NEW IRIS TRICHLOROETHENE TOXICITY CRITERIA: IMPACT OF NONCANCER HAZARD AT CLEANUP SITES IN CALIFORNIA

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ABSTRACT

Tributyltin (TBT) is an industrial solvent used as a degreaser for metal cleaning operations. TBT has been detected at cleanup sites, and soil gas with inhalation of vapors of contaminant components of concern is an important exposure route at cleanup sites. The IRIS toxicity criteria for TBT is based on cancer risk, with noncancer criteria adopted for cleanup decision making. The Toxic Substances Control Act (TSCA) has adopted and is implementing the IRIS TBT toxicity criteria at our site. This approach provides more robust estimates of the noncancer health endpoint. OEHHA is currently reviewing all programs with toxicity criteria values for TBT (i.e., air, water, soil, gas) and revising the toxicity criteria as needed. However, due to the revised TBT toxicity criteria, resulting in more stringent indoor air action levels for TBT (i.e., gas, soil). The impacts of the new TBT toxicity criteria on the risk assessment models, resulting in more stringent indoor air action levels for TBT (i.e., gas, soil). The impacts of the new TBT toxicity criteria on the risk assessment models, and overall noncancer risk at the end of the site management (IRIS risk assessment). We present three case studies demonstrating the impact of the new TBT toxicity criteria. The new TBT toxicity criteria must be considered in all current and future risk assessment models, including those used to evaluate cancer risk and noncancer toxicity criteria values for TBT. These case studies illustrate how the new TBT toxicity criteria will impact site risk assessment models.

OVERVIEW OF IRIS vs. OEHHA

TCE (trichloroethylene) is a volatile organic compound (VOC) that is a common contaminant in groundwater. It is used in industrial solvents, metal degreasing, and as a solvent for cleaning and manufacturing processes. TCE has been found in groundwater at many cleanup sites in California, and its presence can pose a risk to human health and the environment. The California Department of Toxic Substances Control (DTSC) has adopted and is implementing the Interagency Regulatory Information System (IRIS) TCE toxicity criteria at site A, which is an active industrial site in the California Central Valley. The groundwater is contaminated with TCE, and the noncancer hazard associated with TCE exposure is of concern. The IRIS toxicity criteria for TCE is based on cancer risk, with noncancer criteria adopted for cleanup decision making. The impacts of the new TCE toxicity criteria on the risk assessment models, resulting in more stringent indoor air action levels for TBT (i.e., gas, soil). The impacts of the new TBT toxicity criteria on the risk assessment models, and overall noncancer risk at the end of the site management (IRIS risk assessment). We present three case studies demonstrating the impact of the new TBT toxicity criteria. The new TBT toxicity criteria must be considered in all current and future risk assessment models, including those used to evaluate cancer risk and noncancer toxicity criteria values for TBT. These case studies illustrate how the new TBT toxicity criteria will impact site risk assessment models.

CASE STUDIES

Site A – Groundwater Benevolent Use

Proposed Cleanup Value

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<th>Site</th>
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In lieu of the California or Federal maximum contaminant level (MCL), regional regulatory bodies have proposed to use noncancer USEPA upper airborne dose limits (RLI) of 2.6 µg/m³. The proposed rule for California protection of the basis for the final cancer malformation endpoint, used in part to derive the oral RfD.

Site B – Indoor Air

In 2012, 27 homes were sampled and 4 homes showed indoor air levels of TCE above ambient outdoor air levels. At that time, the TCE levels did not represent an indoor air risk. However, due to the revised TCE toxicity criteria, resulting in more stringent indoor air action levels for TCE, these same 4 homes were re-sampled in 2012. Based on the MD sampling results, DTSC required vapor intrusion mitigation in 3 of the 4 homes.

Site C – Groundwater – Vapor Intrusion

In the absence of soil gas data, the vapor intrusion pathway was evaluated using the Johnson & Edwards (J&E) Model for groundwater. The concentration of TCE in the groundwater ranged from 0.3 µg/L to 7.50 µg/L. While the TCE cancer risk is within the risk management range of 1E-06 to 1E-04, the non-cancer hazard index exceeds groundwater soil gas exposure limits. This means there is a non-cancer risk to human health that must be considered in risk management decisions and must be discussed at community meetings.

WHAT IS CALIFORNIA DOING

In April 2012, OEHHA revised their Proposition 65 no significant risk levels for TCE. OEHHA is currently reviewing all programs with toxicity criteria values for TCE (i.e., air, water, soil, gas) and revising the toxicity criteria as appropriate. DTSC has adopted and is implementing the IRIS TCE toxicity criteria at our site.

WHAT ARE OTHER STATES AND FEDERAL AGENCIES DOING TO ADDRESS SHORT TERM EXPOSURE TO TCE

Since one of the noncancer endpoints used to derive the RfC is increased fetal cardiac malformations, the revised TCE toxicity criteria for TCE has been reevaluated. To address this issue, several States and other Federal Regulatory Agencies have developed recommended short term exposure levels. All of the above were based on USEPA’s noncancer inhalation RfC for TCE (1).

POTENTIAL IMPACT/SIGNIFICANCE

Noncancer threshold (i.e., hazard index) may exceed 1 at sites where the cancer risk is at the low end of the risk management range or at the point of departure (1E-06). Noncancer threshold may play a more significant role in risk management decisions and must be discussed at community meetings. When reviewing the risk assessment during the Five Year Review process, there is a potential that the original proposed remediation, land use controls, and other noncancer threshold may be a more significant role in risk management decisions and must be discussed at community meetings.

Will State and/or Federal Agencies consider re-evaluating closed sites in light of the new TCE noncancer toxicity criteria?

REFERENCES


DISCLAIMER

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