July 20, 2022

Submitted electronically via CalSAFER

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RE: **Listing of Motor Vehicle Tires Containing N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD) as a Priority Product**

On May 20, 2022, the California Environmental Protection Agency's Department of Toxic Substances Control (DTSC) issued its proposed listing of Motor Vehicle Tires Containing N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD) as a Priority Product rulemaking under the Safer Consumer Products (SCP) program. The U.S. Tire Manufacturers Association (USTMA) and our member companies appreciate the opportunity to provide comments on this proposed rulemaking.[1]

USTMA thanks DTSC for adding 6PPD in tires to the 2021-2023 work plan and for advancing the listing of 6PPD in tires as a Priority Product. In December 2020, just three weeks after the Tian et al. 2020 paper was published, USTMA sent a letter to Meredith Williams, the Director of the California Department of Toxic Substances Control, to ask that the Department review 6PPD in tires under the California Safer Consumer Products Regulations (SCPR). The SCPR provides a rigorous, transparent, scientific, regulatory framework to analyze whether potential alternatives exist that ensure tire safety and environmental protection. The SCPR recognize the need for products to continue to comply with other state and federal laws, which includes the ability of tires to continue to comply with Federal Motor Vehicle Safety Standards (FMVSS). The use of protection materials, including 6PPD, are essential to ensure tire safety. Any potential alternative to 6PPD identified through the SCPR process must provide the same performance requirements as 6PPD to ensure tire safety and performance.

We look forward to working with DTSC to complete an Alternatives Analysis of 6PPD in tires and coordinating with other stakeholders including the Washington State Department of Ecology. If you have any questions or need additional information, please contact Sarah Amick at (202) 682-4836, samick@ustires.org.

Sarah E. Amick
Vice President EHS&S and Senior Counsel

CC: Karl Palmer, Deputy Director, Safer Consumer Products Program

[1] USTMA members include: Bridgestone Americas, Inc., Continental Tire the Americas, LLC; Giti Tire (USA) Ltd.; The Goodyear Tire & Rubber Company; Hankook Tire America Corp.; Kumho Tire Co., Inc.; Michelin North America, Inc.; Nokian Tyres; Pirelli Tire North America; Sumitomo Rubber Industries, Ltd.; Toyo Tire Holdings of Americas Inc. and Yokohama Tire Corporation

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I. Introduction

The U.S. Tire Manufacturers Association[2] (USTMA) is the national trade association representing major tire manufacturers that produce tires in the United States. We directly support more than 20,000 jobs in the state of California – contributing roughly $3.5 billion dollars in direct output to the California economy. USTMA advances a sustainable tire manufacturing industry through a commitment to science-based public policy advocacy. The tires from our member companies make mobility possible and keep the U.S. economy moving. We thank DTSC for the opportunity to provide comments on the proposed listing of Motor Vehicle Tires Containing N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD) as a Priority Product.[3]

II. Executive Summary

Our comments provide input and recommendations on the various documents included in the proposed rulemaking package.[4] Specifically, we would like to highlight six key points in our comments for DTSC's attention.

1. USTMA supports a review of 6PPD in tires under the SCPR.

In December 2020, a research paper by Tian et al. 2020 was published that suggests a link between 6PPD-quinone and coho salmon mortality.[5] 6PPD-quinone is not used in tire manufacturing. It is a transformation product of 6PPD that may form when 6PPD reacts with oxygen and/or ozone. 6PPD is an antioxidant and antiozonant that helps prevent the degradation and cracking of rubber compounds caused by exposure to oxygen, ozone, temperature fluctuation, and flexing induced fatigue. These benefits of 6PPD are critical to effective tire endurance and thus ultimately to motor vehicle safety. That said, as a science-driven industry, committed to safety and environmental stewardship, we take the findings of this study seriously. In December 2020, USTMA requested that DTSC include 6PPD in tires on the 2021-2023 Priority Products Work Plan for the SCPR. A review of 6PPD in tires under the SCPR provides a scientific, regulatory framework to analyze whether alternatives exist that will enable tire manufacturers to ensure both tire and environmental safety. DTSC added 6PPD in tires to the Priority Products Workplan in early 2021 and since that time, USTMA has worked to support a review of 6PPD in tires under the SCPR.

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[2]USTMA members include: Bridgestone Americas, Inc., Continental Tire the Americas, LLC; Giti Tire (USA) Ltd.; The Goodyear Tire & Rubber Company; Hankook Tire America Corp.; Kumho Tire Co., Inc.; Michelin North America, Inc.; Nokian Tyres; Pirelli Tire North America; Sumitomo Rubber Industries, Ltd.; Toyo Tire Holdings of Americas Inc. and Yokohama Tire Corporation

[3] https://dtsc.ca.gov/listing-motor-vehicle-tires-containing-n-13-dimethylbutyl-n%E2%80%B2-phenyl-p-phenylenediamine-6ppd-as-a-priority-product/

[4] https://dtsc.ca.gov/listing-motor-vehicle-tires-containing-n-13-dimethylbutyl-n%E2%80%B2-phenyl-p-phenylenediamine-6ppd-as-a-priority-product/

[5] Tian Z et al. (2021). A ubiquitous tire rubber–derived chemical induces acute mortality in coho salmon. Science. 371(6525):185–189. doi: 10.1126/science.abd6951.

2. Protection materials, such as 6PPD, are essential for tire performance and safety and any potential alternative must continue to ensure compliance with Federal Motor Vehicle Safety Standards (FMVSS).

6PPD provides critical functions in manufacturing safe and durable tires. Alternatives to 6PPD must also meet these critical functions and have the following qualities:

- Continuously present at the surface of the tire to ensure protection of the rubber compound from degradation due to oxygen and ozone;
- Adequate solubility and diffusivity in rubber compounds;
- Reactive with ozone but not too reactive in order to prevent premature depletion;
- No adverse effects on the rubber processing;
- Available in rubber compound over a tire's entire life cycle to ensure protection of the rubber;
- Low toxicity of the material and any transformation products; and
- No adverse effects on tire safety and performance

Any potential alternative to 6PPD, identified through the SCPR process, must provide the same critical functions as 6PPD to ensure tire safety and performance. The composition and nature of the chemicals present in tires impart a function and the exact composition of tires cannot be modified without great care. It is not a simple process to change the composition of tires; any change could affect the stopping distance of tires, durability, vehicle fuel economy, tire wear, and other safety-related components. DTSC's ability to impart a material change required under the SCPR would be significantly limited by the FMVSS that tire manufacturers must meet. Further, DTSC acknowledges that: "Motor vehicle tires would be required to meet current federal standards for safety and performance whether or not DTSC lists motor vehicle tires containing 6PPD as a Priority Product. The SCP Regulations do not allow DTSC to require the use of alternatives to a Chemical of Concern that would compromise a Priority Product's compliance with health and safety requirements."[8]

3. As a newly discovered transformation material, the science on 6PPD-quinone is still emerging.

The Tian et al. 2020 paper identified a new transformation product of 6PPD, 6PPD-quinone. As a previously unknown transformation product, very little is understood about 6PPD-quinone in the environment and the potential impact to human health and the environment. Additionally, in order to assure that any potential alternative to 6PPD in tires is also safe for the environment, it is critical to fill the knowledge gaps regarding the formation of 6PPD-quinone, its environmental fate, its mode of action in coho salmon and its potential impact on other aquatic species. USTMA continues to engage with stakeholders and the research community to fill relevant data gaps related to 6PPD-quinone.

4. We recommend that the product category "tires" be focused to provide a workable Priority Product to perform an alternatives analysis.

USTMA recommends that a more focused definition of "motor vehicle tires" (limiting the definition to replacement, passenger, all-season tire tread and sidewall) will ensure a workable, single Alternatives Analysis. There are thousands of tire types. For example, tires are designed and uniquely

formulated for various vehicle types including but not limited to passenger, truck, bus, airplane, motorcycle, off-the-road (OTR), and mining tires. Each tire type is specifically designed and formulated to perform on the vehicle for which it is intended and for the performance category it is required to meet. Tire compounds and chemistries vary depending on the vehicle type, performance category of a tire, and manufacturer. The considerable variety of tires, different use scenarios and use rates statewide, and differences between tire construction and chemistries across the different motor vehicle tire types, potentially covered under DTSC's proposed definition, affects DTSC's key prioritization analysis because the Department is required to consider the "potential public and/or aquatic, avian, or terrestrial animal or plant organism exposure to" 6PPD as well as the "potential for one or more exposures to contribute to or cause significant or widespread adverse impacts" to 6PPD in each type of product covered under the proposed definition of "motor vehicle tires." These key prioritization scenarios will be different for each tire type covered by the proposed definition of "motor vehicle tire." Moreover, performing an alternatives analysis for every vehicle type, every performance category, every manufacturer, and every tire component potentially covered by DTSC's proposed definition is too broad and would require a separate alternatives analysis and different set of criteria for evaluating alternatives for each vehicle type, performance tire category, manufacturer and tire component.

USTMA recommends that DTSC focus the definition of Priority Product to replacement, all-season, passenger tire tread and sidewall compounds. A more focused definition of "tire" will enable tire manufacturers to complete one Alternatives Analysis that will likely be applicable to other tire types. Moreover, focusing the regulatory definition of "tire" to those areas of a tire that are exposed to oxygen and ozone would provide much more focus to this rulemaking.

5. DTSC resources should be used on 6PPD rather than on other tire materials.

Resources should be used on 6PPD rather than on all other chemical components in tires. There are a number of chemicals in motor vehicle tires under consideration in addition to 6PPD including zinc, benzothiazoles, chlorinated paraffins, 1,3-diphenylguanidine, (methoxymethyl) melamines, octylphenol ethoxylates, and polycyclic aromatic hydrocarbons (PAHs). It is important to note that chlorinated paraffins are not used in USTMA member company tires. Octylphenol ethoxylates are also not used in tires, however, octylphenol based resins are used in the tire manufacturing process.

Listing multiple chemicals for the same product category will have reasonably foreseeable cumulative effects that need to be considered together. Indeed, DTSC cannot and should not evaluate multiple chemicals for tires as Priority Products in discrete silos, as DTSC is currently proposing to do. See, e.g., 14 CCR § 15355 ("'Cumulative impacts' refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts …). The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." This important principle is missing from DTSC's inclusion of motor vehicle tires and the various chemicals under consideration as part of the current 2021-2023 Priority Product Work Plan.

DTSC's current proposal to consider and review all of these discrete chemicals in motor vehicle tires separately is a violation of CEQA and DTSC's legal obligations to conduct a robust and comprehensive environmental review of its regulatory decisions. Therefore, DTSC should abandon consideration of zinc in tires as a Priority Product, as well as all other chemical considerations for motor vehicle tires. Further, proceeding with listing and review of multiple chemical components of tires, as opposed to just 6PPD, undermines the principle of "prioritization" inherent in the legislature's Green Chemistry Law and Department's Safer Consumer Products regulations. There are other more pressing public health concerns from chemicals in consumer products which DTSC has identified, and the Department should continue to focus its limited resources on other high impact and high priority areas for which it has already devoted considerable time and resources. Motor vehicle tires was recently added as a Priority Product category in 2021. Additionally, other consumer products included on the Work Plan are not as highly regulated for safety as motor vehicle tires.

6. USTMA encourages DTSC to work with the Washington State Department of Ecology in reviewing the alternatives analysis for 6PPD in tires.

In 2022, the Washington State Legislature approved funding for the Department of Ecology to complete an alternatives assessment of 6PPD in tires. We encourage the Department of Ecology to leverage the alternatives analysis that USTMA members will complete under the SCPR to prevent duplicative and conflicting assessments of possible alternatives to 6PPD. We welcome the opportunity to engage with both DTSC and the Department of Ecology as we work to complete an alternatives analysis for 6PPD in tires under the SCPR.

III. Overview of the role 6PPD serves in manufacturing safe and durable tires

Tires are highly engineered and highly regulated to ensure their safety, quality and durability. All tires sold in the United States must meet FMVSS set by the National Highway Traffic Safety Administration, U.S. Department of Transportation.

