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**Implementation Procedure for Assessments Involving  
Perchloroethylene (PCE) and/or Trichloroethylene (TCE)**

*and*

**Technical Bulletin #2: Respecting Changes in  
Toxicological Values for Chlorinated Solvents**

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## Implementation Procedure for Assessments Involving Perchloroethylene (PCE) and/or Trichloroethylene (TCE)

Effective January 1, 2017 Provincial Regulators in Atlantic Canada will require all site assessment, remediation and closure reporting to use the **updated** toxicological information for PCE and TCE provided in the adjoining technical bulletin, with the exception of the following circumstances:

### **Environmental Site Assessment (ESA) completed by January 1, 2017:**

An ESA was completed using the previous toxicological information for PCE and TCE prior to January 1, 2017 but the report was not submitted to the Regulator (i.e. RAP has not been submitted).

In these cases, the RAP must be submitted to the Regulator (if required by provincial regulation, policy, or guidance) by June 30, 2017, and site closure reporting must be submitted to the Regulator in accordance with the RAP schedule.

If a site closure report is not submitted by December 31, 2017 the Regulator will require a revised RAP using the updated toxicological information for PCE and TCE provided in the adjoining technical bulletin.

### **Remedial Action Plan (RAP) accepted by January 1, 2017:**

A RAP, accepted by the Regulatory (if required by provincial regulation, policy, or guidance), was implemented by January 1, 2017 using the previous toxicological information for PCE and TCE.

In these cases, Site Professionals and property owners may continue to use the previous toxicological information to complete remedial work on the site.

If during remediation, site conditions change which result in a re-evaluation and assessment of the site after January 1, 2017, Site Professionals and property owners may continue to use the previous toxicological information provided remediation is completed and site closure reporting is submitted by December 31, 2017. Otherwise, the updated toxicological information must be used to complete the site remediation work.

## Technical Bulletin #2: *Respecting Changes in Toxicological Values for Perchloroethylene (PCE) and Trichloroethylene (TCE)*

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### Guidance for Site Professionals and Risk Assessors

The Atlantic RBCA Toolkit v3.22 contains revisions to support future considerations for risk assessment of selected chlorinated volatile organic compounds. The toxicological data for perchloroethylene (PCE, also known as tetrachloroethylene) and trichloroethylene (TCE) provided in the Atlantic RBCA Toolkit v3.22 were based on toxicological reference values (TRVs) published by Health Canada (2010).

The US EPA has published more recent TRVs for PCE (US EPA 2012) and TCE (US EPA 2011) and Health Canada has advised Atlantic PIRI that a review of the Health Canada (2010) guidance document is currently underway. Health Canada further recommended that Atlantic PIRI use the recent US EPA TRVs for the assessment of sites contaminated with PCE and TCE, as the US EPA values consider more recent toxicity data.

Based on Health Canada's recommendation, and consistent with the recent science, Atlantic PIRI has chosen to adopt the US EPA TRVs for use in Atlantic Canada. The relevant US EPA values are provided in the table below.

Toxicological Reference Value	PCE	TCE
Oral slope factor (1/[mg/kg/d])	0.0021	0.046
Inhalation unit risk factor (1/[ $\mu\text{g}/\text{m}^3$ ])	0.00000026	0.0000041
Oral reference dose (mg/kg/d)	0.006	0.0005
Inhalation reference conc. (mg/m <sup>3</sup> )	0.04	0.002
Source	US EPA 2012	US EPA 2011

As noted in the Atlantic RBCA User Guidance (2015), consideration of PCE and TCE is given on a case by case basis by Provincial regulators. That said, Atlantic PIRI advises the following:

- If Site Professionals propose to use the Atlantic RBCA Toolkit v3.22 to develop Site Specific Target Levels (SSTLs) for PCE or TCE, the "Chem/Tox" database in the toolkit will need to be updated to reflect the above noted TRVs. Step-by-step guidance for updating the Atlantic RBCA Toolkit Chem/Tox database is attached.

