

Roadmap for Reform

*Federal and State Action Needed
to Protect Water from Upstream
Oil and Gas Activities*

March 2021



About this Project

This “Roadmap” provides recommendations for the United States Environmental Protection Agency (EPA) to improve water quality protection from upstream oil and gas development by utilizing the two primary federal water protection laws: the Clean Water Act and Safe Drinking Water Act. It also recommends steps for state agencies with primary enforcement authority for oil and gas regulatory programs under these laws.

Clean Water’s research and advocacy, and the work of federal agencies and academics, have revealed numerous threats to water that long predate the Trump Administration. However, new leadership at EPA presents an opportunity to change course and take proactive steps to rein in polluting oil and gas activities.

The findings and recommendations in this report draw on Clean Water’s research and advocacy, as well as investigations and reports from EPA and the Government Accountability Office (GAO) — which have both published multiple reports on the threats to water from oil and gas production activities and the oversight of it. Clean Water investigations, referenced throughout this report, provide detailed evidence of harm, and documentation of oversight problems within federal regulatory programs. The reports also include in-depth analyses of state programs, specifically Underground Injection Control Class II programs in California, Colorado, Oklahoma and Texas.

Clean Water Act and Safe Drinking Water Act programs are essential to protecting the water resources most at risk in a climate changing world. This “Roadmap” defines a clear path for EPA and states to effectively implement programs to protect water quality and drinking water sources from oil and gas activities as we work to move away from fossil fuels.

This report was written by Andrew Grinberg; edited by Lynn Thorp and Michael Kelly.

Clean Water Action and Clean Water Fund thank the following funders for supporting our work to protect water from oil and gas development:

Dr. Robert C. and Tina Sohn Foundation
Park Foundation
PB and K Family Foundation

Tikkun Earth Fund
Tracey McGrath



Clean Water Action — www.CleanWaterAction.org

Clean Water Action is a national 501(c)(4) environmental organization with nearly one million members nationwide. Since our founding during the campaign to pass the landmark Clean Water Act in 1972, Clean Water Action has worked to win strong health and environmental protections by bringing issue expertise, solution-oriented thinking and people power to the table.



Clean Water Fund — www.CleanWaterFund.org

Clean Water Fund is a national 501(c)(3) research and education organization that has been promoting the public interest since 1978. Clean Water Fund supports protection of natural resources, with an emphasis on water quality and quantity issues. Clean Water Fund’s organizing has empowered citizen leaders, organizations and coalitions to improve conditions in hundreds of communities, and to strengthen policies at all levels of government.

*Cover Photo: Class II Injection Well, Guernsey County, Ohio, March 2018.
Provided by FracTracker Alliance, www.fractracker.org/photos.*

Clean Water Action requests that you provide appropriate credit on all reprinted materials.

Table of Contents

- Background 4**
 - Federal Authority and Loopholes..... 4*
 - Threats to Water..... 4*
 - Emerging Issue: CO₂-EOR..... 6*
- Safe Drinking Water Act —
Underground Injection Control Program Class II..... 7**
 - Key Federal Findings..... 7
 - State by State Findings 8
 - Underground Injection Control Class II Recommendations 9*
 - EPA Recommendations 9
 - State Agency Recommendations 12
- Clean Water Act Regulation of Produced Water Discharges..... 14**
 - Jurisdiction of the Clean Water Act 15*
 - Clean Water Act Recommendations..... 15*
- Conclusion17**
- Notes 18**
- Bibliography 19**

Background

Over the last decade of research and advocacy, Clean Water Action/Clean Water Fund has found that activities essential to oil and gas operations cannot be conducted without regulatory and legislative loopholes that put water at risk. Wastewater disposal injection wells, surface discharge of produced water, hydraulic fracturing, and enhanced oil recovery are central to the industry's survival and future growth, yet these practices threaten water quality. Being able to cheaply manage and exploit water resources has been an important strategy for the industry for more than a century, and the current financial pressure on producers will likely lead to more cost cutting measures and accompanying policies that put water at risk.

As the threats and impacts to our water and communities from climate change grow, now is the time to prioritize water protection over fossil fuel production. Oil and gas activities that fuel the climate crisis and threaten our water must be curtailed through stronger protections for our water and new limits on the riskiest practices.

Federal Authority and Loopholes

The two primary federal water laws, the Safe Drinking Water Act (SDWA) and Clean Water Act, grant EPA the authority to regulate and prevent water pollution from oil and gas production activities both for underground sources of drinking water and for *Waters of the United States* as defined by the Clean Water Act.* In most oil and gas states, primary enforcement and implementation of these laws has been delegated from EPA to state agencies. EPA retains authority in some states and Tribal lands for both laws.

