

October 24, 2016

Ms. Michelle Ramirez  
Office of Environmental Health Hazard Assessment  
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Sacramento, California 95812-4010  
[Michelle.Ramirez@oehha.ca.gov](mailto:Michelle.Ramirez@oehha.ca.gov)

Re: Comments on Prioritization 2016: Chemicals for Consultation by the Carcinogen Identification Committee

Dear Ms. Ramirez:

Franklin International submits the following in response to the September 9, 2016 call for public comments in support of the Proposition 65 Carcinogen Identification Committee's (CIC) efforts to prioritize chemicals for hazard identification review. Franklin is a privately owned marketer and manufacturer of adhesives and sealants with headquarters and most operations in Columbus, Ohio, manufacturing and sales in Guangzhou, China and a distributor network covering the globe. Vinyl acetate (VAM; CAS# 108-05-4) is our most strategic raw material and has been used safely and widely for over fifty-five of our eighty-one years of responsible history. Accordingly, we have a strong interest in this proceeding given that OEHHA has identified VAM as a substance for review by the CIC.

Franklin International does not believe that VAM should be designated as a priority for review or the allocation of valuable public and private resources to support the review. To assess prioritization, CIC should consider whether the potential listing of VAM would ultimately result in the issuance of warnings. Franklin contends that, based on the available health and exposure information, exposure to VAM from the use of consumer and professional products is sufficiently low that it is unlikely that businesses would need to warn if VAM were listed.

Franklin's position is based on the following:

1. VAM's mode of action (MOA) is driven by its active metabolite acetaldehyde (AAlD). Acetaldehyde is ubiquitous and naturally found in ambient air, most animal and plant life, including many foods; acetaldehyde is also an approved food flavoring that is regulated by FDA as GRAS (Generally Recognized as Safe). The internal dose of acetaldehyde from inhalation and oral exposure to VAM is de minimis when compared against natural sources from air, food and as a breakdown product from ethanol consumption in wine and other beverages.
2. The extensive toxicological database supports the view that acetaldehyde and VAM are "threshold carcinogens", i.e., there is a "biologic threshold" below which there should be no risk of adverse effects. This view has been endorsed by scientific experts as well as governmental authorities. For example, a 2008 review by Health Canada concluded that "the genotoxicity data ... are in line with the hypothesis that vinyl acetate genotoxicity is mediated by acetaldehyde" and that "the genotoxicity of acetaldehyde only becomes evident after the cellular defense mechanisms are overloaded."
3. Exposures to VAM are exceedingly low such that warnings would not be needed even if added to Prop 65 List.
  - Vinyl acetate is not manufactured in California. The most likely scenario where exposure might occur is from the manufacture of VAM or VAM-based polymers, and use of products produced with these polymers that may contain very low residual concentrations.

- A comprehensive analytical program to measure residual VAM levels in products was undertaken to support the Canadian government's review of VAM in 2008. Most product classes did not have detectable (below the Limit of Detection) residual concentrations of VAM. In the few cases where VAM was measured, an upper bound estimate of exposure was developed and found to be significantly less than conservative health benchmarks.

## **I. Reliable Studies Support the Conclusion That VAM Does Not Exhibit a Carcinogenic Risk**

OEHHA has identified various studies for assessing VAM's mutagenic and carcinogenic potential. As the Profile notes, the epidemiology evidence, while limited in scope, does not suggest an increased carcinogenic risk to workers involved in the manufacture and formulation of VAM.

The cancer bioassays in rodents present a mixed picture. Inhalation results in mice are negative for systemic or site of contact (e.g., nasal) tumors while a statistically significant increase in nasal cavity tumors are seen in rat studies but only following a high dose lifetime exposures of 600 parts per million. These lifetime exposures result in nasal tissue histopathology and remodeling of the rat nasal mucosa in obligate nasal breathing species. In both species, VAM inhalation was not associated with any remarkable systemic toxicity.

In drinking water studies, a statistically significant increase in tumors were observed in rats and mice when there was lifetime consumption of 10,000 ppm VAM (1%) and then only in tissues lining the upper digestive tract (e.g., oral cavity, esophagus and forestomach). Exposure to 5,000 ppm (0.5% VAM in water) did not elicit a statistically significant increase in these tumors. Overall, the laboratory animal studies show that a carcinogenic response only occurs following high dose exposures along the portal(s) of entry and with no systemic toxicity. Given the low residual levels in products, it is inconceivable for anyone in California to be in a situation where these types of exposures could occur.

The genotoxicity data on VAM and AAlD corroborate the high dose, threshold MOA site of contact tumor response. The genotoxicity data show that VAM requires metabolism to acetaldehyde by endogenous carboxylesterases before genotoxic potential is observed. Acetaldehyde dehydrogenase catalyzes the conversion of AAlD to acetic acid in order to keep the potential adverse effects of acetaldehyde in check. AAlD's toxicity is expressed when present at very high concentrations that exceed the endogenous levels of acetaldehyde dehydrogenase.

## **II. Exposure to Vinyl Acetate Monomer in California is Very Low and Significantly Below Conservative Health Benchmarks**

### **A. Limited Direct Use in California**

Vinyl acetate monomer is not manufactured in California. The only direct use is in industrial settings that produce polymers, which are highly controlled and regulated and where workers are already warned and trained regarding the hazards of VAM. VAM is volatile, flammable and reactive and must be handled with specialized equipment and expert care.

### **B. Residual levels in Polymers are Low**

VAM is used to make a variety of polymers and co-polymers, such as water-based emulsion polymers that are used in the formulation of low-VOC coatings and adhesives. In this regard, VAM polymers are important for California's environmental efforts to achieve critical VOC reductions.

There is a potential for low residual levels of VAM in some polymer formulations that can lead to very low concentrations in some finished products. In 2008, there was an extensive effort undertaken to analyze residual levels in a variety of consumer and commercial products as part of a Canadian government assessment (Canada 2008). Most of the products sampled were below the limit of detection (LOD), which was either 10 ppmv (ppm by volume) or 25 ppmv depending on the type of product and analytical method used. For example, all of the coatings, caulks, flooring adhesives, personal wipes, and food packaging tested were below the LOD. A few product categories had detectable levels of VAM residuals and these were subsequently evaluated by Canada in an “upper bounding” estimate of consumer exposure during the use of these products.

Based on a review of the toxicology and exposure information, Canada concluded that VAM did not meet the Canadian Environmental Protection Act (CEPA) criteria for listing on Schedule 1 (List of Toxic Substances Managed under CEPA).

### **Conclusion**

Franklin International appreciates the opportunity to submit these comments. As outlined above, we do not feel that the available health and exposure data supports making vinyl acetate a priority for review. We accordingly request OEHHA to remove vinyl acetate from consideration for review.

Thank you in advance for your consideration of these comments. Please feel free to contact me at markvrana@franklininternational.com or 614-443-0241 or our Product Stewardship Manager, Mary Sanger, at marysanger@franklininternational.com if you wish to discuss this further.

Respectfully,

Mark A. Vrana, Ph.D.  
VP Technology & Quality