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Environmental Safety and Toxic Materials Committee
and Assembly Natural Resources Committee

"Hydraulic Fracturing in California: Water Quality Protection"

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Introduction

Chairman Alejo, Chairman Chesbro, Committee Members, thank you for the opportunity to testify on the important and timely issue of hydraulic fracturing in California.

My colleague Jayni Foley Hein will address the Committee immediately following my remarks. I would like to start by calling attention to a report that she and I co-authored, entitled "Regulation of Hydraulic Fracturing in California: A Wastewater and Water Quality Perspective."[1] Our testimony draws in part on this research.

We have been asked to start by setting the stage today with some background information. In the time we have, Ms. Hein's and my comments can only touch on some of our findings, but we happy to begin the conversation.

What is fracking?

Hydraulic fracturing ("fracking") is high-pressure underground injection of fluids, the goal of which is to crack rocks and release tightly held oil or gas. Fracking is part of unconventional oil and gas production, and we would argue that it is impossible to responsibly consider them separately.

Hydraulic fracturing, along with the other aspects of unconventional oil and gas production,

[1] Michael Kiparsky and Jayni Foley Hein. 2013. Regulation of Hydraulic Fracturing in California: A Wastewater and Water Quality Perspective. Wheeler Institute for Water Law & Policy, UC Berkeley. Available at http://www.law.berkeley.edu/files/ccelp/Wheeler_HydraulicFracturing_April2013.pdf

presents risks to environmental quality and public health. The hydraulic fracturing process also yields byproducts, including wastewater, which must be properly managed in order to reduce these risks.

Hydraulic fracturing can involve the injection of a broad suite of chemicals, some of which are toxic or hazardous. Nationally, injected chemicals have included benzene, lead, methanol and many others including some regulated under the Safe Drinking Water Act and Clean Air Act. Part of this injected mixture typically returns to the surface, with part of it remaining underground. After fracking, oil wells also produce additional wastewater at the surface that can be harmful to human or environmental health if not managed properly.

Fracking poses risks

Fracking poses some risks. It is important to note that fracking has long-term implications: once fracking has been conducted, its effects may be impossible to reverse.

Contamination of groundwater is a potential danger: wells can form conduits between deeper geological layers and shallower aquifers if they are not properly sealed from surrounding formations. This is particularly pernicious because of the possible delay - while a fracturing job can take hours to complete, the perforated cap rock is a risk factor that lasts forever, because well casing or cementing failure could happen long after a well has ceased production and an operator has moved on.

There are also risks at the surface: spills, leakage and accidental or intentional releases can impact surface waters.

And, in other states, earthquakes have been triggered by injection of wastewater into disposal wells.

But again, we don't have complete information. Fracking is increasingly the subject of research attention, but the science remains uncertain, particularly in the face of technology that is rapidly evolving. We recommend support for more peer-reviewed studies on the risks presented to California water sources from fracking, the risk of induced seismicity, and potential air quality and climate change impacts.

Future of fracking in California

Hydraulic fracturing has been used in California oil production for decades. What is new, and potentially alarming, are projections of dramatically increased fracking activity in California, and the potential for adoption of high volume fracturing methods that have generated great concern in other parts of the country.

Fracking in California primarily targets oil. To date most activity has been focused in Kern and Fresno Counties. The Monterey Shale Formation is the key target, and contains an immense oil resource, perhaps 15 billion barrels by some estimates.

Given this prize, the pace and nature of development may have outstripped the ability of

responsible agencies to effectively oversee fracking activity.

Historically, wells in California have used single, vertically drilled shafts with small volumes of fracking fluids. But fracturing technologies are evolving rapidly. While California hasn't yet experienced a dramatic shift to high-volume methods, other states have, and it could very well happen here. These larger scale operations can use millions of gallons of fluids per well, with attendant increased impacts. In addition, the constituents of fracking fluids continue to evolve faster than our ability to study the risks they pose.

There is a lack of comprehensive information on the scope and prevalence of fracking in the state. This is in part because although oil and gas operators report drilling activity to state agencies, they have not been required to report hydraulic fracturing events themselves.

In sum, there is uncertainty in how much fracking will manifest in California's near future, and in what form. This suggests state regulators will need to be proactive in their oversight of the industry if protection of water resources is an important goal.

The need for accountability and transparency

Despite increasing attention to the issue, there is a lack of clarity about how to best manage and regulate the process.

