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March 30, 2018

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Dear Mr. Tambini and Commissioners:

The American Petroleum Institute (“API”) submits the following comments in response to the Delaware River Basin Commission’s (the “Commission’s” or “DRBC’s”) Notice dated November 30, 2017 requesting comment on its *Proposed Amendments to the Administrative Manual and Special Regulations Regarding Natural Gas Development Activities; Additional Clarifying Amendments*.

### **Background and Statement of Interest**

API represents over 625 oil and natural gas companies, leaders of a technology-driven industry that supplies most of America’s energy, supports more than 9.8 million jobs and 8 percent of the U.S. economy, and, since 2000, has invested nearly \$2 trillion in U.S. capital projects to advance all forms of energy, including alternatives. The oil and natural gas industry is committed to an approach that promotes safety and environmental performance while securing the tremendous benefits of domestic energy production for our nation. API is a leader in developing the industry technical standards and programs that enhance the safety of operations worldwide.

Since 1924, API has led in the establishment, maintenance, and dissemination of hundreds of standards to ensure the safe and sustainable development of oil and natural gas in the U.S. and across the world. The process to create and manage the standards has been accredited by the American National Standards Institute (“ANSI”), the body that accredits similar programs at several U.S. national laboratories. This method brings together academics, government regulators and industry experts to improve and advance the safety of energy development. Each standard is reviewed at least every five years to maintain their integrity. API’s standards represent industry safety practices based on the best available science and research. This is one reason they are widely cited, and often incorporated, in federal and state regulations. International regulators often reference the standards in their country’s regulations, as well. As these standards are implemented and their effects measured, they add to the body of knowledge of industry best practices and lessons learned, and deliver significant improvements to system integrity,

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Reliability, and integrated safety. API maintains a portfolio of more than 700 standards that cover all aspects of the oil and natural gas industry, including 260 focused specifically on exploration and production activities.

It is also clear that producing the energy that the U.S, and its allies, rely upon to fuel the nation's economy has also been a proven tool for job creation, economic stimulation, federal revenues, and national security.

### **General Comments and Approach**

On November 30, 2017, API was pleased to see the DRBC finally release its notice of proposed rulemaking on *Amendments to the Administrative Manual and Special Regulations Regarding Natural Gas Development Activities*. However, as API promotes forward-looking burden-reducing policy decisions promoting domestic energy resources, the organization was disappointed to see a seven-year stalemate on the Commission's 2010 regulatory proposal be replaced with a new proposal to prohibit high volume hydraulic fracturing ("HVHP") within the Delaware River Basin.<sup>1</sup>

The DRBC proposed regulations are unnecessary and, in many ways, duplicative and/or conflicting with Pennsylvania Department of Environmental Protection ("DEP") oil and natural gas regulations, and do not respond to a legislative mandate or clearly demonstrate factual need. The specific issues addressed in this comment letter and the supporting detailed report prepared for API by ALL Consulting, LLC ("ALL" -- see Appendix A -- "*Response to Key Technical Issues Requested by the Delaware River Basin Commission in its Proposed New 18 CFR Part 440 Review*") bear this out and substantiate our position. API has expressed its strong opposition to the proposed prohibition of HVHF during the series of public hearings, speaking at the January 23, January 25, February 22, and March 6, 2018 sessions.

Further, in its November 30, 2017 website announcement of the Notice of Proposed Rulemaking and Public Hearing, the DRBC expressly requested comment on the effects the proposed rules may have within the basin on conservation, utilization, development, management, and control of the water and related resources of the Delaware River Basin. The DRBC requested information on topics such as water availability, the control and abatement of water pollution, economic development, the conservation and protection of drinking water supplies, the conservation and protection of aquatic life, the conservation and protection of water quality in special protection waters ("SPW"), and the protection, maintenance, and improvement of water quantity and quality basin-wide.<sup>2</sup> While addressing all of these aspects of the proposal was simply not possible within the time constraints provided by the comment period, API did request assistance from ALL to develop analysis covering several key technical issues. Appendix A to this comment letter -- builds on work carried forward by ALL in its

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<sup>1</sup>High Volume Hydraulic Fracturing (HVHF) is not terminology used within the industry but is being repeated in this letter to reflect the DRBC proposal.

<sup>2</sup>[http://www.state.nj.us/drbc/meetings/proposed/notice\\_hydraulic-fracturing.html](http://www.state.nj.us/drbc/meetings/proposed/notice_hydraulic-fracturing.html)

previous report to the DRBC (submitted on April 12, 2011)<sup>3</sup> – and includes detailed information on the following topics:

- Water and land use comparing reasonably foreseeable development levels versus no development; water resource availability and potential use compared to other use sectors; and water quality considerations, including SPW and industry's focus on protecting water quality;
- Estimates of the economic benefits that could be brought to the region with an anticipated annual rate of development, including the number of jobs (direct and indirect), wages, income projected from lease and royalty payments, and revenues from taxes paid by the industry;
- Speculation about risks associated with altering landscapes and disturbances to the drainage areas of SPW; and
- Review of the current and future produced water treatment technology landscape including implementation successes across the United States.

### **DRBC Decisions Must Consider Economic Impacts**

The current Vision Statement of the DRBC states that its mission for comprehensive watershed management will be accomplished by seven key actions<sup>4</sup>:

- Serving primarily basin-wide and interstate interests; and national, state-wide, regional, and local watershed interests as the need arises;
- Resolving interstate disputes through mediation;
- Regularly updating the Comprehensive Plan;
- Adopting and implementing policies to manage the basin's water resources in an integrated, planned fashion;
- Integrating environmental and economic needs;
- Basing decisions on sound science; and
- Providing meetings, conferences, seminars, and other opportunities for public education, information exchange, involvement, and resolution of issues.

According to its mission, the DRBC must be committed to integrating environmental and economic needs in its decision to amend its *Special Regulations* to prohibit HVHF in shale and other rock formations. We would argue that the Commission has failed to meet this aspect of its mission. The preamble to the DRBC proposal fails to incorporate any economic information for consideration by the commenting public on what could be lost by a continued prohibition on oil and natural gas development

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<sup>3</sup>Data/information from ALL's April 12, 2011 report to the DRBC was used to respond to the content in the November 30, 2017 DRBC proposal for comparison purposes only. This is not an indication of API's support for the DRBC's previous December 9, 2010 proposed Natural Gas Development Regulations, which we believe were unnecessary and well beyond the jurisdiction of the Commission.

<sup>4</sup>Found on the DRBC website at [http://www.state.nj.us/drbc/library/documents/DRBC\\_vision-mission.pdf](http://www.state.nj.us/drbc/library/documents/DRBC_vision-mission.pdf)

in the basin or conversely, what could be gained economically from a less aggressive approach. In response, API is providing several levels of economic information.

At the macro level, a Price Waterhouse Coopers study, released by API in July of 2017 shows that oil and natural gas production in Pennsylvania supports more than 320,000 jobs in the Commonwealth. This includes direct industry jobs as well as jobs in the wholesale/retail, construction, manufacturing and other sectors. This same study shows that these jobs resulted in roughly \$23 billion in wages paid to individual Pennsylvanians in 2015. These jobs are the cornerstone of a nearly \$45 billion value-added economic benefit to the Commonwealth. It is indisputable that this industry has made a substantial contribution to Pennsylvania's economy overall.<sup>5</sup>

Appendix A to this letter (ALL's Report) provides more specific analysis of the economic picture and potential opportunities lost in six basin counties, if the DRBC finalizes the proposed prohibition regulations.<sup>6</sup> Based on an oil and natural gas development estimate of 40 wells drilled per year in the six counties combined, with no prohibition, the economic benefit to the Commonwealth is quantified conservatively at \$250 million annually (\$6.2 million per well times 40 wells). This potential benefit does not include the: i) lease bonus payments and royalties which would go directly to the landowner (estimated as a bonus payment per acre of between \$500 and \$2,500); ii) unconventional gas well impact fee paid by the operator to the six basin counties (estimated to be over \$125 million for the producing life of the 40 wells drilled annually); iii) the DEP permit fees (estimated at \$1.5 million for the 40 wells over a conservative ten-year period of payment); and iv) a conservative estimate of state income tax paid by individuals and corporations as a result of increased oil and natural gas development activity and associated royalty and lease bonus income, wages, and corporate profits.

