



February 21, 2023

VIA REGULATIONS.GOV RULEMAKING PORTAL

Pipeline and Hazardous Materials Safety Administration
United States Department of Transportation
1200 New Jersey Avenue SE
Washington, DC 20590

**Re: Docket No. PHMSA-2022-0081
Hazardous Materials: Notice of Application for Special Permit (21283-N)**

Delaware Riverkeeper Network (“DRN”) submits these supplemental comments in opposition to the application by Gas Innovations LNG Refrigerants Inc. (“Gas Innovations”) for a Special Permit that would authorize the transportation in commerce of cryogenic ethane in DOT-113C120W9 and DOT-113C120W tank cars via rail freight (the “Application”). We again request, with added vehemence, that the Pipeline and Hazardous Materials Safety Administration (“PHMSA”) deny the Application.

On January 25, 2023, PHMSA issued a notice in the Federal Register extending the public commenting period for the Application.¹ A little over one week later, a train carrying multiple hazardous substances derailed near East Palestine, Ohio. This disaster grimly illustrates the current state of rail transport in our county, and emphasizes the need for a precautionary approach that should result in a denial of Gas Innovations’ Application.

I. Recent rail disasters underscore the risks that already exist within our nation’s rail transportation system and highlight several areas in need of reform prior to the approval of additional hazardous substances as proposed in the Application.

The Norfolk Southern freight train derailment in East Palestine, Ohio on February 3, 2023 (the “Ohio derailment”) resulted in disaster for the regional communities in both Ohio and western Pennsylvania. The train consisted of 150 rail cars,² of which 38 derailed.³ There

¹ Hazardous Materials: Notice of Application for Special Permit; Extension of Comment Period, 88 Fed. Reg. 4,881 (Jan. 25, 2023).

² <https://www.kron4.com/news/national/flames-were-reaching-100-feet-in-the-air-chief-describes-train-fire-in-east-palestine/>

³ <https://www.nts.gov/investigations/Pages/RRD23MR005.aspx>

were 20 total hazardous material cars in the train, 11 of those cars derailed.⁴ A State of Emergency was declared and residents in East Palestine, Ohio and Beaver County, PA were evacuated. Several rail cars broke open and released their contents, quickly igniting an intense fire. Billowing smoke engulfed the sky. A raging fire that could not be extinguished burned for nearly a week. A decision to conduct a “controlled burn” of vinyl chloride, reportedly the contents of five rail cars, was conducted by releasing the vinyl chloride and setting it on fire in a prepared ditch.⁵ The intentional burning of the contents of the five cars carrying vinyl chloride is subject to ongoing investigation and criticism, alarming the communities impacted.⁶ The Ohio Attorney General is considering suing Norfolk Southern.⁷ On February 14, the Ohio Department of Natural Resources reported a fish kill in the receiving waterways, counting 3,500 fish dead, 12 different species.⁸

As the National Transportation and Safety Board (NTSB) investigates, the forensic analysis of the train derailment and its causes will be developed. It is likely to take a year or more before the inquiry is completed and published and recommendations are made by NTSB to those entities involved in the accident. It is possible the public will never know the full story due to a culture among railway companies, including Norfolk Southern, to act defensively, shield themselves from public disclosure and act alone. Norfolk Southern’s lack of collaboration in the wake of the derailment, such as shunning a unified command team during the response, was sharply criticized by Pennsylvania Governor Shapiro in a letter sent to Norfolk Southern’s President and CEO on February 14th, 2023.⁹ The U.S. Senators from Ohio and Pennsylvania also submitted letters to the U.S. Environmental Protection Agency and NTSB expressing grave concerns over adverse air, water, soil, and human health impacts that require comprehensive and speedy investigation to provide needed protection for residents.¹⁰

The issues that arose from the Ohio derailment and the cascade of events that followed are hard lessons that stand as warnings about the potential impacts of derailments of hazardous materials being transported on the nation’s railways. The Gas Innovations application to transport cryogenic ethane in rail cars across the nation, as we have attested in Delaware Riverkeeper Network’s January 4, 2023 comment to PHMSA, is materially inadequate. This is due to lack of information required for special permit use, the numerous errors contained in the application, and because the application doesn’t demonstrate or provide the information necessary for PHMSA to conclude that the “special permit achieves a level of safety at least equal to that required by regulation, or if a required safety level does

⁴ *Ibid.*

⁵ <https://www.cnn.com/2023/02/06/us/east-palestine-ohio-train-derailment-fire-monday/index.html>

⁶ <https://www.wesa.fm/environment-energy/2023-02-15/east-palestine-takes-derailment-questions-ohio-considers-suing>

⁷ *Ibid.*

⁸ <https://www.wlwt.com/article/east-palestine-ohio-train-derailment-fish-dead-livestock/42892700>

⁹ <https://www.alleghenyfront.org/shapiro-rips-train-company-for-prioritizing-track-reopening-over-safer-approach-after-derailment-norfolksouthern/>

¹⁰ *Ibid.*

not exist, is consistent with the public interest”, which is a fundamental regulatory requirement.¹¹

The dearth of information, the lack of studies, tests, or analysis of the proposed activity, the unsubstantiated claims of safety despite the proposed use of substandard rail cars, and the failures in the Gas Innovations application to address basic issues such as environmental justice protections for communities that will be impacted by the transportation, make the case for PHMSA to deny a Special Permit.

The Ohio derailment has put in sharp relief underlying issues that contributed to the derailment there and could contribute to a derailment of rail tank cars carrying cryogenic ethane, should Gas Innovations application for a special permit be approved.

