rulThe 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 Innovation, Industry, and Technology

BILL:	SB 7064
INTRODUCER:	Agriculture Committee
SUBJECT:	Oil Drilling
DATE:	March 25, 2019
REVISED:	

	ANALYST	STAFF DIRECTOR	REFERENCE	ACTION
	Becker	Becker		**AG Submitted as Committee Bill**
1.	Wiehle	Imhof	IT	**Favorable**
2.			EN	
3.			AP	

I. Summary:

SB 7064 prohibits fracking in this state and provides that a permit for drilling or operating a well does not authorize fracking. It also prohibits the disposal of flowback fluid by deepwell injection or any other below ground method, and the use of flowback fluid to irrigate crops.

The bill defines the term "fracking" as all stages of a well intervention performed by injecting large volumes of fluids at a high rate into a rock formation at pressures that exceed the fracture gradient of the rock formation in order to propagate hydraulic fractures. It specifies that this does not include other well intervention techniques, including conventional well stimulation or conventional workover procedures; techniques used for routine well 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 increases bonding requirements and civil penalties for violations occurring in the Everglades Protection Area. It also specifies requirements when drilling in the Everglades Protection Area. The bill:

- Requires the Department of Environmental Protection (DEP or department) to evaluate each application to drill and to visit each proposed access route and drilling site in the area to ensure that exploration and production activities will not cause any permanent adverse impact;
- Sets criteria for DEP to use when evaluating applications, with specific criteria for roads/road extensions, drilling sites, and production;
- Requires a wildlife impact study to be completed at the time of the initial application and at the time of subsequent recertification; and
- Prohibits oil refining within the Everglades Protection Area.

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 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."

Florida Geology

The choice of well stimulation technique to be used is strongly influenced by the site's geology and the type of rock forming the oil reservoir. Geologically, most of Florida is limestone,[7] and much of Florida has developed into karst terrain, the generic term for landforms that have been shaped by dissolution of the underlying carbonate rocks. Karst drainage is characterized by sinkholes, springs, caves, disappearing streams, and underground drainage channels. Because development of a karst terrain involves the development of underground drainage systems, karst formation processes tend to be secretive and imperceptible. The results of these persistent processes will be manifested, sooner or later, in one or more of several possible developments, including a sudden influx of muddy water in a water-well after a heavy rain.[8]

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[1] 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://www.fas.org/sgp/crs/misc/R43148.pdf (last visited Jan. 28, 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 Jan. 28, 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 Jan. 28, 2019).
[5] *Id*. at 2.
[6] *Id*. at 28.
[7] *See*, e.g., Basic Florida Geology, *available at* http://www.floridacaving.com/pages/misc/geoflorida.htm (last visited Mar. 19, 2019).
[8] Florida's oil production is primarily from limestone or dolomite, soft, porous, and permeable stone, with one field consisting of sandstone. *Florida's Geological History and Geological Resources*, Special Publication No. 35, Department of Environmental Protection, 1994, pages 47-50, *available at* http://publicfiles.dep.state.fl.us/FGS/FGS_Publications/SP/SP35LaneHistoryResources.pdf (last visited Mar. 18, 2019).

The formation of a karst terrain is due predominantly to chemical weathering, which dissolves the carbonate rock and removes rock-mass. As rain falls through the atmosphere, some carbon dioxide and nitrogen gases dissolve in it, forming a weak acidic solution. When the water comes into contact with decaying organic matter in the soil, it becomes more acidic. Upon contact with limestone, a chemical reaction takes place that dissolves some of the rock. Limestone is especially susceptible to dissolution by acidic water. Limestone, by nature, tends to be fractured, jointed, laminated, and have units of differing texture, all characteristics which, from the standpoint of percolating ground water, are potential zones of weakness. These zones of weakness in the limestone are avenues of attack that, given time, the acidic waters will enlarge and extend. Given geologic time, conduits will permeate the rock that allow water to flow relatively unimpeded for long distances.[9]

Common geological characteristics of karst regions that influence human use of its land and water resources include ground subsidence, sinkhole collapse, groundwater contamination, and unpredictable water supply.[10]