A. Tires are highly engineered products that are required to meet strict Federal Motor Vehicle Safety Standards (FMVSS)

Tire manufacturers are required by law to certify to the National Highway Traffic Safety Administration (NHTSA) that every tire they manufacture meets safety, durability, and other standards prior to their sale to the consumer. The Safety Act, 49 U.S.C. §§ 30103-30105 et seq., explicitly pre-empts any state law or regulation that conflicts with a NHTSA regulation relating to "safety." The rationale, simply put, is that vehicles are a significant means of transportation for citizens and freight. They travel from one state to another and between countries. The absence of a uniform set of safety rules would allow one state to impose arbitrary requirements that could significantly impact interstate commerce.

All USTMA member companies take extraordinary efforts to ensure the quality, safety, and reliability of the tires they manufacture. Thus, any change in the composition of tires requires a series of safety and durability tests to ensure tires still comply with FMVSS. The composition and nature of the chemicals present in tires impart a function and the exact composition of tires cannot be modified without great care. It is not a simple process to change the composition of tires; any change could affect the stopping distance of tires, durability, vehicle fuel economy, tire wear, and other safety-

related components. DTSC's ability to impart a material change required under the SCPR would be significantly limited by the FMVSS requirements.

The SCPR recognizes the need for products to continue to comply with other state and federal laws. For example, section §69506.9 of the regulations outlines exemption from regulatory responses requirements if:

(A) The required or proposed regulatory response conflicts with one or more requirements of another California State or federal regulatory program or applicable treaties or international agreements with the force of domestic law in such a way that the responsible entity cannot reasonably be expected to comply with both requirements; and/or

(B) The required proposed regulatory response substantially duplicates one or more requirements of another California State or federal regulatory program or applicable treaties or international agreements with the force of domestic law without conferring additional public health or environmental benefits.[6]

Further, DTSC acknowledges that: "Motor vehicle tires would be required to meet current federal standards for safety and performance whether or not DTSC lists motor vehicle tires containing 6PPD as a Priority Product. The SCP Regulations do not allow DTSC to require the use of alternatives to a Chemical of Concern that would compromise a Priority Product's compliance with health and safety requirements."[7]

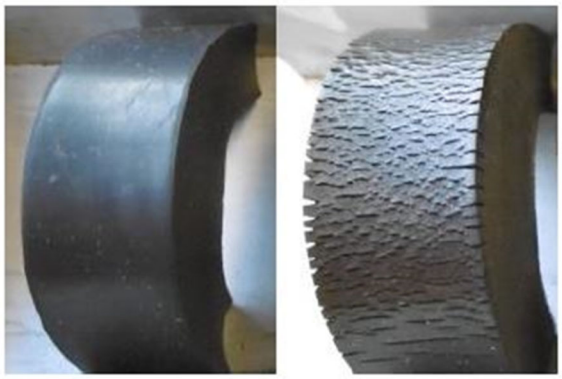
B. The role of antioxidants and antiozonants in manufacturing safe and durable tires

All tires contain antioxidants and antiozonants, often referred to as protection materials. Antioxidants and antiozonants prevent degradation and cracking of the rubber compounds caused by exposure to oxygen, ozone, and temperature fluctuation. Because rubber has the ability to return to its original shape after being stretched or deformed, there are two types of antioxidants and antiozonants used in tires: dynamic and static. Dynamic antioxidants and antiozonants protect the tire while it is in motion and being flexed, and static antioxidants and antiozonants protect the tire when it is in its resting and non-exercised state.

6PPD is both a dynamic and a static antioxidant and antiozonant and is utilized by USTMA members because it is the most effective protection material commercially available today that enables tires to meet safety and performance requirements. 6PPD reacts with ozone in the air to minimize the attack on the tire surface and reacts with the oxygen coming from the internal inflation pressure that degrades the belt rubber compound thus preventing degradation of the outside and inside of the tire.

[6] Safer Consumer Products Regulations §69506.9(b)(6)(A).
[7] https://dtsc.ca.gov/wp-content/uploads/sites/31/2022/05/6PPD-in-Tires_Initial-Statement-of-Reasons-Non-Major-Regulation_accessible.pdf at page 21.

With 6PPD Without 6PPD



Protection materials are essential to ensure tire safety. Tire manufacturers are required by law to certify to NHTSA that every tire they manufacture meets safety, durability, and other performance standards prior to their sale to the consumer. Without the use of high-performing protection materials like 6PPD, tire rubber compounds can crack and degrade rapidly, creating possibly catastrophic safety concerns.

C. Functions required of antioxidants and antiozonants in manufacturing safe and durable tires

6PPD provides critical functions in manufacturing safe and durable tires. Alternatives to 6PPD must also meet these critical functions and have the following qualities:

- Continuously present at the surface of the tire to ensure protection of the rubber compound from degradation due to oxygen and ozone;
- Adequate solubility and diffusivity in rubber compounds;
- Reactive with ozone but not too reactive in order to prevent premature depletion;
- No adverse effects on the rubber processing;
- Available in rubber compound over a tire's entire life cycle to ensure protection of the rubber;
- Low toxicity of the material and any transformation products; and
- No adverse effects on tire safety and performance

In addition to the critical properties listed above, 6PPD is also able to withstand the manufacturing processes and temperatures that are required for tire production and still provide the final product with antidegradant properties. Many other materials would be fully consumed during the manufacturing processes. This is an additional required performance function of 6PPD.

USTMA thanks DTSC for acknowledging some of these qualities in the "Product-Chemical Profile for Motor Vehicle Tires Containing N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD)" (hereinafter Technical Report) and ask DTSC to recognize all of the critical performance and safety functions that 6PPD provides in manufacturing safe and durable tires in its final Technical Report. Each of these critical functions is essential to ensure safe and durable tires. We also

recommend that any evaluation of potential alternatives to 6PPD in tires consider first the critical functions outlined above.

D. USTMA recommends DTSC revise the timeline in the Technical Report regarding the use of 6PPD in tires to accurately reflect the use of 6PPD in tires.

Prior to the development of PPD antiozonants to prevent cracking and degrading of rubber compounds, there was often "rapid deterioration and loss of physical properties which caused failures in rubber goods."[8] The effect of ozone on the degradation of tire rubber compounds was not fully understood until the 1930s. At that time a typical tire life was 10,000 miles or 2 years of wear. In the 1930s, waxes were identified as a static ozone protector for rubber compounds but did not work for products that required dynamic use, where the rubber stretches and flexes when in use, like a tire. The first application of a PPD chemical as an antiozonant was in gasoline. Failure of rubber parts on military vehicles, which were stored from World War II and placed into service for the Korean War, led to U.S. government to sponsor research to study ways to prevent cracking and degrading of rubber compounds. This became known as the Rock Arsenal study which identified a broad class of N, N'-(di-sec-alkyl)-p-phenylenediamines as the most effective antiozonants for rubber compounds.[9] The first PPDs developed were active antiozonants but were not persistent enough to provide protection of rubber compounds for more than 1.5 years. IPPD and DAPD were two of the first antiozonants to be used in rubber compounds in the mid-1960s however, these antiozonants could not provide long-term protection for the tire from ozone, DAPD due to low activity with ozone, and IPPD due to high activity with ozone and premature depletion. The final PPDs to become commercialized were 6PPD, 7PPD, and 8PPD.[10] In 1964, Monsanto published a British patent (GB1035262A) regarding the manufacturing of the 6PPD molecule and in 1968 it completed building the Sauget, IL factory that manufactured 6PPD. By 1975, 6PPD comprised 60% of the antiozonant used in tires (42 million pounds).[11] Some USTMA members began using 6PPD in tire manufacturing in the mid 1960's and early 1970's. However, 6PPD became widely used by USTMA members in the early 2000s. USTMA recommends that DTSC revise the timeline in the Technical Report to accurately reflect the use and timeframe of 6PPD in tires.

E. USTMA recommends DTSC acknowledge the other uses of 6PPD.

6PPD is also used in a variety of other rubber goods. For example, a safety data sheet mentions that 6PPD applications include use in pneumatic tire components, solid tires, belts, hoses, cables, automotive mounts, bushings and general mechanical products that are exposed to continuous and intermittent dynamic operating conditions and require protection from ozonation. Additionally, a

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[8] Kuczkowski, J. A. (1989), 'The Inhibition of Oxidative and Ozonic Processes in Elastomers', Oxidation Inhibition in Organic Materials, Boca Raton, FL, Pospisil J. and Klemchuck, P.P., Eds., pp 247-290

[9] Gilbert, C. E., Beck, B. D., Calabrese, E. J. (1990) and Ozone Risk Communication and Management. United Kingdom: Taylor & Francis

[10] Kuczkowski, J. A. (1989), 'The Inhibition of Oxidative and Ozonic Processes in Elastomers', Oxidation Inhibition in Organic Materials, Boca Raton, FL, Pospisil J. and Klemchuck, P.P., Eds., pp 247-290

[11] EPA report: EPA-560/1-75-002; Environmental Aspects of Chemical Use in Rubber Processing Operations March 12-14, 1975. https://nepis.epa.gov/Exe/ZyPDF.cgi/2000IUPB.PDF?Dockey=2000IUPB.PDF

recent publication by Liang et al. 2022[12] demonstrats that electronic waste recycling is another source of 6PPD-quinone in the environment arising from waste wires, cables and electronic plastics. USTMA recently asked several road building associations about the use of antidegradents in polymer binder used in roadways and whether polymer binder used in roadways contains 6PPD. We hope to receive this information in the near future.

IV. General comments

A. As a newly discovered transformation material, the science on 6PPD-quinone is still emerging.

The Tian et al. 2020 paper identified a new transformation product of 6PPD, 6PPD-quinone. As a previously unknown transformation product, very little is understood about 6PPD-quinone in the environment and the potential impact to human health and the environment. Additionally, in order to assure that any potential alternative to 6PPD in tires is also safe for the environment, it is critical to fill the knowledge gaps regarding the formation of 6PPD-quinone, its environmental fate, its mode of action in coho salmon and its potential impact on other aquatic species. USTMA continues to engage with stakeholders and the research community to fill relevant data gaps related to 6PPD-quinone.

B. USTMA urges DTSC ensure all claims and scientific findings in the Technical Report and other rulemaking documents are supported by references to scientific findings and recommends DTSC clearly identify data gaps to ensure the public has accurate and "reliable information" about 6PPD and its transformation products.

The proposed rulemaking documents are intended to inform the public about the criteria DTSC has used to propose a listing of 6PPD in tires under the SCPR. Public documents should be clear and based on "reliable information."[13] The SCPR defines "reliable information" and specifies that "reliable information means a scientific study or other scientific information that meets the criteria in subparagraphs (A) and (B):

(A) The study or other scientific information was:
1. Published in a scientifically peer reviewed report or other literature;
2. Published in a report of the United States National Academies;
3. Published in a report by an international, federal, state, or local agency that implements laws governing chemicals; and/or
4. Conducted, developed, submitted, prepared for, or reviewed and accepted by an international, federal, state, or local agency for compliance or other regulatory purposes.

(B) With respect to a scientific study, the study design was appropriate to the hypothesis being tested, and sufficient to support the proposition(s) for which the study is presented to the Department." Id.

[12] Liang et al., 2022. E Waste Recycling Emits Large Quantities of Emerging Aromatic Amines and Organophosphites: A Poorly Recognized Source for Another Two Classes of Synthetic Antioxidants. Env. Science and Technology Letters, https://doi.org/10.1021/acs.estlett.2c00366

[13] Safer Consumer Products Final Regulation, §69501.1 (57)(A)(B)

The Technical Report outlines a number of assumptions without reference to reliable information to support the assumption. The peer reviewers for this proposed rulemaking package acknowledge that DTSC is making assumptions or speculations. For example, Dr. Markus Brinkmann states that, "results on the effects of neat 6PPD-quinone on salmonids other than coho salmon have not been reported in the peer-reviewed literature yet. Other species of fishes studied to date, specifically zebrafish and Japanese medaka, were significantly less susceptible compared to coho salmon. In the absence of an established mechanism of toxic action of 6PPD-quinone, the assumption that closely related salmonids will show similar susceptibilities is rather speculative."[14]

USTMA is concerned about the frequent use of the word "may," used 198 times in and the word "potential," used 118 times, in the Technical Report and not tied to scientific findings. Per the SCPR, DTSC is free to use the word "potential" when "the phenomenon described is reasonably foreseeable based on reliable information."[15] Throughout the various documents that make up the regulatory proposal, DTSC makes claims that are assumptions and not based on scientific findings that meet the definition of "reliable information." Given the public nature of the rulemaking documents, USTMA asks that DTSC clarify where there is known and unknown information regarding 6PPD and or 6PPD-quinone. 6PPD-quinone is a newly discovered transformation product and as a result there are many data gaps that need to be filled to increase the scientific understanding of this transformation substance and its mechanism of toxicity for Coho and other aquatic organisms.

