

ATTACHMENT E
GLOSSARY AND ACRONYMS

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GLOSSARY AND ACRONYMS
PROTOCOL FOR REMEDIATION GOAL LOOKUP TABLES
NEBRASKA VOLUNTARY CLEANUP PROGRAM

“adj”: Designation in Table 2, Standard Default Factors, for exposure parameters calculated using an age-adjusted scenario.

Age-adjusted calculations: Performed for VCP RG calculations for exposure pathways for which the contact rate differs between adults and children (e.g., incidental ingestion of soil). Age-adjusted rates take into account differences in ingestion rates, dermal adherence factors, surface areas, body weights, and exposure duration for children versus adults. Age-adjusted parameters were used in calculating the residential VCP RGs for carcinogens for all pathways for both soil and ground water. This age-adjusted approach yielded lower (more protective) VCP RGs for carcinogens than would a carcinogenic assessment of only an adult *or* a child.

Anthropogenic: Describes contaminants present in the environment primarily due to man-made sources (e.g., automobiles). Anthropogenic contamination is typically widespread and can result from organic or inorganic contaminants.

AREA-ST Model: Dispersion model used for calculating the Q/C term, which is used in the VF_s and PEF equations. The AREA-ST Model is an updated version of U.S. EPA’s ISC2 Model.

ASTM: American Society for Testing and Materials.

Background: Ambient concentrations of contaminants in the environment that have not been influenced by humans. The term “background concentration” is typically reserved for metals, since metals are contaminants most likely to occur naturally.

Baseline risk assessment: An evaluation of conditions and risks/hazards to human health at a site, assuming current conditions and no controls are in place. Consists of the following steps: data collection and analysis; exposure assessment; toxicity assessment; and risk characterization.

“ca”: Designation for VCP RGs that are based on carcinogenic effects.

Carcinogen: An agent capable of inducing cancer.

CERCLA: Comprehensive Environmental Response, Compensation and Liability Act of 1980.

Class GA: Ground water currently used as a public drinking water supply or proposed as a public drinking water supply. Defined in NDEQ’s Title 118, Chapter 7.

Class GB: Ground water currently used as a private drinking water supply or with potential for use as a public or private drinking water supply, but which currently cannot be classified as GA. Class GB is assigned to all ground waters in the State except those assigned to Classes GA and GC. Defined in NDEQ’s Title 118, Chapter 7.

Class GC(R): Ground water assigned to Class GC is not being used, and has little or no potential for use as a public or private drinking water supply. Class GC(R) is a subset of Class GC representing certain portions of ground water that the NDEQ has determined may be appropriate for restoration or cleanup for possible future beneficial uses. Defined in NDEQ's Title 118, Chapter 7.

Conceptual site model: A diagram or figure of a site used to identify all potential or suspected sources of contamination, types, and concentrations of contaminants detected at the site; potentially contaminated media; and potential exposure pathways, including receptors. Conceptual site models are also used to identify data gaps and depict the relationship between elements of complete exposure pathways.

Contiguous: Sharing a boundary; touching.

COPC: Chemical of potential concern. Contaminant that has the potential to adversely affect a receptor due to its concentration, distribution, and mode of toxicity. COPCs are potentially "site-related" (i.e., known to be a part of site processes or present at concentrations above background).

2,4-D: 2,4-dichlorophenoxyacetic acid.

DAF: Dilution attenuation factor used in the calculation of soil-to-ground water VCP RGs. Ratio of soil leachate concentration to receptor point concentration. Represents reduction in concentration that occurs as soil leachate moves through soil and ground water as a result of adsorption, degradation, and dilution by clean ground water. The VCP RG calculations use a DAF of 20, which assumes a 20-fold reduction in contaminant concentration between the soil sampling location and the receptor well location.

DDD: 4,4'- Dichlorodiphenyldichloroethane.

DDE: 4,4'- Dichlorodiphenyldichloroethene.

DDT: 4,4'- Dichlorodiphenyltrichloroethane.

