EPA United States Environmental Protection Agency

Unconventional Oil and Natural Gas Development

News

New Environmental Compliance Website for the Crude Oil and Natural Gas Sector

EPA has released a new compliance assistance resource for owners and operators of crude oil and natural gas extraction operations. The web portal, developed in collaboration with the National Center for Manufacturing Sciences and the State Review of Oil and Natural Gas Environmental Regulations (STRONGER), provides easily accessible information to help companies comply with federal and state environmental regulations.

View the Environmental Compliance Information for Energy Extraction Portal at www.eciee.org.

Report Environmental Violations

Report **illegal disposal of wastes or other non-emergency suspicious activity** related to oil and natural gas development through **epa.gov/tips.**

You can provide tips anonymously if you do not want to identify yourself.

Emergency events and spills or releases should be reported through the **National Response Center** at **1-800-424-8802.**

Related Information

Additional EPA Information

- Process of unconventional natural gas production (hydraulic fracturing and shale gas extraction)
- Energy independence
- Radioactive wastes from oil and gas drilling

Other Federal Government Information

- Multi-Agency (EPA, DOE and USGS) Collaboration on Unconventional Oil and Gas Research
- U.S. Department of Energy Shale Research & Development website
- U.S. Department of Interior, U.S. Geological Survey Energy Resources Program
- U.S. Energy Information Administration website on Where Our Natural Gas Comes From

Unconventional oil and natural gas play a key role in our nation's clean energy future. The U.S. has vast reserves of such resources that are commercially viable as a result of advances in horizontal drilling and hydraulic fracturing technologies. These technologies enable greater access to oil and natural gas in shale formations. Responsible development of America's shale gas resources offers important economic, energy security, and environmental benefits.

We work with states and other key stakeholders to help ensure that the economic prosperity from unconventional oil and natural gas extraction does not come at the expense of public health and the environment. We have played a lead role in convening stakeholders and conducting outreach to individual citizens, communities, tribes, state and federal partners, industry, trade associations and environmental organizations that have a strong interest in the agency's work and policies related to unconventional oil and natural gas extraction.

Our focus and obligations under the law are to provide oversight, guidance and, where appropriate, rulemaking and enforcement, that achieve the best possible protections for human health and the air, water and land where Americans live, work and play.

On this page:

Improving our Scientific Understanding of Hydraulic Fracturing

April 2012 Memorandum of Agreement among the U.S. Departments of Energy and Interior and the U.S. EPA about Collaboration on Unconventional Oil and Gas Research (PDF)

Our study of hydraulic fracturing and its potential impact on drinking water resources: We studied the

relationship between hydraulic fracturing for oil and natural gas and drinking water resources. The study includes a review of published literature, analysis of existing data, scenario evaluation and modeling, laboratory studies, and case studies. We released a progress report in December 2012; a final draft assessment report for peer review and comment in June 2015; and the final report in December 2016. Our report concludes that hydraulic fracturing activities can impact drinking water resources under some circumstances and identifies factors that influence these impacts. Learn more:

Final assessment
Study home page: epa.gov/hfstudy
Process of unconventional natural gas production (hydraulic fracturing and shale gas extraction)

Providing Regulatory Clarity and Protections against Known Risks

Natural gas and shale gas extraction operations can result in a number of potential impacts to the environment, including:

Stress on surface water and ground water supplies from the withdrawal of large volumes of water used in drilling and hydraulic fracturing;
Contamination of underground sources of drinking water and surface waters resulting from spills, faulty well construction, or by other means;
Adverse impacts from discharges into surface waters or from disposal into underground injection wells; and
Air pollution resulting from the release of volatile organic compounds, hazardous air pollutants, and greenhouse gases.

Ensuring that hydraulic fracturing using diesel fuels is properly permitted

A core element of the Safe Drinking Water Act's (SDWA) Underground Injection Control (UIC) program is setting requirements for proper well siting, construction, and operation to minimize risks to underground sources of drinking water. The Energy Policy Act of 2005 excluded hydraulic fracturing, except when diesel fuels are used, for oil, natural gas or geothermal production from regulation under the UIC program. This statutory language caused regulators and the regulated community alike to raise questions about the applicability of permitting practices.

We have developed revised UIC Class II permitting guidance specific to oil and natural gas hydraulic fracturing activities using diesel fuels. Although developed specifically for hydraulic fracturing where diesel fuels are used, many of the guidance's recommended practices are consistent with best practices for hydraulic fracturing in general, including those found in state regulations and model guidelines for hydraulic fracturing developed by industry and stakeholders. Thus, states and tribes responsible for issuing permits and/or updating regulations for hydraulic fracturing will find the recommendations useful in improving the protection of underground sources of drinking water and public health wherever hydraulic fracturing occurs.