Hydraulic Fracturing

The department developed the following information on hydraulic fracturing:

> Hydraulic fracturing consists of injecting a mixture of water, sand, and several trace chemicals into the oil/gas reservoir at high pressures sufficient to increase permeability by introducing fractures into the reservoir rock or by enlarging existing fractures. The objective generally is to connect isolated porosity in "tight" (low permeability) rock. When the pressure is reduced, the new fluid pathways are propped open by more permeable media such as sand (or artificial proppants such as ceramic beads) that are injected with the water, allowing improved oil/gas flow to the well. In general, the proven oil and gas reserves in both northwest and south Florida are composed of carbonate formations or reservoirs that already have relatively high permeability compared to the tighter shale or similar formations that are the subject of hydraulic fracturing proposals and environmental studies in other states. As a result, hydraulic fracturing has never been proposed or reviewed for the unique oil producing formations in Florida and would be of questionable value for conservation of oil and gas resources in this state. If hydraulic fracturing were to be proposed in Florida, further research and study would be warranted first to evaluate the potential oil and gas conservation benefits and environmental concerns that have been raised nationally for other states when compared with the unique geologic circumstances in Florida.[11]

[9] *Id*.
[10] Karst Waters Institute, *What is Karst? And why is it important?*, https://karstwaters.org/educational-resources/what-is-karst-and-why-is-it-important/ (last visited Mar. 19, 2019).
[11] DEP, *Hydraulic Fracturing Background and Recommendations*, 1 (Sept. 29, 2011) *available at* http://news.caloosahatchee.org/docs/Dep_Fracturing_Response_130118.pdf (last visited Mar. 14, 2019).

Acid Fracturing

Acid fracturing is generally more successful than hydraulic fracturing in carbonate reservoirs because of the relatively high degree of natural fractures present.[12] Acid fracturing is a well stimulation technique in which well operators pump acidic fluids into a well at a pressure that exceeds the fracture gradient and fractures the rock. The acid etches the walls of the resulting fractures and eliminates the need to use a proppant because the fractures remain open after pressure is released.[13] It can be an effective method for stimulating limestone formations.[14] 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.[15, 16]

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.[17]

Matrix Acidizing

Matrix acidizing uses larger volumes of acid solution injected at pressures below the fracture gradient. It does not produce fracturing; however, hydrochloric acid, commonly used for matrix acidizing in carbonate reservoirs, is very effective at dissolving carbonate minerals (including limestone), generating highly nonuniform dissolution patterns called wormholes, which can penetrate up to 20 feet from the wellbore.[18] Careful treatment, design, and execution is required when performing a matrix acidizing treatment to minimize the probability of acid entering into highly permeable sections of the formation, which could create channels into water-producing zones.[19]

Production of Oil and Gas Resources in Florida

Northwest and South Florida are the major oil and gas producing areas in the state. Annual production of petroleum from these two regions peaked at more than 47 million barrels in 1978, but has subsequently decreased, with annual statewide production dropping to less than 2 million barrels by 2017.[20] There are currently two active oil and gas fields in Northwest Florida, and seven active oil and gas fields in South Florida.[21] In 2018, there were 57 active producer wells in

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[12] *CA Study*, at 56.
[13] *Id*., at 28.
[14] *Id*., at 25.
[15] *Id*., at 14.
[16] Limestone is an alkaline agent with the ability to neutralize, or partially neutralize strong acids. When acid comes into contact with limestone, the acid react with Calcium Carbonate (the primary constituent of limestone) to form water, carbon dioxide, and calcium salts. *Limestone pH Adjustment Systems*, Digital Analysis Corporation, *available at* http://www.phadjustment.com/TArticles/Limestone.html (last visited Mar. 19, 2019).
[17] Middle East & Asia Reservoir Review, vol. 4, *Stimulate the Flow*, 46 (Jan. 2003), *available at* https://www.slb.com/resources/publications/industry_articles/mearr/num4_stimulate_flow.aspx (last visited Mar. 14, 2019).
[18] *CA Study*, at 69.
[19] *Id*., at 44.
[20] EIA, Florida, *Profile Analysis: Petroleum*, http://www.eia.gov/state/analysis.php?sid=FL (last visited Mar. 14, 2019).
[21] DEP, *State Production Data* (2018), *available at* https://floridadep.gov/water/oil-gas/documents/state-production-data (last visited Mar. 14, 2019).