Default values: Exposure factors used in calculating the VCP RGs that do not vary with the contaminant (e.g., air inhalation rate, dermal surface area).

Dermal absorption fraction: Fraction of contaminant dermally absorbed from soil. Chemical-specific value.

D_i: Diffusivity in air. Chemical-specific value used in calculating the volatilization factor for soil (VF_s) term.

Exposure pathway: Course a contaminant takes from a source to an exposed organism. Includes a source area, point of exposure, and an exposure route (e.g., inhalation), as well as a transport mechanism if the point of exposure differs from the source area.

Exposure point: Location of potential contact between an organism and a contaminant.

Fate and transport: Chemical and physical transformation and processes (e.g. degradation, photolysis). Fate and transport also describes the mechanism whereby contaminants are transferred between environmental media (i.e., the VF_s is a fate and transport factor that models how contaminants are transported from soil to ambient air).

Ground water: Supply of fresh water found beneath the earth's surface—usually in aquifers—that feeds wells and springs.

HCH: Hexachlorocyclohexane.

HEAST (“h”): U.S. EPA Health Effects Assessment Summary Tables. A source of toxicity information; “h” is the designation for toxicity factors from HEAST.

Henry’s Law Constant (H): Principle that at a constant temperature, the concentration of a gas dissolved in a fluid with which it does not combine chemically is almost directly proportional to the partial pressure of the gas at the surface of the fluid. Chemical-specific value used in the VF_s equation.

HHMSSL: U.S. EPA Region 6 Human Health Medium-Specific Screening Levels.

HI: Hazard index, a sum of the hazard quotients for a specific pathway or receptor.

HQ: Hazard quotient, the ratio of the exposure dose or concentration to the reference dose or reference concentration.

IEUBK Model: Integrated Exposure Uptake Biokinetic Model for Lead in Children. Model used to calculate the residential VCP RGs for lead.

Inorganic: Contaminant not containing carbon.

Institutional control: Legal instrument placed in the property records (e.g., deed notice) that indicates limitations on or conditions governing use of the property, and which ensures protection of human health and the environment; or equivalent zoning and governmental ordinances. For the VCP RGs, this mainly refers to approving only industrial-commercial use for a property, since industrial RGs were applied to the site contaminant concentrations.

IRIS (“i”): U.S. EPA Integrated Risk Information System. Primary source of toxicity information; “i” is the designation for toxicity factors from IRIS.

ISC2: Industrial Source Complex Model.

K_d : Soil-water partition coefficient used for inorganics. Chemical-specific value used in calculating the VF_s and soil-to-ground water VCP RGs.

K_{oc} : Octanol-water partition coefficient used for organics. Chemical-specific value converted to a K_d used in calculating the VF_s and soil-to-ground water VCP RGs.

L: Liter.

L/day: Liter per day.

Laboratory detection limit: The lowest concentration of a contaminant that can reliably be distinguished from a zero concentration.

“m”: Designation for VCP RG based on the Title 118 MCL or derived from the MCL.

m³/kg: Cubic meter per kilogram.

m³-yr/kg-day: Cubic meter-year per kilogram per day.

“max”: Designation for VCP RGs based on the non-risk-based "ceiling limit" concentration of $1 \times 10^{+5}$ mg/kg.

MCL: Maximum contaminant level in ground water, from Title 118.

mg/kg: Milligram per kilogram.

mg/L: Milligram per liter.

mg-yr/kg-day: Milligram-year per kilogram per day.

MW: Molecular weight.

“n/a”: Designation for volatile inorganic contaminants in the “VOC” column of the VCP RG lookup tables. Indicates that even though these contaminants are volatile, no soil inhalation or particulate values are calculated since these are not organic contaminants.

NAPL: Non-aqueous phase liquid.

“nc”: Designation for VCP RGs based on noncarcinogenic effects.

NCEA (“n”): U.S. EPA National Center for Environmental Assessment. Source of toxicity information; “n” is the designation for toxicity factors that are NCEA values.

NCP: U.S. EPA National Contingency Plan.

NDEQ: Nebraska Department of Environmental Quality.