USTMA asks that DTSC revise the Technical Report and other rulemaking documents to clearly identify the state of the science and to ensure the public has accurate and reliable information. We also ask that DTSC acknowledge in the Technical Report and in the other rulemaking documents where scientific information exists and where it is lacking.

C. USTMA recommends DTSC recharacterize Tire and Road Wear Particles (TRWP) throughout the various proposed rulemaking documents

The 6PPD Discussion Draft mentions that "Tire Wear Particles (TWP)" are a source of 6PPD-quinone in the environment. Further, the discussion draft states that "TWP are generated as tires roll across a road surface, particularly as vehicles brake, accelerate and turn. TWP, and the 6PPD they contain, can be released to the aquatic environment through surface runoff and stormwater."[16]

The World Business Council for Sustainable Development's Tire Industry Project (TIP) has performed extensive research to understand how tire wear exists in the environment and the potential for freshwater toxicity. This research found that tire wear particles do not exist solely as a piece of tire tread but are instead a combination of both tread particle and minerals encrusted from the road to form a tire and road wear particle (TRWP). TRWP differs from tread particles in terms of morphology, as well as composition which has been confirmed by several independent researchers (Kreider et al.,

[14] Dr. Markus Brinkmann peer review at page 9
[15] Safer Consumer Products Final Regulation, §69501.1 (51) (A)
[16] Technical Report at page 5

2010[17], Dall O'stro et al. 2014[18], Wagner et al., 2018[19]; Leads and Weinstein et al., 2019[20]; Rauert et al., 2021[21]). Extensive testing on the potential for aquatic toxicity under environmentally relevant conditions showed that TRWP do not cause acute or chronic toxicity to freshwater organisms (algae, daphnia, Fathead minnows, Chironomids, and Hyalella), when present at concentrations up to 10,000 mg/kg in sediment (Marwood et al., 2011[22]; Panko et al., 2013[23]). The USTMA recognizes that broad assumptions about TRWP toxicity cannot be assumed from this study alone. Although it is unlikely that TRWP will remain in surface water environments for extended periods of time due to their density, most aquatic toxicity studies of their leachate in water have not shown toxicity when tested at relevant environmental concentrations and conditions.

V. General comments on the Technical Report section 1. Rationale for Product-Chemical Selection

A. The proposed definition of the product category "tire" is too unwieldly to perform an alternatives analysis and should be focused on all-season, replacement, passenger tire tread and sidewall.

DTSC proposes to define "tire" as "any product that can be described or observed as a covering for a wheel, usually made of rubber reinforced with cords of nylon, fiberglass, or other material, whether filled with compressed gas (such as nitrogen), solid, or non-pneumatic (airless)." Technical Report at page 7. DTSC is required to provide a description of the product-chemical combination that is sufficient for a responsible entity to determine whether one or more of its products is a Priority Product. Cal. Code Regs. tit. 22, § 69503.5. This principle should also be applied to product categories and underscores the importance of providing enough information for the responsible entity to determine whether it needs to consider alternatives to one of its products. USTMA raised this issue with DTSC in comments filed on September 17, 2021 (available here) in response to the Department's draft product-chemical profile for 6PPD in tires. There, as here, we reiterate the critical points that the

[17] Kreider ML, Panko JM, McAtee BL, Sweet LI, Finley BL. 2010. Physical and chemical characterization of tire-related particles: Comparison of particles generated using different methodologies. Sci Total Environ 408(3):652–659

[18] Manuel Dall'Osto, David C.S. Beddows, Johanna K. Gietl, Oluremi A. Olatunbosun ,Xiaoguang Yang , Roy M. Harrison (2014). Characteristics of tyre dust in polluted air: Studies by single particle mass spectrometry (ATOFMS). Atmospheric Environment 94 (2014) 224e230. http://dx.doi.org/10.1016/j.atmosenv.2014.05.026

[19] Wagner S., Thorsten Hüffer, Philipp Kl€ockner, Maren Wehrhahn, Thilo Hofmann, Thorsten Reemtsma. (2018). Tire wear particles in the aquatic environment - A review on generation, analysis, occurrence, fate and effects. Water Research 139 (2018) 83e100. https://doi.org/10.1016/j.watres.2018.03.051

[20] Leads R.R,∗,and John E. Weinstein (2019). Occurrence of tire wear particles and other microplastics within the tributaries of the Charleston Harbor Estuary, South Carolina, USA. Marine Pollution Bulletin 145 (2019) 569–582. https://doi.org/10.1016/j.marpolbul.2019.06.061

[21] Rauert, C., E. S. Rødland, E. D. Okoffo, M. J. Reid, S. Meland and K. V. Thomas (2021). "Challenges with Quantifying Tire Road Wear Particles: Recognizing the Need for Further Refinement of the ISO Technical Specification." Environmental Science & Technology Letters 8(3): 231-236

[22] Marwood C, McAtee BL, Kreider ML, Ogle RS, Finley BL, Sweet LI, Panko JM. 2011. Acute aquatic toxicity of tire and road wear particles to alga, daphnid and fish. Ecotoxicology 20:2079, doi: 10.1007/s10646-011-0750-x

[23] Panko JM, Kreider ML, McAtee BL, Marwood C. 2013. Chronic toxicity of tire and road wear particles to water- and sediment-dwelling organisms. Ecotoxicology 22(1):13–21, doi: 10.1007/s10646-012-0998-9

the proposed definition of "tire" is too unwieldy for manufacturers to scope and fashion a meaningful Alternatives Analysis.

We recommend that the product category "tires" be focused to provide a workable Priority Product to perform an alternatives analysis. There are thousands of tire types. For example, tires are designed and uniquely formulated for various vehicle types including but not limited to passenger, truck, bus, airplane, motorcycle, off-the-road (OTR), and mining tires. Passenger, truck and bus tires also include a number of performance categories including summer, winter, and all-season tires. Each tire type is specifically designed and formulated to perform on the vehicle for which it is intended and for the performance category it is required to meet. Passenger, all-season tires are designed and formulated for use on passenger vehicles during all types of weather. In contrast, a truck, winter tire, is designed and formulated specifically for trucks and is intended to provide certain performance characteristics that enable that tire to perform in winter weather conditions. Tire compounds and chemistries vary depending on the vehicle type, performance category of a tire, and manufacturer. The considerable variety of tires, different use scenarios and use rates statewide, and differences between tire construction and chemistries across the different tire types potentially covered under DTSC's proposed definition affects DTSC's key prioritization analysis because the Department is required to consider the "potential public and/or aquatic, avian, or terrestrial animal or plant organism exposure to" 6PPD as well as the "potential for one or more exposures to contribute to or cause significant or widespread adverse impacts" to 6PPD in each type of product covered under the proposed definition of "motor vehicle tires." These key prioritization scenarios will be different for each tire type covered by the proposed definition of "motor vehicle tire." Moreover, performing an alternatives analysis for every tire type, every performance category, every manufacturer, and every tire component potentially covered by DTSC's proposed definition is too broad and would require a separate alternatives analysis and different set of criteria for evaluating alternatives for each tire type, performance tire category, manufacturer and tire component.

USTMA recommends that DTSC focus the product listing to replacement, passenger, all-season tire tread and sidewall because Passenger tires are the predominant tire type on U.S. and California's roadways. Further, USTMA's tire shipment data demonstrates that all-season tires are the predominant performance category for passenger tires.[24] Thus, the most common tires on U.S. roadways are passenger, all-season tires supporting a finding by DTSC that this type of tire is a "priority" product. This focused definition also clarifies and streamlines DTSC's key prioritization analysis for the product-chemical combination. Lastly, if an alternative is identified for all-season, replacement, passenger tires, tread and side wall components, this alternative is likely to be applicable in tread and sidewall tire components for other tire types.

DTSC acknowledges in the "Initial Statement of Reasons" that it considered a number of alternatives to the proposed regulatory action.[25] For example, DTSC considered listing "motor vehicle tire tread containing 6PPD," but chose not to pursue this listing as 6PPD and 6PPD-quinone have been found on both the tire tread and the tire sidewall. Id. Additionally, DTSC also considered focusing the

[24] USTMA. (2020b). FactBook 2020, U.S. Shipment Activity Report for the Statistical Year 2019. United States Tire Manufacturers Association (USTMA)
[25] Initial Statement of Reasons, https://dtsc.ca.gov/wp-content/uploads/sites/31/2022/05/6PPD-in-Tires_Initial-Statement-of-Reasons-Non-Major-Regulation_accessible.pdf, at page 20.

scope of the definition of "motor vehicle tires" to replacement, all-season, tires intended for use of passenger cars, the alternative supported by USTMA, but chose not to pursue this option to ensure that any available alternatives are adopted across the tire market. Id. DTSC further mentions that it anticipates that only one Alternatives Analysis will be needed to encompass the broader definition of tires in this regulation. Id.

USTMA disagrees that a single Alternatives Analysis would be efficient to prepare and adequately address the concerns and considerations for a broader definition of "motor vehicle tire." On the contrary, USTMA believes that a *focused* definition of "motor vehicle tires" would ensure a workable, single Alternatives Analysis. DTSC states in its Initial Statement of Reasons that, "[w]hile there is great variety in the types of tires available, industry stakeholders have indicated that any alternatives to 6PPD found for replacement, all-season tires intended for use on passenger cars would be expected to work for all tires. As a result, DTSC anticipates that only one Alternatives Analysis will be needed to encompass a broader definition of tires in this regulation. Choosing a broader definition allows DTSC to ensure that any available alternatives are adopted across the tire market, not just in replacement, all-season tires intended for use on passenger cars, and thus increases protection of California's aquatic environment." ISOR at 20. However, if DTSC finalizes the broad definition of "motor vehicle tires" as proposed, USTMA anticipates that every vehicle type, every performance category, every manufacturer, and every tire component potentially covered by the definition will need to be addressed in the Alternatives Analysis. These different analyses will be lengthy, complex, and cumbersome.

For the reasons outline above, USTMA recommends that DTSC focus the definition of Priority Product for the purposes of conducting the alternatives analysis to replacement, all-season, passenger tire tread and sidewall compounds. In addition, USTMA recommends that DTSC not consider further expanding the final definition of "motor vehicle tire" beyond what has already been proposed. A more focused definition of "tire" will enable tire manufacturers to complete one Alternatives Analysis that will likely be applicable to other tire types. Moreover, focusing the regulatory definition of "tire" to those areas that are most likely to come into contact with oxygen and ozone would provide much more focus to this rulemaking on the issue of greatest interest to DTSC.

B. We support the exclusion of tires intended for use in off-road vehicles and urge DTSC to expand the list of excluded tires.

The Technical Report excludes several tire types including:

- Tires have been installed or a tire intended for exclusive use on non-motorized vehicles such as bicycles, including electric bicycles.
- Tires intended for exclusive use on off-road vehicles including aircraft; vehicles intended exclusively for off-road (e.g., dirt track) use; construction and agricultural equipment such as excavators, paving equipment, tractors, combines, bulldozers, and skidders (but not farm labor vehicles); industrial equipment such as forklifts, airport service equipment, and ice-grooming machines; and military vehicles (except those that are equivalent to civilian vehicles covered by this product definition, such as light-duty vehicles used as staff cars, buses, and delivery vehicles).

- The used component(s) of a retreaded tire; however, the new tire tread material that is used in a retreaded tire is included in the definition.[26]

USTMA supports these exclusions from the definition of "tire." As mentioned previously, replacement, all season, passenger tires represent the majority of tires on California roadways. Exempting bicycle tires, tires intended for exclusive use of off-road vehicles, and the used component of retreaded tire material, helps to narrow the definition of Priority Product to provide a meaningful and workable Priority Product definition. Further, USTMA members must provide certain certifications regarding safety and performance requirements for tires that are utilized by the military, tires utilized on aircrafts and tires placed on new vehicles or original equipment tires. USTMA supports the exclusion of these tire types from the definition of "tire."