A comparison of the Ohio derailment to an earlier derailment and breach of a rail tank car transporting vinyl chloride in New Jersey illustrates ongoing and unaddressed issues that plague the rail transport of hazardous materials, despite the accidents being 11 years apart. The Conrail Freight Train derailment with a vinyl chloride release occurred in Paulsboro, NJ on November 30, 2012. When the train proceeded across a moveable arm bridge, “the bridge span rotated under the moving train, misaligned the running rails, and caused the train to derail”.¹² Seven cars derailed. “Four tank cars that derailed on the bridge came to rest partially in Mantua Creek. Three of the derailed tank cars that entered the creek contained vinyl chloride and one contained ethanol. One tank car was breached and released about 20,000 gallons of vinyl chloride. Eyewitnesses reported a vapor cloud engulfed the scene immediately following the accident.”¹³

The NTSB concluded the derailment was caused by Consolidated Rail Corporation’s (Conrail) erroneous decisions and that there were contributing factors to the accident.

First, the nature and cause of the derailment.

In the Paulsboro derailment, the train had stopped to operate and cross the bridge over the creek. There was a red signal that didn’t change to green. As allowed under Conrail’s operating rules and procedures, an inspection of the track and bridge was done by the engineer, the passage was deemed safe, and Conrail’s dispatcher allowed the train to proceed through the red light, at which time the train derailed. NTSB concluded the direct cause was allowing the train to proceed and the reliance “on a training and qualification program that did not prepare the train crew to examine the bridge lock system”.¹⁴

The freight train in the Ohio derailment was in many ways very different from the Paulsboro derailment, particularly in terms of apparent cause, volume of released chemicals, and the length and consist of the train. In Ohio, the cause will not be settled until NTSB

¹¹ 49 C.F.R. § 107.105(d). *See also id.* § 107.113(f)(2).

¹² National Transportation Safety Board, “Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey”, Accident Report, NTSB/RAR-14/01, PB2014-108828, November 30, 2012. P. 11

¹³ *Ibid.*

¹⁴ *Ibid.*

completes their investigations but it is reported that it was a failure of equipment that caused the “hot wheel” to catch fire, according to video footage of the moving train 20 miles before arriving in East Palestine.¹⁵ NTSB is examining the wheel bearing that seemed to have overheated.¹⁶ However, at this point, we don’t have all the facts on cause.

In Paulsboro, there were three rail cars carrying vinyl chloride and one was breached. There was no fire. Instead, the vinyl chloride was released to the air as a vapor cloud and was not reported to enter the stream.¹⁷ Like Ohio, there was a different chemical reported in a rail car that derailed in Paulsboro—ethanol. Ethanol is also a classified hazardous cargo and is a volatile, flammable liquid. However, the rail car containing ethanol did not break open.¹⁸

The Ohio derailment had many more rail cars that were breached or were destroyed by the fire, as disclosed online in the train car inventory. The United States Environmental Protection Agency (“EPA”) sent a letter to Norfolk Southern stating “ethylene glycol monobutyl ether, ethylhexyl acrylate and isobutylene were also in the rail cars that were derailed, breached and/or on fire.”¹⁹ At this time, the volume of the chemical releases has not been publicly reported. The public doesn’t know the identities of all the chemicals that were released, how long they were emitted from the scene, how many remain in the local environment, including in homes and buildings, or the potential health effects for those exposed and the natural environment.

The Ohio derailment is obviously more expansive and involves many more people and a larger geographic region. However, the severity of these derailments were very similar because people were affected, symptoms of exposure to vinyl chloride were experienced, lives were upended, worry over future health effects persists in Paulsboro to this day (vinyl chloride is a carcinogen, in addition to other acute and chronic health effects), and real costs were incurred (in Paulsboro, the NTSB reported the estimated equipment damages were \$451,000 and the emergency response and remediation costs were about \$30 million).²⁰ Paulsboro is more densely populated than East Palestine and 250 people exposed in Paulsboro went to the emergency room with acute exposure symptoms.²¹ First responders and residents sued for being exposed to the chemical without the proper safeguards or information about what they were dealing with. And both towns experienced trauma that is still felt today in Paulsboro and will doubtlessly reverberate long after in East Palestine. Many of these costs are borne by the public and never counted or fully appreciated by government or the rail industry.

¹⁵ https://www.post-gazette.com/news/transportation/2023/02/10/east-palestine-train-derailment-video-fire-axle-alert/stories/202302100070?fbclid=IwAR36cCAGusvsDpRiZl-OGHO49i5UvPXUzxd00tY9IkzkZB3lumr4ptcM_0

¹⁶ <https://www.nts.gov/news/press-releases/Pages/NR20230214.aspx>

¹⁷ *Ibid.*

¹⁸ *Ibid.*

¹⁹ <https://www.wkbn.com/news/local-news/east-palestine-train-derailment/3-additional-chemicals-discovered-on-east-palestine-train-derailment/>

²⁰ National Transportation Safety Board, “Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey”, Accident Report, NTSB/RAR-14/01, PB2014-108828, November 30, 2012. P. 11

²¹ *Ibid.*

Secondly, the contributing factors

Regardless of the differences, there are some fundamental problems apparent in the Ohio and Paulsboro derailments that are contributing factors. These common factors that contributed to the derailments and their aftermath are symptomatic of safety defects in the way rail companies operate the railways and rolling stock (trains) and the lack of effective government safety regulations that require strict safety protocols. These issues represent higher level problems that are fundamental to all transport of hazardous materials on our nation's railways, particularly flammable substances in tank cars, and demand regulatory reform. These extend to cryogenic ethane because it is hazardous and extremely flammable with difficult to handle properties, as discussed fully in DRN's comment on this docket submitted January 4, 2023 and later in this document.

Problem: Unilateral decisionmaking and self-important practices by rail companies in response actions and a lack of federal regulations requiring a unified and coordinated response. In the absence of comprehensive regulation and safety practices by government, rail companies develop their own guidelines and protocols and are accustomed to self-regulating much of the operation and management of freight trains, including response to a derailment or other rail incident. In these two cases, Norfolk Southern and Conrail both acted unilaterally and without proper coordination and communication, increasing exposure risk for the community and creating confusion.