NHHSS: Nebraska Health and Human Services System.

Noncarcinogen: Contaminant not believed to cause cancer, but which causes other toxic effects.

Nonvolatile: For the VCP RGs, contaminants with an H less than or equal to 1×10^{-5} atm-m³/mole and a MW greater than or equal to 200 grams/mole.

“o”: Designation for factors from nonstandard (“other”) U.S. EPA sources.

Oral absorption factor: Used in the dermal soil contact pathway. Chemical-specific factor estimating gastrointestinal absorption applied to modify the oral toxicity factor for use in the dermal pathway.

ORD: U.S. EPA Office of Research and Development.

Organic: Contaminant containing carbon.

OSWER: U.S. EPA Office of Solid Waste and Emergency Response.

PAH: Polycyclic aromatic hydrocarbon.

PCB: Polychlorinated biphenyl.

PEF: Particulate emission factor.

pica: Abnormal appetite in children for consuming large amounts of non-food items, e.g., soil.

PM₁₀: Particulate matter of 10 micrometers (µm) or less in diameter.

PPRTV (“p”): NCEA Provisional Peer-Reviewed Toxicity Values. Source of toxicity information; “p” is the designation for toxicity factors that are NCEA PPRTVs.

PRG: U.S. EPA Region 9 Preliminary Remediation Goals.

Q/C: Air dispersion factor used in the VF_s equation.

RAC: Remedial action class from Title 118.

RAC-1: Remedial action class 1 from Title 118. Includes ground water of Class GA and a portion of Class GB, imposing a 500-foot radius around all private drinking water supply wells. RAC-1 ground water receives the most extensive remedial action measures.

RAC-2: Remedial action class 2 from Title 118. Includes ground water of Class GB (except for the portion of Class GB placed in RAC-1) and Class GC(R).

RAC-3: Remedial action class 3 from Title 118. Includes, but is not limited to, ground water of Class GC—except for Class GC(R) that was placed in RAC-2. RAC-3 ground water receives the least extensive remedial action measures.

RAGS: U.S. EPA Risk Assessment Guidance for Superfund.

RBC: U.S. EPA Region 3 Risk-Based Concentrations.

RBCA: Risk-based Corrective Action.

RCRA: Resource Conservation and Recovery Act.

Receptor: Organism potentially receiving a contaminant exposure. For the purposes of the VCP RGs, receptors evaluated include residents (adults and children) and industrial-commercial workers (abbreviated as “industrial”).

RfC: Chronic reference concentration. Toxicity factor used to estimate noncarcinogenic hazard from inhalation exposures to site contaminants. An estimate (with uncertainty spanning perhaps an order of magnitude) of a continuous inhalation exposure to the human population (including sensitive subgroups) that is likely to be without an appreciable risk of deleterious effects during a lifetime.

RfD: Chronic reference dose. Toxicity factor used to estimate noncarcinogenic hazard from oral and dermal exposures to site contaminants. An estimate (with uncertainty spanning perhaps an order of magnitude or greater) of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a lifetime.

Safe Drinking Water Act: Passed in 1974, aims to ensure that public drinking water supplies meet national standards that protect consumers from harmful contaminants in drinking water.

SARA: Superfund Amendments and Reauthorization Act of 1986.

“sat”: Designation for VCP RGs that are based on the soil saturation limit.

SEAM: Superfund Exposure Assessment Manual.

SF: Cancer slope factor. Toxicity factor used to estimate cancer risk due to oral and dermal exposures to site contaminants. An upper bound, approximating a 95% confidence limit, on the increased cancer risk from a lifetime exposure to an agent. This estimate is generally reserved for use in the low-dose region of the dose-response relationship, that is, for exposures corresponding to risks less than 1 in 100.

Site-specific: Pertaining to a particular location (i.e., contaminated site). Relevant site-specific parameters include, but are not limited to, organic carbon content of soil, depth to ground water, and mean annual windspeed.