Federal environmental and natural resource protection laws and regulations, like the Clean Water Act and SDWA, are riddled with loopholes and preferential treatment for fossil fuel companies. The most notorious oil and gas exemption is the “Halliburton Loophole,” which exempts hydraulic fracturing from SDWA Underground Injection Control (UIC) regulation. (42 U.S.C. § 300h(d)) The Halliburton Loophole deserves the attention it receives and should be reversed. However, the significant shortcomings of the UIC program mean that closing this loophole and regulating fracking under the UIC program would not be enough.

Similarly, the Clean Water Act exemption for stormwater permitting (33 U.S.C § 402(l)(2)) is commonly noted as a primary exemption for the industry, yet other lesser known provisions in the Effluent Limitation Guidelines (ELG) program of the Clean Water Act allow for direct discharge of produced water into rivers, lakes and streams, and impose inadequate rules for treatment plants that accept produced water. Furthermore, a vast array of activities that may impact water lie outside the scope of either of these laws, including discharge of produced water into unlined pits, spills that may impact soil or groundwater, reuse of produced water for agricultural or other uses, chemical use and mixing, land application of wastes, and water consumption by the industry.

Threats to Water

Oil and gas production poses threats to water quality due to the chemical composition of the resulting wastewater, also known as produced water, as well as from solid wastes, chemicals used in production, oil spills and subsurface migration. Produced water and other byproducts of the production wastestream can include chemical additives and naturally occurring chemicals that cause health and environmental problems, as well as technologically enhanced naturally occurring radioactive materials (TENORM) and

*See page 15 for a discussion of the regulatory definition of Waters of the US and its impact on water pollution from oil and gas development.

naturally occurring radioactive materials (NORM). Hazardous contaminants like benzene and radioactive materials have been found downstream of produced water discharges,¹ and analytical methods for many of the chemicals found in produced water are inadequate, adding uncertainty to the risks of produced water contamination.

There are several ways that oil and gas production activities can impact water quality. EPA, state agencies and academic/scientific institutions have documented water contamination and threats associated with upstream oil and gas, including:

- Direct discharge of produced water into surface waters
- Surface water degradation downstream of commercial wastewater treatment facilities that accept produced water
- Groundwater and soil impacts from spills of produced water and oil
- Injection of produced water and other fluids directly into USDWs
- Produced water disposal into open pits percolating into groundwater and/or running off into surface waters
- Subsurface leakage through well failures, orphaned/abandoned wells, and geologic pathways.

Federal agencies have concluded that threats to water from oil and gas development have not been adequately addressed. Notable reports on oil and gas threats to water include:

- EPA's 2016 study on hydraulic fracturing and drinking water: The agency identified numerous vulnerabilities that have yet to be addressed at the federal level. These issues include some addressed in this report and some outside the scope, such as chemical spills and disposal into open pits.² In addition to Clean Water Act and SDWA reforms, EPA and states should revisit the findings of this report, update findings based on ongoing research, and systematically work to address these threats.
- EPA's 2018 study on centralized waste treatment facilities (CWTs), which documented downstream impacts to water quality from facilities that accept produced water, indicating deficiencies in the regulation of CWTs.³
- GAO's 2014 study which found that EPA does not effectively oversee state UIC programs nor has it adequately addressed emerging threats from injection.⁴
- EPA's 2020 stakeholder engagement process and summary report on produced water discharges, which documented concerns from diverse stakeholders, including academic and health researchers, environmental advocates and industry representatives.⁵

While some states have taken steps to reform oversight of oil and gas activities and mitigate threats to water through new regulations, legislation, increased state agency budgets and more, the federal response to address long-standing problems has been lacking. For both SDWA/UIC, and the Clean Water Act regulation of produced water discharges, Clean Water recommends numerous improvements — for EPA and states programs. The majority of these recommendations can be implemented administratively, without action from Congress or state legislatures.

Emerging Issue: CO₂-EOR

The oil industry's future growth and survival may lean heavily on applying carbon dioxide enhanced oil recovery (CO₂-EOR) to vast residual oil zones, while earning carbon storage tax credits. CO₂-EOR is being sold as a way to bring carbon capture, utilization and sequestration (CCUS) technologies to scale. Though CCUS may be critical to reaching net zero or net negative greenhouse gas emissions, as long as CO₂-EOR is the primary market for captured carbon, CCUS incentives amount to additional subsidies for oil and gas production. Enhanced recovery (of which CO₂-EOR is a subcategory) is the only federally regulated method of oil and gas production due to the potential impacts of fluid injection on groundwater, yet the debate around CCUS largely ignores the water impacts of CO₂-EOR and oil production more generally.

There are emerging parallels between CO₂-EOR expansion and the fracking boom of the last decade. The industry is working to ensure long-term relevance and taxpayer-funded windfalls while simultaneously seeking new exemptions and loopholes under the guise of climate mitigation. In early 2018, Congress passed an expansion of the 45Q tax credit (aka the FUTURE Act), which provides an incentive to capture CO₂ and use it to produce more oil or sequester it underground permanently. While billed as a climate solution, this credit has largely been claimed by oil companies for EOR, rendering this credit a direct subsidy to the oil industry and leading to increased fossil fuel production.