Paulsboro: "Contributing to the consequences of the accident was the failure of the incident commander to implement established hazardous materials response protocols for worker protection and community exposure to the vinyl chloride release."²²

East Palestine: Governor Josh Shapiro's February 14 letter to Norfolk Southern states that not adhering to well accepted safety practices relative to incident management injected unnecessary risk and created confusion. The Governor's letter said "Norfolk Southern failed to explore all potential courses of action, including some that may have kept the rail line closed longer but could have resulted in a safer overall approach for first responders, residents and the environment."²³ The letter stated Norfolk Southern didn't participate in the "Unified Command" that was customarily set up so all agencies and responders could coordinate and communicate, resulting in a general lack of awareness for first responders and emergency management of the tactics Norfolk Southern planned in response including the unilateral and drastic decision by Norfolk Southern to vent and burn all five rail cars containing vinyl chloride".²⁴

Problem: Lack of an effective safety management program for equipment and its operation. Lack of regulations tightening and increasing frequency of inspections, maintenance, and repair of essential safety equipment. Lack of adequate train employees to carry out a

²² *Id.* at P 12.

²³ <https://www.governor.pa.gov/wp-content/uploads/2023/02/2023.2.14-Norfolk-Southern-Letter.pdf>

²⁴ *Ibid.*

comprehensive safety management program. Norfolk Southern, for instance, cut staff by 30% between 2011 and 2021.²⁵ A joint letter from the four U.S. Senators in Ohio and Pennsylvania—Senators Bob Casey (D-PA), John Fetterman (D-PA), Sherrod Brown (D-OH), and J.D. Vance (R-OH)—to the NTSB dated February 15, 2023 stated that overall, Class 1 Railroads have cut their workforce 30% between 2015 and 2021 following the adoption of “Precision Schedule Railroading”.²⁶ Precision Schedule Railroading requires running longer, heavier trains,²⁷ reducing the length of time budgeted for workers to perform safety checks,²⁸ and has resulted in steep job cuts.²⁹ Lack of regulations that protect workers and safety protocols and provide for basic worker protections such as paid sick leave erode job performance and do not mandate sufficient staff to carry out necessary work.

Paulsboro: “Contributing to the accident was the lack of a comprehensive safety management program that would have identified and mitigated the risks associated with the continued operation of the bridge despite multiple bridge malfunctions of increasing frequency.”

East Palestine: Equipment is undergoing extensive and lengthy investigation by the NTSB so there are no definitive conclusions yet by the agency regarding equipment and the need for more frequent and thorough inspections. But the NTSB has said they are investigating a wheel bearing, tank car top fittings, including the relief valves and the rail cars themselves and were collecting data from wayside defect protectors to establish what equipment may have been involved in the derailment.³⁰ The NTSB also stated that there were only three employees on the very long, at least 150-car, train - an engineer, conductor, and a conductor trainee.³¹ This meets current government regulations. Staff cuts over the last decade have reduced staffing on freight trains and regulations are so lax that inadequate numbers of staff has become the status quo.

One of the worst mistakes made in response to the Paulsboro derailment was not employing air monitoring and not using available air dispersion models to measure toxic air pollutants in the hours following the vinyl chloride release. Shocking as it sounds, essential precautions were not taken to protect those closest to the derailed cars, the first responders; even Conrail employees did not use protective gear and did not take basic precautions included in the emergency manual. The NTSB report states:

Emergency responders did not perform air dispersion modeling to determine the appropriate actions that would be needed to protect the community, such as evacuation or shelter-in-place.

²⁵ <https://www.levernews.com/rail-companies-blocked-safety-rules-before-ohio-derailment/>

²⁶ https://www.casey.senate.gov/imo/media/doc/letter_to_ntsb_about_ns_derailment.pdf

²⁷ <https://portside.org/2023-02-09/workers-know-truth-about-derailment-disaster-why-are-they-being-ignored>

²⁸ https://www.casey.senate.gov/imo/media/doc/letter_to_ntsb_about_ns_derailment.pdf

²⁹ <https://portside.org/2023-02-09/workers-know-truth-about-derailment-disaster-why-are-they-being-ignored>

³⁰ <https://www.nts.gov/news/press-releases/Pages/NR20230214.aspx>

³¹ <https://www.wkbn.com/news/local-news/east-palestine-train-derailment/crews-on-scene-of-train-derailment-in-east-palestine/>

The community protective measures were developed without deference to available guidance and without seeking any site-specific data.

About 6 hours into the incident, the fire chief had yet to relocate the ICP to a safe location and failed to establish PPE requirements for the accident scene, despite the availability of air monitoring data that should have prompted these actions. At 8:34 a.m., a Paulsboro Refining Company air monitoring team began testing for volatile organic compounds (VOC) such as vinyl chloride. The air monitoring team's certified industrial hygienist told NTSB investigators that while attempting to calibrate air monitoring instruments near the initial ICP situated next to the accident scene, their meters detected high atmospheric concentrations of a volatile compound. He informed those assembled at the ICP that the team had measured VOC concentrations in excess of 500 ppm and that the permissible exposure limit for vinyl chloride was only 1 ppm. The team reported that the air monitoring results indicated the ICP was located in a hazardous atmosphere. The highest level of vinyl chloride detected was at 1,444 ppm, far exceeding the AEGl-2 concentrations for a 60-minute public exposure.

