report containing this action and other required information to the U.S. Senate, the U.S. House of Representatives, and the Comptroller General of the United States prior to publication of the rule in the **Federal Register**. A major rule cannot take effect until 60 days after it is published in the **Federal Register**. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

Under section 307(b)(1) of the CAA, petitions for judicial review of this action must be filed in the United States Court of Appeals for the appropriate circuit by August 29, 2016. Filing a petition for reconsideration by the Administrator of this final rule does not affect the finality of this action for the purposes of judicial review nor does it extend the time within which a petition for judicial review may be filed, and shall not postpone the effectiveness of such rule or action. This action may not be challenged later in proceedings to enforce its requirements. (See section 307(b)(2)).

List of Subjects in 40 CFR Part 52

Environmental protection, Administrative practice and procedure, Air pollution control, Incorporation by reference, Intergovernmental relations, Nitrogen dioxide, Ozone, Particulate Matter, Reporting and recordkeeping requirements, Sulfur oxides.

Dated: June 16, 2016.

Mark Hague,

Regional Administrator, Region 7.

For the reasons stated in the preamble, EPA amends 40 CFR part 52 as set forth below:

PART 52—APPROVAL AND PROMULGATION OF IMPLEMENTATION PLANS

■ 1. The authority citation for part 52 continues to read as follows:

Authority: 42 U.S.C. 7401 *et seq.*

Subpart AA-Missouri

■ 2. In § 52.1320:

■ a. Revise the section heading.

■ b. In the table in paragraph (c), under Chapter 6, add entries "10–6.372" and "10–6.376" in numerical order.

The revisions read as follows:

§ 52.1320 Identification of plan.

* * * * *

(c)* * *

EPA-APPROVED MISSOURI REGULATIONS

Missouri citation	Title	State effective date	EPA approval date	Explanation
Missouri Department of Natural Resources				
*	*	*	*	*
Chapter 6—Air Quality Standards, Definitions, Sampling and Reference Methods, and Air Pollution Control Regulations for the State of Missouri				
*	*	*	*	*
10–6.372	Cross-State Air Pollution Rule Annual NO_X Trading Allowance Allocations.	12/30/15	6/28/16 [Insert ***Federal Register*** citation].	
10–6.376	Cross-State Air Pollution Rule Annual SO_2 Trading Allowance Allocations.	12/30/15	6/28/16 [Insert ***Federal Register*** citation].	
*	*	*	*	*

* * * * *

[FR Doc. 2016–15048 Filed 6–27–16; 8:45 am]

BILLING CODE 6560–50–P

ENVIRONMENTAL PROTECTION AGENCY

40 CFR Part 435

[EPA–HQ–OW–2014–0598; FRL–9947–87–OW]

RIN 2040–AF35

Effluent Limitations Guidelines and Standards for the Oil and Gas Extraction Point Source Category

AGENCY: Environmental Protection Agency (EPA).

ACTION: Final rule.

SUMMARY: The Environmental Protection Agency (EPA) is publishing a final Clean Water Act (CWA) regulation that protects human health, the environment and the operational integrity of publicly owned treatment works (POTWs) by establishing pretreatment standards that prevent the discharge of pollutants in wastewater from onshore unconventional oil and gas (UOG) extraction facilities to POTWs. UOG extraction wastewater can be generated in large quantities and contains constituents that are potentially harmful to human health and the environment. Certain UOG extraction wastewater constituents are not typical of POTW influent wastewater and can be discharged, untreated, from the POTW to the receiving stream; can disrupt the operation of the POTW (*e.g.*, by inhibiting biological treatment); can accumulate in biosolids (sewage sludge), limiting their beneficial use; and can facilitate the formation of harmful disinfection by-products (DBPs). Based on the information collected by EPA, the requirements of this final rule reflect current industry practices for onshore unconventional oil and gas extraction facilities. Therefore, EPA does not project that the final rule will impose any costs or lead to pollutant removals, but will ensure that current industry best practice is maintained over time.

DATES: The final rule is effective on August 29, 2016. In accordance with 40 CFR part 23, this regulation shall be considered issued for purposes of judicial review at 1 p.m. Eastern time on July 12, 2016. Under section 509(b)(1) of the CWA, judicial review of this regulation can be had only by filing a petition for review in the U.S. Court of Appeals within 120 days after the regulation is considered issued for purposes of judicial review. Under section 509(b)(2), the requirements in this regulation may not be challenged later in civil or criminal proceedings

brought by EPA to enforce these requirements.

ADDRESSES: The EPA has established a docket for this action under Docket ID No. EPA–HQ–OW–2014–0598. All documents in the docket are listed on the *http://www.regulations.gov* Web site. Although listed in the index, some information is not publicly available, *e.g.,* confidential business information (CBI) or other information whose disclosure is restricted by statute. Certain other material, such as copyrighted material, is not placed on the Internet and will be publicly available only in hard copy form. Publicly available docket materials are available electronically through *http://www.regulations.gov.* A detailed record index, organized by subject, is available on EPA's Web site at *https://www.epa.gov/eg/unconventional-oil-and-gas-extraction-effluent-guidelines.*

FOR FURTHER INFORMATION CONTACT: For more information, see EPA's Web site: *https://www.epa.gov/eg/unconventional-oil-and-gas-extraction-effluent-guidelines.* For technical information, contact Karen Milam, Engineering and Analysis Division, Office of Science and Technology (4305T), Environmental Protection Agency, 1200 Pennsylvania Ave. NW., Washington, DC 20460; telephone number: 202–566–1915; email address: *Milam.Karen@epa.gov.*

SUPPLEMENTARY INFORMATION:

Organization of This Preamble

Table of Contents

I. Regulated Entities and Supporting Documentation

A. Regulated Entities

Entities potentially regulated by this final action include:

Category	Examples of regulated entities	North American Industry Classification System (NAICS) Code
Industry	Crude Petroleum and Natural Gas Extraction	211111
	Natural Gas Liquid Extraction	211112

This section is not intended to be exhaustive, but rather provides a guide for readers regarding entities likely to be regulated by this final action. Other types of entities that do not meet the above criteria could also be regulated. To determine whether your facility would be regulated by this final action, you should carefully examine the applicability criteria listed in 40 CFR 435.30 and the definitions in 40 CFR 435.33(b) of the final rule and detailed further in Section VI, of this preamble. If you still have questions regarding the applicability of this final action to a particular entity, consult the person listed for technical information in the preceding **FOR FURTHER INFORMATION CONTACT** section.

B. Supporting Documentation

The final rule is supported by a number of documents including the Technical Development Document for the Effluent Limitations Guidelines and Standards for the Oil and Gas Extraction Point Source Category (TDD), Document No. EPA–820–R–16–003 (DCN SGE01188). This document is available in the public record for this final rule and on EPA's Web site at *https://www.epa.gov/eg/unconventional-oil-and-gas-extraction-effluent-guidelines.*

II. Legal Authority

EPA finalizes this regulation under the authorities of sections 101, 301, 304, 306, 307, 308, and 501 of the CWA, 33 U.S.C. 1251, 1311, 1314, 1316, 1317, 1318, and 1361.

III. Purpose and Summary of Final Rule

A. Purpose and Summary of the Final Rule

Responsible development of America's oil and gas resources offers important economic, energy security, and environmental benefits. EPA has been working with states and other

stakeholders to understand and address potential impacts of hydraulic fracturing, an important process involved in producing unconventional oil and gas, to help ensure public confidence that oil and gas production is conducted in a safe and responsible manner. This final rule fills a gap in existing federal wastewater regulations to ensure that the current industry practice of not sending wastewater discharges from this sector to POTWs continues into the future. This rule does not address the practice of underground injection of wastewater discharges from this sector, which is covered under the Safe Drinking Water Act (SDWA) (see Chapter A of the TDD).

Recent advances in the well completion process, combining hydraulic fracturing and horizontal drilling, have enhanced the technological and economic feasibility of oil and natural gas extraction from both existing and new resources. As a result, in 2013, United States (U.S.) crude oil and natural gas production reached their highest levels in more than 15 and 30 years, respectively (DCN SGE01192). Further, the Department of Energy (DOE) projects that natural gas production in the U.S. will increase by 45 percent by 2040, compared to 2013 production levels (DCN SGE01192). Similarly, the DOE projects that by 2020, crude oil production in the U.S. will increase by 43 percent compared to 2013 production levels (DCN SGE01192).

Direct discharges of oil and gas extraction wastewater pollutants from onshore oil and gas resources to waters of the U.S. have been regulated since 1979 under the existing Oil and Gas Effluent Limitations Guidelines and Standards (ELGs) (40 CFR part 435), the majority of which fall under subpart C, the Onshore Subcategory. Oil and gas extraction activities subject to subpart C include production, field exploration, drilling, well completion, and well treatment. The limitations for direct dischargers in the Onshore Subcategory represent Best Practicable Control Technology Currently Available (BPT). Based on the availability and economic practicability of underground injection technologies, the BPT-based limitations for direct dischargers require zero discharge of pollutants to waters of the U.S. However, there are currently no requirements in subpart C that apply to onshore oil and gas extraction facilities that are "indirect dischargers," *i.e.*, those that send their discharges to POTWs (municipal wastewater treatment facilities) which treat the water before discharging it to waters of the U.S.

