# The Florida Senate
# BILL ANALYSIS AND FISCAL IMPACT STATEMENT

(This document is based on the provisions contained in the legislation as of the latest date listed below.)

Prepared By: The Professional Staff of the Committee on Environment and Natural Resources

BILL: SB 200

INTRODUCER: Senators Montford, Stewart, and Rader

SUBJECT: Advanced Well Stimulation Treatment

DATE: November 1, 2019 REVISED:

| | ANALYST | STAFF DIRECTOR | REFERENCE | ACTION |
|---|---|---|---|---|
| 1. | Schreiber | Rogers | EN | **Favorable** |
| 2. | | | IT | |
| 3. | | | AP | |

## I. Summary:


SB 200 defines:

- "High-pressure well stimulation" as "all stages of a well intervention performed by injecting fluids into a rock formation at a pressure that equals or exceeds the fracture gradient of the rock formation and the purpose or effect is to fracture the formation to increase production or recovery from an oil or gas well, such as in hydraulic fracturing or acid fracturing."
- "Matrix Acidization" as "all stages of a well intervention performed by injecting fluids into a rock formation at a pressure below the fracture gradient of the rock formation and the purpose or effect is to dissolve the formation to increase production or recovery from an oil or gas well. The term does not include techniques used for routine well cleanout work, well maintenance, removal of formation damage due to drilling or production, or acidizing techniques used to maintain or restore the natural permeability of the formation near the wellbore."

The bill prohibits high-pressure well stimulation and matrix acidization in the state. The bill clarifies that a permit for drilling or operating a well does not authorize the performance of high-pressure well stimulation or matrix acidization. The prohibition only applies to oil and gas wells.

## II. Present Situation:

### Production of Conventional Versus Unconventional Oil and Gas Resources: The Use of Well Stimulation Techniques

Conventional oil and gas resources are found in porous and permeable sandstone and carbonate reservoirs.[1] Wells have historically been drilled vertically, straight down into a rock formation to extract conventional resources. Whereas conventional resources are found in concentrated underground locations, unconventional resources are highly dispersed through impermeable or "tight" rock formations, such as shales and tight sands.[2] To extract unconventional resources, drilling has generally shifted from vertical to horizontal.[3]

Well stimulation techniques are used in the production of both conventional and unconventional resources. The techniques can be focused solely on the wellbore (drilled hole) for maintenance and remedial purposes or can be used to increase production from the reservoir.[4] The relatively recent development of horizontal or directional drilling in conjunction with the expanded use of well stimulation techniques has increased the production at oil or gas wells and has led to the profitable extraction of unconventional resources.[5] The three main well stimulation techniques are hydraulic fracturing, acid fracturing, and matrix acidizing.[6] Hydraulic fracturing and acid fracturing are commonly referred to as "fracking."

#### *Hydraulic Fracturing*

Hydraulic fracturing was developed in the 1940s to increase the production of conventional oil and gas resources.[7] While the technique is not new, the composition of the fracturing fluids used in the process has evolved over time. Initially the fracturing fluids were oil-based and relied on a mixture of petroleum compounds, such as napalm and diesel fuels.[8] Modern hydraulic fracturing involves a fracturing fluid that is composed of: a base fluid, in most cases water; additives, each designed to serve a particular function; and a proppant (such as sand), which holds the fractures open during or following the treatment.[9] The composition of the fracturing fluid varies depending on the permeability and brittleness of the reservoir rock.[10] A hydraulic fracturing

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[1] Michael Ratner & Mary Tiemann, Congressional Research Service, R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 2 (Apr. 22, 2015), *available at* https://www.fas.org/sgp/crs/misc/R43148.pdf (last visited Oct. 25, 2019).

[2] *Id.*

[3] U.S. Energy Information Administration (EIA), *Hydraulically Fractured Horizontal Wells Account for Most New Oil and Natural Gas Wells* (Jan. 30, 2018), https://www.eia.gov/todayinenergy/detail.php?id=34732 (last visited Oct. 25, 2019).

[4] California Council on Science and Technology Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California, vol. 1, Well stimulation technologies and their past, present, and potential future use in California*, 13–14 (January 2015) [hereinafter *CA Study*], *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).

[5] *Id*. at 2.

[6] *Id*. at 28.

[7] Gallegos, T.J., and Varela, B.A., United States Geological Survey, *Trends in Hydraulic Fracturing Distributions and Treatment Fluids, Additives, Proppants, and Water Volumes Applied to Wells Drilled in the United States from 1947 through 2010—Data Analysis and Comparison to the Literature*, Scientific Investigations Report 2014–5131, 1 (2015), *available at* http://pubs.usgs.gov/sir/2014/5131/pdf/sir2014-5131.pdf (last visited Oct. 25, 2019).

[8] *Id.* at 7.

[9] *Id.* at 1, 10–11, 303.

[10] *CA Study*, at 48, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).

operation at a horizontal well involves a four-step process. The first step is the "stage," during which a portion of the well is isolated to focus the fracture fluid pressure. The second is the "pad," during which fracture fluid is injected into the well, first without proppant, to initiate and propagate the fracture in the rock formation. The proppant is then added to keep the fractures open. The third stage is the "flush," during which fluid is injected without proppant to push any remaining proppant into the fractures. The fourth stage is the "flowback," during which the hydraulic fracturing fluids are removed and the fluid pressure dissipates.[11]

The U.S. Environmental Protection Agency (EPA) estimates that 25,000-30,000 new wells were drilled and hydraulically fractured annually in the United States between 2011 and 2014.[12] In 2016, hydraulically fractured horizontal wells accounted for 69% of all oil and natural gas wells drilled in the U.S.[13] The combination of horizontal drilling and hydraulic fracturing has contributed to increases in crude oil and natural gas production in the U.S.[14]

***Acid Fracturing***

Acid fracturing is a well stimulation technique that uses acidic fluids. It is sometimes preferred in carbonate reservoirs and can be an effective method for stimulating limestone formations.[15] Well operators pump the acidic fluids into a well at a pressure that exceeds the fracture gradient and, thus, fractures the rock.[16] The acid etches the walls of the fractures and eliminates the need to use a proppant because the fractures remain open after pressure is released.[17] The produced fluids have a much lower acid content than the injected fluids because most of the acid that is injected is neutralized through a reaction with the rock.[18] As compared to hydraulic fracturing, acid fracturing is generally more successful in carbonate reservoirs because of the relatively high degree of natural fractures present.[19]

The purpose of an acid fracturing treatment is to create new or open existing fractures, and dissolve formation material, to create an irregular fracture surface that opens up new flow paths or enhances existing flow paths into the wellbore.[20] As compared to hydraulic fracturing, acid

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[11] *CA Study*, at 42, 300 *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019). Flowback is defined as "fracturing fluid, perhaps mixed with formation water and traces of hydrocarbon, that flows back to the surface after the completion of hydraulic fracturing."

