HOUSE OF REPRESENTATIVES STAFF ANALYSIS

BILL #: CS/HB 7029 PCB ANRS 19-01 Fracking
SPONSOR(S): Agriculture & Natural Resources Appropriations Subcommittee, Agriculture & Natural Resources Subcommittee, Raschein
TIED BILLS: **IDEN./SIM. BILLS:** SB 146, HB 239, CS/SB 314

REFERENCE	ACTION	ANALYST	STAFF DIRECTOR or BUDGET/POLICY CHIEF
Orig. Comm.: Agriculture & Natural Resources Subcommittee	9 Y, 6 N	Melkun	Shugar
1) Agriculture & Natural Resources Appropriations Subcommittee	10 Y, 2 N, As CS	White	Pigott
2) State Affairs Committee			

SUMMARY ANALYSIS

Well stimulation techniques are used in the production of oil and gas resources. The techniques can be used for maintenance and remedial work in wells, or to increase production of oil and gas from wells. The three main well stimulation techniques are hydraulic fracturing, acid fracturing, and matrix acidizing. Hydraulic fracturing and acid fracturing are also referred to as “fracking”.

Hydraulic fracturing and acid fracturing are the injection of a high volume of fluid at a pressure high enough to create fractures in the rock formation, which create channels allowing oil and gas to flow more freely into a wellbore. Hydraulic fracturing uses a mixture of water, chemical additives, and a proppant, while acid fracturing uses an acid-based formula that etches the walls of the fractures, keeping the channels open after the pressure has subsided. Matrix acidizing injects acidic fluid at a lower pressure into the rock formation.

While direct regulation over well stimulation techniques at the federal level is limited, there are several federal statutes and rules that regulate the impacts of oil and gas extraction such as the United States Environmental Protection Agency’s Oil and Gas Extraction Effluent Guidelines and Standards and the Comprehensive Environmental Response, Compensation, and Liability Act. These standards are also incorporated into the National Pollutant Discharge Elimination System regulatory framework under the Clean Water Act. In Florida, the Department of Environmental Protection (DEP) has regulatory authority over oil and gas resources. DEP oversees the permitting process for drilling production and exploration and has authority over the conservation of oil and gas resources. Some local governments, 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.

Potential impacts and concerns from the use of well stimulation techniques include groundwater or surface water contamination, stress on water supplies, inadequate wastewater management and disposal, and air quality degradation. 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 the fluid used, proximity of the fracture zone to an underground drinking water source, the geology of the natural formations, and disposal of produced wastewater.

The bill prohibits fracking in the state and specifies that a permit for drilling or operating a well does not authorize fracking. The bill requires an operator to provide written notice to DEP before using techniques for certain well work. The bill defines the term “fracking” as all stages of well intervention performed by injecting fluids into a rock formation at pressures at or exceeding the fracture gradient of the rock formation in order to propagate fractures. It clarifies that the term does not include techniques used for conventional well stimulation or conventional workover procedures; techniques used for routine well cleanout work, well maintenance, or removal of formation damage due to drilling or production; or conventional acidizing techniques used to enhance, maintain or restore the natural permeability of the formation.

The bill may have an indeterminate positive fiscal impact on state government revenues because violators of the prohibition could be charged penalty fees, which would be paid to DEP. The bill may have an insignificant negative fiscal impact on DEP that can be absorbed within existing resources to conduct rulemaking to modify current rules to comply with the prohibition on fracking.

FULL ANALYSIS

I. SUBSTANTIVE ANALYSIS

A. EFFECT OF PROPOSED CHANGES:

Present Situation

Overview of Oil and Gas Production

Oil and gas extraction is the exploration and production of oil and gas from wells. Production involves the taking of raw natural oil and gas from underground formations,[1] which began in 1859 in northwestern Pennsylvania.[2] In 2017, there were 991,000 producing wells in the United States providing over 10.04 million barrels of oil per day.[3]

Northwest and South Florida are the major oil and gas producing areas in Florida. The first producing oil well was discovered in 1943 at a wellsite located in the Big Cypress Preserve in South Florida.[4] Four oil and gas fields are currently active in South Florida in Lee, Hendry, Collier, and Miami-Dade counties. Oil and gas resources were first discovered in Northwest Florida in 1970. Currently, two oil and gas fields are active in Northwest Florida in Escambia and Santa Rosa counties.[5]

As of November 2018, Florida had 109 permitted oil and gas production wells, of which 59 were actively producing oil and gas. The Florida Department of Environmental Protection's (DEP) November 2018 Florida Oil and Gas Annual Production Report totaled natural gas production at 814,832 million cubic feet and oil production at 622,201 barrels in the state.[6]

