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Missouri Department of Health & Senior Services
Bureau of Environmental Epidemiology
930 Wildwood Drive
Jefferson City, MO 65109

To Whom It May Concern:

At the request of some concerned parents in the Rockwood School District I have reviewed Elizabeth Evans communication of March 13 this year. Since her response relies heavily on a report by the California Office of Environmental Health, my comments relate to some of the concerns I have with that document.

I have looked at the California report (2010) and while it found no problem with regard to VOC or PM 2.5 exposures from artificial turf, the authors clearly did not completely understand the true nature of exposure from turf fields. Let me be more specific with regard to the methods the authors chose to examine potential sources of exposure.

With regard to the PM sampling there are several problems. First, the authors examined area samples, not personal samples. Our previous study (Shalat 2011) found large discrepancies between personal and area samples, with area sampling underestimating exposure by a minimum of a factor of two and perhaps as much as an order of magnitude. Secondly, the authors did not consider larger particles, which are likely to be inhaled during heavy exercise and while these many not enter the lungs, can still result in significant exposure through deposition in the upper airways and subsequent ingestion through the gastrointestinal tract where they can lead to exposure.

The second problem is the focus on VOCs. It is well recognized that VOCs are not likely to be present above artificial turf fields in elevated level after perhaps only one month after having been installed, due to the off gassing of the VOCs from the field. However, that does not preclude the potential for these compounds having off gassed from the field, but have subsequently been reabsorbed onto the infill of the field, particularly when crumb rubber is employed. This is a result of the carbon black used in the rubber being an excellent absorbent. Once deposited on these particles, they in turn can be inhaled and/or ingested by athletes in play on the field resulting in exposure.

The authors also fail to take into account the possible presence of polyaromatic hydrocarbons (PAHa); which are far less volatile than VOCs and therefore may persist in the field for far longer. These compounds are also among those of greatest concerns with regard to potential carcinogens being

present in artificial turf fields. These compounds are also among those most likely to be adsorbed and retained in carbon black particles.

Finally, because when crumb rubber is employed the concentration of various metals and organic compounds cannot be assumed to be uniform across the entire field. This is the result of the use of tires for the crumb rubber being of different composition from cars, trucks and heavy equipment. The limited number of samples employed in this study cannot assure that no "hot spots" were present.

The result of these deficiencies in the sampling design, are such that it should not be relied on to provide certainty that no exposure problem exists from the use of these products. Until the government provides guidance for the types of material that are appropriate for what is often children's play areas, it is up to localities to ensure the fields safety.

Please feel free to contact me directly if you have any further questions.

Sincerely yours,

Stuart L. Shalat, Sc.D.