In 2018, Clean Water Action published "Carbon Capture and Release" which detailed the discrepancy of claimed 45Q credits with EPA approved Monitoring, Reporting and Verification (MRV) plans.⁶ The findings were confirmed by the U.S. Treasury Inspector General for Tax Administration (TIGTA) report from April 2020 which found roughly \$900 million in Section 45Q claims which were not accompanied by MRVs, in response to an inquiry from U.S. Senate Finance Committee senior member Robert Menendez (D-NJ).⁷

The use and abuse of the 45Q tax credit has resulted in a taxpayer-funded oil production activity that is regulated by the Safe Drinking Water Act and which puts water at risk. Its failed implementation also undercuts the effort to make the tax credit, and CO₂-EOR, a climate change solution. In addition to the recommendations below for SDWA oversight improvements of CO₂-EOR, Clean Water advocates for limiting 45Q credits to permanent CO₂ storage or utilization projects that do not produce oil and more stringent monitoring, reporting and verification requirements.

Safe Drinking Water Act — Underground Injection Control Program Class II

When the U.S. Congress passed the Safe Drinking Water Act (SDWA) in 1974, it authorized EPA to develop the Underground Injection Control (UIC) program to protect vital underground drinking water sources from risks of industrial activities in which fluid is injected into the subsurface. The UIC program now consists of six classes of injection wells. Class II wells are designated for fluids associated with oil and gas development, including disposal of produced water and injection of fluids for enhanced recovery (ER). ER is the only federally regulated method of oil and gas production.

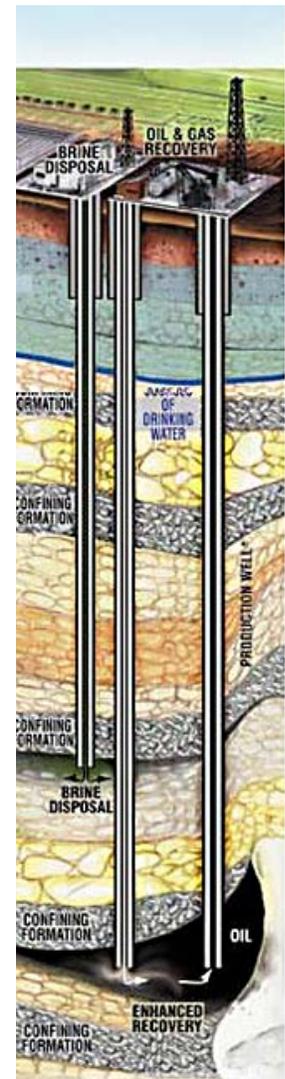
To comply with SDWA's direction to protect underground sources of drinking water (USDWs), EPA established a definition of USDW as an aquifer that contains less than 10,000 mg/L total dissolved solids (TDS). However, Congress also included language mandating that EPA not "interfere with or impede" oil and gas production unless it is "essential" in order to protect USDWs (42 U.S.C. § 1421(b)(2)). When faced with the reality that protecting all USDWs would severely constrain oil and gas activities, EPA included a process for exempting aquifers from USDW classification. The industry effectively pushed to broaden the criteria for exempting aquifers in the final rulemaking, beginning a long history of aquifer exemptions granted with inadequate oversight. (40 CFR § 146.4)

The regulatory, legislative and implementation history of the UIC program dating back to the early days of federal oversight of injection demonstrates how Congress and EPA have prioritized oil and gas development at the expense of water protection. The UIC program can be characterized by a pattern of exemptions, exceptions, and lack of transparency resulting from the effort not to "interfere with or impede" oil and gas activities. Combined with "flexible" regulatory oversight added by Congress in 1980, with the addition of an alternative path to primacy under Sec 1425, and a dramatic record of underfunding, the Class II UIC program's efficacy must be questioned.

Key federal findings:* Clean Water has extensively investigated and advocated for improvements within the Class II UIC program and has identified a long history of inadequate oversight, weak regulations and enforcement, and chronic under-resourcing at the federal Class II program and in some states. The federal Class II UIC program has failed to keep up with changes in the oil and gas industry over the four decades since its inception. Deep research into the UIC program has found:

- Funding for the UIC program in EPA's budget has remained flat for years at less than \$11 million annually, despite increased levels of drilling, oil production and injection activity, limiting EPA's resources for effective program management.

*Federal and state findings are based on extensive investigation which appears in several reports noted in this report's references. They are also based on information compiled from our direct advocacy on these issues.