This final rule applies to a subset of oil and gas extraction, *i.e.*, onshore extraction from shale and/or tight geologic formations (referred to hereafter as unconventional oil and gas (UOG) resources). UOG extraction wastewater can be generated in large quantities and contains constituents that are potentially harmful to human health and the environment. Wastewater from UOG wells often contains high concentrations of total dissolved solids (TDS) (salt content). The wastewater can also contain various organic chemicals, inorganic chemicals, metals, and naturally-occurring radioactive materials (referred to as technologically enhanced naturally occurring radioactive material or TENORM).[1] This potentially harmful wastewater creates a need for appropriate wastewater management infrastructure and management practices. Historically, operators of oil and gas extraction facilities primarily managed their wastewater via underground injection (where available). Where UOG wells were drilled in areas with limited underground injection wells, and/or there was a lack of wastewater management alternatives, it became more common for operators to look to POTWs and private wastewater treatment facilities to manage their wastewater.

POTWs collect wastewater from homes, commercial buildings, and industrial facilities and pipe it through sewer lines to the sewage treatment plant. In some cases, industrial dischargers can haul wastewater to the treatment plant by tanker truck. The industrial wastewater, commingled with domestic wastewater, is treated by the POTW and discharged to a receiving waterbody. Most POTWs, however, are designed primarily to treat municipally-generated, not industrial, wastewater. They typically provide at least secondary level treatment and, thus, are designed to remove suspended solids and organic material using biological treatment. As mentioned previously, wastewater from UOG extraction can contain high concentrations of TDS, radioactive elements, metals, chlorides, sulfates, and other dissolved inorganic constituents that POTWs are not designed to remove. Certain UOG extraction wastewater constituents are not typical of POTW influent wastewater and can be discharged, untreated, from the POTW to the receiving stream; can disrupt the operation of the POTW (*e.g.*, by inhibiting biological treatment); can accumulate in biosolids (sewage sludge), limiting their beneficial use; and can facilitate the formation of harmful DBPs.

Where UOG extraction wastewaters have been discharged through POTWs and private wastewater treatment plants in the past, it has been documented that the receiving waters have elevated levels of TDS, specifically chlorides and bromide (DCN SGE01328). The concentration of TDS in UOG extraction wastewater can be high enough that if discharged untreated to a surface water it has the potential to adversely affect a number of the designated uses of the surface water, including use as a drinking water source, aquatic life support, livestock watering, irrigation, and industrial use. High concentrations of TDS can impact aquatic biota by causing increased receiving water salinity, osmotic imbalances, and toxic effects from individual ions present in the TDS. Increases in instream salinity have been shown to cause shifts in biotic communities, limit biodiversity, exclude less-tolerant species and cause acute or chronic effects at specific life stages (DCN SGE00946).

Discharges of bromide in industrial wastewater upstream of drinking water intakes—either directly or indirectly through POTWs—have led to the formation of carcinogenic disinfection by-products (brominated DBPs, in particular trihalomethanes) at drinking water utilities. Recent studies indicate that UOG extraction wastewaters contain various inorganic and organic DBP precursors that can react with disinfectants used by POTWs, and promote the formation of DBPs or alter speciation of DBPs, particularly brominated-DBPs, which are suspected to be among the more toxic DBPs (DCN SGE00535; DCN SGE00985). DBPs have been shown to have both adverse human health and ecological affects (DCN SGE00535; DCN SGE01126).

Section 307(b) of the CWA provides EPA authority to establish nationally applicable pretreatment standards for industrial categories that discharge indirectly (*i.e.*, send wastewater to any POTW); this authority applies to key pollutants, such as TDS and its constituents, that are not susceptible to treatment by POTWs, or for pollutants that would interfere with the operation

[1] Naturally occurring radioactive materials that have been concentrated or exposed to the accessible environment as a result of human activities such as manufacturing, mineral extraction, or water processing are referred to as technologically enhanced naturally occurring radioactive material (TENORM). "Technologically enhanced" means that the radiological, physical, and chemical properties of the radioactive material have been altered by having been processed, or beneficiated, or disturbed in a way that increases the potential for human and/or environmental exposures. (See EPA 402–R–08–005–V2)

of POTWs. Generally, EPA designs nationally applicable pretreatment standards for categories of industry (categorical pretreatment standards) to ensure that wastewaters from direct and indirect industrial dischargers are subject to similar levels of treatment. EPA, in its discretion under section 304(g) of the Act, periodically evaluates indirect dischargers not subject to categorical pretreatment standards to identify potential candidates for new pretreatment standards. Until issuance of this final rule, EPA had not established nationally applicable pretreatment standards for the onshore oil and gas extraction point source subcategory.

This final rule establishes technology-based categorical pretreatment standards under the CWA for discharges of pollutants into POTWs from existing and new onshore UOG extraction facilities in subpart C of 40 CFR part 435 (80 FR 18557, April 7, 2015). The rule will fill a gap in federal CWA regulations and address concerns regarding the level of treatment provided by POTWs for UOG wastewater, potential interference with treatment processes, and potential impacts on water quality and aquatic life impacts that could result from inadequate treatment. Consistent with existing BPT-based requirements for direct dischargers in this subcategory, this final rule establishes pretreatment standards for existing and new sources (PSES and PSNS, respectively) that require zero discharge of wastewater pollutants associated with onshore UOG extraction facilities to POTWs.

This final rule does not include pretreatment standards for wastewater pollutants associated with conventional oil and gas extraction facilities or coalbed methane extraction facilities. EPA is reserving consideration of any such standards for a future rulemaking, if appropriate. See Section V1.A.

B. Summary of Costs and Benefits

Because the data reviewed by EPA show that the UOG extraction industry is not currently managing wastewaters by sending them to POTWs, the final rule is not projected to affect current industry practice or to result in incremental compliance costs or monetized benefits. UOG extraction wastewater is typically managed through disposal via underground injection wells, reuse/recycle in subsequent fracturing jobs, or transfer to a centralized waste treatment (CWT) facility (see 80 FR 18570, April 7, 2015). EPA is promulgating this rule as a backstop measure because onshore unconventional oil and gas extraction facilities have discharged to POTWs in the past and because the potential remains that some facilities may consider discharging to POTWs in the future.

IV. Background

A. Clean Water Act

Congress passed the CWA to "restore and maintain the chemical, physical, and biological integrity of the Nation's waters." 33 U.S.C. 1251(a). The Act establishes a comprehensive program for protecting our nation's waters. Among its core provisions, the CWA prohibits the discharge of pollutants from a point source to waters of the U.S., except as authorized under the Act. Under section 402 of the CWA, discharges may be authorized through a National Pollutant Discharge Elimination System (NPDES) permit. The CWA establishes a two-pronged approach for these permits, technology-based controls that establish the floor of performance for all dischargers, and water quality-based limits where the technology-based limits are insufficient for the discharge to meet applicable water quality standards. To serve as the basis for the technology-based controls, the CWA authorizes EPA to establish national technology-based effluent limitations guidelines and new source performance standards for discharges from different categories of point sources, such as industrial, commercial, and public sources, that discharge directly into waters of the U.S.

Direct dischargers (those discharging directly to waters of the U.S.) must comply with effluent limitations in NPDES permits. Technology-based effluent limitations (TBELs) in NPDES permits for direct dischargers are derived from effluent limitations guidelines (CWA sections 301 and 304) and new source performance standards (CWA section 306) promulgated by EPA. Alternatively, TBELs may be established based on best professional judgment (BPJ) where EPA has not promulgated an applicable effluent guideline or new source performance standard (CWA section 402(a)(1)(B) and 40 CFR 125.3). The effluent guidelines and new source performance standards established by regulation for categories of industrial dischargers are based on the degree of control that can be achieved using various levels of pollution control technology, as specified in the Act. Additional limitations based on water quality standards are also required to be included in the permit where necessary to meet water quality standards. CWA section 301(b)(1)(C).

EPA promulgates national effluent guidelines and new source performance standards for major industrial categories for three classes of pollutants: (1) Conventional pollutants (total suspended solids, oil and grease, biochemical oxygen demand (BOD5), fecal coliform, and pH), as outlined in CWA section 304(a)(4) and 40 CFR 401.16; (2) toxic pollutants (*e.g.,* metals such as arsenic, mercury, selenium, and chromium; and organic pollutants such as benzene, benzo-a-pyrene, phenol, and naphthalene), as outlined in section 307(a) of the Act, 40 CFR 401.15 and 40 CFR part 423, appendix A; and (3) nonconventional pollutants, which are those pollutants that are not categorized as conventional or toxic (*e.g.,* ammonia-N, phosphorus, and TDS).

