

Date: October 9, 2019

From: Lupita D. Montoya PhD, University of Colorado Boulder

To: Gerald W. Bowes PhD, Cal/EPA Scientific Peer Review Program

Subject: Peer Review of the Department of Toxic Substances Control for the Proposed Adoption of Nail Products Containing Toluene as a Priority Product

General comments:

The Profile provides general evidence that there is a need for this proposed adoption since there is no regulatory oversight over this Chemical-Product by agencies such as the US Food and Drug Administration (FDA).

Specific Minor Comments:

Page 6 (fourth bullet point): Suggest changing wording from “Toluene exposure is also linked to adverse impacts to the immune system and vision and hearing impairment” to “... impacts to the immune system as well as vision and hearing impairment”.

Page 18 (first line): Suggest changing wording from “Another researcher concluded...” to “Other research studies concluded...”

Page 24 (Section 2.5.1): Suggest changing wording from “See Section 2.3, Section 2.4, Section 2.5, Section 3.2, and Section 3.3 for additional information” to remove Section 2.5 from the list.

Page 26 (end of first paragraph): Suggest changing wording from “These differences result in greater sensitivity to infants and children and increased likelihood or severity of adverse impacts” to “...result in greater sensitivity of infants and children...”

Page 26 (last line): Insert the year of publication in parenthesis: “Zhou et al. (2016)...”

Page 34: Figure 4 is included twice.

Page 40 (first full paragraph): Replace wording “... measured in the breathings zone of ...” with “... measured in the breathing zone of ...”

Specific Comments regarding proposed Conclusions:

Conclusion #1. Toluene has hazard traits that can potentially cause significant adverse impacts on human health including neurotoxicity, developmental, and respiratory toxicity. Among other effects, scientific evidence suggests that toluene can be linked to adverse impacts on kidneys, eyes, skin, and immune system.

There is sufficient evidence from human and animal studies that have documented a diverse adverse health effects from toluene exposure. The Profile properly reflects this evidence and reaches appropriate conclusions.

Conclusion #2. There is a potential for consumers and workers (i.e., nail technicians, salon workers) to be exposed to toluene during the use of nail products, and these exposures in nail technicians and salon workers are exacerbated by the working conditions (e.g., ventilation, long shifts, lack of personal protective equipment).

In general, the Profile properly reflects scientific evidence that support Conclusion #2.

Section 2.5 mentions chronically exposed populations as well as multiple sensitive subpopulations. It would be appropriate to include a statement regarding any evidence of exacerbation effects of toluene on respiratory conditions such as asthma and COPD. If no evidence is available, that can be noted as well.

The Profile presents sufficient evidence to show increased exposure to toluene by nail salon workers due to a variety of working conditions like longer workhours and workweeks (compared to other workers) as well as concurrent exposure to multiple nail products.

As documented in section 3, exposure to toluene is difficult to avoid by nail salon workers and consumers since it has been detected in a wide range of products, including those that claim to be toluene-free. The Profile properly presents evidence from various studies that illustrate this challenge. The most significant type of exposure to toluene is via inhalation; however, ingestion and dermal routes are also possible and of concern. These concerns are properly raised in the Profile.

Page 29 (last paragraph): Is DTSC unable to assess aggregate exposure from multiple sources due to a lack of appropriate models? If so, it should be stated.

The Profile discusses a range of factors that affect exposure to toluene in the workplace (which is true in other locales), like building parameters, air exchange rates, and use of personal protective equipment. The Profile cites studies documenting that poor ventilation is fairly common in nail salons. There is limited information about ventilation in California's small businesses similar to nail salons; however, the available data presented in the Profile show that a significant fraction of these buildings do not meet ASHRAE 62.1 standards. In the absence of direct information about nail salons, these data can be used. Further, the filter types identified in these studies were low-rating for PM2.5 with no rating for VOCs. Likely, they are ineffective for VOC removal and for avoiding exposure.

Information regarding ventilation is also appropriately covered and recommendations are provided. Source capture ventilation systems have been shown to reduce exposures by 50 to 60 percent and NIOSH recommends placing these and other local ventilation systems near the where artificial nails are being applied. These are sound recommendations.

Although personal protective equipment (PPE) is listed as one of the least desirable

approaches to control toluene exposure, there is no mention of the rate of use of N95 masks in this industry. It would be useful to mention what are the most important obstacles for their use in nail salons. Is it their cost, their comfort fit, perception issues? Shendell et al., (2018) mentions that workers did not use the recommended mask because it was unnecessary during manicures and pedicures. This response may be hiding biases against mask use. If there is specific information about those issues, it should be mentioned.

Conclusion #3. Certain sensitive subpopulations including nail industry workers, pregnant women (and their fetuses), infants, children, and adolescents may be especially susceptible to the adverse impacts of toluene.

There is sufficient evidence presented in the Profile that documents how these sensitive subpopulations are especially susceptible to the adverse impacts of toluene.

Conclusion #4. Nail products containing toluene have the potential to cause or contribute to significant or widespread adverse impacts in consumers and workers due to the hazard trait and exposure considerations described in the chemical-product profile.

The Profile presents sufficient evidence from human and animal studies in Section 2.3 to document the hazard traits and the diverse adverse health effects from toluene exposure. These effects include neurotoxicity, developmental toxicity, neurodevelopmental toxicity, respiratory toxicity, nephrotoxicity, dermal toxicity, ocular toxicity, and ototoxicity. More studies are needed to determine immunotoxicity, cardiovascular toxicity, and hepatotoxicity. The Profile properly reflects this evidence and makes appropriate conclusions.

Based on the cited literature, the Profile documents the potential for multiple exposures to toluene to occur and to contribute to a significant or widespread adverse impacts.

Nail products are very popular and constitute a significant market presence, as documented by the Profile. Nail polishes constitutes the majority (about \$740 million) of the \$1 billion-dollar nail product industry. Over 100 million women in the US use nail care products and this population is projected to increase. All these facts support the potential for widespread adverse impacts in consumers and workers.

Toluene-containing nail product use is widespread; they can be used at nail salons, at home, and other environments, as documented in the Profile. Of additional concern is the potential for combined exposure via inhalation, and ingestion for children, who may display hand-to-mouth behavior. Nail product use by adults correlates with use by children in the same household; therefore, this concern is supported by evidence.

It is noteworthy that toluene has been linked to developmental toxicity. Exposure to toluene by pregnant women could lead to negative health effects on the fetus. Similarly,

nursing mothers can expose their children to toluene through their milk. Therefore, these exposures could affect wider segments of the population and have longer-term consequences.

It is also appropriate to highlight, as done in the Profile, that the exposure of nail technicians to chemicals such as toluene is an environmental justice issue because most of these workers are immigrants of low socioeconomic status. Further, 90 percent of all nail salons in California are minority-owned, and 68 percent of salons are Vietnamese-owned (U.S. Census Bureau 2012). Evidence suggesting that some Asian populations are generically sensitive to toluene adds to these concerns. All these considerations are appropriately highlighted in the Profile.

The Big Picture:

In reading the product-chemical profile report and proposed implementation language, there seems to be a need for better exposure models for addressing multiple exposures to toluene as well as other VOCs. Similarly, there seems to be a need for protection equipment that encourages compliance among nails salon workers.

There is no discussion on the Profile regarding exacerbation of conditions like asthma or COPD due to toluene exposure; however, taken as a whole, the proposed regulation is based on sound scientific knowledge, methods and practices.