



Credible.  
Independent.  
In the public interest.

July 20, 2023

Alan K. Mayberry  
Associate Administrator for Pipeline Safety  
Pipeline and Hazardous Materials Safety Administration  
U.S. Department of Transportation  
1200 New Jersey Ave., SE  
Washington, D.C. 20590

**Re: Comments of the Pipeline Safety Trust on PHMSA's Public Meeting on CO<sub>2</sub> Pipeline Safety Regulations**

Dear Mr. Mayberry:

Thank you for the opportunity to submit comments regarding the public meeting held in Des Moines, IA about PHMSA's upcoming CO<sub>2</sub> regulations. We appreciate that the meeting was held in the Midwest, where many of these pipelines are proposed to be constructed, and where many communities have expressed safety concerns. We commend you for holding a truly transparent meeting and for allowing a diverse set of stakeholders to speak and be heard. We offer the following items for your consideration in developing regulations on CO<sub>2</sub> pipeline safety under RIN 2137-AF60 as expediently as possible.

**1. PHMSA must clarify its jurisdiction over pipeline safety.**

Throughout the meeting, members of the public, local government representatives, and regulated entities expressed confusion about the extent of PHMSA's jurisdiction over matters such as setbacks, zoning, routing, emergency planning and response, and the issue of preemption. Many individuals also commented that operators proposing projects in their area had made false and/or misleading assertions about the legal and regulatory landscape.

We urge PHMSA to clarify its jurisdiction over these matters and provide general guidance about the matter of preemption of state and local laws relating to CO<sub>2</sub> pipeline safety. PST asks that PHMSA emphasize the fact that local and state lawmakers *do* have the authority to promulgate laws that relate to siting of pipelines, such as setbacks, zoning, and routing limitations. It should also explain that there is legal precedent establishing that local and state governments have jurisdiction over emergency response and the ability to develop their own emergency response plans. PHMSA could also include an explanation of its jurisdiction and the issue of preemption in its explanation of need in its notice of proposed rulemaking on the CO<sub>2</sub> rule. Providing this information proactively will reduce the amount of confusion and tension between operators, state and local governments, and community members, and improve the level of safety in these communities by empowering them to act within jurisdictional bounds.

**2. PHMSA must address significant regulatory and scientific gaps in its rulemaking.**

At the meeting, parties identified key regulatory and scientific gaps that are unaddressed by PHMSA's current regulations. For the public to have any confidence in the safety of the pipelines proposed through communities, regulations need to be modernized. PHMSA should act now to address the

regulatory gaps and ensure that if scientific uncertainty exists that affects pipeline, public, or environmental safety, that proper research is conducted to close those gaps.<sup>1</sup>

As PHMSA is well aware, the primary gap associated with CO<sub>2</sub> pipelines is the fact that its regulatory definition does not cover all physical states. With its current definition, PHMSA's regulations only apply to pipelines transporting carbon dioxide in a supercritical state, meaning that gas and subcritical liquid CO<sub>2</sub> pipelines are unregulated.<sup>2</sup> PHMSA must update its definition of CO<sub>2</sub> to include all phases during transport.

Further, given CO<sub>2</sub>'s physical properties, these pipelines will likely require a unique, comprehensive set of regulations distinct from existing standards which are largely designed for the transport of traditional hydrocarbons. Given the multiple physical states CO<sub>2</sub> will be transported by pipeline as well as its unique properties and safety risks, PHMSA should allot CO<sub>2</sub> its own section of code. This section should have regulations that cover the following issues:

