

**JOINT OVERSIGHT HEARING**

**SENATE NATURAL RESOURCES AND WATER AND  
ASSEMBLY NATURAL RESOURCES COMMITTEES**

**SENATOR HENRY STERN AND ASSEMBLY MEMBER LAURA FRIEDMAN, CHAIRS**

**Oversight of the Cymric Oil Spill and California Oil & Gas Policy:  
How safe and sustainable is oil extraction in the Golden State?**

**Background Paper**

**Overview**

Last summer, a fluid spill stemming from multiple “surface expressions” at the Cymric oil field located in Kern County resulted in one of the larger oil spills in state history. (A surface expression is where oil and other fluids associated with oil and gas operations are released to the surface via cracks or fractures in the subsurface.) Once widely known and reported, this spill raised questions related to public notification of spills and the regulation of oil and gas operations to which the Newsom Administration has recently responded. The purpose of this background paper is to provide a high-level overview of the Cymric oil field spill, the state’s oil and gas regulator and its recent history, and the Newsom Administration’s recent actions related to oil and gas production in the state.

This paper is not intended to provide a comprehensive treatment of steaming operations for enhanced oil recovery, well stimulation treatments (i.e. hydraulic fracturing or fracking), or the state’s implementation of its Class II Underground Injection Control (UIC) program for oil and gas injection wells. While within the jurisdiction of these Committees, that is beyond the scope of this oversight hearing. Additionally, the need to substantially reduce and eventually eliminate net greenhouse gas emissions associated with fossil fuel production and combustion to meet and advance the state’s efforts to combat climate change is also not addressed in detail herein.

**Cyclic steam injection wells and surface expressions**

The California Geologic Energy Management Division (CalGEM<sup>1</sup> – formerly known as the Division of Oil, Gas, and Geothermal Resources or DOGGR) is the state’s oil and gas regulator and is located in the Department of Conservation in the California Natural Resources Agency. The State Oil and Gas Supervisor (supervisor) leads CalGEM.

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<sup>1</sup> For consistency and convenience, CalGEM is used throughout to refer to the state’s oil and gas regulator. The name change from DOGGR to CalGEM went into effect on January 1, 2020.

The supervisor has broad authority to supervise the drilling, operation, maintenance, and abandonment of the state's oil and gas wells, among other things, so as to prevent, as far as possible, damage to life, health, property, and natural resources, and certain other detrimental impacts (Public Resources Code §3106).

Most of the state's onshore oil is produced in Kern County. Los Angeles and Ventura Counties complete the top three oil producing counties in the state.

Many, if not all, of the state's most productive onshore oil and gas fields, such as the Midway-Sunset oil field in Kern County, have been in operation for several decades. As a result, primary oil production – where the oil flows to the surface due to reservoir pressure – has been supplanted by secondary and tertiary production where pressure and/or heat is applied to the reservoir to promote oil production. These methods are known as “enhanced oil recovery” operations and typically involve the use of injection wells. One specific type of injection well is a cyclic steam injection well, and is regulated by CalGEM through its UIC program (see Title 14, California Code of Regulations, §1724.5 *et seq.*). The first reported cyclic steam injection well in California appears to be in 1960, and there are currently about 14,600 active cyclic steam injection wells in the state in 17 fields and eight counties<sup>2</sup>. Cyclic steam injection wells inject steam into the formation, the well is sealed, subsequently unsealed, and the heated oil is produced. Cyclic steam injection wells are somewhat unique to the state, and are often used to produce heavy oil from shallow diatomite formations.

Surface expressions, as noted above, occur when oil or an oil/water fluid or related material travel to the surface through subsurface cracks or fractures and are emitted from the surface. Surface expressions are associated with and likely caused by injection operations. By contrast, “low energy seeps” are not associated with injection operations and do not pose the same risks that surface expressions do to public safety and natural resources (see 14, CCR, §1720.1). In 2011, a contractor at the Midway-Sunset oil field was killed when he fell into a steaming surface expression that opened underneath him. Recent updates to CalGEM's UIC regulations explicitly ban surface expressions as of April 1, 2019 and require certain steps to be taken – including the development of plans – should a surface expression occur (14, CCR, §1724.11).

Previous UIC regulations did not explicitly ban surface expressions, but, where surface expressions pose risks, are and were within the supervisor's authority to take action against. It appears that CalGEM was aware of the occurrence of surface expressions and at least tolerated operating conditions that could result

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<sup>2</sup> Poso Creek, San Ardo, Arroyo Grande, Kern Front, Kern River, Lost Hills, McKittrick, Midway-Sunset, West Newport, Orcutt, Oxnard, Placerita, South Belridge, Cat Canyon, Coalinga, Cymric and Edison fields in Kern, Los Angeles, Ventura, San Luis Obispo, Fresno, Monterey, and Santa Barbara counties.

in the presence of surface expressions in some locations. Some of these surface expressions – such as some of those described below – were quasi-permanent and CalGEM authorized the installation of infrastructure, such as catchment basins, to collect the released fluids. There appear to be at least 10 of these. CalGEM's regulations prior to April 1, 2019 did not particularly address surface expressions or leaks not associated with casing or well failures. However, injection fluids are required to stay in the intended zone of injection (see, for example, 14, CCR, §1724.7) and it is unclear how “good oilfield practice” (14, CCR, §1722) includes regular, uncontrolled release of injection-related fluids to the surface through fractures in the subsurface. In the last few years, CalGEM, as described below, has acknowledged numerous and repeated instances where it did not follow its own law and regulations.

