April 5, 2019

Doug Parsons (7101M)
Senior Policy Advisor
Office of Pollution Prevention and Toxics
US Environmental Protection Agency
1200 Pennsylvania Ave NW
Washington, DC 20460-0001

Re: Critical Use Exemption Request for Phenol, Isopropylated, Phosphate (3:1)[1] in Automotive Uses

Dear Mr. Parsons:

We are writing on behalf of the members of the Alliance of Automobile Manufacturers (Alliance) and the Motor & Equipment Manufacturers Association (MEMA) to request that EPA use its authority under TSCA section 6(g) (or other available authority) to grant a Critical Use Exemption (or other appropriate exemption) for phenol, isopropylated, phosphate (3:1) (PIP) in automotive uses in connection with the upcoming rulemaking under TSCA section 6(h). The following comments provide information in support of this request.

The Alliance is the leading advocacy group for the auto industry, representing automakers who build 70% of all cars and light trucks sold in the United States. Alliance members are BMW Group, FCA US LLC, Ford Motor Company, General Motors, Jaguar Land Rover, Mazda, Mercedes-Benz USA, Mitsubishi Motors, Porsche, Toyota, Volkswagen Group of America, and Volvo Car USA. Headquartered in Washington, DC, the Alliance also has offices in Sacramento, California and Detroit, Michigan. The Alliance is committed to developing and implementing constructive solutions to policy challenges that promote sustainable mobility and benefit society in the areas of environment, energy, and motor vehicle safety.

Automakers employ tens of thousands of skilled workers in all 50 states and support more than 7.25 million jobs across the nation, with 44 vehicle assembly facilities in 14 states.[2] These good-

[1] Our understanding is that Phenol, Isopropylated, Phosphate (3:1), or PIP, includes, but is not limited to, the chemical identified by CASRN 68937-41-7. The Alliance wishes to emphasize the importance of using Chemical Abstracts Service Registry Numbers (CASRN). The CASRN is a unique numerical identifier assigned to every chemical substance described in the open scientific literature and is the standard the automotive industry uses to track and manage chemicals.
[2] Center For Automotive Research, "Contribution of the Automotive Industry to the Economies of All Fifty States and the United States" January, 2015.

paying jobs include a wide-range of opportunities that support families and communities nationwide.[3]

Automobile manufacturing drives an astonishing 953 billion dollars in economic activity in the United States every year, from sales to service and from paychecks to tax revenue.[4] The automotive sector constitutes the nation's largest manufacturing sector and accounts for more than 3% of the gross domestic product.[5]

MEMA represents more than 1,000 companies that manufacture new original equipment (OE) and aftermarket components, systems, and materials for use in passenger cars and heavy trucks.[6] The motor vehicle components manufacturing industry is the nation's largest direct employer of manufacturing jobs – employing over 871,000 workers in all 50 states – with a total employment impact of 4.26 million jobs.[7] MEMA members develop and produce a multitude of technologies and a wide-range of products, components, and systems that make vehicles safer, more efficient, and with reduced emissions.

1. Criteria for a Section 6(g) Exemption

Under TSCA section 6(g)(1), the United States Environmental Protection Agency (EPA or Agency) may grant an exemption from a risk management rule (even for a section 6(h) chemical such as PIP) if the Agency finds that:

(A) the specific condition of use is a critical or essential use for which no technically and economically feasible safer alternative is available, taking into consideration hazard and exposure;
(B) compliance with the requirement, as applied with respect to the specific condition of use, would significantly disrupt the national economy, national security, or critical infrastructure; or
(C) the specific condition of use of the chemical substance or mixture, as compared to reasonably available alternatives, provides a substantial benefit to health, the environment, or public safety.

