August 7, 2019

Re: **Proposed Special Permit SP 20534, Docket PHMSA-2019-0100**

Delaware Riverkeeper Network (DRN) submits this comment in opposition to the proposed Special Permit (SP) that would allow rail cars to carry Liquefied Natural Gas (LNG) on the nation's railways. The Special Permit poses unacceptable dangers that cannot be justified. The proposed transport of LNG by DOT 113C120W tank cars is unsafe and the threats that result from the wholly inadequate review process and Environmental Assessment (EA) are completely avoidable by either rejecting the application for a Special Permit or by requiring the appropriate process to be completed – a full Environmental Impact Statement (EIS) under the National Environmental Policy Act (NEPA). Approval of the SP without an EIS would violate NEPA because the substantial and complex impacts have not been adequately assessed in the EA and the potential for human and environmental harm are great. DRN advocates that the proposed SP be denied and, if PHMSA is to consider the allowance of rail transport of LNG, that a full EIS be conducted with the opportunity for robust and diverse public participation across the nation.

NEPA is our "basic national charter for protection of the environment."[1] NEPA makes environmental protection a part of the mandate of every federal agency[2] by requiring that federal agencies take environmental considerations into account in their decision-making "to the fullest extent possible."[3] Pursuant to NEPA, federal agencies must consider environmental harms and the means of preventing them in a "detailed statement" before approving any "major federal action significantly affecting the quality of the human environment."[4] This required analysis serves to ensure that "the agency will not act on incomplete information, only to regret its decision after it is too late to correct."[5] Approval of the use of tank cars to transport LNG definitely meets the standard of requiring NEPA review.

The use of the DOT 113C120W tank cars for LNG transport requires testing, design specification analysis, regulations that govern conditions of use, and wide public review and input. The DOT 113C120W cars have not been proven safe for the extreme and unique requirements of LNG.

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[1] 40 C.F.R. § 1500.1(a).
[2] *See* 42 U.S.C. § 4332(1).
[3] 42 U.S.C. § 4332.
[4] Id. § 4332(2)(C).
[5] *Marsh v. Oregon Natural Res. Council*, 490 U.S. 360, 371 (1979).

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The bulk transportation of LNG by rail tank car is prohibited today. A small number of special permits have been granted. DRN advocates that this prohibition continue to protect human health, safety, and the environment.

The SP would allow unit trains, up to 100 cars, to transport LNG, subjecting railways to long, heavy, hard-to-handle trains. These trains pose threats due to:

- *no stated limit on train length,*
- *no stated maximum allowable car weight,*
- *allowing a maximum speed of 50 mph with no empirical data to support that speed; it exceeds by 25 percent the maximum allowable speed of 40 miles per hour proposed by the Federal Railroad Administration for oil trains traveling near major population centers,*
- *no BLEVE (boiling liquid evaporating vapor explosion) modeling, and*
- *no analysis of "limited zone of hazard" beyond labeling it "significant",*
- *complete lack of permit restriction to avoid routing through densely populated centers.*

Safety and human health issues:

LNG is inherently dangerous due to the nature of the product, which must be kept frozen at extremely low temperatures, ~260 degrees F, and, when released transforms into a gas that is at least 600 times greater in volume than the cryogenic material. PHMSA's EA at pages 6 and 7 outline the safety and human health hazards associated with LNG and its release.

> "LNG poses potential cryogenic temperature exposure hazards as well as fire and explosion hazards. Due to a large difference in temperature, the rapid transfer of heat from an object into the cryogenic liquid can cause burns if direct contact of liquid with skin occurs or if Personal Protective Equipment (PPE) is inadequate to prevent cold-temperature injury during an exposure. Additionally, large spills of the liquid onto metal structures can cause embrittlement and fracturing. Methane is odorless and LNG contains no odorant (unlike odorized residential natural gas supplies), making detection difficult without a flammable gas detector device."
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> "Releases of LNG due to venting or to accidents involving either a MC-338 cargo tank or a DOT-113C120W have the potential to create flammable clouds of natural gas. Large releases of LNG due to the breach of the inner tank of a tank car could pose pool fire, vapor fire and explosion hazards, which pose the highest potential impacts when compared to localized cryogenic hazards."
> (EA, Pp. 6, 7)

Thus, catastrophic events can result from release of LNG. The dangers are well known to government regulatory agencies, which have advised that LNG facilities and storage areas be kept in remote areas, away from human populations, sensitive ecological systems and infrastructure. This alone should meet the requirements for the performance of an EIS.

