Identifying a Soil Clean-up Criteria for Dioxin in Residential Soils: How Has 20 Years of Research and Risk Assessment Experience Impacted The Analysis?

Dennis J Paustenbach[1], Kurt Fehling[1], Mark Harris[1], Paul Scott[1], Brent D Kerger[2]

[1]ChemRisk, Inc.
[2]Health Sciences Resource Integration

Introduction

Over the past 20 years, numerous scientists have conducted risk assessments to identify the concentrations of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) in soils which are sufficiently low to not pose a health hazard to humans [1-5]. Identification of the proper methodology, exposure factors and toxicity criteria to use has been topics of vigorous debate for the past two decades. Although a great deal of new information on the dioxins has been collected over the past decade, no one has attempted to bring all this information together to recommend a new soil guidance value (sometimes called "clean-up values") for dioxin in residential or industrial site soils; especially one which attempts to account for the uncertainty in the toxicology data and exposure factors.

In the following sections we provide a methodology and scientific basis for selected parameters used to develop probability-based ranges for risk-based soil cleanup criteria applicable to PCDD/Fs in urban residential settings. Since our last paper [3] addressing soil cleanup levels for TCDD, a considerable amount of new information has become available on the key parameters that drive the risk calculations for identifying acceptable concentrations of dioxin in contaminated soil. Thus, we have incorporated new information on child soil ingestion rates, dermal uptake parameters, bioavailability, residential exposure duration and others. These different assumptions are incorporated using probabilistic techniques. Distributions of health risk-based dioxin soil clean-up levels consistent with USEPA guidance were developed.