- *Geohazards*: Although operators are required to identify and develop plans to mitigate all potential threats to pipeline integrity in High Consequence Areas as part of their integrity management plans, there's nearly nothing required on geohazards for areas outside high consequence areas (HCAs). PHMSA should require geohazard mitigation plans on the entire length of CO<sub>2</sub> pipelines given the unique risk of fracture propagation and the fact that CO<sub>2</sub> plumes can travel and envelop communities miles away from the point of failure.
- *Fracture Mitigation*: The appropriate fracture toughness and steel pipe quality is currently unknown to prevent CO<sub>2</sub> pipelines from leaks or ruptures.<sup>3</sup> More research is needed to develop pipe quality standards and strategies for the correct placement of fracture mitigation measures along these pipelines. PHMSA should also require crack arrestors at appropriate intervals through the entire length of a CO<sub>2</sub> pipeline.
- *Odorization*: Carbon dioxide is odorless and colorless, making detection by first responders and the public difficult. PHMSA should require odorization for the transport of CO<sub>2</sub> via pipeline to make leak detection easier.
- *Dispersion Modeling*: The unique physical properties of CO<sub>2</sub> can dramatically increase the size and scope of the impacted area of a rupture. Weather, terrain, and atmospheric pressure affect how quickly CO<sub>2</sub> will dissipate and how far the product will migrate away from the failure site. PHMSA should require that operators conduct dispersion modeling on CO<sub>2</sub> pipelines that takes these factors into account. Further, PHMSA should consider lessons learned with Denbury's ruptured CO<sub>2</sub> pipeline in Satartia, Mississippi and ensure that dispersion modeling is realistic and appropriately conservative. Dispersion modeling should also be available to the public so that individuals can be informed about safety risks and enable emergency response planning.
- *Impurities*: Historically, CO<sub>2</sub> pipelines have transported relatively dry and pure CO<sub>2</sub> from natural sources. However, the expansion to anthropogenic sources of CO<sub>2</sub> has the potential to lead to significantly higher water content and impurities introduced into pipelines, such as hydrogen

---

<sup>1</sup> Pipeline Safety Trust, *Summary for Policymakers: Carbon Dioxide Pipeline Safety* (May 2023) [https://pstrust.org/wp-content/uploads/2023/06/carbon\\_dioxide\\_pipeline\\_safety\\_summary\\_6\\_21\\_23.pdf](https://pstrust.org/wp-content/uploads/2023/06/carbon_dioxide_pipeline_safety_summary_6_21_23.pdf) (hereinafter "Summary for Policymakers").

<sup>2</sup> 49 C.F.R. § 195.2.

<sup>3</sup> PHMSA, Pipeline Safety Research and Development: Research Announcement # 693JK322RA0001 <https://primis.phmsa.dot.gov/matrix/FilGet.rdm?fil=16583>

sulfide, methane, carbon monoxide, oxygen, nitrogen oxides, sulfur oxides and hydrogen. In addition, carbon dioxide mixed with water can form carbonic acid which is extremely corrosive to the internal surface of the pipe. Carbonic acid also forms much more quickly once the water content has surpassed the product's solubility level. Impurities can reduce the solubility level of CO<sub>2</sub> leading to unexpectedly rapid corrosion. PHMSA should establish regulations setting specific maximum contaminant levels for CO<sub>2</sub> pipelines. PHMSA should also require reporting on contaminant levels and blending on CO<sub>2</sub> pipelines.

- *Leak detection:* Further research is needed on technologies appropriate for detecting leaks on CO<sub>2</sub> pipelines. PHMSA should also clarify whether the new Advanced Leak Detection rule will apply to gas-phase CO<sub>2</sub> pipelines.

### **3. PHMSA should update its incident reporting regulations.**

PHMSA can only regulate against issues that it is aware of. Unfortunately, shortcomings in PHMSA's incident reporting regulations keep it in the dark because its regulations only require reporting if certain thresholds are met. Consequently, many large and potentially dangerous incidents are not reported to the administration. For example, after Denbury's CO<sub>2</sub> pipeline ruptured outside of Sartoria, MS, the operator was not required to report the fact that over 40 people were sent to the hospital because the regulations only required that incidents requiring inpatient hospitalization be reported. Because of insufficient reporting, PHMSA's safety data likely underrepresents incident prevalence and that the opportunity to use these incidents as a learning opportunity is lost.

Though it is the Trust's position that PHMSA's current incident reporting regulations are insufficient with respect to gas and liquid lines, the regulations are especially inappropriate for CO<sub>2</sub> pipelines given the dire public health risks associated with CO<sub>2</sub> exposure. As such, PHMSA should redefine a reportable injury to:

Bodily harm to any person resulting in one or more of the following:

- Loss of consciousness,
- Necessity to carry a person from the scene,
- Necessity for medical treatment, or
- Disability which prevents the discharge of normal duties or the pursuit of normal duties beyond the day of the accident.<sup>4</sup>

### **4. PHMSA must clarify its conversion of service regulations.**

Because of financial incentives, operators are looking for any way to transport CO<sub>2</sub> via pipeline, including by transitioning existing gas pipelines to carry CO<sub>2</sub>.<sup>5</sup> However, no federal safety standards exist for this process. CO<sub>2</sub> does not have the same attributes as methane, and thus the brief regulations meant to cover gas conversions<sup>6</sup> are likely insufficient or irrelevant. Gas pipelines are notoriously leaky,<sup>7</sup> and converting those lines to transport another greenhouse gas would reduce the climate benefit if it never made it to its ultimate destination and place frontline communities at serious health and safety risk.