### **The 2019 Cymric oil field spills**

According to documents obtained from CalGEM, Chevron has approximately 350 active cyclic steam injection wells at the Cymric oil field. Through September 10, 2019, there were at least eight surface expressions intermittently or continuously active associated with Chevron operations at three locations within the Cymric oil field.

On May 10, 2019, Chevron reported the occurrence of a surface expression amidst its oil and gas operations in the Cymric oil field. This surface expression released approximately 4,400 gallons of water and oil and became inactive later that same day. This was the first of the “Cymric 1Y” area surface expressions. These surface expressions ultimately resulted in the release of almost 1.3 million gallons of an oil/water mixture from multiple locations into a dry streambed in a canyon at the oil field prior to August 1, 2019. The spill was entirely within the Cymric oil field and there was no public access to the spill. Of the 1.3 million gallons, approximately 400,000 gallons were crude oil. This spill received substantial news coverage, although the spill was not reported in the press until approximately two months after it started.

Efforts to protect wildlife from the spill started with the initial spill and included wildlife hazing techniques and wildlife monitors. A total of four birds were oiled. On July 22, 2019 – while there were still active surface expressions at the site – a unified incident command was established in response to the spill to provide coordinated actions. Incident command included CalGEM, the Office of Spill Prevention and Response (OSPR), the Kern County Public Health Department, and Chevron. Cleanup of the 1Y spill was completed October 11, 2019.

There are more surface expressions associated with Chevron operations at the Cymric oil field. The Cymric 1Y surface expressions were located close to the Gauge Setting 5 separation plant or GS-5 area at the Cymric oil field. At GS-5, a series of surface expressions have occurred off and on at least since 2012. CalGEM has also identified surface expressions in the McPhee “36W” area also located in the Cymric oil field.

CalGEM issued two Notices of Violation (NOVs) specific to the 1Y spill, as well as an order to perform remedial work, including undertaking work necessary to stop the flow through the surface expressions, and assessed a \$2.7 million penalty. The penalty is under appeal by Chevron. CalGEM has issued at least 5 additional NOVs for the GS-5 and 36W surface expressions and spills. In addition, CalGEM has ordered Chevron to provide technical data in order to assist in its evaluation of the events.

In addition to the enforcement actions taken against Chevron, CalGEM has also issued 4 NOVs to Sentinel Peak Resources since June 20, 2019 for surface expressions at the Midway-Sunset oil field Keene and Reardon sites, its Cymric oil field Star Fee site, and its McKittrick oil field Richfield site. As noted above, surface expressions have been observed in other oil fields in the state, at least historically. Injection requirements require the injectate to be confined to the permitted injection zone. A “heat map” provided by CalGEM, dated February 9, 2018, of surface expressions showed surface expression activity in at least 8 oil fields. In some instances, at least, CalGEM personnel ordered actions taken to stop the surface expressions.

### **Recent history of oil and gas law and regulation in the state**

Federal regulation instituted the UIC program for various types of injection wells following the passage of the Safe Drinking Water Act in 1974. In 1982, CalGEM sought, and subsequently received, primacy from the US Environmental Protection Agency (US EPA) to implement its own UIC program for oil and gas (Class II) wells.

An independent audit of the UIC program was about to reveal systemic issues with the program in 2011. At the same time, public concern regarding the practice of hydraulic fracturing (or fracking) on oil and gas wells was becoming widespread. In 2013, SB 4 (Pavley, Chapter 313, Statutes of 2013) instituted a rigorous statutory framework for the regulation of well stimulation treatments (WSTs), including fracking, in the state. SB 4 was much stronger than CalGEM regulations for fracking then in development, and, as the author noted at the time, there was insufficient support for a ban or moratorium on fracking. Among other provisions, SB 4 required disclosure of all ingredients in frack fluids, and instituted permitting requirements for fracking, and groundwater monitoring programs in the vicinity of the state’s oil and gas fields.

In 2017 and 2018, 228 and 223 well stimulation treatment permits were issued. Of the completed WSTs, almost all of them were frack jobs. Since the implementation of SB 4, WST operations have predominantly occurred in the South Belridge (76%), North Belridge (9%), Lost Hills (8%), and Elk Hills (4%) oil fields in Kern County.

