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January 13, 2021

Sent by Certified Mail and Email

The Honorable Tom Wolf
Governor, Commonwealth of Pennsylvania
508 Main Capitol Building
Harrisburg, PA 17120

Re: Fracking Waste Disposal Injection Well Threatens Pittsburgh's Drinking Water

Dear Governor Wolf:

The residents of the Allegheny River Valley urgently ask you to exercise your supreme executive power, as is outlined in the Pennsylvania Constitution, to **revoke the permit for the Penneco Sedat #3A class 2 waste disposal well in Plum Borough**. The well site would present devastating risks to several downstream Allegheny River public drinking water systems, including the Pittsburgh Water and Sewer Authority which provides water to hundreds of thousands of City of Pittsburgh residents and businesses. New scientific evidence suggests there are numerous pathways for pollution, including:

1. Engineering Structural Inadequacies

- The Plum well was not engineered to be a waste disposal well. Waste disposal wells are subject to high levels of repeated pressurization and depressurization, resulting in what is commonly referred to as the "fatigue effect". This greatly increases the risk of failures in cement and/or casings, leaks and other potential impacts. Gas pressure of a conventional well would decrease over time, but the pressure of an injection well increases over time with cyclic pressure, which has different engineering impacts than production pressures.

- The planned injection of toxic wastewater is scheduled to occur only about 1000 ft. below the groundwater aquifer. The small distance presents a high probability of upward migration of fracking waste through defects in the well's 30-year old casing. The well also goes through or is near abandoned coal mines, conventional wells, water wells, and seeps which are known as "permeability super-highways". A 2016 U.S. Geological Survey study found waste from oil and gas disposal was found in surface waters and sediments near an

underground injection well in West Virginia, demonstrating that injection wells can impact the quality of adjacent surface waters[1].

- Penneco failed to use engineering best practices to verify the integrity of the well casing when completing the Cement Bond Log in 2015. By expert opinion, the company employed an inferior testing method which did not take a 360-degree modern circumference ultrasound. The Cement Bond Log would detect deterioration in cement integrity, casing corrosion, and ground movement that would weaken the integrity of the well. There was also no information about a camera drop to look for casing cracks and corrosion. The same expert reviewed the Cement Bond Log and determined that it was not acceptable for the Plum conventional gas well to be converted for use as a waste disposal well.

2. Seismic Activity and Mine Subsidence

- The Plum community is severely undermined from decades of coal mining. In addition to abandoned mine drainage impacting local streams and waterways, this well was drilled through the Renton coal mine, a portion of which has been on fire for decades, leaving unknown structural degradation. Allowing oil and gas wastes to be pumped into an underground, highly-fractured strata raises serious concerns about current and future underground risk conditions.

- Waste disposal wells are very dangerous and unstable activities and have caused earthquakes in Oklahoma, the Dakotas and Ohio. On New Year's Eve in 2011, a fracking waste injection well near Youngstown caused a 4.0 quake that was felt across hundreds of miles. Ohio governor and fracking proponent John Kasich intervened and shut the well down. When the waste disposal well activity stopped, the earthquakes stopped.

- According to the United States Geological Survey, earthquakes induced by fluid injection can be extremely dangerous, often yielding earthquakes with a magnitude in the range of 4.5-5 in multiple states. Arkansas, Kansas, and Oklahoma have experienced four earthquakes with a magnitude greater than 5[2]. These earthquakes do not always occur in close proximity to the fluid-injection wells, but they can cause an earthquake 10 or more

[1] Akob, Denise M. et. al. "Wastewater Disposal from Unconventional Oil and Gas Development Downgrades Stream Quality at West Virginia Injection Facility". *ACS Publications*. https://pubs.acs.org/doi/full/10.1021/acs.est.6b00428

[2] "How Large Are the Earthquakes Induced by Fluid Injection?" *Science Changing for a Better World*, USGS, www.usgs.gov/faqs/how-large-are-earthquakes-induced-fluid-injection?qt-news_science_products=0

miles away through injection pressures that may counteract frictional forces on faults[3,4]. The pressure and weight created through fluid injection can exacerbate this earth movement, triggering widespread seismic activity and subsidence within the extensively mined voids beneath Plum.

- There have been multiple reported cases in recent years where residents living near disposal wells have been negatively affected by waste contamination reaching drinking water. Here in Plum, our geology is very different from that of Ohio. Our steep and rolling hills, heavily coal-mined subsurface and abundance of underground freshwater aquifers make this an especially dangerous site for a waste disposal well. The proximity of the well to the Allegheny River and its tributaries makes contamination highly likely -- and catastrophic for hundreds of thousands of Pennsylvanians, not to mention the millions more living further downstream.

