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Ligia Mora-Applegate
Bureau of Waste Cleanup
Florida Department of Environmental Protection
2600 Blair Stone Road
Tallahassee, FL 32399-2400

Re: Koppers probabilistic risk assessment distributions selected by City of Gainesville for Focused Review

Dear Ms. Mora-Applegate:

At your request we have reviewed specific distributions proposed for the probabilistic human health risk assessment at the Koppers Superfund Site and selected by the City of Gainesville for a focused review. These distributions originate from the *Evaluation of Potential On-Site Human Health Risks Associated with Soils and Sediments at the Koppers Inc. Wood-Treating Facility in Gainesville, Florida* (AMEC Earth & Environmental, January 29, 2009). We have the following comments regarding the distributions in question:

Soil Ingestion Rate Distribution

1. Based on current US EPA recommended soil ingestion rates, the values utilized in the human health risk assessment appear to underestimate potential soil ingestion. The Koppers MEE analysis chose a maximum soil ingestion rate of 50 mg/day based on the 75th percentile soil ingestion rate from a study by Stanek et al. (1997) and a mean soil ingestion rate of 10 mg/day based on a recommendation by Dr. Calabrese (2003). The US EPA currently uses a value of 100 mg/day as an upper end soil ingestion rate for outdoor workers (US EPA, 2002) and recommends using 50 mg/day as the most likely or median value (US EPA, 1997, Table 4-23).

Exposure Frequency Distribution for the SWWA, NWGA, and NEGA

2. The risk assessment assumes future use will remain the same as current use. A site-specific exposure frequency distribution from a current use scenario (median equals 100 d/y) was utilized for the southwest wooded area (SWWA), northwest grassed area (NWGA), and northeast grassed area (NEGA). This value was used to determine the exposure frequency distribution for the probabilistic risk assessment under both current and future use scenarios. This distribution is not representative of a future use industrial scenario. In the event that current activity patterns at the site change, a reassessment of risk is required.

Exposure Duration Distribution

3. The exposure duration distribution is applicable only to current use and does not address future use scenarios. Documentation for the high job turnover rates at Koppers was not provided. The median tenure at Koppers Inc. was listed as 0.4 years. Based on Figure 5C, 55% of Koppers employees are at the facility for less than six months and 70% of Koppers employees are there for less than a year. These job turnover rates are unusually high and need to be documented.

Body Weight Distribution

4. The risk assessment is not representative of female workers. The *Evaluation of Potential On-Site Human Health Risks Associated with Soils and Sediments at the Koppers Inc. Wood-Treating Facility in Gainesville, Florida* (AMEC, 2009) states that male distributions were chosen because nearly all of the Koppers employees are male. This choice affects the MEE distributions for body weight, surface area, inhalation rate, and possibly other distributions. Without consideration of female or combined male and female exposure factors, it is unclear if the results are protective of females employed at the site (currently or in the future).

Exposure Time Distribution for Boiler Area (BA), Western Active Area (WAA), Eastern Active Area (EAA), and Process Area (PA)

5. The exposure time distribution was based on site-specific Koppers data and appears reasonable for a current use scenario. This distribution also appears sound for a future use scenario. The default commercial/industrial scenario assumes an exposure time of 8 hr/day. The Koppers exposure time distribution uses 8 hr/day as the minimum exposure time and is therefore a reasonable estimation of a future industrial scenario.

Exposure Time Distribution for SWWA, NWGA, and NEGA

6. As stated above, the risk assessment assumes future use will remain the same as current use. Current site-specific information is used to derive the exposure time distribution for the SWWA, NWGA, and NEGA. The exposure time distribution may be applicable for these areas under a current use scenario where exposure time is 2 h/d. However, this distribution is not applicable to an industrial future use scenario. Risk will need to be reassessed using exposure time default distributions to address reasonably foreseeable future use.

Relative Absorption Factor Distributions

7. The distribution of relative absorption factors (RAFs) utilized in the assessment was not obtained from site-specific *in vivo* data. RAFs vary from site to site due to soil factors that are still not completely understood. Therefore, adjustment of the default relative bioavailability assumptions for contaminants in soil without site-specific *in vivo* data is inconsistent with FDEP procedures.

8. The distribution chosen for PAH oral RAFs (Figure 5J) biases the risk

calculations low for PAHs. The literature summary presented in *Relative Absorption Factors (RAFs) for Oral and Dermal Absorption of Compounds in Soil Cabot Carbon/Koppers Site* (AMEC, 2008) listed oral RAFs ranging from <0.1 to 1. The chosen distribution uses values from the low end of this range with 85% of the iterations using a value of 0.5 or less.

9. The distribution chosen for arsenic oral RAFs (Figure 5J) is based on one measurement. It remains unclear how a distribution was derived from one RAF.

Cancer Slope Factors – TCDD-TEQ Distributions

10. Distributions of toxicity values were used for dioxins in the MEE analysis. This is inconsistent with RAGS Volume 3, Part A (US EPA, 2001) which states "This guidance does not develop or evaluate probabilistic approaches for dose-response in human health assessment and, further, *discourages undertaking such activities on a site-by-site basis.* Such activities require contaminant-specific national consensus development and national policy development". Use of distributions for toxicity values is inconsistent with FDEP procedures. For dioxins, the Department uses the cancer slope factor from the highest source in its hierarchy (FDEP, 2005, pg.10), which is the value in HEAST (1.5E+05 mg/kg-d^{-1}). This cancer slope factor has been used to develop soil cleanup criteria adopted by rule (Chapter 62-777, F.A.C.) and is used to guide risk management decisions.

Please let us know if you have any questions regarding this review.

Sincerely,

Stephen M. Roberts, Ph.D.

Leah D. Stuchal, Ph.D.

References:

FDEP (2005) *Technical Report: Development of Cleanup Target Levels (CTLs) for Chapter 62-777, F.A.C.* Division of Waste Management.

US EPA (1997) *Exposure Factors Handbook.* National Center for Environmental Assessment. Office of Research and Development.

US EPA (2001) *Risk Assessment Guidance for Superfund, Volume III – Part A, Process for Conducting Probabilistic Risk Assessment.* Office of Emergency and Remedial Response. Washington, DC.

US EPA (2002) *Supplemental Guidance for Developing Soil Screening Levels for Superfund Sites.* Office of Solid Waste and Emergency Response.

US EPA (2007) *ProUCL Version 4.0 Technical Guide.* Office of Research and Development. National Exposure Research Laboratory.