

RISK & ASSESSMENT

THE WEST VIRGINIA VOLUNTARY REMEDIATION PROGRAM

The Office of Environmental Remediation provides for clean, safe, and productive West Virginia communities by assessing and remediating environmental resources and restoring contaminated properties to beneficial use.



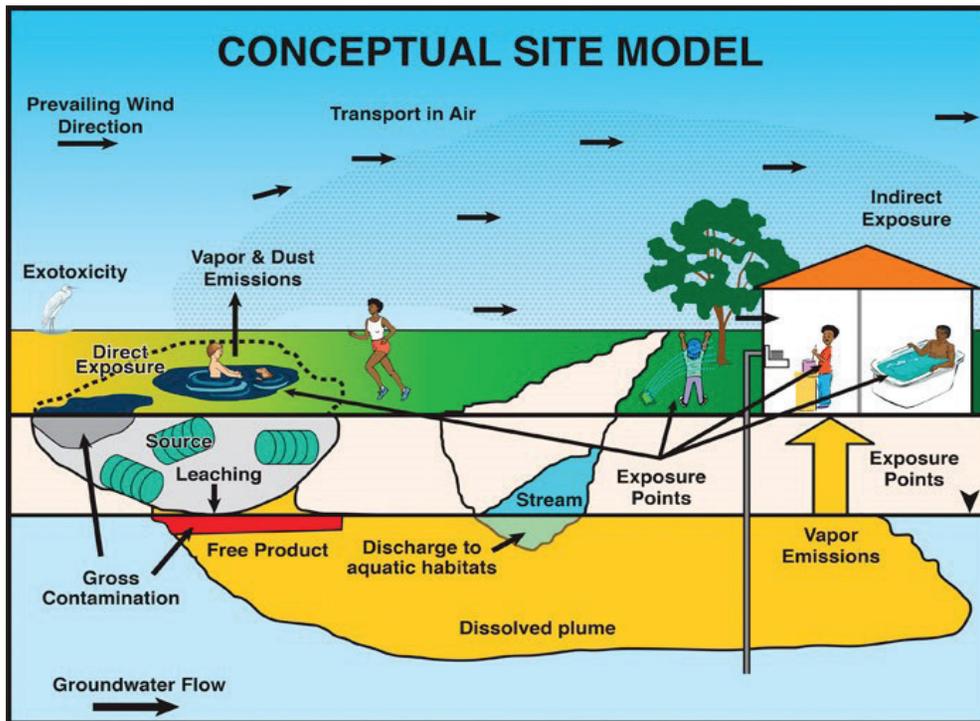
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The Voluntary Remediation Program

The Voluntary Remediation Program (VRP) encourages companies, communities, and other stakeholders to voluntarily cleanup previously polluted sites. Entities that remediate sites are provided flexible cleanup standards based on site-specific conditions and future land uses to earn liability protections under West Virginia Law. Communities experience many environmental, social, and economic benefits from site remediation. Potential environmental and social benefits include reduced or eliminated exposure to contamination, improved public health and safety, decreased blight and crime, preservation of historic landmarks, and conservation of greenspaces. Potential economic benefits include private investment, job creation, increased property values, and improved local tax base.

WHAT IS A CONCEPTUAL SITE MODEL?

The Conceptual Site Model (CSM) is a drawing (see example below) or flowchart that shows how chemicals are released from a site, the pathways they follow, and how people, animals, or plants are likely to come into direct or indirect contact with those chemicals.



WHY DOES FUTURE SITE USE MATTER FOR RISK ASSESSMENT?

It is often not possible or practical to remove all contamination from a site. If some contamination is left at the site, then the amount of risk caused by the remaining contamination will depend on how the site is used. The VRP considers three types of land use (resident, recreation, and industrial) when estimating both current and future risks for a site. Residential land use requires higher remediation standards, because residents would have more contact with remaining contamination than workers and are not compensated for their exposures. Recreational standards are typically between residential and industrial standards.

HOW IS RISK DETERMINED?

Exposure (dose) deals with how much chemical we come in contact with, which is a function of concentration and exposure pathway (ingestion, dermal contact, and inhalation) and is dependent on how a site is used. Toxicity (dose response) deals with how harmful the chemical is and what type of harm it causes. Given exposure and toxicity, the risk assessment predicts the nature, magnitude, and some measure of the likelihood of the adverse health effects that may occur.

HOW IS RISK DESCRIBED?

Risk is described as a calculated number in two ways. For chemicals that cause cancer, risk is described as the odds that cancer will be caused by contaminants at a site. For chemicals that cause non-cancerous health effects, risk is described as a Hazard Quotient (HQ), which estimates whether or not the exposure exceeds the level that is considered safe. HQs are added together for all chemicals and pathways of exposure at a site to calculate a Hazard Index (HI). Many chemicals can cause both cancerous and noncancerous health effects, and any remedy must be protective of both potential risks.

WHAT ARE CONTAMINANTS OF CONCERN?

Those are chemicals at a site that people can come in contact with now or in the future. Investigation of the site determines which ones are present, where the contaminants are located, and how much is there. The three most common classes of contaminants are:

Volatile Organic Compounds (VOCs)

VOCs are liquid chemicals that evaporate easily. They are widely used in industry for making chemicals and manufacturing electronics, as well as at home for dissolving grease or paint and cleaning surfaces. Examples are Acetone, Benzene, and Trichloroethylene (TCE).

Semivolatile Organic Compounds (SVOCs)

SVOCs are chemicals that evaporate slowly, or not at all. Many by-products and wastes from the production of chemicals contains SVOCs. Examples of SVOCs are Dioxin, Pesticides, and Polychlorinated biphenyls (PCBs).

Metals

Metals are naturally-occurring and part of our "background" exposures to toxins in daily life. Metal compounds are also found in commercial products, industrial products, and waste materials. While some metals are essential for life, metals known as "heavy metals", such as Arsenic, Cadmium, Lead, and Mercury are very toxic.