Source: <http://water.epa.gov/type/groundwater/uic/class2/>

- Federal UIC regulations have not been updated to include key components such as fluid characterization, chemical additive reporting, groundwater monitoring, and other commonsense and feasible safeguards.
- EPA oversight of state Class II programs has been uneven and in some cases inadequate to ensure states are protecting USDWs.
- While primary enforcement of many federal environmental laws has been delegated to state environmental or public health agencies, the UIC Class II program is implemented in most states by oil and gas agencies whose historical role has been permitting production of fossil fuels and are often staffed by former industry employees. This dynamic can lead to regulatory capture and inadequate focus on environmental and health protection.
- Sec. 1425 of SDWA allows for states to obtain Class II primacy without adhering to the same standards as the federal regulations. Sec. 1425 primacy has resulted in highly variable regulatory schemes for Class II wells in different states.
- Data collection and management within UIC programs has been deficient with inadequate record-keeping and a lack of transparency and data accessibility for the public.
- The federal aquifer exemption program is in need of major reform including updating the criteria for granting exemptions, transparency, and public engagement in the approval process.
- The regulatory scheme for CO₂-EOR is inadequate. The UIC Class VI regulations provide numerous protections for carbon sequestration in saline formations, but most CO₂-EOR projects are permitted under Class II. The Class II regulation was not developed for long term carbon storage. Its regulatory intent is to protect underground sources of drinking water (USDWs), but it does not address atmospheric emissions nor long term storage of carbon. EPA's Greenhouse Gas Reporting Program (GHGRP) Subpart RR addresses a major gap in Class II for CO₂-EOR, yet together with Class II does not form a fully appropriate regime. This points to the need for a tailored regulatory approach for CO₂-EOR such as a new class of UIC well that is designed specifically for this activity.

State by state findings: In states where Clean Water Action has investigated Class II injection issues, several shortcomings have emerged. In every state there are challenges with data, transparency and public participation/access, and in each state where we've worked, specific problems have been identified, including in:

- California — Thousands of injection wells were permitted to inject into protected aquifers, endangering drinking water sources and spurring a major reform of the Class II program, including new regulations, exemption criteria and processes, and an overhaul of the state oil and gas agency. California's Class II reform efforts illuminate several opportunities for improvements that could be applied in other states and at the federal level.*
- Colorado — Clean Water's investigation of aquifer exemptions found concerning issues such as lax approval processes and inadequate geological review for exemptions that raise questions about the adequacy of USDW protection.⁸

**Clean Water Action has engaged directly in the reform of California's Class II UIC program, helping to expose issues of USDW endangerment and advocating for regulatory, legislative and oversight changes.*

- Oklahoma — Clean Water found the state’s classification of protected groundwater was lacking in scientific rigor and may have led to injection into USDWs.⁹
- Texas — Despite being home to more injection wells than any other state, not a single aquifer exemption has been applied for or granted, and some injection wells were permitted directly into USDWs.¹⁰

Underground Injection Control Class II Recommendations

This section recommends actions that EPA and states should take to improve protections for underground sources of drinking water from SDWA/UIC Class II activities.

EPA Recommendations: EPA should begin the process of updating the Class II regulations, which would improve EPA’s direct oversight of injection wells in states and Tribal lands that it maintains authority for. It would also raise the bar for state primacy programs by compelling states which obtained primacy under Sec 1422 to demonstrate compliance with updated requirements. While it would not compel 1425 primacy states to change regulations, it would provide a new standard for states to test their regulations against and an oversight mechanism for EPA in for program evaluation. At a minimum, the revised federal Class II regulations should:

- Establish definitions of disposal and enhanced recovery and different technologies (e.g. waterflooding, thermal EOR such as steam flooding and cyclic steaming, miscible gas injection, etc.), as well as adopt specific requirements for each of the technologies.
- Eliminate fixed-radius ¼ mile areas of review, and use a geologically justified radius such as zone of endangering influence (ZEI).
- Require the disclosure of chemicals used in underground injection and routine operations for Class II wells and any well that produces fluids disposed of by injection.



Fracking Wastewater Treatment Plant, Wellsboro, PA, May 2019. Photo by Lighthawk, provided by FracTracker Alliance, www.fractracker.org/photos.

- Require regular testing, characterization and public disclosure of injected and recovered fluids, including produced water.
- Require groundwater quality monitoring of aquifers, especially USDWs, adjacent to, underlying and above injection zones, and those which are penetrated by injection wells.
- Require annual reviews of all injection projects in order to ensure compliance with regulations.
- Review and update regulations for CO₂-EOR to both protect USDWs and address atmospheric emissions. This may include developing a new class or subclass of UIC wells specifically for CO₂-EOR, or requiring CO₂-EOR wells to obtain a Class VI permit.