C. USTMA recommends DTSC clarify that a tire imported into or sold in California as a component of a motor vehicle is also excluded from the definition of Priority Product.

The Proposed Regulatory text specifies that "For the purposes of this section, "motor vehicle tire" does not include:

1. A tire imported into or sold in California as a component of a motor vehicle.
2. A tire intended for exclusive use on off-road vehicles, including aircraft; vehicles intended exclusively for off-road (e.g., dirt track) use; construction and agricultural equipment such as excavators, paving equipment, tractors, combines, bulldozers, and skidders (but not farm labor vehicles); industrial equipment such as forklifts, airport service equipment, and ice-grooming machines; and military vehicles (except those that are equivalent to civilian vehicles covered by this product definition, such as light-duty vehicles used as staff cars, buses, and delivery vehicles);…"[27]

However, this exemption for "a tire imported into or sold in California as a component of a motor vehicle" is not included in the proposed exemptions listed in the Technical Report. The Technical Report specifies that:

> "Motor vehicle tire" does not mean a motor vehicle on which tires have been installed or a tire intended for exclusive use on non-motorized vehicles such as bicycles, including electric bicycles. It also does not mean a tire intended for exclusive use on off-road vehicles including aircraft; vehicles intended exclusively for off-road (e.g., dirt track) use; construction and agricultural equipment such as excavators, paving equipment, tractors, combines, bulldozers, and skidders (but not farm labor vehicles); industrial equipment such as forklifts, airport service equipment, and ice-grooming machines; and military vehicles (except those that are equivalent to civilian vehicles covered by this product definition, such as light-duty vehicles used as staff cars, buses, and delivery vehicles). Additionally, "motor vehicle tire" does not mean the used

[26] Technical Report page at 7.
[27] Proposed Regulatory Text, https://dtsc.ca.gov/wp-content/uploads/sites/31/2022/05/6PPD-in-Tires_Proposed-Regulatory-Text_accessible.pdf, at page 2.

component(s) of a retreaded tire; however, the new tire tread material that is used in a retreaded tire is included in the definition."[28]

USTMA asks that DTSC clarify in the Technical Report that tires imported or sold in California as a component of a motor vehicle are exempt from the definition of "tire."

D. USTMA recommends DTSC engage chemical manufacturers of 6PPD for input on "Hazard Traits and Environmental and Toxicological Endpoints."

As mentioned previously, USTMA members use 6PPD in the process of manufacturing tires. Our member companies rely on the data provided by their suppliers regarding potential environmental and human health impacts of tire materials and their transformation products. USTMA recommends that DTSC consult with manufacturers of 6PPD for input and feedback on the "hazard traits and environmental and toxicological endpoints" of 6PPD. Their input and participation in this regulatory process is critical and beneficial to ensure accurate information on 6PPD and potential alternatives.

E. USTMA asks DTSC to include citations to the scientific literature to support the various statements made in this section.

Throughout Section 1, DTSC should accurately characterize what is known about TRWP and chemicals associated with the particles. For example, on page 5 of the Technical Report in the "Potential for Exposure Section", DTSC states, a sizable fraction of these TWP are released to the aquatic environment, especially during rain events and results in high potential for exposure of aquatic organism to tire-derived contaminants." DTSC should reference reliable scientific research rather than generic language when characterizing the fate and transport of TRWP in the environment. A mass balance analysis by Unice et al., 2019[29] reported that on average 20% of TRWP released to the environment are transported to freshwater aquatic systems. Similarly, the qualifier 'high potential for exposure' should not be used because exposure to the tire related chemicals is dependent on their potential migration from the particles and the fate and transport of the chemical in water.

Further on page 5, DTSC states that "detections of 6PPD-quinone in California waterways clearly indicates that is it sufficiently persistent for aquatic organisms to be potentially exposed." However, there is no citation or reference to the project or researcher associated with the water samples, nor is there any information related to how and why they were collected. To our knowledge the only information regarding analysis of California waterway samples for 6PPD-quinone was in Tian et al. 2020, supplementary file. The authors reported that 6PPD-quinone was detected in 4 of 9 surface water samples from California. Although the sample collection date and the latitude/longitude coordinates are provided, there is no contextual information as to why the samples were collected, or how they were processed or stored prior to the analysis by Tian et al. USTMA recommends that DTSC add a more comprehensive discussion of the Los Angeles and San Francisco area samples.

[28] Technical Report at page 7.

[29] Unice KM et al. (2019). Characterizing export of land-based microplastics to the estuary - Part I: Application of integrated geospatial microplastic transport models to assess tire and road wear particles in the Seine watershed. Science of The Total Environment. 646:1639–1649. doi: 10.1016/j.scitotenv.2018.07.368

F. USTMA asks DTSC to clarify that urban runoff mortality syndrome is one factor that contributes to the decline of coho salmon but is not the only factor that contributes to the decline of coho salmon.

We recommend that DTSC revise the Technical Report to acknowledge in Section 1 that significant declines of the coho salmon populations in California were observed as early as the 1940s, pre-dating the use of 6PPD in tires and that urban runoff mortality syndrome is only one of many factors that contribute to the decline of coho salmon.[30] As acknowledged by DTSC on page 47 of the Technical Report, the overall decline in the salmon populations is a result of various factors present in both the freshwater (for coho) and marine environment. A recent report by Pearsall et al. 2021 supports this finding stating that impacts to natural spawning success due to URMS is unlikely to account for the changes observed in both hatchery and wild coho marine survival. Specifically, the scientific study states that URMS primarily occurs in urban rivers and coho show synchronicity in marine survival patterns among populations from urban and rural areas throughout the Salish Sea.[31] Pearsall et al. examined the population decline of several salmon species in the Salish Sea including chinook, coho, and steelhead. The authors report that the survival of the salmon populations is affected by many factors including: salmon behavior and physical habitat, food supply, predators, disease and contaminants. As shown in table 1 below, Pearsall et al (2021) outlines the relative importance of the various factors that impact salmon and rank contaminants as a moderate factor for chinook and low for coho. Id.

[30] California Fish & Game Commission. (2002). Status review of California coho salmon north of San Francisco: Report to the California Fish and Game Commission. Available at: https://nrm.dfg.ca.gov/FileHandler.ashx?DocumentID=121350

[31] Pearsall I,* M Schmidt,* I Kemp, and B Riddell. 2021 Synthesis of findings of the Salish Sea Marine Survival Project, Version 1.0. www.marinesurvivalproject.com, www.psf.ca, and www.lltk.org.

Table 1. *Synthesis Committee perspectives on the significance of the different SSMSP hypotheses to explain the changes in marine survival for chinook, coho, and steelhead in the Salish Sea (excerpted from Pearsall et al. 2021)*

Hypotheses	Salish Sea								
	Chinook			Coho			Steelhead		
	Trend since late 1970s	Recent Patterns	Strength of Evidence	Trend since late 1970s	Recent Patterns	Strength of Evidence	Trend since late 1970s	Recent Patterns	Strength of Evidence
Decline in marine survival	1	NA	M	1	NA	H	1	NA	H
Critical Period - Growth	U	2	M	U	2	M	6	6	H
Critical Period - Instantaneous Mortality	U	3	L	U	2	M	U	1	H
Salmon Behavior and Physical Habitat									
Outmigration Timing*	2	1	H	4	4	H	U	U	H
Distribution & Migration Pathways	5	2	L	6	6	L	6	6	H
Residency	5	3	M	2	2	L	6	6	H
Physical Habitat	3	3	M	5	5	L	6	6	M
Bottom up - Food Supply									
Prey availability	1	1	M	1	1	M	6	6	L
↳Water quality/Biogeochemistry	2	2	L	2	2	L	3	3	L
↳Mismiatch	3	3	L	3	3	L	6	6	H
↳Competition	4	3	M	4	3	L	6	6	H
Ocean Acidification**	5	5	NA	5	5	NA	6	6	H
Harmful Algae**	5	5	NA	5	5	NA	6	6	H
Top down - Predation									
Predator abundance	2	2	M	2	3	M	2	1	M
Specialization	6	5	L	6	5	L	6	6	L
Pulse prey abundance	4	4	L	4	4	L	4	5	L
Buffering/Prey switching	3	U	L	3	U	L	2	2	M
Top down - Disease and contaminants									
Disease	U	1	M	U	2	M	5	5	H
Contaminants	3	2	M	U	4	L	U	U	NA

**Rankings reflect the finding of a reduction in variability and change in mean of hatchery Chinook release times, some change in Coho hatchery release times, and correlations with survival in multi-factor models (Sobocinski et al. 2021). Outmigration timing in and of itself may not affect survival. Rather, it may interact with other ecosystem factors (e.g., mismatch with prey availability, competition, and pulse prey abundance).*

***Ocean acidification and harmful algae likely have minimal impact now but are a substantial concern into the future as climate change increases the potential impact of these factors.*

Legend

Level of Impact	
Substantial-Moderate	1-2
Some	3-4
Minimal - None	5-6
Unknown	U

Strength of Evidence	
Strong	H
Moderate	M
Week	L
Not Applicable	NA

USTMA recommends DTSC acknowledge in Section 1, that URMS has not been officially documented in California and as such, it is unclear how significant 6PPD-quinone is in view of all of the other factors affecting the survival of the coho populations. This point was also raised by Dr. Marcus Brinkman, one of DTSC's peer reviewers. Dr. Brinkman indicated that follow up studies are needed to independently validate and confirm the connection between 6PPD-quinone and URMS in California.

VI. USTMA general comments on section 3. Candidate Chemical Definition and Properties

A. Degradation, Reaction, or Metabolic Products of Concern

The discovery of the transformation product 6PPD-quinone is recent and its half-life, solubility, and stability in the environment is unknown. Many environmental factors will impact these properties. There is a need for more research to fill data gaps in this area.

B. Consideration of structural or mechanistic similarity to chemicals with known adverse impacts

DTSC leverages certain toxicological characteristics of other quinone substances to support its rationale that 6PPD-quinone may result in adverse human health effects. This use of 'read-across' from structurally similar chemicals is not well supported for all quinone compounds. This was recognized by one of the DTSC peer reviewers, Dr. Marcus Brinkman who stated that "it would be pertinent to include one or two more sentences emphasizing the potential shortcomings of this read-across approach, and … provide a percentage of the quinones that have been studied to date for which these characteristics have been demonstrated."

USTMA recommends that DTSC use recognized read-across or QSAR tools if DTSC wants to make predictions about the potential for the human health toxicity of 6PPD-quinone. Alternatively, DTSC should identify the human health hazard as a data gap for 6PPD-quinone without additional speculation.

VII. General Comments on the Technical Report section 4. Potential for Exposures to the Candidate Chemical During the Product's Life Cycle

A. As mentioned previously USTMA asks DTSC to utilize "reliable information," as defined in the SCPR, to accurately reflect the use of 6PPD in tires in the U.S.

See rationale in Section V, A.

B. Presence of the Candidate Chemical in the Product

New vehicle tires reportedly contain as much as 1 to 2% (10,000 to 20,000 µg/g) 6PPD (OSPAR Commission 2006[32]; USTMA 2021c[33]). Performance and application requirements can impact the amount of 6PPD that may be applied **within** this range.

[32] OSPAR Commission. (2006). Hazardous Substances Series 4-(dimethylbutylamino)diphenylamine (6PPD) 2005 (2006 Update). Available at: https://www.ospar.org/documents?v=7029.
[33] USTMA. (2021c). Antioxidants and antiozonants role in manufacturing safe tires. U.S. Tire Manufacturers Association (USTMA).