Geologists believe there may be large oil and natural gas deposits off Florida's western coast; however, oil and gas resources are not being explored because the state enacted a drilling ban for state waters in 1990. In 2006, Congress banned the leasing of federal offshore oil and gas blocks within 125 miles of Florida's western coast until at least 2022.[7]

Use of Well Stimulation Techniques

Conventional oil and gas resources are found in concentrated underground locations, referred to as reservoirs, located in permeable rock formations, including sandstone and carbonate.[8] Wells have historically been drilled vertically, straight down into a rock formation to extract the conventional oil and gas resources. Unconventional oil and gas resources are highly dispersed through impermeable or "tight" rock formations such as shales and tight sands. To extract unconventional oil and gas resources,

[1] United States Environmental Protection Agency (EPA), *Overview of the Natural Oil and Gas Industry*, available at https://www.epa.gov/natural-gas-star-program/overview-oil-and-natural-gas-industry (last visited Feb. 2, 2019).
[2] American Oil & Gas Historical Society, *First American Oil Well*, available at https://aoghs.org/petroleum-pioneers/american-oil-history/ (last visited Feb. 2, 2019).
[3] United States Energy Information Administration (EIA), *U.S. Oil and Natural Gas Wells by Production Rate* (Oct. 29, 2018), available at https://www.eia.gov/petroleum/wells/ (last visited Feb. 2, 2019).
[4] American Oil & Gas Historical Society, *First Florida Oil Well* (2018), available at https://aoghs.org/petroleum-pioneers/first-florida-oil-well/ (last visited Jan. 28, 2019).
[5] DEP, *Florida Oil and Gas Annual Production Reports* (2018), available at https://floridadep.gov/water/oil-gas/documents/state-production-data (last visited Jan. 28, 2019).
[6] *Id.*
[7] United States EIA, Florida State Profile, *Analysis: Petroleum*, available at https://www.eia.gov/state/analysis.php?sid=FL (last visited Jan. 28, 2019); *see* s. 377.242(1), F.S. In 2018, a Florida constitutional amendment was passed that banned drilling for exploration or extraction of oil or natural gas on lands beneath all state waters which have not been alienated that lie between the mean high water line and the outermost boundaries of the state's territorial seas. *See* art. II, s. 7(c), Fla. Const.
[8] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 2 (Apr. 22, 2015), available at https://fas.org/sgp/crs/misc/R43148.pdf (last visited Jan. 24, 2019).

drilling has shifted from vertical to horizontal or directional away from the oil and gas reservoir and toward the source rock.[9]

Well stimulation techniques are used in the production of both conventional and unconventional oil and gas resources. The techniques can be focused solely on the wellbore for maintenance and remedial purposes or can be used to increase production from the reservoir.[10] The relatively recent development of horizontal and directional drilling in conjunction with the expanded use of well stimulation techniques has increased production at oil and gas wells and has led to profitable extraction of unconventional oil and gas resources.[11] The three main well stimulation techniques are hydraulic fracturing, acid fracturing, and matrix acidizing.[12] Hydraulic fracturing and acid fracturing are often referred to as "fracking".

Hydraulic Fracturing

Hydraulic fracturing was developed in the late 1940s to enhance the production of oil and gas resources.[13] 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.[14] 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 or ceramic material.[15] A hydraulic fracturing operation at a horizontal well involves four stages. The first 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 the fracture fluid is injected without the proppant to initiate and propagate the fracture. The proppant is then added to keep the fractures open. The third stage is the "flush," during which fluid is injected without the 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.[16]

The United States Environmental Protection Agency (EPA) estimated 25,000-30,000 new wells were drilled and hydraulically fractured annually in the United States between 2011 and 2014.[17] In the United States, hydraulically fractured oil and gas production wells accounted for approximately 46 million barrels per day of oil and gas production in 2017.[18] Hydraulic fracturing in conjunction with horizontal or directional drilling techniques has led to a surge in domestic production of oil and gas resources in the

[9] *Id.* at 10.
[10] California Council on Science and Technology at the Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California*, Vol. 1, 14 (January 2015), available at https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Jan. 24, 2019).
[11] *Id.* at 2.
[12] *Id.* at 28.
[13] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 3-4 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).
[14] T.J. Gallegos and B.A. Varela, United States Geological Survey (USGS), *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, 7 (2015), available at https://pubs.usgs.gov/sir/2014/5131/pdf/sir2014-5131.pdf# (last visited Jan. 25, 2019).
[15] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 7 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).
[16] California Council on Science and Technology at the Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California*, Vol. 1, 42 (January 2015), available at https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Jan. 24, 2019).
[17] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 3-1 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).
[18] United States EIA, *Today in Energy: U.S. remains the world's top producer of petroleum and natural gas hydrocarbons* (May 21, 2018), available at https://www.eia.gov/todayinenergy/detail.php?id=36292 (last visited Jan. 25, 2019).

