HAZARDOUS MATERIALS: REQUEST FOR FEEDBACK ON RECYCLED PLASTICS POLICY

Pipeline & Hazardous Materials Safety Administration
Office of Hazardous Materials Safety
United States Department of Transportation

AMERICAN CHEMISTRY COUNCIL
AND
AMERICAN FUEL & PETROCHEMICAL MANUFACTURERS
COMMENTS

Attention: Docket No. PHMSA-2022-0111 (Notice No. 2022-14)

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I. Introduction

The American Chemistry Council ("ACC")[1] and American Fuel & Petrochemical Manufacturers ("AFPM")[2] respectfully submit these comments on the Pipeline and Hazardous Materials Safety Administration ("PHMSA"), Federal Register notice titled "*Hazardous Materials: Request for Feedback on Recycled Plastics Policy*" (the "Notice").[3] The Notice intends to solicit feedback on the potential use of recycled plastic resins in the manufacturing of specification packaging used for hazardous materials shipments and to better inform future policy decisions in that arena. ACC and AFPM (the "associations") recognize the importance of robust and reliable packaging used to transport hazardous materials and appreciate PHMSA efforts to embrace recycled plastic in its packaging regime.

Our comments provide a high-level overview of the two predominate methods of recycling (mechanical and advanced) to help inform PHMSA's decision and explain why PHMSA should treat plastic packaging created from recycled plastics derived from advanced and mechanical recycling processes no differently than non-recycled plastic packaging if it meets the specification and testing requirements contained in 49 CFR Part 178.

II. The Associations' Interest in PHMSA's Recycled Plastic Policy

The petrochemical and chemical industries are committed to sustainably manufacturing the petrochemicals, derivatives for plastics, and plastics that growing global populations and economies need to thrive. To do this, we need to improve recycling and reuse rates, and develop policies and technologies to address plastic pollution and lower emissions. ACC and AFPM members are committed to collaborating with policymakers to develop sound, risk- and science-based policies to ensure transportation safety and address environmental issues including the complex plastic pollution challenge.

To this end, PHMSA's "*Recycled Plastic Policy*" provides a unique opportunity to ensure transportation safety while supporting the development of a truly circular economy for plastics derived from petrochemicals. The associations appreciate PHMSA's efforts to improve transportation safety while embracing recycled plastic in its packaging regime.

III. Plastics are Critical to a Sustainable Future and Improve Transportation Efficiencies

Petrochemicals and their derivatives are the building blocks that make plastic products. Plastics are lightweight and efficient materials that allow us to do more with less material,

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[1] ACC is the leading, collective voice of the business of chemistry, driving a pro-growth, common sense and science-based public policy agenda that brings forth innovation, creates jobs and economic expansion and enhances public and environmental health and safety. Learn more HERE.

[2] AFPM is the leading trade association representing the manufacturers of base petrochemicals that are the essential building blocks for plastic products that improve the health, safety, and living conditions of humankind and make modern life possible. To produce these essential goods, AFPM member companies rely on a reliable and safe transportation system to move materials to and from refineries and petrochemical facilities and their customers. Learn more HERE.

[3] *See* 88 *Fed. Reg.* 23140, "Hazardous Materials: Request for Feedback on Recycled Plastics Policy" PHMSA-2022-0111 (Notice No. 2022-14), published April 14, 2023.

decrease water usage and food spoilage, and help drive down greenhouse gas emissions in a variety of ways including improving transportation efficiencies. Furthermore, petrochemicals and the plastics derived from them have helped improve the quality of life of the global population and have been a catalyst that has brought millions of people out of poverty and into a growing global middle class.

The 2030 Agenda for Sustainable Development, adopted by the United Nations ("UN"), provides 17 Sustainable Development Goals ("SDGs"). The SDGs are a collection of interlinked objectives designed to serve as a "shared blueprint for peace and prosperity for people and the planet, now and into the future." [4] Achieving the UN SDGs is not possible without petrochemicals and the plastics derived from them. Plastic products are critical to renewable energy, public safety, electronics, food safety and longevity, and modern medicine. Plastic products not only enable us to live longer, but they also help us attain a higher quality of life.