Under section 307(b) of the CWA, there are general and specific prohibitions on the discharge to POTWs of pollutants in specified circumstances in order to prevent "pass through" or "interference." Pass through occurs whenever the introduction of pollutants from a user will result in a discharge that causes or contributes to a violation of any requirement of the POTW permit. See 40 CFR 403.3(p). Interference means a discharge that, among other things, inhibits or disrupts the POTW or prevents biosolids use consistent with the POTW's chosen method of disposal. See 40 CFR 403.3(k). These general and specific prohibitions must be implemented through local limits established by POTWs in certain cases. See 40 CFR 403.5(c). POTWs with approved pretreatment programs must develop and enforce local limits to implement the general prohibitions on user discharges that pass through or interfere with the POTW and implement specific prohibitions in 40 CFR 403.5(b). In the case of POTWs that are not required to develop a pretreatment program, the POTWs must develop local limits where there is interference or pass through and the limits are necessary to ensure compliance with the POTW's NPDES permit or biosolids use.

The CWA also authorizes EPA to promulgate nationally applicable pretreatment standards that restrict pollutant discharges from facilities that discharge pollutants indirectly, by sending wastewater to POTWs, as outlined in sections 307(b) and (c) and 33 U.S.C. 1317(b) and (c). Specifically, the CWA authorizes EPA to establish pretreatment standards for those pollutants in wastewater from indirect dischargers that EPA determines are not susceptible to treatment by a POTW or which would interfere with POTW operations. CWA sections 307(b) and (c). Under section 301(b)(1)(A) and

301(b)(2)(A) and the legislative history of the 1977 CWA amendments, pretreatment standards are technology-based and analogous to TBELs for direct dischargers for the removal of toxic pollutants. As explained in the statute and legislative history, the combination of pretreatment and treatment by the POTW is intended to achieve the level of treatment that would be required if the industrial source were making a direct discharge. Conf. Rep. No. 95–830, at 87 (1977), reprinted in U.S. Congress. Senate. Committee on Public Works (1978), A Legislative History of the CWA of 1977, Serial No. 95–14 at 271 (1978). As such, in establishing pretreatment standards, EPA's consideration of pass through for national technology-based categorical pretreatment standards differs from that described above for general pretreatment standards. For categorical pretreatment standards, EPA's approach for pass through satisfies two competing objectives set by Congress: (1) That standards for indirect dischargers be equivalent to standards for direct dischargers; and (2) that the treatment capability and performance of the POTWs be recognized and taken into account in regulating the discharge of pollutants from indirect dischargers.

B. Effluent Limitations Guidelines and Standards Program

EPA develops ELGs that are technology-based regulations for specific categories of dischargers. EPA bases these regulations on the performance of control and treatment technologies. The legislative history of CWA section 304(b), which is the heart of the effluent guidelines program, describes the need to press toward higher levels of control through research and development of new processes, modifications, replacement of obsolete plants and processes, and other improvements in technology, taking into account the cost of controls. Congress has also stated that EPA need not consider water quality impacts on individual water bodies as the guidelines are developed. See Statement of Senator Muskie (October 4, 1972), *reprinted in* U.S. Senate Committee on Public Works, Legislative History of the Water Pollution Control Act Amendments of 1972, Serial No. 93–1, at 170.

There are four types of standards applicable to direct dischargers (facilities that discharge directly to waters of the U.S.), and two types of standards applicable to indirect dischargers (facilities that discharge to POTWs), described in detail later on. Subsections 1 through 4 describe standards for direct discharges and subsection 5 describes standards for indirect discharges.

1. Best Practicable Control Technology Currently Available (BPT)

Traditionally, EPA defines BPT effluent limitations based on the average of the best performances of facilities within the industry, grouped to reflect various ages, sizes, processes, or other common characteristics. BPT effluent limitations control conventional, toxic, and nonconventional pollutants. In specifying BPT, EPA looks at a number of factors. EPA first considers the cost of achieving effluent reductions in relation to the effluent reduction benefits. The Agency also considers the age of equipment and facilities, the processes employed, engineering aspects of the control technologies, any required process changes, non-water quality environmental impacts (including energy requirements), and such other factors as the Administrator deems appropriate. See CWA section 304(b)(1)(B). If, however, existing performance is uniformly inadequate, EPA can establish limitations based on higher levels of control than are currently in place in an industrial category, when based on an Agency determination that the technology is available in another category or subcategory and can be practically applied.

2. Best Conventional Pollutant Control Technology (BCT)

For discharges of conventional pollutants from existing industrial point sources, the CWA requires EPA to identify additional levels of effluent reduction that can be achieved with BCT. In addition to other factors specified in section 304(b)(4)(B), the CWA requires that EPA establish BCT limitations after consideration of a two-part "cost reasonableness" test. In a July 9, 1986 **Federal Register** Notice, EPA published and explained its methodology for the development of BCT limitations in (51 FR 24974). Section 304(a)(4) designates the following as conventional pollutants: BOD_5, total suspended solids (TSS), fecal coliform, pH, and any additional pollutants defined by the Administrator as conventional. The Administrator designated oil and grease as an additional conventional pollutant on July 30, 1979 (44 FR 44501; 40 CFR part 401.16).

3. Best Available Technology Economically Achievable (BAT)

BAT represents the second level of stringency for controlling direct discharge of toxic and nonconventional pollutants. In general, BAT-based effluent guidelines and new source performance standards represent the best available economically achievable performance of facilities in the industrial subcategory or category. Following the statutory language, EPA considers the technological availability and the economic achievability in determining what level of control represents BAT. CWA section 301(b)(2)(A). Other statutory factors that EPA considers in assessing BAT are the cost of achieving BAT effluent reductions, the age of equipment and facilities involved, the process employed, potential process changes, and non-water quality environmental impacts, including energy requirements and such other factors as the Administrator deems appropriate. CWA section 304(b)(2)(B). The Agency retains considerable discretion in assigning the weight to be accorded these factors. *Weyerhaeuser Co.* v. *Costle,* 590 F.2d 1011, 1045 (D.C. Cir. 1978).

4. Best Available Demonstrated Control Technology (BADCT)/New Source Performance Standards (NSPS)

NSPS reflect effluent reductions that are achievable based on the best available demonstrated control technology (BADCT). Owners of new facilities have the opportunity to install the best and most efficient production processes and wastewater treatment technologies. As a result, NSPS should represent the most stringent controls attainable through the application of the BADCT for all pollutants (that is, conventional, nonconventional, and toxic pollutants). In establishing NSPS, EPA is directed to take into consideration the cost of achieving the effluent reduction and any non-water quality environmental impacts and energy requirements. CWA section 306(b)(1)(B).

5. Pretreatment Standards for Existing Sources (PSES) and Pretreatment Standards for New Sources (PSNS)

As discussed previously, section 307(b) of the Act authorizes EPA to issue pretreatment standards for discharges of pollutants from existing sources to POTWs. Section 307(c) of the Act authorizes EPA to promulgate pretreatment standards for new sources (PSNS). Both standards are designed to prevent the discharge of pollutants that pass through, interfere with, or are otherwise incompatible with the operation of POTWs. Categorical pretreatment standards for existing sources are technology-based and are analogous to BPT and BAT effluent

limitations guidelines, and thus the Agency typically considers the same factors in promulgating PSES for toxic and non-conventional pollutants as it considers in promulgating BAT. See *Natural Resources Defense Council* v. *EPA,* 790 F.2d 289, 292 (3rd Cir. 1986). Similarly, in establishing pretreatment standards for new sources, the Agency typically considers the same factors in promulgating PSNS as it considers in promulgating NSPS (BADCT).

C. Subcategorization

In developing ELGs, EPA can divide an industry category into groupings called "subcategories" to provide a method for addressing variations among products, processes, treatment costs, and other factors that affect the determination of the "best available" technology. See *Texas Oil & Gas Ass'n.* v. *US EPA,* 161 F.3d 923, 939–40 (5th Cir.1998). Regulation of a category by subcategories provides that each subcategory has a uniform set of effluent limitations or pretreatment standards that take into account technological achievability, economic impacts, and non-water quality environmental impacts unique to that subcategory. In some cases, effluent limitations or pretreatment standards within a subcategory can be different based on consideration of these same factors, which are identified in CWA section 304(b)(2)(B). The CWA requires EPA, in developing effluent guidelines and pretreatment standards, to consider a number of different factors, which are also relevant for subcategorization. The CWA also authorizes EPA to take into account other factors that the Administrator deems appropriate. CWA section 304(b).