We issued the guidance alongside an interpretive memorandum, which clarifies that Class II UIC requirements apply to hydraulic fracturing activities using diesel fuels, and defines the statutory term "diesel fuel" by reference to five chemical abstract services registry numbers. The guidance outlines for our permit writers, where we are the permitting authority,
(i) existing Class II requirements for diesel fuels used for hydraulic fracturing wells, and
(ii) technical recommendations for permitting those wells consistently with these requirements.
Learn more:

Read the guidance, interpretive memo and *Federal Register* notice.
The EPA and states share primary responsibility ("primacy") for implementing the UIC program. Learn about the primacy status of each state.

Ensuring the safe management of wastewater, stormwater, and other wastes

As the number of shale gas wells in the U.S. increases, so too does the volume of shale gas wastewater that requires disposal. Wastewater associated with shale gas extraction can contain high levels of salt content also called total dissolved solids or TDS. The wastewater can also contain various organic chemicals, inorganic chemicals, metals, and naturally occurring radioactive materials (also referred to as technologically enhanced naturally occurring radioactive material or TENORM). In partnership with states,we are examining the different management methods employed by

industry to ensure that there are regulatory and permitting frameworks in place to provide safe and legal options for disposal of flowback and produced water. These options include:

EPA Study on Managing Produced Water

The study will consider available approaches to manage wastewater from both conventional and unconventional oil and gas extraction at onshore facilities, and will address questions such as:

how existing federal approaches to produced water management under the CWA can interact more effectively with state regulations, requirements or policy needs, and
whether potential federal regulations that may allow for broader discharge of treated produced water to surface waters are supported.

Learn more about the study.

Underground injection of waste fluids from oil and natural gas wells (Class II wells)

In many regions of the U.S., underground injection is the most common method of managing fluids or other substances from shale gas extraction operations. Management of flowback and produced water via underground injection is regulated under the Safe Drinking Water Act's Underground Injection Control (UIC) program.

Class II oil and natural gas-related injection wells
UIC regulations

Wastewater discharges to treatment facilities

The Clean Water Act (CWA) effluent guidelines program sets national standards for industrial wastewater discharges to surface waters and municipal sewage treatment plants based on the performance of treatment and control technologies. Effluent guidelines for on-shore oil and natural gas extraction facilities prohibit the discharge of pollutants into surface waters, except for wastewater that is of good enough quality for use in agricultural and wildlife propagation for those onshore facilities located in the continental United States and west of the 98th meridian.

Final rule: On June 28, 2016, we promulgated pretreatment standards for the Oil and Gas Extraction Category (40 CFR Part 435). The regulations prohibit discharges of wastewater pollutants from onshore unconventional oil and natural gas (UOG) extraction facilities to POTWs.

Related study of private wastewater treatment facilities: We are conducting a study of private wastewater treatment facilities (also known as centralized waste treatment, or CWT, facilities) accepting oil and natural gas extraction wastewater. We are collecting data and information related to the extent to which CWT facilities accept such wastewater, available treatment technologies (and their associated costs), discharge characteristics, financial characteristics of CWT facilities, the environmental impacts of discharges from CWT facilities, and other relevant information.

Learn more about effluent guidelines for unconventional extraction in the oil and natural gas industry

Stormwater discharges from oil and natural gas operations or transmission facilities

Under the CWA, oil and natural gas exploration, production, processing, or treatment operations or transmission facilities, including associated construction activities, are not required to obtain National Pollutant Discharge Elimination System (NPDES) permit coverage for stormwater discharges unless there is a reportable quantity spill or the discharge causes or contributes to a water quality violation.

Regulation of stormwater discharges from oil and natural gas construction activities

Use of surface impoundments (pits or ponds) for storage or disposal

In some cases, operators use surface storage tanks and pits to temporarily store hydraulic fracturing fluids for re-use or until arrangements are made for disposal. In addition, other wastes are generated during the well drilling, stimulation, and production stages. States, tribes, and some local governments have primary responsibility for adopting and implementing programs to ensure proper management of these wastes.

Regulation of crude oil and natural gas waste under the Resource Conservation and Recovery Act (RCRA)
Proper Management of Oil and Gas Exploration and Production Waste (main page on RCRA regulation of wastes from hydraulic fracturing processes)
Review of State Oil and Natural Gas Exploration, Development, and Production (E&P) Solid Waste Management Regulations (April 2014)
Compilation of Publicly Available Sources of Voluntary Management Practices for Oil and Gas Exploration and Production (E&P) Wastes as They Address Pits, Tanks, and Land Application (April 2014)

Recycling of wastewater

Some drilling operators elect to re-use a portion of the wastewater to replace and/or supplement fresh water in formulating fracturing fluid for a future well or re-fracturing the same well. Re-use of shale gas wastewater is, in part, dependent on the levels of pollutants in the wastewater and the proximity of other fracturing sites that might re-use the wastewater. This practice has the potential to reduce discharges to treatment facilities or surface waters, minimize underground injection of wastewater and conserve water resources.

