

# **VRP Act Brings Risk-based Corrective Action (RBCA) Features**

In VRP, RBCA principles incorporated but RBCA not defined

## VRP Legislative Purpose (Sec 101)

- to encourage the ***voluntary and timely investigation and remediation*** of properties for the purpose of ***reducing human and environmental exposure to safe levels,***
- to ***protect current and likely future use*** of groundwater,
- to ensure ***the cost-effective allocation of limited resources,***
- that provisions of this part shall ***take precedence over any conflicting provisions, regulations, or policies.***

## Think of RBCA as a decision making process

...used to assess actual or likely human and/or ecological risk of exposure to a chemical release and to determine appropriate remedial actions accordingly

## Goal: Protection vs. Restoration?

RBCA is exposure-protection centric while current HSRA has become more media-restoration centric, irrespective of exposure

## **RBCA Consensus Standard Now Available**

ASTM Standard Guide E2081 (2004) Risk-Based  
Corrective Action for Chemical Releases

## What is Risk?

The risk of harm to a person or other living receptor is the **multiplied product** of chemical **concentration** in the contaminated media multiplied by the chemical-specific toxicity multiplied by the receptor **exposure** to the contaminated media

**In conceptual form...**

**Risk = Concentration x Toxicity x Exposure**

## How Can Risk Be Reduced to Safe Levels?

As concentration, toxicity, or exposure is reduced to zero, risk also reduces to zero.



## Begs the Question...

If risk is truly zero and will stay zero, why remediation beyond risk-based need?



## Plenty of Possible Reasons...

- ❑ Statutory/regulatory requirements?
- ❑ Agency policy or precedent?
- ❑ Natural resource restoration objectives?
- ❑ Marketability of properties?
- ❑ Company policy?
- ❑ Lender requirements?
- ❑ Future litigation concerns?
- ❑ Non-owned properties?
- ❑ Contamination stigma?
- ❑ Community relations?
- ❑ Long-term cost to maintain property controls?
- ❑ Other reasons?

## RBCA-Derived Definitions are Key for VRP Act (Section 102)

- **Constituents of Concern**...those specific regulated substances that may contribute to unacceptable receptor exposure
- **Exposure**...contact of a constituent of concern with a human or sensitive organism (receptor)
- **Exposure pathway**...a route by which a receptor comes into contact with a constituent of concern

## **RBCA-derived Definitions are Key for VRP Act (Section 102) (cont' d)**

- **Institutional and engineering controls...**measures that minimize the current and future potential for receptor exposure
- **Exposure domain...**a contaminated geographical area of a site that can result in exposure of a particular receptor by way of a specified exposure pathway

## Georgia UECA (Sec 107)

- Any voluntary remediation property relying on controls, including groundwater use restrictions, shall execute a covenant in conformance with UECA.
- EPD to maintain an inventory of such properties.

## **Point of exposure (for ground water)...the nearest of the following locations:**

- Closest existing downgradient drinking water well
- Closest downgradient location for future drinking water well where public supply not likely to be available or
- Hypothetical point of drinking water exposure located 1000 feet downgradient from delineated site contamination

## Point of demonstration wells...

- Groundwater monitoring wells located between the source of groundwater contamination and the downgradient point of exposure

**Representative concentration...**the average concentration to which a specified receptor is exposed over an exposure duration within a relevant exposure domain for soils or at an established point of exposure for groundwater (consistent with USEPA guidance for determination of average exposure concentration)



## **Other RBCA Features Available as VRP Options (Sec 108)...**

## Site Delineation Options...

- May delineate to anthropogenic background not affected by the subject site release
- May delineate metals in soils to concentrations for GA undisturbed native surficial soils in USGS Boerngen & Shacklette Report (1981)
- May delineate to HSRA Type 1 generic residential risk reduction standards

## **No Further Evaluation Required for Incomplete Exposure Pathways**

An exposure pathway is complete (only) if there are no discontinuities or impediments to constituent movement from contamination source to receptor, including consideration of controls; otherwise, exposure pathway is incomplete and requires no (further) evaluation.

## Site-specific Average Exposure Concentration

Compliance with HSRA Type 2 (residential) and Type 4 (nonresidential) “site-specific” risk reduction standards may be determined on the basis of representative (average) concentrations in soils and groundwater, rather than point-by-point maxima under current HSRA.

## **VRP Flexibility to Choose Type 5 Standards**

May choose to use Type 5 risk reduction standards without demonstrating that Type 1 – 4 risk reduction standards are inappropriate or impracticable, as required under current HSRA

## Source Material Flexibility for Types 2 and 4 RRSs

Source material requirements may be satisfied for Type 2 residential or Type 4 nonresidential RRSs by removal, decontamination, or immobilization in the subsurface, to the extent practicable – current HSRA requires removal or decontamination of all source material.

## **VRP Broadens Use of Fate and Transport Modeling ...**

for calculation of risk-based concentrations at the point of exposure, point of demonstration, soil source area, RQSM flow-path analysis, stream protection criteria, vapor pathway, and “what-if” testing of remediation and control alternatives including natural attenuation

## Fate and Transport Modeling

- RBCA advocates a gradual process of using models, starting with simple analytical equations and proceeding to complex numeric models if needed.
- Complexity of selected models should balance the quantity and quality of available data with the model output



## Fate and Transport Modeling

- Quantity and quality of available field data may eliminate the need for F&T modeling.
- In some cases, F&T models may not be applicable (e.g., when model calibration and verification are not possible).

## HSI Delisting (Sec 107)

- Upon receipt of CSR, a decision of concurrence with the report and certification shall be issued on evidence satisfactory to the director that it is consistent with the provisions, purposes, standards, and policies of the VRP.
- Within 90 days of concurrence, listed property removed from HSI