D. Oil and Gas Extraction Effluent Guidelines Rulemaking History

The Oil and Gas Extraction industry is subcategorized in 40 CFR part 435 as follows: (1) Subpart A: Offshore; (2) subpart C: Onshore; (3) subpart D: Coastal; (4) subpart E: Agricultural and Wildlife Water Use; and (5) subpart F: Stripper. EPA promulgated the first Oil and Gas Extraction ELGs (40 CFR part 435) in 1979 establishing BPT-based limitations for the Offshore, Onshore, Coastal, and Agricultural and Wildlife Use subcategories. EPA established BAT- and NSPS-based limits for certain subcategories in 1993 (Offshore), 1996 (Coastal), and 2001 (Synthetic-based drilling fluids). EPA also established pretreatment standards for one subcategory (Coastal) in 1996.

The previously established subpart C (Onshore) regulation covers wastewater discharges from field exploration, drilling, production, well treatment, and well completion activities in the onshore oil and gas industry. Although UOG resources occur in offshore and coastal regions, recent development of UOG resources in the U.S. has occurred primarily in onshore regions, to which the regulations in subpart C (Onshore) and subpart E (Agricultural and Wildlife Water Use) apply. Accordingly, this rule addresses the gap in onshore regulations, and only the regulations that apply to onshore oil and gas extraction are described in more detail here.

1. Subpart C: Onshore

Subpart C applies to facilities engaged in the production, field exploration, drilling, well completion, and well treatment in the oil and gas extraction industry which are located landward of the inner boundary of the territorial seas—and which are not included in the definition of other subparts—including subpart D (Coastal). The regulations at 40 CFR 435.32 specify the following for BPT: There shall be no discharge of wastewater pollutants into navigable waters from any source associated with production, field exploration, drilling, well completion, or well treatment (*i.e.,* produced water, drilling muds, drill cuttings, and produced sand).

2. Subpart E: Agricultural and Wildlife Use

Subpart E applies to onshore facilities located in the continental U.S. and west of the 98th meridian for which the produced water has a use in agriculture or wildlife propagation when discharged into navigable waters. Definitions in 40 CFR 435.51(c) explain that the term "use in agricultural or wildlife propagation" means that (1) the produced water is of good enough quality to be used for wildlife or livestock watering or other agricultural uses; and (2) the produced water is actually put to such use during periods of discharge. The regulations at 40 CFR 435.52 specify that the only allowable discharge is produced water, with an oil and grease concentration not exceeding 35 milligrams per liter (mg/L). The BPT regulations prohibit the discharge of waste pollutants into navigable waters from any source (other than produced water) associated with production, field exploration, drilling, well completion, or well treatment (*i.e.,* drilling muds, drill cuttings, produced sands).

E. State Pretreatment Requirements That Apply to UOG Extraction Wastewater

In addition to applicable federal requirements, some states regulate the management, storage, and disposal of UOG extraction wastewater, including regulations concerning pollutant discharges to POTWs from oil and gas extraction facilities. In addition to pretreatment requirements, some states have indirectly addressed the issue of pollutant discharges to POTWs by limiting the management and disposal options available for operators to use.

During initial development of Marcellus shale gas resources, some operators managed UOG wastewater by transfer to POTWs. EPA did not identify other areas in the U.S. where POTWs routinely accepted UOG extraction wastewaters. Chapter A of the TDD summarizes how Pennsylvania, Ohio, Michigan, and West Virginia responded to UOG extraction wastewater discharges to their POTWs. EPA did not identify any states that require zero discharge of pollutants from UOG operations to POTWs in the same manner as this final rule.

F. Related Federal Requirements in the Safe Drinking Water Act

As required by SDWA section 1421, EPA has promulgated regulations to protect underground sources of drinking water through Underground Injection Control (UIC) programs that regulate the injection of fluids underground. These regulations are found at 40 CFR parts 144–148, and specifically prohibit any underground injection not authorized by UIC permit. 40 CFR 144.11. The regulations classify underground injection into six classes; wells that inject fluids brought to the surface in connection with oil and gas production are classified as Class II UIC wells. Thus, onshore oil and gas extraction facilities that seek to meet the zero discharge requirements of the existing ELGs or final pretreatment standard through underground injection of wastewater must obtain a Class II UIC permit for such disposal or take the wastewater to an appropriately permitted injection facility.

V. Industry Profile

EPA gathered information on the industry via the North American Industry Classification System (NAICS), which is a standard created by the U.S. Census for use in classifying business establishments within the U.S. economy. The industry category affected by this final rule is the Oil and Gas Extraction industry (NAICS code 21111). The industry has two segments: Crude Petroleum and Gas Extraction (NAICS 211111) which is made up of facilities that have wells that produce petroleum or natural gas or produce crude petroleum from surface shale or

tar sands; and Natural Gas Liquid Extraction (NAICS 211112), which is made up of facilities that recover liquid hydrocarbons from oil and gas field gases and sulfur from natural gas. According to data from the Statistics of U.S. Businesses (SUSB), in 2012 there were 6,646 firms in the overall Oil and Gas Extraction (OGE) industry. Of those firms, 98.5% were considered small business based on the Small Business Administration (SBA) criteria definition of a small firm in this industry as having 500 or fewer employees. In 2012, *Oil and Gas Extraction* sector firms employed, on average, 19 employees and had an estimated average $53 million in revenue per firm.

EPA reviewed financial performance of oil and gas firms from 2006 to 2014. Generally, over the analysis period, all segments of the oil and gas industry showed a similar profile of revenue growth; however, reviews of financial performance and condition metrics indicate a recent deterioration in financial performance and condition for OGE firms since mid-2014 due to the fall in crude oil and natural gas prices. The prediction of slow price recovery indicates that the financial condition of OGE firms in general may not recover in the short term, though the crude oil and natural gas prices are forecast to increase through 2040 (DCN SGE01192). While many factors will affect further UOG development, and forecasts inevitably involve considerable uncertainty, production is expected to continue to increase. EIA forecasts that by 2040, shale gas will account for 55 percent of U.S. natural gas production, with tight gas as the second leading source at 22 percent, and shale/tight oil [2] will account for 45 percent of total U.S. oil production (DCN SGE01192). See the industry profile (DCN SGE01277) for more information.

VI. Final Rule

A. Scope/Applicability

Consistent with the proposal, the scope of this final rule is specific to pretreatment standards for onshore oil and gas extraction facilities (subpart C). EPA did not propose to reopen the regulatory requirements applicable to any other subpart or the requirements for direct dischargers in subpart C. Rather, the scope of the final rule amends subpart C only to add requirements for indirect dischargers where there currently are none. Further, also consistent with the proposal, the final rule establishes requirements for wastewater discharges from UOG extraction facilities to POTWs. It does not establish requirements for wastewater discharges from conventional oil and gas extraction (COG) facilities. EPA reserves consideration of any such standards for a future rulemaking, if appropriate.

The final rule defines unconventional oil and gas resources 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, and tight oil)." This definition is generally consistent with other readily available sources. For additional information, see Chapter B of the TDD.

As a point of clarification, although coalbed methane would fit this definition, the final pretreatment standards do not apply to pollutants in wastewater discharges associated with coalbed methane extraction to POTWs. EPA notes that the requirements in the existing effluent guidelines for direct dischargers also do not apply to coalbed methane extraction, as this industry did not exist at the time that the effluent guidelines were developed and was not considered by the Agency in establishing the effluent guidelines (DCN SGE00761). To reflect the fact that neither the final pretreatment standards nor the existing effluent guideline requirements apply to coalbed methane extraction, EPA expressly reserved a separate unregulated subcategory for coalbed methane in this final rule. For information on coalbed methane, see *https://www.epa.gov/eg/coalbed-methane-extraction-industry.*

B. Option Selection

EPA analyzed three regulatory options at proposal, the details of which were discussed fully in the document published on April 7, 2015 (80 FR 18557). In general, these three options ranged from requiring zero discharge of pollutants to POTWs, establishing non-zero pretreatment standards, or establishing no national pretreatment standards. Depending on the interests represented, public commenters supported virtually all of the regulatory options that EPA proposed—from the least stringent to the most stringent. Thus, in developing this final rule, EPA again considered the same three regulatory options.

1. PSES

After considering all of the relevant factors and technology options discussed in this preamble and in the TDD, as well as public comments, EPA decided to establish PSES based on current industry practice: Disposal in UIC wells, wastewater reuse/recycling to fracture [3] another well, or management by centralized waste treatment (CWT) facilities—none of which involve sending wastewater to POTWs. Thus, for PSES, the final rule establishes a zero discharge standard on all pollutants in UOG extraction wastewater.

Generally, EPA designs pretreatment standards to meet Congress' objective to ensure that wastewaters from direct and indirect industrial dischargers are subject to similar levels of pollutant removals prior to discharge to waters of the U.S. *See Chemical Manufacturers Assn.* v. *EPA,* 870 F.2d 177, 245 (5th Cir. 1989). This means that, typically, the requirements for indirect dischargers are analogous to those for direct dischargers. As explained in Section IV.C., the existing BPT-based requirement for direct dischargers in the Onshore Subcategory is zero discharge of wastewater pollutants into waters of the U.S. from any source associated with production, field exploration, drilling, well completion, or well treatment.

