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Dear Commissioners,

I am a resident of Kings and Yates counties in New York State, and wholeheartedly urge the Commission to permanently ban all natural gas drilling and fracking, plus the storage, processing, and discharge of fracking wastewater, and the export of water for drilling and fracking even if legal elsewhere throughout the Delaware River Basin. During the 8 year DRBC drilling/fracking moratorium, the water contamination caused by fracking spills, leaks, and accidents in Western states and right here in Pennsylvania have been well documented and studied by scientists and have led to permanent bans in New York State and Maryland.

In a press event at COP23, Robert Howarth, the David R. Atkinson Professor of Ecology at Cornell University said, "Methane is an important greenhouse gas and is currently responsible for an amount of global warming equal to approximately 60% of that caused by carbon dioxide. Methane reductions offer one of the few available approaches to immediately slow the rate of global warming, since the climate responds more quickly to decreases in methane compared to carbon dioxide." A ban on fracking in the Delaware River Basin is an important step in limiting methane emissions, but allowing water withdrawals and the processing of fracking waste in the Basin will only enable more fracking and, therefore, more methane leaks outside of the basin., A 2017 study by researchers at the Northeast Climate Science Center and Climate System Research Center at U. Mass Amherst found that the Northeastern U.S. is the fastest-warming region in the lower 48 states, heating at a rate 50 percent faster than the global average. According to the Union of Concerned Scientists, "Records from the mid-twentieth century through 2000 show that the number of snow-covered days across the Northeast has decreased significantly." The shrinking snowpack and increased runoff will worsen as temperatures continue to rise. Further reducing our water supply by moving water out of the basin and exposing our remaining water to fracking waste contamination should not be permitted, especially when those practices support the fossil fuel production that is exacerbating warming in the first place., In fact, at the

very same time that warming is posing risks to our water supply, the amount of water required for fracking is increasing. "Oil and natural gas fracking, on average, uses more than 28 times the water it did 15 years ago, gulping up to 9.6 million gallons of water per well." More clean water contaminated means more waste. Fracking was never a good idea, but, as the problems it helped create intensify, it has become such a bad idea that it must be stopped. The Delaware River Basin Commission must provide the protections the Basin deserves and vote in favor of a full ban on fracking, water extraction, and fracking waste processing., The regulations proposed by the DRBC are setting up an unsustainable cycle of sending clean water out of the basin and bringing highly contaminated water into the basin. If we are to successfully combat climate change, we must stop our unsustainable practices and avoid implementing new ones., Duke University researchers announced in January that they are finding radioactivity in Pennsylvania sediment from a Pennsylvania stream near a plant where fracking waste is treated. Science is still catching up with the damage fracking has done everywhere it's been done. Meanwhile, the Intergovernmental Panel on Climate Change has said, "Climate change challenges the traditional assumption that past hydrological experience provides a good guide to future conditions." Michael Mann says that it would be a mistake to see extreme weather events as the 'new normal'. What we are dealing with is an "ever-shifting baseline." "So, there isn't a new normal," he explains. "Things get continually worse if we go down this highway." We are dealing with many unknowns and when we do learn something, it's never good news. There are no bases except political expedience and greed that advocate for doing anything but banning all fracking related activities., Enabling the shale gas industry by allowing it to take our water and dump its waste in the basin means that we can expect more industrialization in the basin. We will see more pipelines, power plants, and processing facilities. All of that shale gas infrastructure is designed to be around longer than we can afford to be using fossil fuels. If the Commissioners take into account the cumulative climate impacts of the regulations they are considering, they will see they have no choice but to ban all fracking-related activities in the basin., Climate changed. We see the evidence of it everywhere. The only hope we have now is to speed the transition to clean, renewable, sustainable energy. If we don't, the impacts will not be limited to our water resources, but will endanger every aspect of our lives and very our survival. The DRBC must not allow any practices that enable more fossil fuel extraction anywhere. Protecting the water resources of the basin with a full fracking ban protects much more.