[12] U.S. Environmental Protection Agency (EPA), *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 3-1 (Dec. 2016) [hereinafter *EPA Study*], *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 25, 2019).

[13] U.S. Energy Information Administration (EIA), *Hydraulically fractured horizontal wells account for most new oil and natural gas wells* (Jan. 28, 2019), https://www.eia.gov/todayinenergy/detail.php?id=34732 (last visited Oct. 25, 2019).

[14] *Id.*

[15] *CA Study*, at 25, 56, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019); s*ee generally* Bing Hou, Ruxin Zhang, Mian Chen, Jiawie Kao, and Xin Liu, *Investigation on Acid Fracturing Treatment in Limestone Formation Based on True Tri-Axial Experiment*, 235 Fuel 473-484 (2019), *available at* https://www.sciencedirect.com/science/article/pii/S0016236118314273?via%3Dihub#bi005 (last visited Oct. 25, 2019).

[16] *CA Study* at 348, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).

[17] *Id.* at 28.

[18] *Id*. at 14.

[19] *Id*. at 56.

[20] American Petroleum Institute, *Acidizing: Treatment in Oil and Gas Operations*, 1–3 (2014), *available at* http://www.api.org/~/media/files/oil-and-natural-gas/hydraulic-fracturing/acidizing-oil-natural-gas-briefing-paper-v2.pdf (last visited Oct. 25, 2019).

fracturing results in fractures that are relatively short in length.[21] One of the main factors that adversely affects acid fracture growth is fluid loss, or acid "leakoff." Acid leakoff can result in the enlargement of channels and natural fractures, and can greatly increase the area from which fluid loss occurs, making fluid-loss control difficult and preventing acid from reaching untreated parts of the fracture.[22]

***Matrix Acidizing***

Well operators have been using matrix acidizing for over 100 years.[23] Drilling and production in oil and gas operations cause damage to the rock formation.[24] Formation damage can include the plugging of perforations or the plugging of the rock matrix by debris from the well and well operations, which restrict the flow of hydrocarbons into the wellbore.[25] Matrix acidizing is performed by pumping acidic fluids into a well at a pressure that does not exceed the fracture gradient.[26] Acidizing is often used for well maintenance and to remediate damage caused by well operation and drilling.[27] Operators use acid, which is very effective at dissolving carbonate minerals, to bypass formation damage around the well.[28] Most of this acid is neutralized due to reactions with the rock.[29] Additionally, various acids are used to clean residential water wells to loosen or dissolve debris so that it can be pumped out of the well.[30]

If larger volumes of acid are injected into carbonate formations, matrix acidizing can be used to increase the permeability of the formation beyond the zone impacted by drilling or production activities.[31] Matrix acidizing can result in stimulation of carbonate reservoir permeability beyond the region near the well.[32] This technique is not commonly used for stimulation in unconventional reservoirs because it does not increase recovery enough in low permeability reservoirs to make production viable.[33] The penetration into the formation caused by matrix acidizing is typically less extensive than after use of a fracturing technique.[34] However, in carbonate reservoirs, matrix acidizing can create deeply penetrating channels, known as wormholes, and lead to deeper acid penetration into more permeable fractures of a naturally fractured reservoir.[35] Hydrochloric acid is commonly used for matrix acidizing in carbonate reservoirs.[36] To minimize the probability of acid entering into highly permeable sections of the

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[21] *CA Study*, at 56, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).
[22] Middle East & Asia Reservoir Review, vol. 4, *Stimulate the Flow*, 46 (Jan. 2003), *available at* https://connect.slb.com/~/media/Files/resources/mearr/num4/stimulate_flow.pdf (last visited Oct. 25, 2019).
[23] *CA Study*, at 69, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).
[24] Middle East & Asia Reservoir Review, vol. 4, *Stimulate the Flow*, 42 (Jan. 2003).
[25] *Id*.
[26] *CA Study*, at 69, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).
[27] *Id*. at 14.
[28] *Id*. at 69.
[29] *Id.* at 14.
[30] The Groundwater Association, *How Well Systems Are Cleaned*, http://wellowner.org/water-well-maintenance/residential-well-cleaning/ (last visited Oct. 25, 2019).
[31] *CA Study*, at 14, *available at* https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Oct. 25, 2019).
[32] *Id*. at 28.
[33] *Id*. at 14, 69-70.
[34] *Id.* at 30.
[35] *Id*.
[36] Middle East & Asia Reservoir Review, vol. 4, *Stimulate the Flow*, 42, (Jan. 2003), https://connect.slb.com/~/media/Files/resources/mearr/num4/stimulate_flow.pdf (last visited Oct. 25, 2019).

formation, which could create channels into water-producing zones, careful treatment, design, and execution is required when performing a matrix acidizing treatment.[37]

**Production of Oil and Gas Resources in Florida**

Northwest and South Florida are the major oil and gas producing areas in the state. Florida's first producing oil well was discovered in 1943 at a wellsite located near present-day Big Cypress Preserve.[38] Oil and gas resources were first discovered in Northwest Florida in 1970, in the town of Jay.[39] Annual production of petroleum from these two regions peaked at more than 47 million barrels in 1978 but has subsequently decreased substantially, with annual statewide production dropping to less than 2 million barrels annually since 2016.[40] Florida's natural gas production also peaked in the 1970s, and production in 2017 was less than one-third of peak output in 1978.[41] There are currently two active oil and gas fields in Northwest Florida, and seven active oil and gas fields in South Florida.[42] While geologists believe that there may be oil and natural gas deposits off Florida's western coast, the state enacted a drilling ban for state waters in 1990 and, in 2006, Congress banned the leasing of federal offshore blocks within 125 miles of Florida's western coast until at least 2022.[43] Additionally, federal law gives priority use of much of the area to the military for training.[44] In 2018, the Florida constitution was amended to prohibit drilling for exploration or extraction of oil or natural gas on lands "beneath all state waters which have not been alienated and that lie between the mean high water line and the outermost boundaries of the state's territorial seas."[45]

In 2018, there were 57 active producer wells in Florida.[46] The Department of Environmental Protection's (DEP) 2018 Annual Production Report totaled natural gas production at 816,587 million cubic feet and oil production at 622,359 thousand barrels in the state.[47] Proven oil and gas reserves in Northwest and South Florida are composed of carbonate formations (limestone and dolomite reservoirs), which have naturally higher permeability than the tighter shale or similar formations.[48] Rather than hydraulic fracturing, well operators in the state have generally preferred washing or flushing the formations, or other alternative methods, to enhance recovery of oil and gas resources.[49]