As explained in Section XII.E of the proposal (80 FR 18570, April 7, 2015), EPA evaluated the practices currently used to manage UOG extraction wastewaters. Based on the information reviewed as part of this final rulemaking, EPA concludes that current industry practice is to not discharge pollutants from onshore UOG extraction to POTWs.[4] Rather, the vast majority of this wastewater is managed by disposal in underground injection wells and/or re-use in fracturing another well. A small, but in some geographic areas increasing, portion of the industry also transfers its wastewater to CWT facilities.[5]

The technology basis for the promulgated PSES is disposal in UIC wells, wastewater reuse/recycling to fracture another well, or management by CWT facilities. Because all existing UOG extraction facilities currently employ alternative wastewater management practices other than

[2] EIA reported this data as "tight oil" production but stated that it includes production from both shale oil formations (*e.g.,* Bakken, Eagle Ford) and tight oil formations (*e.g.,* Austin Chalk).

[3] In some cases, industry has also re-used/recycled the water to drill another well that is not fractured.

[4] EPA solicited additional data and information on current industry practice as well as its preliminary finding that no UOG facilities currently discharge to POTWs in the proposal. EPA did not receive data since proposal to contradict this finding.

[5] Existing effluent limitations guidelines and pretreatment standards at 40 CFR part 437 apply to CWT facilities. The CWT industry handles wastewater and industrial process by-products from off-site. CWT facilities may receive a wide variety of hazardous and non-hazardous industrial wastes for treatment.

transfer to a POTW, the technology basis for meeting a zero discharge requirement is widely available. While EPA bases pretreatment standards and associated discharge limits on a technology basis, the agency does not require facilities to employ any specific technology; rather, facilities may comply with alternative technologies as long as they meet the prescribed limits.

Some commenters asserted that UIC wells may not be available in the future in all geographic locations, but provided no data to support their assertion. EPA does not have any data to demonstrate that UIC capacity nationwide will be expended and that this current management option will not be available in the future (See Chapter D of the TDD). Further, data suggest that, where UIC wells are currently available, this availability will likely continue in the future (see Chapter D of the TDD). Moreover, the technology basis for the final pretreatment standards is not limited to UIC disposal. EPA identified two other approaches that also meet the zero discharge requirement: Reuse/recycle of the wastewater for re-fracturing other wells, or transfer of the wastewater to a CWT facility. In recent years, industry has greatly expanded its knowledge about the ability to reuse/recycle UOG flowback and long-term produced water (the major contributors to UOG extraction wastewater by volume) in fracturing another well. Consequently, as the UOG industry continues to grow and new wells are being fractured, the need for UIC capacity for UOG extraction wastewater may decrease, even in geographic locations with an abundance of UIC capacity, due to the increased availability of reuse/recycle. In addition, EPA's record demonstrates that in areas of the country where UIC wells and/or opportunities for reuse in fracturing another well are limited, UOG extraction facilities transfer their wastewater to a CWT facility (see Chapter D of the TDD). Some commenters assert that the option to transfer UOG wastewater to CWT facilities may be limited in the future because EPA may revise ELGs for this industry. While EPA is conducting a study of CWT facilities that accept oil and gas wastewater to determine if revision to the CWT regulations may be appropriate, EPA is not evaluating any approaches that would directly restrict their availability to accept such wastewaters.

While the technology basis is best performing in that it achieves zero discharge of pollutants in UOG extraction wastewater to POTWs, the requirement reflects current industry practice and EPA therefore estimates that there will be no incremental pollutant reductions. Accordingly, because industry is already meeting this requirement, no facilities will incur incremental costs for compliance with the promulgated PSES and, therefore, the promulgated PSES is economically achievable. For the same reasons, the final PSES will result in no incremental non-water quality environmental impacts. Finally, because the final rule represents current industry practice, EPA requires that the PSES based on zero discharge of wastewater pollutants to POTWs be effective as of the effective date of this rule, 60 days after publication of this rule in the **Federal Register**.

EPA did not establish PSES based on Option 2, under which EPA would establish non-zero numerical pretreatment standards for discharges of wastewater pollutants from UOG extraction facilities. Such an option could be similar to the one adopted in Pennsylvania in 2010 that requires pretreatment of oil and gas wastewaters before discharge to a POTW to meet a maximum TDS concentration of 500 mg/L as well as specific numerical concentrations for other pollutants (see Chapter A of the TDD). Some commenters suggested this approach would provide an "escape-valve" for the future in the event that UIC disposal well capacity is exhausted. Others have suggested this would allow the water to be available for re-use (other than in fracturing another well) if technologies become available to pre-treat it to remove dissolved pollutants in a cost effective manner.

Although EPA identified technologies [6] that currently exist to treat dissolved pollutants in UOG extraction wastewater that could be used to set a non-zero numeric discharge limit, EPA did not select this option for the following reasons. First, the existing requirements for direct discharges of UOG extraction wastewater in the Onshore Subcategory require zero discharge of pollutants. As explained previously, EPA generally establishes requirements for direct and indirect discharges so that the wastewater receives comparable levels of pollutant removals prior to discharge to waters of the U.S.

Second, as detailed previously, UOG facilities in this subcategory are currently meeting the zero discharge requirement. Thus, any option that would allow for a discharge of UOG pollutants above the current zero discharge level would be less stringent than the current industry practice and thus would potentially increase the discharge of such pollutants to POTWs. EPA reasonably concluded that—as compared to a less stringent non-zero technology basis in Option 2—a standard based on available zero discharge options reflects the "best" available technology within the meaning of Section 304(b) of the Clean Water Act. Moreover, unlike Option 2, a zero discharge technology option is consistent with the CWA goal of eliminating the discharge of pollutants into navigable waters (CWA sections 101(a)(1); 301(b)(2)(A) and 306(a)(1)).

Third, EPA disagrees with the commenters' suggestion that an option allowing for the discharge to POTWs is necessary as an "escape valve" in case of limited future availability of UIC disposal options. As explained previously, UIC disposal capacity is currently widely available, and EPA does not have data to suggest that this capacity will be limited in the future. Moreover, approaches to achieve zero discharge are not limited to UIC wells, and EPA has no data to suggest that other zero discharge options, such as reuse/recycle of wastewater for re-fracturing or sending wastewater to CWT facilities, will be limited in the future. Without any such data, there is no basis for EPA to conclude that an "escape valve" allowing for discharge to POTWs is needed to address concerns about limited future availability of zero discharge technology options.

Fourth, although EPA identified technologies that currently exist to treat dissolved pollutants in UOG extraction wastewater, these TDS-removal technologies are also likely more costly, as demonstrated by information in the record on estimated costs of managing wastewater under various approaches, relative to the suite of technologies that form the zero discharge technology basis for the final rule. See DCN SGE01186, SGE00139, SGE00070, SGE00350, SGE00279, SGE01064, SGE00283, SGE00300, SGE00625, SGE00635, SGE00280, SGE00245, SGE00279, SGE00276, SGE00275.

With respect to the comments suggesting that EPA establish a non-zero numerical treatment standard in order to allow for (non-fracturing) reuse/recycle of the wastewater, data collected for this rulemaking demonstrate that the current technologies are capable of reducing TDS (and other dissolved pollutants) well below 500 mg/L (see DCN SGE01186). To the extent that these technologies or others are developed in the future to reduce pollutants in UOG extraction wastewater to enable them to be reused/

[6] See DCN SGE01186.

recycled for purposes other than fracturing another well, these pre-treated wastewaters can be used directly for the other applications rather than going to a POTW.

In addition to the PSES option of zero discharge of wastewater pollutants, EPA also considered a "no rule" option, based on the discussion previously that no UOG facilities are currently transferring wastewater to POTWs, and given available alternative management options such as disposal in UIC wells and reuse/recycling.

EPA did not select a "no rule" option for several reasons. First, there is no national regulation that prevents or requires pretreatment of such discharges—and, as mentioned previously, EPA is not aware of any POTWs that are designed to treat dissolved pollutants common in UOG extraction wastewater. Thus, as explained previously, some pollutants of concern in UOG extraction wastewater will not be physically, chemically, or biologically reduced by the treatment processes typically used at POTWs, and these pollutants, if sent to POTWs, are expected to be discharged from the POTW into receiving waters. In addition, these pollutants can cause operational problems for the POTW's biological treatment processes and alter the POTW's ability to adequately remove BOD, TSS, and other pollutants for which it is regulated. For some UOG pollutants, such as radionuclides, the data indicate POTWs will remove some portion while discharging the remainder (DCN SGE01028; DCN SGE01185). In these cases, some portion of the radionuclides will partition to the POTW biosolids, which can cause the POTW to incur increased costs to change its selected method of biosolids management (DCN SGE00615). See Chapter D of the TDD. This means that, absent a pretreatment standard, constituents of such wastewater could be discharged to receiving waters or interfere with POTW operations when other available options such as reuse/recycle and proper disposal in a Class II UIC well better protect water quality and aquatic communities and help further the zero discharge goal of the CWA. CWA section 101(a)(1).