During the initial incident response, Conrail personnel entered the derailment scene within feet of the punctured vinyl chloride tank car without using any respiratory protection to identify the involved tank cars and assess them for damage and chemical releases.³²

In the Ohio derailment, when and how air monitors and air dispersion modeling was used to delineate the "red zone" and evacuation and/or enforce evacuation and shelter-in-place orders is not fully disclosed. However, Governor Shapiro raised a critical air pollution issue in his February 14 letter, stating that Norfolk Southern's lack of participation in the Unified Command led to a "wide variability in the potentially affected population estimates in the downwind plume impacting the Commonwealth".³³ As the incident and the response are assessed, a comparison of these critical actions will help inform the public and regulators of exactly how air monitoring was carried out and used to establish "red zones" and evacuation areas and timelines, including during the intentional burning of vinyl chloride. This will fill out the story of the common and underlying problems regarding air pollution and the exposure of people to toxic and hazardous substances as a result of a derailment.

Additional common problems that complicated the response to these derailments and may have increased exposure of the public and first responders to toxics include the late

³² National Transportation Safety Board, "Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey", Accident Report, NTSB/RAR-14/01, PB2014-108828, November 30, 2012. PDF P. 51.

³³ <https://www.governor.pa.gov/wp-content/uploads/2023/02/2023.2.14-Norfolk-Southern-Letter.pdf>

calls to agencies by the rail companies and the lack of access by first responders to what was in the rail cars and how to most safely address the material that was released. In both the East Palestine and Paulsboro incidents state agencies were not notified immediately by the rail company. Local emergency responders were not properly informed or briefed. In the Paulsboro derailment, the NTSB concluded that Conrail failed to immediately provide “critical hazardous materials information to emergency responders that could have assisted in executing a safer response to this accident.”³⁴ Conrail refused to supply to the first responders and agencies the list of what was contained in all the railcars for more than 3 hours, the critical time when the vinyl chloride was released. This resulted in exposure of responders and the Paulsboro community to vinyl chloride that could have been avoided. “Personnel exposure to vinyl chloride would have been minimized had the incident commander followed guidance contained in the Emergency Response Guide, accepted the advice from hazardous materials emergency responders, and conducted the emergency operations in accordance with Hazardous Waste Operations and Emergency Response standards under Title 29 Code of Federal Regulations 1910.120.”³⁵ Lack of information and the dissemination of misinformation to the public made matters worse, according to the NTSB report: “The dissemination of inaccurate public information about the release of vinyl chloride revealed the lack of an effective system for communicating to the public accurate information about the current situation following the accident.”³⁶

The NJ Department of Health was not notified immediately; this delayed their ability to set up air monitors that would inform the size of the “red zone”, the area that must be evacuated. The NJ Department of Health in their 2014 Fact Sheet on the health assessment and air quality studies that they conducted after the derailment recommends that “communities should develop, test and follow emergency communication plans. Local officials should prepare and make available community-specific emergency planning educational materials tailored to the initial response to relevant catastrophic hazards. Within the incident command system, public health agencies should be engaged to provide guidance to and address health concerns of the community.”³⁷

In the Ohio derailment it is stated by Governor Josh Shapiro in his February 14 letter that the PADEP and the Pennsylvania Emergency Management Agency were not immediately notified by Norfolk Southern and learned of the incident from an independent source, delaying their arrival at the scene.³⁸ The letter states that the agencies began right away to monitor for impacts. However, they observed that the rail company was acting unilaterally and not in consultation with all the other response agencies in deciding the response actions, which contributed to confusion and a lack of coordination.³⁹

³⁴ National Transportation Safety Board, “Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey”, Accident Report, NTSB/RAR-14/01, PB2014-108828, November 30, 2012. PDF P. 69.

³⁵ *Ibid.*

³⁶ *Ibid.*

³⁷ https://www.nj.gov/health/ceohs/documents/eohap/haz_sites/gloucester/train_derail/factsheet.pdf

³⁸ <https://www.governor.pa.gov/wp-content/uploads/2023/02/2023.2.14-Norfolk-Southern-Letter.pdf>

³⁹ *Ibid.*

Federal regulations that require immediate notification by rail companies to state emergency response agencies are needed because without them business-as-usual in rail company culture is to not notify immediately, as evidenced by both these derailments by two different companies in two different states, 11 years apart. Without regulatory requirements and strong, effective implementation of regulations, there is no reason not to expect that the same culture and lack of cooperation could occur with the response of a rail company to a derailment of ethane.

These were contributing factors that increased risk of exposure and caused harm to first responders and the community. The fault lies squarely with the insular self-driven culture that both Conrail and Norfolk Southern displayed in these incidents. This underlying common problem makes disaster and poor response more likely for all hazardous rail transport, including for ethane, if approved.

An important common perennial problem that can lead to poor incident response that endangers the community, first responders and the environment is the lack of public education and knowledge about the trains that travel through communities transporting hazardous substances. Much of this information is kept from the public and not even shared with local government as a matter of policy set by the rail companies and government. In the Paulsboro derailment, NTSB criticized the lack of public education and accessibility to facts about the freight trains and their cargo, and the lack of local government's preparedness to deal with the disaster because they did not have the necessary information. The NTSB concluded:

- "Had Consolidated Rail Corporation executed an effective public awareness program, the Paulsboro community and emergency response organizations would have been better prepared to safely and effectively respond to the vinyl chloride release.
- Active participation by railroads in local emergency planning would result in safer and more efficient emergency responses to railroad accidents involving hazardous materials releases.
- Had the borough of Paulsboro performed an assessment of the emergency response needs and capabilities for the hazardous materials that are present and transiting through its community, it would have been apparent that the emergency response capabilities and plans were inadequate for the types of high consequence incidents that can occur in the jurisdiction."⁴⁰

The NTSB Paulsboro report recommended to the U.S. Department of Transportation:

"Require railroads transporting hazardous materials through communities to provide emergency responders and local and state emergency planning committees

