Air Toxics Hot Spots Program
Guidance Manual

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Purpose of the Hot Spots Guidance Manual

To provide a User’s Manual to risk assessors on how to conduct a Hot Spots Risk Assessment

It is a consolidation of methodologies from three Hot Spots documents previously reviewed by the SRP

The Guidance Manual contains:

- Air dispersion modeling procedures to estimate emissions migrating offsite into neighborhoods and businesses
- Equations and default values used to estimate noncancer hazard and cancer risk from these facility emissions
- Distributions of some variates (e.g., breathing rates) to provide stochastic analysis
Approved Hot Spots Documents
Incorporated into the Guidance Manual

- OEHHA revised the Hot Spots Program to include consideration of sensitive subpopulations (i.e., infants and children) to comply with Children’s Health Protection Act.
- OEHHA created the Technical Support Documents (TSDs) to lay out underlying science and methods to meet this requirement
  - Exposure Assessment and Stochastic guidelines reviewed by SRP in 2012
SRP Charge for Guidance Manual

- Review new material not presented in the three TSDs already approved
  - Is the Guidance Manual clear?
  - Are there any problems or errors with the material we clarified or added?
- Highlighted additions in draft document to help avoid need to review entire Manual
Text added to clarify examples of “release types” for point, area or volume sources and modeling selection related to screening or refined air dispersion modeling.

Text clarified spatial averaging method – how to place the grid when dealing with a fence line receptor.
Clarification:

- For simplicity and health protection, the Tier 1 default assumes 70-year soil deposition for the accumulation period at end of a 70-year facility lifetime. In order to estimate exposure via soil contact and ingestion.

- Under a Tier 2 scenario, subject to District approval, the risk assessor may use soil accumulation at the time of the assessment to estimate exposure or expected accumulation at the end of facility operation.
Estimation of Concentration
Mother’s Milk Pathway

- Guidance added for use of mother’s milk biotransfer coefficients

<table>
<thead>
<tr>
<th>Chemical/chem. group</th>
<th>$T_{co_m}$ (day/kg-milk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCDDs - oral$^a$</td>
<td>3.7</td>
</tr>
<tr>
<td>PCDFs - oral$^a$</td>
<td>1.8</td>
</tr>
<tr>
<td>Dioxin-like PCBs - oral$^a$</td>
<td>1.7</td>
</tr>
<tr>
<td>PAHs – inhalation</td>
<td>1.55</td>
</tr>
<tr>
<td>PAHs – oral</td>
<td>0.401</td>
</tr>
<tr>
<td>Lead - inhalation$^b$</td>
<td>0.064</td>
</tr>
</tbody>
</table>

$^a$ Use Oral $T_{co_m}$ also for the inhalation and dermal pathways for dioxins and PCBs

$^b$ Use inhalation $T_{co_m}$ also for the ingestion and dermal pathways for lead
Clarification:

- Footnotes added to Table 5.4 – conditions for using various intake point estimates for food animals (cows, chickens and pigs) in the food animal pathway.
Clarification on when 8-hour RELs can be used

- Primarily for exposure to off-site worker, and can be used for school site exposures. But few 8-hour RELs currently available, so we recommend that the assessor also estimate the chronic Hazard Index (HI) at these locations.

- An 8-hour HI based on the daily average 8-hour exposure is not required for the MEIR, but can be performed at the discretion of the District.
Estimation of Dose
Noncancer, Non-inhalation Pathway

No equations in 2012 Exposure Assessment TSD for calculating average dose for chronic non-inhalation pathways

- For hazard assessment, a time-weighted average approach is used to combine food ingestion rates for the age groups (i.e., 0<2, 2<16 and 16-70 yrs) to estimate the chronic dose for residential exposure.
Estimation of Dose
Noncancer, Non-inhalation Pathway

Example:
Soil Ingestion Rate (SIR):

\[(SIR \text{ for age } 0<2 \text{ yrs } \times \text{Csoil} \times \text{GRAF} \times 10^{-9} \times 2 / 70) +\]

\[(SIR \text{ for age } 2<16 \text{ yrs } \times \text{Csoil} \times \text{GRAF} \times 10^{-9} \times 14 / 70) +\]

\[(SIR \text{ for age } 16-70 \text{ yrs } \times \text{Csoil} \times \text{GRAF} \times 10^{-9} \times 54 / 70) =\]

soil Chronic Dose

GRAF = gastrointestinal relative absorption factor
Noncancer RELs

OEHHA considers developmental toxicity as a subset of reproductive toxicity; thus for the Hazard Index, we combine them as impacting one target organ system.