last decade and, since 2009, the United States has remained the world's top producer of oil and natural gas.[19]

Acid Fracturing

Well stimulation techniques that use acid-based formulas are sometimes preferred in carbonate reservoirs.[20] Acid fracturing is a well stimulation technique that uses acidic fluids. Well operators pump the acidic fluids into a well at a pressure that exceeds the fracture gradient to fracture the rock. The acid etches the walls of the fracture and eliminates the need to use a proppant because the fractures remain open after pressure is released.[21] 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.[22] As compared to hydraulic fracturing, acid fracturing is generally more successful in carbonate reservoirs because of the relatively high degree of natural fractures present.[23]

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 for oil and gas into the wellbore.[24] Compared to hydraulic fracturing, acid fracturing results in fractures that are relatively short in length.[25]

Matrix Acidizing

Well operators have been using matrix acidizing for over 100 years, with the first use documented in 1895.[26] Drilling and production operations, in general, lead to formation damage.[27] Formation damage can include the plugging of perforations or the plugging of the rock matrix by debris from the well and well operations, which restricts the flow of oil and gas into the wellbore.[28] Matrix acidizing is performed by pumping acidic fluids into a well at a pressure that does not exceed the fracture gradient.[29] Matrix acidizing is often used for well maintenance and to remediate damage caused by well operations and drilling.[30] Operators use acid to dissolve carbonate minerals and bypass formation damage around the well.[31] The acid is mostly neutralized because it reacts quickly with the limestone. This technique is also commonly used to clean water well systems to remove mineral deposits from the well and the immediate formation.[32]

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[19] *Id.*
[20] California Council on Science and Technology at the Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California*, Vol. 1, 56 (January 2015), available at https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Jan. 24, 2019).
[21] *Id.* at 28.
[22] *Id.* at 14.
[23] *Id.* at 56.
[24] American Petroleum Institute, *Acidizing: Treatment in Oil and Gas Operations*, 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 Jan. 25, 2019).
[25] California Council on Science and Technology at the Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California*, Vol. 1, 56 (January 2015), available at https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Jan. 24, 2019).
[26] *Id.* at 69.
[27] Middle East & Asia Reservoir Review, vol. 8, *Carbonate Stimulation*, 58 (2007), available at https://www.slb.com/~/media/Files/resources/mearr/num8/51_63.pdf (last visited Jan. 28, 2019).
[28] Middle East & Asia Reservoir Review, vol. 4, *Stimulate the Flow*, 42 (Jan. 2003), available at https://www.slb.com/~/media/Files/resources/mearr/num4/stimulate_flow.pdf (last visited Jan. 28, 2019).
[29] California Council on Science and Technology at the Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California*, Vol. 1, 69 (January 2015), available at https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Jan. 24, 2019).
[30] *Id.* at 14.
[31] *Id.* at 69.
[32] National Groundwater Association, *Residential Well Cleaning* (2016), available at https://www.ngwa.org/docs/default-source/default-document-library/groundwater/residential-well-cleaning.pdf?sfvrsn=3fc05d97_2 (last visited Jan. 28, 2019).

If large 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.[33] Matrix acidizing can result in limited stimulation of the carbonate reservoir permeability beyond the near-wellbore region.[34] This technique is not commonly used for stimulation in unconventional oil and gas reservoirs because it does not increase recovery enough in low permeability reservoirs to make production viable.[35] The penetration into the formation caused by matrix acidizing is less extensive compared to a fracturing technique. However, in carbonate reservoirs, matrix acidizing can create deep penetrating channels, known as wormholes, that allow acid to penetrate deeper into more permeable fractures of a naturally fractured reservoir.[36] To minimize the probability of acid entering into highly permeable sections of the formation, which could create channels into water-producing zones, careful treatment, design, and execution is required when performing a matrix acidizing treatment.[37]

Oil and gas reserves both in Northwest and South Florida are composed of carbonate formations and reservoirs with relatively high permeability.[38] Rather than hydraulic fracturing, well operators in Florida prefer washing or flushing the formations with acid to open carbonate pathways to enhance recovery of oil and gas resources.[39]

Regulation of Well Stimulation Techniques

Federal

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).[40] 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) used for hydraulic fracturing operations. The CWA was amended to characterize oil and gas exploration and production as "construction activities," thereby removing these operations from the scope of the CWA.[41] Thus, the Energy Policy Act effectively exempted non-diesel hydraulic fracturing from federal regulation.[42]

In an attempt to regulate hydraulic fracturing on federal and tribal lands, the Bureau of Land Management (BLM), in March 2015, published final rules governing hydraulic fracturing.[43] The rules