### **DRBC Decisions Must Be Based on Sound Science**

As stated above, beyond the DRBC's commitment to integrating environmental and economic needs in policy or rulemaking Commission decisions must be based on facts and sound science. In the proposed rulemaking, the Commission relies heavily on two specific studies to support its claims of the risks and vulnerabilities associated with HVHF and thus, the proposed prohibition – these include the U.S. Environmental Protection Agency's ("EPA's" or "Agency's") hydraulic fracturing water resources study (initiated in 2010) and the New York Supplemental Generic Environmental Impact Statement ("SGEIS").

#### **A. EPA Study**

EPA publicly released the Draft Assessment Report titled *Assessment of the Potential Impacts of Hydraulic Fracturing for Oil and Gas on Drinking Water Resources* on June 4, 2015. The Agency

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<sup>5</sup>[http://www.api.org/~media/Files/Policy/Jobs/Economics-Nat-Gas-Oil/API\\_OilEconomy\\_Pennsylvania.pdf](http://www.api.org/~media/Files/Policy/Jobs/Economics-Nat-Gas-Oil/API_OilEconomy_Pennsylvania.pdf)

<sup>6</sup> According to the U.S. Energy Information Administration's analysis of the Appalachian Basin, six northeastern Pennsylvania counties have viable oil and natural gas production potential and as a result, could be affected by the DRBC proposal. The six counties are Carbon, Lackawanna, Luzerne, Monroe, Pike, and Wayne counties.

concluded its year-long formal peer review by the EPA Chartered Science Advisory Board (“SAB”) with the submission of a Recommendations Report to the EPA Administrator on August 11, 2016. Afterwards, the Agency released its Final Assessment Report on December 13, 2016 retitled *Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States* (EPA 600-R-16-236ES).

The EPA Chartered SAB Recommendations Report suggested that EPA needed more quantitative support of its June 2015 Draft Assessment topline and accurate conclusion of **“no systemic widespread impacts from hydraulic fracturing,”** As a result, API developed and shared two reports with the EPA Office of Research and Development (“ORD”) – i) *Industry Practices and Trends Protecting Water Resources During Hydraulic Fracturing: Information for US EPA’s Draft Assessment (October 2016)* and ii) *Quantitative Support for EPA’s Finding of No Widespread, Systemic Effects to Drinking Water Resources from Hydraulic Fracturing (November 2016)*. Both reports are available on the API website.<sup>7</sup>

In its December 2016 Final Assessment, EPA altered its original topline conclusion and provided a new conclusion *“that activities under the hydraulic fracturing water cycle can impact drinking water resources under some circumstances.”* Based on the facts at hand, API strongly disagreed with this unsubstantiated reversal by EPA.

The 2016 Final Assessment identified certain conditions under which impacts from hydraulic fracturing activities can be more frequent or severe:

- Water withdrawals for hydraulic fracturing in times or areas of low water availability, particularly in areas with limited or declining groundwater resources;
- Spills during the handling of hydraulic fracturing fluids and chemicals or produced water that result in large volumes or high concentrations of chemicals reaching groundwater resources;
- Injection of hydraulic fracturing fluids into wells with inadequate mechanical integrity, allowing gases or liquids to move to groundwater resources;
- Injection of hydraulic fracturing fluids directly into groundwater resources;
- Discharge of inadequately treated hydraulic fracturing wastewater to surface water; and
- Disposal or storage of hydraulic fracturing wastewater in unlined pits, resulting in contamination of groundwater resources. (*Hydraulic Fracturing for Oil and Gas: Impacts from the Hydraulic Fracturing Water Cycle on Drinking Water Resources in the United States -- EPA 600-R-16-236ES – Page 1*).

EPA reported that impact generally occurred near hydraulically fractured oil and natural gas production wells and ranged in severity. EPA further stated that data gaps and uncertainties in the available data

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<sup>7</sup><http://www.api.org/oil-and-natural-gas/wells-to-consumer/exploration-and-production/hydraulic-fracturing/scientific-evidence-in-epa-study-confirm>

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prevented ORD staff from calculating or estimating the national frequency of impacts on drinking water resources from activities in the hydraulic fracturing water cycle or fully characterize the severity of impacts. While unable to quantitatively determine a national impact frequency, EPA claimed to qualitatively describe factors that affect the frequency or severity of impacts at the local level.

However, in this very report, in Chapter Six -- *Well Injection* -- the Agency references several studies which support the fact that the possibility of fluids rising from fracturing operations into the shallow water table is highly unlikely:

“...due to the very **low permeabilities** of shale formations; this means that hydraulic fracturing operations are **unlikely** to generate sufficient pressure to drive fluids into shallow drinking water zones (Flewelling and Sharma, 2014 – Page 6-52).”

“Some natural conditions could also create an upward hydraulic gradient in the absence of any effects from hydraulic fracturing. However, these natural mechanisms have been found to cause very low flow rates over very long distances, yielding **extremely small vertical fluxes** in sedimentary basins. These translate to some estimated travel times of 100,000 to 100,000,000 years across a 328 ft (100 m) thick layer with about 0.01 nD (1 . 10–23 m<sup>2</sup>) permeability (Flewelling and Sharma, 2014 – Page 6-52).”

“In deep, low-permeability shale and tight gas settings and where induced fractures are contained within the production zone, flow through the production formation has generally been considered an **unlikely pathway** for migration into drinking water resources (Jackson et al., 2013d – Page 6-53).”

After six years and over \$30 million spent on this study, EPA’s 2016 key findings (noted above) were nothing new. These were acknowledged by industry at the study’s beginning and emphasized by industry repeatedly throughout the research stages and Assessment development process. Specifically, the industry recognized that strong industry standards and operational practices, robust state regulatory programs, and federal environmental statutes work together to address all the potential impacts identified.

API contends that the science and data clearly demonstrate that hydraulic fracturing can be and has been done safely and responsibly and the U.S. taxpayer has witnessed a huge expense and time expended only to see draft final conclusions – supported by science -- changed to final conclusions based in political ambiguity. API cautions that the DRBC is on a similar poorly devised course and offers that there are a host of reputable studies by government agencies and academic institutions, coupled with empirical evidence, that lead one to firmly conclude that hydraulic fracturing is not a threat to drinking water resources (see Attachment 1 to this letter).

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A recent example worthy of note is a two-year study released in mid-2017 by the Academy of Medicine, Engineering, and Science of Texas (“TAMEST”).<sup>8</sup> This work analyzed the overall impacts of oil and natural gas development in Texas – a state with a development history that dates to 1866. The report identifies data gaps and areas of concern (most notably under transportation), while recognizing that these are all being addressed by state and federal regulations and industry practices. The report concluded – based on facts – that hydraulic fracturing is being done in a safe and environmentally friendly manner with economic benefits provided to the state. This report also supports the EPA original fact-based assertion above, that hydraulic fracturing is not a significant threat to drinking water supplies, in its statement:

“Direct migration of contaminants from targeted injection zones is highly unlikely to lead to contamination of potential drinking water aquifers.” (The Academy of Medicine, Engineering and Science of Texas, *Environmental and Community Impacts of Shale Development in Texas* – Page 128.)

#### B. New York State Study

The second study that the DRBC relied upon to justify its prohibition was the New York State Department of Public Health's (“NYSDOH”) report titled “*A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development.*” The review, in its conclusion, presumed that there were still unanswered questions and unaddressed risks to public health that could result from allowing shale development in New York. Based on the review’s recommendation, the DEC passed a de facto moratorium against “high volume hydraulic fracturing” in the state. API studied the NYDOH review and our findings raise serious questions about the DRBC’s reliance on the review to support its current proposal. API found the methodology used to conduct the NYSDOH public health review flawed. The conclusions lacked reproducibility, and the process of how the Agency arrived at their conclusion was not transparent (see Attachment 2 to this letter titled “*Critique of New York State Department of Public Health HVHF Health Review*”). Overall, NYSDOH did not consider how the risk mitigation and management activities recommended in the SGEIS would have reduced or eliminated potential exposures. Regardless of the failings of NYSDOH review, the review is now dated and should not be a primary resource for the DRBC in its decision-making on health implications of its current proposal.