As demonstrated below, use of PIP in automobile manufacturing and automotive parts is a critical or essential use for which no technically feasible safer alternative is currently available; compliance with a ban on use of PIP in automotive uses would significantly disrupt the national

[3] *Id.*
[4] *Id.*
[5] *Id.*
[6] MEMA represents its members through four divisions: Automotive Aftermarket Suppliers Association (AASA); Heavy Duty Manufacturers Association (HDMA); Motor & Equipment Remanufacturers Association (MERA); and, Original Equipment Suppliers Association (OESA).
[7] "The Employment and Economic Impact of the Vehicle Supplier Industry in the U.S." based on research undertaken by IHS Markit on behalf of MEMA, January, 2017.

economy; and use of PIP in automobile manufacturing and automotive parts substantially benefits public safety.

2. PIP Is Critical for Use in Automobile Manufacturing and Automotive Parts

Automakers and automotive part manufacturers use PIP extensively in automobile parts, including body panels, vehicle wiring, motor lubricants, seating, headlamps, foam, gasket and coating applications, and windshield wiper modules, among others. A search of the automotive industry's International Material Data System (IMDS) indicates PIP is found in approximately 500 different automotive components across all manufacturers. In these parts, PIP serves variable and sometimes overlapping services as a flame retardant, an elastomer, and as a lubricant, among other functions. PIP is also used in automobile manufacturing facilities in hydraulic fluids, sealants, and adhesives, among other critical uses.

The presence of PIP in automotive components ensures that the parts perform appropriately and contribute to vehicle safety. For example, the presence of PIP acting as a flame retardant in vehicle wiring is necessary to minimize the risk of fire from electrical ignition sources during vehicle operation. Similarly, the presence of PIP in various lubricants or greases is necessary to prevent component wear and failure. Without PIP (or an effective alternative, yet to be identified), vehicles would not function as intended and would experience a decrease in performance and safety. Thus, simple elimination of PIP from these automotive uses is not an option.

PIP is particularly important for preventing vehicle fires. Over the past few decades, automakers have expended considerable effort to reduce the potential for vehicle fires. As a result, the number of annual vehicle fires in the US has fallen by more than half from 1980 to 2015, despite a substantial increase in the total number of vehicles.[8] Removal of PIP from automotive components without a technologically feasible alternative flame retardant (or flame retardants) as a replacement would threaten this progress and threaten public safety.

3. No Technically and Economically Feasible Alternative to PIP for Use in Automotive Manufacturing and Automotive Parts Is Currently Available

No technologically feasible alternative to PIP for use in automobile manufacturing and automotive parts has been identified or confirmed. As a result, no Alliance member or MEMA member has begun the lengthy process for validating the suitability of substituting another flame retardant for PIP in vehicle manufacturing and automotive parts. This is in contrast to the extensive efforts by Alliance and MEMA members to phase out of another one of the TSCA section 6(h) chemicals, decabromodiphenyl ethers (Deca bde).

In March 2019, the Alliance conducted another internal review among its members and confirmed that there is no awareness of any alternatives assessment that has considered

[8] National Fire Protection Association (NFPA) (Quincy, MA); Ahrens, M. January 2017. "Trends and Patterns of U.S. Fire Loss." NFPA No. USS47-REV. 21p.

alternatives to PIP. Likewise, MEMA is not aware of any viable alternatives to PIP for its functions and uses in automotive components.

In addition to its internal assessment, the Alliance conducted a literature review on PIP alternatives. EPA has published at least one alternatives assessment for brominated or chlorinated flame retardants which feature PIP as a possible alternative to other flame retardants.[9] The State of Washington is currently evaluating the use of PIP as a flame retardant in children's products and upholstered furniture, including the availability of possible substitutes for PIP, but no report on this effort is available.[10]

In the EPA docket for PIP, ICL Industrial Products commented that its flame-retardant products, based on isobutylenated phenol phosphate, are an alternative to PIP.[11] It is not clear for which applications ICL has tested this alternative. The Alliance and MEMA are unaware of any testing applicable to automotive components or use in OEM facilities. It is likely that an isobutylenated phenol product would have different properties from an isopropylated phenol product like PIP, so it is not clear that the ICL product would be technically feasible for automotive use. The Alliance also notes that the chemical has been identified as a "new environmental pollutant,"[12] suggesting it could potentially be a regrettable substitution.