[33] California Council on Science and Technology at the Lawrence Berkeley National Laboratory, *An Independent Assessment of Well Stimulation in California*, Vol. 1, 14 (January 2015), available at https://ccst.us/wp-content/uploads/160708-sb4-vol-I.pdf (last visited Jan. 24, 2019).
[34] *Id.* at 28.
[35] *Id.* at 14.
[36] *Id.* at 30.
[37] Middle East & Asia Reservoir Review, vol. 4, *Stimulate the Flow*, 44 (Jan. 2003), available at https://www.slb.com/~/media/Files/resources/mearr/num4/stimulate_flow.pdf (Jan. 28, 2019).
[38] DEP, *Hydraulic Fracturing Background and Recommendations* (Sept. 29, 2011), available at http://news.caloosahatchee.org/docs/Dep_Fracturing_Response_130118.pdf (last visited Jan. 28, 2019).
[39] *Id*.
[40] Energy Policy Act of 2005, H.R. 6, 109th Cong. (2005-2006).
[41] The United States EPA rule implementing the CWA amendment was challenged and the Ninth Circuit Court of Appeals vacated the rule; Oil and gas construction facilities remain subject to stormwater permitting requirements, as well as, National Pollutant Discharge Elimination System permit.
requirements; *see*, William J. Brady, *Hydraulic Fracturing Regulation in the United States: The Laissez-faire approach of the Federal government and varying state regulations*, 8 (Unv. of Denver Sturm College of Law), available at http://www.law.du.edu/documents/faculty-highlights/Intersol-2012-HydroFracking.pdf (last visited Jan. 28, 2019).
[42] 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 Jan. 28, 2019).
[43] 80 FR 16128-01 (2015); *see* 40 CFR 3162.3-3 (2015).

were to take effect in June 2015; however, the United States District Court for the District of Wyoming granted a preliminary injunction and the rule was stayed.[44] In June 2016, the court held that the BLM lacked authority to regulate hydraulic fracturing and set aside the final rules.[45] The decision was appealed and was dismissed in September 2017.[46]

While direct regulation over well stimulation techniques at the federal level is limited, there are several federal statutes and rules that regulate the impacts of oil and gas extraction. The United States EPA's Oil and Gas Extraction Effluent Guidelines and Standards regulate wastewater discharges from field exploration, drilling, production, well treatment, and well completion activities.[47] The regulations apply to conventional and unconventional extraction with the exception of extractions of coalbed methane.[48] These standards are incorporated into the National Pollutant Discharge Elimination System regulatory framework in the CWA.[49]

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).[50] While recovered oil or natural gas is exempt from CERCLA, other hazardous substances that result from oil or gas production, such as fracturing fluids, fall under CERCLA. If a release of such fluids occurs, the facility owner and operator could face liability under CERCLA.[51]

State

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.[52]

In Florida, DEP has regulatory authority over oil and gas resources. The Division of Water Resource Management (division) within DEP oversees the permitting process for drilling production and exploration. 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.[53] Drilling and exploration is not authorized or is subject to local governmental approval in tidal waters, near improved beaches, and within municipal boundaries.[54]

When issuing permits for oil and gas exploration or extraction, the division must 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

[44] *State of Wyo. v. U.S. Dept. of the Int.*, No. 2: 15-CB-043-SWS (D. Wyo. Sept. 30, 2015) (order granting preliminary injunction).
[45] *State of Wyo. v. U.S. Dept. of the Int.*, No. 2: 15-CV-043-SWS (D. Wyo. June 21, 2016) (order on petitions for review of final agency action).
[46] *State of Wyo. v. Zinke*, No. 16-8068 (10th Cir. Sept. 21, 2017) (dismissing appeal).
[47] 40 CFR Part 435; *see also,* United States EPA, *Oil and Gas Extraction Effluent Guidelines: Rule Summary* (Oct. 2018), available at https://www.epa.gov/eg/oil-and-gas-extraction-effluent-guidelines (last visited Jan. 28, 2019).
[48] United States EPA, *Oil and Gas Extraction Effluent Guidelines: Rule Summary* (Oct. 2018), available at https://www.epa.gov/eg/oil-and-gas-extraction-effluent-guidelines (last visited Jan. 28, 2019).
[49] *Id*.
[50] *CERCLA*, 42 U.S.C. §§ 9601-9675.
[51] 42 U.S.C. § 9607.
[52] 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 Jan. 28, 2019).
[53] Section 377.21(1), F.S.
[54] Section 377.24, F.S.

viable basis.[55] DEP also must ensure that all precautions are taken to prevent the spillage of oil or other pollutants in all phases of drilling for and extracting oil, gas, or other petroleum products.[56] Additionally, DEP is required to issue rules requiring the drilling, casing, and plugging of wells in such a manner as to prevent the escape of oil or other petroleum products from one stratum to another.[57]