DOT 113C120W rail tank cars are a 50-yr-old design, which has never before been authorized for LNG service. The comparison with current use of these cars is not valid due to the difference in properties of LNG. No rail tank car standards for transport of LNG have yet been established. The transport of LNG by rail should not be approved without specific design for LNG tank cars.

PHMSA's EA agrees that response to a broken cryogenic tank car is very difficult for first responders and fire companies and risks catastrophe due to the great potential for explosions and large fires. The response is essentially to evacuate the area since a methane gas-fueled fire cannot be extinguished. Certainly, the huge volume of a gas cloud (600 times greater than the liquid) released from a breached LNG tank as well as the instance where a tank car is engulfed in fire compounds the potential for catastrophe in populated areas and for communities that are along the transportation route. The result is not only fire but can also result in a bomb-like explosion that is similar to a thermogenic event - literally a bomb.

In case of an LNG-by-rail fire and/or an explosion, PHMSA appears unable to adequately define the hazard zone and the risk to nearby populations. PHMSA refers to a *"*limited zone of hazard" and labels it "significant." Neither term is defined, leaving first responders, health professionals, planners and concerned citizens in the dark as to how extensive that hazard zone is, and the nature and degree of risk posed within that zone. PHMSA does state, "…exposure to heat from an LNG pool fire or ignition of LNG vapors could result in fatalities, serious injuries, and property damage for those within the limited zone of hazard." PHMSA also states:

> "Response and mitigation techniques beyond evacuation for breaches in cryogenic tank cars do not exist or are impractical during a derailment scenario. Breach of a cryogenic tank car will result in the loss of the entire volume of material in the tank car. Incidents are rare, though rail impacts can be high-consequence, given the quantity of hazardous materials in transportation." (EA, P. 7)

Unfortunately, there are instances of serious damage to DOT 113C120W rail tank cars during transportation, including instances where a DOT 113C120W car lost cargo due to breach of both its outer and its inner tanks. Should the outer and inner tanks of a car carrying LNG be breached, such as during derailment, the results could be a catastrophic explosion and fire, as discussed below. However, the record of use of the DOT 113C120W rail tank car is very limited nationally considering that in 2015 only about 13,000 were used, a tiny proportion of the 2.3 million railcars used annually according to Association of American Railroads estimates for all hazmat rail cargoes. Today, there are reportedly very few of the DOT 113C120W rail tank car are in service. Therefore, making reasonable estimates from the historical record of the DOT 113C120W rail tank car's likely performance in future derailments is not reasonable. It is known, however that a serious puncture of this rail car is likely to release the entire refrigerated cargo, risking disaster. This is one of the most compelling reasons that a thorough EIS is required to fully assess the potential for harm within specified distances of a release or accident.

New information has shown that LNG can cause a catastrophic BLEVE or Boiling Liquid Expanding Vapor Explosion if the vessel is exposed to high temperatures or a fire. The expansion of the liquid LNG in a vessel causes the pressurized liquid to boil, and the gas takes up more room than the liquid, stressing the container as pressure builds. Relief valves are only designed to release pressure slowly to keep equilibrium in the pressurized container. Exposed to high heat, the valve will fail to keep up and the metal will weaken, cracks will result in the container, causing LNG to be released with an explosion. The result is a BLEVE, a catastrophic failure of the container. There are many incidents over the years of BLEVE catastrophes, some as recent as 2019, but the fact that a BLEVE can occur with LNG has only recently been established.

