

**Senate Committees on Natural Resources and Water
and
Environmental Quality**

Senators Pavley and Hill, Chairs

Joint Oversight Hearing

SB 4 (2013) Implementation and Well Stimulation Regulations

BACKGROUND PAPER

Overview

The Division of Oil, Gas and Geothermal Resources (DOGGR), in collaboration with the Water Boards, the Air Resources Board (ARB), the Department of Toxic Substances Control (DTSC), and other regulators, has begun to implement SB 4 – California’s new well stimulation law. Multiple simultaneous processes and activities, including the development and enforcement of regulations, are underway. While considerable progress has been made, there are several concerns regarding various elements of SB 4’s implementation (described in the Implementation Concerns section below).

Introduction

Total domestic production of oil and gas has recently begun to increase. Projections by the US Energy Information Administration are for this trend to continue to increase and for production to remain elevated through 2050. California is and has been a major producer of oil and gas among the 50 states¹. The evolution of oil and gas exploration and production technology is, in part, responsible for this increase. In particular, advancements in the practice of hydraulic fracturing (or “fracking”) in combination with directional well drilling techniques have led to the production of large amounts of natural gas and crude oil from gas and oil-bearing reservoirs that were previously too difficult and uneconomic to produce. The drilling and stimulation of thousands of oil and gas wells across the country has raised many concerns. Numerous stories, reports and peer-reviewed scientific journal articles document worry about and instances of:

- surface and well water quality degradation,
- air pollution, including criteria and toxic air pollutants and greenhouse gases,
- potential or actual water supply scarcity,
- increased earthquake activity,
- public and occupational health risks, and
- other negative public and environmental health and safety impacts.

¹ According to the most recent data available from the US Energy Information Administration, California ranks 3rd for oil production (2013) and 13th for natural gas production (2012).

These are associated either with fracking itself or the resulting oil and gas production and related activities.

Hydraulic fracturing is a well “stimulation” or “completion” practice used to enhance the permeability of a subsurface geologic formation in order to facilitate the movement of oil and gas trapped in the formation to the wellbore. Pumps apply fracturing fluids at high pressure to fracture or break apart the formation. Typical hydraulic fracturing fluid mixtures are 95% or more water with the remainder added chemicals. In many states, millions of gallons of freshwater are used for each fracking treatment. In California, the Western States Petroleum Association (WSPA) reports that the average amount of water used for each voluntarily-reported fracking treatment in 2012 was about 116,000 gallons, although wells using more than a million gallons are also reported². Hydraulic fracturing is only one form of well stimulation treatment. Another well stimulation treatment – “acidization” – uses large volumes of acids to increase formation permeability through chemical reaction with the formation itself. Acidization can be performed at pressures both higher and lower than those necessary to fracture the formation and typically uses strong acids, such as hydrochloric and hydrofluoric acids. Acidization is thought to be very important to the development and production of California’s Monterey Shale, which is estimated to contain up to 15.4 billion barrels of recoverable oil³.

Hydraulic fracturing and well stimulation in California

Early forms of hydraulic fracturing and acidization have been used in California for decades. Neither treatment, however, was specifically regulated by DOGGR, the state’s oil and gas regulator, and reporting is incomplete. In March 2012, responding to legislative and public pressure, DOGGR asked for voluntary reporting of hydraulic fracturing activities in California. To date, 1577 fracking treatments have been reported since 2011 with the following annual breakdown: 91 (2011), 625 (2012), 831 (2013) and 30 (2014)⁴. Of these, over 95% were in Kern County and 3% were in Ventura County. Other reported locations include the Counties of Los Angeles, Glenn, Colusa, Sutter and Kings, and state waters off Los Angeles County.

SB 4 (2013)

In 2013, nine bills were introduced that would have regulated, limited or banned fracking in California. Of these bills, only one – SB 4 (Pavley/Leno, c. 313, Statutes of 2013) – passed the Legislature and was signed into law by Governor Brown. SB 4 provides for the comprehensive

² Over 1,500,000 gallons were used to stimulate well API#04-030-22893, for example, according to data reported on the web-site Fracfocus.

³ See, for example, “Acidizing could rival fracking in Monterey Shale” by David R. Baker, San Francisco Chronicle, August 25, 2013.