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.[58] An application for a permit to drill must include a proposed casing and cementing program and a location plat survey.[59] Each drilling permit is valid for one year and may be extended for an additional year.[60] Before a permit is granted, the owner or operator is required to post a bond or other form of security for each well. The bond or security amounts vary depending upon well depth.[61] In lieu of posting a bond or security for each well, the owner or operator may file a blanket bond for the coverage of multiple operations, up to 10 wells, in the amount of $1 million.[62]

Before a well is used for its intended purpose, a permit to operate the well must be obtained.[63] Operating permits are valid for the life of the well; however, every five years DEP must perform a comprehensive field inspection and the permit must be re-certified.[64] Each application and subsequent re-certification 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.[65]

A separate permit is not required for the performance of well stimulation techniques. Such techniques are regulated as workovers.[66] Rule 62C-25.002(61), Florida Administrative Code (F.A.C.), defines 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." An operator must notify DEP before commencing a workover procedure and must submit a revised Well Record[67] to DEP within 30 days after the workover.[68]

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 air, water, or property of the state;
- The reasonable costs of tracing the source of the discharge and for controlling and abating the source and the pollutants; and
- The costs of restoring air, water, and property.[69]

[55] Section 377.241, F.S.
[56] Section 377.22, F.S.
[57] *Id*.
[58] Rule 62C-26.003, F.A.C.
[59] *Id*.
[60] *Id*.
[61] Rule 62C-26.002, F.A.C.
[62] *Id*.
[63] Rule 62C-26.008, F.A.C.
[64] Rules 62C-25.006 and 62C-26.008, F.A.C.
[65] Rule 62C-26.008, F.A.C.
[66] *See*, e.g., s. 377.22, F.S., requiring the division to adopt rules to "regulate the shooting, perforating, and chemical treatment of wells" and to "regulate secondary recovery methods, in the introduction of gas, air, water, or other substance in producing formations;" and s. 377.26, F.S., requiring the division 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."
[67] Rule 62C-26.008, F.A.C.
[68] Rule 62C-29.006, F.A.C.
[69] Section 377.37(1)(a), F.S.

Such persons are also subject to judicial imposition of a civil penalty of up to $10,000 for each offense.[70] Each day a violation occurs constitutes a separate offense.[71]

Local

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.[72] 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.[73] Section 377.24(5), F.S., restricts DEP from issuing a permit for drilling within the corporate limits of a municipality unless the municipality adopts a resolution approving the permit. Six municipalities (Estero, Bonita Springs, Coconut Creek, Cape Coral, Dade, and Zephyrhills) and 11 counties (Alachua, Bay, Brevard, Broward, Citrus, Martin, Miami-Dade, Pinellas, St. Lucie, Volusia, Wakulla, and Walton) have banned one or more forms of well stimulation techniques by ordinance.[74] Additionally, other counties and municipalities have passed resolutions supporting various types of bans and moratoriums relating to well stimulation techniques.[75]

Environmental Concerns and Regulation of Environmental Impacts

There are environmental concerns associated with 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.[76] The extent of environmental impacts varies depending on the well stimulation technique and the toxicity of the fluid, the properties of the rock formation, the closeness of the fracture zone to an underground drinking water source, the existence of a barrier between the fracture formation and other formations, and how wastewater is disposed.[77]