Instead, API urges the Commission to review the 2017 assessment conducted by the Colorado Department of Public Health and Environment (“CDPHE”) and its utilization of a process that was transparent, reproducible, and scientifically defensible. The review included a systematic review of the literature, assessed study quality, and included a screening assessment of potential exposures and health effects. CDPHE concluded, based on its systemic review, that the risk of harmful health effects associated with oil and natural gas development is low.

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<sup>8</sup><http://tamest.org/wp-content/uploads/2017/07/Final-Shale-Task-Force-Report.pdf>



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API believes that DRBC would be better served by performing its own review of local investigations and studies and assessing the evidence using best available scientific methods within the context of the basin.

As a final comment on the necessity for sound science in this deliberative process, on February 1, 2018, New Jersey Governor Phil Murphy held a press conference in Phillipsburg, New Jersey located immediately across the Delaware River from Easton, Pennsylvania.<sup>9</sup> His announcement was simply that he would cast the New Jersey vote in favor of the proposed DRBC rulemaking prohibiting hydraulic fracturing. His declaration was inappropriate and premature. This, considering the public comment period on the proposal remained open until March 30, 2018 and only two of the six public hearings (including one teleconference) had taken place at the time. In each session, the public was specifically instructed at the start of each meeting by the DRBC Hearing Officer that all statements were videotaped and recorded for the Commissioners (none of whom were in attendance) to view before the close of the formal comment period and for inclusion in a final Response to Comment document. Following those steps – expected to take until late spring or early summer – the proposal would be placed before the Commissioners for a final vote.

At the end of his February press conference, Governor Murphy stated, “Whether we always agree with the decisions or not, let’s get back to making decisions based on the science and based on the facts.” Despite his premature pronouncement, API could not agree more: science and fact-based analysis and decision-making should be the underpinning of this and all DRBC’s initiatives.

### **The Oil and Natural Gas Industry’s Management of Water and Waste**

During the six public hearings scheduled by the DRBC, numerous statements were made by engaged participants about how oil and natural gas development in the basin would result in detrimental effects on groundwater, private drinking water wells, and the Delaware River.

These and many other statements about the oil and natural gas industry’s operations were either grossly exaggerated or flat-out wrong, and no opportunity was provided to industry to correct the record during the hearings. API is therefore addressing these water and waste management issues briefly in this comment letter.

#### **A. Protection of Water Resources**

Hydraulic fracturing has been conducted for nearly six decades, and during this time industry has developed techniques for improving well drilling, cementing, and casing to protect freshwater sources, restrict fluids to the intended zone, and enable efficient hydrocarbon production. The primary means of ensuring that underground sources of drinking water are protected is by carefully casing the well with a steel pipe and cementing it into place to create a tight seal. Several redundant layers of steel casings and

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<sup>9</sup>The February 1, 2018 press conference can be viewed via this link: <https://www.youtube.com/watch?v=5MV6ObQf9Gs>



cement sheaths are sequentially installed to provide layers of protection. After installation the cement is tested to evaluate its strength and seal.<sup>10</sup>

In addition to well integrity being a top priority for protecting subsurface water resources, the industry carefully manages water at the surface at all stages of operations. This applies throughout the water cycle and includes sourcing, transportation, and use as well as treatment, reuse, or disposal. Technological, and in certain cases, state regulatory advances have allowed producers to minimize use of fresh water sources in favor of non-potable, lower quality water, or produced water. Water reuse within the oil and natural gas industry is also encouraging development of more efficient, more mobile water treatment technologies that could eventually be scaled and utilized by other industries.

The federal government creates framework environmental laws that often prescribe regulatory minimum thresholds for states to follow. For example, the Clean Water Act (“CWA”) applies to oil and natural gas operations, particularly where water resource protection, and in certain cases, restoration is concerned. The CWA allows for the establishment of the National Pollutant Discharge Elimination System (“NPDES”), which, in most states, regulates how oil and natural gas operators manage stormwater and other wastewater discharges from their sites. Operators must seek coverage under construction and operating permits; prepare compliant Stormwater Pollution Prevention Plans (“SWPPP”); and implement best management plans (“BMPs”) and controls (including routine inspections and testing of upstream discharge points) to prevent impacts to receiving water bodies. In Pennsylvania, stormwater discharges are permitted through PA’s ESCGP-2 general permits. The NPDES program further requires permits and engineering and other controls (including routine inspections and testing) for any discharge of wastewater from oil and natural gas sites. Further, a separate provision of the CWA, the Oil Spill Prevention, Control, and Countermeasures (“SPCC”) Regulation requires oil and natural gas operators to prepare SPCC plans, implement controls, and establish BMPs to prevent impacts to receiving water bodies from tanks and other structures that hold oil on site.

Under the federal structure, states are authorized to be the primary stewards and regulators of their water. Most states producing shale energy have extensive water quality and quantity regulations overseen by a wide range of agencies. States typically mandate considerable disclosures for water use permitting requiring applicants to demonstrate the water sources they plan to use, as well as show that their expected uses will not have an adverse impact on other users or the environment even in times of floods or droughts. Many states also require companies to show how they plan to transport, store, treat, and dispose of the water safely and in accordance with the law.

Specific to Pennsylvania, in 2010 DEP established new regulations affecting the discharge of produced water with elevated total dissolved solids (“TDS”). The regulations established four revised effluent standards for TDS, chlorides, barium, and strontium – which publicly-owned treatment works

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<sup>10</sup>[http://www.api.org/~media/Files/News/Infographics/Cementing\\_A\\_Seal\\_For\\_Safety.pdf](http://www.api.org/~media/Files/News/Infographics/Cementing_A_Seal_For_Safety.pdf)

("POTWs") and centralized waste treatment ("CWT") facilities were required to meet. In May of 2011, DEP asked operators to stop discharging shale produced water to POTWs and CWTs because of water quality concerns downstream of municipal discharge points. The DEP request shut down this type of treatment of shale produced water in Pennsylvania, although produced water from conventional or traditional shallow wells is still being discharged to these facilities. The DEP Fact Sheet on Marcellus

Shale Development outlines the numerous state requirements in place concerning water use and wastewater disposal activities in the Commonwealth.<sup>11</sup>

"Large volumes of water are required to complete a Marcellus Shale natural gas well, and large volumes of waste water are generated as part of the process. This wastewater is considered industrial wastewater and is a residual waste in Pennsylvania. DEP, in cooperation with the Susquehanna and Delaware River Basin Commissions, has created additional permit guidelines for drilling in the Marcellus Shale formation to create consistent rules for water withdrawal, usage, treatment, and disposal in all areas of the state, and to ensure that the water quality and uses of waters of the Commonwealth are not threatened by drilling operations.

As part of the permit application process, the applicant must develop a Water Management Plan to identify where it plans to obtain and store the water, identify withdrawal quantity, rate, timing, and pass-by flow requirements. When applying for a permit, the applicant must specify the withdrawal locations of source water and demonstrate the following: proposed withdrawal will not adversely affect quantity or quality for other uses or users, designations and uses of the source water body will be maintained, water quality in the entire watershed will not be adversely impacted and a reuse plan for water used to hydraulically fracture the wells will be provided.

Drilling companies must also identify where produced wastewater will be stored, treated, and disposed. Pits or impoundments with an embankment for temporarily storing drilling wastes must meet DEP standards for construction (e.g., synthetic liners) and may also require a DEP dam permit.

Wastewater (fluids) must be recycled, treated at an authorized wastewater treatment facility, or disposed at an authorized waste disposal facility. DEP approval is required before the receiving treatment or disposal facility can accept the wastewater for processing and/or disposal."