⁴ Fracfocus reports California data two ways – through a map and an online spreadsheet. The Fracfocus map indicates 1497 fracking treatments while the spreadsheet has 1580 entries. Neglecting the three wells that appear to be in Texas, the adjusted spreadsheet data – reported above – are 1577 fracking treatments. The discrepancy between the two methods of data reporting is, in part, due to duplicates, although some wells have clearly been fracked multiple times. An additional caveat is that WSPA reported that its members fracked 628 wells in 2011 in California but only 91 wells are reported to Fracfocus.

regulation of well stimulation treatments – including both fracking and acidization. SB 4 requires that DOGGR promulgate emergency interim and permanent regulations for well stimulation treatments. Additionally, SB 4 requires that (1) a statewide Environmental Impact Report on well stimulation treatments be prepared, (2) an independent scientific study of well stimulation be performed and (3) DOGGR consult with and reach formal agreements with other regulators to provide regulatory accountability for, and public transparency to, well stimulation treatments. Among other additional provisions, SB 4 also provides for well stimulation-related activities undertaken by various state agencies, including for air and water quality-related work and research, be paid for by industry as are DOGGR’s costs. A summary of SB 4’s near-term implementation requirements is provided in the table below.

SB 4 Implementation summary and timeline
<p>DOGGR Regulations</p> <p><u>Interim well stimulation regulations</u></p> <ul style="list-style-type: none"> • <i>Effective January 1, 2014, good for 180 days</i> • Govern well stimulation activities prior to the permanent regulations becoming effective • Incorporates groundwater monitoring • <i>Must be renewed – Summer 2014</i> <p><u>Permanent well stimulation regulations</u></p> <ul style="list-style-type: none"> • Initial public comment period closed • Revised release – Spring 2014 • <i>Must be in effect January 1, 2015*</i>
<p>Statewide Environmental Impact Report</p> <ul style="list-style-type: none"> • DOGGR is lead agency • Scoping process underway –Spring 2014 estimated completion • <i>Must be certified July 1, 2015</i>
<p>Independent Scientific Study</p> <ul style="list-style-type: none"> • Professor Robert Powell appointed – January 2014 • Contract for study to be issued – Winter/Spring 2014 • <i>Must be completed January 1, 2015</i>
<p>SWRCB development of “model criteria” for groundwater monitoring</p> <ul style="list-style-type: none"> • Convene expert panel – post-budget/Summer 2014 • <i>Must be completed July 1, 2015</i>
<p>Inter-governmental consultation and development of formal agreements</p> <ul style="list-style-type: none"> • Discussions underway • <i>Must be completed January 1, 2015</i>

* According to the Department of Finance’s web-site, the Administration appears to propose extending this deadline to July 1, 2015

Regulatory jurisdiction and authority

DOGGR has extensive and broad jurisdiction and authority over oil and gas development and production. DOGGR’s well stimulation regulatory framework for both the emergency interim and permanent regulations required under SB 4 includes:

- pre- and post- well stimulation disclosure of:
 - the well and its location,
 - when stimulation is planned for or has occurred,
 - the source and volume of water used in the treatment, including the amount recycled,
 - the chemical additives used in the treatment and their concentrations,
 - the composition of the waste fracking fluid, its measured radioactivity and its disposal method,
- full disclosure of the list of chemicals used in the treatment (i.e. no trade secret protection),
- groundwater monitoring near the well to be stimulated, and
- advance notification to the neighbors of planned well stimulation treatments and an opportunity for the neighbors to have baseline and follow-up testing of their surface and well water by contractors meeting established criteria and using appropriate protocols⁵, among other provisions.

Well stimulation treatments are not solely under DOGGR’s jurisdiction and authority. SB 4 addresses this in two ways – by requiring specific action by other regulators and through the consultation and formal agreement provisions noted above. These other regulators include those responsible for water quality, air quality, and hazardous materials, among others.

The State Water Resources Control Board (SWRCB) and the regional water boards (collectively the Water Boards) have statutory authority to regulate water quality in the state under both federal and state law. The Water Boards are responsible for regulating all actual and potential discharges of waste to the waters of the state. While DOGGR, through a Memorandum of Agreement with the Water Boards, regulates the Class II Underground Injection Control (UIC) well program, the Water Boards retain the authority to address water quality impacts related to any activity, including from oil and gas. SB 4 requires the SWRCB to develop “model criteria” for groundwater monitoring with input from experts and stakeholders, and to establish and implement a comprehensive groundwater monitoring program for oil and gas field activities.

ARB has broad authority under the Global Warming Solutions Act of 2006 to regulate greenhouse gas emissions. Both ARB and local air districts have jurisdiction over emissions of air toxics. Local air districts have responsibility for pollutant emissions from stationary sources, such as oil and gas wells. The South Coast Air Quality Management District passed rule 1148.2 last year to institute reporting and notification requirements for well stimulation treatments and associated emissions. ARB is currently developing a regulation to control methane emissions from the production, processing, and storage of oil and natural gas. Pursuant to SB 4, the ARB will undertake specific actions to monitor and evaluate air emissions associated with well stimulation treatments.