[70] *Id*.
[71] *Id*.
[72] *See, e.g.*, LEE COUNTY, FLA., LAND DEV. CODE §§ 34-1651 and 34-145(c) (2018).
[73] *Id*.
[74] *See, e.g.*, VILLAGE OF ESTERO, FLA., ORDINANCE NO. 2015-19, (2015), bans well stimulation within and below the corporate boundaries; CITY OF BONITA SPRINGS, FLA., ORDINANCE NO. 15-17 (2015), bans well stimulation; CITY OF COCONUT CREEK, FLA. ORDINANCE NO. 2015-009 (2014), bans well stimulation; CITY OF CAPE CORAL, FLA., ORDINANCE NO. 4-16 (2016); prohibits well stimulations within the corporate limits; CITY OF DADE, FLA., ORDINANCE NO. 2016-08 (2016), prohibits extreme well stimulation; CITY OF ZEPHYRHILLS, FLA., ORDINANCE NO. 1310-16 (2016), prohibits extreme well stimulation regardless of whether the surface access point is within city limits; ALACHUA COUNTY, FLA., CODE OF ORDINANCES §77.13.5, prohibits extraction of oil and natural gas; BAY COUNTY, FLA., LAND DEV. REG. §311, prohibits hydraulic fracturing in all zone districts in unincorporated Bay County; BREVARD COUNTY, FLA., ORDINANCES NO. 2016-04 (2016), prohibits well stimulations; CITRUS COUNTY, FLA., ORDINANCE NO. 2016-01 (2016), bans any form of well stimulation; BROWARD COUNTY, FLA., ORDINANCE NO. 2016-03 (2016), prohibits extreme well stimulation; MARTIN COUNTY, FLA., ORDINANCE NO. 1016 (2017), prohibits high-pressure well stimulation; MIAMI-DADE COUNTY, FLA., ORDINANCE NO. 16-106 (2016), prohibits well stimulations; PINELLAS COUNTY, FLA., ORDINANCE NO. 16-37 (2016), prohibits well stimulation; ST. LUCIE COUNTY, FLA., ORDINANCE NO. 42054859 (2015), prohibits high-intensity petroleum operations; VOLUSIA COUNTY, FLA., ORDINANCE NO. 2016-07 (2016), prohibits high-pressure well stimulation; WAKULLA COUNTY, FLA., ORDINANCE NO. 2016-10 (2016), prohibits high intensity petroleum operations; WALTON COUNTY, FLA., ORDINANCE NO. 2016-11 (2016), prohibits extreme well stimulation.
[75] Food & Water Watch, *Local Regulations Against Fracking*, available at https://www.foodandwaterwatch.org/insight/local-resolutions-against-fracking#florida (last visited Jan. 29, 2019).
[76] United States EPA, *Natural Gas Extraction-Hydraulic Fracturing: Providing Regulatory Clarity and Protections Against Known Risks*, available at https://www.epa.gov/uog#providing (last visited Jan. 29, 2019).
[77] 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 Jan. 29, 2019).

Water Quality

The United States EPA estimated 275,000 wells have been hydraulically fractured between 2000 and 2013, and approximately 3,900 public water systems were within one mile of a hydraulically fractured well.[78] Due to a lack of public data, little is known about drinking water quality impacts from spills of hydraulic fracturing fluids or additives.[79] According to a 2015 study, the majority of hydraulic fracturing-related spills were caused by human error and equipment failure. Spills caused by a failure of container integrity were generally associated with the larger spill volumes.[80] Though there are concerns with inadequate well casing or cementing in the construction of all well types, horizontally drilled and hydraulically fractured wells pose more production challenges because the well casing is subject to greater pressures.[81]

Mitigating measures, such as extending the casing farther below groundwater resources and pressure testing the well casing before the injection of fluids, can prevent well casing failures. Blowout preventers also help control and prevent pressure build-ups.[82] The vast majority of Florida's public water supply is obtained from groundwater sources, specifically from the Floridan aquifer.[83] Areas in the system in which oil and gas have been extracted have an upper confining unit that is generally greater than 100 feet, which serves as a barrier to prevent contamination.[84]

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 sources. These "frac hits" are more likely to occur if wells are close to each other or are on the same well pad. Frac hits most commonly occur when multiple wells are drilled from the same surface location and when wells are spaced less than 1,100 feet apart.[85] Rule 62C-26.004, F.A.C., provides well spacing requirements for wells in Florida, including more stringent spacing requirements for horizontal wells and associated drilling units deeper than 7,000 feet.[86]

Surface water contamination can also occur, typically due to inadequate storage and disposal of produced wastewater, which is the water that comes to the surface naturally as part of the oil and gas production process and typically includes the fracturing fluids. Produced wastewater has been found to contain salts, metals, radioactive materials, and hydraulic fracturing chemicals and their chemical transformation products.[87] The concentrations of these constituents have varied across the United States, both within and among different rock formations.[88] As the use of hydraulic fracturing has

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[78] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 4-6 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).

[79] *Id.* at 22; *see also*, 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 Jan. 29, 2019).

[80] United States EPA, *Review of State and Industry Spill Data: Characterization of Hydraulic Fracturing-Related Spills* (May 2015), available at https://www.epa.gov/sites/production/files/2015-05/documents/hf_spills_report_final_5-12-15_508_km_sb.pdf (last visited Jan. 29, 2019).

[81] 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 Jan. 29, 2019).

[82] *Id.* at 7.

[83] DEP, *Aquifers*, available at https://fldep.dep.state.fl.us/swapp/Aquifer.asp (last visited Jan. 29, 2019).

[84] USGS, *Conceptual Model of the Floridan*, available at https://fl.water.usgs.gov/floridan/conceptual-model.html (last visited Jan. 29, 2019).

[85] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 28 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).

[86] Rule 62C-26.004(2), F.A.C.

[87] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 7 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019); the produced wastewater is also called produced water.