Florida.[22] The department's 2018 Annual Production Report totaled oil production at 1,839,069 barrels statewide.[23] 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.[24] Rather than hydraulic fracturing, well operators in the state have generally preferred washing or flushing the formations, or other alternative methods, to open carbonate pathways and enhance recovery of oil and gas resources.[25]

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.[26] Additionally, federal law gives priority use of much of the area to the military for training.[27] 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."[28]

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.[29] 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 method of wastewater disposal.[30]

Water Quality

The majority of Florida's public water supply is obtained from groundwater sources, such as the Floridan aquifer system.[31] 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

[22] *Id*.
[23] *Id*.
[24] DEP, *Hydraulic Fracturing Background and Recommendations*, 1–3 (Sept. 29, 2011) *available at* http://news.caloosahatchee.org/docs/Dep_Fracturing_Response_130118.pdf (last visited Mar. 14, 2019).
[25] *Id*. at 3.
[26] EIA, Florida, *Profile Analysis: Petroleum*, http://www.eia.gov/state/analysis.php?sid=FL (last visited Mar. 14, 2019); s*ee* Pub. L. No. 109-432, s. 104(a)(2), 120 Stat. 3003 (2006); *see* s. 377.242(1), F.S.
[27] *Id*.
[28] FLA CONST. art. II, s. 7.
[29] EPA, *Unconventional Oil and Natural Gas Development, Providing Regulatory Clarity and Protections Against Known Risks*, https://www.epa.gov/uog (last visited Mar. 14, 2018).
[30] 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).
[31] DEP, *Aquifers*, https://fldep.dep.state.fl.us/swapp/Aquifer.asp (last visited Mar. 14, 2019).

contamination.[32] Based on current technical information, it is believed that the producing formations in Florida are too deep below any potential underground sources of drinking water for hydraulic fracturing contamination to be a valid concern. For example, in south Florida where the shallowest producing depths are below 11,300 feet, the bottom of the underground sources of drinking water has been consistently identified at depths above 2,100 to 2,200 feet below land surface. In northwest Florida, oil producing depths are greater than 14,000 feet in one case and otherwise at depths greater than 15,000 feet below land surface, while the bottom of the underground sources of drinking water at depths between 1,500 to 1,800 feet below land surface. Research on the potential effects of hydraulic fracturing in softer, less brittle and more permeable materials such as the carbonate deposits in Florida does not appear to be readily available.[33]

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.[34] 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 fracturing are toxic.[35] It is estimated that approximately 10-40 percent of the volume of injected fracturing fluids return to the surface after hydraulic fracturing.[36]

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.[37] 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.[38]

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[32] U.S. Geological Survey, *Conceptual Model of the Floridan*, http://fl.water.usgs.gov/floridan/conceptual-model.html (last visited Mar. 14, 2019).
[33] DEP, *Hydraulic Fracturing Background and Recommendations*, 3 (Sept. 29, 2011) *available at* http://news.caloosahatchee.org/docs/Dep_Fracturing_Response_130118.pdf (last visited Mar. 14, 2019).
[34] *EPA Study*, at ES-33, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Mar. 14, 2019).
[35] *Id.* at 9-1, 9-16; *see* FracFocus, *What Chemicals Are Used*, https://fracfocus.org/chemical-use/what-chemicals-are-used (last visited Mar. 14, 2019).
[36] 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, 8340 (2014).
[37] *EPA Study*, at 4-3, 4-11, *available at* https://cfpub.epa.gov/ncea/hfstudy/recordisplay.cfm?deid=332990 (last visited Mar. 14, 2019).
[38] 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 (2014); Hannah Wiseman, *Risk and Response in Fracturing Policy*, 84 UNV. OF COL. L. REV. 729-817, 776 (2009).

