

VII. VURAM 3.1 (June 2020)

- 1) Includes RSL Update release May 2020.
- 2) Includes RSL Subchronic Metadata Update.
- 3) The chemical compound “Hexane, Commercial” was added to the RSL table without a CAS RN or EPA identification number. Virginia DEQ assigned a surrogate CAS RN of “HEX-Comm”.

VI. VURAM 3.0 (April 2020)

- 1) Solid Waste Alternate Concentration Limits (ACL) tables have been removed from the screening module. Tables can be found on line at [DEQ.website](#) and downloaded [here](#).
- 2) Includes RSL Update release November 2019.
- 3) Includes Subchronic Metadata Update.
- 4) Includes Updates from Virginia Surface Water Quality Standards and National Recommended Water Quality Criteria tables.
- 5) VURAM Users Guide Updated.
- 6) Screening values for asbestos MCL are in millions of fibers per liter (MFL) and for refractory ceramic fibers units are in fibers per meter cubed (f/m<sup>3</sup>).
- 7) Following CAS #s are revised:

CAS	Analyte
1336-36-3-Hi	Polychlorinated Biphenyls (high risk)
7439-96-5-Diet	Manganese (Diet)
7439-96-5-NonDiet	Manganese (Non-diet)
7440-43-9-Diet	Cadmium (Diet)
7440-43-9-Water	Cadmium (Water)
1336-36-3Total	Total PCBs

- 8) Minor bug fixes.

V. VURAM 2.2 (July 2019):

- 1) Includes RSL Update release Nov 2018 and May 2019.
- 2) Includes Subchronic Metadata Update.
- 3) Three Virginia DEQ exposure defaults are updated:

Trespasser Sediment Mutagenic Dermal Contact Factor-age adjusted-calculated using age-segment values (DFSMtrs-sed-adj): 43332.48 mg/kg updated to 50926.8 mg/kg.

Recreator Sediment Mutagenic Dermal Contact Factor - age adjusted - calculated using age-segment values (DFSMrec-sed-adj): 352076.4 mg/kg updated to 413774.4 mg/kg.

Particulate Emission Factor Subchronic (construction worker: PEFsc): 3339236953.22437 m<sup>3</sup>/kg updated to 1266503136.97919 m<sup>3</sup>/kg.

4) VURAM Users Guide Updated.

5) Following CAS #s are revised:

CAS	Analyte
1336-36-3-High	Polychlorinated Biphenyls (high risk)
1336-36-3-Low	Polychlorinated Biphenyls (low risk)
1336-36-3-Lowest	Polychlorinated Biphenyls (lowest risk)
7439-96-5-D	Manganese (Diet)
7439-96-5-ND	Manganese (Non-diet)
7440-09-7	Potassium
7440-43-9-D	Cadmium (Diet)
7440-43-9-W	Cadmium (Water)
Creosote	Creosote
Endrin-Metab	Endrin metabolites
Etybisdithiocarb-salts	Ethylenebisdithiocarbamic acid, salts and esters
Hexdibenzfur	Heptachlorodibenzofurans
Hexdibenz-p-diox	Heptachlorodibenzo-p-dioxins
Hexdibenz-diox	Hexachlorodibenzo-p-dioxin, Mixture
Nico-salt	Nicotine salts
Nmust-HCl-salt	Nitrogen mustard, hydrochloride salt
Nmust-Nox-HCl-salt	Nitrogen mustard, N-oxide, hydrochloride salt
Pentchlordibenzfur	Pentachlorodibenzofurans
Polychlordibenz-p-diox	Polychlorinated dibenzo-p-dioxins; PCDD's
Phth-Acd-Estr	Phthalic acid esters, N.O.S.
Sacch-salts	Saccharin salts
Tetchldibenzfur	Tetrachlorodibenzofurans
Tetchldibenz-p-diox	Tetrachlorodibenzo-p-dioxins

6) Refractory Ceramic Fibers and Asbestos in VURAM 2.2 are not presented in units of fibers. Refer Section 5.23 in EPA RSL Users Guide for more info: <https://www.epa.gov/risk/regional-screening-levels-rsls-users-guide#rcf>

#### IV. VURAM 2.1.1 (August 2018):

1) Minor bug fixes.

#### III. VURAM 2.1 (June 2018):

1) Includes RSL Update release June 2018.

2) Includes Subchronic Metadata Update.

3) Includes June 2017 VA Surface Water Update.

#### II. VURAM 2.0 (March 2018):

1) Includes RSL Update release Nov 2017.

2) A Screening Level Risk Assessment (SLRA) module for Voluntary Remediation Program (VRP) and RCRA Corrective Action (CA).

- 3) Site Specific Background Comparison module for inorganics for soil, groundwater, surface water, and sediment media.
- 4) Alternate Concentration Limits (ACL) functionality for RCRA Hazardous (VHWMR) and Solid Waste (VSWMR Table 3.1) facilities to view or print ACL tables. This module is for reference only.
- 5) VURAM 2.0 User's Guide is updated to reflect all changes since VURAM 1.0 release.
- 6) Addition of construction worker soil gas Quantitative Risk Assessment (QRA) evaluation.
- 7) Virginia DEQ groundwater construction worker in a trench soil gas model was evaluated. A parameter ( $L_d$ : distance between trench bottom and groundwater) in the model is modified in order to provide an accurate representation of both exposure and risks to construction workers. As a result, there is a substantial change in the screening levels. This change only applies to the soil gas model and not the groundwater model.
- 8) Averaging Time (AT:  $EW_{cw} \times 7 \times ED_{cw}$ ) for noncancer construction worker has been changed from 365 days to 350 days to reflect subchronic scenario.
- 9)  $Q/C_{(wind)}$  value is calculated based on EPA 2002 Soil Supplemental Guidance for Construction Worker (See Exhibit D-2). Soil Inhalation Dispersion Constants: A, B and C for Philadelphia, Zone 8 are selected as constants.
- 10) Commercial worker groundwater page:
- 11) For RCRA CA program, the page is available to use
- 12) For VRP, a groundwater declaration page is added
- 13) "In EPD?" Yes/No column added to SLRA and QRA module Setup pages Chemical List
- 14) Other user-interface improvements
- 15) Ability to enter label/site name
- 16) Chemical search using CAS RN
- 17) Chemical list allows for alphabetical scrolling through chemical names in SLRA and QRA modules.
- 18) Ability to go back and forth between set up and calculation pages in SLRA and QRA modules to make changes on the setup page
- 19) QRA setup page changed to include program, study area and risk value defaults
- 20) Page to view "Standard Defaults" is changed to reflect defaults grouped by study area

#### **I. VURAM 1.12 (March 2017)**

- 1) Reflective of EPA RSL update of May 2016.
- 2) Revised text on the report clearly identifies cumulative risk. The screenshots provided in the VURAM User's Guide will not match exactly to VURAM 1.12 but the information provided in the user's guide remains correct and valid to use the model and interpret the report.
- 3) Summation glitch for inhalation pathway for construction worker is fixed.

- 4) On the “Setup” screen, “Chemical List” Window: Chemical selection using chemical name or CAS number is not available for this window. The user must scroll down the entire list to select site-wide COPC list.
- 5) In line with EPA Region 3 guidance (<https://www.epa.gov/risk/updated-dermal-exposure-assessment-guidance>) VURAM calculates dermal risk for small set of chemicals which, per RAGS part E, are outside of the Effective Predictive Domain (EPD). While this approach increases uncertainty to some degree, it maintains conservative approach by including dermal risk for chemicals that may have high skin-permeability. Please contact DEQ for further discussion if these chemicals are identified as risk drivers for your facility.