C. USTMA asks that DTSC revise the "Market Presence and Trends" data to accurately reflect USTMA tire shipment data.

DTSC mentions in the Technical Document that "most tires sold in the United States today are produced domestically by foreign-owned global tire manufacturers that operate production plants across the United States." Further, DTSC mentions in the Technical Report that "USTMA member companies account for approximately 80% of the tires shipped each year." We would like to clarify that USTMA's 12 full members and 4 statistical affiliate members, together, account for approximately 80% of US tires shipments each year.[34]

Additionally, the Technical Report indicates that "based on USTMA data, DTSC estimates that approximately 363,916,000 new tires entered the United States supply stream from both domestic and foreign manufacturers in 2019 (USTMA 2020b)[35]. This figure is calculated based on the assumptions that (1) USTMA members account for roughly 80% of domestic tire production, and (2) non-USTMA members export approximately the same percentage of total output. Exports are subtracted from total production, and then imports are added to yield the total number of tires entering the supply stream." USTMA recommends that DTSC correct this statement to clarify that based on the USTMA FACTBOOK, approximately 332,685,000 new tires entered the United States Original Equipment or Aftermarket Replacement supply stream from both domestic and foreign manufactures in 2019 (USTMA 2020b). This total is calculated from the full member and affiliate member actual reporting plus the estimation of the USTMA non-participants, subtracting USTMA import from total US imports. Less than half of the tires sold in the United States today are produced domestically by global tire manufacturers that operate production plants across the United States.

D. USTMA asks DTSC to revise the Technical Report to clarify the description of the particles formed by the interaction of tires and road pavement based on the scientific literature that indicates that the particles are a mixture of tread rubber and pavement particles.

Throughout the document, DTSC refers to the particles generated from the abrasion of tires and the road surface as tire wear particles. However, as indicated in our earlier comment, the use portion of the tire life cycle generates particles that are a mixture of tread rubber and embedded pavement particles which are now referred to as tire and road wear particles (TRWP) (Kreider et al., 2010, Dal O'stro et al. 2014, Wagner et al., 2018; Leads and Weinstein et al., 2019; Rauert et al., 2021). (Kreider et al. 2012)[36] provided an overview of the chemical composition of TRWP and demonstrated that they are notably different than particles generated just from tread, especially in terms of polymer content (16% for TRWP versus 46% for tread particles) and mineral content (61% for TRWP and 16% for tread particles). Many factors impact TRWP generation, including tire design, vehicle characteristics (such as weight, distribution of load, location of driving wheels and suspension types), road surface (material, runoff design, roughness), weather (humid or dry, hot or cold), road topology (hilly or flat,

[34] USTMA's four statistical members include Double Coin, Maxxis, Nexen and Sailun.
[35] USTMA. (2020b). FactBook 2020, U.S. Shipment Activity Report for the Statistical Year 2019. United States Tire Manufacturers Association (USTMA)
[36] Kreider ML, Doyle-Eisele M, Russell RG, McDonald JD, Panko JM. 2012. Evaluation of potential for toxicity from subacute inhalation of tire and road wear particles in rats. Inhal Toxicol 24(12):907–917.

winding or straight), and driving behavior (aggressive or smooth driving, high or moderate speed, respecting the correct inflation pressure, braking).

It is currently unknown whether TRWP are the primary source of 6PPD-quinone in the environment. However, the environmental availability of 6PPD from TRWP was evaluated by Unice et al. (2015)[37]. In this study, the researchers quantified the specific contribution of each lifecycle step (manufacturing including rubber vulcanization and curing), on-road use (I.e., TRWP), terrestrial aging in soil and leachable fraction in aquatic systems (I.e., sediment incubators). The total environmental availability and release to water were calculated for the 6PPD and its transformation products. The total environmental availability of 6PPD inclusive of transformation products for an accelerated terrestrial aging time in soil of 0.1 years was 6 percent of the formulated mass in the tread compound. Further, column leaching tests of the aged particles showed no detection of 6PPD at 0.8 yrs or after and none of the transformation products were detected in the column leachates at any time point. The sediment incubator tests demonstrated that 6PPD and its main hydrolysis transformation products predominantly partitioned to sediment and not to the overlying or pore water in the test systems.

E. Potential Exposures to the Candidate Chemical During the Product's Life Cycle - Use

1. USTMA asks DTSC to clarify that an optimal migration rate for antidegradents in tires is needed for tire performance and safety.

The migration rate of an antidegradent is critical to its performance in a tire. DTSC states in the Technical Report that "fast migration to the surface of the tire and reactivity toward ozone are required characteristics for antiozonants." However, this statement is not accurate since a migration that is too fast will be depleted quickly and will not protect the tire throughout its lifetime. An optimal migration speed is required to balance the protection requirements with the lifetime durability requirements. USTMA recommends DTSC clarify this important quality of antidegradents in tires in the Technical Report.

2. USTMA recommends DTSC clarify that there is no data that identifies the main source of 6PPD-quinone in the environment.

Additionally, DTSC states in the Technical Report that 6PPD and its reaction products can be emitted to the environment from tires in several ways. Some might be leached when it rains or when the car is washed (McIntyre 2021), or, less likely, evaporate into the atmosphere from the surface of tire products (OSPAR Commission 2006)."[38] DTSC then goes on to claim that "the main way tires release 6PPD and its reaction products into the environment, however, is likely through mechanical tire abrasion on the roads, which produces microplastics known as TWP (OSPAR Commission 2006; Tian et al. 2021)."[39] This statement is not based on any scientific findings. To date, there is no data that

[37] Unice K et al. (2015). Experimental methodology for assessing the environmental fate of organic chemicals in polymer matrices using column leaching studies and OECD 308 water/sediment systems: Application to tire and road wear particles. The Science of the Total Environment. 533:476–487. doi: 10.1016/j.scitotenv.2015.06.053
[38] McIntyre J. (2021). Written Testimony of Jenifer McIntyre, Ph.D., Assistant Professor, College of Arts & Sciences; College of Agricultural, Human and Natural Resource Sciences, Washington State University before the Committee on Natural Resources, Subcommittee on Oversight and Investigations. Available at: https://naturalresources.house.gov/imo/media/doc/2021_07_15_Written_Testimony_Jenifer_ McIntyre.pdf.
[39] Technical Report at page 31.

identifies the main source of 6PPD-quinone in the environment. USTMA asks DTSC to clarify in the Technical Report that there is no data regarding the main way in which tires release 6PPD and its reaction products into the environment.

3. USTMA recommends that DTSC clarify the amount of a tire's mass loss

Further, DTSC states in this section that "more than 10% of a tires' mass loss is worn away onto road surfaces over its useful life (Blok 2005)."[40][41] Based on USTMA's tire wear estimate for the U.S., 10-12% of the tire's mass is lost via tread wear.

4. USTMA estimate for the amount of tire wear released in the U.S.

DTSC specifies in the Technical Report – "Depending on the estimate, a total of 806,354 to 1,524,740 metric tons of TWP are released in the U.S. each year (Kole et al. 2017[42]; USTMA 2021b[43]), which corresponds to between 2.5 and 4.7 kg TWP per person per year. Assuming this rate is constant throughout the U.S., that adds up to between 19,250 and 36,200 metric tons (19.25 to 36.2 million kg) of TWP generated each year in the San Francisco Bay Area (Sutton et al. 2019[44]; USTMA 2021b), and between 98,750 and 185,650 metric tons generated each year in California. As commented previously by USTMA (USTMA 2021b), the estimates of tire wear provided by Sutton et al, 2019 are nearly double the amount that is likely to be realistic. The estimate provided by Sutton et al. (2019) is based on a tire wear rate of 4.7 kg/capita/year, obtained from the publication by Kole et al. 2017. The Kole et al., 2017 wear rate of 4.7 kg/year/capita for the U.S. overestimates the likely release rate by approximately 2-fold due to an underestimation of distance traveled by trucks in the US and an overestimatation of the tire wear rate for trucks. A recent examination of the tire wear rate data sources highlighted the significant lack of reliable data used by Kole et al. (2017) and others stating that "we found a wide network of TWP emission related studies which mostly consist of reviews or summarizing articles and references that are no longer available. Only an appalling small number of studies actually measured TWP emissions. Additionally, half of these measurements were almost 50-years-old or did not consider standard passenger cars or were published by institutions as reports" (Mennekes and Nowak, 2022)[45]. As such, the use of USTMA estimates, which are based on modern tires and verifiable shipment data are superior to estimates made using the wear rates provided by Kole et al. (2017).

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[40] Technical Report at page 31.

[41] Blok J. (2005). Environmental exposure of road borders to zinc. Science of The Total Environment. 348(1–3):173–190. doi: 10.1016/j.scitotenv.2004.12.073.

[42] Kole PJ et al. (2017). Wear and tear of tyres: A stealthy source of microplastics in the environment. International Journal of Environmental Research and Public Health. 14(10):1265. doi: 10.3390/ijerph14101265

[43] USTMA. (2021b). Comments by the U.S. Tire Manufacturers on the Product - Chemical Profile for Motor Vehicle Tires Containing N-(1,3-Dimethylbutyl)-N'-phenyl-p-phenylenediamine (6PPD). Available at: https://calsafer.dtsc.ca.gov/workflows/Comment/13054/?from=search. Accessed 28 Sep 2021.

[44] Sutton R et al. (2019). San Francisco Estuary Institute, 5 Gyres: Understanding microplastic levels, pathways, and transport in the San Francisco Bay Region. Available at: https://www.sfei.org/sites/default/files/biblio_files/Microplastic%20Levels%20in%20SF%20Bay %20-%20Final%20Report.pdf

[45] Mennekes D, Nowack B. Tire wear particle emissions: Measurement data where are you? Sci Total Environ. 2022 Jul 15;830:154655. doi: 10.1016/j.scitotenv.2022.154655. Epub 2022 Mar 18. PMID: 35314235

5. USTMA does not recommend that 6PPD-quinone be used as a chemical marker for tire wear

In the Technical Report, DTSC cites the Klöckner et al. 2021b[46] publication which indicates that 6PPD-quinone would make a good chemical marker for TRWP in environmental samples. However, a reliable chemical marker must be one that is stable in the environment and does not leach from the substance for which it is related. Although Klöckner et al. did not observe leaching of 6ppd-quinone from the tire particles that they tested, others have certainly observed leaching. Additionally, a reliable marker must also be stable in the environment and very little information is available for stability of 6PPD-quinone; although Hiki et al. (2021)[47] has reported a half-life of 33 hrs in water. Given its leaching behavior and lack of persistence in at least one environmental compartment, 6PPD-quinone is not a good marker for TRWP. Nevertheless, a series of chemical markers related to the pyrolysis products associated with tire tread (Unice et al., 2012[48]; Miller et al., 2022[49]; Rodland et al., 2022[50]) have been developed and found to be reliable for quantification of TRWP in air, water, soil and sediment (ISO TS20593:2017 and TS21396:2017).

6. USTMA recommends DTSC clarify that 6PPD does not remain on tire wear particles forever.

The Technical Report specifies that "combining the new information from Tian et al. (2021) and Klöckner et al. (2021a)[51] with the decades-old literature on the mechanism of antiozonant action, it appears that 6PPD-quinone forms on the surface of the tire as part of the protective film, and remains present on TWP."[52] 6PPD is a highly reactive product and will continue to react with ozone and oxygen until it is exhausted in the rubber compound. Thus, 6PPD is not expected to be present in tire wear particles indefinitely.

F. Potential Exposures to the Candidate Chemical During the Product's Life Cycle - End-of-Life

One of the most important properties of an effective antiozonant and antioxidant used in tire rubber compounds is that it is present for the in-use portion of the tire life cycle. As such, the amount

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[46] Klöckner P et al. (2021b). Organic markers of tire and road wear particles in sediments and soils: Transformation products of major antiozonants as promising candidates. Environmental Science & Technology. acs.est.1c02723. doi: 10.1021/acs.est.1c02723

[47] Hiki K et al. (2021). Acute toxicity of a tire rubber-derived chemical, 6PPD quinone, to freshwater fish and crustacean species. Environmental Science & Technology Letters. 8(9):779–784. doi: 10.1021/acs.estlett.1c00453

[48] Unice KM, Kreider ML, Panko JM. 2012. Use of a deuterated internal standard with pyrolysis-GC/MS dimeric marker analysis to quantify tire tread particles in the environment. Int J Environ Res Pub Health 9:4033–4055

[49] Miller et al., 2022. Evaluation of three pyrolyzer technologies for quantitative pyrolysis-gas chromatography-mass spectrometry (Py-GC-MS) of tire tread polymer in an artificial sediment matrix. Environmental Advances * (2022) 100213

[50] Rodland et al. (2022). A novel method for the quantification of tire and polymer-modified bitumen particles in environmental samples by pyrolysis gas chromatography mass spectroscopy. Journal of Hazardous Mateials 423 (2022) 127092

[51] Klöckner P et al. (2021a). Comprehensive characterization of tire and road wear particles in highway tunnel road dust by use of size and density fractionation. Chemosphere. doi: https://doi.org/10.1016/j.chemosphere.2021.130530.