Second, as detailed in the TDD, few states have regulations or policies that prevent discharges of pollutants in UOG extraction wastewater to POTWs or that mandate pre-treatment prior to discharge to a POTW. In the absence of such regulations or policies, resource-constrained control authorities and/or POTWs that receive requests to accept UOG extraction wastewater would be in the position of having to evaluate whether to accept transfers of wastewater on a case-by-case basis. It is beneficial to the states as a practical matter to establish federal regulations that mandate this existing practice, in order to avoid the burden for each state to potentially repeat the effort of promulgating state-level regulations. EPA has discussed this rule with several states that have indicated that a federal pretreatment standard would reduce their administrative burden (DCN SGE00762; DCN SGE00743).

Third, EPA also considered the future burden that continued lack of pretreatment standards can impose on POTWs. The UOG extraction industry is predicted to continue to grow in the future, resulting in the installation, fracturing, and possible re-fracturing of hundreds of thousands of wells. Well operators will continue to generate UOG extraction wastewater and could request that local POTWs accept their wastewater for discharge. In the absence of federal pretreatment standards, POTWs can legally accept UOG extraction wastewater to the extent that such wastewater transfers are in compliance with state and local requirements and that resulting discharges comply with their permits. Evaluating each potential customer (industrial user) and developing a determination for each new UOG extraction wastewater source on a case-by-case basis could be burdensome for POTWs. In addition, where a POTW determines it can accept this wastewater, complying with applicable reporting requirements could be a significant burden to some POTWs. EPA concluded that a national-level determination that UOG extraction wastewater contains pollutant concentrations that could pass through POTWs, and establishment of categorical pretreatment standards, will avoid burdening individual pretreatment Control Authorities (*e.g.* POTWs) with evaluating each individual request. While EPA does not have the information to quantify the reductions in administrative burden that will likely result from the final rule, states generally support EPA's position that such reductions will be realized (DCN SGE00762; DCN SGE00743).

Fourth, history demonstrates that, absent controls preventing the transfer of or requiring pretreatment of such wastewater, POTWs could and did accept it. This occurred in Pennsylvania (see Chapter A and Chapter D of the TDD), where POTWs were used to manage UOG extraction wastewater until the state took action. This action included promulgating new regulations requiring pretreatment. Among the drivers behind these actions taken by Pennsylvania was that some waters were impaired by TDS. (DCN SGE00187). To avoid future scenarios where POTWs receive UOG extraction wastewater, it is reasonable to codify the zero discharge practice already adopted by the industry that EPA has found to be "best" in terms of pollutant removals, as well as both technologically available and economically achievable.

2. PSNS

After considering all of the relevant factors and technology options discussed in this preamble and in the TDD, as well as public comments, as is the case with PSES, EPA decided to establish PSNS based on the technologies described in Option 1. For PSNS, the final rule establishes a zero discharge standard on all pollutants in UOG wastewater.

As previously noted, under section 307(c) of the CWA, new sources of pollutants into POTWs must comply with standards that reflect the greatest degree of effluent reduction achievable through application of the best available demonstrated control technologies. Congress envisioned that new treatment systems could meet tighter controls than existing sources because of the opportunity to incorporate the most efficient processes and treatment systems into the facility design. The technologies used to control pollutants at existing sources, disposal in UIC wells, wastewater reuse/recycling to fracture another well, and/or management at CWT facilities—are fully available to new sources for the same reasons specified earlier for existing sources. They achieve the greatest degree of effluent reduction available: zero discharge of pollutants in UOG extraction wastewater. Furthermore, EPA has not identified any technologies that are demonstrated to be available for new sources that are different from those identified for existing sources.

EPA determined that the final PSNS present no barrier to entry into the market for new sources. EPA has no data in the record indicating that new sources would manage their wastewater any differently than existing sources or that the management options that are available for existing sources would not be available for new sources. Indeed, EPA's record demonstrates that as new UOG facilities have come into existence, they are relying on the same current industry best practices as existing facilities, using zero discharge technology options to avoid sending wastewater to POTWs. See TDD Table D–1 and DCN SGE01179.A03.

Accordingly, EPA found that there are no overall incremental impacts from the final standards on new sources, as is the case for existing sources, since the incremental costs faced by new sources generally will be the same as those faced by existing sources. EPA projects no incremental non-water quality environmental impacts. Therefore, EPA established PSNS that are the same as the final PSES for this final rule.

EPA rejected other options for PSNS for the same reasons that the Agency rejected other options for PSES. And, as with the final PSES, EPA determined that the final PSNS prevent pass through of pollutants from POTWs into receiving streams and also help control contamination of POTW sludge.

3. Pollutants Selected for Regulation Pass-Through Analysis

EPA identifies all pollutants in UOG extraction wastewater as pollutants of concern and similarly determined all pollutants pass through. As a result, all pollutants in UOG extraction wastewater are directly regulated by the final pretreatment standards.

CWA section 301(b) directs EPA to eliminate the discharge of all pollutants where it is technologically available and economically achievable to do so (after a consideration of the factors specified in section 304(b) of the Act). The first step in such an analysis is typically to identify Pollutants of Concern (POCs)—or the pollutants to be potentially regulated by the effluent guideline. For some industries and wastestreams, not every pollutant in the wastestream may be a pollutant of concern. For example, not every pollutant may be present in an amount or frequency that EPA can demonstrate, using available data, is treatable by the candidate technology. Where this is the case, EPA may choose to establish numerical limitations for only a subset of the pollutants present in the wastestream. For other industries and wastestreams, the candidate technology may be capable of controlling all pollutants present in the wastestream regardless of amount or frequency. Where this is the case, EPA considers all pollutants in the wastestream to be POCs. This is the case in this final rule because, as described previously, the technology bases for the rule: underground injection of UOG extraction wastewater, recycling and reuse of that wastewater, or management by CWT facilities; results in zero discharge of all pollutants from UOG facilities to POTWs. Therefore, under this rule, all pollutants in UOG extraction wastewater are POCs. Chapter C of the TDD provides a summary of available characterization data for UOG extraction wastewaters.

In addition, before establishing PSES/PSNS for a pollutant, EPA examines whether the pollutant "passes through" a POTW to waters of the U.S. or interferes with the POTW operation or sludge disposal practices. In determining whether a pollutant passes through POTWs for these purposes,[7] where EPA establishes non-zero pretreatment standards, EPA generally compares the percentage of a pollutant removed by well-operated POTWs performing secondary treatment to the percentage removed by the BAT/NSPS technology basis. A pollutant is determined to pass through POTWs when the median percentage removed nationwide by well-operated POTWs is less than the median percentage removed by the BAT/NSPS technology basis. Pretreatment standards are established for those pollutants regulated under BAT/NSPS that pass through POTWs. In this way, EPA is able to ensure that the standards for indirect dischargers are equivalent to direct dischargers and that the treatment capability and performance of POTWs is recognized and taken into account in regulating the pollutants from indirect dischargers.

For those wastestreams regulated with a zero discharge limitation or standard, EPA typically sets the percentage removed by the technology basis at 100 percent for all pollutants. Because a POTW would not be able to achieve 100 percent removal of wastewater pollutants, the percent removal at a POTW would be less than that of the candidate zero-discharge technology. For this final rule, using this approach, EPA determined that all pollutants pass through and that it is appropriate to set PSES/PSNS for all pollutants to prevent pass through.

VII. Environmental Impacts

UOG production generates significant volumes of wastewater that need to be managed. As described in Section XII.C.2 of the proposed rule (80 FR 18569, April 7, 2015), unconventional wells can produce flowback volumes ranging between 210,000 and 2,100,000 gallons during the initial flowback process.[8] During the production phase, wells typically produce smaller volumes of water (median flow rates range from 200–800 gallons per day) and continue producing wastewater throughout the life of the well (see TDD Chapter C.2).

In general, evidence of environmental impacts to surface waters from discharges of UOG extraction wastewater is sparsely documented—as direct discharges from onshore oil and gas extraction have been prohibited under the existing regulations since 1979; and based on current industry best practice, there have been few indirect discharges of such wastewater to POTWs. Some of the environmental impacts documented to date, such as increased DBP formation in downstream drinking water treatment plants, resulted from wastewater pollutants that passed untreated through POTWs in Pennsylvania (see Chapter D of the TDD).

A. Pollutants

As described in Section XII.D of the proposed rule (80 FR 18569, April 7, 2015), high concentrations of TDS are common in UOG extraction wastewater. Inorganic constituents leaching from geologic formations, such as sodium, potassium, bromide, calcium, fluoride, nitrate, phosphate, chloride, sulfate, and magnesium, represent most of the TDS in UOG extraction wastewater. Produced water can also include barium, radium, and strontium. Based on available data, TDS cations (positively charged ions) in UOG extraction wastewater are generally dominated by sodium and calcium, and the anions (negatively charged ions) are dominated by chloride (DCN SGE00284; See also Chapter C of the TDD). TDS concentrations vary among the UOG formations and can exceed 350,000 mg/L. For comparison, sea water contains approximately 35,000 mg/L TDS.