Soil saturation limit: Measure of the contaminant concentration at which all soil pore space (both air- and water-filled) is saturated with the contaminant and the adsorptive limits of the soil particles have been reached. Represents an upper bound on the applicability of the VF_s model, because contaminants exceeding the saturation limit may be present in free phase, which would violate a key principle of the model (i.e., that Henry's Law applies).

Soil to ground water: Migration of contaminants from soil to underlying ground water through leaching.

Surface water: Aboveground water bodies (e.g., lakes, rivers).

SVOC: Semivolatile organic compound.

Target cancer risk level /carcinogenic risk level: Target cancer risk level is a particular carcinogenic risk level set to be protective of human health. Carcinogenic risk level is the additional risk of developing cancer due to exposure to a contaminant incurred over the lifetime of the individual. For the VCP RGs, the target cancer risk levels are set as follows:

| Type of Land Use/Scenario | Individual or Combined (Cumulative) Contaminant Exposure | Target Cancer Risk Level |
|---------------------------|--|--------------------------|
| Residential | Individual | 1 x 10 ⁻⁶ |
| | Combined | 1 x 10 ⁻⁵ |

| Type of Land Use/Scenario | Individual or Combined (Cumulative) Contaminant Exposure | Target Cancer Risk Level |
|---------------------------|--|--------------------------|
| Industrial | Individual | 1×10^{-5} |
| | Combined | 1×10^{-4} |

Target HQ/HQ: Target noncarcinogenic hazard quotient/noncarcinogenic hazard quotient. HQ is the ratio of a single noncarcinogenic contaminant's exposure level to a RfD or RfC for that contaminant. Target HQ is a particular HQ set to be protective of human health. For the VCP RGs, the target noncarcinogenic HQs and HI are set as follows:

| Type of Land Use/Scenario | Individual or Combined (Cumulative) Contaminant Exposure | Target HQ or HI |
|---------------------------|--|--------------------------------|
| Residential | Individual | HQ = 0.25 |
| | Combined | Target organ-specific HI = 1.0 |
| Industrial | Individual | HQ = 1.0 |
| | Combined | Target organ-specific HI = 1.0 |

Target HI/HI: Target noncarcinogenic hazard index/noncarcinogenic hazard index. HI is the sum of more than one HQ for multiple noncarcinogenic substances and/or multiple exposure pathways. Target HI is a particular HI set to be protective of human health. See definition of HQ above for HI values used for VCP RG calculations.

Target organ: The biological organ(s) most adversely affected by exposure to a chemical, physical, or biological agent.

TCDD: Tetrachlorodibenzo-p-dioxin.

TCEQ: Texas Commission on Environmental Quality.

Tier 1: Under VCP, comparison/remediation to background concentrations.

Tier 2: Comparison/remediation to VCP RGs.

Tier 3: Development of and comparison/remediation to site-specific VCP RGs by the participant, under oversight by NDEQ.

Title 118: NDEQ's Ground Water Quality Standards and Use Classification.

Ubiquitous: Widespread; present virtually everywhere.

µm: Micron.

U.S. EPA: U.S. Environmental Protection Agency.

URF: Unit risk factor. Toxicity factor used to estimate cancer risk due to inhalation exposures to site contaminants. The upper-bound excess lifetime cancer risk estimated to result from continuous exposure to an agent at a concentration of 1 microgram per cubic meter ($\mu\text{g}/\text{m}^3$) in air.

VCP RG: NDEQ Voluntary Cleanup Program Remediation Goal. Term for Tier 2 soil and ground water concentrations calculated using the methods described in the protocol.

VF_s: Volatilization factor for soil inhalation pathway. Calculated, chemical-specific value for VOCs.

VF_w: Volatilization factor for ground water inhalation pathway. Default value previously derived using chemical-specific information; used for VOCs.

VOC: Contaminant considered a volatile organic compound. For the VCP RG lookup tables, VOCs are defined as contaminants having an H greater than 1×10^{-5} atm-m³/mole and a MW less than 200 grams/mole.

“x”: Designation for VCP RG toxicity factors that have been withdrawn from their original source.