The Alliance also conducted a preliminary review of the properties of PIP and other non-halogenated flame retardants (including butylenated varieties). This review identified a number of data gaps that would need to be addressed to clearly determine if a viable alternative to PIP exists for use in automobile manufacturing. Data inputs inferred from publicly available sources (e.g., inferring feasibility based on performance data for applications other than those PIP is typically used for in automotive vehicles) introduced substantial uncertainty into the overall alternatives assessment. This limited the reliability of any conclusions from this assessment.

Thus, given the lack of published information on suitable alternatives, the Alliance members would need to conduct their own alternatives analysis to determine if there are viable PIP candidates for the particular automotive applications where PIP is currently being used.

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[9] US EPA. September 2005. "Furniture Flame Retardancy Partnership: Environmental Profiles of Chemical Flame-Retardant Alternatives for Low-Density Polyurethane Foam, Volume 1." 153p. Accessed on April 4, 2019 at https://www.epa.gov/sites/production/files/2013-12/documents/ffr_foam_alternatives_vol1.pdf.
[10] Washington State Dept. of Health. September 28, 2018. "Flame Retardant Advisory Committee Sept 28, 2018 meeting notes." 12p.
[11] Howell, L. [ICL-IP America, Inc.]. January 12, 2018. "Letter to US EPA Docket re: ICL's additional comments for phenol, isopropylated, phosphate (3:1)." EPA-HQ-OPPT-2016-0730.
[12] Kemsley, J. 2018. "New pollutant identified in homes, environment." *Chem. Eng. News* 96(44):17.

4. Impact on the National Economy from a Ban on Use of PIP in Automotive Manufacturing and Automobile Parts

As described above, PIP is a critical component for a variety of automotive uses. Automobile manufacturing in the U.S. and internationally would be substantially disrupted by a ban on use of PIP in auto manufacturing facilities, in automobiles, and in automotive parts, given the current lack of any proven technically feasible alternative.

a. Finding a Technically and Economically Feasible Safer Alternative

Because no technologically feasible safer alternative to PIP for use in automobile manufacturing and automotive parts is currently available, an alternative would need to be identified if EPA restricts the use of PIP. Finding a suitable chemical has significant time requirements and cost considerations.

i. Time Requirements

Based on previous internal research of the alternatives analysis process, a conservative estimate of time to complete a *preliminary* screen for possible alternatives to PIP is four to six months, and possibly much longer (see Figure A below). A more in-depth analysis including stakeholder surveys to collect additional information on performance and economic feasibility for various alternatives could take at least 6 to 12 months. Note both of these estimates are in line with the timeframe described in the California Department of Toxic Substances Control (DTSC) Safer Consumer Products (SCP) regulations (*i.e.*, six months from priority product notification to submittal of a preliminary alternatives analysis, 12 months after DTSC provides comments on the preliminary analysis to submit a final analysis). Based on our experience, an additional one to two years to conduct adequate performance testing would be required before OEMs would be able to commit to using a particular alternative. This step brings the entire process of finding a suitable alternative to a total timeline of at least two to three years, and possible much longer.

For further context, we note that the automotive industry also conducted a research program to investigate alternative refrigerants to comply with the mobile air conditioning (MAC) directive implemented by the European Union (EU). This investigation focused on a comparative evaluation of technology risks, performance and material compatibility testing, and revision of relevant standards. The entire process, which involved a drop-in replacement chemical and did not require system redesign, took over eight years to reach a clear industry consensus on an alternative.[13,14,15,16].

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[13] Estimates of the time frame are variable depending on the stage at which one considers the decision to have been reached.

[14] Lewandowski, TA. [Gradient]. December 17, 2009. "Risk Assessment for Alternative Refrigerants HFO-1234yf and R-744 (CO2): Phase III." Report to SAE International. 127p.

