



EPA's Clean Water Act Activities on Oil and Gas Produced Water

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SBEAP

Jesse W. Pritts, P.E.
USEPA Office of Water

Overview

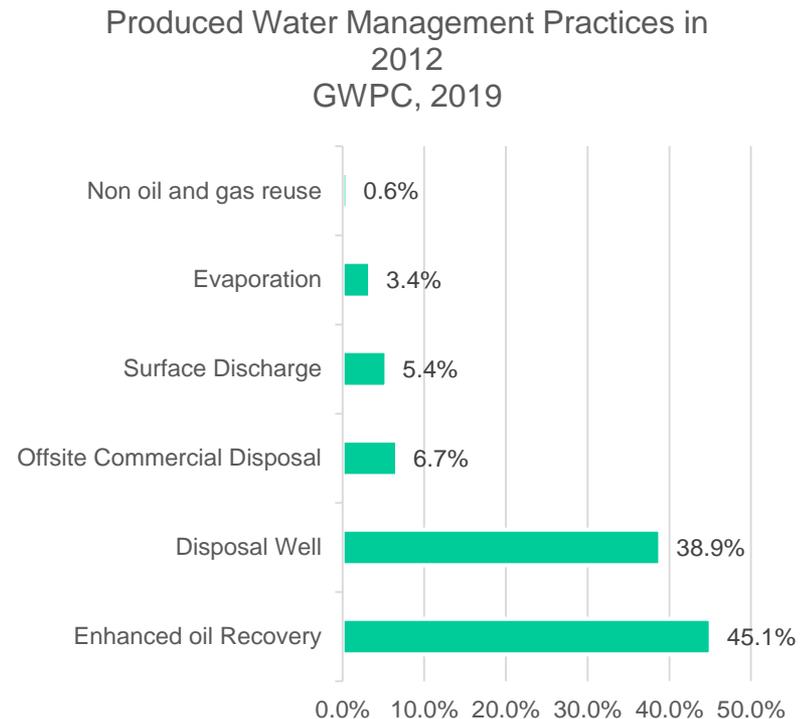
- Background – oil and gas produced water generation and management
- Overview of Clean Water Act (CWA) regulations affecting oil and gas produced water management
- EPA's current CWA produced water management activities
 - Pretreatment standards
 - Centralized Waste Treatment (CWT) study
 - National produced water study

Produced Water Generation

- Oil and gas extraction activities generate wastewater
 - Drilling waste and spent drilling fluids
 - Hydraulic fracturing “flowback” water
 - “Produced water” which includes water contained in the formation
 - Well maintenance activities
- In 2012, the nearly 1 million producing oil and gas wells in the U.S. generated nearly 900 billion gallons of produced water (Ground Water Protection Council (GWPC) Produced Water Report: Regulations, Current Practices, and Research Needs, 2019)
- These wastewaters can contain a variety of pollutants, including salts, hydrocarbons and other organic compounds, metals, and radioactivity
- Total Dissolved Solids in produced water can range from a few hundred mg/L to over 300,000 mg/L

Produced Water Management Options

- Oil and gas produced water is managed using a variety of approaches, including
 - Reuse for enhanced oil recovery
 - Reuse for hydraulically fracturing wells
 - On-site management in pits or evaporation ponds
 - Application to roads for deicing or dust suppression
 - Watering of livestock or wildlife propagation (beneficial reuse)
 - Irrigation of crops
 - Treatment and discharge to surface waters
 - Disposal in injection wells



Ground Water Protection Council (2019). Produced Water Report: Regulations, Current Practices, and Research Needs.

Background on Clean Water Act Regulations

- The National Pollutant Discharge Elimination System (NPDES) was created in 1972 by the Clean Water Act (CWA)
 - Addresses water pollution by regulating point source discharges of pollutants to waters of the United States
 - Applies to industrial sources as well as discharges from publicly owned treatment works (or POTWs)
- Any discharge of pollutants to surface waters must obtain authorization to discharge (i.e., a permit)
- NPDES permits contain both technology-based effluent limitations (called effluent guidelines) as well as water quality-based effluent limitations
 - Technology-based limitations are based on the performance of best available treatment technologies, while considering factors such as economic achievability to the industry
 - Water quality-based effluent imitations are protective of the water quality of the receiving water; water quality goals for water bodies are defined by state water quality standards

Effluent Guidelines Affecting Oil and Gas Extraction

- EPA has two nationally applicable, technology-based regulations that affect discharge of oil and gas extraction wastewaters:
 - Oil and gas extraction effluent guidelines
 - 40 CFR part 435
 - Centralized waste treatment effluent guidelines
 - 40 CFR part 437



Oil and Gas Extraction Guidelines

- For onshore facilities, the oil and gas extraction effluent guidelines generally prohibit the discharge of pollutants in wastewaters directly to surface waters (zero discharge)
- An exception is for discharge for beneficial reuse west of the 98th meridian
- In 2016 EPA promulgated a rule (pretreatment standards) that prohibits the discharge of wastewater from unconventional wells to POTWs