B. Impacts From the Discharge of Pollutants Found in UOG Extraction Wastewater

As explained in Chapter D of the TDD, POTWs are typically designed to treat organic waste, total suspended solids, and constituents responsible for biochemical oxygen demand, not to treat TDS. When transfers of UOG extraction wastewater to POTWs were occurring in Pennsylvania, these POTWs, lacking adequate TDS removal processes, diluted UOG extraction wastewaters with other sewage flows and discharged TDS-laden effluent into local streams and rivers. POTWs not sufficiently treating TDS in UOG extraction wastewater were a suspected source of elevated TDS levels in the Monongahela River in 2009 (DCN

[7] As explained in Section IV, the definition of pass through for general pretreatment standards appropriately differs from the definition in establishing national categorical pretreatment standards as they serve different objectives.

[8] As explained in Chapter B of the TDD the length of the flowback process is variable. Literature generally reports it as 30 days or less (DCN SGE00532).

SGE00525). Also see Chapter D of the TDD for additional examples.

In addition to UOG wastewater pollutants passing through POTWs, other industrial discharges of inadequately treated UOG extraction wastewater have also been associated with in-stream impacts. One study of discharges from a CWT facility in western Pennsylvania that treats UOG extraction wastewater examined the water quality and isotopic compositions of discharged effluents, surface waters, and stream sediments (DCN SGE00629).[9] The facility's treatment process includes settling, precipitation, and fine screening, but does not remove TDS (DCN SGE00525). The study found that the discharge of the effluent from the CWT facility increased downstream concentrations of chloride and bromide above background levels. The chloride concentrations 1.7 kilometers downstream of the treatment facility were two to ten times higher than chloride concentrations found in similar reference streams in western Pennsylvania. Radium 226 levels in stream sediments at the point of discharge were approximately 200 times greater than upstream and background sediments.

C. Impact on Surface Water Designated Uses

UOG extraction wastewater TDS concentrations are typically high enough, that if discharged untreated to surface water, affect adversely a number of designated uses of the surface water, including drinking water source, aquatic life support, livestock watering, irrigation, and industrial use.

1. Drinking Water Uses

Available data indicate that the concentration of TDS in UOG extraction wastewaters can often significantly exceed recommended drinking water concentrations. Because TDS concentrations in drinking water source waters are typically well below the recommended levels for drinking, few drinking water treatment facilities have technologies to remove TDS. Two published standards for TDS in drinking water include the U.S. Public Health Service recommendation and EPA's secondary maximum contaminant level recommendation that TDS in drinking water should not exceed 500 mg/L. High concentrations of TDS in drinking water primarily degrade its taste rather than pose a human health risk. Taste surveys found that water with less than 300 mg/L TDS is considered excellent, and water with TDS above 1,100 mg/L is unacceptable (DCN SGE00939). The World Health Organization dropped its health-based recommendations for TDS in 1993, instead retaining 1,000 mg/L as a secondary standard for taste (DCN SGE00947).

Bromide in UOG wastewater discharges can adversely affect surface waters used as drinking water supplies. Recent studies of industrial discharges that contain bromide upstream of drinking water utilities' intakes demonstrate that with bromides present in drinking water source waters at increased levels, carcinogenic disinfection by-products (brominated DBPs, in particular trihalomethanes (THMs)) can form at the drinking water utility (DCN SGE01329). DBPs have been shown to have both adverse human health and ecological affects. Studies also demonstrate that bromide in UOG wastewaters treated at POTWs can lead to the formation of DBPs within the POTW. EPA reviewed a study of a POTW accepting UOG wastewater that unintentionally created DBPs due to insufficient removal of bromide and other UOG wastewater constituents (DCN SGE00535; DCN SGE00587). The study found that UOG extraction wastewaters contain various inorganic and organic DBP precursors that can react with disinfectants used by POTWs to promote the formation of DBPs, or alter speciation of DBPs, particularly brominated-DBPs, which are suspected to be among the more toxic DBPs (DCN SGE00535; DCN SGE00985). See Chapter D of the TDD for further discussion of DBP formation associated with UOG extraction wastewaters.

2. Aquatic Life Support Uses

TDS and its accompanying salinity play a primary role in the distribution and abundance of aquatic animal and plant communities. High levels of TDS can impact aquatic biota through increases in salinity, loss of osmotic balance in tissues, and toxicity of individual ions. Increases in salinity have been shown to cause shifts in biotic communities, limit biodiversity, exclude less-tolerant species and cause acute or chronic effects at specific life stages (DCN SGE00946). A detailed study of plant communities associated with irrigation drains reported substantial changes in marsh communities, in part because of an increase in dissolved solids (DCN SGE00941). Observations over time indicate a shift in plant community coinciding with increases in dissolved solids from estimated historic levels of 270 to 1170 mg/L, as species that are less salt tolerant such as coontail (*Ceratophyllus demersum*) and cattail (*Typha* sp.) were nearly eliminated. A related study found that lakes with higher salinity exhibit lower aquatic biodiversity, with species distribution also affected by ion composition (DCN SGE00940).

Aquatic toxicity is dependent on the ionic composition of the mixture. Salts, specifically sodium and chloride, are the majority (*i.e.*, much greater than 50 percent) of TDS in UOG produced water (DCN SGE00284). Typical chloride concentrations in UOG wastewater have been measured at concentrations up to 130,000 mg/L (see TDD Table C11). Macroinvertebrates, such as fresh water shrimp and aquatic insects that are a primary prey of many fish species, have open circulatory systems that are especially sensitive to pollutants like chloride. Based on laboratory toxicity data from EPA's 1988 chloride criteria document and more recent non-EPA studies, chloride acute effect concentrations for invertebrates ranged from 953 mg/L to 13,691 mg/L. Chloride chronic effect concentrations for invertebrates ranged from 489 mg/L to 556 mg/L. In addition to the laboratory data, EPA also reviewed data from a 2009 Pennsylvania Department of Environmental Protection violation report documenting a fish kill attributed to a spill of diluted produced water in Hopewell Township, PA. The concentration of TDS at the location of the fish kill was as high as 7,000 mg/L. While not related to UOG extraction wastewater, negative impacts of high TDS, including fish kills, were documented during 2009 at Dunkard Creek located in Monongalia County, Pennsylvania. (DCN SGE00001 and DCN SGE00001.A01)

3. Livestock Watering Uses

POTW discharges to surface waters containing high concentrations of TDS can impact downstream uses for livestock watering. High TDS concentrations in water sources for livestock watering can adversely affect animal health by disrupting cellular osmotic and metabolic processes (DCN SGE01053). Domestic livestock, such as cattle, sheep, goats, horses, and pigs have varying degrees of sensitivity to TDS in drinking water.

4. Irrigation Uses

If UOG extraction wastewater discharges to POTWs increase TDS concentrations in receiving streams, downstream irrigation uses of that surface water can be negatively affected.

[9] Discharges from CWT facilities are subject to ELGs in 40 CFR part 437. However, the effect of discharges of treated oil and gas wastewaters from CWT facilities that lack treatment for TDS is similarly representative of POTWs.

Elevated TDS levels can limit the usefulness of water for irrigation. Excessive salts affect crop yield in the short term, and the soil structure in the long term. Primary direct impacts of high salinity water on plant crops include physiological drought, increased osmotic potential of soil, specific ion toxicity, leaf burn, and nutrient uptake interferences (DCN SGE00938). In general, for various classes of crops the salinity tolerance decreases in the following order: forage crops, field crops, vegetables, fruits.

In addition to short-term impacts to crop plants, irrigating with high TDS water can result in gradual accumulation of salts or sodium in soil layers and eventual decrease in soil productivity. The susceptibility of soils to degradation is dependent on the soil type and structure. Sandy soils are less likely than finely textured soils to accumulate salts or sodium. Soils with a high water table or poor drainage are more susceptible to salt or sodium accumulation. The most common method of estimating the suitability of a soil for crop production is through calculation of its sodicity as estimated by the soil's sodium absorption ratio (SAR). The impact of irrigation water salinity on crop productivity is a function of both the SAR value and the electrical conductivity. The actual field-observed impacts are very site-specific depending on the soil and crop system (DCN SGE00938).

5. Industrial Uses

POTW discharges to surface waters are often upstream of industrial facilities that withdraw surface waters for various cooling and process uses. High concentration of TDS can adversely affect industrial applications requiring the use of water in cooling tower operations, boiler feed water, food processing, and electronics manufacturing. Concentrations of TDS above 500 mg/L result in excessive scaling in water pipes, water heaters, boilers and household appliances (DCN SGE00174). Depending on the industry, TDS in intake water can interfere with chemical processes within the plant. Some industries requiring ultrapure water, such as semi-conductor manufacturing facilities, are particularly sensitive to high TDS levels due to the treatment cost for the removal of TDS.