[15] Lewandowski, TA. [Gradient]. July 24, 2013. "Additional Risk Assessment of Alternative Refrigerant R-1234yf." Report to SAE International (Warrendale, PA) 106p.

ii. Cost Considerations

In addition to time requirements, substantial costs would be incurred to conduct an adequate alternatives analysis. Such costs might include those for performance testing and additional information gathering to fill data gaps and ensure an informed decision. If no viable alternatives are readily identified, additional costs may be associated with research and development of new chemistries, and subsequent process development and scaling up necessary to achieve a feasible alternative. Based on our members' experience, estimates for conducting evaluations of alternative technologies range from the hundred thousand-dollar range (with minimal new data acquisition) into the million-dollar range (if the evaluation requires extensive testing and acquisition of data).

If no viable alternatives are readily identified, significant financial investments may be required to develop new technologies. In 2005, the Society of Automotive Engineers (SAE) had a Cooperative Research Program (CRP) to evaluate ways of reducing refrigerant leaks and improving efficiency. The associated costs of this program were indicated to be on the order of $3,000,000.[17] The European Union lists funding from Innovate UK for research on new/disruptive automotive technologies ranging from approximately $650,000 up to $6,5000,000[18]. Domestically, the United States Advanced Battery Consortium awarded $4,600,000 towards researching a 12 volt stop-start alternative battery system.[19] In summary, costs associated with developing a new technology as a feasible alternative can range from millions to tens of millions of US dollars.

b. Implementing a Technically and Economically Feasible Safer Alternative

i. Time Requirements

Once a suitable alternative has been identified, additional time is needed to implement the new formulation (see Figure A below). A conservative estimate of the time needed for implementation of an alternative to PIP is three to five years. Implementation would require redesigning and testing new parts that contain PIP alternatives for compliance with applicable standards would be a resource-intensive and time-consuming process. Similar tests and evaluations would likely be needed to eliminate PIP use in automotive industrial machinery. Given that PIP is used in multiple automotive applications, it is likely that such requirements would disrupt and delay automotive production schedules.

[17] https://www.nrel.gov/transportation/assets/pdfs/mac_2005.pdf accessed April 4, 2019
[18] https://clepa.eu/mediaroom/innovate-uk-funding-83-million-automotive-rd/ accessed April 4, 2019
[19] http://www.uscar.org/guest/news/949/News-Release-USABC-AWARDS-4-6-MILLION-12-VOLT-STOP-START-BATTERY-TECHNOLOGY-DEVELOPMENT-CONTRACT-TO-XALT-ENERGY accessed April 4, 2019

Significant time will be required to overcome these obstacles. Alternatives need sufficient change-over periods. For example, airbag systems took about two decades from the first pilot applications in luxury cars to the wider application in mass-volume production. Another reason extensive time would be required to incorporate any alternative to PIP is because OEMs use staggered vehicle introduction schedules. New vehicles are introduced on staggered schedules with approximately five-year development schedules. Refreshed vehicles are introduced on staggered schedules with approximately four-year development schedules.

ii. Cost Considerations

In addition to these timing considerations, a ban on the use of PIP in automobile manufacturing and automotive parts would incur substantial implementation costs, which would also disrupt the national economy.

Implementation costs include manufacturing infrastructure and vehicle redesign costs. Manufacturing infrastructure represents a significant cost of new technology implementation. Existing plants may need to be re-tooled to a new purpose. Employees would need training. These major changes would require sufficient financial investment. Furthermore, disruption in the vehicle production process necessitated by the need to engage in an alternatives assessment, to reformulate parts (assuming a viable alternative is identified as discussed above) and to conduct testing to meet safety standards would jeopardize this contribution to the national economy.

Due to the complex nature of the automotive production process, product reformulations or redesigns can be extremely costly. As noted in a paper published by the National Bureau of Economic Research:[20]