Multiple studies have found that the use of plastic packaging and plastic in consumer products can significantly reduce greenhouse gas emissions when compared to non-plastic alternatives.[5] The outperformance of plastics verses non-plastic alternatives can be attributed to unique physical characteristics of plastics. Plastics are strong and durable yet incredibly lightweight and because of this require much less material to perform similar functions of non-plastic alternatives. The lightweight nature makes plastics, specifically plastic packaging and plastic products, more efficient to move across the global supply chain.

In addition to lightweighting vehicles that move goods, plastic packaging can lightweight the freight itself, while not sacrificing durability or performance. Plastic packaging performs an integral role in ensuring that hazardous materials are transported safely, securely and efficiently. Plastics are a vital source material for the manufacture of packaging used to transport hazardous materials around the world. Plastic drums, jerricans, non-bulk composite packaging, and composite intermediate bulk containers ("IBCs")—as well as some inner packaging that are part of combination packaging— are lighter than their non-plastic alternatives such as glass and metals and can further drive down emissions associated with freight transportation.

The plastics value chain is complex and involves a variety of stakeholders across its entire life cycle. At its most basic level, the plastics value chain can be divided into three areas 1) material production, 2) manufacturing and use, and 3) end of life treatment (disposal, reuse, recycling). The plastic value chain is transitioning away from a linear economy and embracing a circular economy where used plastics are no longer perceived as waste, but rather a valuable feedstock. To achieve circularity in the United States, it will require consistent and rational policies that improve waste management, embrace technology innovations, encourage the use of recycled materials, and incorporate solutions across the entire plastics value chain.

ACC and AFPM members are doing their part by investing in circularity across the globe and partnering with value chain partners to (re)design or incorporate recycled feedstocks into their operations. ACC and AFPM members are also leading efforts to improve both mechanical

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[4] *See* United Nations Department of Economic and Social Affairs – Sustainable Development [Accessed 7/13/2023]
[5] *See* McKinsey & Company. July 26, 2022. *Climate impact of plastics*., p. 4. By Stefan Helmcke, Thomas, Chris Musso, Wen Jie Ong, Jonas Oxgaard, and Jeremy Wallach. [Accessed 7/13/2023]

and advanced recycling. In just the past few years the petrochemical and plastics industry have made investments in 28 projects that are operational, under construction, or planned to scale up recycling infrastructure globally valued at over $16 billion.[6]

IV. Relevant Background on Recycling

In the context of developing policy, it is important that PHMSA has a robust understanding of all types of recycling, specifically the differing technologies and processes used, and their benefits and limitations. The associations provide a high-level overview of the two predominate methods of recycling (*e.g.,* mechanical and advanced recycling). This knowledge will help inform any eventual policy decisions by PHMSA on the authorization of recycled packaging for the transportation of hazardous materials.

There are several different technologies being used to address the challenge of moving plastic through the recycling value stream. The most common is mechanical recycling, where certain types of plastic are shredded and melted back down into plastic pellets, which can then be used to make new products — including things like running shoes and reusable plastic bottles. That's what is generally referred to as traditional recycling and what people often first think of when they hear the term recycling. But not every plastic can be mechanically recycled. An additional challenge with traditional mechanical recycling is that plastics can only be recycled a limited number of times in this manner before the material degrades and loses the required quality and durability for further use.

Advanced recycling (a family of technologies including chemical or molecular recycling) is a scientific process where heat and various catalysts or chemical reactions are used to initiate reactions that return plastics to their original monomer building blocks, identical in structure to the original monomers, or as virgin feedstocks like naphtha.[7] This material can then be used as a substitute for virgin feedstocks. Once plastics are chemically converted back to monomer form, there are a much wider range of options for recycling and reuse.[8] These monomers are effectively identical to virgin feedstocks currently used to make the plastics that go into the plastic packaging currently authorized by PHMSA. Advanced recycling expands the number and volume of plastics that can be recycled and can recycle material previously thought unrecyclable and expand the potential end uses of those recycled plastics.[9]