Previously:

Acute HI was a combined Hazard Index for reproductive/developmental

Chronic was not combined – it was reproductive or developmental

- We recommend that in a risk assessment, Hazard Quotients for either developmental or reproductive toxicity are combined into one Hazard Index.
Cancer Risk Assessment

For mother’s milk pathway, we modified risk equation for 0<2 yr from this:
RISKmm = Dose-Im × CPForal × ASF × ED × 0.5
To this:
RISKmm = Dose-Im × CPForal × ASF × ED/AT

 Puts AT back into equation
 Emphasize mother’s milk pathway risk exposure duration is only for the first year in the 0<2 yr age group.
Cancer Risk from Short-Term Projects

Hot Spots guidelines used for permitting short-term projects

Guidance included more details around offsite worker short-term exposures

- For offsite worker, although workers are presumed to be older than 16 yrs, risk managers need to consider presence of women of child-bearing age and daycares at the site, and apply ASFs to the risk estimate
Cancer Risk from Short Term projects

- Suggested that risk managers consider lowering the allowable risk level when evaluating short-term projects (to avoid compacting “lifetime” risk into short time period)

  - Reflects concern over impacts of higher exposure to carcinogens during short-term projects

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Polychlorinated Biphenyls

- Previously, no noncancer health values for unspeciated PCBs

- Added language in Appendix E for estimating noncancer hazard impacts from unspeciated PCB mixtures:

  “Consult with OEHHA and the local Air Pollution Control or Air Quality Management District if an assessment of the noncancer hazard for unspeciated PCB mixtures is needed.”
Summary

- The updated draft Guidance Manual incorporates approved methods from the Cancer, Noncancer, and Exposure Assessment TSDs

- We are looking for comments on:
  - Clarity
  - New material added that was not in previous TSDs
Comments
Many comments had to do with issues already addressed at previous public reviews on early-in-life cancer risks, i.e., Age Sensitivity Factors (ASFs):

- Cancer risk for exposures from third trimester to <2 years weighted 10x (OEHHA, 2009)
- Cancer risk for exposures from age 2 to <16 years weighted 3x (OEHHA, 2009)
- Cancer risk for exposures from age 16-70 years weighted 1x (OEHHA, 2009)
Comments

- **Comment:** OEHHA should incorporate into the final guidelines a procedure for developing ASFs based on chemical-specific data that can be used in Tier I HRAs.

- **Response:** In Section 8.2.1 we already say, “The risk assessments generated under the Air Toxics Hot Spots Act are reviewed by OEHHA. If a risk assessor had data indicating there are no windows of susceptibility early in life or that a different ASF should be used for a specific carcinogen and wanted to use these data, OEHHA would review the material as part of the review of the risk assessment.”
Comments

- **Comment:** the proposed changes in the guidance overstate risk from exposure without recognizing the large range in risk variables or the degree of uncertainty built into the process.

- **Response:** this is also a subject covered in previous TSDs. Nevertheless we made an addition to Chapter 1 that provides a detailed definition of cancer risk and the noncancer hazard index, noting that uncertainty factors are built into the REL values.
Comment: The process and criteria by which a project could seek and obtain approval to utilize Tier 2 or Tier 4 approaches is not well defined, nor is it clear why a Tier 1 approach is needed if other approaches provide better and more scientifically sound site-specific data.

Response: We clarify further in Section 2.5.3. Tier 1 is a standard point estimate approach using the recommended point-estimates presented in Hot Spots Guidance Manual. If site-specific information is available to modify some point estimates and is more appropriate to use than the recommended point-estimates in this document, then Tier 2 allows use of that site-specific information.
Comments

- We have also added language in Section 8.1.1 regarding use of Tier 2 and 4 for small footprint facilities (e.g., gas stations). For example, alternative breathing rates (point estimates or distributions) may be used as part of Tier 2 or Tier 4 risk assessments with appropriate supporting justification in the case of a very small zone of impact. OEHHA would work with risk managers at ARB and the Districts to review the alternative estimates in such an assessment.
Comments

- A number of comments from the LA Sanitation District asked for additional clarity for specific items in the air dispersion chapter...primarily regarding the air dispersion modeling program (HARP).

- All these comments were addressed and clarifying language was included in the air dispersion chapter of the manual.
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