EPA should update the regulation and oversight of aquifer exemptions, including:

- Reassessing the underground source of drinking water (USDW) definition and aquifer exemption criteria. EPA should update regulations and guidance to reflect modern environmental challenges, the changing climate, water demands and population trends, and technical advances such as in water well drilling and treatment.
 - EPA should review the 10,000 TDS mg/L threshold for USDW (40 CFR § 144.3), and consider a more protective definition that reflects the growing use of brackish and saline groundwater as drinking water sources.
 - EPA should review and update the aquifer exemption criteria in 40 CFR § 146.4.
- Imposing an immediate moratorium on new aquifer exemptions until new rules and approval procedures are in place, including full and transparent opportunities for public participation in the aquifer exemption application process, with targeted notification and engagement from key stakeholders such as water systems and other water users.
- Investigating and/or working with states to evaluate whether all USDWs are adequately protected, including determining whether injection is occurring into non-exempt aquifers and requiring migration modeling for exemptions pertaining to a portion of an aquifer to ensure that injected fluid does not migrate outside the injection zone.
- Documenting injection activity in exempt aquifers to date and whether exemptions have been granted but not utilized. Document whether exemptions were granted for other activities outside of waste disposal and enhanced recovery, including hydraulic fracturing, coalbed methane production and other unconventional extraction activities in USDWs.
- Evaluating existing exemptions for adequate statements of basis, geologic review and consistency with exemption criteria.
- Continuing to work with states and regions to fill gaps and keep up to date the national aquifer exemption inventory and map.¹¹
- Publicly posting online the supporting documents and statements of basis for each exemption.

EPA should address data gaps, improve its data management and increase oversight of state UIC Class II programs, including:

- Improving communication and notification to water users, Public Water Systems, water well permitting agencies, and other key stakeholders about injection activities and permitting. This could include direct notification of pending injection projects and opportunities for participation in approval processes.
- Filling the data gaps identified in EPA's 1981 study on enhanced recovery, specifically on the health risks from chemicals used in ER, persistence of injected chemicals over time, transport mechanisms out of reservoirs, and movements of chemicals in fresh-water aquifers.¹²
- Expediting implementation of a national UIC database which would allow EPA to assess whether UIC programs are meeting their annual inspection goals, and to report UIC results at a national level in a complete and comparable fashion.
- Improving collection of well-specific inspection data from state and EPA-managed programs.
- Conducting annual on-site UIC program evaluations.
- Conducting systematic in-depth reviews of state programs at least every five years.
- Reviewing and considering updates to primacy agreements and memoranda of agreement/understanding (MOA/MOUs) with state agencies to ensure program adequacy.

EPA should address budget and staff constraints to more effectively manage UIC program and better oversee state programs:

- Conduct a comprehensive workforce analysis to identify the resources and staff necessary to oversee state and EPA-managed programs and effectively protect underground sources of drinking water.
- Seek increased budget for the UIC program through a funding request to Congress. We advocate for an initial increase to at least \$20 million annually (from current levels of approximately \$10 million).



State Agency Recommendations: In addition to incorporating the strengthened federal regulatory requirements described above, states with Class II primacy should undertake other activities to improve oversight of injection wells and groundwater protection. Some states have taken these actions already. California has implemented many of them in part or fully in its Class II reform effort.* States should take action to improve UIC programs, as some have done, regardless of changes at the federal level.

States should update USDW identification and protection activities, including revisiting definitions, aquifer exemption approval and oversight processes, and permitting practices:

- Develop comprehensive inventories of all injection projects and wells, including determining water quality of injection zones and reviewing zonal isolation, to determine whether or not injection has occurred into USDWs.*
- Immediately halt injection activities that are occurring in USDWs, until all required aquifer exemptions are granted by EPA.
- Require water quality information of injection zones and demonstration of zonal isolation from USDWs in all future UIC permit applications prior to project and well approvals.
- Provide a clear process for all future injection well permit applications to ensure that injection into USDWs does not occur.*
- Include additional agencies in the aquifer exemption and injection project/well approval processes, such as state water regulators, public health agencies and water districts.*
- Develop a process for submitting aquifer exemption applications to EPA that includes public notice and a public hearing and opportunities for public comment.*
- For any exemptions that are based on a fixed radius or rectangle, states should revisit the geologic review used and reapply to EPA based on actual geologic conditions.
- Evaluate exemptions that have no active injection wells and review applicability of exemption criteria.
- Evaluate the federal aquifer exemption criteria and USDW definition, and consider more rigorous standards that align with actual and future water and population conditions in each particular state.*

States should improve data management of Class II injection and oil and gas activities generally:

- Improve data management systems to make locations and attributes of all injection wells readily available online to the public.*
- Devote resources to the transition from paper-based to electronic data management systems.*
- Conduct groundwater mapping to better understand the water quality of USDWs and aquifers near and within oil and gas fields.*
- Develop state specific inventories and information on aquifer exemptions that link to EPA's Aquifer Exemption Map to improve public availability of information.

*Indicates a UIC Class II recommended state action that California has taken, either partially or fully.