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[37] *Id.* at 44.
[38] American Oil & Gas Historical Society, *First Florida Oil Well*, http://aoghs.org/states/first-florida-oil-well/ (last visited Oct. 31, 2019).
[39] Lloyd, Jacqueline M., *Information Circular 107, Part I: 1988 and 1989 Florida Petroleum Production and Exploration*, 1 (1991), *available at* http://ufdc.ufl.edu/UF00001168/00001/pdf (last visited Oct. 25, 2019).
[40] EIA, Florida, *Profile Analysis*, http://www.eia.gov/state/analysis.php?sid=FL (last visited Oct. 25, 2019).
[41] *Id.*
[42] DEP, *State Production Data* (2018), *available at* https://floridadep.gov/water/oil-gas/documents/state-production-data (last visited Oct. 25, 2019).
[43] EIA, Florida, *Profile Analysis: Petroleum*, http://www.eia.gov/state/analysis.php?sid=FL (last visited Oct. 25, 2019); *see* Pub. L. No. 109-432, s. 104(a)(2), 120 Stat. 3003 (2006); *see* s. 377.242(1), F.S.
[44] EIA, Florida, *Profile Analysis: Petroleum*, http://www.eia.gov/state/analysis.php?sid=FL (last visited Oct. 25, 2019).
[45] FLA CONST. art. II, s. 7(c).
[46] DEP, *State Production Data* (2018), *available at* https://floridadep.gov/water/oil-gas/documents/state-production-data (last visited Oct. 25, 2019).
[47] *Id.*
[48] DEP, *Hydraulic Fracturing Background and Recommendations*, 2-3 (Sept. 29, 2011) *available at* http://news.caloosahatchee.org/docs/Dep_Fracturing_Response_130118.pdf (last visited Oct. 25, 2019).
[49] *Id.* at 3.

### Regulation of Well Stimulation Techniques

#### *Federal Regulation*

There is limited direct federal regulation over oil and gas activities. In 2005, Congress passed the Energy Policy Act amending, in part, the Safe Drinking Water Act (SDWA) and the Clean Water Act (CWA).[50] The SDWA was amended to revise the definition of the term "underground injection" to specifically exclude the underground injection of fluids or propping agents (other than diesel fuels) pursuant to hydraulic fracturing operations.[51] The CWA contains exemptions from stormwater permitting requirements for oil and gas exploration production, processing, or treatment operations or transmission facilities.[52] Although the 2005 Energy Policy Act broadened the exemptions to include "construction activities" in the definition of oil and gas exploration and production, any flows from oil and gas operations which are contaminated or come into contact with overburden, raw material, intermediate products, finished product, byproduct, or waste products remain regulated under the CWA.[53]

In March of 2015, in an attempt to regulate hydraulic fracturing on federal and tribal lands, the Bureau of Land Management (BLM) published final rules governing hydraulic fracturing.[54] The rules were to take effect on June 24, 2015. However, the United States District Court for the District of Wyoming granted a preliminary injunction and the rule was stayed.[55] In June of 2016, the court held that the BLM lacked authority to regulate hydraulic fracturing and set aside the final rules.[56] The court's ruling was appealed to the United States Court of Appeals Tenth Circuit, which dismissed the appeal and remanded with directions to vacate the district court's opinion and dismiss the action without prejudice in light of BLM's decision to rescind the final rules.[57]

[50] Energy Policy Act of 2005, H.R. 6, 109th Cong. (2005-2006).

[51] 42 U.S.C. s. 300h(d) (2012).

[52] 33 U.S.C. s 1342 (l)(2) (2012).

[53] 33 U.S.C. s. 1362(24) (2012); *NRDC v. U.S. EPA*, 526 F.3d 591, 599, 608 (9th Cir. 2008)(vacating an EPA rule implementing the 2005 amendment); William J. Brady, *Hydraulic Fracturing Regulation in the United States: The Laissez-faire Approach of the Federal Government and Varying State Regulations*, 7–8 (2012), *available at* http://www.law.du.edu/documents/faculty-highlights/Intersol-2012-HydroFracking.pdf (last visited Oct. 31, 2019). Oil and gas construction facilities remain subject to the CWA's permitting requirements for stormwater, and for discharging a pollutant into navigable waters, when applicable.

[54] *Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands*, 80 Fed. Reg. 16,128-16,222 (Oct. 25, 2015). Under the final BLM regulations, the term "hydraulic fracturing" is defined as "those operations conducted in an individual wellbore designed to increase the flow of hydrocarbons from the rock formation to the wellbore through modifying the permeability of reservoir rock by applying fluids under pressure to fracture it. Hydraulic fracturing does not include enhanced secondary recovery such as water flooding, tertiary recovery, recovery through steam injection, or other types of well stimulation operations such as acidizing."

[55] *State of Wyo. vs. U.S. Dept. of the Int.*, No. 2: 15-CV-043-SWS (D. Wyo. Sept. 30, 2015) (granting a preliminary injunction), *available at* http://www.wyd.uscourts.gov/pdfforms/orders/15-cv-043%20130%20order.pdf (last visited Oct. 25, 2019).

[56] *State of Wyo. vs. U.S. Dept. of the Int.*, No. 2: 15-CV-043-SWS (D. Wyo. June 21, 2016), *available at* http://www.wyd.uscourts.gov/pdfforms/orders/15-cv-043-S%20Order.pdf (last visited Oct. 25, 2019).

[57] *State of Wyo. vs. U.S. Dept. of the Int.*, No. 16-8068 (10th Cir. Sept. 21, 2017), *available at* https://www.ca10.uscourts.gov/opinions/16/16-8068.pdf (last visited Oct. 25, 2019).

While direct regulation over well stimulation techniques at the federal level is limited, there are several federal statutes that regulate the indirect impacts of oil and gas extraction. The EPA's Oil and Gas Extraction Effluent Guidelines and Standards regulate wastewater discharges from field exploration, drilling, production, well treatment, and well completion activities.[58] The regulations apply to conventional and unconventional extraction, with the exception of extractions of coalbed methane.[59] These standards are incorporated into the CWA's National Pollutant Discharge Elimination System (NPDES) regulatory framework.[60]

Because oil and gas activities may result in the release of hazardous substances into the environment at or under the surface in a manner that may endanger public health or the environment, these activities are regulated under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA).[61] While recovered petroleum or natural gas is exempt from the act, other hazardous substances that result from oil or gas production, such as fracturing fluids, are subject to CERCLA.[62] If a release of such fluids occurs, the facility owner and operator could face liability under CERCLA.[63]