Wastewater Management and Disposal

The majority of produced water is disposed of using injection wells.[39] Injection wells are permitted under the Underground Injection Control (UIC) program.[40] The goal of the UIC program is the effective isolation of injected fluids from underground sources of drinking water.[41] 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.[42] There are currently 22 permitted Class II UIC wells used for disposal in Florida.[43]

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.[44] In 2012, the EPA issued the first federal air standards for hydraulically fractured natural gas wells.[45] The New Source Performance Standards required reductions in VOC emissions from hydraulically fractured natural gas wells.[46]

In May of 2016, the EPA issued three regulations 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.[47] The final regulation 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

[39] *Id.* at 8-3.
[40] EPA, *Underground Injection Control, General Information About Injection Wells*, https://www.epa.gov/uic/general-information-about-injection-wells (last visited Mar. 14,, 2019).
[41] *Id*.
[42] Watershed Council, *Regulations and Exemptions*, https://www.watershedcouncil.org/hydraulic-fracturing---regulations-and-exemptions.html (last visited Mar. 14,, 2019).
[43] Email from Kevin Cleary, Director of Legislative Affairs, DEP, RE: Class II Injection Wells in FL (Feb. 11, 2019).
[44] 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); *see* Richard Lattanzio, R 42986, *Methane and Other Air Pollution Issues in Natural Gas Systems* (Nov. 5, 2018), *available at* https://fas.org/sgp/crs/misc/R42986.pdf (last visited Mar. 14, 2019).
[45] Michael Ratner & Mary Tiemann, Cong. Research Serv., R 43148, *An Overview of Unconventional Oil and Natural Gas: Resources and Federal Actions*, 14 (Mar. 14, 2015).
[46] EPA, *Controlling Air Pollution from the Oil and Natural Gas Industry*, https://www.epa.gov/controlling-air-pollution-oil-and-natural-gas-industry (last visited Mar. 14, 2019).
[47] 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 Mar. 14, 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 Mar. 14, 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 Mar. 14, 2019).

VOC pollution.[48] The regulation phased in requirements for a process known as "green completion" to capture aerial emissions from hydraulically fractured wells.[49] The EPA expects that implementation of the regulation 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.[50] In October of 2018, the EPA proposed clarifications and amendments regarding details of the regulation's implementation.[51]

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).[52] 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.[53] The CWA contains exemptions from stormwater permitting requirements for oil and gas exploration production, processing, or treatment operations or transmission facilities.[54] 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.[55]

In March 2015, in an attempt to regulate hydraulic fracturing on federal and tribal lands, the Bureau of Land Management (BLM) published final regulations governing hydraulic fracturing.[56] The regulations were to take effect on June 24, 2015. However, the United States

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[48] 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 Mar. 14, 2019).
[49] *Id*. at 3.
[50] *Id*. at 4.
[51] 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 Feb. 28, 2019); *see* EPA, *EPA Proposes Amendments to the 2016 New Source Performance Standards for the Oil 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 Mar. 14, 2019).
[52] Energy Policy Act of 2005, H.R. 6, 109th Cong. (2005-2006).
[53] *See* 42 U.S.C. s. 300h(d) (2012).
[54] 33 U.S.C. s 1342 (l)(2) (2012).
[55] 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 Mar. 14, 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.
[56] *Oil and Gas; Hydraulic Fracturing on Federal and Indian Lands*, 80 Fed. Reg. 16,128-16,222 (Mar. 26, 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."

District Court for the District of Wyoming granted a preliminary injunction and the regulation was stayed.[57] In June 2016, the court held that the BLM lacked authority to regulate hydraulic fracturing and set aside the final regulations.[58] 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 the Bureau of Land Management's decision to rescind the final regulations.[59]

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. The regulations apply to conventional and unconventional extraction, with the exception of extractions of coalbed methane. These standards are incorporated into the CWA's National Pollutant Discharge Elimination System 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, at a minimum, include the chemical names of substances that are considered hazardous under the OSHA regulations.[65]

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[57] *State of Wyo. vs. U.S. Dept. of the Int.*, No. 2: 15-CB-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 March 14, 2019).
[58] *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 March 14, 2019).
[59] *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 March 14, 2019).
[60] EPA, *Oil and Gas Extraction Effluent Guidelines, Rule Summary*, *available at* http://www.epa.gov/eg/oil-and-gas-extraction-effluent-guidelines (last visited March 14, 2019).
[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 (Sept. 26, 2014), *available at* https://www.fas.org/sgp/crs/misc/R43152.pdf (last visited March 14, 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*.