- Publicize annual aggregated production data separated by recovery method, including primary recovery, waterflooding, CO₂-EOR, thermal EOR, etc in order to more accurately describe UIC programs and state oil and gas trends.
- Generally update websites to make more data publicly available and encourage public participation in oil and gas oversight activities.

States should increase financial and human resources of regulatory agencies and prioritize knowledge transfer between staff:

- Raise permit fees and severances to more adequately fund Class II programs (may require legislative action).
- Hire more personnel and ensure vacant positions are filled as soon as possible if staffing shortfalls limit effective oversight.

States should improve programs that are separate, but related to Class II UIC:

- Improve management of idle, abandoned, and orphaned wells to mitigate contamination pathways.
- Review financial assurance regulations, such as bonding levels to ensure adequate resources for plugging and remediating orphan wells.
- Adopt more stringent regulations and escalating fee structures for idle wells to encourage permanent plugging and abandoning and reduce idle well inventories.
- Review and update well construction regulations as needed.
- Improve chemical reporting, testing and disclosure requirements for all oil and gas production additives to better understand the characteristics of produced water and other threats to water quality.



Clean Water Act Regulation of Produced Water Discharges

Under the Clean Water Act, EPA and states with delegated authority regulate discharges into *Waters of the United States* through the National Pollution Discharge Elimination System (NPDES). Effluent Limitation Guidelines (ELGs) are industry specific Clean Water Act standards which set criteria, including pollutant limits, for discharges. Two ELG regulations are most relevant to the discharge of produced water:

- 40 CFR § 435 which regulates direct discharges of produced water, and
- 40 CFR § 437 which regulates commercial waste treatment (CWT) facilities, including those that accept produced water.

Discharges of oil and gas wastewater to surface water are generally prohibited onshore, except in the following cases:

- Areas of the U.S. west of the 98th meridian for agricultural use — watering of livestock and crop irrigation — and wildlife propagation (regulated by 40 CFR § 435 subcategory E)
- Oil and gas wells producing less than 10 barrels of crude oil per day, also known as stripper wells (subcategory F)
- Facilities producing coalbed methane (subcategory H)
- Wastewater from conventional sources treated at a municipal sewage plant (publicly owned treatment works or POTW). In 2016, Clean Water Action successfully advocated for EPA to adopt regulations that prohibit the discharge of unconventional oil and gas waste to publicly owned treatment works (POTWs) (40 CFR § 435.33).^{*} Yet, despite evidence that produced water from unconventional and conventional sources may contain similar constituents of concern, there are no existing pretreatment standards for wastewater from conventional oil and gas activities. This regulation, while only applying to unconventional waste and not applying to conventional waste, allows for potentially polluting discharges to still occur from those facilities.
- Produced water treated at an industrial waste treatment plant (centralized waste treatment or CWT facility) and discharged under CWT regulations (40 CFR § 437) that lack effluent limitations for pollutants common in produced water. EPA's CWT study identified several problems including elevated contaminant levels downstream of CWTs accepting produced water, indicating that current regulations may not be up to the task of preventing water pollution.

These provisions amount to loopholes in Clean Water Act regulation that enable oil and gas producers to bypass the direct discharge prohibition. The known hazards of compounds commonly found in produced water, combined with lack of knowledge around others, means that discharges may be polluting receiving water bodies, undermining the goals of the Clean Water Act.

^{*}EPA defines "unconventional oil and gas wastewater" as "crude oil and natural gas produced by a well drilled into a shale and/or tight formation (including, but not limited to, shale gas, shale oil, tight gas, tight oil)".

Jurisdiction of the Clean Water Act

Over the last two decades the definition of *Waters of the US* has been a moving target. The scope of the Clean Water Act has significant ramifications for how the oil industry operates and may impact water quality. When the Trump Administration finalized its “Dirty Water Rule” it narrowed the scope of the Clean Water Act by cutting federal protections for more than half of our nation’s wetlands and millions of stream miles, ignoring the science and legal requirements of the Act. (Navigable Waters Protection Rule. 33 CFR § 328.3 and 40 CFR §120.2.)

There are multiple lawsuits proceeding through the courts, which bring uncertainty to the future of the Dirty Water Rule and jurisdiction of the Act. Additionally, the Biden Administration has directed EPA to review and consider suspending, revising, or rescinding a host of anti-environment and health regulations promulgated by the Trump Administration, including the Dirty Water Rule. (Executive Order on Protecting Public Health and the Environment and Restoring Science to Tackle the Climate Crisis, Jan 20, 2021).

However, until the legal issues are resolved, and the Biden Administration actions are completed to rescind it, the Dirty Water Rule, will continue to have significant impacts in oil and gas producing states. Ten of the 11 largest oil producing states (with the exception of #2 Alaska) have significant portions of stream miles that lose Clean Water Act protection under the rule. The Dirty Water Rule eliminates protections for ephemeral streams — those that flow only after heavy rain or snow events, and some intermittent (seasonal) streams. As noted in EPA’s economic analysis of the Dirty Water Rule, these major oil states lose federal protections for a significant share of overall stream miles, potentially unleashing a torrent of produced water into these streams, and/or opening them up to destruction for the purposes of building pipelines and other oil and gas facilities.