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<sup>11</sup> <http://www.depgreenport.state.pa.us/elibrary/GetDocument?docId=4947&DocName=8100-FS-DEP4217.pdf>

## B. Chemical Disclosure

Approximately 99.5 percent of the contents of most hydraulic fracturing fluid systems are well-known and widely disclosed: water (90 percent by volume) and a proppant (typically sand or other non-toxic material, which constitutes 9.5 percent by volume). The substances that are most commonly found in the additional 0.5 percent of hydraulic fracturing fluid systems are also commonly found in food, cosmetics, detergents and other household products.<sup>12</sup> These substances are essential for efficient delivery of the proppant to the rock fractures, reduction of friction, which in turn reduces the energy required to pump, and in the prevention of corrosion and scale build up, which is detrimental to equipment and overall production. The combination of chemicals used by certain service companies, who typically carry out the actual fracturing operations, can be of a proprietary nature and receive similar protections from disclosure offered to other industries. The industry generally protects specific ingredients within additives that commonly represent less than a thousandth of a percent (0.001 percent) of the total hydraulic fracturing fluid volume. Even in those narrow circumstances, where precise chemical identification is not publicly released, the industry typically provides chemical category information that allows the public to identify the class and function of the chemical. Further, several states require that the precise identity of these ingredients be disclosed to regulators, physicians, and emergency personnel.

As a part of stakeholder engagement and to maintain a high level of transparency with communities, companies report specific information about fracturing fluid used at an individual well via a voluntary, publicly accessible website: FracFocus.org. This chemical disclosure registry was developed in 2011 by the Groundwater Protection Council and the Interstate Oil and Gas Compact Commission, two organizations comprised of state regulators that oversee the oil and natural gas industry. FracFocus.org also serves as a reporting method to meet state disclosure requirements for 24 states, including Pennsylvania. To date, chemical information on over 130,000 wells is contained within the registry.

Finally, safety data sheets (“SDSs”) contain safety, health, and environmental information for all ingredients (including those denoted as proprietary). SDS documents must be available onsite for the substances used in the hydraulic fracturing process as required by the Occupational Safety and Health Administration (“OSHA”).

## C. Waste Management

Waste from oil and natural gas drilling and production activities are managed in accordance with state and federal environmental laws and numerous industry recommended practices and standards. In many states, companies submit waste management plans as part of the permitting process to ensure that waste management options are carefully considered long before drilling ever begins. The industry generally manages waste by employing a tiered decision-making process based on a hierarchy of control that is

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<sup>12</sup> Department of Energy/Groundwater Protection Council: Modern Shale Gas Development in the United States: A Primer (2009)

designed to best protect public and environmental health: reduce, reuse, recycle, treat, and dispose. Reduction involves efforts which decrease the volumes of waste generated and determining if more environmentally friendly (but equally effective) chemical substitutes are available for use. The second tier involves reclaiming and reusing as much waste as possible, using treatments that allow materials to be reused, and reduce the residual waste produced, thereby reducing the amounts that must be disposed. The third tier involves environmentally sound and responsible methods of disposing of generated wastes.

As a final note regarding oil and natural gas wastes, a common topic raised during the public hearings was radioactivity or naturally occurring radioactive material (“NORM”). Low levels of NORM are all around us.<sup>13</sup> They are in the foods we eat and the houses we live in, and in the air, rocks, and soil in the environment. Consequently, some of the water and wastes resulting from exploration and production of oil and natural gas may contain low levels of radioactivity through contact with underground formations. The industry operates under federal, state, and local regulations to manage, store and dispose of these materials in a safe manner, which protects both workers and the community.

Protecting workers, individuals, and the community who are near oil and natural gas operations is of paramount importance to the industry. Companies are dedicated to implementing internationally-recognized standards and best practices, which provide for safe work environments and the public safety. The way the industry handles NORM is no different. For decades, companies have effectively managed and disposed of these materials from production and processing equipment, as well as waste products, such as production fluid and cuttings, all in compliance with federal and state regulations. Currently, operators identify, store, and dispose of any naturally occurring radioactive material in compliance with state environmental laws and OSHA regulations. Due to varying background levels of NORM, NORM-specific regulations are the responsibility of states. However, remediation guidelines for sites undergoing closure may be subject to EPA’s requirements concerning allowable soil and surface water limits.

Generally, states distinguish between levels of radiation that are non-hazardous and hazardous. In any question of worker protection, state health standards combined with OSHA regulations determine permissible exposures. Associated reporting and transparent activities work together to create an environment where the oil and natural gas industry can effectively monitor, manage, and disclose its work around NORM.<sup>14</sup>

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<sup>13</sup>According to EPA, NORM is defined as, “Materials which may contain any of the primordial radionuclides or radioactive elements as they occur in nature, such as radium, uranium, thorium, potassium, and their radioactive decay products, that are undisturbed as a result of human activities. Further, background radiation, which is present in terrestrial, cosmic, man-made or cosmogenic sources, is all around us.” Technologically Enhanced Naturally Occurring Radioactive Materials (“TENORM”) are “NORM materials that have been concentrated or exposed to the accessible environment as a result of human activities, such as manufacturing, mineral extraction or water processing.”

<https://www.epa.gov/radiation/technologically-enhanced-naturally-occurring-radioactive-materials-tenorm>

<sup>14</sup>A 2015 peer-reviewed Pennsylvania DEP [study](#) titled *Technologically Enhanced Naturally Occurring Radioactive Materials (TENORM) Study Report* (revised in May 2016) stated that there is “little potential for harm to workers or the public from radiation exposure due to oil and gas development.”

## **The Delaware River Basin Commission Lacks Authority to Prohibit Hydraulic Fracturing**

Purporting to “protect and conserve the water resources of the Delaware River Basin,” Proposed 18 C.F.R. § 440.1(a), the DRBC proposes to regulate, among other things, “high-volume hydraulic fracturing,” defined as “hydraulic fracturing using a combined total of 300,000 or more gallons of water during all stages in a well completion . . .,” Proposed 18 C.F.R. § 440.2.<sup>15</sup> Pursuant to the proposed regulations, “[h]igh volume hydraulic fracturing in hydrocarbon bearing rock formations is prohibited within the Delaware River Basin.” Proposed 18 C.F.R. § 440.3(b).

Because the Commission’s authority to issue regulations derives solely from the Delaware River Basin Compact (“Compact”), and the Compact does not give the Commission authority to prohibit hydraulic fracturing, the proposed regulation should be rejected.

### *A. The Compact’s Origins Constrain the Scope of the Commission’s Authority.*

The Constitution grants Congress the authority to “regulate Commerce . . . among the several States.” U.S. Const. art I, § 8, cl. 3. The United States Constitution’s Compact Clause permits a State to enter into an agreement or compact with other States, but only with “the Consent of the Congress.” U.S. Const., art. I, § 10, cl. 3.

The Compact between New York, New Jersey, Pennsylvania, Delaware, and the United States arose from long-running litigation over the allocation of water along the Delaware River. “In order to meet its increasing need for supplies of public water, New York City in 1929 began to plan the diversion of the waters of the Delaware River.” *Badgley v. City of New York*, 606 F.2d 358, 362 (2d Cir. 1979). New Jersey promptly “commenced an original suit in the U.S. Supreme Court against the State of New York . . . to enjoin and restrain any *diversion* of the waters of the Delaware River . . .” *Id.* (emphasis added).

The Supreme Court referred the diversion dispute to a special master, who prepared a report subsequently adopted by the Court. *See New Jersey v. New York*, 283 U.S. 336, 344–45 (1931). The Court’s resulting order precluded New York from diverting from the Delaware River and its tributaries more than a set amount of water daily, required New York to install “an efficient plant for the treatment of sewage” before any diversion would be allowed, set limitations on the concentration of waste in waters returned to the Delaware River, and required New York to release additional water into the Delaware River if its depth fell below set levels in New Jersey. *See id.* at 346–47. In this way, the Supreme Court “intended to establish a comprehensive scheme of river regulation, all-inclusive as to all matters concerning the manipulation of the flow of the undiverted portions of the waters of the Delaware River.” *Badgley*, 606 F.2d at 368.

