

MassDEP Shortforms for Human Health Risk Assessment under the MCP

USER'S GUIDE

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I. Shortform Applicability

The Shortforms are designed to streamline the Method 3 risk assessment and review process. While Method 3 risk assessments are site-specific, some exposure scenarios are sufficiently standardized for a template approach. MassDEP has assembled recommended exposure assumptions and toxicity information into the Shortforms to calculate risk for each of these standard scenarios.

The Shortforms have important limitations. These include, but are not limited to:

1. Exposure Assumptions - It is the risk assessor's responsibility to verify that the exposure assumptions in each Shortform are appropriate for use at their site.
2. Exposure Pathways - The Shortforms may not cover all exposure pathways present at a site. For example, the Park Visitor Shortform for contaminated soil does not assess risks associated with inhalation of volatile compounds. At sites where this pathway might be of concern (e.g., athletic fields or parks established over former landfills), additional assessment would be needed.
3. EPC Development - Development of appropriate Exposure Point Concentrations (EPCs) for each exposure pathway is vital to ensuring that the results of the Method 3 Risk Assessment are valid. Regulations and guidance describing the development of EPCs can be found in 310 CMR 40.0900 and MassDEP's 2024 *Guidance for Disposal Site Risk Characterization*. If these requirements are not met, results from the Shortform are invalid.
4. Generic IH Calculations - The Shortforms use a generic approach to evaluating imminent hazards (IH). However, MassDEP's regulations at 310 CMR 40.0955(2)(c) call for chemical-specific approaches for certain hazardous materials. While some chemicals have reminders that pop up about a chemical-specific IH hazard quotient, it is the Shortform user's responsibility to identify contaminants that require a chemical-specific approach and evaluate them accordingly.
5. Non-Calculated Risks - Some risks are not included in the Shortforms. For instance, chromium(VI) in soils poses an imminent hazard due to contact dermatitis at a level of 200 mg/kg (rounded from 170 mg/kg) although the residential Shortform yields a hazard quotient of less than one for that concentration. All calculations should be reviewed to ensure that they comply with the MCP.

II. Shortforms Set-Up

The Shortforms are comprised of Excel workbooks, each of which addresses a specific receptor (e.g., resident, trespasser, construction worker, etc.) exposed to oil or hazardous materials (OHM) in soil, indoor air, drinking water, or surface water. Each Shortform workbook contains several spreadsheets, the

first of which is an index with a short description of each of the subsequent spreadsheets. The following spreadsheets provide information on Exposure Point Concentrations (“EPCs”), equations to calculate cancer and noncancer risk (“C Eq” and “N Eq”), exposure assumptions (“Exp”), and chemical-specific information (“Chem”) drawn from the “Method 3 Lookup Tables” workbook (the current version – i.e., June 2024 version – is named “v0624.xlsx”). Tables in the spreadsheets are designed to be self-explanatory and are meant to compliment a site’s written risk assessment report.

All Shortforms are linked to the “Method 3 Lookup Tables” workbook that contains chemical-specific information such as dose-response values and physical constants. The Shortforms and the “Method 3 Lookup Tables” workbook are intimately linked. To keep this relationship intact and the Shortforms functional, anytime a new file is available, it’s best to download the entire suite of files again. (MassDEP publishes the Shortforms and the Method 3 Lookup Tables workbook in a suite of Zipped files referred to as “Shortforms Suite” or “Shortforms Zipped File”.)

III. Using the Shortforms

The Shortforms Zipped File should be extracted to the same folder before being opened.

Using each Shortform is a simple two-step process:

1. Select Contaminants of Concern (COCs) in the first column of the “EPCs” spreadsheet. COCs can be added using a drop-down menu that appears when a cell in that first column is selected.
2. Enter site-specific EPCs in the cell immediately to the right of each COC. Check to be sure the units of your data match those in the Shortform. Risks associated with each COC/EPC combination are calculated automatically and displayed in the cells to the right of the EPC. Risks are only displayed for pathways that might contribute significantly to overall risk.

