

Toxics Information Clearinghouse: *Pilot Scientist Questionnaire*

Office of Environmental Health Hazard Assessment

Background

In 2008, the California State Legislature approved Senate Bill 509 which requires the Department of Toxic Substances Control (DTSC) to establish the Toxics Information Clearinghouse. The primary purpose of the Clearinghouse is to collect, maintain, and distribute chemical hazard information via a publicly accessible web-based portal. The legislation requires the Office of Environmental Health Hazard Assessment (OEHHA) to evaluate and specify the hazard traits, toxicological and environmental endpoints and any other relevant data to be included in the Clearinghouse. This scientist questionnaire is part of OEHHA's consultation effort under SB 509.

We are asking you to participate in our pilot questionnaire as a scientific expert on chemical hazards or as a scientist interested in the implementation of the California Green Chemistry Initiative. OEHHA seeks your answers to the specific questions and any other comments or suggestions you may have on our mandate under SB 509.

Proposed Hazard Trait Taxonomy

The term "hazard trait" is used broadly to include: general types of human health toxicity, environmental effects (including ecotoxicity) and exposure properties; specific toxicological and environmental endpoints and exposure potential parameters; and indicators for all of these. The hazard trait taxonomy can be represented as a tiered system:

Hazard Traits

- General types of human health toxicity, environmental effects (including ecotoxicity) and exposure properties
- Toxicological and environmental endpoints and exposure potential parameters
- Indicators for toxicity, environmental effects and exposure potential

The highest tier represents general categories of adverse human health and environmental effects such as carcinogenicity, neurotoxicity, endocrine disruption, aquatic toxicity, species loss and climate change. This tier also includes general exposure properties such as persistence and bioaccumulation, which can be used to understand the likelihood of significant exposures to a chemical.

Toxicological endpoints are specific adverse human health outcomes (e.g., lung cancer, bronchiolitis obliterans, growth retardation). Environmental endpoints include specific ecotoxic and environmental effects (e.g., feminization in a fish population, impaired timber growth). Exposure potential parameters, such as half-life in sea water, can be the basis for identifying a general exposure property like persistence.

“Indicators” are predictors for human health toxicity, environmental effects and exposure potential. In some cases, indicators may predict specific toxicological or environmental endpoints or exposure potential parameters, but are more commonly useful for general predictions. For example, a chemical may test strongly positive in an *in vitro* genotoxicity battery, indicating its potential to cause cancer, but the site or type of cancer may be difficult to predict. Indicators for exposure potential could include physical and chemical properties such as vapor pressure and log K_{ow} (log octanol-water partition coefficient).

The hazard trait tiers can overlap. For example, certain general toxicity types (e.g., genotoxicity) might also be considered indicators for other types (e.g., carcinogenicity).

The following examples illustrate some possible hazard traits.

Example chemical 1

Hazard traits:

- Induces sister chromatid exchanges and chromosomal aberrations in human lymphocytes
- Metabolized to an epoxide that is mutagenic
- Induces peripheral neuropathy

The first two hazard traits are indicators for the general toxicity types of genotoxicity and carcinogenicity; the third is a toxicological endpoint for neurotoxicity.

Example chemical 2

Hazard traits:

- Half-life in water of 21 days
- Toxic to bees

The first hazard trait is an indicator for persistence; the second is an ecotoxicity endpoint.

Questions

1. Is the proposed hazard trait taxonomy clear? Do you have comments?
2. What do you consider the highest priority general types of human health toxicity and environmental effects for inclusion in the Toxics Information Clearinghouse (TIC)?
3. What do you consider the highest priority exposure properties for inclusion in the TIC?
4. Are there other important types of human health toxicity, environmental effects or exposure properties that you think should be included in the TIC?
5. In the absence of full toxicological and environmental studies, which indicators for human health toxicity or environmental effects do you consider scientifically valid and useful in evaluating a chemical? For example:
 - A structural similarity to a known hazardous chemical?
 - Evidence of metabolism to an electrophilic intermediate?
 - In vitro* evidence of androgen receptor binding?
6. In the absence of full exposure studies, which indicators for exposure potential do you consider scientifically valid and useful in evaluating a chemical? For example:
 - Log K_{ow} ?
 - Calculated bioconcentration factors?
 - In vitro* evidence of bioavailability/absorption?
7. What would you consider the *best* indicators to predict the high priority types of human health toxicity, environmental effects or exposure properties that you named in questions 2 and 3?
8. Have you used any of the indicators you named in questions 5, 6, or 7 to identify a chemical as being a hazard to human health or the environment or as having significant exposure potential, to avoid a specific chemical, and/or to choose a safer alternative? If so, can you provide the details of the example?
9. Can you provide details on the process you go through or would suggest to screen chemical ingredients for human health and environmental hazards and exposure potential? (e.g., the assays you perform, the databases and authoritative sources you consult, the guidance/regulations you follow, the software you run, how you fill data gaps, etc.)
10. Is there any issue not addressed in this questionnaire that you'd like to comment on?
11. Do you have any other suggestions on or additional questions that should be asked in the questionnaire?