Some of the oil and gas states which would lose the most in federal protection if the Dirty Water Rule stands:¹³

- New Mexico loses protection for 156,000 stream miles (66% of the total in the state which are categorized as ephemeral).
- California loses protection for 213,000 stream miles (34% of total).
- Texas loses protection for 84,000 stream miles (15% of total).
- Colorado loses protection for 67,000 stream miles (15% of total)*
- Wyoming loses protection for 35,000 stream miles (12% of total).

By limiting which bodies of water are defined as a Water of the US, the Dirty Water Rule would open the door to unchecked pollution that bypasses the federal permitting process that is the main way the Clean Water Act seeks to achieve its goal of eliminating the discharge of pollution into our nation’s waters.

Clean Water Act Recommendations

Under the Clean Water Act, EPA has a number of administrative tools at its disposal to improve the regulation of upstream oil and gas activities. These recommendations focus on addressing produced water discharges regulated by the Clean Water Act.

The first step in restoring the Clean Water Act's efficacy in protecting water quality from oil and gas operations must be to re-define *Waters of the US* based on a scientifically and legally justifiable standard that protects water quality from all pollution, including oil and gas operations.

EPA should improve its understanding about chemical characteristics of produced water by promulgating regulations to:

- Improve chemical additive transparency by limiting trade secret claims and requiring disclosure of chemicals used in routine well activities and enhanced recovery.
- Require regular produced water testing and reporting.

EPA should take steps to revise effluent guidelines for oil and gas extraction:

- Review and update the effluent guidelines for oil and gas extraction in 40 CFR § 435, in order to mitigate pathways of chemical exposure that could harm the environment and public health, including:
 - Eliminate subcategory E (agricultural and wildlife water use subcategory) by expanding the zero discharge standard to all areas west of the 98th meridian until appropriate analytical methods and standards are developed that can ensure discharges are safe for humans and the environment.
 - Update effluent guidelines for subcategory F (stripper well subcategory).
 - Update effluent guidelines for subcategory H (coalbed methane subcategory).
 - Establish zero discharge pretreatment standards for discharges to POTWs for conventional oil and gas wastewater.
- EPA should also review and update CWT effluent guidelines in 40 CFR § 437 to address risks and deficiencies, such as those identified in EPA's CWT study. EPA should prohibit receipt of produced water wastes by private facilities or develop specific guidelines for CWTs to accept these wastes.
- Limit the use of chemical additives in oil production activities which lack established analytical methods and/or have incomplete toxicity profiles, especially when surface discharge may occur.
- EPA should develop Aquatic Life and Human Health Water Quality Criteria for known constituents in produced water that do not currently have criteria and develop guidelines for land application that is allowed in the west or prohibit such discharges.

Specific recommendations for EPA and states with oil and gas NPDES primacy to improve permitting oversight and transparency:

- Review, evaluate and update state water quality standards to ensure protection of water resources from produced water discharges.
- Make NPDES permits documentation available and easily searchable online and by request. Increased transparency would allow the public to know where discharges are occurring. Specific steps include:

- Consider following Mississippi and Arkansas (or similar) model for making permits and other documentation available and searchable online.
- Include federal regulation, including subcategory, in the permit and the search filters of the online search tool. This change would allow a member of the public to search, for example, how many permits from coalbed methane extraction facilities for wastewater discharges to surface water are active in their state.
- Create a national inventory of oil and gas discharges to surface waters that includes links to permits and information on regulatory activities such as enforcement and monitoring.

Conclusion

The visions and goals of the Clean Water Act and the Safe Drinking Water Act have not been fully realized when it comes to protecting water quality from oil and gas development, but the Acts have the potential to rein in some of the most polluting oil and gas activities. EPA and states should take the steps outlined in this report to close loopholes and exemptions that put our water at risk, and increase oversight and budgets to effectively implement the laws and programs meant to protect water.

Over the past decade, Clean Water has developed expertise in the implementation of these laws at the federal and state levels. We've found Clean Water Act and Safe Drinking Water Act programs are essential to protecting the water resources most at risk in a climate changing world. Our work, backed up by federal agency and academic research, defines a clear path for a new administration and states to effectively implement programs to protect water quality and drinking water sources from oil and gas activities as we work to move away from fossil fuels.