⁴⁰ National Transportation Safety Board, "Conrail Freight Train Derailment with Vinyl Chloride Release, Paulsboro, New Jersey", Accident Report, NTSB/RAR-14/01, PB2014-108828, November 30, 2012. PDF P. 69-70.

with current commodity flow data and assist with development of emergency operations and response plans. (R-14-XX)”⁴¹

In the Ohio derailment, concerns have been raised by the public that they are left in the dark without knowing what they and their families have been exposed to and how it will affect their health going forward. Residents complain that even after 3 days, they still did not know what was in the trains and released.⁴² A town meeting the week after the derailment was unsatisfying, with people complaining they were left with more questions than answers. Although they were invited and expected, Norfolk Southern didn’t even attend the town meeting hosted by East Palestine government officials.⁴³ This lack of effective communication, lack of public disclosure, lack of Norfolk Southern’s interaction with the community, and dearth of information about the hazardous materials going through their town, feeds the trauma already experienced, generates distrust and resentment, and adds to the damage the community has had to absorb.

This common underlying problem has been called out by NTSB, local government, and residents living along the tracks that carry these hazardous substances. Regulations, and strict implementation of those regulations, are needed to require the disclosure and public engagement that the NTSB says is needed. It is not only a matter of a community’s right to know, which is of great importance, but it can mean the difference between people being protected or being exposed to toxic materials that could have been prevented. This makes this a public health and safety issue as well. As long as the government and companies keep information about hazardous material transport on railways secret or not fully disclosed, the lack of knowledge will continue to endanger lives.

This problem would apply to ethane if it were approved for railcar transport unless federal regulatory action is taken to require greater public and local government education, disclosure and involvement.

II. Regulations in place fail to ensure safe transport of hazardous materials that are already on the rails, and PHMSA should not add to this risk by approving Gas Innovations’ Application.

One aspect of what makes the catastrophe in East Palestine so tragic is how preventable it was. With better infrastructure, better regulations, better worker protections, and better choices from Norfolk Southern, none of this would have happened. What makes it even worse, is that mere months ago railway workers were seeking to strike in part specifically because of the issues which lead to this accident. And previously existing regulations which would have likely prevented this were chosen not to be reinstated. It is important to examine how existing regulations are wholly insufficient, and substantial work has gone into trying to get regulators to recognize this and do something about it. It is

⁴¹ *Id.* P 70.

⁴² <https://www.news5cleveland.com/news/east-palestine-train-derailment/1-45pm-epa-chief-to-hear-from-ohio-villagers-over-toxic-train-spill>

⁴³ <https://www.wesa.fm/environment-energy/2023-02-15/east-palestine-takes-derailment-questions-ohio-considers-suing>

important for PHMSA because it highlights why the existing landscape of transporting dangerous hazardous substances by rail is far too unsafe, and ill equipped to handle the transportation of cryogenic ethane.

To best understand the regulatory context which led to this event, a very similar train derailment occurred in Paulsboro, New Jersey in November of 2012. As previously discussed, it was also a disastrous train derailment that led to the release of 24,000 gallons of vinyl chloride with substantial human damage to go along with it.⁴⁴ Sparked in part by this incident, along with a marked increase in oil train derailments such as the infamous deadly crude oil derailment in Lac-Mégantic, Canada, in 2013 where forty-seven people died and a town was obliterated, the Obama Administration proposed improved regulations concerning the safety for trains carrying crude oil and other hazardous substances.⁴⁵

But this rule was ultimately narrowed to just trains carrying crude oil, with other concessions in response to substantial lobbying by the railway industry.⁴⁶ Speed limits for trains carrying hazardous materials were removed, as well as regulations defining what trains would be designated as “high-hazard flammable trains.”⁴⁷ All of these sacrifices in safety were made in the pursuit of reducing rail company costs, while ignoring the costs that would be saved from a reduction in accidents.⁴⁸

Then in 2017, the Trump Administration and Senate Republicans repealed even these meager safety standards, particularly provisions which would update the braking systems of trains carrying hazardous flammable substances.⁴⁹ Norfolk Southern had previously touted their design of new electronically controlled pneumatic (ECP) brakes, as a means of reducing accidents like this one, and then spent millions lobbying the DOT to repeal regulations requiring them to use them.⁵⁰

Since then, Norfolk Southern has continued to lobby for fewer safety regulations, cut the number of railway workers working, increase the number of hours each worker is on the job, refuse to update tracks and brake systems of trains that date to the Civil War, or, in other words, do nearly everything possible to stop much-needed safety upgrades. The result was an increased risk for an incident like the Ohio derailment to occur.⁵¹ For example, the train that derailed would not be considered a “high-hazard flammable train” because vinyl chloride is a Class 2 flammable, and the current regulations only designated a train that if it

⁴⁴ <https://response.restoration.noaa.gov/about/media/train-derails-paulsboro-nj-releasing-23000-gallons-toxic-vinyl-chloride-gas.html#:~:text=On%20Nov.,23%2C000%20gallons%20of%20vinyl%20chloride.>

⁴⁵ <https://www.usatoday.com/story/money/business/2014/07/23/obama-dot-proposes-tougher-oil-train-safety-rules/13036837/>

⁴⁶ <https://www.levernews.com/rail-companies-blocked-safety-rules-before-ohio-derailment/>

⁴⁷ *Id.*

⁴⁸ *Id.*

⁴⁹ <https://www.railwayage.com/regulatory/usdot-repeals-ecp-brake-rule/>

⁵⁰ <https://www.levernews.com/rail-companies-blocked-safety-rules-before-ohio-derailment/>

⁵¹ *Id.*

is carrying Class 3 flammable.⁵² It is simply not credible that a substance whose burning created a smoke plume which darkened the sky of an entire community, is not flammable enough to be designated high-hazard.