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]

Vermont, New York, and Maryland prohibit 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]

Regulation in Florida

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. DEP has adopted rules to implement and enforce the regulation of oil and gas resources.[71] 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.[72] Local government approval is required for drilling in tidal waters, near improved beaches, and within municipal boundaries.[73]

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

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[66] *See* 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); *see also State of Wyo. vs. U.S. Dept. of the Int.*, No. 2: 15-CB-043-SWS at 40 (D. Wyo. Sept. 30, 2015) (showing a list of states with regulations that address hydraulic fracturing).
[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 Mar. 14, 2019).
[69] *See Id.* at 41. 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] Fla. Admin. Code, Chapters 62C-25–62C-30.
[72] Section 377.21(1), F.S.
[73] Section 377.24, F.S.

ownership of the applicant; and the proven or indicated likelihood of the presence of oil, gas, or related minerals on a commercially viable basis.[74] 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.[75] The purposes of such rules and orders include preventing the pollution of fresh, salt, or brackish waters or lands of the state, and preventing the escape of oil or other petroleum products from one stratum to another.[76]

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.[77] An application to DEP for a permit to drill must include a proposed casing and cementing program[78] and a location plat survey.[79] 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.[80] Each drilling permit is valid for one year from the date of approval.[81] Before a permit is granted, the owner or operator is required to post a bond or other form of security for each well.[82]

Before a well is used for its intended purpose, a permit to operate the well must be obtained.[83] 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.[84] 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.[85]

A separate permit is not required for the performance of well stimulation techniques. Such techniques are regulated as workovers.[86] 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."[87] An operator is required to notify DEP before commencing a workover procedure and must submit a revised well record to DEP within 30 days after the workover.[88]

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[74] Section 377.241, F.S.
[75] Section 377.22(2), F.S.
[76] *Id*.
[77] Fla. Admin. Code R. 62C-26.003.
[78] 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. *See, e.g.*, FracFocus, *Well Construction & Groundwater Protection*, https://fracfocus.org/hydraulic-fracturing-how-it-works/casing (last visited Mar. 14, 2019).
[79] *Id*.
[80] Fla. Admin. Code R. 62C-27.005. The regulations specify standards for casing depth and pressure testing.
[81] Fla. Admin. Code R. 62C-26.003.
[82] Fla. Admin. Code R. 62C-26.002.
[83] Fla. Admin. Code R. 62C-26.008.
[84] *Id.*
[85] *Id.*
[86] The division is required to adopt rules to "regulate secondary recovery methods, including the introduction of gas, air, water, or other substance into producing formations." Section 377.22, F.S.
[87] Fla. Admin. Code R. 62C-25.002(61).
[88] Fla. Admin. Code R. 62C-29.006.

In December 2013, DEP received a workover notice proposing use of an enhanced extraction procedure. The department requested that the company that submitted the notice not complete the procedure until DEP could conduct a review.[89] When the company commenced with the procedure, DEP issued a cease and desist order.[90] DEP fined the company $25,000 for violating the cease and desist order.[91] It was concluded that the workover performed on the well involved hydraulic fracturing.[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]

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.[96] 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.[97] 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.[98] 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 well stimulation techniques by ordinance.[99] Additionally, many other counties and cities have