To ensure that employees who may be exposed to hazardous chemicals in the workplace are aware of the chemicals' potential dangers, manufacturers and importers must obtain or develop Material Safety Data Sheets (MSDS) for hydraulic fracturing chemicals that are hazardous according to the Occupational Safety and Health Administration (OSHA) standards.[64] MSDS must be maintained for hazardous chemicals at each job site and must include the chemical names of substances that are considered hazardous under the OSHA regulations.[65]

***Regulation in Other States***

States have primary jurisdiction and authority over the regulation of oil and gas activities. Almost all states with economically viable production wells have extensive regulatory programs in place for permitting and monitoring oil and gas activities. Recent advances in technology and the widespread use of well stimulation techniques, particularly hydraulic fracturing, have motivated some states to update and revise their oil and gas regulations to specifically address such techniques, or to ban certain techniques altogether.[66]

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[58] EPA, *Oil and Gas Extraction Effluent Guidelines*, *Rule Summary*, *available at* http://www.epa.gov/eg/oil-and-gas-extraction-effluent-guidelines (last visited Oct. 25, 2019).
[59] *Id*.
[60] *Id*.
[61] 42 U.S.C. ss. 9601-9675 (2012); Adam Vann, Brandon J. Murrill, & Mary Tiemann, Cong. Research Serv., R 43152, *Hydraulic Fracturing: Selected Legal Issues*, 12-13 (Sept. 26, 2014), *available at* https://www.fas.org/sgp/crs/misc/R43152.pdf (last visited Oct. 28, 2019).
[62] Adam Vann, Brandon J. Murrill, & Mary Tiemann, Cong. Research Serv., R 43152, *Hydraulic Fracturing: Selected Legal Issues*, 12–13 (Sept. 26, 2014).
[63] *Id.* at 13.
[64] *Id*. at 22.
[65] *Id*.
[66] *See generally* Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115 (2009), *available at* http://law.uh.edu/faculty/thester/courses/Emerging%20Tech%202011/Wiseman%20on%20Fracking.pdf (last visited Oct. 25, 2019).

Vermont, New York, Maryland, and Washington prohibit some form of hydraulic fracturing. In 2012, Vermont banned the practice of hydraulic fracturing.[67] In 2015, New York's Department of Environmental Conservation found that there were "no feasible or prudent alternatives [other than a ban which] would adequately avoid or minimize adverse environmental impacts and that address the scientific uncertainties and risks to public health from [high-volume hydraulic fracturing]."[68] The Findings Statement effectively banned high-volume hydraulic fracturing in the state of New York.[69] In 2017, Maryland prohibited hydraulic fracturing for the exploration or production of oil or natural gas.[70] In 2019, the state of Washington prohibited hydraulic fracturing for the exploration and production of oil or natural gas.[71]

**Regulation in Florida**

In Florida, DEP has regulatory authority over oil and gas resources.[72] DEP's Division of Water Resource Management (Division) oversees the permitting process for drilling, production, and exploration.[73] The Division has jurisdiction and authority over all persons and property necessary to administer and enforce all laws relating to the conservation of oil and gas.[74] Local government approval is required for drilling within municipal boundaries, or in tidal waters or near improved beaches.[75]

When issuing permits for oil and gas exploration or extraction, the Division is required to consider the nature, character, and location of the lands involved; the nature, type, and extent of ownership of the applicant; and the proven or indicated likelihood of the presence of oil, gas, or related minerals on a commercially profitable basis.[76] DEP is required to issue orders and adopt rules that ensure all precautions are taken to prevent the spillage of oil or any other pollutant in all phases of drilling for and extracting oil, gas, or other petroleum products.[77] The purposes of such rules and orders include preventing the pollution of fresh, salt, or brackish waters or lands

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[67] 29 V.S.A. § 571; 29 V.S.A. § 503(30). The statute defines the term "hydraulic fracturing" as "the process of pumping a fluid into or under the surface of the ground in order to create fractures in rock for the purpose of the production or recovery of oil or gas."

[68] New York Department of Environmental Conservation, *Final Supplemental Generic Environmental Impact Statement on the Oil, Gas, and Solution Mining Regulatory Program: Regulatory Program for Horizontal Drilling and High-Volume Hydraulic Fracturing to Develop the Marcellus Shale and Other Low-Permeability Gas Reservoirs, Findings Statement*, 42 (June 2015), *available at* http://www.dec.ny.gov/docs/materials_minerals_pdf/findingstatehvhf62015.pdf (last visited Oct. 25, 2019).

[69] *See id.* at 2. The Findings Statement defined the term "high-volume hydraulic fracturing" as "the stimulation of a well using 300,000 or more gallons of water as the base fluid for hydraulic fracturing for all stages in a well completion, regardless of whether the well is vertical or directional, including horizontal."

[70] Maryland Code § 14-107.1 (2017). Under Maryland law, the term "hydraulic fracturing" is defined as "a stimulation treatment performed on oil and natural gas wells in low-permeability oil or natural gas reservoirs through which specially engineered fluids are pumped at high pressure and rate into the reservoir interval to be treated, causing fractures to open."

[71] RCWA 78.52.560. Under the prohibition, "hydraulic fracturing" is defined as "the process of pumping a fluid into or under the surface of the ground in order to create fractures in rock for the purpose of the production or recovery of oil or natural gas."

[72] Chapter 377, pt. I, F.S.; Fla. Admin. Code, Chapters 62C-25–62C-30.

[73] DEP, *Oil and Gas Program*, https://floridadep.gov/water/oil-gas (last visited Oct. 28, 2019).

[74] Section 377.21(1), F.S.

[75] Section 377.24, F.S.

[76] Section 377.241, F.S.

[77] Section 377.22(2), F.S.

of the state, and preventing the escape of oil or other petroleum products from one stratum to another.[78]

Before any person begins work other than environmental assessments or surveying at the site of a proposed drilling operation, a permit to drill is required and a preliminary site inspection must be conducted by DEP.[79] In oil and gas wells, the "casing" is a hollow steel pipe used to line the inside of the wellbore, and the casing is usually surrounded by a cement sheath.[80] An application to DEP for a permit to drill must include a proposed casing and cementing program and a location plat survey.[81] The regulations require the operator to case and cement wells in order to maintain well control and prevent degradation of other natural resources, including water.[82] Each drilling permit is valid for one year from the date of approval.[83] Before a permit is granted, the owner or operator is required to post a bond or other form of security for each well.[84]

Before a well is used for its intended purpose, in addition to the drilling permit, a permit to operate the well must be obtained.[85] Operating permits are valid for the life of the well, although each operating well and permit must be recertified every five years from the permit date.[86] Each application and subsequent recertification must include: the appropriate fee; bond or security coverage; a spill prevention and cleanup plan; flowline specifications and an installation plan; containment facility certification; and additional reporting and data submissions, such as driller's logs and monthly well reports.[87]

