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Chapter 3

Wastewater Management Regulation in the Appalachian Basin

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Synopsis

§ 3.01. Wastewater Management Needs of the Oil and Natural Gas Industry 75
§ 3.02. Treatment, Recycling, and Discharge Regulation 77
[1] — Effluent Limitations Guidelines in General 79
[2] — Proposed Amendments to 40 C.F.R. Part 435 80
[3] — Ongoing Study of Centralized Wastewater Treatment (CWT) Facilities 82
[4] — Draft Assessment of Hydraulic Fracturing's Impacts on Drinking Water Resources 85
[5] — State Regulation of CWT Facilities 91
§ 3.03. Underground Injection Control Well Disposal 93
[1] — EPA Gathers Information, Assesses UIC Wells 95
[2] — Lawsuit Challenges RCRA Exemption 98
[3] — EPA Focuses on Managing Induced Seismicity 100
[4] — USGS Begins Predictive Seismic Modeling 103
[5] — States First Releases Primer on Risk Management and Mitigation 106
[6] — "Community Rights" Ordinances Challenge Development 109
§ 3.04. Future of Wastewater Management Regulations 113

§ 3.01. Wastewater Management Needs of the Oil and Natural Gas Industry.

The production of oil and natural gas yields wastewater containing a range of constituents requiring proper management.[1] Despite the recent

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1 "[Waste]water is a byproduct of oil and natural gas production. After hydraulic fracturing is completed, . . . water is allowed to flow back from the well. The return flow

decrease in new exploration and production activities, oil and natural gas wastewater generation has continued to rise in the Appalachian Basin. Conventional and unconventional operators in Pennsylvania, for example, reported producing over 46 million barrels of fracturing and produced fluids in 2015 alone, an increase of almost 6 percent from 2014 totals.[2] While unconventional wells use less total water than other energy extraction methods and represent only a fraction of total industrial water use nationwide, Marcellus wells still require an average of 4.25 million gallons of water to develop and produce an average of 1.37 million gallons of wastewater over their lifespans.[3] The industry-wide decrease in exploration and production activities underscores the importance of sound wastewater management practices, as fewer new wells are available for wastewater recycling while older wells continue to yield significant aggregate quantities of produced water.

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contains chemicals injected as part of the hydraulic fracturing fluid, chemicals characteristic of the formation, hydrocarbons, and in-formation reaction and degradation products. Initially this water is called "flowback," and consists mostly of fracturing fluid. After a time, the water, known as "produced fluid," becomes more similar to formation water. "Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources," *U.S. Envtl. Prot. Agency*, 7-1 (June 2015), http://ofmpub.epa.gov/eims/eimscomm.getfile?p_download_id=523539.

2 PADEP Oil and Gas Reporting Website, Pa. Dep't. of Envtl. Prot., https://www.paoilandgasreporting.state.pa.us/publicreports/Modules/Welcome/Agreement.aspx (last visited May 11, 2016). "The Utica and Marcellus shales are generally viewed as drier," producing less produced water per MMCF than peer shale plays, either due to low water saturation within the shale or low relative permeability to water. *Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources*, *supra* note 1 at 7-13.

3 Andrew Kondash and Avner Vengosh, "Water Footprint of Hydraulic Fracturing," *Envtl. Science & Tech.* (Sept. 15, 2015), http://pubs.acs.org/doi/full/10.1021/acs.estlett.5b00211. The U.S. Environmental Protection Agency estimates that horizontal Marcellus wells can produce up to 860 gallons of produced water per day and that Utica wells can produce up to 510 gallons of produced water per day. Technical Development Document for Proposed Effluent Limitations Guidelines and Standards for Oil and Gas Extraction, U.S. Envtl. Prot. Agency, 51 (Mar. 2015), https://www.epa.gov/sites/production/files/2015-06/documents/uog_proposal_tdd_03-2015.pdf. Marcellus wells typically produce between 300,000 and 1,000,000 gallons of wastewater within the first 10 days after completion. Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources, *supra* note 1 at 7-10.

Federal and state regulatory authorities appear more focused than ever on wastewater management techniques as the volume of oil and natural gas wastewater increases. Several recent developments have the potential to affect the treatment, recycling, and possible discharge of oil and natural gas wastewater. At the federal level, the U.S. Environmental Protection Agency (EPA) has: proposed to prohibit the indirect discharge of unconventional wastewater through publicly owned treatment works (POTWs); begun work on a study of centralized wastewater treatment (CWT) facilities, which might include operator wastewater management techniques; and continued efforts on a comprehensive assessment of hydraulic fracturing's impacts on drinking water resources. The latter two initiatives could result in additional federal regulation for operators and CWT facilities. Within the Appalachian Basin, operators in Pennsylvania are also likely to be affected by approved amendments to the Commonwealth's oil and natural gas regulations, several of which directly implicate operator wastewater management practices.

Additionally, the Underground Injection Control (UIC) Class II Disposal Program could be entering a period of significant regulatory and scientific development. EPA continues to gather substantial data regarding existing Class IID wells through the use of an Information Collection Request and through periodic reviews of the state-run programs. EPA headquarters may also begin gathering more targeted information on inspections and enforcement given the recommendations of a U.S. Government Accountability Office audit released in February 2016. Operators will also want to closely follow a recent citizen suit that challenges EPA's Subtitle C Resource Conservation and Recovery Act regulations. With respect to scientific development, several recent articles and white papers have suggested methods to predict, limit, and mitigate the risk of induced seismicity from Class IID wells, including notable contributions from EPA, the U.S. Geological Survey (USGS), and the state-run organization States First. Finally, several municipalities in the Appalachian Basin have enacted "community rights" ordinances, which challenge the construction and operation of federally permitted Class IID wells.

§ 3.02. Treatment, Recycling, and Discharge Regulations.

The use of CWT facilities is especially strong among operators in the Appalachian Basin. According to the EPA, nationally there are 73 CWT