When the gas or vapor cloud in the container is released, because it is flammable it is likely to ignite after the BLEVE, typically causing a fireball that burns fast, hot and wide. A fuel air explosion can also occur,

known as a “vapor cloud explosion”. A vapor cloud explosion is the mechanism used in a thermobaric weapon that uses air to generate a high-temperature explosion, producing a long duration blast wave. These weapons are also termed a fuel-air bomb. This is the threat that LNG storage and transport brings to the Gibbstown region and to every traffic route used to carry the LNG to the Delaware River and on the river during export.

On dry land such as a terminal where LNG is stored or is contained in tankers on trucks or rail cars, a BLEVE where there is no liquid in the local environment to absorb the heat, can rupture even faster than a vessel on water. Truck transport regulations are being closely examined due to an increase in accidents involving truck transport of LNG. While it used to be assumed that truck transport had a low potential for explosion or fire, an accident in Spain changed that:

> In 2002, an LNG truck in Spain flipped over, burned, then exploded into a 500-foot fireball that killed the driver and burned two others. ‘The severity of this kind of explosion is something people haven't usually considered applicable to LNG trucks,’ says Jerry Havens, former director of the Chemical Hazards Research Center at the University of Arkansas. ‘But what happened in Spain changes that picture. It shows you've got the potential for a massive explosion’.

In the accident in Spain, a BLEVE occurred, which resulted in death to the driver and burns to two people approximately 650 feet away, and threw large flaming debris, including the truck’s diesel engine, for 853 feet. A similar LNG truck accident with a catastrophic fire occurred in Spain in 2011, killing the driver. It was pointed out by an analyst in Savanna Georgia during debate over LNG truck transport that a pool fire and and/or explosion involving an LNG truck may have a low probability, but it has a high consequence with instant injuries or death for those within several hundred feet. The chances, according to the analyst, of an LNG truck accident are 200 to 1. This is a great risk for populated areas and truck routes through urban centers. The potential impacts of the transit of trucks to the site and the parking, movements, unloading and exit of the trucks must be fully examined for risk of accidents and resulting damage to people and the environment.

In the event of a release of LNG, the LNG must gas off naturally, as the container cannot be capped or interacted with, the area must be immediately evacuated and secured, ignition sources must be eliminated, and water cannot be used, as the release is cryogenic. Water can plug the valves of the container with ice and any cold air release can freeze skin in seconds and can even turn air to liquid or solid form, removing oxygen, an obvious disaster for anyone in the area. The potential for such explosion alone should require an EIS to be conducted.

Climate change issues:

The impacts of greenhouse gas emissions that will be released as a result of the upstream and downstream greenhouse gas emissions – cradle to grave – of methane are substantial must be considered by PHMSA. Methane is a highly potent greenhouse gas with a greater efficiency at warming the atmosphere than any other fossil fuel. It is 86 times more powerful than carbon on a 20-year time scale and over 100 times more potent on a 10-year time scale. These 10 and 20-year periods are those that are the most important today as we globally face tipping points from which our planet will not be able to recover. Already societies are suffering from the impacts of global climate change, with the worst of the impacts being borne by those already bearing the heavy price of dirty energy and other hazardous environmental impacts. Furthermore,

fracking is ruining communities and the environment where it is occurring today across the nation and in Pennsylvania, the second largest producer of natural gas and one of the Delaware River Watershed states. Harms are being experienced in the form of environmental degradation of water and air quality and adverse health effects of fracking, materializing as alarming public health trends and incidents. (https://bit.ly/30kqe4u and https://www.psr.org/blog/resource/compendium-of-scientific-medical-and-media-findings-demonstrating-risks-and-harms-of-fracking/) These impacts must be fully considered in an EIS by PHMSA.

Methane and carbon are leaked, released or burned through the full life cycle of the hydraulically fractured (fracked) gas produced for transport by rail – from extraction by fracking through delivery systems such as pipelines and compressors to the liquefaction plant, the processing at the LNG liquefaction plant, the transport by rail to the export terminal, any interim storage, the transloading of the material and the storage in the ocean-going vessel and then the final re-gasification of the LNG and its end use.