This was also the viewpoint of the NTSB when the rules were first proposed in 2014 and it submitted comments to PHMSA on broadening this classification to cover substances exactly like vinyl chloride.⁵³ And yet these restrictions were not implemented, and even if they were, they would have been repealed just a few years later under the Trump Administration. So far, the Biden Administration has done nothing to ensure that any regulatory progress will be made.

In the present, the Biden Administration has not proposed any rulemaking to adopt effective safety regulations for rail transport of hazardous substances. Even more so, it has continued to worsen the factors and regulation which contributed to this derailment. Due to this lack of safety regulation and unjust labor practices, last fall, prominent labor unions were moving towards striking against the railway companies, including Norfolk Southern.⁵⁴ The Biden Administration, with the aid of Congress, forced its way into the negotiations, reneged promises concerning sick leave, and did nothing to remedy the workers' safety concerns.⁵⁵ All the while Norfolk Southern is posting record profits, spending millions on stock buybacks, and increasing the average length of their trains to the highest in the industry at 1.3 miles.⁵⁶ The train that derailed in East Palestine was 1.8 miles.⁵⁷

In the face of inadequate regulation, and an industry that is motivated by profit alone, how can our rail system be trusted to safely transport cryogenic ethane? Fundamental change in how this industry is run and regulated and how regulations are implemented must occur, or else it will only be a matter of time before another cataclysmic derailment happens, in which cryogenic ethane is on board. PHMSA must address and examine this industry with greater scrutiny and a critical perspective to safely fulfill its purpose, and in the meantime, refrain from issuing any special permits, including the one requested by Gas Innovations, that would exacerbate the current risks.

III. Transporting multiple hazardous materials in a single train presents risks that are unknown to PHMSA, rail companies, local governments, and first responders.

As the situation in East Palestine unfolds, it is becoming more and more clear that the situation is both worse than was initially represented, and not as bad as it could have been. It is far worse, now that regulators and the public are starting to learn of the scale and severity of the material that is currently polluting the community and region. And it was not

⁵² <https://www.regulations.gov/comment/PHMSA-2012-0082-2637>;
<https://webwisser.nlm.nih.gov/substance?substanceId=43&identifier=Vinyl%20chloride&identifierType=name&menuItem=2&catId=163>

⁵³ <https://www.regulations.gov/comment/PHMSA-2012-0082-2637>

⁵⁴ <https://www.levernews.com/biden-is-breaking-his-sick-leave-promise-to-crush-rail-workers/>

⁵⁵ *Id.*

⁵⁶ *Id.*

⁵⁷ *Id.*

as bad, due to nothing besides pure luck, that some of the cars containing very dangerous substances were not breached. But most importantly this incident has shown that current regulations are wholly inadequate to protect our communities and environment. But before the fundamentally preventable nature of this incident can be examined, it is important to look through all of the substances and materials that were released, the ones that were nearly released, along with health and environmental effects and how they synergize with each other.

Before moving forward with examining the list of known substances that were on the train at the time of the derailment, it is important to acknowledge that the extent and the specifics of the harm done is ever evolving and it will be years before the true extent of this crisis is understood. This means that the herein analysis will inevitably be based on incomplete information, but not insufficient. Even an incomplete spreadsheet from EPA detailing the known substances that were released from this derailment paints an exceptionally grim picture. Below is a list of the substances that were released in the derailment and subsequent purposeful burn off afterwards, along with substances that thankfully just missed being additions to the ecological destruction of East Palestine and the affected portions of the Ohio River, its tributaries and watershed. This data was pulled from a spreadsheet released by EPA on February 11th, where it found that 20 of the 50 derailed cars contained hazardous materials.⁵⁸

Confirmed substances that were released:

- Polyethylene: 2 hopper cars, completely burned off in the fire
- Vinyl Chloride: 5 tank cars, tens of thousands of gallons burned and released into the groundwater
- Propylene Glycol: 2 tank cars, 1 car most of load was lost the other none
- Diethylene Glycol: 3 tank cars
 - 2 tank loads unknown amount released into groundwater
 - 1 tank load completely lost
- Ethylene Glycol Monobutyl Ether: 1 tank car, the majority likely burned off due to highly combustible nature
- Semolina Flour: 1 hopper car, completely burned off
- Ethylhexyl Acrylate: 1 tank car, majority of highly combustible liquid either burned off or leaked into groundwater
- Polyvinyl: 2 hopper cars, completely burned off
- Petroleum Lube Oil: 4 tank cars
 - 1 tank load completely lost
 - 2 tank loads mostly lost
 - 1 tank load partially lost
- Polypropyl Glycol: 1 tank car, most of load lost

⁵⁸ [EPA Release of Substances Involved in Derailment](#)

- Butyl Acrylates: 1 tank car, entire load either spilled or burned off
- Petro Oil: 1 tank car, small leak of unknown amount into soil and groundwater
- Polyvinyl: 2 hopper cars, majority burned off
- MEDCL, CTN, Balls: 1 box car, completely burned
- Sheet Steel: 1 box car, majority burned off
- Frozen Vegetables: 1 box car, majority burned off
- Powder Flakes: 1 hopper car, partially burned off

Substances involved in the derailment but were not released:

- Polypropylene: 2 hopper cars
- Dipropylene Glycol: 1 tank car
- Propylene Glycol: 1 tank car
- Isobutylene: 1 tank car
- Benzene: 2 tank cars
- Paraffin Wax: 1 tank car
- Hydraulic Cement: 1 hopper car
- Passenger Automobiles: 1 autorack car
- Malt Liquors: 9 box cars

When assessing the health and environmental harms that have come from this derailment, it is substantially more complicated than a standard chemical spill, due to the fact that such a substantial amount of the substances that were released were done so via burning. Many of the substances that have now dispersed themselves across surface waters of the region, have very different effects once they are burned off. There are substantial deposits of currently unknown but clearly visible chemicals across the surrounding creeks, along with fish and livestock die-offs twenty miles from the crash site.⁵⁹