Advanced recycling, as a complement to mechanical recycling, has the potential to increase recycling rates, help meet ambitious recycled content targets, reduce plastic pollution, and displace plastics derived from virgin feedstocks. A recent study notes that if existing constraints were resolved, advanced recycling could grow to 20 to 40 million metric tons and meet up to 8 percent of polymer demand by the end of the decade, providing investment opportunities of more than $40 billion.[10] The same study also suggests that while global polymer

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[6] *See* Global Partners for Plastic Circularity – Tracking Our Progress [Accessed 7/13/2023]
[7] *See* Closed Loop Partners – Advancing Recycling's Role in a Circular Economy [Accessed 7/13/2023]
[8] *See* AFPM.org, Advanced Recycling: A Breakthrough in Plastic Sustainability [Accessed 7/13/2023]
[9] *See* AFPM.org, Mechanical vs. advanced recycling — what's the difference? [Accessed 7/13/2023]
[10] *See* McKinsey & Company. May 16, 2022. Advanced recycling: Opportunities for growth By Zhou Peng, Theo Jan Simons, Jeremy Wallach and Adam Youngman [Accessed 7/13/2023]

demand is set to increase over the next decades, embracing advanced recycling has the potential to decrease the use of virgin feedstocks.[11]

V. Responses to PHMSA Request for Feedback

PHMSA requests comment on the following questions to assist in its evaluation of future approval requests and to better inform PHMSA-supported research and development, and potential regulatory revisions:

Question 1: *Are the controls (e.g., material characteristics, design and requalification testing, and manufacturers quality assurance program) in the current approvals adequate for broader adoption of recycled plastics? Are they too narrow or too burdensome? Are there additional controls that should be implemented to ensure safety while using recycled plastic resins?*

Response: In the Notice, PHMSA notes they have issued approximately 10 approvals permitting manufacturers of plastic packaging to use recycled plastic resins provided strict controls are followed to ensure the quality of the packaging. [12] PHMSA further details controls and requirements required by those approvals. While the associations believe those current controls would be adequate for broader adoption, the associations believe there are ways to reduce burden while maintaining safety, and we would encourage PHMSA to explore a less burdensome regime that tracks the existing testing and approval regime for packaging.

Regardless of the type of recycling utilized, ACC and AFPM members and package manufacturers require extensive testing as part of quality assurance programs. Advanced recycling effectively creates monomers that are identical to the virgin feedstocks currently used to make the plastics that go into the plastic packaging currently authorized by PHMSA. Regarding mechanical recycling, package manufacturers require that recycled plastics meet high standards and fall within specified ranges to be incorporated into packaging. To this end, PHMSA should consider treating plastic packaging created from recycled plastics in the same manner as non-recycled plastic packaging if it is able to meet the specification and testing requirements contained in 49 Code of Federal Regulations ("CFR") Part 178.

Question 2: *Do current cleaning processes for recycled plastic resins adequately remove all contaminants of the prior lading? What additional cleaning methods are being considered?*

Response: The current cleaning processes for recycled plastic resins adequately remove contaminants of the prior lading. Both mechanical and advanced recycling require extensive sorting, cleaning, and processing of post-consumer plastic prior to being recycled and used in new products. There are many types of plastics, and to effectively recycle materials (through either mechanical or advanced recycling) re-processers and petrochemical manufacturers need clean and sorted waste streams of specific polymers.

[11] *Id* at Exhibit 3.
[12] *See* 88 *Fed. Reg.* 23140, "Hazardous Materials: Request for Feedback on Recycled Plastics Policy" PHMSA-2022-0111 (Notice No. 2022-14), published April 14, 2023.

For example, pyrolysis, often used for molecular recycling, is a process that uses heat without oxygen to avoid combustion. Pyrolysis breaks apart polymer molecules to form smaller molecules. This process can be repeated over and over with little to no degradation. Pyrolysis can also be used to process mixed post-consumer plastic and make a substance (called pyrolysis oil), which is a mixture of hydrocarbons in the naphtha range.[13] Pyrolysis requires oils that are free of any contaminants can damage catalysts used in the manufacturing process.

