

Testimony to Pennsylvania Senate Environmental Resources and Energy Committee

March 10, 2021

Chairman Yaw, members of the Senate Environmental Resources and Energy Committee, my name is Jacquie Fidler, and I am Vice President of Environmental and Sustainability at CONSOL Energy. On behalf of CONSOL, thank you for the opportunity to provide testimony on Carbon Dioxide Management technologies, as it relates to our advanced PFBC power plant project. I'm joined today by Dr. Evan Blumer, an independent consultant leading the biomass and CO₂ components of our project.

CONSOL Energy's assets include the Pennsylvania Mining Complex (PAMC), the CONSOL Marine Terminal located in the Port of Baltimore, the Itmann Mine in West Virginia, and more than 1 billion tons of undeveloped reserves. The Pennsylvania Mining Complex is the largest producing underground coal mining operation in North America – and, the coal we mine at PAMC is among the highest quality coal in the world – with a lower carbon intensity compared to other coal ranks, and structural properties that make it optimal for use in non-thermal applications.

Together with our predecessors, we've has been mining coal since 1864. The Company's strong history is truly a differentiating factor in the coal industry and is something we're very proud of. It also exemplifies our commitment to responsible business practices and our legacy of innovation. In the 1940's, CONSOL became the first U.S. coal company to operate its own, privately funded Research and Development facility. By the 2000's, CONSOL R&D was keenly focused on carbon capture and storage technology. Upon becoming an independent, standalone coal company in 2017, we outlined sustainability goals that complement our core values and strategic priorities. These goals intentionally align with "ESG" aspects of greatest concern – including our workforce of more than 1500 employees and hundreds of contractors, our communities, and the environment. We've reinvigorated efforts to innovate and develop advanced mining technologies, alternate uses of coal, and other low-to-no emissions projects, with a focus on sustainably leading the transformation of a mature industry.

CONSOL's advanced PFBC Project was developed in response to the Department of Energy's Coal FIRST program in 2019. This initiative is a multi-phase program that aims to design a commercially viable coal plant of the future –with the ability to provide secure, stable, and reliable power and the smallest environmental footprint possible. Our project has successfully advanced to phase 3 of DOE's competitive down-selection process and a complete Front-End Engineering and Design (FEED) study is currently underway to evolve the design to a level of detail needed for construction of a prototype plant.

The CONSOL advanced PFBC plant will be an approximately 300 MW, waste coal and biomass fueled plant, equipped with carbon dioxide capture and storage. PFBC technology is well-established, with 6 commercial

plants developed internationally, with more than 200 combined years of operating experience. CONSOL's PFBC technology concept was originally demonstrated at CONSOL's R&D facility in 2006-2007 and again in 2009-2010. Under this initiative, the PFBC technology to utilize a paste feed including waste coal slurry and biomass and incorporating first-of-its-kind CO₂ capture technology.

The project will be sited at or near PAMC – which provides a number of benefits, including integration with existing PAMC infrastructure that further enhances the project's value, supports a reduced environmental impact, and promotes sustainability of the power generation supply chain. From a water and waste perspective --- not only is waste coal a low to no cost primary source of fuel, providing an opportunity to decrease environmental liabilities associated with waste coal storage facilities, and, the mineral matter that may be separated from our waste coal fuel could be beneficially re-used in agricultural applications. In addition, the potential to integrate the plant into PAMC's existing water re-use strategy further minimizes water consumption. This plant will also be equipped with a zero-liquid discharge, protecting local water resources. The dry, solid ash byproduct produced as part of the project has potential commercial applications – eliminating waste and supporting project circularity.

But, the reason we're here today is to discuss the air quality components of our plant. The plant will be equipped with emissions controls such as limestone injection within the PFBC vessel, a metallic hot gas filter, and an activated carbon bed, that provide for near zero emissions of regulated pollutants. The proposed PFBC power plant will further its capability for near-zero emissions via the planned capture of 97% of the CO₂ in the exhaust gas prior to the stack using a commercially-available, state-of-the-art amine-based process or comparable system. The biomass, when co-fed with the waste fuel at a modest rate (5-10% of the total fuel input) and coupled with reasonably deep CO₂ capture (~97%), provides an opportunity for the overall power plant to achieve CO₂-negative operation through BECCS (bioenergy with carbon capture and storage). With BECCS, the carbon in the biomass is extracted from the atmosphere when the biomass grows. Capturing/storing this plant-sourced CO₂ post combustion results in a "carbon negative" energy source that removes more carbon from the atmosphere than is emitted. BECCS deployment has been slow and there are few facilities operating. Major BECCS technologies are mature and their potential to impact global CO₂ levels is substantial. Our project would establish one of the largest BECCS operations to date (~ 30 MW BECCS at 10% biomass co-feed).

Most importantly, siting the plant at or near PAMC is critical to our CO₂ disposition plan. As you've heard today, a preliminary evaluation of geologic strata suggests that geologic sequestration in southwest Pennsylvania is likely feasible. PAMC is also located in proximity to extensive oil and gas production infrastructure, which provides an opportunity to utilize CO₂ for enhanced gas or oil recovery, or, to convert existing shale wells into CO₂ storage facilities. In these efforts, we are supported by a project team of CO₂ management experts from Battelle and Carbon Solutions. Over the next 2 – 2.5 years, the team will complete critical feasibility and design work, including completing a detailed characterization of deeper reserves within our study area to assess CO₂ storage capacity. Local and regional capture, transport, and storage inputs will be parameterized and modeled

using the specialized SimCCS platform. We will also evaluate and confirm the feasibility of deep well injection options, and detailed plans associated with a potential 15 – 20,000 ft. CO₂ injection well located on the project site will be developed. Finally, the resulting “net zero CO₂” or “net negative CO₂” status will be evaluated through a full lifecycle analysis of plant operations, as well as upstream and downstream activities.

If successful, construction of the plant could commence in 2024, with commissioning in 2028.

We see an opportunity to be a part of a regional CO₂ hub that could evolve in the next 5-10 years. In this way, the CONSOL Coal FIRST project is complementary to the other efforts undertaken in the region, by NETL, DCED, DCNR, and the Midwest regional carbon initiative -- it will advance the state of carbon capture technology and will expand the understanding of carbon storage opportunities in the Northern Appalachian Basin. Separately, investment in technology and innovation are required to achieve aspirational global emissions reductions goals, across all sectors. IPCC 2°C scenarios acknowledge the critical nature of carbon capture technologies, and also, generally assume that BECCS will be technically and economically viable and successfully scaled up as a “negative emissions” technology.

This project can be a model for the country to remediate coal waste while generating a reliable and resilient source of zero-emission, and near zero footprint, baseload electricity supply that will continue to be needed to support the electric grid of the future. And, we believe this a great opportunity for southwest Pennsylvania to remain a diversified energy and industrial hub capable of supporting economic development, family sustaining jobs, and resilient communities.

Thank you again, and, Dr. Blumer and I are happy to take any questions.