



Impact of Oil and Gas Development on Groundwater Resources

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Introduction

My name is Dominic DiGiulio. I am a senior research scientist at PSE Healthy Energy which is a nonpartisan nonprofit research institute that studies the way energy production and use impacts public health and the environment. Prior to joining PSE, I was a research associate at Stanford University where I continue as a visiting scholar. I retired from the U.S. Environmental Protection Agency's Office of Research and Development in 2014 after 34 years of public service. I wish to thank members of the Committee for the opportunity to speak today on the issue of impact to groundwater resources from oil and gas development.

Groundwater resources are vital to the economic development of the United States and the well-being of its citizens. Groundwater resources are especially important in arid regions of the country experiencing rapid population growth and where climate change is expected to further worsen water demand. I will briefly summarize research conducted by myself and coworkers on the relevance of our research to regulatory rulemaking.

In 2016, we published a paper that demonstrated impact to groundwater resources meeting the definition for an Underground Source of Drinking Water or USDW at the Pavillion, WY Field. A USDW is defined as a groundwater resource in EPA's Underground Injection Control Program under the Safe Drinking Water Act. While it was known at the time that hydraulic fracturing and acid stimulation occurs in formations containing groundwater resources, this was the first publication which demonstrated that injection of stimulation fluids into formations containing groundwater resources impacts groundwater resources.

The Energy Policy Act of 2005 largely exempted hydraulic fracturing from the Safe Drinking Water Act and essentially stripped federal protection of groundwater resources during well

stimulation. Our research indicates that groundwater resources can be impacted by well stimulation and thus exemption from the Safe Drinking Water Act needs to be reexamined.

Due to this exemption, definitions of protected groundwater during well stimulation vary from state to state. In 2018, we published a paper that found that, in most states, definitions of protected groundwater are either ambiguous or do not protect groundwater resources. We also found that geographically groundwater resources in the Rocky Mountain states are the most vulnerable to impact as a result of exemption of hydraulic fracturing from the Safe Drinking Water Act.

In 2015, we published a paper in which we found that that at least 6% of hydraulic fracturing in the United States occurs within 3000 feet of surface. Since fractures can propagate as much as 2000 feet upward, deeper groundwater resources could be impacted by hydraulic fracturing even where it does not occur directly in formations containing groundwater resources. Most states do not require estimation of fracture propagation length to ensure an adequate distance between depths of hydraulic fracturing and groundwater resources.

Finally, in California, we are examining the impact of disposal of produced water into unlined produced water ponds. This disposal practice has resulted in groundwater contamination at a number of locations throughout the San Joaquin Valley - a drought prone area of national significance for agricultural production.

This impact is largely a consequence of exemption of oil and gas exploration and development waste from Subtitle C of the Resource Conservation and Recovery Act or RCRA. Exemption from Subtitle C has resulted in a patchwork of regulations for disposal and management of oil and gas waste in various states that have continued to evolve over time. At present, there is no

“cradle to grave” tracking of oil and gas development waste in any state as would be required under Subtitle C of RCRA.

In conclusion, exemption from federal regulation and often inadequate state regulation has caused impact to groundwater resources as a result of oil and gas development. At present, this situation can only be remedied by reconsideration of federal exemptions or improved regulation on a state-by-state basis. This testimony has been provided to inform the Committee on the need for such action at the federal and state level.

Again, I thank the committee for the opportunity to speak today.