- These inhalation toxicity data may also be used to calculate Vapour Intrusion Screening Levels (VISLs) using the equations provided in Appendix D of the *Guidance for Vapour Intrusion Assessments (December 2016)*. Site Professionals will need to consider both the carcinogenic and non-carcinogenic health endpoints when deriving VISLs for PCE and TCE.

## References

Health Canada. 2010. Federal Contaminated Site Risk Assessment in Canada, Part II: Health Canada Toxicological Reference Values (TRVs) and Chemical-Specific Factors, Version 2.0.

U.S. Environmental Protection Agency (US EPA). 2011. Integrated Risk Information System (IRIS), Chemical Assessment Summary – Trichloroethylene. CASRN 79-01-6. Available on-line: [https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance\\_nmbr=199](https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=199)

U.S. Environmental Protection Agency (US EPA). 2012. Integrated Risk Information System (IRIS), Chemical Assessment Summary - Tetrachloroethylene (Perchloroethylene). CASRN 127-18-4. Available on-line: [https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance\\_nmbr=106](https://cfpub.epa.gov/ncea/iris2/chemicalLanding.cfm?substance_nmbr=106)

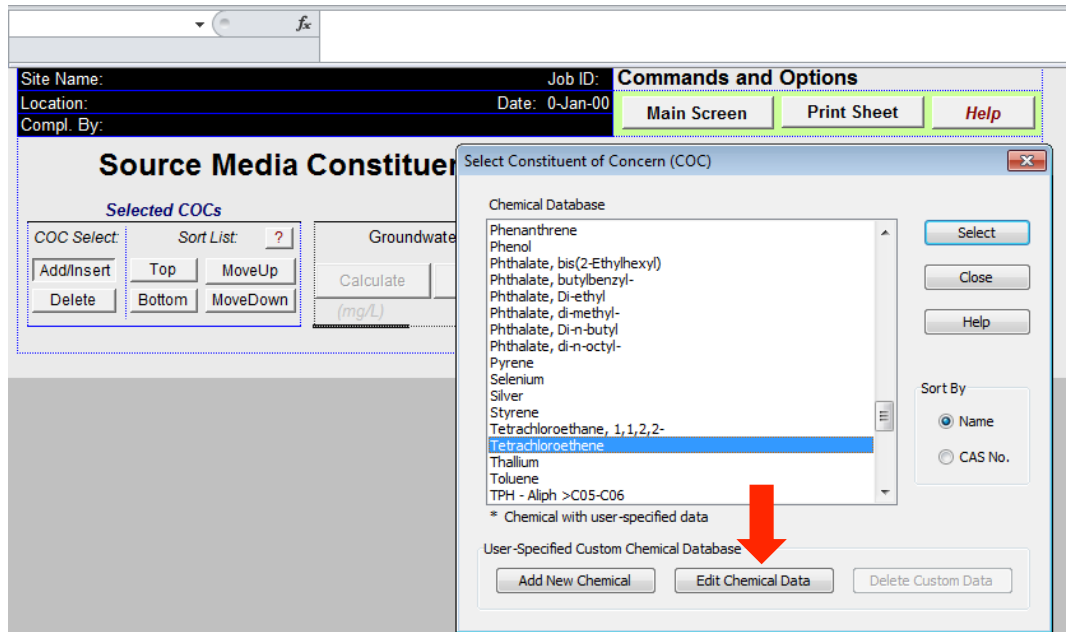
**Attachment:**

## **Updating the Chem/Tox Database in the Atlantic RBCA Toolkit**

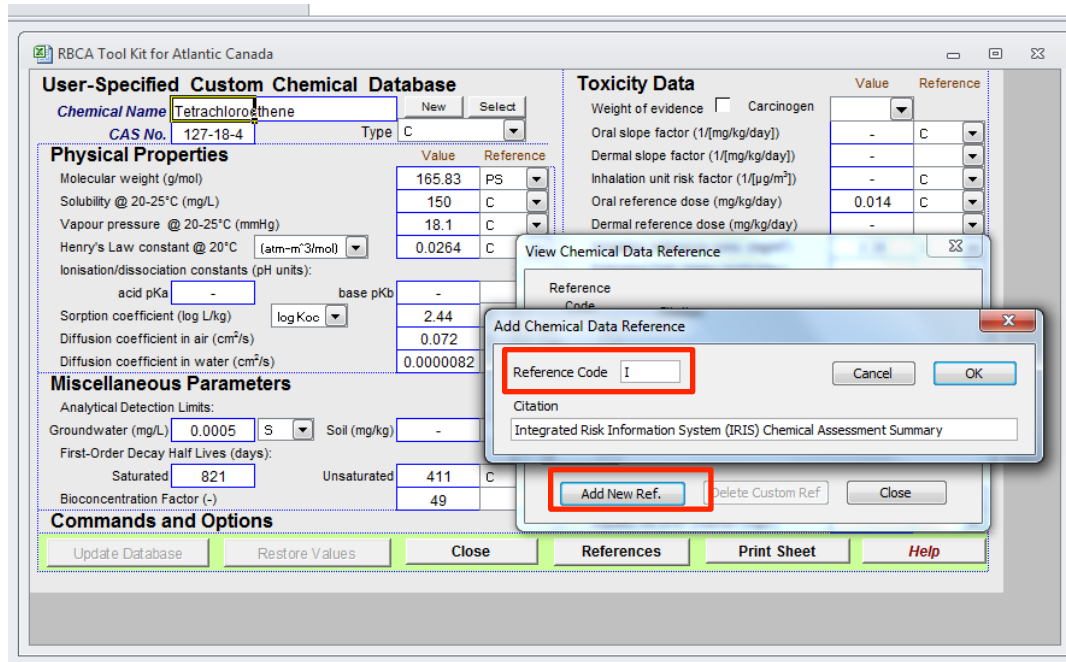