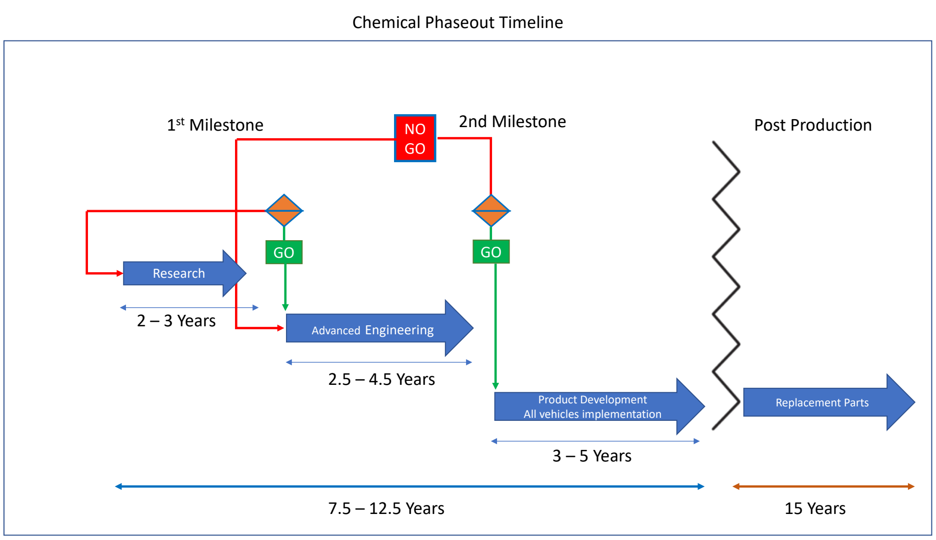
> Redesigns are an involved and costly process. Automobile manufacturers employ teams of engineers and designers that work for years on new redesigns, and which also involve substantial coordination of suppliers, retooling of assembly lines, etc. While redesign cost numbers are closely guarded by automobile manufacturers, anecdotal information suggests that it can sometimes be over $1 billion. Our estimates below are quite consistent with this, averaging $1.3 billion over the various classes of automobiles. Thus, redesigns are major economic decisions facing automobile manufacturers.

A recent example specific to the auto industry further demonstrates the significant costs associated with implementing a product reformulation. The European Chemicals Agency (ECHA) Committee for Socioeconomic Analysis (SEAC) estimated the costs for removing methanol from windshield wiper fluids and substituting with alternative formulations ranged

[20] Blonigen, BA; Knittel, CR; Soderbery, A. April 2013. "Keeping it Fresh: Strategic Product Redesigns and Welfare." National Bureau of Economic Research (Cambridge, MA) NBER Working Paper No.18997. 46p. Accessed on March 28, 2019 at https://www.nber.org/papers/w18997.

from 0.4 up to 4 million euros per year in Finland alone[21]. Even for simple chemical substitution that did not involve the need for complex product testing, the replacement of bisphenol A in thermal paper with an alternative, estimates submitted to the European Union indicated an annual cost of approximately $20 million.[22] Again, thermal paper is a relatively simple product relative to an automobile in terms of the safety and performance standards involved and the effort involved only a single type of product. Based on these recent examples, estimated costs for implementing re-formulation is on the order of millions to tens of millions of US dollars per year. It should be anticipated that replacing PIP in multiple applications in a complex product would cost at least an order of magnitude more, particularly if the redesign had to be conducted outside the normal product development process.

Figure A.



c. Automotive Replacement Parts

Another source of impact on the national economy is the need for replacement parts made with PIP. In section 6(c)(2)(D) of TSCA, Congress directed EPA to exempt replacement parts for complex durable goods, such as automobiles, unless EPA makes a specified finding.

Another federal regulation that has authority over the automobile industry is The Fixing America's Surface Transportation (FAST) Act of 2015, Pub. L. No. 114-94. This law requires that automotive manufacturers remedy recalls and defects for a period of 15 years post-manufacture. Consistent with the FAST Act, automotive manufacturers and suppliers retain a

[21] https://echa.europa.eu/documents/10162/cc415549-cac9-4784-97dc-2170d0bf8f25 accessed April 4, 2019.

[22] European Chemicals Agency (ECHA), Committee for Socio-Economic Analysis (SEAC) September 11, 2015. "Opinion on an Annex XV dossier proposing restrictions on Bisphenol A(Draft)." 28p. Accessed on March 29, 2019 at https://echa.europa.eu/documents/10162/7f8d2988- fad4-4343-bef3-4518336db109.

portion of the produced parts for a period of 15 years for this purpose. Prohibiting the presence of PIP in these parts could feasibly require that suppliers and manufacturers have to redesign, re-source, and re-validate parts for vehicles that are no longer in production, ultimately producing a whole new set of compliant parts (which could require retooling production lines) while scrapping currently retained parts and consuming limited landfill space.