The DRBC is considering fracking regulations it is not capable of enforcing. The Commission relies on the watershed states' environmental regulators to carry out enforcement of the rules it sets. State regulatory agencies are chronically understaffed and underfunded. It is unreasonable for the DRBC to place on state regulators the burden of enforcement of dangerous practices like fracking waste processing and extraction of water for fracking operations outside of the basin., DRBC's draft regulations do not specifically propose that injection wells that would hold frack wastewater be allowed in the Delaware River Watershed. However, they do propose to allow wastewater from fracking to be brought into the Watershed for storage, treatment and discharge so "storage" could mean long-term storage of wastewater in underground wells within the Basin. This is a practice that threatens public health and the environment. Injection of wastewater does not "treat" waste or remove contaminants, it simply moves the toxic wastewater produced by fracking from one place and time to another. It risks the migration of untreated toxic and radioactive frack wastewater to aquifers and surface water through

leaks from the injection well and spills and accidental releases while being handled. Injection wells are causing earthquakes in Ohio and Oklahoma as well as other locations, as documented by USGS and other scientific institutions. Injection wells are not leak-proof and can exposing groundwater and aquifers to contamination from the toxic mix that constitutes untreated frack wastewater when seals are broken and fractures occur as a result of seismic activity., When a site is developed for gas well development, the change is dramatic, essentially transforming the land to an industrial landscape. The result is destruction of acres of vegetation (8.8 acres per well pad in 2011 with 30 acres of forest impacts due to edge effects, more than double that is the trend today), soil compaction and destruction of the natural land contours, alterations to watershed drainage patterns, and hydrologically connected systems such as wetlands and vernal pools. Habitats and complex ecosystems are disrupted or lost. 85% of the Upper Delaware where the Marcellus Shale is located is forested. Forest destruction and fragmentation in turn destroys the ability of the forest ecosystem to capture, clean, and infiltrate precipitation, removes the trees that sequester carbon, reduces biodiversity, encourages invasive species, and destroys vital habitat., Changes to stream water quality occur where gas drilling and related activities are located. For instance, a publication of the Proceedings of the National Academy of Sciences found streams adjacent to gas wells are negatively impacted by runoff and sedimentation (Total Suspended Solids), harming benthic life, fish and wildlife and causing streams to be eroded and destabilized. DRBC follows the state's stormwater rules where a project is located, leaving loopholes in current nonpoint source laws that allow fracking activities to escape strict oversight. This would be a recipe for disaster if fracking were to occur, which is why it must be banned in the Delaware River Watershed., DRBC regulates withdrawals from streams with the use of a "pass-by flow" or "minimum flow limit" that limits the amount of water that can be withdrawn to protect streams from being overdrawn. However, a pass-by flow that is based on using the Q7-10 (the flow which occurs for a period of seven consecutive days one time in 10 years – considered "drought flow") is not adequate to protect waterways and the life that depends on them and can be expected to cause direct harm to the habitats and water quality of the stream. Using the Q7-10 allows the stream's flow to be artificially "flattened" because the natural flow regime and seasonality will be disrupted and potentially eliminated. An ecological flow analysis of the waterway and an inventory of the species and habitats that live there is an essential protection. To set an ecological flow to govern withdrawals regulators must measure the natural variation of the waterway's flows in terms of volume, rate, temperature, stream structure, and quality to understand the needs of species and the effects of flow on habitat and water quality. Setting protections based on a waterway's ecological flow regime is necessary to give needed protection but that is not what DRBC does or is proposing to do. The withdrawal of water under the draft and current regulations will significantly damage the ecosystems and species of the streams and rivers that would be tapped., Pennsylvania's Wolf administration talks about a 100-year cycle of shale gas development. At present, there are about 10,000 wells in the ground. The industry's goal is 100,000 wells. In the past ten years, more than 300 confirmed cases of water contamination have occurred. Some of those cases involve several families. More than 9,400 complaints have been filed with the DEP. More than 4,400 of those are water-related. Most have gone unaddressed. More than 1200 peer-reviewed studies have identified wide-ranging health effects already impacting Pennsylvanians. Dead cattle and fish kills are just some of the indications that shale gas development is affecting our farm animals and wildlife. Quality of life is all but gone for many in the shale fields and the many more who now spend every available minute fighting