[88] *Id.* at 29-30.

increased, so has the volume of wastewater generated. Spills of produced wastewater do occur and can result in large volumes or high concentrations of chemicals reaching groundwater sources.[89] In 2015, the United States EPA concluded that of the 225 produced wastewater spills, 30 (approximately 13 percent) reached surface water and one reached groundwater.[90] In Florida, any spill of waste material 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.[91]

Water Supply

The amount of water used during a hydraulic fracturing treatment depends on the well depth, formation geology, and the composition of the fluids injected. In most cases, the majority of the fracturing fluid is water, and each hydraulically fractured well can require thousands to millions of gallons of water.[92] To decrease the competition among users of the same water sources, some states have implemented pilot projects evaluating the feasibility of reusing wastewater produced by oil and gas operations or other brackish wastewater.[93] The reuse of wastewater, however, is often limited by the quality and quantity of available wastewater.[94]

Wastewater Management and Disposal

The vast majority of produced wastewater is disposed of using injection wells, permitted under the Underground Injection Control (UIC) program. The goal of the UIC program is the effective isolation of injected fluids from underground sources of drinking water.[95] Class II wells are wells used only to inject fluids associated with oil and gas production. Class II wells fall into one of three categories: disposal wells, enhanced recovery wells, and hydrocarbon storage wells. Disposal wells are primarily used to reinject flowback as well as wastewater from hydraulic fracturing activities. Enhanced recovery wells inject fluids into oil-bearing formations to recover residual oil and in limited applications, natural gas. Finally, hydrocarbon wells inject liquid hydrocarbon into underground caverns as part of the United States Strategic Petroleum Preserve.[96] 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.[97] There are 22 Class II disposal wells in the State of Florida.[98]

Additionally, in some states the produced wastewater is sent to treatment facilities that are not equipped to treat wastewater from hydraulically fractured wells.[99] In June 2016, the United States EPA,

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[89] United States EPA, *Review of State and Industry Spill Data: Characterization of Hydraulic Fracturing-Related Spills* (May 2015), 15, available at https://www.epa.gov/sites/production/files/2015-05/documents/hf_spills_report_final_5-12-15_508_km_sb.pdf (last visited Jan. 29, 2019).

[90] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 31 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).

[91] Section 377.371, F.S.

[92] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 31 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).

[93] 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 Jan. 29, 2019).

[94] United States EPA, *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States*, 35 (December 2016), available at https://www.epa.gov/sites/production/files/2016-12/documents/hfdwa_executive_summary.pdf (last visited Jan. 24, 2019).

[95] United States EPA, *UIC Program*, available at https://www.epa.gov/uic (last visited Jan. 29, 2019).

[96] United States EPA, *UIC: Class II Oil and Gas Related Injection Wells*, available at https://www.epa.gov/uic/class-ii-oil-and-gas-related-injection-wells (last visited Jan. 30, 2019).

[97] *Id.*

[98] Email from Kevin Cleary, Director of Legislative Affairs, DEP, RE: Committee Questions, regarding well stimulation techniques and well statistics (Feb. 1, 2019).

[99] Hannah Wiseman, *Risk and Response in Fracturing Policy*, 84 Unv. Of Col. L. Rev. 729-817, 769 (2009), available at http://lawreview.colorado.edu/wp-content/uploads/2013/11/11.-Wiseman_For-Printer_s.pdf (last visited Jan. 29, 2019).

under the authority of the CWA, published final rules for the oil and gas extraction category. The rules establish pretreatment standards that prevent the discharge of produced wastewater from onshore unconventional oil and gas facilities to publicly owned treatment works.[100] A voluntary remand for the final rule is currently in effect.[101]

Air Quality

The key emissions associated with unconventional oil and natural gas production include methane, volatile organic compounds (VOCs), nitrogen oxides, sulfur dioxide, particulate matter, and various hazardous air pollutants.[102] In 2012, the United States EPA issued the first federal air standards for hydraulically fractured natural gas wells.[103] The New Source Performance Standards required reductions in VOC emissions from hydraulically fractured natural gas wells.[104] In May 2016, the United States EPA issued three rules that sought to curb emissions of methane, VOCs, toxins, and air pollutants, such as benzene, from new, reconstructed, and modified oil and gas sources.[105] The final rule required compressor stations to monitor leaks, also known as "fugitive emissions," four times a year and required owners or operators to find and repair such leaks, which can be a significant source of both methane and VOC pollution.[106]

On September 11, 2018, the United States EPA proposed targeted improvements to the 2016 New Source Performance Standards for the oil and gas industry that streamline implementation, reduce duplicative requirements by the United States EPA and states, and significantly decrease unnecessary burdens on domestic energy producers. This targeted improvements package is expected to save up to $484 million in regulatory costs from 2019 through 2025, or $75 million annually.[107] Comments, which were due to the United States EPA by December 17, 2018, are currently under review.[108]

Effect of the Proposed Changes

The bill amends s. 377.19, F.S., to define the term "fracking" as all stages of well intervention performed by injecting fluids into a rock formation at pressures at or exceeding the fracture gradient of the rock formation in order to propagate fractures. The bill clarifies that the term does not include techniques used for conventional well stimulation or conventional workover procedures; techniques used for routine well cleanout work, well maintenance, or removal of formation damage due to drilling or production; or conventional acidizing techniques used to enhance, maintain, or restore the natural permeability of the formation.