[89] *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 Mar. 14, 2019).
[90] *Id*.
[91] *Id*.
[92] 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*, 4 (2014), *available at* https://assets.documentcloud.org/documents/1507525/allconsulting.pdf (last visited Mar. 14, 2019).
[93] Section 377.37(1)(a), F.S.
[94] *Id*.
[95] *Id*.
[96] *See, e.g.*, Lee County's Land Development Code §§ 34-1651 and 34-145(c).
[97] *Id*.
[98] Section 377.24(5), F.S.
[99] 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, §67.441; Miami-Dade County's Code of Ordinances, §33-437; Pinellas County's Code of

passed resolutions supporting various types of bans and moratoriums relating to well stimulation techniques.[100]

III. Effect of Proposed Changes:

Fracking and Flowback Fluid

The bill creates s. 377.2405, F.S., to prohibit fracking and state that a permit for drilling or operating a well does not authorize fracking. The bill amends s. 377.19, F.S., to define the term "fracking" as: all stages of a well intervention performed by injecting large volumes of fluids at a high rate into a rock formation at pressures that exceed the fracture gradient of the rock formation in order to propagate hydraulic fractures. The term does not include other well intervention techniques, including 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 also prohibits disposal of "flowback fluid" by deep well injection or any other below ground method. It defines the term to mean any liquid that flows back to the surface during or after completion of well stimulation. The bill amends s. 570.93, F.S., to ban the use of "flowback fluid" for crop irrigation and to define that term to mean any liquid that flows back to the surface during or after completion of well stimulation.

Everglades Protection Area

The bill creates s. 377.421, F.S., to provide criteria for drilling in the "Everglades Protection Area" a term defined to mean Water Conservation Areas 1, 2A, 2B, 3A, and 3B; the Arthur R. Marshall Loxahatchee National Wildlife Refuge; and the Everglades National Park.

The bill requires the department to evaluate each application to drill and visit each proposed access route and drilling site in the Everglades Protection Area to ensure that the exploration and production activities will not cause any permanent adverse impact on the water resources or the sheet flow of the area or on the vegetation or the wildlife of the area, with a special emphasis placed on rare and endangered species. A wildlife impact study must be completed at the time of the initial application and at the time of subsequent recertification. If a proposed site is located on developed or highly impacted uplands, the department must review the application and field inspection reports from staff to determine whether to reinspect the site.

The bill requires the department to use the following criteria in evaluating applications for drilling permits.

- For roads, including road extensions:
  - A permit to drill must be obtained before any road construction or improvement begins;

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.

[100] *See* Food & Water Watch, *Local Regulations Against Fracking*, http://www.foodandwaterwatch.org/insight/local-resolutions-against-fracking#florida (last visited Mar. 14, 2019). The page shows a list of local governments have adopted resolutions against fracking.

- Existing roads must be used where feasible;
- The improvement of existing roads or the construction of new roads must be completed from trucked-in fill material that is taken from approved borrow pits. There may not be any parallel borrow canals along roads;
- All roads must have culverts installed and be maintained to prevent degradation by industry vehicles. The size and number of culverts must be sufficient to ensure that the natural flow of water is not impeded and the resource is protected;
- All roads may be only wide enough to accommodate one lane of traffic, but must have at least one turnout every mile for passing;
- All road elevations must be high enough to assure year round usage, except where otherwise expressly required to be less;
- All roads must follow the best practical route suited to protect the natural environment. Where feasible, roads and road extensions should follow existing wood roads;
- Roads must be constructed in a way that avoids serious damage to or enduring scars to land and loss of wildlife, and must be constructed to avoid obstructing the natural movement of water and wildlife;
- All roads must be restored as specified in Florida Administrative Code Rule 63C-29.009;
- All new access roads authorized to serve the needs of exploration activities must be limited in use to the permitted purpose. For these limited use access roads, the applicant must submit as part of the permit application the means to accomplish the limited use, including the control of unauthorized vehicles, for the duration of the permitted purpose of the road;
- Access corridors and drilling pads may not be constructed in or through sensitive resources, such as cypress or mixed forest swamps, hardwood hammocks, mangrove forests, archaeological sites, native ceremonial grounds, and those zones documented or confirmed by the Fish and Wildlife Conservation Commission as being areas of high-level Florida panther activity *unless reasonable and prudent alternatives are not available*. Known red-cockaded woodpecker colonies, rookeries, alligator holes, research sites, pine uplands, and threatened or endangered species habitats must be avoided *where possible*; and
- Access corridors, including pipelines, must be contiguous where possible and corridors emanating from new entry points must be prohibited unless the applicant demonstrates them to be the more prudent and reasonable alternative.

