

ug/m³ is representative of the ambient EGBE concentrations expected in typical urban areas, based on monitoring data, we estimate that propionaldehyde concentrations resulting from degradation of these EGBE levels would be roughly 0.4 ug/m³.

Based on available monitoring data from 23 sites, the mean ambient air concentration of propionaldehyde is 0.94 ug/m³. The 95th percentile of the ambient monitoring data is 2.3 ug/m³. Since the ambient average concentration of propionaldehyde in urban areas is about 0.94 ug/m³, we estimated that as much as 40 percent (i.e., 0.4 ug/m³) of the ambient propionaldehyde could be due to EGBE transformation.

Propionaldehyde is not classified as a carcinogen, and we were not able to locate data that indicated carcinogenic properties. Consequently, cancer risks due to the ambient levels of propionaldehyde were not evaluated. There are, however, very limited data on noncancer effects of propionaldehyde; but there are no RfCs or MRLs available.

The only noncancer benchmark found on propionaldehyde is a draft Preliminary Evaluation Concentration (PEC) of 9 ug/m³, developed in 1994 and presented in a draft EPA report titled: *Non-Cancer Benchmarks for Screening Hazardous Air Pollutants for the Urban Area Source Program. Draft for Peer Review.* (April 1994). The draft PEC is an interim screening level value and has not undergone peer review. It is based on the assumption that propionaldehyde exhibits toxic effects similar to acetaldehyde, but is less toxic than acetaldehyde. In deriving the PEC, several uncertainty factors were applied to account for various uncertainties and data limitations. Based on the approach to derivation, we believe that the PEC is probably protective, and that exposures to propionaldehyde at levels below 9 ug/m³ are not likely to pose significant risk of adverse noncancer health effects.

Using the PEC as a decision criterion, the mean ambient concentrations for propionaldehyde (about 0.94 ug/m³) and the 95th percentile (about 2.3 ug/m³) are well below the PEC of 9 ug/m³. Although we estimate EGBE transformation to contribute as much as 40 percent of the ambient concentration of propionaldehyde, we judge that adverse noncancer health effects are not likely to result due to transformation of EGBE to propionaldehyde.

Acetaldehyde is also formed from EGBE via a two step process. In this process, EGBE transforms to propionaldehyde which then further converts to one of 3 compounds: formaldehyde, acetaldehyde or

peroxypropionyl nitrate. As described previously in this section, we assumed that each EGBE molecule is converted to one propionaldehyde molecule in 25 hours and that half of the propionaldehyde converts into acetaldehyde in 12 hours. Based on these assumptions, we estimated that in approximately 37 hours, one half of the available EGBE molecules in the ambient air is convert to acetaldehyde molecules. The half-life of acetaldehyde is about 2.5 times shorter than the half-life of EGBE's conversion to acetaldehyde through the two step process, which indicates that acetaldehyde degrades about 2.5 times faster than it is formed from EGBE. Therefore, assuming steady state, the concentration of acetaldehyde is predicted to be roughly 6.7 times lower than the concentration of EGBE. Assuming that 1 ug/m³ is representative of the ambient EGBE concentrations that would be expected in typical urban areas, we estimate that acetaldehyde concentrations resulting from degradation of these EGBE levels would be roughly 6.7 times lower, or 0.15 ug/m³.

Since the ambient average concentration of acetaldehyde in urban areas is about 2.5 ug/m³ (based on available ambient monitoring data for urban areas), we estimated that roughly 6 percent or 0.15 ug/m³ of the ambient acetaldehyde could be due to EGBE transformation. We think this is a conservative estimate, and that the actual contribution of EGBE to acetaldehyde levels in typical urban areas is likely to be less than 6 percent.

To evaluate the potential risks for public health, the increased cancer risks can be estimated. The URE for acetaldehyde is 2×10^{-6} per ug/m³. (Note: As with formaldehyde, the URE for acetaldehyde is currently being reviewed by EPA and is likely to change. However, based on currently available information, the URE for acetaldehyde is not likely to become significantly higher, and may be much lower than the current value.) This means that if people are exposed to 1 microgram of acetaldehyde per cubic meter of air (1 ug/m³) for a lifetime, we estimate that they would have an estimated upper bound increased risk of cancer of 2.2×10^{-6} , or 2.2 in 1 million. Therefore, if we assume people are exposed to the average ambient concentration of acetaldehyde (i.e., 2.5 ug/m³) for a lifetime, we calculated the upper bound increased cancer risk for these people to be about 6 in 1 million, or 6×10^{-6} . As with formaldehyde, the total risk level from ambient levels of acetaldehyde is greater than 1 in 1

million. However, only a relatively small portion of these ambient levels is attributable to EGBE transformation. Because EGBE is likely to contribute less than 6 percent of the total ambient concentration of acetaldehyde, we do not anticipate that acetaldehyde from EGBE transformation will have an adverse impact on human health.

We also evaluated the potential for noncancer hazards. The RfC for acetaldehyde is 9 ug/m³, which is higher than the reported ambient concentrations, therefore, we do not expect adverse noncancer effects to occur due to exposures to these outdoor ambient concentrations.

Based on our analyses, as well as information presented in the petition, we feel that EGBE transformation to HAP is not a significant concern for public health. Since EGBE transformation products are likely to pose relatively low risks in typical urban ambient air, and since EGBE emissions are not expected to result in elevated levels of formaldehyde, propionaldehyde, or acetaldehyde near EGBE emission sources that pose significant risks to human health, we have made an initial determination that the available data indicate that atmospheric transformation of EGBE emissions to other HAP is not reasonably anticipated to cause significant human health risks.

The quantitative estimates and the associated risk estimates presented above have some uncertainty associated with the estimates. This is due to the simplified approach, assumptions made, and incomplete knowledge of the atmospheric chemistry, and toxicity of the chemicals. However, we generally used conservative assumptions including: lifetime exposures; linear non-threshold dose-response relationship; conservative estimate of formaldehyde that would be formed per mole of EGBE transformed; and that the EGBE concentrations are 1 ug/m³. Therefore, we judge that the estimates of risk due to the transformation of EGBE to formaldehyde, propionaldehyde, and acetaldehyde as presented in this analysis are more likely to be overestimated rather than underestimated. Overall, this analysis suggests that the fractions of formaldehyde, propionaldehyde, and acetaldehyde in typical urban ambient air resulting from transformation of EGBE emissions are not likely to pose significant risks to human health.

The EPA also recognizes that EGBE is a potential tropospheric ozone precursor. However, we feel that it is inappropriate to include a substance on the HAP list under CAA section 112(b)