Notes

- 1 EPA. “Detailed Study of the Centralized Waste Treatment Point Source Category for Facilities Managing Oil and Gas Extraction Wastes EPA-821-R-18-004.
- 2 EPA. “Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States.”
- 3 EPA. “Detailed Study of the Centralized Waste Treatment Point Source Category for Facilities Managing Oil and Gas Extraction Wastes EPA-821-R-18-004.
- 4 GAO. “DRINKING WATER: EPA Program to Protect Underground Sources from Injection of Fluids Associated with Oil and Gas Production Needs Improvement.”
- 5 EPA. “Summary of Input on Oil and Gas Extraction Wastewater Management Practices Under the Clean Water Act.”
- 6 Clean Water Action. “Carbon Capture and Release”
- 7 Department of the Treasury, Office of the Inspector General for Tax Administration. “Letter to Senator Robert Menendez.” April 15, 2020. <https://www.menendez.senate.gov/imo/media/doc/TIGTA%20IRC%2045Q%20Response%20Letter%20FINAL%2004-15-2020.pdf>
- 8 CWA. “Colorado Aquifer Exemptions”
- 9 CWA. “Oklahoma Drinking Water at Risk from Oil and Gas Injection Wells”
- 10 CWA. “Texas Aquifer Exemptions”
- 11 US EPA. Aquifer Exemptions Map. <https://www.epa.gov/uic/aquifer-exemptions-map>
- 12 US EPA. Potential Environmental Problems of Enhanced Oil and Gas Recovery Techniques (EPA-600/S2-81-149). Sept. 1981.
- 13 EPA and US Army. Economic Analysis Economic Analysis for the Navigable Waters Protection Rule: Definition of “Waters of the United States” Jan 22. 2020. p 198. https://www.epa.gov/sites/production/files/2020-01/documents/econ_analysis_-_nwpr.pdf

Bibliography

Clean Water Action Reports:

Aquifer Exemptions: Sacrificing Groundwater for Oil and Gas Production. January 2015

<https://cleanwater.org/publications/aquifer-exemptions-sacrificing-groundwater-oil-and-gas-production>

Carbon Capture and Release: Oversight Failures in the Section 45Q Tax Credit for Enhanced Oil Recovery. May 2018.

<https://www.cleanwateraction.org/publications/carbon-capture-and-release>

Citizen Petition to Repeal or Amend the EPA's Aquifer Exemption Regulations to Protect Underground Sources of Drinking Water. Natural Resources Defense Council (NRDC), Clean Water Action, Powder River Basin Resource Council. March 2016.

<https://www.cleanwateraction.org/files/SDWA%20Aquifer%20Exemption%20Petition%20-%20NRDC%20et%20al%20-%202016-23-2016.pdf>

Clean Water Act Regulation of Oil and Gas Wastewater Discharges. January 2020

<https://cleanwater.org/publications/report-clean-water-act-regulation-oil-and-gas-wastewater-discharges>

Colorado Aquifer Exemptions. March 2019.

<https://cleanwater.org/publications/colorado-aquifer-exemptions>

Oklahoma Drinking Water at Risk from Oil and Gas Injection Wells. April 2017.

<https://cleanwater.org/publications/oklahoma-drinking-water-risk-oil-and-gas-injection-wells>

Regulating Oil & Gas Activities to Protect Drinking Water. January 2015

<https://cleanwater.org/publications/regulating-oil-gas-activities-protect-drinking-water>

Texas Aquifer Exemptions. August 2016.

<https://cleanwater.org/publications/texas-aquifer-exemptions>

The Environmental Risks and Oversight of Enhanced Oil Recovery in the United States. August 2017.

<https://cleanwater.org/publications/EOR-risks>

Significant Federal Government Agency Reports:

United States Environmental Protection Agency (US EPA). *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States.* EPA/600/R-16/236F. Dec. 12, 2016.

<https://www.epa.gov/hfstudy>

US EPA. *Detailed Study of the Centralized Waste Treatment Point Source Category for Facilities Managing Oil and Gas Extraction Wastes.* EPA-821-R-18-004. May 2018.

https://www.epa.gov/sites/production/files/2018-05/documents/cwt-study_may-2018.pdf

US EPA. *Summary of Input on Oil and Gas Extraction Wastewater Management Practices Under the Clean Water Act.* EPA-821-S19-00. May 2020.

<https://www.epa.gov/eg/summary-input-oil-and-gas-extraction-wastewater-management-practices-under-clean-water-act-final>

US EPA. *Potential Environmental Problems of Enhanced Oil and Gas Recovery Techniques.* EPA-600/S2-81-149. Sept. 1981.

United States Government Accountability Office (US GAO). *DRINKING WATER: Characterization of Injected Fluids Associated with Oil and Gas Production.* GAO-14-857R. Sept 2014.

<https://www.gao.gov/products/GAO-14-857R?source=ra>

US GAO. *DRINKING WATER: EPA Program to Protect Underground Sources from Injection of Fluids Associated with Oil and Gas Production Needs Improvement.* GAO-14-555. June 2014.

<https://www.gao.gov/products/GAO-14-555>

March 2021



1444 Eye Street NW, #400, Washington DC 20005-6538 | 202.895.0420 | www.cleanwater.org