ACC and AFPM members using pyrolysis oil in their operations already require extensive testing as part of quality assurance programs ensuring product purity and protecting their equipment. Any feedstock (circular or virgin) used to make base petrochemical building blocks must be free of contaminants to avoid unwanted chemical reactions that affect the quality of the resulting products. Catalytic hydrocrackers are advanced processing equipment systems that are expensive to maintain and operate. Petrochemical manufacturers will not risk jeopardizing such equipment by introducing contaminants into their systems. Similarly, mechanical recycling requires a containment-free feedstock of cleaned plastics.

Question 3: *What, if any, are the potential cost savings in using recycled resins? Has there been or is there an expected increase in demand for hazardous materials packaging containing recycled materials?*

Response: Policies that enable and encourage use of recycled content send a demand signal that can drive investment in waste management, recycled packaging development, and recycling, as post-consumer plastic would be viewed as a valuable feedstock. As we have witnessed with consumer products, demand for recycled content is increasing and this has resulted in plastics manufacturers incorporating more recycled content into packaging and petrochemical manufacturers designing materials for circularity. This gives the consumer, or customer, optionality and ultimately can drive prices down for recycled materials.

By enabling the use of recycled plastics in packaging used for transportation, PHMSA can enable similar action in the freight transportation sector and also help the transportation sector meet climate and circularity goals. PHMSA has a unique opportunity with the *Recycled Plastics Policy* to support the use of recycled plastics in materials packaging used for transport in order to improve transportation efficiencies, reduce greenhouse gas ("GHG") emissions, and address the global plastic pollution challenge, all while maintaining the current level of safety provided by PHMSA's Hazardous Materials Regulations ("HMR").

Question 4: *What would be the climate impact of using more recycled resins?*

Response: To address the impacts of climate change the UN has identified "Climate Action" as one of the seventeen SDGs. Meaningful progress to achieve EPA's mission and address the UN

[13] Naphtha from petroleum refining processes has been used for decades as a feedstock to make petrochemical building blocks by cracking (breaking apart) the larger molecules to make smaller ones, such as ethylene, propylene, butylenes, benzene, toluene, and xylenes. These base petrochemicals, along with methane, butane, and acetylene, are used as building blocks to make most, if not all of the monomers for plastics. Since the pyrolysis oil is molecularly very similar to naphtha, it too can be directly fed into naphtha crackers to make the same base petrochemicals.

SDGs cannot be achieved without plastics, as they help drive down greenhouse gas emissions, increase transportation and construction efficiencies, and enable renewable energy technologies.

Plastics are strong and durable yet incredibly lightweight and because of this require much less material to perform similar functions of non-plastic alternatives. The lightweight nature makes plastics and plastics products more efficient to move across the global supply chain. Use of recycled plastics and recycled resin in packaging have the potential to drive cost savings across various supply chains. Because of their lightweight and durable nature plastic packaging reduces shipping costs and emissions. In addition to increased fuel economy due to lightweighting of freight loads, a recent study found that four times more alternative material is needed (by weight) to perform the same function as plastics in consumer products and packaging and the GHG emissions from plastic packaging and plastic in consumer products, including single-use plastics, are significantly lower during their lifecycle compared to their alternatives.[14]

In approximately 90 percent of applications (when considering both product lifecycle and impact from use), plastics have anywhere between "10 to 90 percent lower GHG emissions than the next-best alternative" material.[15] Moreover, studies show that in the near term, plastic adoption actually promotes decarbonization efforts, especially when food spoilage rates and energy efficiency are factored.[16]

Enabling a circular economy for plastics by creating demand for recycled content will help increase recycling rates, reduce plastic pollution, and displace or complement plastics derived from virgin feedstocks. Specifically, while global polymer demand is set to increase over the next decades, embracing recycling and creating more end-markets for used plastics has the potential to decrease the use of virgin feedstocks and increase the percentage of recycled feedstocks needed to meet demand for recycled content.[17]

Question 5: *Should hazardous materials packagings composed of recycled plastic resins be limited to resins derived from used hazardous materials packagings (i.e.,industrial packagings) or should other sources of plastics—such as plastics from consumer packagings—be allowed? How could PHMSA expand allowable materials sources in this area without adversely affecting the safety of packagings? What consensus standards are available to help facilitate this change in source materials?*

Response: PHMSA should consider treating plastic packaging created from recycled plastics derived from advanced and mechanical recycling processes in the same manner as non-recycled plastic packaging if it is compliant with the HMR. Specifically, if recycled plastic packaging can meet the specification and testing requirements contained in 49 CFR Part 178, it should be authorized agnostic of the source of the recycled plastic.

