

Why do my Forward and Backward Calculations Yield Different Results?

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When performing a RBCA assessment, comparing the results for the backward calculation (risk-based cleanup levels) to the results for the forward calculation (risk levels) does not always yield the same result for a site. In other words, comparing calculated risk levels to user-specified target risks may indicate that risk levels are acceptable at a site; however, concentrations detected at the site may exceed risk-based screening levels (e.g., RBSLs) generated using the same target risks, or vice versa. When reading the following, please keep in mind that forward-mode calculations include the transient Domenico analysis worksheets, and cumulative risk calculation sheet, and backward-mode calculations include the TPH calculation worksheets.

In general, the two modes use the same models and input parameters, but in certain cases, the results will not always be identical because the two modes use different assumptions. The primary reasons the two methods may not always give the same results are listed below:

Backward-mode calculations sometimes include non-risk-based criteria, such as MCLs, as alternate criteria to the risk-based values.

Backward-mode calculations screen out results that exceed solubility or soil residual concentrations for indirect pathways. Target values calculated above these levels are flagged by the software as ">", and either the aqueous solubility or soil saturation limit, depending on whether a groundwater or soil concentration is being reported. Forward-mode calculations do not screen for these values, which may result in inappropriately large risk values.

Backward-mode calculations for the surface soil pathway will combine intakes due to ingestion, dermal contact, and inhalation of volatiles and particulates. Forward mode calculations do not combine these intakes.

These inconsistencies result from standard practices within the technical community that differ between the two methods. As with any model, the user is advised to review the underlying assumptions and determine whether they are appropriate for conditions at the site being modeled.