- For drilling sites:
  - The sites must be located to minimize negative impacts on the vegetation and wildlife, including rare and endangered species, and on the surface water resources;
  - Topographical and engineering surveys of the drilling site, together with an aerial photograph of the drill site, must be prepared at a large scale with the well spotted thereupon and included as a part of the permit application;
  - Site preparation may not begin before the applicant obtains a permit to drill;
  - Every effort shall be made to limit the drilling's impact on the Everglades Protection Area environment by using prairies, limited-growth forest, grazing, farming, or cleared lands *where practical*;
  - Drilling pads must be constructed from trucked-in fill material that is taken from approved borrow pits and be constructed to an elevation sufficient to ensure year-round usage;

- A protective berm of sufficient height and impermeability to prevent the escape of pad fluids shall be constructed around the drilling site and storage tank areas;
- Directional or slant drilling must be used from existing drilling pads where technically feasible and where it will have a beneficial effect upon maintaining environmental quality; and
- All drilling sites must be restored as required by Florida Administrative Code Rule 63C-29.009.

- For production:
  - The operating company must submit to the department a field development plan as soon as practical for each new field;
  - All transportation of oil in the Everglades Protection Area must be by pipeline;
  - If the oil from a producing well is to be removed by pipeline, the pipeline must be equipped with automatic shut-off valves;
  - All flowlines and utilities must be contained within the rights-of-way secured for road construction;
  - The operating company shall develop an emergency and contingency plan. An updated plan must be submitted annually to the department; and
  - The operating company must clean the site of any oil or other contaminants spilled in conjunction with the drilling, production, and transportation activities. Spill response and remediation equipment must remain on site and be made available for immediate use to accomplish this *goal*.

The bill prohibits refining oil in the Everglades Protection Area.

The bill amends s. 377.22, F.S., which requires DEP to adopt oil drilling rules that require a performance bond in a reasonable amount. The bill requires that the bond for drilling in the Everglades Protection Area be a minimum of $500,000 per well or $5 million for a blanket bond.

The bill amends s. 377.24, F.S., which provides requirements for granting oil drilling permits exploration and extraction of underground minerals, and which currently requires an applicant to post a good and sufficient performance surety bond. The bill requires that the bond for drilling in the Everglades Protection Area be a minimum of $500,000 per well or $5 million for a blanket bond.

The bill amends s. 377.37, F.S., relating to penalties for:

- Any person who violates the terms of any permit to drill for or produce oil, gas, or other petroleum products or to store gas in a natural gas storage facility;
- Any lessee, permitholder, or operator of equipment or facilities used in the exploration for, drilling for, or production of oil, gas, or other petroleum products, or storage of gas in a natural gas storage facility, who refuses inspection by the division as provided in this chapter; or
- Any person who violates any related rule, regulation, or order of the Division of Resource Management of the Department of Environmental Protection.

The current statute provides that each violator is subject to judicial imposition of a civil penalty in an amount of not more than $10,000 for each offense. The bill increases the penalty to $50,000 for offenses occurring in the Everglades Protection Area.

Effective Date

Section 8 provides an effective date of July 1, 2019.

IV. Constitutional Issues:

A. Municipality/County Mandates Restrictions:

None.

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's provisions on techniques that may be used to increase production or recovery from an oil or gas well and those increasing bonding requirements and penalties for violations when drilling in the Everglades Protection Area may have an indeterminate economic impact.

C. Government Sector Impact:

The department may need to revise its rules, and may incur expenses in doing so.

VI. Technical Deficiencies:

None.

VII. Related Issues:

None.

VIII. Statutes Affected:

This bill substantially amends the following sections of the Florida Statutes: 377.19, 377.22, 377.244, 377.37, and 570.93.

This bill creates the following sections of the Florida Statutes: 377.2405 and 377.421.

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.