Addressing air quality impacts

There have been well-documented air quality impacts in areas with active natural gas development, with increases in emissions of methane, volatile organic compounds (VOCs) and hazardous air pollutants (HAPs). The EPA, the Department of the Interior, other federal agencies and states are working to better characterize and reduce these air emissions and their associated impacts.

Through the Natural Gas STAR program, the EPA and partner companies have identified technologies and practices that can cost-effectively reduce methane emissions from the oil and natural gas sector in the U.S. and abroad.

Through the Clean Construction USA program, we are promoting newer, more efficient technology and cleaner fuels to innovate the ways in which hydraulic fracturing equipment and vehicles reduce emissions. We also administer Clean Air Act regulations for oil and natural gas production, including regulations on reporting greenhouse gas emissions.

Controlling Air Pollution from the Oil and Natural Gas Industry home page
Regulatory actions
Natural Gas STAR Program
About our Oil and Gas Methane Partnerships
Recommended Technologies to Reduce Methane Emissions
Global Methane Initiative EXIT
Clean Construction USA program
Clean Air Act Standards and Guidelines for the Oil and Natural Gas Industry
Greenhouse Gas Reporting Program
Greenhouse Gas Reporting Program and the Oil and Gas Industry

Working with Partners

Memorandum of Understanding between the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) and EPA

In November 2018, the State Review of Oil and Natural Gas Environmental Regulations (STRONGER) EXIT and EPA entered into the memorandum of understanding (MOU) to facilitate greater collaboration and to achieve greater success in the effort to protect human health and the environment. The MOU objectives are to:

affirm EPA's commitment to meaningful participation in STRONGER's efforts to develop guidelines for state oil and natural gas environmental regulatory programs, conduct reviews of such programs and publish reports of those reviews, and
improve communication, coordination and collaboration between EPA and STRONGER on responsible oil and

natural gas exploration and development activities.

View the Memorandum of Understanding
Read the press release

Related Information

New Mexico Energy, Minerals and Natural Resources Department page on wastewater management in oil and gas extraction processes EXIT

Memorandum of Understanding between the State of New Mexico and EPA

In July 2018, EPA and the State of New Mexico entered into a Memorandum of Understanding (MOU) to clarify the existing regulatory and permitting frameworks related to the way produced water from oil and gas extraction activities can be reused, recycled, and renewed for other purposes.

Draft White Paper on Oil and Natural Gas Governance of Produced Water

As described in the MOU, EPA and New Mexico have developed a draft white paper on the governance of produced water in New Mexico. This draft white paper, *Oil and Natural Gas Produced Water Governance in the State of New Mexico*,was available for review and public input for 30 days, through the close of business, Monday, December 10, 2018. Stakeholders and interested members of the public provided input to the EPA and the State of New Mexico by emailing renewablewater@state.nm.us.

View:
- the Memorandum of Understanding
- draft white paper
- questions and answers about the draft white paper, and
- the public input.

Convening Stakeholders

We occasionally partner with, or convene, oil and natural gas stakeholders to increase opportunities for environmental improvements.

Our Smart Sectors program partners with sectors that represent the engine of the American economy in order to explore significant opportunities for environmental improvement. Currently, we are partnering with 14 sectors, including oil and gas. Additional sectors may be added over time.

In April 2017, various industry associations expressed their concerns to us about our compliance assurance activities. View the letters and memos to us, and our July 2017 responses. In response to these concerns, former Administrator Pruitt convened this roundtable in February 2018 in cooperation with the Environmental Council of States (ECOS) and the Interstate Oil and Gas Compact Commission (IOGCC). View the press release, agenda, meeting highlights, case studies, and participant list.

Assuring Compliance

We target compliance and enforcement activities to ensure compliance with laws and regulations, with an emphasis on correcting violations with significant potential harm to human health and the environment. In addition to self-directed investigations, we receive thousands of leads and incident reports relating to oil and natural gas activities that could impact human health and air or water quality. We work with state and local governments to respond to incidents, encourage diligent accident prevention, and provide effective and prompt responses when emergencies occur. Our

offices around the nation ("Regions" or "Regional offices") provide guidance and grants to state regulators, perform inspections, conduct enforcement actions, and issue permits and information request letters, in order to ensure that existing federal laws are consistently and effectively implemented.

New Owner Clean Air Act Audit Program for Oil and Natural Gas Exploration and Production Facilities
National Enforcement Initiative: Ensuring energy extraction activities comply with environmental laws
The October 2000 Compliance Assistance Sector Notebook: Profile of the Oil and Gas Extraction Industry can be found in the EPA archive by searching for "oil gas sector notebook" SEARCH EPA ARCHIVE

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