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<sup>15</sup>“Hydraulic fracturing,” in turn, is defined as “a technique used to stimulate the production of oil and natural gas from a well by injecting fracturing fluids down the wellbore under pressure to create and maintain induced fractures in the hydrocarbon-bearing rock of the target geologic formation.” Proposed 18 C.F.R. § 440.2.

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Following a subsequent New York City petition to the Supreme Court “to allow an increase in the diversion of the Delaware River waters,” New York, New Jersey, Pennsylvania, and Delaware entered into a consent decree further defining the States’ relative rights to the Delaware River’s waters. *Id.* at 362–63. The decree amended the allowable diversions, maintained the treatment requirements, and established a river master to administer the terms of the decree. *See New Jersey v. New York*, 347 U.S. 995, 996–1005 (1954).

Further formalizing their relationship, in 1961 New York, New Jersey, Pennsylvania, and Delaware entered the Compact, providing for, among other things, the creation of the Commission. *Badgley*, 606 F.3d at 363. Congress approved the Compact, which was then signed by the President and the governors of the signatory States. *See* Pub. L. No. 87-328, 75 Stat. 688 (1961); Compact at 38.

Consistent with its genesis in resolving long-running litigation among the States over water diversion, the Compact aims:

“to promote interstate comity; to remove causes of present and future controversy; to make secure and protect present developments within the states; to encourage and provide for the planning, conservation, utilization, development, management and control of the water resources of the basin; to provide for cooperative planning and action by the signatory parties with respect to such water resources; and to apply the principle of equal and uniform treatment to all water users who are similarly situated and to all users of related facilities, without regard to established political boundaries.”

Compact, Section 1.3(e). Similarly illustrating the Compact’s underlying preoccupation with water diversion, the States identified a number of goals, including to:

“provide effective flood damage reduction; conservation and development of ground and surface water supply for municipal, industrial, and agricultural uses; development of recreational facilities in relation to reservoirs, lakes, and streams; propagation of fish and game; promotion of related forestry, soil conservation, and watershed projects; protection and aid to fisheries dependent upon water resources; development of hydroelectric power potentialities; improved navigation; control of the movement of salt water; abatement and control of stream pollution.”

Compact, Part 1. Ultimately, the Compact relies on the “*regulation of stream flows toward the attainment of those goals.*” *Id.* (emphasis added).

**B. *The Compact’s Language, Structure, And Course of Dealing Preclude the Authority to Prohibit Hydraulic Fracturing.***

“The construction of a compact sanctioned by Congress under . . . the [Compacts Clause] of the Constitution presents a federal question,” and requires application of federal law. *Petty v. Tennessee-Missouri Bridge Comm’n*, 359 U.S. 275, 278, 280 (1959). Because “a congressionally approved

interstate compact” within the purview of the Commerce Clause is construed “just as if [it] were . . . a federal statute,” *Virginia v. Maryland*, 540 U.S. 56, 66 (2003) (quotation and alteration omitted); *see also New Jersey v. Delaware*, 552 U.S. 597, 610 (2008); *Cuyler v. Adams*, 449 U.S. 433, 440 (1981) (“[T]he consent of Congress transforms the States’ agreement into federal law under the Compact Clause.”), the “focus [is] on the text” of an interstate compact “to determine the scope of . . . authority” conferred. *EnergySolutions, LLC v. Utah*, 625 F.3d 1261, 1273 (10th Cir. 2010).

As the Supreme Court has made clear, “[s]tatutory construction must begin with the language employed by Congress and the assumption that the ordinary meaning of that language accurately expresses the legislative purpose.” *Gross v. FBL Fin. Servs., Inc.*, 557 U.S. 167, 175 (2009). *See also Virginia*, 540 U.S. 56, 66 (looking to the compact’s “plain language”); *Pievsky v. Ridge*, 98 F.3d 730, 733 (3rd Cir. 1996) (“The interpretation of the Compact must be grounded and based upon the very language of the instrument.”). This is particularly true for interstate compacts, which, “like treaties, are presumed to be the subject of careful consideration before they are entered into and are drawn by persons competent to express their meaning and to choose apt words in which to embody the purposes of the high contracting parties.” *New Jersey*, 552 U.S. at 615–16 (quotation omitted).

The Commission’s present assertion of authority to prohibit hydraulic fracturing rests on its general authority in the Compact over “projects,” *see* Proposed 18 C.F.R. § 440.1(b) (citing Sections 3.6(b), 3.8, 7.1, and 13.1), and its specific authorization to engage in pollution control, *see id.* (citing Section 5.2). Neither source supports a prohibition on hydraulic fracturing.

***1. The Compact’s provisions governing “projects” do not authorize the proposed hydraulic fracturing prohibition.***

Under the Compact, a “project” is “any work, service or activity which is separately planned, financed, or identified by the commission, or any separate [public or private] facility undertaken . . . **for** the conservation, utilization, control, development or management of water resources . . . .” Compact, Section 1.2(g) (emphasis added). Hydraulic fracturing is plainly not “for” the listed purposes that define a “project” covered by the Compact and, by extension, the Commission’s authority. That those purposes are a key feature of defining “projects” is clear from the Compact’s consistent usage of the term, which demonstrates a focus on water management projects such as diversion, treatment, and the like rather than regulation of oil and natural gas operations that happen to use water that may or may not originate from the Delaware River. *See Virginia*, 540 U.S. at 66 (comparing differing language of several sections of compact, illustrating compact’s intent and ability to draw distinctions among different citizens’ rights).

For example, the proposed regulations rely on Section 3.6(b) of the Compact. Proposed 18 C.F.R. § 440.1(b). But that provision permits the Commission to “[e]stablish standards of planning, design and operation of all projects and facilities in the basin which affect its water resources,” such as “water and waste treatment plants, stream and lake recreational facilities, trunk mains for water distribution, local flood protection works, small watershed management programs, and ground water recharging operations.” Compact, Section 3.6(b). While the Compact professes that Section 3.6(b) is “without



limitation” to the specific listed examples, *see id.*, each species is of the same genus—management of water availability and waste treatment. That focus is on all fours with the circumstances of the Compact’s formation and execution, and, indeed, the Supreme Court’s orders resolving the diversion disputes between New Jersey and New York. *See supra* (describing Supreme Court orders for managing water diversion and treatment in New York).

Other provisions evince a similar focus. *See, e.g.*, Compact, Part 1 (explaining that Compact is necessary because “water resources planning, and development is technical, complex, and expensive, and has often required fifteen to twenty years from the conception to the completion of a large dam and reservoir”); *id.* (“[T]he public interest requires that facilities must be ready and operative when needed, to avoid the catastrophe of unexpected floods or prolonged drought . . . .”); Compact, Compact, Section 3.6(a)–(g) (describing “General Powers” of Commission, including planning, research, and investigation relating to water resource management); Section 10.1 (“The commission may regulate and control withdrawals and diversions from surface waters and ground waters of the basin . . . .”); Compact, Section 10.3 (“[N]o person, firm, corporation or other entity shall divert or withdraw water for domestic, municipal, agricultural or industrial uses in excess of such quantities as the commission may prescribe by general regulation . . . .”); Compact, Section 13.1 (providing that “public and private projects and facilities” in a comprehensive plan are limited to what is “required, in the judgment of the commission, for the optimum planning, development, conservation, utilization, management and control of the water resources of the basin”).