---

<sup>4</sup> PST makes this recommendation based upon Louisiana Department of Natural Resources' updated regulations governing the safety of pipelines used to transport Carbon Dioxide. LA. ADMIN. CODE tit. 43, § 4101 (2023).

<sup>5</sup> Nicholas Kusnetz, *Rush to Build Carbon Pipelines Leaps Ahead of Federal Rules and Safety Standards*, INSIDE CLIMATE NEWS (July 1, 2023) <https://insideclimatenews.org/news/01072023/carbon-pipelines-safety-standards/>.

<sup>6</sup> 49 C.F.R. § 192.12.

<sup>7</sup> Ramon A. Alvarez, et al., *Assessment of Methane Emissions from the U.S. Oil and Gas Supply Chain* 361 SCIENCE 186 (June 21, 2018) <https://www.science.org/doi/10.1126/science.aar7204>.

PHMSA's new regulations must ensure that any conversion of gas pipelines to CO<sub>2</sub> service is done safely and only in pipelines that will be able to keep the product in the pipe. We suggest that PHMSA consider the scientific knowledge gaps that exist with respect to CO<sub>2</sub> pipelines when drafting these requirements,<sup>8</sup> and consider the fact that it may not ever be appropriate for gas lines to be converted to transport CO<sub>2</sub>. We also suggest that PHMSA consider whether integrity issues on gas pipelines could be aggravated by transporting CO<sub>2</sub> in these lines, especially given the fact that gas-phase CO<sub>2</sub> from dirty sources used for CCS is likely to have far more contaminants than the natural form of CO<sub>2</sub> that has been transported via pipeline in the past.

PHMSA needs to be especially diligent in regulating conversion to dense phase CO<sub>2</sub>, either subcritical liquid or supercritical fluid. Given the high pressure required to maintain the dense phase and the extreme temperature changes after a failure or loss of pressure, it may not ever be possible to safely convert a pipeline built for traditional hydrocarbons to dense phase CO<sub>2</sub> service.

**5. PHMSA should engage directly with and ensure that environmental justice communities do not face disproportionate impacts of CO<sub>2</sub> pipelines.**

Pipeline infrastructure burdens America's most vulnerable communities. Tribal nations, people of color, and rural areas tend to face disproportionate burdens of pipelines, such as noise, reduced property value, health and safety risks from leaks and explosions, and cultural harms.<sup>9</sup> Transmission and gathering pipelines are often located in rural areas that are frequently discounted during analysis of environmental and cultural effects of pipeline operation and construction. Distribution lines in densely populated communities are often routed through the "path of least resistance," disenfranchised communities, often communities of color.<sup>10</sup> These communities may also face problems associated with less frequent inspections and longer repair schedules due to their remote nature and/or "danger" discouraging operators from returning.<sup>11</sup>

Emergency response in these communities can also vary greatly. In urban and rural communities, emergency responders lack resources, staff, and training appropriate for responding to CO<sub>2</sub> pipeline incidents.<sup>12</sup> Rural communities face additional challenges because people live in more remote areas and many emergency response departments consist solely of volunteers.<sup>13</sup>

---

<sup>8</sup> Summary for Policymakers, *supra* note 1.

<sup>9</sup> Ryan E. Emanuel, et al., *Natural Gas Gathering and Transmission Pipelines and Social Vulnerability in the United States*, 5 GEOHEALTH 6, May 18, 2021 <https://agupubs.onlinelibrary.wiley.com/doi/10.1029/2021GH000442>.

<sup>10</sup> E.g. Wraight, S., Hofmann, J., Allpress, J., and Depro, B. (2018). *Environmental Justice Concerns and the Proposed Atlantic Coast Pipeline Route in North Carolina*. RTI Press Publication No. MR-0037-1803. Research Triangle Park, NC: RTI Press. <https://doi.org/10.3768/rtipress.2018.mr.0037.1803>; Catherine Thorbecke, *Memphis Community Celebrates After Crude Oil Pipeline Proposal Scrapped*, ABC News, July 6, 2021 <https://abcnews.go.com/US/memphis-community-celebrates-crude-oil-pipeline-proposal-scrapped/story?id=78692386>.