In 2015, irregularities and inconsistencies in the UIC program and its implementation became evident at least in part through the efforts of CalGEM and the Water Boards to implement SB 4. Approximately 2,500 UIC wells were improperly permitted, and CalGEM and the Water Boards began to work with the US EPA to bring the UIC program into compliance. Recordkeeping for many wells and UIC projects, and the technical analysis required to permit these wells was incomplete. CalGEM sought and obtained emergency regulations to require that certain improperly permitted wells would be shut-in on a specified schedule. While these regulations were subsequently thrown out through litigation, CalGEM retained its authority on a case-by-case basis to shut-in wells that presented certain risks.

Subsequently, CalGEM, with the concurrence of the Water Boards, began to seek additional “aquifer exemptions” to permit the injection of oil/gas field materials into the subsurface where the aquifer was determined not to be a source of drinking water. The boundaries of exempt aquifers were set in the 1982 primacy agreement and never updated as the boundaries of oil and gas fields expanded over time. Some of the aquifer exemptions sought were expansions of the existing boundaries, but some were new. Over 30 potential aquifer exemptions were evaluated, and many have been approved by the US EPA. In some instances, the Water Boards have recommended that there be certain operating limitations for any wells associated with a particular proposed exemption. Some aquifer exemption proposals were also rejected.

The regional groundwater monitoring program instituted pursuant to SB 4 has provided some evidence of the migration of oil field waters outside the boundaries established for those waters (see, for example, Gillespie, JM et al. (2019) Groundwater Salinity and the effects of produced water disposal in the Lost Hills-Belridge oil fields, Kern County, California. *Environmental Geosciences*, 26(3), 73-96.)

Following the UIC scandal, the Brown and Newsom Administrations have made a concerted effort to revise and update several outdated elements of state law governing certain requirements imposed upon operators of oil and gas wells and related infrastructure. This is one aspect of CalGEM’s “Renewal Plan” (originally released in October 2015). These reforms included substantial changes to the state’s idle well requirements to reduce the number of idle wells, to the processes for addressing hazardous and deserted wells and facilities, to well and related infrastructure bonding requirements, and provide enhanced penalty and investigative authority at CalGEM, among other things. Most recently, AB 1057 (Limón, Chapter 771, Statutes of 2019) changed the name of the division to CalGEM and added language emphasizing that CalGEM’s purposes include “protecting public health and safety and environmental quality, including reduction and mitigation of greenhouse gas emissions associated with the development of hydrocarbon and geothermal resources in a manner that meets

the energy needs of the state”, among other things, to help the state meet its clean energy goals. (Public Resources Code §3011)

### **Additional Newsom Administration actions**

In Spring 2019, news reports indicated that CalGEM had continued to issue fracking permits pursuant to SB 4, and that certain CalGEM personnel owned stock in the oil and gas industry that they had not been required to sell. The then-supervisor was fired, a moratorium on fracking and WST permits was instituted and a new conflict-of-interest policy was ordered.

In November 2019, the Newsom Administration issued a press release ordering three actions related specifically to oil and gas, as follows:

- 1) Rules for public health and safety protections near oil and gas extraction facilities will be updated and strengthened.
- 2) Pending applications to conduct hydraulic fracturing and other well stimulation practices will be independently reviewed (this includes UIC).
- 3) A halt of approvals of new oil extraction wells that use high-pressure steam to break oil formations below the ground, a process linked to the Cymric oil field surface expressions.

The Administration intends through the development of regulations to establish a transparent set of rules designed to protect residents and communities near oil and gas extraction sites. The rulemaking process will consider the best available science and data to inform new protective requirements, and will seek input from environmental and public health advocates, experts and authorities, including the California Department of Public Health. The stated objective is to have new regulations in place by the end of 2020.

It remains unclear that all of the deficiencies identified in the UIC program identified by the three or four reviews and audits of the program’s implementation in the last ten years have been fully addressed. For example, all of the missing data and analyses for existing UIC wells may not have been fully corrected.

The Administration is in the process of issuing a contract to independent experts at Lawrence Livermore and Sandia National Laboratories to assess whether high pressure steam injection wells – where the pressure exceeds the fracture gradient – are safe. While this review is underway, permits for new wells will not be issued, although existing wells will be allowed to continue to operate. A notice to operators was issued in January describing the permitting moratorium in more detail.

In its Fiscal Year 2020/2021 budget proposal, the Newsom Administration has asked for an increase of 128 people at CalGEM to ensure that all appropriate activities are witnessed. The Water Boards are also seeking continuing funding

for their UIC-related efforts. In the last 10 years, the number of personnel at CalGEM has already approximately tripled.

In response to the Newsom Administration's moratorium on new high pressure injection and WST permits, the Kern County Board of Supervisors held a meeting on January 14<sup>th</sup> where numerous speakers testified to the positive economic impact that oil and gas development has in Kern County. A study provided by the Institute for Construction Economic Research reported projects totaling \$1.4 billion in investment in Kern County from 2008 – 2018. Many noted that the oil imported into the state to satisfy current consumption is largely from foreign sources.