

1 INTRODUCTION

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4 This document presents background information and justification for the Integrated Risk
5 Information System (IRIS) Summary of the hazard and dose-response assessment of
6 **trichloroethylene**. IRIS Summaries may include oral reference dose (RfD) and inhalation
7 reference concentration (RfC) values for chronic and other exposure durations, and a
8 carcinogenicity assessment.

9 The RfD and RfC, if derived, provide quantitative information for use in risk assessments
10 for health effects known or assumed to be produced through a nonlinear (presumed threshold)
11 mode of action. The RfD (expressed in units of mg/kg/d) is defined as an estimate (with
12 uncertainty spanning perhaps an order of magnitude) of a daily exposure to the human
13 population (including sensitive subgroups) that is likely to be without an appreciable risk of
14 deleterious effects during a lifetime. The inhalation RfC (expressed in units of ppm or $\mu\text{g}/\text{m}^3$) is
15 analogous to the oral RfD, but provides a continuous inhalation exposure estimate. The
16 inhalation RfC considers toxic effects for both the respiratory system (portal-of-entry) and for
17 effects peripheral to the respiratory system (extrapulmonary or systemic effects). Reference
18 values are generally derived for chronic exposures (up to a lifetime), but may also be derived for
19 acute (≤ 24 hours), short-term (>24 hours up to 30 days), and subchronic (>30 days up to 10% of
20 lifetime) exposure durations, all of which are derived based on an assumption of continuous
21 exposure throughout the duration specified. Unless specified otherwise, the RfD and RfC are
22 derived for chronic exposure duration.

23 The carcinogenicity assessment provides information on the carcinogenic hazard
24 potential of the substance in question and quantitative estimates of risk from oral and inhalation
25 exposure may be derived. The information includes a weight-of-evidence judgment of the
26 likelihood that the agent is a human carcinogen and the conditions under which the carcinogenic
27 effects may be expressed. Quantitative risk estimates may be derived from the application of a
28 low-dose extrapolation procedure. If derived, the oral slope factor is a plausible upper bound on
29 the estimate of risk per mg/kg/d of oral exposure. Similarly, an inhalation unit risk is a plausible
30 upper bound on the estimate of risk per ppm or $\mu\text{g}/\text{m}^3$ in air breathed.

31 Development of these hazard identification and dose-response assessments for
32 **trichloroethylene** has followed the general guidelines for risk assessment as set forth by the
33 National Research Council (NRC, 1983). U.S. EPA Guidelines and Risk Assessment Forum
34 Technical Panel Reports that may have been used in the development of this assessment include
35 the following: *Guidelines for the Health Risk Assessment of Chemical Mixtures* (U.S. EPA,
36 1986a), *Guidelines for Mutagenicity Risk Assessment* (U.S. EPA, 1986b), *Recommendations for*
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1 *and Documentation of Biological Values for Use in Risk Assessment* (U.S. EPA, 1988),
2 *Guidelines for Developmental Toxicity Risk Assessment* (U.S. EPA, 1991), *Interim Policy for*
3 *Particle Size and Limit Concentration Issues in Inhalation Toxicity* (U.S. EPA, 1994a), *Methods*
4 *for Derivation of Inhalation Reference Concentrations and Application of Inhalation Dosimetry*
5 (U.S. EPA, 1994b), *Use of the Benchmark Dose Approach in Health Risk Assessment* (U.S. EPA,
6 1995), *Guidelines for Reproductive Toxicity Risk Assessment* (U.S. EPA, 1996), *Guidelines for*
7 *Neurotoxicity Risk Assessment* (U.S. EPA, 1998), *Science Policy Council Handbook: Risk*
8 *Characterization* (U.S. EPA, 2000a), *Benchmark Dose Technical Guidance Document* (U.S.
9 EPA, 2000b), *Supplementary Guidance for Conducting Health Risk Assessment of Chemical*
10 *Mixtures* (U.S. EPA, 2000c), *A Review of the Reference Dose and Reference Concentration*
11 *Processes* (U.S. EPA, 2002), *Guidelines for Carcinogen Risk Assessment* (U.S. EPA, 2005a),
12 *Supplemental Guidance for Assessing Susceptibility from Early-Life Exposure to Carcinogens*
13 (U.S. EPA, 2005b), *Science Policy Council Handbook: Peer Review* (U.S. EPA, 2006a), and *A*
14 *Framework for Assessing Health Risks of Environmental Exposures to Children* (U.S. EPA,
15 2006b).

16 The literature search strategy employed for this compound was based on the Chemical
17 Abstracts Service Registry Number and at least one common name. Any pertinent scientific
18 information submitted by the public to the IRIS Submission Desk was also considered in the
19 development of this document. The relevant literature was reviewed through April, 2009.

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