## OVERVIEW

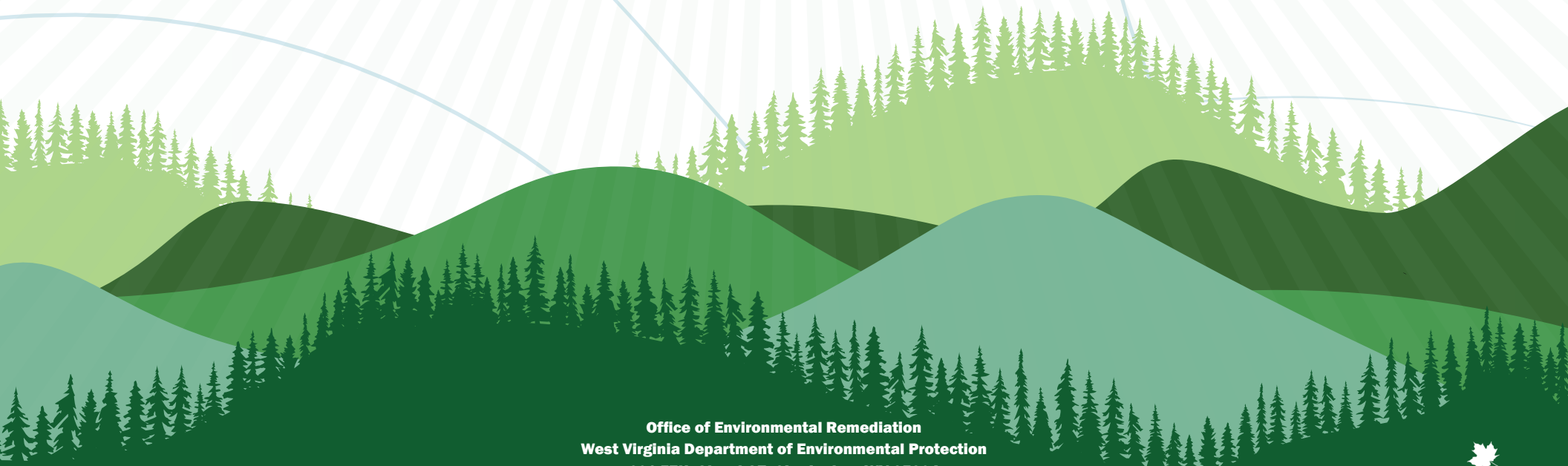
The Voluntary Remediation Program (VRP), administered by the Office of Environmental Remediation (OER) within the West Virginia Department of Environmental Protection (WVDEP), encourages voluntary cleanup of abandoned and underutilized sites so that those properties may be returned to productive use and undeveloped pristine land remains protected.

The Voluntary Remediation Program uses risk assessment to make two important decisions about how sites are addressed in the VRP. First, risk assessment is used to decide whether a site needs to be cleaned up to reduce risk to human health. Second, if cleanup is needed, risk assessment helps determine how much cleanup is needed.

*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.*

# RISK & ASSESSMENT

# THE WEST VIRGINIA VOLUNTARY REMEDIATION PROGRAM



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# FREQUENTLY ASKED QUESTIONS

## THE VOLUNTARY REMEDIATION PROGRAM

### WHAT IS THE PURPOSE OF THE VOLUNTARY REMEDIATION PROGRAM?

The VRP encourages companies, communities, and other stakeholders to voluntarily clean up sites that have been polluted in the past. Entities that remediate sites are provided flexible cleanup standards based on site-specific conditions and future land uses and afforded 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 MEANT BY "CLEANUP" AND "REMEDIATION"?

"Cleanup" and "remediation" have the same meaning: the removal, destruction, or control of hazardous chemicals at a site. Any one of these three remedies may be used alone or in combination at a VRP site. When it is not possible to completely remove or destroy all hazardous chemicals present at a VRP site, the remaining hazardous chemicals are tightly controlled to keep them from spreading or causing harm.

### WHAT ARE THE STEPS OF CLEANING UP A VRP SITE?

The VRP involves a series of steps to ensure that human health and the environment is protected. These include completing site investigation, developing a conceptual site model, performing risk assessment, and selecting and implementing a remedy.

### WHAT IS A CONCEPTUAL SITE MODEL?

The Conceptual Site Model (CSM) is a drawing that shows how chemicals are released from a site and how people are likely to come in contact—directly or indirectly—with those chemicals.

## RISK ASSESSMENT

### WHAT IS RISK ASSESSMENT?

Risk assessment is the estimation of the risk of harmful effects to human health or to ecological systems posed by chemicals that are present at, or that may have migrated from, hazardous chemical sites.

### HOW IS RISK DETERMINED?

The basic risk equation is: *Risk = Exposure x Toxicity*

Exposure deals with how much chemical we come in contact with and how we come in contact with it. Toxicity deals with how harmful (poisonous) the chemical is and what type of harm it causes. Given exposure and toxicity, the risk assessment predicts the probability, nature, and magnitude of the adverse health effects that may occur.

### HOW IS RISK DESCRIBED?

Risk is described as a number in two ways:

1. For chemicals that cause cancer, risk is described as the odds that cancer will be caused by contaminants at a site.
2. For other chemicals, risk is described as some portion of the level that is considered safe (i.e., one-tenth of a safe level).

### 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 requires two types of land use, residential and industrial, to be considered 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.

### DOES RISK ASSESSMENT APPLY TO WILDLIFE?

Yes. The VRP requires that the risks to animals and plants are evaluated in an ecological risk assessment.

## CONTAMINANTS OF CONCERN

### WHAT ARE CONTAMINANTS OF CONCERN?

"Contaminants of concern" are chemicals at a site that people can come in contact with now or in the future. The site investigation determines what contaminants are present at the site, where the contaminants are located, and how much is there.

### WHAT ARE COMMON CONTAMINANTS OF CONCERN AT VRP SITES?

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: Acetone, Benzene, Perchloroethylene (PCE)*

#### 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: Dioxin, Pesticides, Polychlorinated biphenyls (PCBs)*

#### Metals

Metal compounds are found in commercial products, industrial products, and wastes materials. Some metals occur widely in nature and are essential for life. Other metals, called "heavy metals," are very toxic.

*Examples: Arsenic, Cadmium, Lead, Mercury*

### HOW MIGHT I COME IN CONTACT WITH CHEMICALS FROM HAZARDOUS SITES?

You might come in contact with chemicals in soil, water, or air if you visit, live, or work on or near a site with hazardous chemicals present. Common ways chemicals may enter your body include dermal exposure (touching against skin), inhalation exposure (breathing in), and ingestion exposure (eating or swallowing). Contact may be direct (playing in contaminated soil) or indirect (consuming fish from contaminated surface water).