[14] *See e.g.*, McKinsey & Company. July 26, 2022. *Climate impact of plastics*., p. 3. By Stefan Helmcke, Thomas, Chris Musso, Wen Jie Ong, Jonas Oxgaard, and Jeremy Wallach. [Accessed 7/13/2023]
[15] *Id.* at 2.
[16] *Id*.
[17] *Id at* Exhibit 3.

Question 6: *What research could PHMSA conduct to characterize potential risks of transporting hazardous materials in packaging made of recycled resins?*

Response: A packaging's ability to contain its content is essential and therefore hazardous materials packaging is already highly regulated. For example, in addition, to the packaging specification and testing requirements in 49 CFR 178, recycled resin use in plastic packaging must also comply with 49 CFR Appendix B to Part 173 - *Procedure for Testing Chemical Compatibility and Rate of Permeation in Plastic Packaging and Receptacles*.

While it is unlikely that recycled packaging would yield different results when compared with non-recycled polymers of the same type, it is of utmost importance to ensure compatibility with a packaging's contents. To this end, research on compatibility of recycled packaging with different types of hazardous materials would be most beneficial.

Question 7: *Are there specific hazardous materials classes or divisions, including packing groups, that should not be allowed for use with recycled resins?*

Response: This determination would be based on compatibility of a given packaging with the lading. See response to Question 6.

Question 8: *Are the hazardous materials compatibility requirements of the HMR adequate for use with packagings made from recycled resins or should there be additional considerations? If so, what are these considerations?*

Response: Given advanced recycling uses reactions that return plastics to their original monomer building blocks, identical in structure to virgin feedstocks, they would be consistent with the current hazardous materials compatibility requirements of the HMR. Basically, using advanced recycled plastics to make a packaging creates a "like new" packaging. To this end, regarding the general adequacy of hazardous materials compatibility requirements of the HMR it could be helpful for PHMSA to review incident data to determine if the current HMR is deficient. It is our members' experience this is not the case for "new" packaging and would not be the case for "like-new" packaging utilizing plastics derived from advanced recycling.

We are confident that the same should be the case with mechanically derived recycled plastics if they pass the appropriate performance tests required by the HMR. That said, PHMSA may want to consider research on how mechanically recycled packaging holds up over multiple cycles given plastics can only be mechanically recycled a limited number of times before the material loses some quality and durability for further use.

Question 9. *Should there be a limit to the number of times resins can be recycled, and if so, what should that limit be? How could PHMSA track this information?*

Response: As stated previously, advanced recycling uses reactions that return plastics to their original monomer building blocks, identical in structure to virgin feedstocks. Given this property, we do not believe there is a reason to limit the number of times resins can be recycled provided it meets all other applicable requirements. Along with ongoing research by ACC and

AFPM members to improve the quality and performance of mechanically recycled resins, compliance of mechanical recycled material to the required specifications for the desired packaging ensures that any material with deficient performance will not be used for demanding applications. Tracking the recycled count of specific resin only partly clarifies the expected performance of recycled material, with variables such as use duration and laded material contributing significantly to the quality and performance of recycled resins.

VI. Conclusion

Petrochemicals and plastics provide tremendous societal benefits including helping drive down GHG emissions by improving transportation and shipping efficiencies. The associations thank PHMSA for its recognition of the benefits of plastics and its consideration of our comments related to this proposal. PHMSA has an important safety mission and the HMR includes robust and reliable packaging specifications to transport hazardous materials. The associations appreciate PHMSA efforts to improve transportation safety while embracing recycled plastic in its packaging regime.

Sincerely,

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