DTSC has a limited role in the management of waste generated by the oil and gas industry. As noted above, DOGGR regulates Class II UIC wells. Most oil and gas industry waste is disposed

⁵ A list of companies currently available to perform the testing state-wide is available on the SWRCB’s web-site.

of in Class II wells. DTSC has authority over waste from well stimulation treatments only if the waste is deemed hazardous and not disposed of in a Class II well. DTSC is working to ensure that well operators know if they are producing hazardous waste, and if so, further guarantee that this waste is managed and disposed of properly.

CalRecycle is also named as one of the participating agencies for the development of rules and regulations specific to well stimulation treatments under SB 4. CalRecycle's jurisdiction includes any nonhazardous petroleum-contaminated soils residual to fracking that might be disposed of in landfills. Currently, there are five sites in California that are permitted to receive this waste.

SB 4 well stimulation regulations

DOGGR has issued both interim and permanent well stimulation regulations. Additional SB 4-mandated processes, as shown in the table, are underway. Both DOGGR and the SWRCB have updated their web-sites to provide information on well stimulation treatments.

Interim well stimulation regulations

DOGGR released interim well stimulation regulations in mid-December 2013. These well stimulation regulations went into effect on January 1, 2014 and will govern well stimulation activities in California until the permanent regulations go into effect on January 1, 2015.

DOGGR and the Water Boards developed the groundwater monitoring requirements collaboratively. In general, the interim well stimulation regulations require that:

- well owners or operators complete a well stimulation certification notice and submit it to DOGGR which may “approve as complete” the submitted notice.
- the well stimulation certification notice incorporates the regulatory framework previously described (e.g. well ID and location, chemical disclosure, etc.).
- after well stimulation is completed, there are detailed post-stimulation reporting requirements to the state.
- well stimulation certification notices are posted on DOGGR's web-site and the post-well stimulation treatment information will also be available online.

Under SB 4, 249 well certification notices have been submitted to DOGGR and are available in the online index. About 99% are in Kern County (only three submissions are located in Ventura County). These were submitted by four operators and propose well stimulation in seven fields. Approximately 14% are for acid matrix treatments and the rest are for hydraulic fracturing. 15 certification notices were withdrawn.

Permanent well stimulation and related regulations

DOGGR released the first draft of permanent well stimulation regulations in November 2013. The public comment period closed in mid-January 2014. A second draft of permanent well stimulation regulations incorporating the responses to the first draft is likely to be released in the spring. The statutory deadline for the permanent well stimulation regulations to be in effect by is January 1, 2015. The permanent well stimulation regulations build upon the interim well stimulation requirements and are more comprehensive. They include the following provisions:

- Pre- and post-well stimulation disclosures and reporting are largely the same as under the interim regulations.
- Well owners or operators must apply to DOGGR for a well stimulation permit which DOGGR has to review and approve.
- Groundwater monitoring requirements will be met by use of the “model criteria” developed by the SWRCB and may be satisfied, in some instances, by regulatory monitoring.
- Well testing, well stimulation modeling, and further waste handling requirements are among the additional requirements beyond the interim well stimulation regulations.

In addition to DOGGR’s action, the SWRCB anticipates starting the process of the development of the “model criteria” for groundwater monitoring with input from experts and stakeholders this summer. The ARB anticipates including regulations specific to well stimulation activities as part of its ongoing development of oil and gas production, processing and storage regulations later this year. Other regulatory entities are also likely to update their regulations upon completion of the consultation and formal agreements required under SB 4.

Implementation concerns

Committee staff have received and reviewed the individual public comments received during DOGGR’s interim regulation process. Committee staff, in collaboration with the Senate Office of Research, have reviewed the well stimulation certification notices received and approved in January 2014 by DOGGR. The following highlight some of the issues identified.

Groundwater monitoring

All 234 “approved as complete” well stimulation certification notices posted on DOGGR’s web-site claim exemption from the groundwater monitoring required under SB 4 due to the lack of “protected waters” surrounding the well⁶. The SWRCB has asked for additional information to support these claims⁷. All of these well certification notices were submitted prior to January 1, 2014. After January 1, 2014, the interim regulations require that submitted well certification notices include the SWRCB’s written concurrence with all claims of exemption from groundwater monitoring. Most of the approximately 100 well stimulation certification notices submitted after January 1, 2014 require this concurrence and have not been approved as complete. These well stimulation sites are covered by fewer than 20 proposed groundwater monitoring plans. In all instances, the SWRCB has asked for additional supporting information from the well operator. The time necessary for the resolution of these exemption claims is unclear as are the steps taken to ensure appropriate groundwater monitoring of any exemption claims denied for wells with pre-January 1, 2014 well certification notices.