The bill creates s. 377.2405, F.S., to prohibit fracking in the state. The bill specifies that a permit for drilling or operating a well does not authorize fracking. Finally, the bill requires an operator to provide written notice to DEP before using techniques for routine well cleanout work, well maintenance,

[100] 81 Fed. Reg. 41845 (2016), established final pretreatment standards for the Oil and Gas Extraction category; *see also,* 40 CFR Part 435.
[101] 81 Fed. Reg. 88126 (2016), postponed the compliance date to August 29, 2019, for existing sources that were lawfully discharging.
[102] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 8 (April 22, 2015), available at https://fas.org/sgp/crs/misc/R43148.pdf (last visited Jan. 29, 2019).
[103] 40 C.F.R. Parts 60 and 63 (2012).
[104] *Id*.
[105] 40 C.F.R. Part 60; *see also,* EPA, *Controlling Air Pollution from the Oil and Gas Industry*, available at https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/actions-and-notices-about-oil-and-natural-gas (last visited Jan. 29, 2019).
[106] *Id.*
[107] United States EPA, *Proposed Improvements to 2016 New Source Performance Standards*, available at https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry/proposed-improvements-2016-new-source (last visited Jan. 29, 2019).
[108] Oil and Natural Gas Sector: Emission Standards for New, Reconstructed, and Modified Sources Reconsideration, 83 Fed. Reg. 52056-52107 (2018).

removal of formation damage due to drilling or production, or enhancing, maintaining, or restoring the natural permeability of the formation.

The bill provides an effective date of upon becoming a law.

B. SECTION DIRECTORY:

Section 1. amends s. 377.19, F.S., to define the term “fracking.”

Section 2. creates s. 377.2405, F.S., to prohibit fracking and require operators to provide written notice to the department before using techniques for certain purposes.

Section 3. provides an effective date of upon becoming a law.

II. FISCAL ANALYSIS & ECONOMIC IMPACT STATEMENT

A. FISCAL IMPACT ON STATE GOVERNMENT:

1. Revenues:

The bill may have an indeterminate positive fiscal impact on state government revenues because violators of the prohibition could be charged penalty fees, which would be paid to DEP.

2. Expenditures:

The bill may have an insignificant negative fiscal impact on DEP that can be absorbed within existing resources to conduct rulemaking to modify current rules to comply with the prohibition on fracking.

B. FISCAL IMPACT ON LOCAL GOVERNMENTS:

1. Revenues:

None.

2. Expenditures:

The bill may have an indeterminate positive fiscal impact on local government expenditures because local governments would not need to use local government resources to create and enforce a prohibition on fracking at the local level.

C. DIRECT ECONOMIC IMPACT ON PRIVATE SECTOR:

The bill may have an indeterminate negative effect on the private sector because it prohibits techniques used to increase production or recovery from an oil or gas well; however, the effect is unknown because there are no records of wells in Florida utilizing fracking to increase oil and gas production.

D. FISCAL COMMENTS:

None.

III. COMMENTS

A. CONSTITUTIONAL ISSUES:

1. Applicability of Municipality/County Mandates Provision:

Not Applicable. This bill does not appear to require counties or municipalities to spend funds or take action requiring the expenditures of funds; reduce the authority that counties or municipalities have

to raise revenues in the aggregate; or reduce the percentage of state tax shared with counties or municipalities.

2. Other:

None.

B. RULE-MAKING AUTHORITY:

The bill will require DEP to conduct rulemaking to revise existing rules to comply with the prohibition on fracking and require operators to provide written notice before using techniques for certain purposes. While the bill does not expressly grant rulemaking authority to DEP, existing rulemaking authority is sufficient.

C. DRAFTING ISSUES OR OTHER COMMENTS:

None.

IV. AMENDMENTS/ COMMITTEE SUBSTITUTE CHANGES

On March 26, 2019, the Agriculture & Natural Resources Appropriations Subcommittee adopted an amendment and reported the bill favorably as a committee substitute. The amendment changed the definition of “fracking” from “performed by injecting high volumes of fluids at a high rate” to “peformed by injecting fluids”.

This analysis is drafted to the committee substitute as approved by the Agriculture & Natural Resources Appropriations Subcommittee.