Indeed, among “projects,” the Compact elsewhere lists “dams, reservoirs and other facilities.” Compact, Section 4.1. *See also, e.g., Delaware Water Emergency Grp. v. Hansler*, 536 F. Supp. 26, 31 (E.D. Pa. 1981) (considering challenged to proposed “pumping station” project). This strict focus on water management comports with the *Commission’s* underlying duty to “develop and effectuate plans, policies and projects relating to the water resources of the basin.” Compact, Section 3.1. *See also id.* (stating the Commission “shall encourage the planning, development and financing of water resources projects”). In other words, “projects” exist to promote the purposes of the Compact. *See* Compact, Section 3.2(b) (requiring the Commission to assess “the quantity and quality of water resource needs of the area . . . , balanced by existing and proposed *projects required to satisfy such needs*” (emphasis added)). It is such projects to which Compact Section 3.8’s requirement of Commission approval of a “project having a substantial effect on the water resources of the basin” applies. *See* Proposed 18 C.F.R. § 440.1(b) relying on Section 3.8).<sup>16</sup>

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<sup>16</sup>Prior to approving the Compact, the Congress obtained a legal opinion on its constitutionality. *See* Memorandum for the Honorable Fredrick G. Dutton, Special Assistant to the President, Re: Delaware River Basin Compact (April 25, 1961). Notably, that opinion similarly described the scope of “projects” contemplated by the Compact, explaining:

Under Articles 3 to 10, inclusive, [the Commission] could develop plans and construct projects relating to water supply, including the construction and operation of dams and reservoirs, construct and operate projects for pollution control, flood protection, and soil conservation and erosion control . . . . It would have the power to approve or disapprove a project of a privately owned public utility or a public agency (including federal projects) which might have a substantial effect on the comprehensive plan.

At bottom, “[t]he main purpose of the Compact is to regulate the allocation of water from the Delaware River among the four states that are parties to the Compact.” *Allen v. City of New York*, No. 05-cv-1559, 2006 WL 2052229, at \*5 (N.D.N.Y. July 21, 2006). The Compact’s terms must be read in light of this “central purpose.” *Oklahoma v. New Mexico*, 501 U.S. 221, 237 (1991) (relying on the “central purpose” of a compact “to settle the respective rights of the States to” the river’s water). In that light, the Compact’s reference to “projects”— which the Compact dictates must be directed “for” certain water management purposes, *see* Compact, Section 1.2(g); *supra*—cannot extend to private hydraulic fracturing operations for gas production simply because the operations may use water from the basin. A contrary reading would permit the Commission to regulate seemingly any activity within the basin, an absurd result at odds with the well-defined focus of the Compact. *See Griffin v. Oceanic Contractors, Inc.*, 458 U.S. 564, 575 (1982) (“[I]nterpretations of a statute which would produce absurd results are to be avoided if alternative interpretations consistent with the legislative purpose are available.”).

The Commission’s and signatory States’ course of dealing both under and outside the Compact confirms this reading. *See, e.g., New Jersey*, 552 U.S. at 618–19 (looking to course of conduct under interstate compact); *Tarrant Regional Water Dist. v. Herrmann*, 569 U.S. 614, 636 (2013) (same). As detailed in, among other places, the Comprehensive Plan developed under the Compact, “projects” are generally limited to water management and control projects, such as reservoirs, dams, and flood control. *See* 2001 Delaware River Basin Commission Comprehensive Plan at 10–37 (describing existing and proposed projects, including reservoirs, water supply systems, and flood control. Likewise, the Commission’s previously issued substantive regulations involve flood plains, *see* 18 C.F.R. Part 415, charges for supplying water, *see* 18 C.F.R. Part 420, and regulations for extracting groundwater in areas of southeastern Pennsylvania, *see* 18 C.F.R. Part 430.

By contrast, the individual State signatories of the Compact have independently and extensively regulated oil and natural gas operations, including hydraulic fracturing, within their borders. *See* New York Dep’t of Environmental Conservation, Final Supplemental Generic Env’t Impact Statement, Findings Statement (June 2015) (implementing ban on high-volume hydraulic fracturing), *available at* [http://www.dec.ny.gov/docs/materials\\_minerals\\_pdf/findingstatehvhf62015.pdf](http://www.dec.ny.gov/docs/materials_minerals_pdf/findingstatehvhf62015.pdf); Pennsylvania Dep’t of Env’t Protection, Final Regulations for Oil and Gas Surface Activities, *available at* <http://files.dep.state.pa.us/PublicParticipation/Public%20Participation%20Center/PubPartCenterPortalFiles/Environmental%20Quality%20Board/2016/February%203/Fact%20Sheet%20for%20Final%20Ch%2078%20Regulation.pdf>.

In addition to illustrating the stark difference in regulatory scope exercised by the Commission and the signatory States over oil and natural gas operations, the existence of competing State regulations raises a fundamental question of sovereignty. Reading the Compact to reverse the Commission’s longstanding practice with respect to “projects” and allow the Commission to supplant the signatory States’ oil and

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*Id. Cf. Oklahoma v. New Mexico*, 501 U.S. 221, 234 n.5 (1991) (noting that “a congressionally approved Compact is both a contract and a statute, and we repeatedly have looked to legislative history and other extrinsic material when required to interpret a statute which is ambiguous”).

gas regulations conflicts with “[t]he background notion that a State does not easily cede its sovereignty” that “inform[s] [the] interpretation of interstate compacts.” *Tarrant*, 569 U.S. at 631. The Compact’s definition of “projects” falls well short of the clear statement necessary to strip away a State’s sovereign authority within its borders.

2. ***The Compact’s provisions governing pollution control (Article 5) do not authorize the proposed hydraulic fracturing prohibition.***

The Commission’s reliance on the Compact’s pollution control provisions, *see* Proposed 18 C.F.R. § 440.1(b) (citing Compact Section 5.2), similarly fails to support the proposed hydraulic fracturing prohibition.

Pursuant to Article 5 of the Compact, the Commission “may undertake investigations and surveys, and acquire, construct, operate and maintain projects and facilities to control potential pollution and abate or dilute existing pollution . . . .” Compact, Section 5.1. This authority mirrors—and, indeed, includes—the Commission’s authority over “projects” that is textually and contextually restricted to Commission-led water management projects. Indeed, this focus comports with the litigation history that led to the Compact, as the Supreme Court ordered construction and maintenance of “an efficient plant for the

treatment of sewage” prior to any diversion by New York, and set limitations on the concentration of waste in waters returned to the Delaware River. *See New Jersey*, 283 U.S. at 346–47.

The Commission may also “assume jurisdiction to control future pollution and abate existing pollution in the waters of the basin, whenever it determines after investigation and public hearing . . . that the effectuation of the comprehensive plan so requires.” Compact, Section 5.2. But that authority is likewise limited. After the required public hearing, the Commission “may **classify** the waters of the basin and **establish standards of treatment** of sewage, industrial or other waste . . . .” Compact, Section 5.2 (emphases added). To these ends, the Commission can “adopt . . . rules, regulations and standards to control such future pollution and abate existing pollution, and to **require such treatment** of sewage, industrial or other waste . . . .” Compact, Section 5.2 (emphasis added). This language authorizes Commission water management activities aimed at reducing pollutants released into the Delaware River through specified means restricted to—again mirroring the Supreme Court’s predecessor requirements—“standards” and “treatment” of waste. *Compare id. with New Jersey*, 283 U.S. at 346.

The plain language of Article 5 therefore fails to authorize a blanket prohibition on any operation, much less oil and gas operations otherwise distinct from the Compact’s central purposes. *See supra*. Nor may prohibitory language be read into the plain language of the Compact. *See, e.g., Barnhart v. Sigmon Coal Co.*, 534 U.S. 438, 454 (2002) (declining read additional terms into “the unambiguous language of the statute”). This constructive canon is even more pronounced with respect to interpretation of an interstate compact where “federalism and separation-of-powers concerns . . . would arise were [a court] to rewrite an agreement among sovereign States, to which the political branches [of the United States Government] consented.” *EnergySolutions*, 625 F.3d at 1272 (quoting *Alabama v. North Carolina*, 560 U.S. 330, 352 (2010)). The signatory States’ independent regulation of oil and gas operations, including hydraulic fracturing, reinforces this reluctance, and leaves the Commission solely within the means of pollution control detailed in the Compact. Because the prohibition in the proposed regulations is not included, the

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Commission lacks the authority to proceed.<sup>17</sup> Therefore, the proposed prohibition on HVHF should be rejected as exceeding the Commission's authority under the Compact and decisional precedent from the U.S. Supreme Court.