5. Use of PIP in Auto Manufacturing and in Auto Parts Provides a Substantial Benefit to Health and Public Safety as Compared to Alternatives

Health and safety are critical considerations when developing any new technology for an automobile. Automotive health and safety encompasses a large and complex area of issues, including regulatory compliance, testing, customer protection, reliability, and more.

a. Health Considerations

As used in motor vehicles and auto parts, PIP does not present an unreasonable risk to health, including to potentially exposed and susceptible subpopulations such as consumers. While this document does not review the health effects of PIP, its exposure potential is very low, making any risk not unreasonable.

Although PIP is used in hundreds of automotive components throughout the vehicle, consumer exposure to PIP is very low. Most of the automotive uses of PIP (e.g., as a part lubricant or as a flame retardant in engine wiring) would not foreseeably result in consumer exposure because these parts are inaccessible to consumers. Even for automotive components where contact with consumers is possible, exposure is low.

PIP is a chemical of very low volatility. It has a vapor pressure on the order of 10^{-8} mm Hg at room temperature.[23] Thus, off-gassing of PIP would not be anticipated to lead to significant exposures *via* inhalation.

PIP has not been found in vehicle dust. A presentation by the Washington State Department of Health that indicated that PIP has been detected in the indoor dust of homes, daycare facilities and schools but not in vehicle dust or vehicle air.[24]

b. Public Safety Considerations

As stated earlier, PIP is particularly important for preventing vehicle fires and PIP keeps automakers in compliance with a variety of state and federal safety laws and regulations, including the Federal Motor Vehicle Safety Standards mandated by the National Highway

[23] EPA, Design for the Environment. August 2015. "Flame Retardants Used in Flexible Polyurethane Foam: An Alternatives Assessment Update," pp. 7-273 to -274. EPA 744-R-15-002.
[24] Morrissey, B. [Washington State Dept. of Health, Office of Environmental Public Health Sciences]. September 28, 2018. "Human Health Review." Presented at Flame Retardant Stakeholder Advisory Committee. 21p.

Traffic Safety Administration. In particular, 49 C.F.R. § 571.302 – Standard No. 302; Flammability of interior materials, specifies burn resistance requirements for materials used in occupant compartments of motor vehicles. That standard does not mandate the use of PIP specifically, but it does set performance criteria that automakers and auto part suppliers can meet using PIP.

It is entirely unknown whether the alternatives to PIP suggested by ICL or others would achieve the necessary fire resistance required by this and other standards. That can only be determined through extensive and time-consuming tests. Numerous mechanical, electrical, environmental, and chemical tests are called for by Standard 302 and other governmental requirements in the U.S. and abroad.[25] These testing standards must be met, including those set by the International Organization for Standardization (ISO) and SAE International (formerly the Society of Automotive Engineers). Removal of PIP from vehicles without a technologically feasible alternative flame retardant as a replacement would threaten public safety.

CONCLUSION

Phenol, isopropylated, phosphate (3:1), or PIP, serves a critical function in automotive uses as a widely-employed flame retardant, essential for maintaining required and expected standards of automotive vehicle safety. Because of the essential services PIP provides, it is found in hundreds of automotive components throughout the vehicle, however, consumer exposure to PIP is minimal. Furthermore, no technically viable alternatives to PIP are known to automakers or automotive suppliers at this time. For these reasons, the Alliance and MEMA believe our request for a critical use exemption is justified and urge EPA to use it statutory authority to grant us regulatory relief.

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[25] Some of the required tests are summarized in Ruiz V, Pfrang A, Kriston A, Omar N, Van den Bossche P, Boon-Brett L. 2018. "A review of international abuse testing standards and regulations for lithium ion batteries in electric and hybrid electric vehicles." Renewable and Sustainable Energy Reviews 81(1):1427-1452.