[52] Technical Report at page 33.

of 6PPD that is used in tire rubber compound formulations is targeted to last for the service life of a tire on a vehicle, but not beyond. The amount of 6PPD in the tire will decrease over time as it is reacted with the ambient oxygen and ozone in the air.

Scrap tire management in California, across the U.S. and globally is essential to ensure tires do not end up in stockpiles or are illegally dumped which present fire and disease risk. To date, there is limited data on the amount of 6PPD-quinone that may potentially be released from scrap tire end-of-life uses. However, DTSC acknowledges in the Technical Report that as tires age, the concentration of 6PPD is depleted, reducing the risk of 6PPD-quinone formation.

A recent study by researchers at the University of Reno, Nevada found that release of 6PPD-quinone from compacted rubber modified asphalt mixtures in rainfall simulation ranged from 0.003 - 0.008 ug/L (Lokesh et al. 2022)[53]. These concentrations are below the LC50 for coho salmon of 0.095 ug/L reported by Tian et al. (2022)[54] and in real world scenarios would be additionally diluted before or when entering surface water. Therefore, rubber modified pavements are expected to be an insignificant potential source of 6PPD-quionone in the environment. Additionally, Lokesh et al (2022) reported that rubber modified asphalt can serve as a sink for 6PPD-quinone on the road surface and as such may provide mitigation of 6PPD-quinone in stormwater. Additional research is needed to understand the potential release of 6PPD-quinone from other scrap tire applications including tire derived aggregate and crumb rubber.

G. USTMA asks DTSC to revise the Technical Report Section "Aggregate Effect" to clarify what is known regarding the potential exposure to 6PPD from products made of recycled or reused tires.

DTSC states that 6PPD can be found in products made from recycled or reused tires and that all of the products have the potential to release 6PPD and 6PPD-quinone, however no citations to peer-reviewed publications or reports are provided to support this statement. USTMA requests that DTSC provide a description of the products that have been tested and citations to the research. Where data is lacking for products made from recycled tires, DTSC should identify them as data gaps rather than draw conclusions that are not supported by scientific findings.

H. USTMA does not recommend the use of DPG, HMMM or DCU as surrogates for 6PPD or 6PPD-quinone.

DTSC specifies in the "Technical Document" that:

"Given the paucity of information on environmental 6PPD or 6PPD-quinone concentrations, other tire derived chemicals may function as surrogates for 6PPD and 6PPD-quinone. Peter et

[53] Srinidhi Lokesh*1, Siththarththan Arunthavabalan1, Elie Y. Hajj1, Edgard Hitti2, Yu Yang1 1Department of Civil & Environmental Engineering, University of Nevada, Reno, Presented at the 17th IWA Leading Edge Conference on Water and Wastewater Technologies. IWA_LET_programme_FINAL-WEB-VERSION.pdf
[54] Tian Z et al. (2022). 6PPD-quinone: Revised toxicity assessment and quantification with a commercial standard. Environmental Science & Technology Letters. acs.estlett.1c00910. doi: 10.1021/acs.estlett.1c00910

al. (2020)[55] estimated TWP concentrations in Miller Creek (a small, urban stream that flows into Puget Sound) using measurements of three chemicals in samples collected between July and December 2018:

· 1,3-diphenylguanidine (DPG, a vulcanization accelerator in tire rubber),
· hexa(methoxymethyl)melamine (HMMM, a cross-linking agent in tire rubber), and
· dicyclohexylurea (DCU, a reaction byproduct in tire rubber)."[56]

Surrogates are only necessary when a substance of interest cannot be directly measured, which is not the case for 6PPD and 6PPD-quinone as there are existing analytical methods and reference standards. In fact, Tian et al, 2020 reportedly retrospectively measured 6PPD and 6PPD-quinone in archived water samples from Los Angeles and San Francisco. Thus, it is unnecessary to speculate about the presence or absence of 6PPD and 6PPD-quinone as there are methods to directly quantify them. Additionally, the presence of DPG, HMMM and DCU are not useful indicators for the presence of 6PPD or 6PPD-quinone. While these three chemicals may be associated with tires, their detection does not allow one to know whether 6PPD or 6PPD-quinone is present, or at what concentration because their fate in the environment is quite different. Challis et al, 2021[57] reported analysis of stormwater samples collected at various sampling sites in Toronto where detection frequency for 6PPD-quinone was only 57% compared to 96%, and 90% for DPG and DCU, respectively. As such, the presence of DPG or DCU does not indicate whether 6PPD or 6PPD quinone would be present. Additionally, Rauert et al., (2022)[58] quantified the concentrations of 15 tire additive chemicals, 6PPD-quinone and TRWP in surface waters near Brisbane and did not report an association between 6PPD-quinone and specific tire additive chemicals. USTMA recommends that this section of text be removed as it is inaccurate and misleading.

I. USTMA recommends DTSC clarify the amount of tire and road wear particles that may be released to nearby waterbodies.

In addition to USTMA's request to update/revise the tire wear emission rate (USTMA Comments, Section VII, E – 4), USTMA request that DTSC use recent and reliable scientific literature when describing the amount of tire and road wear particles that may be released to surface water bodies. Currently, DTSC states that an estimated 70% of tire-derived microplastics may be released into nearby waterbodies, citing to publications by Blok (2005) and (Sutton et al. 2019). This estimation is not correct, because Blok (2005) estimated that 70% of zinc related to tires, not TRWP, is deposited on the road and subsequently washed off where it may or may not go to stormwater treatment. The current understanding based on research of the fate and transport of TRWP in the environment indicates that approximately 50% of TRWP generated will be deposited on the road and available for transport via road runoff to surface water or water treatment systems and the other 50% will be transported to roadside soil (Unice et al., 2019).

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[55] Peter KT et al. (2020). More than a first flush: Urban creek storm hydrographs demonstrate broad contaminant pollutographs. Environmental Science & Technology. 54(10):6152–6165. doi: 10.1021/acs.est.0c00872.
[56] Technical Report at page 44.
[57] Challis JK et al. (2021). Occurrences of Tire Rubber-Derived Contaminants in Cold-Climate Urban Runoff. Environmental Science & Technology Letters. acs.estlett.1c00682. doi: 10.1021/acs.estlett.1c00682
[58] Rauert C, Charlton N, Okoffo ED, Stanton RS, Agua AR, Pirrung MC, and Thomas KV,Environmental Science & Technology 2022 56 (4), 2421-2431
DOI: 10.1021/acs.est.1c07451

VIII. USTMA general comments on the Technical Report section 5. Potential for Significant or Widespread Adverse Impacts

A. USTMA recommends DTSC include the full data set for "California Coho Salmon Population Estimates" in Figure 5 on page 48 of the Technical Report.

On page 48, in Figure 5, DTSC adapted historical estimates of CCC coho salmon populations from Figure 1 of the 2012 National Marine Fisheries Recovery Plan (NMFS, 2012)[1][59]. In Figure 5, DTSC only reported the population estimates for CCC coho from the 1960s to 1990s, which DTSC noted "corresponds with the use of 6PPD in tires," and did not report available data for estimates of the entire California coho salmon population from the 1940s to 2011. DTSC acknowledged the substantial decline of California coho populations since the 1940s (which pre-dates the introduction of 6PPD).

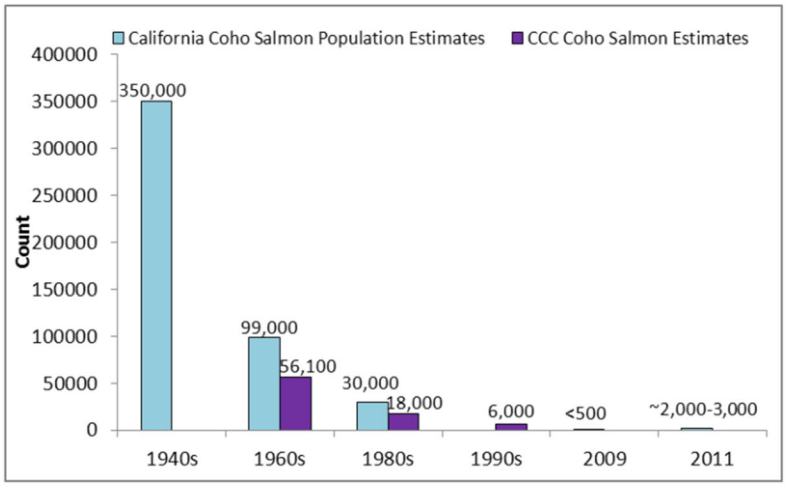

Figure 1: Historical estimates of coho salmon spawners across ESU

In addition, the National Marine Fisheries Service (NMFS 2012) noted the substantial decline of CCC coho, specifically, beginning in the 1940s. For example, on page 41, NMFS stated: "On the Garcia River, Lando Franci recalled that '(s)almon were already starting to dwindle' by the 1940s." Similarly, California Fish & Game (2002),[2] as cited by DTSC, reported substantial decline in California coho populations beginning in the 1940s. For example: "Adult coho salmon counts at Benbow Dam on the South Fork Eel River show a substantial decline in coho salmon abundance in this system starting in the mid-1940s."

B. USTMA recommends DTSC include an evaluation of all available data regarding aquatic toxicity before making broad assumptions that are not well supported by the scientific literature.

DTSC states in the Technical Report that, "Little is known about 6PPD-quinone's sublethal effects in coho or its toxicity in other fish and species at other trophic levels. However, it is unlikely that

[59] NMFS. (2012). Recovery plan for the evolutionarily significant unit of Central California Coast coho salmon. United States National Marine Fisheries Service (NMFS). Available at: https://repository.library.noaa.gov/view/noaa/15987

a chemical that is so acutely toxic to coho would not be toxic to other organisms (Tian et al. 2021)." Although the scientific research regarding the aquatic toxicity of 6PPD-quinone is still evolving, DTSC should include an evaluation of all available data before making such broad assumptions that are not well supported by the scientific literature.

Since the release of Tian et al. 2020, additional research has evaluated the impact of 6PPD-quinone on other fish species. The table below summaries the sensitivity of three fish species chum salmon, rainbow trout and coho. As shown in the table below, coho are at least 20 times more sensitive than rainbow trout to 6PPD-quinone. Non-salmon species showed variable sensitivity to 6PPD-quinone, with no lethality in medaka, water flea, amphipods, artic char and white sturgeon; lethality in zebra fish at concentrations more than 3 orders of magnitude higher than coho, and lethality in brook trout at concentrations 6 times higher than the coho.

	Species	6PPD ug/L	6PPD-Q ug/L	References
LC50 *in vivo*	Coho salmon (24h)	250	0.095	Tian et al., 2022
	Brook trout (24h)		0.59	Brinkmann et al., 2022
	Rainbow trout (24h)		1.96	
	Rainbow trout (96h)		1.00	
	Artic char (24h)		>14.2	
	Artic char (96h)		>12.7	
	White sturgeon (24h)		>14.2	
	White sturgeon (96h)		>12.7	
	Japanese rice fish (96h)	28	> 34	Hiki et al., 2021
	Zebrafish (24h)	1384	308	Varshney et al., 2021
	Zebrafish (96h)	442	132	

Information regarding sub-lethal endpoints is emerging as well, where coho salmon appear to be more sensitive than other species. A summary of available data is shown in the table below.