### Conclusion

The oil and natural gas industry is committed to an approach within the Delaware River Basin that promotes safety and environmental performance while securing the tremendous benefits of domestic energy production for our nation. Further, API is a leader in developing the industry technical standards and programs that enhance the safety of operations worldwide. API urges the Commission to consider the scientific data, the available studies, state and federal regulatory frameworks, industry best practices, and the significant technology and engineering advancements in this industry that make safe and responsible oil and natural gas development possible. Upon having considered the above in an unbiased manner, you must conclude that existing controls (both involuntary and voluntary) are more than adequate to protect human health and the environment and that a complete prohibition on HVHF is not only unwarranted, it does not constitute effective policy for the four basin states or the nation.

Sincerely,



Erik Milito  
Group Director  
Upstream and Industry Operations  
American Petroleum Institute

cc: Pamela M. Bush, J.D., M.R.P, Commission Secretary, DRBC

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<sup>17</sup> The recent district court decision in *Wayne Land & Mineral Group, LLC v. Delaware River Basin Commission*, 247 F. Supp. 3d 477 (M.D. Pa. 2017), does not dictate a different outcome. The case—argued on appeal before the Third Circuit on November 20, 2017 and now awaiting decision—considered the Commission's authority to review all plans for "natural gas well pads and related facilities targeting shale formations." *Id.* at 484. Although the district court decided that such gas exploration and development plans constitute "projects" subject to approval under Compact Section 3.8, *see id.* at 502–03, it did not consider the separate question whether the Compact authorizes the Commission permanently to prohibit any oil and natural gas or hydraulic fracturing operations. At any rate, the district court's short discussion of "projects" subject to approval under the Compact is both contrary to the history and language of the Compact, *see supra*, and irrelevant to the Commission's separate allegation of authority under Article 5 of the Compact.

## ATTACHMENT 1

### Water Quality Studies From 2010 to 2017 Concluding that Fracturing is not a Major Threat to Drinking Water

- Vengosh et al., 2017 ([study link](#))
- U.S. Geological Survey (USGS), 2017 ([study link](#))
- Environmental Protection Agency (EPA), 2016 ([study link](#)).
- Wyoming Department of Environmental Quality, 2016 ([study link](#)).
- Townsend-Small et al., 2016 ([study results link](#)).
- Ladage et al., 2016 ([article](#) and study in German ([only](#))).
- Bureau of Economic Geology, University of Texas at Austin, 2016 ([study link](#)).
- Siegel et al., 2016 ([study link](#))
- Jackson et al., 2015 ([study link](#))
- Drollette et al., 2015 ([study link](#))
- Siegel et al., 2015 ([study link](#))
- Birkholzer et al. 2015 ([study link](#))
- California Council on Science and Technology (CCST), 2015 ([study link](#))
- Hammack et al., 2014 ([study link](#))
- Kresse et al., 2013 ([study link](#))
- Flewwelling et al., 2013 ([study link](#))
- Molofsky et al., 2013 ([study link](#))
- U.S. Government Accountability Office, 2012 ([report link](#))
- Cardno Entrix, 2012 ([study link](#))
- Massachusetts Institute of Technology (MIT) Energy Initiative, 2010 ([study link](#))

## ATTACHMENT 2

### *Critique of New York State Department of Public Health HVHF Health Review*

**Citation:** Zucker, H. A. (2014). A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development. *New York State Department of Health*.

**Background:** On December 14, 2014, based on the recommendation of the New York State Acting Commissioner of Health, Dr. Howard Zucker, the New York State Department of Environmental Conservation (DEC) recommended that High Volume Hydraulic Fracturing (HVHF) for oil and natural gas be prohibited in New York State. HVHF, as defined by the state, is a technique used by the oil and natural gas industry to extract resources from shale formations. The decision was the culmination of a regulatory process that lasted six years. The recommendation from Dr. Zucker was based on a public health review conducted by the State's Department of Health (NYSDOH). The review titled "*A Public Health Review of High Volume Hydraulic Fracturing for Shale Gas Development*" (PHR) consisted of a literature review, recommendations from experts, site visits, summaries of discussions that the NYSDOH engaged in with other environmental and health officials from States experiencing oil and natural gas development, and communications with a variety of stakeholders (Zucker, 2014). This critique reviews the methodology used to assess the public health related aspects of New York State (NYS) DEC's decision by assessing the review for key characteristics of evidence-based decision-making. The evidence-based decision-making process in the public health field includes a) the evidence gathering phase (the use of the best-available science, the use of contextual information, use of experts and knowledgeable stakeholders, and the assurance of the replicability, verifiability, and credibility of the evidence); b) evidence interpretation (looking at the strength of the evidence, stakeholder input and the ability to utilize the evidence within the relevant context; and c) the application of the findings.

Incorporating evidence-based strategies to improve public health analyses has both direct and indirect benefits which include the increased likelihood of successful programs and policies (Brownson et al., 2009). However, the challenging portion of evidence-based public health (EBPH) is determining when evidence is sufficient for action (Brownson et al., 1999).

**Summary of NYSDOH's Review Process:** To satisfy the requirements of NYS State Environmental Quality Review Act (SEQRA), DEC prepared a Supplemental Generic Environmental Impact Statement (SGEIS) that was to be used in conjunction with DEC's existing Generic Environmental Impact Statement (GEIS) to regulate the development of oil and natural gas in the State. However, during the process of public input into the SGEIS in 2009, and the revised SGEIS in 2011, the DEC received over 260,000 comments which included recommendations for the Agency to broaden the scope of the SGEIS to include a broad look at potential public health impacts that could be associated with HVHF. In response, the DEC Commissioner, in the fall of 2012, asked the NYS Commissioner of Health to assess if the regulations and mitigation efforts proposed in the SGEIS could adequately protect public health. After two years of contemplation, the NYSDOH released its public health review of HVHF for shale development (Zucker, 2014). While, the PHR was initially developed to assess the SGEIS in terms of its ability to mitigate potential negative public health outcomes, it was subsequently broadened to 1) evaluate the body of literature related to the potential health effects associated with oil and natural gas production; 2) include input from environmental and health officials from other States where oil and natural gas activities were taking place; and, 3) include input from a broad range of stakeholders including academicians, and local, state, and federal officials as well as international stakeholders.

**Study Conclusions:** Utilizing a precautionary approach, the PHR concluded that there was enough evidence to suggest that HVHF would put public health at risk and therefore recommended that New York not proceed with HVHF.



## **CRITIQUE OF THE PUBLIC HEALTH REVIEW REPORT**

According to the Institute of Medicine (IOM), decision-making in the public health field is driven by “*crises, hot issues and concerns of organized interest groups*” and that the tension between professional expertise and the political process can contribute to policy decisions being made without a comprehensive analysis of the scientific facts (Institute of Medicine, 1988). IOM recommended that public health officials charged with policy development should promote the use of the evidence-based scientific knowledge in the decision-making process as well utilizing a strategic approach based on the appreciation of the democratic political process. This implies that ethical considerations related to public health from all stakeholder perspectives involved in the decision process should be taken into consideration.

### **Gathering evidence**

***Seek out best available science:*** The NYSDOH in the PHR expressed the importance of “*an objective evaluation of the emerging scientific information on environmental impacts and public health effects of HVHF activity*” to the public health review process (Zucker, 2014). The Agency selected and reviewed studies that reported relationships between HVHF and public health outcomes, as well as other literature that was deemed relevant by the State. Brownson et al. (1999) describe the process of using evidence in public health decision-making as a process that works through principles of scientific reasoning which includes the use of systematic reviews of data. The systematic review process can be utilized in various disciplines such as epidemiology, biostatistics, health economics and behavioral sciences that when combined may provide input to create a narrative (if the assessment is qualitative), that can answer the questions being asked. Evidence should be searched systematically to ensure that all conclusive evidence on a topic is captured and that the effort is reproducible (Cochrane reviews). This is done by first pre-selecting literature search terms and criteria for the studies that the researcher wants to include

or exclude; second, identifying relevant studies; and then assessing study quality (Shea et al., 2007). NYSDOH, in their review did not provide information on how they selected their studies, or how they accessed the quality of the studies that were included in their review. While the PHR qualitatively described study quality, it did not provide uniform criteria on which the studies were judged. This would have been useful in strengthening the conclusion (Harbour et al., 2001).

