



ARCADIS' Strengths in Exposure Assessment and Modeling

ARCADIS is fully versed in the current suite of conventional exposure assessment tools in multiple contexts such as REACH dossiers, the HPV Program, and national chemical registrations.

ARCADIS conducts exposure assessments for a range of environmental, occupational, consumer and residential exposure scenarios required for chemical registrations of wide variety of substances. We predict cumulative and aggregated exposures to the public and sensitive sub-populations, and often tailor assessments to habits and practices specific to various cultures. We use geospatial analysis and national databases to identify areas most vulnerable to groundwater leaching or runoff to surface water.

As required under REACH, we are experienced in estimating exposure across the full life-cycle of the chemical/product, including: manufacture, formulation, transport, and downstream uses. We are skilled in human health exposure assessments involving all potential routes of exposure (e.g., inhalation, incidental ingestion, diet, and dermal contact) as well as ecological exposure assessments for both non-target aquatic and terrestrial receptors. We integrate strong data searching capabilities to identify and input key physical, chemical and biological data, to build realistic and sound exposure models.

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Selected Exposure Assessment Tools and Resources Used by ARCADIS

ECETOC TRA Tool – is often used in a first tier assessment for occupational, consumer and environmental exposure assessment under REACH. The exposure estimates are mainly driven by the use descriptors (e.g. process categories, product categories, and environmental release categories) outlined in the legislation. However, basic refinement options such as duration of exposure, presence of Local Exhaust Ventilation, concentration of the substances are available for occupational / consumer exposure.



EUSES – is the workhorse risk characterization tool for EU risk assessments, with extensive human and environmental exposure data defaults and algorithms. Our scientists work closely with clients to identify the appropriate data to provide accurate and realistic exposure and risk estimates.

Advanced REACH Tool (ART) – incorporates a higher tier model of inhalation exposure and a statistical approach to update the estimates with measurement data. Therefore, this tool can be used when refinement is needed in order to confirm safe use.

Pesticide Root Zone Model (PRZM) and Exposure Analysis Modeling System (EXAMS) – tools developed by USEPA to estimate exposure concentrations in surface water adjacent to field applications of pesticides. Our modelers have collaborated with USEPA to verify the accuracy of all crop and scenario-specific scenarios as well as to develop new scenarios to assess risks to endangered species. We work closely with clients to develop and implement higher tier probabilistic fate and transport modules that will incorporate a Varying Volume Water Body Model (VVWM), and an extension of the PRZM model to estimate groundwater concentrations for human health risk assessment.

Terrestrial Impact Model (TIM) – USEPA's next generation Level II probabilistic model for evaluating avian population level risks from agricultural pesticide applications. Our scientists assisted with the model development, testing, and sensitivity analysis to determine the subset of key inputs from among 70 model variables for different applications.

EPI-Suite™ (USEPA) Quantitative Structure-Activity Relationships (QSAR) and Read-Across – is used to estimate key parameters lacking empirical data, and read-across conventions to fill data gaps using data for structurally-similar substances, as these key physical-chemical parameters are required by many exposure models to assess effects of adsorption, volatilization, hydrolysis, etc. on the fate of substances in surface waters and terrestrial systems.

In addition to these widely-recognized conventional models, we often develop context-specific exposure tools to estimate chemical exposures for specific media, locations, uses, and/or sub-populations.