## Updating the Chem/Tox Database

**Step 1:** Open the Atlantic RBCA Toolkit, and select “Constituents of Concern”.

**Step 2:** Click “Add/Insert”, select “Tetrachloroethylene”, and “Edit Chemical Data” as shown below.



**Step 3:** Add “Integrated Risk Information System (IRIS) Chemical Assessment Summary” to the list of references. Assign the Reference Code “I”.



**Step 4:** Update the values as shown below, then click “Update Database”

**User-Specified Custom Chemical Database**

Chemical Name: Tetrachloroethene  
CAS No.: 127-18-4  
Type: C

**Physical Properties**

Property	Value	Reference
Molecular weight (g/mol)	165.83	PS
Solubility @ 20-25°C (mg/L)	150	C
Vapour pressure @ 20-25°C (mmHg)	18.1	C
Henry's Law constant @ 20°C (atm·m <sup>3</sup> /mol)	0.0264	C
log K <sub>oc</sub>	2.44	C
Diffusion coefficient in air (cm <sup>2</sup> /s)	0.072	C
Diffusion coefficient in water (cm <sup>2</sup> /s)	0.0000082	C

**Miscellaneous Parameters**

Analytical Detection Limits:

Groundwater (mg/L): 0.0005 S  
Soil (mg/kg): -

First-Order Decay Half Lives (days):  
Saturated: 821  
Unsaturated: 411 C

Bioconcentration Factor (-): 49

**Commands and Options**

Update Database Restore Values Close References Print Sheet Help

**Toxicity Data**

Property	Value	Reference
Weight of evidence	-	-
Oral slope factor (1/(mg/kg/day))	0.0021	I
Dermal slope factor (1/(mg/kg/day))	-	-
Inhalation unit risk factor (1/(μg/m <sup>3</sup> ))	2.6E-07	I
Oral reference dose (mg/kg/day)	0.006	I
Dermal reference dose (mg/kg/day)	-	-
Inhalation reference conc. (mg/m <sup>3</sup> )	0.04	I
Estimated Daily Intake (mg/kg/day)	-	-
Background Air Conc. (mg/m <sup>3</sup> )	-	-