I will mention one certainty, however: the only way to completely remove the risks from hydraulic fracturing would be by prohibiting it. The legislature and relevant agencies in California should not shy away from finding that there is not enough scientific knowledge or institutional capacity to effectively manage a sharp increase in the expansion of hydraulic fracturing in California. If it makes this determination, the state may choose to slow the growth of fracking until more knowledge and capacity can be developed. We recognize the political and economic costs of a moratorium on fracking may be significant, and that the Natural Resources Committee has recently advanced bills on this topic, so we focus on recommendations that could guide alternate pathways to manage its growth.

The solution to regulation under uncertainties may lie in an approach that combines two approaches.

The first approach is requiring technical best practices. California can learn from other states experiences to put such requirements in place.

The second element is to shift greater accountability for the impacts of fracking from regulators onto operators and owners. This is important because best practices, by definition, are of limited value in the face of changing technologies that may render them obsolete.

Regulation of fracking in California

From the perspective of its potential impacts, it is conceptually difficult to separate hydraulic fracturing itself from the entire production process, including drilling, completion, oil or gas

production, storage and disposal of waste, and decommissioning of the well. From a regulatory perspective, a more inclusive discussion is more appropriate as well. In either case, a myopic focus on hydraulic fracturing injection events alone would fail to capture the full range of potential impacts.

Similarly, the impacts from fracking do not fit neatly within jurisdictional boundaries.

At the state level, the California Department of Conservation's Division of Oil, Gas and Geothermal Resources (DOGGR) has primary oversight responsibility for oil and gas production. However, DOGGR, the State Water Resources Control Board and the nine Regional Boards share all share responsibility for protection of the state's water resources. The Department of Public Health and California Air Resources Board also have relevant responsibilities.

Further, you are aware that multiple bills pertaining to hydraulic fracturing have been introduced in this legislative session alone, and recent and pending lawsuits are calling into question how this landscape may shift.

More interagency coordination

In the face of this regulatory complexity, more interagency coordination would be valuable.

For one example, a 1988 Memorandum of Agreement between DOGGR and the State and Regional Boards addressed, among other things, their responsibility to work together. One specific responsibility is for DOGGR to report to SWRCB instances of leakage from well casing and cementing failure.

It is not clear whether or how often such reporting has occurred. At the very least, such reporting should be detailed and made more transparent. Beyond that, we believe that greater coordination between the two agencies is warranted given their fundamentally overlapping responsibilities. Such coordination should include increased attention to enforcement and active oversight throughout the oil and gas production lifecycle. The overarching goal here would be to drive better regulatory oversight and efficiency.

On this note, I am heartened to know that that the Chair of the State Water Resources Control Board is here today, and I am eager to hear her remarks.

Oversight of injection disposal

One key area that requires focus is on the oversight of injection wells that are used for disposal of flowback and produced water.

Naturally, stronger technical standards for monitoring and testing of well integrity are needed, and these have been reviewed elsewhere.

Also, however, there is a discrepancy between DOGGR's definition of an "underground source

of drinking water" and that of US EPA. DOGGR's definition should be strengthened to remove this ambiguity.

We note in our report several measures intended to increase accountability for operators. Baseline water quality testing should be conducted, ideally statewide, and at the very least near fracking sites, before fracking events occur. Idle wells could be used to augment other groundwater wells in order to develop such a baseline.

Related to idle wells, we note that the bond amounts currently required of operators do not effectively incentivize proper decommissioning of wells – clearly these should be increased.

Related to this, possibly the ultimate accountability measure would be the insertion of unique chemical tracers in injected fluids. The goal here would be to enable unambiguous identification of the responsible party in the case of contamination. The technology would need to be vetted and tested for use in oil and gas production contexts, but a number of promising candidates exist.

Conclusion

I will conclude with a segue into Ms. Hein's remarks.

This is an unusual moment for California: historically a leader in environmental regulations, California has often set the course for other states on a broad range of environmental issues, and has done so extremely well.

California's challenge may now be to look east, to stand on the shoulders of those who have been grappling with fracking for a few years longer. California can also push regulatory concepts to drive responsibility operators and align the interests of operators and the citizens of California who rely on its clean water and air.

I thank you all for your leadership as you strive not only to meet the bar set by other states, but to exceed this bar as you tailor California's oversight to its unique circumstances.

Thank you.