pipeline and infrastructure projects. And all of that and much, much more is what has happened just ten years in. Any action by the DRBC that enables an industry that has done so much to harm Pennsylvanians in just ten years and exposes the basin to the particular threats fracking waste and water extraction pose is unacceptable. The DRBC must impose a full fracking ban.

On March 13, leading scientists and physicians released the Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, 5th Edition documenting fracking's harm to public health. Please read all of the study's findings. Their conclusion, and mine, is that the only way to truly protect public health is to prohibit fracking and all its associated activities (waste hauling, treatment, disposal). I urge you to ban all of these activities in your final regulations., The newly released Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, 5th Edition speaks to the simple fact that you cannot completely protect people from fracking operations. We cannot prevent accidents from happening. As documented many times handling wastewater in the Delaware basin will cause impacts and contamination. It is not a question of if but when and where., As stated in the Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, 5th Edition, growing evidence shows that regulations are simply not capable of preventing harm (pg 17). Further, cases of drinking water sources contaminated by drilling and fracking activities, or by associated waste disposal, are now proven. EPA's assessment of fracking's impacts on drinking water resources confirmed specific instances of water contamination caused by drilling and fracking related activities and identified the various pathways by which this contamination has occurred: spills; discharge of fracking waste into rivers and streams; and underground migration of chemicals, including gas, into drinking water wells (pg18)., After every spill, waste treatment mishap, or agency blunder, there is a potential health tragedy for the lives impacted. When you look at the Compendium of Scientific, Medical, and Media Findings Demonstrating Risks and Harms of Fracking, 5th edition and see the documentation, know that the numbers, and the toxins involved they are not just statistics they are real people who bear the brunt of an industry that does not care. We have an opportunity in the Delaware Basin to ban fracking and to ban water withdrawals and wastewater containment facilities and waste water treatment and release.

Our wonderful area's environment, public health, and economies are at stake with this decision. After the injection of millions of gallons of chemically-treated water underground -- including radioactive elements, carcinogens, and many other toxins -- what happens to these millions of gallons of the oil and gas industry's wastewater? Sewage treatment plants are not capable of treating these toxins found in hazardous fracking wastewater, and according to an EPA study, receiving streams and rivers cannot adequately dilute this toxic water. Recently, large areas of the Basin suffered through flooding, and with climate change promising more extreme weather accompanied by increased precipitation, what would happen to the millions and millions of highly toxic fracking wastewater in holding ponds throughout the Delaware River Basin?

In addition to the environmental hazards of fracking, what is the "collateral damage" of fracking on small, struggling, rural communities? What happens to the agriculture, the burgeoning tourism industry, and the natural beauty of this area? What is known is that rapid industrialization of a rural area can be devastating to fragile local economies and infrastructures. These cash-strapped communities will be

responsible for the maintenance of roads damaged by thousand of truck trips per gas well. Property values will plummet, not just those of gas lease holders but their neighbors as well, shrinking the tax base just when more revenue is needed because of the tremendous strain on a small infrastructure. What happens to a community when a way of life and, truly, a place of natural splendor is destroyed?

The health of our environment, residents, and economies should not be put in harm's way in order to increase the oil and gas companies' and wall street investors' profits or to satiate the rapidly growing fuel demands of developing countries. And, all residents of the Delaware River Basin deserve equal protection of the law; therefore, please ban fracking in the Basin.

Thank you for your close attention to this very important issue.

Most sincerely,

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Sincerely,

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