**Dermal Exposure**

Property	Value	Reference
Dermal relative adsorption factor (-)	0.03	D
Dermal permeability coefficient (cm/hr)	0.0149	-
Lag time for dermal exposure (hr)	0.9	-
Critical dermal exposure time (hr)	4.3	-
Relative contribution of perm. coeff. (-)	0.25	-

**Regulatory Standards**

Property	Value	Reference
Drinking Water Standard (mg/L)	0.03	Ref
Air PEL/TWA (mg/m <sup>3</sup> )	680	-
Aquatic life prot. criterion (mg/L)	-	-

**Step 5:** Repeat the steps above to update the values for Trichloroethylene as shown below

**User-Specified Custom Chemical Database**

Chemical Name: Trichloroethylene  
CAS No.: 79-01-6  
Type: C

**Physical Properties**

Property	Value	Reference
Molecular weight (g/mol)	131.4	23
Solubility @ 20-25°C (mg/L)	1100	C
Vapour pressure @ 20-25°C (mmHg)	74.3	C
Henry's Law constant @ 20°C (atm·m <sup>3</sup> /mol)	0.0117	C
log K <sub>oc</sub>	2.07	C
Diffusion coefficient in air (cm <sup>2</sup> /s)	0.079	C
Diffusion coefficient in water (cm <sup>2</sup> /s)	0.0000091	C

**Miscellaneous Parameters**

Analytical Detection Limits:

Groundwater (mg/L): 0.001 S  
Soil (mg/kg): 0.005 S

First-Order Decay Half Lives (days):  
Saturated: 821  
Unsaturated: 411 C

Bioconcentration Factor (-): 39

**Commands and Options**

Update Database Restore Values Close References Print Sheet Help

**Toxicity Data**

Property	Value	Reference
Weight of evidence	✓ Carcinogen	-
Oral slope factor (1/(mg/kg/day))	0.046	I
Dermal slope factor (1/(mg/kg/day))	-	-
Inhalation unit risk factor (1/(μg/m <sup>3</sup> ))	0.0000041	I
Oral reference dose (mg/kg/day)	0.0005	I
Dermal reference dose (mg/kg/day)	-	-
Inhalation reference conc. (mg/m <sup>3</sup> )	0.002	I
Estimated Daily Intake (mg/kg/day)	-	-
Background Air Conc. (mg/m <sup>3</sup> )	-	-

**Dermal Exposure**

Property	Value	Reference
Dermal relative adsorption factor (-)	0.03	D
Dermal permeability coefficient (cm/hr)	0.0136	-
Lag time for dermal exposure (hr)	0.55	-
Critical dermal exposure time (hr)	1.3	-
Relative contribution of perm. coeff. (-)	0.026	-

**Regulatory Standards**

Property	Value	Reference
Drinking Water Standard (mg/L)	0.005	Ref
Air PEL/TWA (mg/m <sup>3</sup> )	269	ACGIH
Aquatic life prot. criterion (mg/L)	-	-

Once these changes have been made, the revised database will be saved to the program folder and the changes will be reflected in future model runs with the Atlantic RBCA Toolkit (i.e., a manual update is not required every time the Atlantic RBCA Toolkit is used).

Users are asked to print the “COC Chem. Parameters” output pages from the Atlantic RBCA Toolkit and include in their report submissions to the Regulators to document that an appropriately updated User Chem/Tox Database was used in the modeling.

For further information, please refer to the Atlantic RBCA Toolkit manual, Version 3.22, provided with the Atlantic RBCA Toolkit, or contact Atlantic PIRI at [info@atlanticrbca.com](mailto:info@atlanticrbca.com) or <http://www.atlanticrbca.com/>.

#### **Note**

Some Atlantic RBCA Toolkit users have experienced issues while attempting to update the User Chem/Tox database. This is likely due to a computer compatibility issue. To address the issue, users should consult their internal IT support staff, or refer to the GSI Environmental Webpage at <http://www.gsi-net.com/en/software/gsi-software-faq.html>.