Vinyl chloride is a hazardous chemical that is primarily used in the manufacturing of PVC (polyvinyl chloride) plastic.⁶⁰ According to Dr. McBride, a professor of Soil and Crop Sciences at Cornell, vinyl chloride is exceptionally mobile in its ability to spread through soil and water.⁶¹ Unfortunately at this time, it is unknown how much of the tens of thousands of gallons, or 1.1 million pounds, of lost vinyl chloride is currently in the soil of East Palestine, and in the ground and surface water of the Ohio River Watershed, due to the amount that was burned off.⁶² In the form in which it was transported, vinyl chloride is highly

⁵⁹ <https://www.usatoday.com/story/news/nation/2023/02/17/east-palestine-ohio-train-derailment-water/11282711002/>

⁶⁰ <https://news.cornell.edu/media-relations/tip-sheets/vinyl-chloride-highly-mobile-soils-and-water-east-palestine-area-farmers>

⁶¹ *Id.*

⁶² <https://www.usatoday.com/story/news/nation/2023/02/16/train-derailment-norfolk-southern-vinyl-chloride-ohio/11274194002/>

carcinogenic. Exposure is associated with a substantial increase in a rare form of liver cancer, along with primary liver cancer, brain and lung cancers, and leukemia and lymphoma.⁶³

And yet, vinyl chloride was only one of a few highly carcinogenic hazardous substances involved in this derailment. How long until this chemical is spread throughout the Ohio River Basin, in both Ohio and Pennsylvania? How many wells in the region have been poisoned through groundwater infiltration? What will happen to affected crops and livestock? The impact of this incident will be long-term and affect every aspect of this community, and should give regulators pause before increasing the number and quantity of these hazardous substances traveling by rail through these communities.

Norfolk Southern, in a move independent of Unified Command,⁶⁴ made the unilateral decision to intentionally burn off what hadn't already entered the soil and surface water in a "controlled explosion."⁶⁵ Part of the rationale, besides just wanting to clear the railway as fast as possible for Norfolk Southern's benefit, was that mixture of vinyl chloride with the other hazardous and flammable substances involved in the derailment would cause an even worse explosion along with the above described "highly mobile" nature of it.⁶⁶ While it could be argued that there were no "good" choices to be made in this situation, Norfolk Southern merely created different problems from having to deal with the spill and release of so many different hazardous substances.

First with vinyl chloride, when burned it releases phosgene gas, a substance that was previously a chemical weapon in WWI which causes severe upper respiratory harm⁶⁷ and hydrochloric acid, one of the known causes of acid rain.⁶⁸ A sky darkening plume of these substances has now spread across the region. And while Norfolk Southern's response was based largely on the vinyl chloride, the response impacted all of the hazardous substances involved. Butyl acrylate was burned off, which causes dangerous skin irritation, and sometimes permanent respiratory damage.⁶⁹ Two hoppers full of plastic made from vinyl chloride were burned. And not even to mention the two full cars full of benzene, a highly carcinogenic substance, that thankfully were not involved in the derailment.

Regardless of the efficacy in the action of Norfolk Southern and/or the Unified Command, and what would have been a better response to this catastrophe, there is no completely safe way to handle a spill of so many hazardous substances. The logistical negligence of Norfolk Southern matched with the inadequate regulation of railways, allowed for a single train to be 150 cars long, and contain at least ten different hazardous substances. Would PHMSA allow the addition of another, especially one as flammable and potentially explosive and unstudied as cryogenic ethane, to be the eleventh? With outdated

⁶³ <https://www.cancer.gov/about-cancer/causes-prevention/risk/substances/vinyl-chloride>

⁶⁴ Letter from Josh Shapiro

⁶⁵ <https://www.npr.org/2023/02/06/1154760911/ohio-train-derailment>

⁶⁶ <https://www.npr.org/2023/02/16/1157333630/east-palestine-ohio-train-derailment>

⁶⁷ <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3841534/>

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[https://chem.libretexts.org/Bookshelves/Environmental_Chemistry/Green_Chemistry_and_the_Ten_Commandments_of_Sustainability_\(Manahan\)/10%3A_Blue_Skies_for_a_Green_Environment/10.09%3A_Acid_Rain](https://chem.libretexts.org/Bookshelves/Environmental_Chemistry/Green_Chemistry_and_the_Ten_Commandments_of_Sustainability_(Manahan)/10%3A_Blue_Skies_for_a_Green_Environment/10.09%3A_Acid_Rain)

⁶⁹ <https://www.cdc.gov/niosh/npg/npgd0075.html>

infrastructure, under-regulation, and workplace injustices, our Nation's rail system is wholly ill-equipped to handle the logistics of transporting the hazardous and explosive substances that it currently does. Under these circumstances, PHMSA must not allow for cryogenic ethane to go into tank cars that are unproven to be able to safely transport the substance.

As events in East Palestine unfold, it is clear that Unified Command, Norfolk Southern, local emergency services, and even the Ohio government were completely ill equipped to handle the health, environmental, logistical, and safety concerns that come along with a train derailment carrying multiple hazardous substances. Pennsylvania Governor Josh Shapiro called the intentional burn off of the vinyl chloride and other hazardous carcinogenic substances, "an accelerated and arbitrary timeline to reopen the rail line."⁷⁰ He further went on to explain that Norfolk Southern, as the entity heading Unified Command, chose this option over safer alternatives which would have reduced the health and environmental impact of this derailment but would have kept the rail line closed longer.⁷¹

How can a logistical and regulatory system that allows for Norfolk Southern to make such a decision in the face of such a dramatic and internationally captivating event such as this, be trusted to safely transport a substance as dangerous and novel as cryogenic ethane? Before PHMSA can even begin to consider allowing cryogenic ethane to be transported by companies like Norfolk Southern, there must be a robust overhaul of how this industry is regulated and how regulations will be effectively implemented, and a concrete showing that either new or existing infrastructure can safely transport it.