The total site cancer (Excess Lifetime Cancer Risk, ELCR) and noncancer (Hazard Index, HI) risks for all of the COCs are summed at the top right of the “EPCs” spreadsheet for each medium. If there is exposure to more than one medium (soil and groundwater, for example), the total risk must be calculated by adding the HIs and ELCRs from all of the applicable Shortform files.

Notes of caution: **Under no circumstances should columns or rows be deleted or inserted in the Shortforms.** Doing so would disrupt the intra- and inter-workbook links, thus compromising the validity of the risk calculations. Similarly, do not change the name of the Method 3 Lookup Tables file (currently named v0624). The risk assessor is responsible for ensuring that the most recent versions of the Shortforms and the Method 3 Lookup Tables files are downloaded from the MassDEP website when used to support a risk characterization report.

If a Shortform is submitted to fulfill a Method 3 Risk Assessment requirement, it must be submitted as a component of a report that includes a comprehensive site description, hazard identification, description of site activities and uses, identification of receptors and exposure points, discussion of the applicability of any Activity and Use Limitations (AULs), EPC estimation, risk characterization summary, and an uncertainty section. The Shortform is a risk calculation tool, intended for use by risk assessors in the context of a complete risk assessment.

IV. Adding Non-listed Chemicals to the Shortforms

Risk assessors comfortable with Excel can use the Shortforms to include additional chemicals of concern. Other than adding COCs and their respective properties and EPCs, the spreadsheets must not be modified in any way if they are to be submitted as Shortforms. If exposures factors or toxicity values for listed chemicals are altered, any **modifications should be highlighted** through the use of bold text, changed titles, and text description that clarifies that the workbooks are no longer the standard MassDEP Shortforms. The risk assessor should also describe and provide technical justification for the changes in the accompanying text.

Risk assessors may add chemicals to the OHM list, provided they have the required physical and toxicological information for that chemical. For details about how to add chemicals to the OHM list, please see the instructions below.

Instructions For Adding New Chemicals

Users may add new chemicals to the OHM list, provided that they have the required physical and toxicological information for the chemical. The new OHM need to be added only to the "Method 3 Lookup Tables" workbook (v0624.xlsx).

1. Adding OHM to the Method 3 Lookup Tables Workbook

- A. Open the Lookup file (v0624.xlsx).
- B. On the "Add_OHM" sheet (tab), enter the name of the OHM using the same format as already in the spreadsheet, i.e., any numbers in the chemical name should appear as suffix (e.g., "TRICHLOROBENZENE, 1,2,4-" not "1,2,4-TRICHLOROBENZENE").

NOTE: If the user needs to modify a property for an existing OHM, the OHM should be entered as a new chemical. The name assigned to this chemical must be different from the original chemical name in the Lookup Tables for the spreadsheets to function properly (e.g., "LEAD_NEW" for "LEAD")

- C. The added OHM will automatically appear on the sheets "V1_Add_Data", "V2_Add_Data", "V3_Add_Data", and "V4_Add_Data" after the last OHM already in the original spreadsheet (i.e., ZINC).
- D. Add all necessary physical/toxicological data for each new chemical on "V1_Add_Data", "V2_Add_Data", "V3_Add_Data", and "V4_Add_Data".
- E. All OHM data will be automatically copied and sorted on "V1", "V2", "V3", and "V4" spreadsheets.
- F. Add any references and/or other notes for the newly added OHM on the "User_Notes" sheet. The "Blank" spreadsheet is also available to the user as a scratch sheet.
- G. **Do not modify any other spreadsheets or sections.**
- H. Save the document.
- I. The newly added OHM will appear in the dropdown selection list on the "EPCs" spreadsheet in all Shortforms.

2. Adding OHM with Mutagenic Effects

To add mutagenic chemicals to the list of OHM several additional steps must be taken, including adding and modifying other spreadsheets in various workbooks. Please contact MassDEP if you need to add any chemicals with mutagenic mode of action to the list of OHM.

V. Contact Information

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