As explained in an article about LNG-powered ships in Washington State, natural gas is composed mostly of methane, which is one of the four major greenhouse gases and a culprit in the global warming of our atmosphere, exacerbating climate change. Moreover, methane leaks throughout the entire gas development process, from fracking at the extraction well, through pipeline and compressor delivery systems, during storage and in end use such as power plants and gas processing and petrochemical facilities, including when it is used for fuel in shipping. The article states "The International Coalition for Clean Transportation estimates 2.2-4.6% of methane on ships escapes into the atmosphere after passing through the engine without combusting. This is known as methane slip and its rate depends on the type of engine."[6]

It explains further, that "Again, LNG is composed chiefly of methane, which is itself a nasty greenhouse gas – 86 times worse than CO2 over a 20 year span and 36 times worse over a 100 year span. New research actually suggests that those numbers may be underestimated by as much as 14%. This means that we don't want to be adding any more methane to the atmosphere and, in fact, scientists point out that we can have more immediate impacts on lessening climate change by reducing methane since it doesn't last as long in the atmosphere as CO2. Alarmingly, US methane emissions have risen 30% in the past decade thanks mostly to the central US, a hotbed of fracking."[7]

Energy Transport Solutions

Energy Transport Solutions (ETS), a subsidiary of New Fortress Energy, submitted an application for the transport of LNG by rail tank cars with a goal of exporting LNG for sale overseas. While the origins and the destinations of the LNG that would be transported by ETS were redacted from their application, DRN is aware of the plans for the delivery of LNG from a proposed LNG liquefaction plant in Wyalusing Township, Bradford County, PA to the Gibbstown Logistics Center, a deepwater port terminal in Gibbstown, Gloucester County, NJ on the Delaware River. We are opposed to this plan and to addition of LNG to the export cargo allowed at the Gibbstown facility. See https://www.delawareriverkeeper.org/sites/default/files/DRN%20Comment%20to%20ACE%20re%20Gibbstown%20LNG%20supmntl%20%282019-07-31%29.pdf and https://www.delawareriverkeeper.org/sites/default/files/Fact%20Sheet%20Gibbstown%20Logistics%20LN

[6] Villa, Daniel, *The Origins of LNG as a Maritime Fuel*, 350 Tacoma, June 21, 2018. Available at **https://www.350tacoma.org/the-origins-of-lng-as-a-maritime-fuel/.**

[7] Ibid.

G%20ltrhd_0.pdf). Permits are still outstanding but New Fortress Energy is very actively pursuing the necessary approvals. The communities that will be negatively impacted by the full life cycle of the fracked LNG that would be exported from the Delaware River Watershed include: the Pennsylvania shale field locations where the fracking would occur; Wyalusing Township, Bradford County, where the liquefaction plant would be built; the rail routes that would carry the LNG from Bradford County, at least 175 miles through Pennsylvania and New Jersey; the Gibbstown, NJ residents and Gloucester County residents where the Gibbstown Logistics Center Dock 2 would be built to ship LNG down the Delaware River; the Delaware River communities in Southeastern PA, in Delaware and in New Jersey where the LNG shipping vessels would travel; the current operations that occur on the Delaware River, Estuary and Bay that would be impacted by the dangerous transport of LNG; the ocean waters that would be traveled; the receiving ports such as Puerto Rico and Jamaica where New Fortress Energy now operates and other ports they have stated publicly where they will sell and finally burn the LNG. All of these human communities will be impacted and must be considered. Furthermore, the fish, wildlife, aquatic species, and other non-human communities as well as the environment and its ecological resources that will be impacted through this "cradle to grave" pathway must be considered in an EIS by PHMSA.

DRN opposes the SP and urges PHMSA to deny the permit and, if it moves ahead with considering LNG by rail, DRN states that under NEPA an EIS is required and must be performed by PHMSA.

Thank you for the opportunity to comment.