This must be done, before cryogenic ethane becomes that next previously publicly unknown dangerous substance that the nation learns about on the news. If this incident is not a wake-up call to PHMSA to fundamentally reconsider whether railway transit of highly flammable and highly toxic substances is a viable option with existing infrastructure and existing regulations, it calls into question what the priorities of the agency is. Is it to protect the public and the environment through regulating the industry? Or is it to be an agency more responsive to the interests of industry? If existing infrastructure cannot safely handle the transport of hazardous substances how is it to handle novel and highly dangerous substances using the same tanker cars? These are the questions that PHMSA must answer.

In the face of the risks posed by such a human and ecological health disaster, which is the result of the lack of regulation of this industry, it would be nothing short of recklessness for PHMSA to allow for this special permit to be granted and the transportation of cryogenic ethane to begin. As catastrophic as the incident in East Palestine is, if instead of five tanker cars of vinyl chloride, it was five tanker cars of cryogenic ethane, the discussion would be surrounding the burning crater in which the town used to reside. While the "controlled explosion" of the vinyl chloride might have been purposeful in the case of East Palestine, a derailment of similar scale and magnitude involving cryogenic ethane, would likely lead to a

⁷⁰ <https://www.alleghenyfront.org/shapiro-rips-train-company-for-prioritizing-track-reopening-over-safer-approach-after-derailment-norfolksouthern/>

⁷¹ *Id.*

catastrophic explosion regardless. This is due to the specific types of explosions that could occur with cryogenic ethane called Deflagration to Detonation (DDT).

As further examined by commenter Coralie Pryde, a DDT explosion is when a mixture of flammable substances and air ignite and disperse via deflagration which is subsonic “slow moving” shockwaves that spread the explosive substance over a greater radius, before some force causes that dispersed mixture to combust and detonate.⁷² This transition causes shockwaves similar to that of a bomb, making the radius of the area affected substantially larger than that of just the fireball from the ignition.⁷³ This is inherently more dangerous than other types of explosions from other flammable substances.

The most recent and harrowing example of such an explosion would be those that destroyed the Port of Beirut in 2020, when a warehouse full of burning ammonia nitrate suddenly exploded killing hundreds, and leveling an entire section of the city.⁷⁴ Ethane has already been proven to cause these types of explosions. In a study simulating a DDT explosion at a plant either producing or using large quantities of ethane, found that under correct conditions an ethane fire or accident could lead to a DDT.⁷⁵ This study was initially done to understand more about how DDTs occur, due to the relative lack in understanding of them, and determined that ethane could pose a massive risk of causing a DDT.⁷⁶ It further highly recommended that infrastructure handling or manufacturing large quantities of ethane should put in any safety parameters necessary to prevent such an accident stating that whatever costs involved would be a small fraction of the cost of a full DDT incident.⁷⁷ The magnitude of a DDT or any type of explosion is magnified by drastic changes in pressure and temperature. In order to be stable, cryogenic ethane must be very low temperature and very high pressure, two factors which would make the transition in a DDT that much more violent and destructive. The greater the change the greater the reaction.

And while there have been no large DDT incidents related to cryogenic ethane, it has still been a source of dangerous explosions. Just a few weeks ago a fire at a cryogenic ethane plant in Washington County, Pennsylvania occurred sending shock waves that shook the houses of nearby residents and was unable to be put out for 11 hours.⁷⁸ A shelter-in-place order for the surrounding community was sent out, and all of this was from a relatively small fire that only had burn off and detonation, not DDT.⁷⁹ Furthermore it occurred at a plant that specifically has personnel, equipment, and procedures for how to handle such a fire. Now imagine something similar happens on a train loaded with tank cars in a town like East Palestine, going through the cities of Pittsburgh or Philadelphia, or adjacent to a major river?

⁷²Investigation of Deflagration to Detonation Transition for Application to Pulse Detonation Engine Ignition Systems E. Schultz, E. Wintenberger, J. Shepherd California Institute of Technology

⁷³ *Id.*

⁷⁴<https://link.springer.com/article/10.1007/s00193-021-01031-9>

⁷⁵<https://www.sciencedirect.com/science/article/abs/pii/S0950423015001060>

⁷⁶ *Id.*

⁷⁷ *Id.*

⁷⁸<http://www.paenvironmentdigest.com/newsletter/default.asp?NewsletterArticleID=57148&SubjectID=2>

⁷⁹ *Id.*

The Gas Innovations application states that the company plans to initiate the trains from Marcus Hook, Pennsylvania, located on the Delaware River within the busy Delaware River Ports, near dense populations in southeastern Pennsylvania, southern New Jersey, and Delaware, ten miles from Wilmington, Delaware and less than a half hour from Philadelphia, Pennsylvania and Camden, New Jersey. The inherent risk that cryogenic ethane presents makes it far too dangerous to be transported over rail and through communities. When issues in regulatory and safety coverage are combined with self-interested responses from railway companies like Norfolk Southern, and matched with the highly volatile and somewhat unstudied nature of how of a possible cryogenic ethane DDT could occur, it could become an issue of *when* the true nature of such an explosion can be determined if it is allowed to be transported over rail. There is simply not enough data about the dangers involved in what would happen if cryogenic ethane is part of a train derailment, and for that reason alone PHMSA should prevent it from occurring.

IV. Conclusion

For the reasons stated above, and the additional reasons stated in DRN's January 4, 2023 comment, PHMSA should promptly deny Gas Innovation's Application.

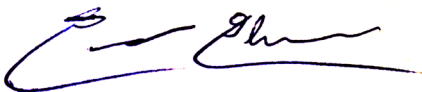
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