	Species	6PPD-Q ug/L	References
Sub-lethal in vivo	Chum salmon, adult (Oncorhynchus keta) - Behavior and blood physiology	>2.4	McIntyre et al 2021 (values are LOAELs reported as semi-quantitative from Tian et al 2020)
	Coho salmon, adult (Oncorhynchus kisutch) - Behavior and blood physiology	<2.1 - 2.4	
	Zebrafish, embryo (Danio rerio) - Hatching rate and growth	>54	Hiki et al., 2021 (Values are NOAELs)

	Japanese medaka (Oryzais latipes) - Behavior	>34	
	Zebrafish, embryo (Danio rerio) - Behavior and metabolic oxygen consumption	>1	Varshney et al. 2021 (Values are NOAELs)
	Zebrafish, embryo (Danio rerio) - Hatching rate, body length	>25	
	Zebrafish, embryo (Danio rerio) - Development	>10	
	Zebrafish, embryo (Danio rerio) - Cardiotoxicity	>1	
	Rainbow trout, juvenile (Oncorhynchus mykiss) - Blood physiology - blood glucose	1.38	Brinkman et al., 2022
	Brook trout, juvenile (Salvelinus frontinalis) - Blood physiology - blood glucose	0.11	
	Brook trout, juvenile (Salvelinus frontinalis) - Blood physiology - hematocrit	0.72	

On page 18 in the Technical Report, DTSC reported that exposure to 6PPD-quinone caused 80% mortality in medaka at 0.107 mg/L TWA; 100% mortality in D. magna at 0.138 mg/L TWA, and 100% mortality in H. Azteca at 0.286 mg/L TWA (Hiki *et al*., 2021). In contrast, there was no mortality in zebrafish embryos exposed to 6PPD-quinone at 0.137 mg/L TWA (Hiki *et al*., 2021), nor in larval zebrafish exposed to 6PPD-quinone at "the environmentally relevant concentration of 0.001 mg/L" (Varshney *et al*., 2021)[60]. The aforementioned concentrations are one to three orders of magnitude greater than the updated LC50 value for 6PPD-quinone in coho salmon of 95 ng/L (0.000095 mg/L) reported by Tian *et al*. (2022).

In March 2022, Brinkmann *et al*. (2022) reported that exposure of brook trout and rainbow trout to 6PPD-quinone was associated with LC50s of 0.59 and 1.00 µg/L (0.00059 and 0.001 mg/L), respectively.[61] Moreover, Brinkmann *et al*. (2022) reported no mortalities in Arctic char or White sturgeon exposed to 6PPD-quinone at concentrations up to 14.2 µg/L (0.0142 mg/L).[62] The aforementioned concentrations are two to four orders of magnitude greater than the updated LC50 value for 6PPD-quinone in coho salmon of 95 ng/L (0.000095 mg/L) reported by Tian *et al*. (2022). The results of Brinkmann *et al*. (2022) were not discussed in DTSC's report, likely because the study was published in the same month that DTSC published its report (March 2022).[63]

[60] Varshney S et al. (2021). Toxicological effects of 6PPD and 6PPD quinone in zebrafish larvae. Journal of Hazardous Materials. 127623. doi: 10.1016/j.jhazmat.2021.127623

[61] Markus Brinkmann, David Montgomery, Summer Selinger, Justin G. P. Miller, Eric Stock, Alper James Alcaraz, Jonathan K. Challis, Lynn Weber, David Janz, Markus Hecker, and Steve Wiseman, Environmental Science & Technology Letters 2022 9 (4), 333-338, DOI: 10.1021/acs.estlett.2c00050

[62] Id.

[63] Brinkmann, M., Montgomery, D., Selinger, S., Miller, J.G., Stock, E., Alcaraz, A.J., Challis, J.K., Weber, L., Janz, D., Hecker, M. and Wiseman, S., 2022. Acute toxicity of the tire rubber-derived chemical 6ppd-quinone to four fishes of commercial, cultural, and ecological importance. Environmental Science & Technology Letters, 9(4), pp.333-338.

Additionally, on page 50 of the Technical Report, DTSC acknowledged that juvenile sockeye (Blair *et al*., 2021)[64] and adult chum salmon (Scholz *et al*., 2011[65]; McIntyre *et al*., 2018[66]) appear to be unaffected by exposure to urban storm water runoff. DTSC also acknowledged on page 53 of the Technical Report that "not all species are expected to respond to 6PPD-quinone in the same way as salmonids," and discussed the results of Hiki *et al*. (2021): "A recent study found that exposure to 6PPD-quinone had no apparent acute toxicity toward zebrafish embryos, medaka, and two species of freshwater crustacean (D. magna and H. Azteca) (Hiki *et al*. 2021)."

DTSC did not report that Hiki *et al*. (2021) concluded that their results suggest a "specific toxicity of 6PPD-quinone to coho salmon." Hiki *et al*. (2021) concluded that: "In contrast to the high toxicity observed in coho salmon in a previous study (24 h LC50 of 0.79 µg/L), 6PPD-quinone did not exhibit acute lethal toxicity to any species [*i.e*., zebrafish embryos, medaka, and two species of freshwater crustacean] at its maximum water solubility. The absence of acute lethality of 6PPD-quinone to tested species indicates that the urban runoff toxicity observed for the species can be attributed to other chemicals. The observed large discrepancy in toxicity (by a factor of ∼100) might be due to the specific toxicity of 6PPD-quinone to coho salmon."

On page 50 of the Technical Report, DTSC states that chinook salmon are most closely related to coho and these were affected by 6PPD exposure in the McIntyre *et al*., 2018 study suggesting that other salmonid species are affected. However, DTSC fails to note that steelhead were even more affected than chinook and are less closely related to coho. It seems too early in the research program to use phylogenetic relationships as a basis for sensitivity to 6PPD-quinone. DTSC should acknowledge the limitations of their analogy. Further, on page 51 of the Technical Report, DTSC lists all the salmon species in California and suggests "they may also be sensitive to the toxic effects of 6PPD-quinone". This type of argument might be reasonable if there were not studies indicating some equally related species (chum, sockeye) are not affected. DTSC should at least acknowledge the possibility that these other California species are not affected and that additional research is needed to understand whether other fish species may be potentially impacted.

C. Populations that May be Adversely Impacted

The DTSC Technical Report attempts to attribute the decline in salmon populations and its economic ramifications solely on 6PPD without considering other contributing factors and other potential chemicals that could also be responsible. Indeed, the report contains broad claims about 6PPD's impact on the socio-economic status of tribal communities. For example, the Technical Report makes reference to the state of California and California's Native American tribes' participation in the Fisheries Restoration Grant Program (CDFW 2021c)[67], claiming that millions of dollars have been invested to improve the habitat for salmonids. *See* page 63. As we state above, there are a number of

[64] Blair SI, Barlow CH and McIntyre JK. (2021). Acute cerebrovascular effects in juvenile coho salmon exposed to roadway runoff. Canadian Journal of Fisheries and Aquatic Sciences. doi: 10.1139/cjfas-2020-0240.
[65] Scholz NL et al. (2011). Recurrent die-offs of adult Coho salmon returning to spawn in Puget Sound lowland urban streams. PLOS ONE. 6(12):e28013. doi: 10.1371/journal.pone.0028013
[66] McIntyre JK et al. (2018). Interspecies variation in the susceptibility of adult Pacific salmon to toxic urban stormwater runoff. Environmental Pollution. 238:196–203. doi: https://doi.org/10.1016/j.envpol.2018.03.012
[67] CDFW. (2021c). California Department of Fish and Wildlife (CDFW) Fisheries Restoration Grant Program. Available at: https://wildlife.ca.gov/Grants/FRGP. Accessed 16 Mar 2021

factors that have had an impact on salmon populations. Rather than trying to attribute the entire species decline and the economic impact of that decline to 6PPD, there needs to be a holistic assessment of habitat impact factors and solutions. Indeed, the Technical Report claims that a reduction in solely the release of 6PPD-quinone into streams would help ensure that these resource-intensive restoration projects will help the recovery of coho. *See* page 63.

The Technical Report also attempts to attribute widespread poverty and hunger in tribal communities to 6PPD without a holistic and historic consideration of the ways in which tribal communities have faced systematic inequalities relating to health care access for generations. DTSC's far-reaching position on the connection between 6PPD in tires, salmon populations, and direct negative outcomes for Tribal populations is unsupported by DTSC's preliminary analysis and those sources relied on.[68] Indeed, the U.S. Department of Health and Human Services attributes "lower life expectancy and disproportionate disease burden perhaps because of inadequate education, disproportionate poverty, discrimination in the delivery of health services, and cultural differences. These are broad quality of life issues rooted in economic adversity and poor social conditions.".[69] The U.S. Department of Health states that in trying to account for these disparities, "health care experts, policy makers, and tribal leaders are looking at many factors that impact the health of Indian people, including the adequacy of funding for the Indian health care delivery system." This holistic approach should also be considered here.

For these and other reasons, DTSC cannot point to highly attenuated downstream negative impacts to Tribal populations, which also cannot be traced directly and exclusively to 6PPD from motor vehicle tires, as concrete support for proposition that the two regulatory key prioritization principles are met for this listing decision – that there is a potential public exposure to the candidate chemical in the product-chemical combination and that the potential for that exposure would contribute to or cause significant or widespread adverse impacts.

IX. Other Regulatory Programs

DTSC specifies in the Technical Report that the "SCP Regulations do not allow DTSC to require the use of alternatives to a Chemical of Concern that would compromise a Priority Product's compliance with health and safety requirements."[70] NHTSA regulates tire safety and performance, and while it does not specifically regulate tire materials, it is the chemical compounds in tires that enable tires to comply with Federal Motor Vehicle Safety Standards (FMVSS). USTMA thanks DTSC for acknowledging that the SCPR do not provide DTSC the authority to require use of an alternative to 6PPD that would compromise a tire's compliance with FMVSS.

A. Any potential alternative to 6PPD must enable tires to meet safety and performance standards as established by NHTSA.

An alternative material to 6PPD must ensure tire safety and performance, the ability to meet FMVSS, customer expectations, and market requirements. Overall, an alternative chemical needs to

[68] Note too, that some of the technical materials relied on by DTSC as background for this issue, including the 2005 Norgaard paper, do not meet the Department's regulatory criteria for reliability.
[69] See https://www.ihs.gov/newsroom/factsheets/disparities/
[70] Technical Report at page 65.

provide antiozonant performance over the required tire lifetime and be compatible with the other ingredients that are used in tires. 6PPD provides aging protection as an antiozonant, antioxidant, and antifatigue agent. It also has an optimal balance for migration rate and persistence over a tire's expected lifetime. The protocols for rubber and tire testing are clear and should be the first criteria that are considered when evaluating alternatives. To date, there are still many unknowns related to how 6PPD-quinone is formed and the mode of action of toxicity on coho. Additionally, without a clear and accepted definition of the requirements for what constitutes a "safer alternative", it may be difficult to assess whether there is "safer" alternative. USTMA welcomes the opportunity to work with DTSC, the Washington Department of Ecology, chemical manufacturers and other stakeholders to identify the criteria for a "safer alternative."

X. USTMA disagrees with DTSC's decision that the proposed listing of 6PPD in motor vehicle tires is California Environmental Quality Act (CEQA) exempt; USTMA recommends that any future environmental review should consider cumulative impacts of all tire-related rulemakings.

A. CEQA review is appropriate and required at the listing decision stage

DTSC indicates in its Notice of Proposed Action (NOPA) that the rulemaking action to list 6PPD in tires as a Priority Product is exempt from CEQA review under three distinct provisions: i) the "feasibility or planning study" statutory exemption (14 CCR § 15262); ii) the "data collection" categorical exemption (14 CCR § 15306); and iii) the "common sense" exemption (14 CCR § 15061(b)(3)). DTSC's draft CEQA NOE states that these exemptions apply because the proposal to list 6PPD in tires as a Priority Product "requires notifications from any manufacturer of the Priority Product if its product is sold in California and the possible creation of reports that evaluate alternatives to the Priority Product. DTSC cannot anticipate how individual manufacturers will choose to comply with the regulation or mandate any particular response." NOPA at 3. USTMA believes that CEQA review is appropriate and required at the Priority Product listing decision stage and that the CEQA exemptions proposed by DTSC do not apply.

First, DTSC cannot segregate a Priority Product listing decision from the environmental effects of further regulatory decisions DTSC may make as a result of this first step in the rulemaking process – this is improper piecemealing. A listing decision rulemaking under the SCPR is necessary precedent for DTSC's subsequent regulation of 6PPD in motor vehicle tires as a Priority Product. But CEQA prohibits "piecemeal" environmental impacts analysis, where a large project is chopped into smaller projects with little impacts, which taken together as a whole could have significant impacts. That is precisely what is happening here, where DTSC has segmented the listing decision process from the reasonably foreseeable effects (both manufacturer-led and future regulatory decisions from DTSC).