3. Radioactive Contamination and Cancer

- We ask you to launch an immediate and comprehensive investigation of the Technically Enhanced Naturally Occurring Radioactive Material (TENORM) waste by-products of Oil & Gas operations. Fracking brings high concentrations of radioactive material to the surface from deep underground where Uranium-238 and other radioactive levels are significantly higher than the background level of earth's crust. The injected waste at the Plum well site would include radioactive materials like radium-226 and 228, heavy metals and other toxins. A 2020 nationwide study on the effects of radiation near unconventional oil and gas development wells determined that wells within 20 km showed an increase in particle radioactivity[5]. The safe level of radium in drinking water, as defined by the U.S. EPA is 5 pCi/L (picocuries per liter). The levels in fracking waste can exceed 18,000 pCi/L as identified by the USGS and PA DEP[6].

- Both radium-226 and radium-228 have isotopes of radon in their decay chains. As this fluid is injected underneath residences above the site, the same conduits for pollution

[3] "Are Earthquakes Induced by fluid-injection activities always located close to the point of injection?"*Science Changing for a Better World*, USGS, https://www.usgs.gov/faqs/are-earthquakes-induced-fluid-injection-activities-always-located-close-point-injection

[4] "How does the injection of fluid at depth cause earthquakes?"*Science Changing for a Better World*, USGS, https://www.usgs.gov/faqs/how-does-injection-fluid-depth-cause-earthquakes?qt-news_science_products=0#qt-news_science_products

[5] "Are Earthquakes Induced by fluid-injection activities always located close to the point of injection?*Science Changing for a Better World*, USGS, https://www.usgs.gov/faqs/are-earthquakes-induced-fluid-injection-activities-always-located-close-point-injection

[6] Rowan, E.L., Engle, M.A., Kirby, C.S., and Kraemer, T.F. "Radium Content of Oil- and Gas-Field Produced Waters in the Northern Appalachian Basin (USA): Summary and Discussion of Data" *U.S. Geological Survey Scientific Investigations Report 2011–5135*, USGS. http://pubs.usgs.gov/sir/2011/5135/

migration discussed above can also lead to the accumulation of radon gas in people's homes. Note that radon is the second leading cause of lung cancer in the US and is already present in high concentrations throughout Western Pennsylvania.

- Radium exposure is associated with liver, breast and bone cancer. Studies are urgently needed to examine the potential that radium present in fracking waste is linked to the inexplicable spike of rare childhood cancers, including Ewing sarcoma, in highly fracked counties in Pennsylvania's Marcellus Shale. The enormous risk of radioactive contamination from fracking waste disposal cannot be ignored. **There is more information emerging daily on this issue, and the Plum injection well would put hundreds of thousands of Pennsylvanians at risk**.

- Scientists have found that disposal wells have similar risks of leaking as oil or gas wells, therefore they have the same risk of contaminating water because waste seeps out and fills cracks in the ground. Pollution leaks that are undetected could be fatal because pollution dispersal cannot be tracked underground[7].

- Western Pennsylvania residents already suffer from some of the highest cancer rates in the country and other health challenges from decades of fossil fuel development and other industrial activities. An underground pit of toxic fracking waste in our community is a risk we cannot afford to take. The Sedat 3A injection well could further undermine residents' rights to a healthy and safe environment and our constitutional right to clean air and pure water. In addition to revoking the permit for this well, we ask you to conduct a full investigation into the fracking waste and radioactivity, including the proper testing for radioactive material that is present.

Governor Wolf, it is imperative that you intervene and revoke the permit for the Sedat #3A injection well on behalf of the residents of Plum Township, residents of the City of Pittsburgh, and the Pennsylvanians that rely on the Allegheny River for clean drinking water. With this urgent action, you will protect our families, our communities and most importantly our water from the troubling, secretive, radioactive and toxic waste of the gas industry.

Sincerely,

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Citizens 4 Plum

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Executive Director
Protect PT

Matthew M. Mehalik, Ph.D.
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[7] Rowan, E.L., Engle, M.A., Kirby, C.S., and Kraemer, T.F. "Radium Content of Oil- and Gas-Field Produced Waters in the Northern Appalachian Basin (USA): Summary and Discussion of Data" *U.S. Geological Survey Scientific Investigations Report 2011–5135*, USGS. http://pubs.usgs.gov/sir/2011/5135/ Lustgarten, Abrahm. "Injection Wells: The Poison Beneath Us." ProPublica, 21 June 2012. www.propublica.org/article/injection-wells-the-poison-beneath-us

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