<sup>11</sup> Zachary D. Weller et al., *Environmental Injustices of Leaks from Urban Natural Gas Distribution Systems: Patterns Among and Within 13 U.S. Metro Areas* 56 Environ. Sci. Technol. 8599, 2022 <https://pubs.acs.org/doi/pdf/10.1021/acs.est.2c00097>; Marcos Luna & Dominic Nicholas, *An Environmental Justice Analysis of Distribution-Level Natural Gas Leaks in Massachusetts, USA*, 162 ENERGY POLICY 112778, 2022 <https://doi.org/10.1016/j.enpol.2022.112778>.

<sup>12</sup> PHMSA heard extensive testimony at the public meeting about the lack of resources available to communities likely to be affected by CO<sub>2</sub> pipelines.

<sup>13</sup> Rural Health Information Hub, *Rural Emergency Preparedness and Response Toolkit: Rural Barriers to Emergency Preparedness and Response* <https://www.ruralhealthinfo.org/toolkits/emergency-preparedness/1/rural-barriers>

PHMSA must take steps in this rulemaking to ensure that these communities do not continue to experience disproportionate impacts of pipeline infrastructure, especially given the serious safety risks of CO<sub>2</sub> pipelines. One mechanism for doing so would be to require operators to truly engage with the public and to disclose more information about plume dispersion modeling, mapping, and the composition of product being transported. It could also require operators to engage in more vigorous emergency planning and communication with local officials in the rule. PHMSA could also require that specialized training and equipment be provided to communities and fund grants for this purpose.

PHMSA should also activate its Community Liaison program to meet the specific needs of environmental justice communities that are likely to feel the impacts of CO<sub>2</sub> pipeline development. As mentioned above, the CL program should engage directly with these communities on pipeline safety education, communicate with local emergency responders, planners, and lawmakers, and prepare informational meetings, fact sheets, and other materials. The CL program should also work with local governments on grants to properly equip, fund, and train emergency responders for CO<sub>2</sub> pipeline incidents.

Finally, PHMSA should also solicit these communities directly about submitting comments into the regulatory docket for this rule and put on seminars to educate the public about how to participate in the comment process.<sup>14</sup>

#### **6. PHMSA should reduce its reliance upon incorporation by reference.**

Finally, we would like to recommend that PHMSA develop its own standards rather than continuing to rely upon those of the industry via incorporation by reference. The process for the development of industry standards lacks transparency since typically members of the public are excluded from participation. Further, these industry standards are not easily accessible to the public and are at times practically unavailable without payment. This removes the review of standards from those outside the industry. This lack of transparency diminishes public confidence in regulatory processes and does not advance continuous improvement in pipeline safety.<sup>15</sup>

Thank you again for the opportunity to submit this comment and for hosting a productive, engaging meeting on pipeline safety. We hope that PHMSA addresses these issues in its upcoming NPRM. If you have any questions about this comment or would like to discuss its contents, please feel free to contact me at [erin@pstrust.org](mailto:erin@pstrust.org) or (360) 543-5686, x107.

Sincerely,



Erin Sutherland  
Policy & Program Director/Counsel

---

(2022); Julia Simon, *The U.S. is Expanding CO<sub>2</sub> Pipelines. One Poisoned Town Wants You to Know its Story*, NPR (May 21, 2023) <https://www.npr.org/2023/05/21/1172679786/carbon-capture-carbon-dioxide-pipeline> (describing emergency response challenges unique to CO<sub>2</sub> pipeline disasters).

<sup>14</sup> PHMSA could emulate FERC's Office of Public Participation, which has put on numerous programs to educate the public about the regulatory process.

<sup>15</sup> For more details on the Pipeline Safety Trust's position on consensus standards and recommended practices, see our Briefing Paper. Pipeline Safety Trust, *Pipeline Briefing Paper #4, Pipeline Safety Statutes, Regulations, Consensus Standards, Recommended Practices* (Feb. 2019) <https://pstrust.org/wp-content/uploads/2019/03/2019-PST-Briefing-Paper-04-StatutesRegs.pdf> (update forthcoming).