VIII. Regulatory Implementation of the Standard

The requirements in this rule apply to discharges from UOG facilities through local pretreatment programs under CWA section 307. Pretreatment standards promulgated under section 307(b) and (c) are self-implementing. See CWA section 307(d). The duty to comply with such standards is independent of any state or a municipal control authority permit or control mechanism containing the standards and associated reporting requirements.

A. Implementation Deadline

Because the requirements of the final rule are based on current practice, EPA determined that the PSES/PSNS standards apply on the effective date of the final rule, August 29, 2016.

B. Upset and Bypass Provisions

For discussion of upset and bypass provisions, see the proposed rule (80 FR 18569, April 7, 2015).

C. Variances and Modifications

For discussion of variances and modifications, see the proposed rule (80 FR 18569, April 7, 2015).

IX. Statutory and Executive Order Reviews

Additional information about these statutes and Executive Orders can be found at *https://www.epa.gov/laws-regulations/laws-and-executive-orders.*

A. Executive Order 12866: Regulatory Planning and Review and Executive Order 13563: Improving Regulation and Regulatory Review

This action is not a significant regulatory action and was therefore not submitted to the Office of Management and Budget (OMB) for review.

B. Paperwork Reduction Act

This action does not impose an information collection burden under the provisions of the Paperwork Reduction Act. This final rule codifies current industry practice and does not impose any additional reporting requirements.

C. Regulatory Flexibility Act

I certify that this action will not have a significant economic impact on a substantial number of small entities under the Regulatory Flexibility Act. In making this determination, the impact of concern is any significant adverse economic impact on small entities. An agency may certify that a rule will not have a significant economic impact on a substantial number of small entities if the rule relieves regulatory burden, has no net burden or otherwise has a positive economic effect on the small entities subject to the rule.

For purposes of assessing the impacts of the final rule on small entities, small entity is defined as: A small business that is primarily engaged in Crude Petroleum and Natural Gas Extraction and Natural Gas Liquid Extraction by NAICS code 211111 and 211112 with fewer than 500 employees (based on Small Business Administration size standards). The small entities that are subject to the requirements of this final rule are small businesses that engage in UOG extraction as defined in Section V, of this preamble. No small businesses will experience a significant economic impact because the final rulemaking codifies current industry practice and does not impose any new requirement that is not already being met by the industry. I have therefore concluded that this action will have no net regulatory burden for all directly regulated small entities.

D. Unfunded Mandates Reform Act

This action does not contain any unfunded mandate as described in UMRA, 2 U.S.C. 1531–1538, and does not significantly or uniquely affect small governments. The action imposes no incremental enforceable duty on any state, local or tribal governments or the private sector.

E. Executive Order 13132: Federalism

This action does not have federalism implications. It does not alter the basic state-federal scheme established in the CWA under which EPA authorizes states to carry out the NPDES permit program. It will not have substantial direct effect on the states, on the relationship between the national government and the states, or on the distribution of power and responsibilities among the various levels of government. Although this order does not apply to this action, as explained in Section VI, EPA coordinated closely with states through a workgroup, as well as outreach efforts to pretreatment coordinators and pretreatment authorities.

F. Executive Order 13175: Consultation and Coordination With Indian Tribal Governments

This action does not have tribal implications as specified in Executive Order 13175. It will not have substantial direct effects on tribal governments, on the relationship between the Federal government and Indian tribes, or on the distribution of power and responsibilities between the Federal government and Indian tribes. The final rule contains no Federal mandates for tribal governments and does not impose any enforceable duties on tribal governments. Thus, Executive Order 13175 does not apply to this action.

Although Executive Order 13175 does not apply to this action, the EPA coordinated with tribal officials early in

the process of developing this rule to enable them to have meaningful and timely input into its development. EPA coordinated with federally recognized tribal governments in May and June of 2014, sharing information about the UOG pretreatment standards proposed rulemaking with the National Tribal Caucus and the National Tribal Water Council. EPA continued the outreach effort by collecting data about UOG operations on tribal reservations, UOG operators that are affiliated with Indian tribes, and POTWs owned or operated by tribes that can accept industrial wastewaters (see DCN SGE00785). Based on this information, there are no tribes operating UOG wells that discharge wastewater to POTWs nor are there any tribes that own or operate POTWs that accept industrial wastewater from UOG facilities; therefore, this final rule will not impose any costs on tribes.

G. Executive Order 13045: Protection of Children From Environmental Health Risks and Safety Risks

This action is not subject to Executive Order 13045 because it is not economically significant as defined in Executive Order 12866, and because the EPA does not believe the environmental health or safety risks addressed by this action present a disproportionate risk to children. This action codifies current industry practice; therefore there is no change in environmental health or safety risks.

H. Executive Order 13211: Energy Effects

This action is not subject to Executive Order 13211, because it is not a significant regulatory action under Executive Order 12866.

I. National Technology Transfer and Advancement Act

This final rulemaking does not involve technical standards.

J. Executive Order 12898: Federal Actions To Address Environmental Justice in Minority Populations and Low-Income Populations

The final rule will neither increase nor decrease environmental protection (as described in Section VI) as it codifies current industry practice; therefore, EPA determined that the human health or environmental risk addressed by this action will not have potential disproportionately high and adverse human health or environmental effects on minority, low-income or indigenous populations. EPA requested comment on this E.O. in the proposal (80 FR 18579; April 7, 2015) and received no comments.

K. Congressional Review Act (CRA)

This action is subject to the CRA, and the EPA will submit a rule report to each House of the Congress and to the Comptroller General of the United States. This action is not a "major rule" as defined by 5 U.S.C. 804(2).

List of Subjects in 40 CFR Part 435

Environmental protection, Pretreatment, Waste treatment and disposal, Water pollution control, Unconventional oil and gas extraction.

Dated: June 13, 2016.

Gina McCarthy,

Administrator.

Therefore, 40 CFR part 435 is amended as follows:

PART 435—OIL AND GAS EXTRACTION POINT SOURCE CATEGORY

■ 1. The authority citation for part 435 is revised to read as follows:

Authority: 33 U.S.C. 1251, 1311, 1314, 1316, 1317, 1318, 1342 and 1361.

Subpart C—Onshore Subcategory

■ 2. Add § 435.33 to subpart C to read as follows:

§ 435.33 Pretreatment standards for existing sources (PSES).

(a) *PSES for wastewater from unconventional oil and gas extraction.* Except as provided in 40 CFR 403.7 and 403.13, any existing source subject to this section, must achieve the following pretreatment standards for existing sources (PSES).

(1) There shall be no discharge of wastewater pollutants associated with production, field exploration, drilling, well completion, or well treatment for unconventional oil and gas extraction (including, but not limited to, drilling muds, drill cuttings, produced sand, produced water) into publicly owned treatment works.

(2) For the purposes of this section,

(i) *Unconventional oil and gas* means 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).

(ii) *Drill cuttings* means the particles generated by drilling into subsurface geologic formations and carried out from the wellbore with the drilling fluid.

(iii) *Drilling mud* means the circulating fluid (mud) used in the rotary drilling of wells to clean and condition the hole and to counterbalance formation pressure.

(iv) *Produced sand* means the slurried particles used in hydraulic fracturing, the accumulated formation sands, and scales particles generated during production. Produced sand also includes desander discharge from the produced water waste stream, and blowdown of the water phase from the produced water treating system.

(v) *Produced water* means the fluid brought up from the hydrocarbon-bearing strata during the extraction of oil and gas, and includes, where present, formation water, injection water, and any chemicals added downhole or during the oil/water separation process.

(b) *PSES for Wastewater from Conventional Oil and Gas Extraction.* [Reserved]

■ 3. Add § 435.34 to subpart C to read as follows:

§ 435.34 Pretreatment standards for new sources (PSNS).

(a) *PSNS for wastewater from unconventional oil and gas extraction.* Except as provided in 40 CFR 403.7 and 403.13, any new source with discharges subject to this section must achieve the following pretreatment standards for new sources (PSNS).

(1) There shall be no discharge of wastewater pollutants associated with production, field exploration, drilling, well completion, or well treatment for unconventional oil and gas extraction (including, but not limited to, drilling muds, drill cuttings, produced sand, produced water) into publicly owned treatment works.

(2) For the purposes of this section, the definitions of unconventional oil and gas, drill cuttings, drilling muds, produced sand, and produced water are as specified in § 435.33(b)(2)(i) through (v).

(b) *PSNS for Wastewater from Conventional Oil and Gas Extraction.* [Reserved]

■ 4. Add subpart H to read as follows:

Subpart H—Coalbed Methane Subcategory [Reserved]

[FR Doc. 2016–14901 Filed 6–27–16; 8:45 am]

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