A separate permit is not required for the performance of well stimulation techniques. Such techniques are regulated as workovers.[88] DEP regulations define the term "workover" as: "an operation involving a deepening, plug back, repair, cement squeeze, perforation, *hydraulic fracturing*, *acidizing*, or other chemical treatment which is performed in a production, disposal, or injection well in order to restore, sustain, or increase production, disposal, or injection rates."[89] An operator is required to notify DEP before commencing a workover procedure and must submit a revised well record to DEP within 30 days of completion of any workover procedure.[90] During the time period from January 2016 to present, DEP has received a total of

[78] *Id*.
[79] Fla. Admin. Code R. 62C-26.003.
[80] FracFocus, *Well Construction & Groundwater Protection*, https://fracfocus.org/hydraulic-fracturing-how-it-works/casing (last visited Oct. 28, 2019).
[81] Fla. Admin. Code R. 62C-26.003.
[82] Fla. Admin. Code R. 62C-27.005. The regulations specify standards for casing depth and pressure testing.
[83] Fla. Admin. Code R. 62C-26.003.
[84] Fla. Admin. Code R. 62C-26.002.
[85] Fla. Admin. Code R. 62C-26.008.
[86] *Id.*
[87] *Id.*
[88] *See* s. 377.22(2)(o)(p), F.S. The division is required to adopt rules to "regulate the 'shooting,' perforating and chemical treatment of wells," and to "regulate secondary recovery methods, including the introduction of gas, air, water, or other substance into producing formations"; s*ee* s. 377.26, F.S. In regulating the vertical orientation of the well, the division is required to "take into account technological advances in drilling and production technology, including, but not limited to, horizontal well completions in the producing formation using directional drilling methods."
[89] Fla. Admin. Code R. 62C-25.002(61).
[90] Fla. Admin. Code R. 62C-29.006.

196 workover notifications.[91] Of the 196 notifications, 41 of those workovers involved the use of acid and all of those were for near wellbore cleanout purposes. There have been no workover notifications/requests to perform hydraulic fracturing since 2013.[92]

A person that violates any statute, rule, regulation, order, or permit of the division relating to the regulation of oil or gas resources or who refuses inspection by the division is liable for damages caused to the air, waters, or property of the state; for the reasonable costs of tracing the source of the discharge and for controlling and abating the source and the pollutants; and for the costs of restoring the air, waters, and property.[93] Such persons are also subject to judicial imposition of a civil penalty of up to $10,000 for each offense.[94] Each day during any portion of which a violation occurs constitutes a separate offense.[95]

In December of 2013, DEP received a workover notice proposing use of an enhanced extraction procedure and requested that the company that submitted the notice not complete the procedure until DEP could conduct a review.[96] When the company commenced with the procedure, DEP issued a cease and desist order.[97] DEP fined the company $25,000 for violating the cease and desist order.[98] It was concluded that the workover procedures performed on the well involved hydraulic fracturing, and seemingly also involved acid stimulation.[99]

***Local Regulation***

While cities and counties do not operate oil and gas permitting programs in Florida, some, through their land use regulations or zoning ordinances, require special exceptions for oil and gas activities or limit oil and gas activities to certain zoning classifications.[100] When authorizing oil and gas activities, local governments consider factors such as consistency with their comprehensive plan, injuries to communities or the public welfare, and compliance with zoning ordinances.[101] DEP may not issue a permit for drilling within the corporate limits of a municipality unless the municipality first adopts a resolution approving the permit.[102] At least six municipalities (Estero, Bonita Springs, Coconut Creek, Cape Coral, Dade, and Zephyrhills) and thirteen counties (Alachua, Bay, Brevard, Broward, Citrus, Indian River, Martin, Miami-Dade, Osceola, Pinellas, St. Lucie, Volusia, Wakulla, and Walton) have banned one or more forms of

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[91] Email from John Truitt, Deputy Secretary for Regulatory Programs, DEP, RE: Follow-Up (Oct. 18. 2019)(on file with the Environment and Natural Resources Committee).
[92] *Id.*
[93] Section 377.37(1)(a), F.S.
[94] *Id.*
[95] *Id.*
[96] *State of Florida Department of Environmental Protection vs. Dan A. Hughes Company, L.P.*, OGC File No. 14-0012, 2 (April 8, 2014), *available at* https://www.doah.state.fl.us/FLAID/DEP/2014/DEP_14-0012_05162014_014716.pdf (last visited Oct. 28, 2019).
[97] *Id.*
[98] *Id.*
[99] ALL Consulting, LLC., *Expert Evaluation of the D.A. Hughes Collier-Hogan 20-3H, Well Drilling and Workover, Prepared for Florida Department of Environmental Protection*, 3, 4, 25 (2014), *available at* https://assets.documentcloud.org/documents/1507525/allconsulting.pdf (last visited Oct. 28, 2019).
[100] *See, e.g.*, Lee County's Land Development Code § 34-1651 and 34-145.
[101] *Id*.
[102] Section 377.24(5), F.S.

well stimulation techniques by ordinance.[103] Additionally, many counties and cities in Florida have passed resolutions supporting bans or moratoriums relating to well stimulation techniques.[104]

**Environmental Concerns**

There are a variety of environmental concerns relating to well stimulation techniques. Potential impacts and concerns include: groundwater or surface water contamination; stress on water supplies; inadequate wastewater management and disposal; and air quality degradation including methane emissions.[105] Because well stimulation techniques are applied to so many types of underground formations using a variety of methods and fluids, environmental impacts vary depending on factors such as the toxicity of the fluid used; the closeness of the fracture zone to underground drinking water; the existence of a barrier between the fracture formation and other formations; and how wastewater is disposed of.[106]

***Water Quality***

The EPA estimated that of the approximately 275,000 wells that have been hydraulically fractured in 25 states between 2000 and 2013, an estimated 21,900, or 8%, were within one mile of at least one public water system groundwater well or surface water intake.[107] As a result of fracturing, sources of drinking water may be contaminated through the release of gas-phase hydrocarbons, in what is known as stray gas migration, if the well casing or cementing is too weak or if it fails.[108] The EPA concluded that the "injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity [may allow for] gases or liquids to move to groundwater sources."[109] While concerns related to inadequate well casing or cementing are not

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[103] Village of Estero, Ordinance No. 2015-19; Bonita Spring's Land Development Code, Chapter 4, Article VI, Division 15, Section 4-1380; Coconut Creek's Land Development Code, Article IV, Section 13-1000; City of Cape Coral, Ordinance §3.23; City of Dade, Ordinance No. 2016-08; City of Zephyrhills, Ordinance No. 1310-16; Alachua County's Code of Ordinances, §77.13.5; Bay County's Land Development Regulation, §311; Brevard County's Code of Ordinances, §46-375; Citrus County's Code of Ordinances, §66-133; Indian River County's Code of Ordinances, §317.03; Osceola County's Land Development Code, §4.12.3; Broward County's Code of Ordinances, §27-193; Martin County's Code of Ordinances, §67.443; Miami-Dade County's Code of Ordinances, §33-437; Pinellas County's Code of Ordinances, §58-489; St. Lucie County's Code of Ordinances, Policy 6.1.5.7; Volusia County's Code of Ordinances, §50-42; Wakulla County's Code of Ordinances, §6-34; Walton County's Code of Ordinances, §9-156.