Second, DTSC's proposed CEQA exemptions are inapplicable. DTSC suggests that the listing decision is CEQA-exempt under the "feasibility or planning study" provision [14 CCR § 15262]. However, listing a Priority Product is not merely a feasibility/planning study for "possible future actions" where DTSC has "not approved, adopted, or funded" because a decision to list 6PPD in motor vehicle tires itself entails cost and triggers regulatory obligations under the Safer Consumer Products regulations (e.g., manufacturer notification requirements, AA requirements, option to stop selling a product, and a suite of regulatory responses to AAs after DTSC reviews and considers). Moreover, while a listing decision may produce a variety of economic or regulatory responses, it is clear that this rulemaking is

an example of "adoption of a plan that will have a legally binding effect on later activities." DTSC next suggests that the listing decision is CEQA-exempt for "data collection purposes" [14 CCR § 15306]. However, as addressed above, any listing decision is not merely for informational gathering purposes that DTSC has not yet approved, adopted, or funded – the listing decision rulemaking itself triggers requirements that bind manufacturers and provides a wide range of regulatory response options at DTSC's disposal. Finally, DTSC cites the "common sense" exemption from CEQA analysis because this rulemaking is one where "it can be seen with certainty that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA" [14 CCR § 15061(b)(3)]. But DTSC cannot reach such a conclusion at this stage of the Priority Product regulatory process. Moreover, even rulemakings that intend environmental benefit can still be subject to CEQA consideration and do not automatically qualify as exempt under the "common sense" provision.

B. USTMA urges DTSC to consider the cumulative effects of its rulemaking and should therefore focus motor vehicle tire chemical/product analysis on 6PPD.

Resources should be used on 6PPD rather than on all other chemical components in tires. There are a number of chemicals in motor vehicle tires under consideration in addition to 6PPD including zinc, benzothiazoles, chlorinated paraffins, 1,3-diphenylguanidine, (methoxymethyl) melamines, octylphenol ethoxylates, and polycyclic aromatic hydrocarbons (PAHs). It is important to note that chlorinated paraffins are not used in USTMA member company tires. Octylphenol ethoxylates are also not used in tires, however, octylphenol based resins are used in the tire manufacturing process.

Listing multiple chemicals for the same product category will have reasonably foreseeable cumulative effects that need to be considered together. Indeed, DTSC cannot and should not evaluate multiple chemicals for tires as Priority Products in discrete silos, as DTSC is currently proposing to do. *See, e.g.*, 14 CCR § 15355 ("'Cumulative impacts' refer to two or more individual effects which, when considered together, are considerable or which compound or increase other environmental impacts …). The cumulative impact from several projects is the change in the environment which results from the incremental impact of the project when added to other closely related past, present, and reasonably foreseeable probable future projects. Cumulative impacts can result from individually minor but collectively significant projects taking place over a period of time." This important principle is missing from DTSC's inclusion of motor vehicle tires and the various chemicals under consideration as part of the current 2021-2023 Priority Product Work Plan.

DTSC is considering listing multiple different ingredients in tires separately and without explicitly considering in one public rulemaking the interrelated, significant, and dependent impacts of possibly regulating or restricting all of these ingredients. *See, e.g.,* current Q2 2022 DTSC rulemaking timeline, which shows the proposed rulemaking for zinc in tires proceeding into 2023 and consideration of the other chemicals in tires also proceeding into next year (available here). It is also apparent that DTSC is work-sharing, without being explicit, between the 6PPD and zinc dockets because certain zinc-focused technical reports and documents are listed as references in several of the 6PPD regulatory

reports (e.g., the external scientific review panel report and the 6PPD product/chemical profile document).[71]

DTSC's current proposal to consider and review all of these discrete materials in motor vehicle tires separately is a violation of CEQA and DTSC's legal obligations to conduct a robust and comprehensive environmental review of its regulatory decisions.

Therefore, DTSC should abandon consideration of zinc in tires as a Priority Product, as well as all other chemical considerations for motor vehicle tires. Abandoning separate consideration of zinc, for example, makes sense for a number of reasons. First, zinc is essential to manufacturing motor vehicle tires that are safe, durable, and that meet FMVSS. Moreover, there are no safer alternatives for zinc that enable rubber to vulcanize. Indeed, vulcanization plays a critical role in manufacturing safe and durable tires that meet Federal Motor Vehicle Safety Standards. Tires that do not properly vulcanize would not meet FMVSS. DTSC tacitly acknowledges this fact in the 6PPD Initial Statement of Reasons, p. 21: "Motor vehicle tires would be required to meet current federal standards for safety and performance whether or not DTSC lists motor vehicle tires containing 6PPD as a Priority Product. The SCP Regulations do not allow DTSC to require the use of alternatives to a Chemical of Concern that would compromise a Priority Product's compliance with health and safety requirements."

Second, there is no scientific research tracing zinc in watersheds to zinc from tires and TRWP. There is also a lack of evidence that zinc-oxide in TRWP is bioavailable to aquatic organisms. The difficulty of tracing zinc in watersheds to TRWP undercuts any key prioritization principle from the Safer Consumer Product regulations. Indeed, there are better scientific models, i.e. the Biotic Ligand Model, for assessing the presence of zinc and exceedances of water standards for zinc that are still being developed by other government entities including the State Water Resources Control Board. The evaluation of zinc in tires as a Priority Product actually circumvents this work to utilize the best available science to evaluate water quality criteria for zinc. Use of the Biotic Ligand Model to establish water quality criteria for zinc demonstrates that exceedances for zinc in California water bodies is over estimated. It is important to highlight that there are numerous other sources of zinc in the environment that could contribute to stormwater runoff into watersheds, including zinc from galvanized metal road barricades and buildings and from agricultural runoff. While zinc in tires is irreplaceable, there are numerous solutions to reduce zinc intrusion from corroded galvanized metal road structures or buildings (like paint or enamels).

Finally, proceeding with listing and review of multiple chemical components of tires, as opposed to just 6PPD, undermines the principle of "prioritization" inherent in the legislature's Green

[71] For example, DTSC references its work on zinc in the 6PPD Technical Report page 43: "The data for Los Angeles roadway runoff are noteworthy. As stated in DTSC's Rationale Document for Motor Vehicle Tires Containing Zinc (DTSC 2021b), stormwater runoff may constitute a significant proportion of the total flow of many California waterways during and immediately following precipitation events. Unlike the samples collected in Los Angeles, the San Francisco samples were taken from stormwater-impacted creeks, but all samples, regardless of location, revealed concentrations that demonstrate that 6PPD-quinone is present at ecologically relevant levels in California stormwater and streams…" *See also, id.* at 44: "While not directly applicable, given that the relevant treatment technologies may differ, cost estimates for zinc presented in DTSC's Rationale Document for Motor Vehicle Tires Containing Zinc are informative. The estimated total capital cost of projects required to meet applicable zinc limits for the Ballona Creek and Upper Los Angeles River watersheds exceeds $5.8 billion, and the estimated total operations and maintenance cost exceeds $249 million per year."

Chemistry Law and Department's Safer Consumer Products regulations. There are other more pressing public health concerns from chemicals in consumer products.

USTMA recognizes that prioritizing chemicals of concern and consumer product categories that most affect everyday Californians – the key feature of this regulatory program – must be accomplished within significant constraints; as the Department's 2021-2023 Priority Product Workplan notes:

> "[e]ach of [the steps in the Safer Consumer Products regulatory program]—screening, public engagement, developing a Product-Chemical Profile, rulemaking, Alternatives Analysis, and regulatory response—requires significant resources. We anticipate that much of our product evaluation during the 2021-2023 Work Plan cycle will be a continuation of work that is already underway. Products we began researching during the 2015-2017 Work Plan cycle are now in the rulemaking process. Scoping work begun during the subsequent (2018-2020) cycle led to informal proposals and public consultation for additional possible future Priority Products. The SCP Program is a small program with fewer than 30 technical staff. As we work our way through the many steps that lead to a regulatory response, we will be required to divert some of our resources from evaluating and identifying potential new Priority Products to other required activities, such as reviewing Alternative Analysis reports and developing regulatory responses. However, to the extent our resources permit, we will continue our efforts to identify and list new Priority Products via research and stakeholder engagement." 2021-2023 Priority Product Workplan at 21.

At the same time, the Workplan notes that some product categories have been under review and study for four years or more – "beauty, personal care, and hygiene product" have been highlighted as a priority since 2015 and "cleaning products," "building products and materials used in construction and renovation," and "food packaging" have been highlighted as priorities since 2018. Yet, since the Safer Consumer Products program launched in 2013 the Department has only finalized five Priority Product listings despite "conduct[ing] scoping research on approximately 70 chemicals in half a dozen product categories." 2021-2023 Priority Product Workplan at 1.

Many of the consumer products in these other priority categories are used by significant numbers of Californians and may lead to direct, harmful exposures to consumer as well as the environment. DTSC says about the "beauty, personal care, and hygiene" product category, for example, that "[a]ccording to data collected through the California Safe Cosmetics Program, between 2009 and 2015 over 57,000 cosmetic products sold in California contained one or more of 77 unique chemicals identified as a carcinogen or a reproductive or developmental toxicant … [and that] [p]roducts in this category may contain Candidate Chemicals that are reproductive or developmental toxicants." But while this product category has been scrutinized by DTSC since 2015, the Department has only just recently proposed rulemakings to list nail product that contain toluene and methyl methacrylate. DTSC itself acknowledges that more work should be done in this, and other areas – "[w]hile the SCP Program accomplished a great deal in this category during the two prior Work Plan cycles, we still have much to do." 2021-2023 Priority Product Workplan at 10.

USTMA submits that DTSC has identified pressing public health concerns from chemicals in consumer products other than those under considerations in motor vehicle tires, which was only just added as a priority category on this most recent Workplan, and the Department should continue to

focus its limited resources on other high-impact and high-priority areas it has already devoted considerable time and resources to for many years.

Many of these other chemical/product combinations are also not as highly regulated as motor vehicle tires. Safer alternatives to chemicals in consumer products other than tires may exist that would not undermine the safety of the product in the same way it would for zinc in tires. Zinc arguably enters watersheds from numerous other sources that would not be addressed with a Priority Product listing. Regulating zinc levels in water is already addressed by other federal and state regulators; considering zinc for listing as a Priority Product would be duplicative and less effective. Moreover, any significant restriction on using zinc in tires will cause this critical consumer product to fail to meet NHTSA safety and performance standards – USTMA members are prohibited from manufacturing tires that cannot meet FMVSS.

XI. USTMA encourages DTSC to work with the Washington State Department of Ecology in reviewing the alternatives analysis for 6PPD in tires.

USTMA supports review of 6PPD in tires under the SCPR and encourages DTSC to continue to coordinate with all stakeholders on this topic, including the Washington state Department of Ecology. In 2022, the Washington State Legislature approved funding for the Department of Ecology to complete an alternatives assessment of 6PPD in tires. We hope that the Department of Ecology can leverage the alternatives analysis that USTMA members will complete under the SCPR to prevent duplicative and conflicting assessments of possible alternatives to 6PPD. We welcome the opportunity to engage with both DTSC and the Department of Ecology as we work to complete an alternatives analysis for 6PPD in replacement, all-season, passenger tire tread and sidewall under the SCPR.

XII. Conclusion

USTMA thanks DTSC for adding 6PPD in tires to the 2021-2023 work plan and for advancing the listing of 6PPD in tires as a Priority Product. The SCPR provides a rigorous, transparent, scientific, regulatory framework to analyze whether potential alternatives exist that ensure tire safety and environmental protection. The use of 6PPD and protection materials in general, are essential to ensure tire safety. Any potential alternative to 6PPD identified through the SCPR process must provide the same performance requirements as 6PPD to ensure tires meet stringent FMVSS. Without the use of high-performing protection materials like 6PPD, tire rubber compounds can crack and degrade rapidly, creating potential catastrophic safety concerns. We look forward to working with DTSC to complete an Alternatives Analysis of 6PPD in replacement, all-season, passenger tire tread and sidewall, and coordinating with other stakeholders including the Washington State Department of Ecology.