternatives to recycling and reuse are also necessary. These alternatives include treatment and disposal both within and outside Pennsylvania. The wastewater disposal options in Pennsylvania have been limited in recent years by a variety of state and federal factors.

DEP asked unconventional operators to voluntarily stop sending wastewater to publicly owned treatment works (POTW) in 2010. EPA finalized a new regulation in 2016 banning unconventional oil and gas operators from sending wastewater to POTWs, a practice the federal Environmental Protection Agency noted as “current” industry practice.¹

Historically, there have been few injection wells constructed and permitted in Pennsylvania, and some operators have sent wastewater to Ohio and other states where injection wells are more common. Under the Safe Drinking Water Act, EPA issues the federal Underground Injection Control (UIC) permits in Pennsylvania, and then DEP issues a well permit under the Oil and Gas Act to construct a new well or alter an existing well for injection. The Commonwealth has not taken primacy over the federal UIC program. DEP, however, has recently revised its permitting process for the state permit needed to construct and operate UIC wells, revisions made in the midst of legal challenges in both state and federal courts.

EPA identified 15 UIC disposal wells in Pennsylvania, including plugged and abandoned wells and two wells pending permit approval, in its 2016 UIC well inventory. DEP’s 2016 annual oil and gas report listed eight active UIC disposal wells, two inactive wells and two wells under DEP technical review. Bear Lakes Properties in Warren County operates two commercial disposal wells, and it is anticipated that Windfall Oil & Gas in Clearfield County will operate commercial wells upon the approval of its pending permit application. The remaining UIC wells are not currently in commercial operation

for use by third parties.

The UIC permitting process in Pennsylvania

Receiving approval to drill a new injection well or alter a depleted well for injection is a lengthy process that involves agency technical review at both the federal and state levels. Regarding the federal permit, EPA Region III reviews UIC permit applications for various engineering and geological points, including injection pressure and volume, the competency of the targeted injection zone, and the risk of seismicity. If the application passes technical review, EPA publishes public notice of and invites comments on the proposed permit. EPA often holds public hearings on a proposed UIC permit. Once EPA approves the final UIC permit, the operator may apply to DEP for the state well permit. The final federal UIC permit must be included in the state permit application. DEP reviews other technical aspects of the proposed well, including the construction of the well site and surface activities needed to convert existing wells. The state application process also has recently included a public comment component.

It can take several years to obtain both the federal and state permits for an injection well. This delay results, in part, from DEP regulations that require the applicant to include the final federal UIC permit in the state well permit application package. In a recent example, Penneco Oil Company applied for a federal UIC permit for a well in Plum Borough, Allegheny County, on March 9, 2016. EPA held the first public hearing over a year later, on July 26, 2017. If approved, the well can accept up to 54,000 barrels of wastewater per month, which would be the highest volume of any permitted UIC disposal well in Pennsylvania. Permitting by DEP will follow.

In another example, the Sammy-Mar LLC’s state permit application was filed with DEP on May 10, 2016. DEP held a public hearing on June 28, 2016 and approved the permit 11 months later in May 2017. This state permit approval followed two other recent well permit approvals for UIC disposal wells on March 27, 2017, when DEP approved well permits for Seneca Resources Corporation in Highland Township, Elk County, and Pennsylvania General Energy Company in Grant

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Township, Indiana County. Seneca applied for the DEP permit in November 2014; PGE applied to DEP in March 2015.

There is no indication that either federal or state permitting procedures will be streamlined any time soon.

The controversy

UIC wells can be utilized to inject thousands of gallons of oil and gas wastewater into underground strata below underground sources of drinking water. The wells are cased to ensure that the wastewater reaches only the targeted formation. Targeted formations are contained by low permeability formations that prevent migration from the formation. The UIC permitting program has been developed to protect sources of drinking water.

Some recent concern with UIC disposal wells has been related to induced seismicity. Induced seismicity is seismic activity that originates from anthropogenic activity rather than from the natural movement of the Earth's plates. DEP confirmed in early 2017 that it recorded the first earthquakes in the Commonwealth related to completion of Utica wells in Lawrence County.² The five earthquakes were tremors of 1.8 and 2.3 on the Richter scale. Earthquakes of that magnitude cause no physical surface damage and cannot be felt aboveground.

Oklahoma has experienced seismic activity related to its 3,200-plus injection well industry. In 2011, residents were injured and 200 buildings were damaged by a 5.7 magnitude earthquake experts say could be linked to wastewater disposal wells.³ Studies found the strongest correlation between induced seismicity and UIC disposal wells where high volumes of fluid—around 300,000 barrels a month—are injected quickly. No UIC wells permitted or pending in Pennsylvania are permitted to inject more than 54,000 barrels a month.

DEP has taken two recent steps related to seismicity concerns. First, it expanded its seismic monitoring network to thirty realtime seismic stations throughout the Commonwealth, as well as five rapid response temporary stations to be deployed to events of significant interest.⁴ Second, the department included seismic monitoring conditions on the three most recently issued state well permits for UIC wells in Elk, Clearfield and Indiana counties. These permit conditions include the installation of a seismometer and continuous recorder at the disposal well, incorporation of the data into the Incorporated Research Institutions for Seismology network, and a seismic contingency plan with monitoring, reporting and mitigation provisions. The contingency plan includes a mandatory termination of injection if a seismic event of a magnitude 2.0 or greater occurs within three miles of the UIC well.⁵

Whether DEP's recent UIC permit conditions are necessary or appropriate—questions to be decided by the Environmental Hearing Board—oil and gas wastewater disposal options will continue to be a topic for creative exploration and innovation by operators, treatment facilities agencies and the public.

¹ The Pennsylvania Grade Crude Oil Coalition challenged the federal effluent limitation guideline regulation in November 2016. *PGCC v. EPA*, No. 16-4064 (3rd Cir. 2016). PGCC

claims the EPA erred by prohibiting conventional operators from continuing to send brine to POTWs for treatment. The briefing schedule for the case has been stayed until September so the parties can discuss settlement options.

² PA DEP, *Review of Seismic Events in Lawrence County, Pennsylvania* (Jan. 2017), available at www.dep.pa.gov/About/Regional/NorthwestRegion/Community-Information/Pages/Lawrence-County-Earthquake.aspx.

³ *Exploring the Link Between Earthquakes and Oil and Gas Disposal Wells*, StateImpact (2016), stateimpact.npr.org/oklahoma/tag/earthquakes.

⁴ Pennsylvania OKs new injection wells for oil and gas wastewater, StateImpact (Mar. 27, 2017), stateimpact.npr.org/pennsylvania/2017/03/27/pennsylvania-oks-new-injection-wells-for-oil-and-gas-wastewater; DCNR, *DEP Increasing Efforts to Monitor Seismic Activity in Pennsylvania*, Penn State Extension (Sept. 30, 2015), extension.psu.edu/natural-resources/natural-gas/news/2015/09/dcnr-depincreasing-efforts-to-monitor-seismic-activity-in-pennsylvania.

⁵ PGE appealed the Grant Township, Indiana County well permit to the Penn - sylvania Environmental Hearing Board in April 2017. *Pennsylvania General Energy Company, LLC v. Commonwealth of Pennsylvania Department of Environmental Protection*, No. 2017-031-R. Several Grant Township residents also appealed the permit. *Judith Wanchisn, et al. v. Commonwealth of Pennsylvania Department of Environmental Protection*, No. 2017-032-R