[104] *See* Food & Water Watch, *Local Regulations Against Fracking*, http://www.foodandwaterwatch.org/insight/local-resolutions-against-fracking#florida (last visited Oct. 28, 2019). The page shows a list of local governments that passed resolutions against fracking.

[105] EPA, *Unconventional Oil and Natural Gas Development, Providing Regulatory Clarity and Protections Against Known Risks*, https://www.epa.gov/uog (last visited Oct. 28, 2018).

[106] Hannah Wiseman, *Untested Waters: The Rise of Hydraulic Fracturing in Oil and Gas Production and the Need to Revisit Regulation*, 20 FORDHAM ENVTL. L. REV. 115, 6 (2009), *available at* http://law.uh.edu/faculty/thester/courses/Emerging%20Tech%202011/Wiseman%20on%20Fracking.pdf (last visited Oct. 28, 2019).

[107] *EPA Study*, at 2-14, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).

[108] Avner Vengosh, Robert B. Jackson, Nathaniel Warner, Thomas Darrah, & Andrew Kondash, *A Critical Review of the Risks to Water Resources from Unconventional Shale Gas Development and Hydraulic Fracturing in the United States*, American Chemical Society, 48 Env. Sci. & Technol. 8334-8348, 8335-8336 (C-D) (Mar. 2014), *available at* https://www.researchgate.net/publication/260643891_A_Critical_Review_of_the_Risks_to_Water_Resources_from_Unconventional_Shale_Gas_Development_and_Hydraulic_Fracturing_in_the_United_States (last visited Oct. 28, 2019).

[109] *EPA Study*, at 10-3.

unique to hydraulic fracturing, horizontally drilled, hydraulically fractured wells pose more production challenges because the well casing is subject to greater pressures.[110]

Mitigating measures, such as extending the casing farther below groundwater resources and pressure testing the well casing before the injection of fluids, may work to prevent well casing failures.[111] Blowout preventers also help control and prevent pressure build-ups.[112] Hydraulically fractured wells in shale formations are usually drilled deeper than vertical wells, which can lead to a greater vertical separation between the formation and the drinking water resource.[113] Thousands of feet of rock layers typically overlay the produced portion of shale and serve as a barrier to contamination.[114] The majority of Florida's public water supply is obtained from groundwater sources, such as the Floridan aquifer system.[115] Areas in which oil and gas have been extracted have an upper confining unit that is generally greater than 100 feet, which may serve as a barrier to contamination.[116]

Fractures created during hydraulic fracturing can intersect nearby wells or their fracture networks, resulting in the flow of fluids into those wells and to underground drinking water resources. These "frac-hits" are more likely to occur if wells are close to each other or are on the same well pad.[117] According to one study, the likelihood of a frac-hit is less than 10% in hydraulically fractured wells more than 4,000 feet apart, while the likelihood is nearly 50% in wells that are less than 1,000 feet apart.[118] In Florida, horizontal wells and associated drilling units that are deeper than 7,000 feet have more stringent spacing requirements.[119]

Surface water contamination may occur because of the inadequate storage and disposal of produced water. Produced water is the water that comes back to the surface as part of the oil and gas production process, and has generally been found to contain salts, metals, organic compounds, radioactive materials, and hydraulic fracturing chemicals.[120] For a hydraulically fractured well, the produced water includes the fracturing fluids, or flowback. While the chemicals used will vary by region or between wells, some chemicals used in hydraulic

[110] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 8 (Apr. 22, 2015), *available at* https://fas.org/sgp/crs/misc/R43148.pdf (last visited Oct. 28, 2019).
[111] *EPA Study*, at 6-9, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).
[112] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 10 (Apr. 22, 2015), *available at* https://fas.org/sgp/crs/misc/R43148.pdf (last visited Oct. 28, 2019); ScienceDirect, *Preventers: Learn More About Preventers*, https://www.sciencedirect.com/topics/engineering/preventers (last visited Oct. 28, 2019).
[113] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 7 (Apr. 22, 2015).
[114] *Id*.
[115] DEP, *Aquifers*, https://fldep.dep.state.fl.us/swapp/Aquifer.asp (last visited Oct. 28, 2019).
[116] U.S. Geological Survey, *Conceptual Model of the Floridan*, http://fl.water.usgs.gov/floridan/conceptual-model.html (last visited Oct. 28, 2019).
[117] *EPA Study*, at 6-71, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).
[118] *Id*. at 10-18.
[119] Fla. Admin. Code R. 62C-26.004(5).
[120] *EPA Study*, at ES-33, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).

fracturing are hazardous.[121] It is estimated that approximately 10-40% of the volume of injected fracturing fluids return to the surface after hydraulic fracturing.[122] In most produced waters, the concentrations of toxic elements, such as radioactive radium, are positively correlated with salinity, which suggests that many of the potential water quality issues associated with produced waters may be attributable to the geochemistry of the brines within the shale formations.[123]

As the use of hydraulic fracturing has increased, so has the volume of wastewater generated. Spills of produced water do occur and can result in large volumes or high concentrations of chemicals reaching groundwater sources.[124] The EPA has reported that spills generally occur at 1-10% of hydraulically fractured or active wells.[125] In Florida, any spill of waste material relating to oil or gas wells must be immediately reported to the Division and the appropriate federal agencies, and the owner or operator is responsible for the costs of cleanup or other damage incurred.[126]

***Water Supply***

The amount of water used during the performance of a hydraulic fracturing treatment depends on factors such as the well depth, formation geology, and the composition of the fluids injected. In most cases, the large majority of the fracturing fluid is water, and each hydraulically fractured well can require thousands to millions of gallons of water.[127] While the total water use for hydraulic fracturing is relatively low compared to other industrial uses of water, wells that are good candidates for such techniques are usually located near the same water source and, as a result, the collective impact of water withdrawals can be significant.[128] Some states have implemented pilot projects evaluating the feasibility of reusing produced waters or other brackish or wastewaters.[129] The reuse of wastewater, however, is often limited by the amount of wastewater that is available.[130] The volume of produced water from a single well can be relatively small compared to the volume of water needed to fracture a well.[131]

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[121] *Id.* at 9-1, 9-16; *see* FracFocus, *What Chemicals Are Used*, https://fracfocus.org/chemical-use/what-chemicals-are-used (last visited Oct. 28, 2019).

