CSR OMNIBUS UPDATING: Protocol Summary - Amendments to CSR Schedule 11 Generic Vapour Standards

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Protocol Summary

1. Updated existing CSR Schedule 11 Generic Vapour Standards based on current (as of 2015) inhalation TRVs available from various regulatory agencies.

2. Derived a new category of Schedule 11 "Parkade" vapour standards for parkade exposures.

3. Consolidated the updated CSR Schedule 11 and newly derived Parkade vapour standards into the new Omnibus Schedule V, Generic Vapour Standards.

4. As a component of the Stage 10 Amendment, CSR Schedule 11 will be repealed and replaced with the new Omnibus Schedule V, Generic Vapour Standards

Associated Omnibus Updating Documents

Details related to the proposed changes to CSR Schedule 11 are available in the ministry's 2015 Draft Discussion Document entitled "CSR OMNIBUS UPDATE: Proposed Amendments to Schedule 11" [1]

Details related to the ministry's response/decisions on stakeholder comment received on the proposed changes to CSR Schedule 9 are available in 2015, "Omnibus Updating of CSR Standards Draft Discussion Documents – Land Remediation Response to Stakeholder Comment." [2]

Protocol Details related to the Calculation of Omnibus Schedule V, Vapour Quality Standards for the Stage 10 Amendment to the CSR

1. Selection of Toxicity Reference Values (TRVs) used in the derivation of Land Use specific CSR Schedule V standards was completed in accordance with the TRV selection hierarchy as described in ministry Technical Guidance 7 Supplemental Guidance for Risk Assessment [3]. However, the ministry reserves the right to use/or derive *de novo* TRVs, in preference to any of the sources identified in the hierarchy.

2. In general, chronic inhalation reference concentrations (RfCs) were used in preference to TRVs derived from other exposure pathways (i.e. RfCs derived from RfDs) regardless of a lower ranking in the TRV selection hierarchy.

3. Selected substance specific TRVs were then tailored for use in CSR land use scenarios (AL, PL and RL land uses, and discreet standards for CL and IL land uses) using the exposure terms described below.

4. An additional exposure term specific to parkades was also used in deriving Schedule V, Parkade generic vapour standards. These parkade vapour standards will be applicable to all parkades irrespective of a particular site's CSR land use. A parkade is considered a building, storey of a building or other construction specifically designed for the parking of motor vehicles.

Table 1. Exposure terms (ETs) used to derive Schedule V, Generic Vapour Standards

ET	Exposure Term: land-use specific[1]
AL/RL/PL	ET = 1.0 (24hr/24hr x 7d/7d x 52 wk/52wk x 70 yr/70yr)
CL	ET = 0.33 (12hr/24hr x 5d/7d x 48 wk/52wk x 70 yr/70yr)
IL	ET = 0.11 (8hr/24hr x 5d/7d x 48 wk/52wk x 35 yr/70yr)
PK	ET = 0.125 ((1hr/24hr x 5d/7d)+(8hr/24hr x 2d/7d)) x 52 wk/52wk x 70 yr/70yr

[1] With the exception of the parkade (PK) exposure term, which was used to derive generic vapour standards applicable specifically to parkades, irrespective of the applicable CSR land use for the site.

5. Schedule V, Generic Vapour Standards were derived using the following toxicological equations:

i. For non-carcinogenic substances:

$$VS = (HQ^T \times RfC) / ET$$

where: VS = Schedule V Generic Vapour Standard (mg/m^3)
HQ^T = Target Hazard Quotient for substance = 1.0
ET = Exposure Term (unitless)
RfC = Reference Concentration (mg/m^3): if RfC unavailable for substance, then RfC = RfCcalc (see below)

RfCcalc = Reference Concentration calculated (mg/m^3): substance specific

$$RfCcalc = (RfD \times BW) / IR$$

where: RfD = Reference Dose (mg/kg/d): substance specific
BW = Body weight (kg): age specific, adult = 70 kg, child = 13 kg
IR = Inhalation Rate (m^3/d): age specific, adult =23 m^3/d, child = 5 m^3/d

ii. For carcinogenic substances:

$$VS = ICLR^T / (UR \times ET)$$

where: VS = Schedule V, Generic Vapour Standard (mg/m^3)
$ICLR^T$ = Target Incremental Lifetime Cancer Risk = $1.0x\ 10^{-5}$
ET = Land use specific exposure term (unitless)
UR = Cancer Unit Risk $(mg/m^3)^{-1}$: if UR unavailable for substance, then UR = URcalc (see below)

URcalc = (SF x IR) / BW

where: SF Cancer Slope Factor $(mg/kg/d)^{-1}$: substance specific
IR Inhalation Rate (m^3/d): age specific, adult =23 m^3/d, child = 5 m^3/d
BW Body weight (kg): age specific, adult = 70 kg, child = 13 kg

Next Cycle Revisions

1. Consider: updating existing soil vapour standards where new data has become available and developing new soil vapour standards for additional substances (e.g., emerging volatile substances, semi-volatiles, mercury) using the current ministry derivation methodology.

2. Review options for petroleum hydrocarbon fractions.

3. Consider: Deriving a new set of human health protective generic vapour standards for wildlands land use. [2]

References

[1] British Columbia. (2015). *CSR OMNIBUS UPDATING: Proposed Amendments to Schedule 11.* Ministry of Environment. June, 2015.

[2] British Columbia. (2015). *Omnibus Updating of CSR Standards Draft Discussion Documents – Land Remediation Response to Stakeholder Comment*. Ministry of Environment. November, 2015

[3] British Columbia. (2015). *Technical Guidance 7 Supplemental Guidance for Risk Assessments. version 4.* Ministry of Environment. November, 2015.

[2] Derivation of human health protective generic vapour standards for the wildlands land use was deferred from the Stage 10 Amendment to the CSR.