***Contextual information:*** NYSDOH was able to develop answerable questions from a broad range of information that identified specific areas of concern (from both a science-based approach and democratic process approach). Identifying answerable questions is the first key step in the development of an evidence-based public health approach to policy decision-making process (Brownson, 1999). However, answering the questions may have been complicated because of varied inputs of evidence (interpreting studies, incorporating information collected in interviews, etc.) (Jacobs et al., 2012).

***Use of experts and knowledgeable stakeholders:***

**Meeting with Other State Agencies:** The NYSDOH Commissioner met with officials from California Department of Public Health (CDPH), California Department of Conservation (CDOC), Texas Department of State Health Services, Texas Railroad Commission (TRC), Texas Commission of Environmental Quality (TCEQ), Illinois Department of Public Health (IDPH), and the Illinois Department of Natural Resources (IDNR). Based on the meeting summaries, NYSDOH was interested in: the State's oil and natural gas activity history, the availability of regulations targeting HVHF, specifically the provisions regarding the management of *frac* chemicals and flowback fluids, whether the State had monitoring programs (for example, drinking water quality monitoring, air quality monitoring, health surveillance, and environmental contamination events monitoring), and if the state had any reported incidents of negative public health effects.

**Public Health Expert Consultation:** The state retained three consultants to respond to three charge questions:

- *Are there additional potential public health impacts of HVHF gas development that should be considered beyond those already discussed in the SGEIS?*
- *Are additional mitigation measures beyond those identified in the SGEIS needed to address the potential health impacts of HVHF? If so, what additional prevention or mitigation measures are recommended?*
- *Are existing and proposed environmental and health monitoring and surveillance systems adequate to establish baseline health indicators and to measure potential health impacts? If not, what additional monitoring is recommended?*

The experts provided comprehensive responses. The consultants identified common themes of concerns that included air quality impacts, truck traffic impacts, noise, wastewater management challenges, social disruption, stress, and indirect public health impacts related to the degradation of the environment (potential loss of wetlands, impacts to the food chain, and impact to recreational opportunities).

However, the NYSDOH was not transparent on how they selected the states that they visited nor did the State Agency justify why certain States were selected over others.

***Assurance of the replicability, verifiability, and credibility of the evidence:*** A systematic literature review framework was not used. This framework would have ensured that the literature search was objective, replicable, verifiable and credible capturing all available literature (Shea et al., 2007).

### **Evidence interpretation**

***The conclusions were not based on a weight of evidence (WOE) approach:*** While the phrase “weight of evidence” may have different connotations; in this critique, it refers to a process where “all” relevant evidence is reviewed and weighed, albeit qualitatively in the form of a narrative (Weed, 2005). The weight of evidence narrative includes a systematic review of the literature, as well as thorough interpretation of evidence (which may include the use of causal criteria like Hill’s list). Criteria on how conclusions and recommendations are made are also included in the WOE approach. While the PHR qualitatively summarizes findings and determines a public health action, the PHR does not offer a systematic process on how evidence was identified, rated, weighed or assessed.

***Lack of transparency:*** Transparency may help in establishing credibility. Agencies create new regulations that are intended to deliver benefit at a minimum cost to society- this includes public health benefits (Kilmartin & Mendelson, 2008). As some rules may have significant impacts (economic loss related to loss of jobs and income in the form of taxes paid by the industry or averted public health impacts as concluded by the PHR), it is important that transparency and public participation occur to enhance the quality of regulation as well as its legitimacy. This issue is addressed by the Task Force on Transparency and Public Participation that was convened by the Office of Management and Budget Watch. Among the Task Force's recommendation is:

- *Adopting best practices for establishing rulemaking dockets when agencies begin working on new rules and promptly including in these dockets all relevant background information (Kilmartin & Mendelson, 2008).*

This supports the IOM's view on the need for the use of best practices. The PHR process however, did not apply best practices as discussed above or did the Agency provide information on how the public health review was to be conducted.

***Threats to validity:*** The PHR did not address the limitations associated with the threats to validity. Regarding external validity, the studies reviewed may not have applied to New York. For example, it is anticipated that New York's Shale formations contain primarily dry gas. This resource-specific information was not considered by NYSDOH when selecting, reviewing, and incorporating key findings in its own PHR.

## **Application of findings**

***Precautionary principle versus acceptable risk framework:*** Ultimately the decision to prohibit shale oil and natural gas development in NYS rested on the NYS Department of Health Commissioner's adoption of the Precautionary Principle approach. This approach asserts that without sufficient information, an

outcome of harm is assumed. While on the surface this precautionary approach appears to be protective, there are leading scientists that argue that invoking the principle in this manner without any avenue for recourse is not sound public policy (Sunstein, 2005). The precautionary principle may be used in cases where there are no benefits associated with the risk being presented. However, there are clear benefits associated with developing oil and natural gas. Instead, the use of the precautionary principle acts as a barrier and limits technological advancement; it also limits the assessment of other options and realizations.

In conclusion, the PHR, despite its limitations, laid the groundwork for other States looking for methodologies to use to assess the potential health effects related to HVHF. By acknowledging the flaws in the PHR approach, as discussed in this critique, it may be possible to develop a more thoughtful review process that is evidence-based, transparent and reproducible – all earmarks of a science-based decision-making process.

## References

- Brownson, R. C., Gurney, J. G., & Land, G. H. (1999). Evidence-based decision making in public health. *Journal of Public Health Management and Practice*, 5(5), 86-97.
- Brownson, R. C., Fielding, J. E., & Maylahn, C. M. (2009). Evidence-based public health: a fundamental concept for public health practice. *Annual review of public health*, 30, 175-201.
- Cochrane reviews. <http://www.cochrane.org/cochrane-reviews>
- Harbour, R., & Miller, J. (2001). A new system for grading recommendations in evidence-based guidelines. *BMJ: British Medical Journal*, 323(7308), 334.
- Institute of Medicine (US). Committee for the Study of the Future of Public Health. (1988). *The future of public health* (Vol. 88, No. 2). National Academy Press.
- Jacobs, J. A. (2012). Tools for implementing an evidence-based approach in public health practice. *Preventing chronic disease*, 9.
- Kilmartin, H., & Mendelson, E. (2008). Transparency and Public Participation in the Rulemaking Process.
- Shea, B. J., Grimshaw, J. M., Wells, G. A., Boers, M., Andersson, N., Hamel, C., ... & Bouter, L. M. (2007). Development of AMSTAR: a measurement tool to assess the methodological quality of systematic reviews. *BMC medical research methodology*, 7(1), 10.
- Sunstein, C. R. (2005). The precautionary principle as a basis for decision making. *The Economists' Voice*, 2(2).
- Tirilis, D., Husson, H., DeCorby, K., & Dobbins, M. (2011). Missing and accounted for: gaps and areas of wealth in the public health review literature. *BMC public health*, 11(1), 757.
- Tranfield, D., Denyer, D., & Smart, P. (2003). Towards a methodology for developing evidence-informed management knowledge by means of systematic review. *British journal of management*, 14(3), 207-222.
- Victora, C. G., Habicht, J. P., & Bryce, J. (2004). Evidence-based public health: moving beyond randomized trials. *American journal of public health*, 94(3), 400-405.
- Weed, D. L. (2005). Weight of evidence: a review of concept and methods. *Risk Analysis*, 25(6), 1545-1557.
- Zucker, H. A. (2014). A public health review of high volume hydraulic fracturing for shale gas development. *New York State Department of Health*.