Centralized Waste Treatment (CWT) Guidelines

- CWT facilities accept wastewater from off-site for treatment or reuse
- CWT facilities can accept oil and gas extraction wastewater and can discharge wastewater directly to surface waters and indirectly to POTWs
- CWT rules were not developed specifically for wastes from the oil and gas extraction industry, so the technology basis and the effluent limitations may not adequately control those wastewaters (see May, 2018 CWT study)



2016 Pretreatment Standards

- Produced water contains a number of constituents (such as chlorides) that are not removed by treatment technologies present at POTWs
- Pollutants in produced water may pass-through the POTW untreated and cause problems such as impacting downstream drinking water sources and causing harmful disinfection by-product formation.
- Pollutants in produced water may also hinder the performance of the POTW treatment technologies and may accumulate in biosolids affecting their reuse
- EPA promulgated a rule in 2016 that established zero discharge pretreatment standards for discharges of wastewater from unconventional oil and gas extraction facilities to POTWs
- We define unconventional extraction as wells drilled into shale and/or tight formations
- Existing sources discharging into POTWs were given until August 29, 2019 to comply with the rule.
- This rule primarily affects producers in Pennsylvania as that is the only state where POTWs were accepting produced water from unconventional wells

Centralized Waste Treatment Study

- EPA completed a study in 2018 evaluating CWT facilities that accept oil and gas extraction wastes
- The goals of the study included:
 - Evaluate types/quantities of wastes received at these facilities
 - Evaluate treatment in place at these facilities (baseline)
 - Evaluate cost/performance of technologies for treating produced water
 - Evaluate economics of industry
 - Evaluate human health and ecological impacts of discharges (disinfectant by-product formation, effects on receiving water biota)
- Use information to inform whether updates to existing regulation are needed
- The Agency did not make any decisions on next steps, but instead started a national produced water management study

National Produced Water Study

- Large volumes of wastewater – or *produced water* - are generated in the oil and gas extraction industry, and projections show these volumes will increase
- Produced water is primarily managed by reuse in the oil field and by disposing of it using a practice known as underground injection via Class II Underground Injection Control (UIC) disposal wells
- New approaches to managing produced water are emerging
- Some states and stakeholders, particularly in water scarce areas of the country, are asking what steps would be necessary to treat and renew this water for other purposes

Oil and Gas Study – Goals and Scope

- Goal is to look at how EPA, states, tribes and stakeholders regulate and manage wastewater from the oil and gas industry
- To evaluate opportunities to increase reuse of produced water both inside and outside of the oil field
- To understand if support exists for potential regulations that may allow for broader discharge of oil and gas extraction wastewater to surface waters under NPDES
- Key component is to solicit information from individual perspectives on topics surrounding produced water management and reuse

Engagement Activities

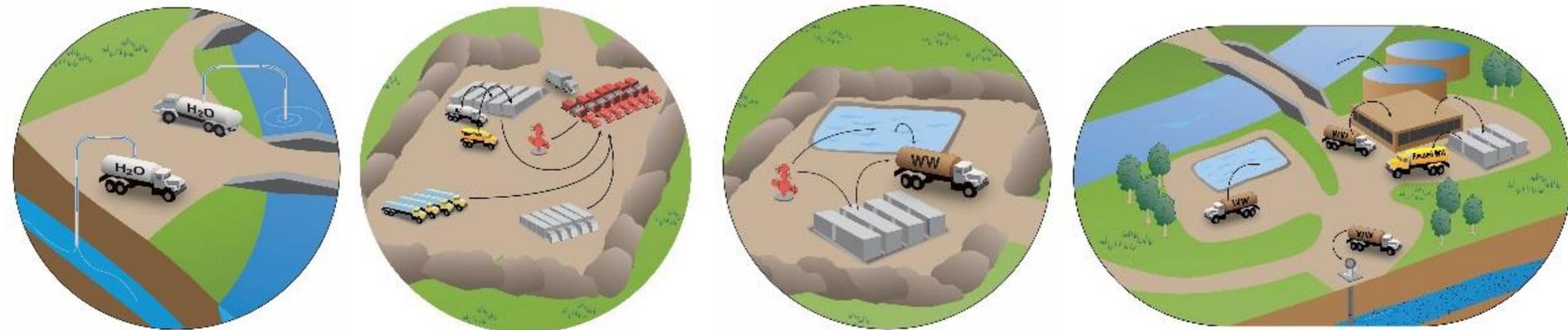
- We held over 80 engagement activities during 2018
- In-person meetings with stakeholders in states
 - Washington DC, New Mexico, Colorado, Wyoming, Texas, California, Oklahoma, and Pennsylvania
- Conference calls and webinars
 - Academia
 - Industry
 - NGOs
 - Public
 - States (Utah, North Dakota, and Louisiana) and state-affiliated organizations
 - Tribes
 - Vendors

Next Steps

Draft Study was published in May, 2019

Public input period ended July 1, 2019

We plan to finalize the study later this year and announce potential next steps



Links

<https://www.epa.gov/eg/unconventional-oil-and-gas-extraction-effluent-guidelines>

<https://www.epa.gov/eg/centralized-waste-treatment-effluent-guidelines#study>

<https://www.epa.gov/eg/study-oil-and-gas-extraction-wastewater-management>

Jesse W. Pritts

Pritts.jesse@epa.gov

202-566-1038