[122] Avner Vengosh, Robert B. Jackson, Nathaniel Warner, Thomas Darrah, & Andrew Kondash, *A Critical Review of the Risks to Water Resources from Unconventional Shale Gas Development and Hydraulic Fracturing in the United States*, American Chemical Society, 48 Env. Sci. & Technol. 8334-8348, 8339 (G) (Mar. 2014), *available at* https://www.researchgate.net/publication/260643891_A_Critical_Review_of_the_Risks_to_Water_Resources_from_Unconventional_Shale_Gas_Development_and_Hydraulic_Fracturing_in_the_United_States (last visited Oct. 28, 2019).

[123] *Id*.

[124] *EPA Study*, at ES-35, 10-3, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).

[125] *Id*. at 10-9.

[126] Section 377.371, F.S.

[127] *EPA Study*, at 4-3, 4-11, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).

[128] Avner Vengosh, Robert B. Jackson, Nathaniel Warner, Thomas Darrah, & Andrew Kondash, *A Critical Review of the Risks to Water Resources from Unconventional Shale Gas Development and Hydraulic Fracturing in the United States*, American Chemical Society, 48 Env. Sci. & Techol. 8334-8348, 8343 (J) (2014); Hannah Wiseman, *Risk and Response in Fracturing Policy*, 84 UNV. OF COL. L. REV. 729-817, 776 (2009), *available at* http://lawreview.colorado.edu/wp-content/uploads/2013/11/11.-Wiseman_For-Printer_s.pdf (last visited Oct. 28, 2019).

[129] Hannah Wiseman, *Risk and Response in Fracturing Policy*, 84 UNV. OF COL. L. REV. 729-817, 770 (2009).

[130] *EPA Study*, at 10-6, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).

[131] *Id*.

***Wastewater Management and Disposal***

The majority of produced water is disposed of using injection wells.[132] Injection wells are permitted under the federal Underground Injection Control (UIC) program.[133] The goal of the UIC program is the effective isolation of injected fluids from underground sources of drinking water.[134] Class II injection wells are designed for injecting fluids associated with the production of oil and natural gas, or fluids used to enhance hydrocarbon recovery. While the injection of fracturing fluids, unless the fluid contains diesel, is exempt from the UIC program, the wastewater from oil and gas operations is not exempt.[135] As of 2016, there were about 14 active Class II disposal wells in Florida, with an average disposal rate per well of 246,000 gallons per day.[136]

Another issue that is developing with the increase in the number of injection wells is the concern that the deep-well disposal of oil and gas production wastewater is responsible for seismic activity in certain areas.[137] The Oklahoma Geological Survey stated that the primary suspected source of triggered seismicity is from the injection of produced water associated with oil and gas production in disposal wells.[138] The likelihood of potentially inducing seismic events differs between regions, based on factors such as geology and the wastewaters produced.[139]

Additionally, in some states, the produced water is being sent to treatment facilities that are not equipped to treat wastewater from hydraulically fractured wells.[140] In June of 2016, the EPA, under the authority of the CWA, published final rules for the oil and gas extraction category.[141] The rules establish pretreatment standards that prevent the discharge of pollutants in wastewater from onshore, unconventional oil and gas facilities to publicly owned treatment works.[142] The

132 *Id.* at 8-3.
133 EPA, *Underground Injection Control, General Information About Injection Wells*, https://www.epa.gov/uic/general-information-about-injection-wells (last visited Oct. 28, 2019).
134 *Id*.
135 Watershed Council, *Regulations and Exemptions*, https://www.watershedcouncil.org/hydraulic-fracturing---regulations-and-exemptions.html (last visited Oct. 28, 2019).
136 *EPA Study*, at 8-24, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Oct. 28, 2019).
137 *See generally* Peter Folger & Mary Tiemann, Cong. Research Serv., R 43836, *Human-Induced Earthquakes from Deep-Well Injection: A Brief Overview* (Sept. 30, 2016), *available at* https://www.fas.org/sgp/crs/misc/R43836.pdf (last visited Oct. 28, 2019).
138 Oklahoma Geological Survey, *Statement on Oklahoma Seismicity*, 1 (Apr. 21, 2015), http://wichita.ogs.ou.edu/documents/OGS_Statement-Earthquakes-4-21-15.pdf (last visited Oct. 28, 2019).
139 Tanya Gallegos, Brian Varela, Seth Haines, & Mark Engle, *Hydraulic Fracturing Water Use Variability in the United States and Potential Environmental Implications*, Water Resour. Res., 5839–5845, 5844 (2015), *available at* https://agupubs.onlinelibrary.wiley.com/doi/epdf/10.1002/2015WR017278 (last visited Oct. 28, 2019).
140 Hannah Wiseman, *Risk and Response in Fracturing Policy*, 84 UNV. OF COL. L. REV. 729-817, 768-769 (2009), *available at* http://lawreview.colorado.edu/wp-content/uploads/2013/11/11.-Wiseman_For-Printer_s.pdf (last visited Oct. 28, 2019).
141 Effluent Limitations Guidelines and Standards for the Oil and Gas Extraction Point Source Category, 81 Fed. Reg. 41845–41857 (June 28, 2016), *available at* https://www.govinfo.gov/content/pkg/FR-2016-06-28/pdf/2016-14901.pdf (last visited Oct. 28, 2019).
142 EPA, *Unconventional Extraction in the Oil and Gas Industry*, http://www2.epa.gov/eg/unconventional-extraction-oil-and-gas-industry (last visited Oct. 28, 2019).

compliance date for the rules was extended until 2019 for certain facilities, but the rules are currently in effect.[143]

***Air Quality***

The key aerial emissions associated with unconventional oil and gas production include methane (the main component of natural gas and a potent greenhouse gas), volatile organic compounds (VOCs), nitrogen oxides, sulfur dioxide, particulate matter, and various hazardous air pollutants.[144] In 2012, under the Clean Air Act, the EPA issued the first federal air standards for hydraulically fractured natural gas wells.[145] The New Source Performance Standards required reductions in VOC emissions from hydraulically fractured natural gas wells.[146]

