

UNCONVENTIONAL SHALE DEVELOPMENT WASTE

What is Unconventional Shale Development waste?

There are two types of waste from unconventional shale development: solid and liquid waste. Solid waste primarily is in the form of drill cuttings generated when a well is drilled through different formations of the earth. Solid waste drill cuttings are typically chemically inert and sent to landfills for disposal. Liquid waste typically refers to fluids that return up the wellbore to the surface during and after a well is hydraulically fractured and put into production.

How is waste from Unconventional Shale Development regulated?

Unconventional shale development waste primarily is regulated by [Act 13 of 2012](#), known as the Oil and Gas Act, and [Act 97 of 1980 \(as amended\)](#), known as the Solid Waste Management Act, and their associated regulations. Among these provisions:

- Act 13 regulates the overall development of unconventional oil and gas, including specific requirements for waste handling, tracking and reporting.
- [25 Pa. Code Chapter 78a](#), which was promulgated in 2016, further delineates the obligations of an unconventional operator with respect to waste handling, tracking and reporting. In addition, the 2016 updates prohibited the use of open drilling pits and required centralized storage impoundments to be permitted under the requirements of the Clean Streams Law.
- The Solid Waste Management Act and its regulations establish standards for the collection, handling, transportation, processing, disposal and beneficial use of solid waste in Pennsylvania, including waste from the unconventional shale industry when transported, stored, treated or disposed off well sites.

What are the different classifications of waste?

In Pennsylvania, waste is typically regulated as either residual, municipal or hazardous, depending upon the source of generation and potential risks that waste may pose to the environment or public health. The classification of waste dictates the manner in which it is collected, handled, transported, processed, and ultimately disposed or beneficially used. Unconventional shale development waste generally is characterized as residual waste. A *Form U Request to Process or Dispose of Residual Waste* form must be completed and approved by the Pennsylvania Department of Environmental Protection (PADEP) prior to treatment or disposal at a permitted solid waste treatment or disposal facility in PA. This approval process, which includes sampling of the waste constituents, assures that all waste received by the treatment or disposal facility is disposed according to the waste criteria acceptance conditions of the treatment or disposal facility's PADEP solid waste permit. Obtaining a solid waste permit is a rigorous process, including lengthy (multi-year in some cases) review by the PADEP with extensive public comment and input. Once obtained, it is incumbent on the operator of the facility to maintain compliance with the terms of the permit; failure to do so jeopardizes the facility's permit and ability to operate within the Commonwealth.

May liquid waste from Unconventional Shale Development be treated and discharged into Pennsylvania waterways?

The unconventional natural gas industry does not send liquid waste to publicly owned treatment works (POTWs). The industry voluntarily discontinued sending liquid waste to POTWs, which treat liquid waste and discharge into waterways, back in 2011. This voluntary action was eventually incorporated as a federal rule and a condition of the discharge permits of POTWs, and no POTW has discharged unconventional liquid waste into a waterway since this time.

Approximately 90% of fluids are recycled by operators and reused to stimulate new wells, while the balance of liquid waste is safely disposed in deep underground injection wells that are approved and permitted by the U.S. EPA.

Federal and PADEP regulations permit centralized wastewater treatment (CWT) facilities to discharge unconventional liquid waste if it is first treated to meet federal treatment standards. However, this may not be a viable option in most situations because currently there is limited CWT facility capacity in the Commonwealth.

Is Unconventional Shale Development waste disposed properly in PA?

Yes. To ensure that any waste is disposed appropriately, it must be characterized based upon testing from an accredited laboratory. As an added safeguard, each Pennsylvania landfill may only accept a fixed amount of waste from oil and gas activities on an annual basis. Pennsylvania's landfills have strict permit requirements and acceptance criteria and, therefore, regardless of the federal exemption that exists for oil and gas related waste in 40 CFR 261, wastes that are characteristically hazardous or contain listed hazardous constituents cannot be disposed in Pennsylvania landfills. Waste that is characteristically hazardous or is a listed hazardous waste can only be disposed at a RCRA Subtitle C permitted Hazardous Waste Facility or, in the case of a waste that exhibits a hazardous waste characteristic, must be treated in a manner that renders the material to no longer be hazardous. There are currently no such facilities in Pennsylvania accepting hazardous oil and gas waste.

How is Unconventional Shale Development waste tracked and reported?

- Oil and gas is the only industry in PA that is required to report waste volumes monthly. PADEP requires oil and gas operators to electronically submit monthly waste volumes on a per well basis.
- Oil and gas is also the only industry that is required to report waste at levels more detailed than the individual facility level (oil and gas operators are required to report waste monthly per well and annually per well pad).
- Oil and gas operators must also provide an annual report (via Form 26R) per well pad for each waste type generated.
- Oil and gas has a few waste streams not directly generated by oil and gas production that are also required to be submitted biennially.
- Other industries in PA are only required to report waste generated to the PADEP annually and/or biennially.
- Waste treatment and disposal facilities are separately permitted by PADEP and must submit their own reports on the amount and origin of waste accepted at each facility.

Oil and gas related waste generation volumes can be easily viewed by the public. This data includes volumes generated per well and the disposal location for each waste type. Electronic monthly reporting of waste, which far exceeds the reporting frequency of any other industry in PA, can be [downloaded](#) from the PADEP website by the public. Most other industry waste generation data, such as the 26R reports, are submitted to the PADEP via paper copy and/or PDF documents that cannot be easily retrieved and analyzed.

What is leachate?

Leachate is liquid that drains – or ‘leaches’ – through a landfill. It must be collected and handled according to regulatory requirements. Facilities that have received a [Form U](#) approval must chemically analyze waste, including leachate, by using a PADEP-accredited laboratory. As part of the chemical analysis, an evaluation of the leachate of solid waste via the Toxicity Characteristic Leachate Procedure (TCLP) is performed. The TCLP is a US EPA-approved method to simulate leaching of materials from solid waste placed within a landfill. A 2016 PADEP study of leachate samples from nine landfills concluded “*that there exists little difference in the radium detected in leachate from the landfills that accept higher volumes of oil and gas derived waste versus radium detected in leachate from the remaining landfills in Pennsylvania.*” Further, the study concluded that there is “*limited potential for radiological environmental impacts from leachate*” from landfills that accept oil and gas derived waste.

Additionally, landfill leachate is monitored and managed in accordance with a landfill’s PADEP issued solid waste facility permit. Leachate sent to treatment facilities is also monitored/managed in accordance with the treatment facility’s PADEP issued solid waste facility permit. At the end of the treatment process, any sediment/sludge generated during treatment of leachate is returned to the landfill for disposal as a solid waste.

What are NORM and TENORM?

In Pennsylvania, operators monitor waste leaving the well site for Naturally Occurring and Technologically Enhanced Radioactive Materials (NORM & TENORM). Protective measures include:

- The Form U and 26R approval processes, which include analysis for radiochemistry to determine proper protection and disposal;
- Preparing and implementing a Radiation Protection Action Plan (RPAP) by both the oil and gas operator and landfill. The RPAP establishes thresholds for monitoring every truckload of waste, specifically when it arrives at a landfill, preventing any unknown amount of NORM/TENORM from being received for disposal;

PA landfills can accept NORM/TENORM; however, they are individually modeled and have regulatory thresholds in their permits regarding the amount of radioactive material each facility may accept each month. The RPAP provides additional protocols, as necessary, to assure adequate protection to the worker, public and surrounding environment.

For more information, please view the MSC’s [NORM and TENORM Fact Sheet](#).