⁶ “Protected waters” are defined in the regulations as water outside of a hydrocarbon zone that contains no more than 10,000 mg/l total dissolved solids unless the water has been determined to be an exempt aquifer pursuant to the Code of Federal Regulations, title 40, part 146.4.

⁷ See, for example, the SWRCB’s letter to Aera Energy, LLC dated December 24, 2013 (available on the SWRCB’s web-site)

Well stimulation certification notices

Numerous January 2014 notices appear to be incomplete to staff despite being “approved as complete” by DOGGR. The “incompleteness” stems from the following:

- chemical concentration data are not completely provided
- chemical concentrations do not sum to at least 100%
- latitude and longitude of some wells are inaccurately reported
- the time period reported for the well stimulation activity is inconsistent with the 30-day neighbor notification period
- disclosures are vague

In addition, several certification notices, as posted, are confusing. More than one chemical disclosure form is included, and duplicate certification pages are posted, among others. Further, many neighbor notifications (performed by third parties, not DOGGR) appear to have been sent without an approved well certification notice in violation of the interim regulations and SB 4.

Regulations

Several particular concerns with the proposed regulations – interim and/or permanent – were raised during the public comment periods. These include:

- the lack of specific reference to offshore wells (SB 4 applies to both onshore and offshore well stimulation in state waters). Fracking has been reported in both state and federal waters offshore of California.
- SB 4 requires that DOGGR determine a volume-based threshold value to identify acid matrix stimulation treatments subject to SB 4’s well stimulation certification notice and permitting requirements. The value must be developed using specified criteria, and could be as little as zero gallons. Choosing to ignore SB 4’s explicit direction, the regulations instead use an arbitrary acid concentration threshold value (7%). This creates a significant potential loophole – hundreds of thousands of gallons of acid could be used in an acid treatment and evade regulation. At the least, this provides considerable industry incentive to develop these treatments.
- confusing and contradictory language concerning well stimulation treatments and wells that are part of Class II UIC projects. All wells that have well stimulation treatments must adhere to SB 4’s requirements.
- no direction to industry that all use of acid must now be reported in the well history.
- posted information (since acknowledged to be in error) on trade secret chemical handling contradictory to SB 4.
- restricting the tenants notified under the neighbor notification requirement to those with written leases contrary to SB 4.
- the proposed combining of multiple well stimulation treatments into a single permit.
- industry-expressed concern about the scope of the groundwater monitoring program.

Numerous public comments to the interim regulations expressed concerns about the risk of earthquakes associated with fracking and called for an immediate moratorium or ban on well stimulation in California.

Additional SB 4 implementation

Independent scientific study

SB 4 requires that the Secretary of the Natural Resources Agency cause to be conducted a comprehensive independent scientific study examining all aspects of well stimulation statewide. The scientific study must be completed by January 1, 2015. In January 2014, the Administration appointed Professor Robert Powell (of UC Davis) to provide scientific management of the study. While Professor Powell is a very distinguished and accomplished scientist, his particular expertise is not specific to well stimulation or other required elements of the study.

Statewide Environmental Impact Report

SB 4 requires that an environmental impact report for well stimulation activities be prepared and certified by July 1, 2015. DOGGR, acting as lead agency, issued a Notice of Preparation in November 2013 and scoping meetings were held in December 2013 and January 2014. The public comment period for the scoping period ended in January 2014. The release of the scoping plan by DOGGR is expected in the spring.

Inter-governmental consultation and formal agreements

SB 4 requires that DOGGR consult with the Water Boards, ARB, local air districts, CalRecycle, DTSC and other public entities in the development of a comprehensive regulatory approach for well stimulation activities. Additional entities with applicable jurisdiction and authority involved in the consultation process include, for example, the California Coastal Commission and the California Department of Public Health. The intent of the consultation process is to ensure that there is public agreement between regulators on the respective roles of each in regulating well stimulation activities. Discussions and collaboration are underway and formal public agreements must be reached by January 1, 2015.

Budget considerations

DOGGR, SWRCB and ARB have all issued pending Budget Change Proposals (BCPs) to provide for the implementation of SB 4. The funding requested for FY 2014–15 will be paid for by the oil and gas industry through the existing per barrel of oil/equivalent amount of natural gas production fee. DOGGR has requested 60 permanent and 5 limited-term positions and \$13 million to implement all of its requirements under SB 4. The SWRCB has asked for 14 positions and \$6.2 million and the ARB has asked for 6 positions and \$1.3 million. All BCPs include funding for development of regulations and the consultation and formal agreements required by SB 4.