In May of 2016, the EPA issued three rules which together sought to curb emissions of methane, VOCs, toxins, and air pollutants, such as benzene, from new, reconstructed, and modified oil and gas sources.[147] The final rule on new and modified sources required compressor stations to monitor leaks, also known as "fugitive emissions," and required owners or operators to find and repair such leaks, which can be a significant source of both methane and VOC pollution.[148] The rule phased in requirements for a process known as "green completion" to capture aerial emissions from hydraulically fractured wells.[149] The EPA expects that implementation of the rule will reduce air pollutants and toxins, as well as provide health benefits related to reductions in fine particle pollution and ozone toxics, along with improvements in visibility.[150] In October of 2018, the EPA proposed clarifications and amendments regarding details of the rule's implementation.[151] In 2019, the EPA issued proposed amendments to the New Source

[143] 40 C.F.R. ss. 435.33 and 435.34 (2016).
[144] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 9 (Apr. 22, 2015), *available at* https://fas.org/sgp/crs/misc/R43148.pdf (last visited Oct. 28, 2019); *see* Richard Lattanzio, R 42986, *Methane and Other Air Pollution Issues in Natural Gas Systems*, 5-6 (Nov. 5, 2018), *available at* https://fas.org/sgp/crs/misc/R42986.pdf (last visited Oct. 29, 2019).
[145] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 14 (Apr. 22, 2015).
[146] EPA, *Controlling Air Pollution from the Oil and Natural Gas Industry: Actions and Notices About Oil and Natural Gas Air Pollution Standards*, https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/actions-and-notices-about-oil-and-natural-gas#regactions (last visited Oct. 28, 2019).
[147] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources, 81 Fed. Reg. 35824–35942 (June 3, 2016), *available at* https://www.govinfo.gov/content/pkg/FR-2016-06-03/pdf/2016-11971.pdf (last visited Oct. 28, 2019); Source Determination for Certain Emission Units in the Oil and Natural Gas Sector, 81 Fed. Reg. 35622–35634 (June 3, 2016), *available at* https://www.govinfo.gov/content/pkg/FR-2016-06-03/pdf/2016-11968.pdf (last visited Oct. 28, 2019); Federal Implementation Plan for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector; Amendments to the Federal Minor New Source Review Program in Indian Country To Address Requirements for True Minor Sources in the Oil and Natural Gas Sector, 81 Fed. Reg. 35944–35981 (June 3, 2019), *available at* https://www.govinfo.gov/content/pkg/FR-2016-06-03/pdf/2016-11969.pdf (last visited Oct. 28, 2019).
[148] EPA, *EPA's Actions to Reduce Methane Emissions from the Oil and Gas Industry: Final Rules and Draft Information Collection Request*, 2 (2016), *available at* https://www.epa.gov/sites/production/files/2016-09/documents/nsps-overview-fs.pdf (last visited Oct. 28, 2019).
[149] *Id.* at 3.
[150] *Id*. at 4.
[151] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration, 83 Fed. Reg. 52056–52107 (Oct. 15, 2018), *available at* https://www.govinfo.gov/content/pkg/FR-2018-10-15/pdf/2018-20961.pdf (last visited Oct. 28, 2019); *see* EPA, *EPA Proposes Amendments to the 2016 New Source Performance Standards for the Oil*

Performance Standards, which include rescinding methane emissions limits, while keeping the limits for VOCs, for sources in the production and processing segments of the oil and gas industry such as well completion.[152]

## III. Effect of Proposed Changes:

**Section 1** amends s. 377.19, F.S., to create two new definitions relating to hydraulic fracturing, acid fracturing, and matrix acidization:

- "High-pressure well stimulation" is defined to mean "all stages of a well intervention performed by injecting fluids into a rock formation at a pressure that equals or exceeds the fracture gradient of the rock formation and the purpose or effect is to fracture the formation to increase production or recovery from an oil or gas well, such as in hydraulic fracturing or acid fracturing."
- "Matrix Acidization" is defined to mean "all stages of a well intervention performed by injecting fluids into a rock formation at a pressure below the fracture gradient of the rock formation and the purpose or effect is to dissolve the formation to increase production or recovery from an oil or gas well. The term does not include techniques used for routine well cleanout work, well maintenance, removal of formation damage due to drilling or production, or acidizing techniques used to maintain or restore the natural permeability of the formation near the wellbore."

**Section 2** creates s. 377.2405, F.S., regarding advanced well stimulation treatments. The bill prohibits the performance of high-pressure well stimulation or matrix acidization in the state. The prohibition states that a permit from the Department of Environmental Protection (DEP) allowing drilling or operating an oil or gas well does not authorize high-pressure well stimulation or matrix acidization. The bill clarifies that the prohibition only applies to wells regulated under Ch. 377, F.S., entitled "Energy Resources." The only types of wells regulated under Ch. 377, F.S., relate to the oil and gas industry. The bill would not apply to water wells, or other wells that are not directly related to the oil and gas industry.

**Section 3** states that the bill shall take effect upon becoming law.

## IV. Constitutional Issues:

### A. Municipality/County Mandates Restrictions:

None.

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*and Natural Gas Industry: Fact Sheet* (2018), *available at* https://www.epa.gov/sites/production/files/2018-09/documents/oil_and_gas_technical_proposal_fact_sheet.9.11.18_0.pdf (last visited Oct. 28, 2019).

[152] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Review, 84 Fed. Reg. 50244–50286 (Sept. 24, 2019), *available at* https://www.govinfo.gov/content/pkg/FR-2019-09-24/pdf/2019-19876.pdf (last visited Oct. 28, 2019); EPA, *EPA Proposed Policy Amendments to the 2012 and 2016 New Source Performance Standards for the Oil and Gas Industry*, 1-2 (Aug. 28, 2019), *available at* https://www.epa.gov/sites/production/files/2019-08/documents/fact_sheet._proposed_amendments_to_nsps_for_oil_and_natural_gas_industry.8.28.19.pdf (last visited Oct. 28, 2019).

### B. Public Records/Open Meetings Issues:

None.

### C. Trust Funds Restrictions:

None.

### D. State Tax or Fee Increases:

None.

### E. Other Constitutional Issues:

None.

## V. Fiscal Impact Statement:

### A. Tax/Fee Issues:

None.

### B. Private Sector Impact:

The bill prohibits certain techniques used to increase production or recovery from an oil or gas well. The fiscal impact of the prohibition on the private sector is indeterminate at this time.

### C. Government Sector Impact:

DEP may incur additional costs related to amending Rules 62C-25 through 62C-30 of the Florida Administrative Code to implement the prohibition contained in the bill.

## VI. Technical Deficiencies:

None.

## VII. Related Issues:

None.

## VIII. Statutes Affected:

This bill substantially amends section 377.19 of the Florida Statutes.
This bill creates section 377.2405 of the Florida Statutes.

## IX. Additional Information:

### A. Committee Substitute – Statement of Changes:
(Summarizing differences between the Committee Substitute and the prior version of the bill.)

None.

### B. Amendments:

None.