Model Toxics Control Act
Cleanup Regulation

WASHINGTON STATE DEPARTMENT OF ECOLOGY

Remedy Selection

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For additional information, see our web page:
http://www.ecy.wa.gov/programs/tcp/cleanup.html

Threshold Requirements for Cleanup Actions

- Protect human health and the environment
- Comply with cleanup standards
  - → See WAC 173-340-720 through 760
- Comply with applicable state and federal laws
  - → See WAC 173-340-710
- Provide for compliance monitoring
  - → See WAC 173-340-410 and 173-340-720 through 760

Other Requirements for Cleanup Actions

- Use permanent solutions to the maximum extent practicable
  - → See WAC 173-340-360(3)
- Provide for a reasonable restoration time frame
  - → See WAC 173-340-360(4)
- Consider public concerns
  - → See WAC 173-340-600

Site-Specific Requirements for Cleanup Actions

- Requirements for Ground Water Cleanup Actions
  - → See WAC 173-340-360(2)(c)
- Requirements for Soil Cleanup Actions for Residential Areas, Schools and Child Care Centers
  - → See WAC 173-340-360(2)(d)
- Requirements for Cleanup Actions that use Institutional Controls
  - → See WAC 173-340-360(2)(e) and 173-340-440

Site-Specific Requirements for Cleanup Actions

- Requirement to prevent or minimize present or future releases and migration of hazardous substances
  - → See WAC 173-340-360(2)(f)
- Requirements for Cleanup Actions that use Dilution and Dispersion
  - → See WAC 173-340-360(2)(g)
- Requirements for Cleanup Actions that use Remediation Levels
  - → See WAC 173-340-360(2)(h)

Permanent to the Maximum Extent Practicable

WAC 173-340-360(2)(b)(i)

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WAC 173-340-360(3)

Permanent to the Maximum Extent Practicable

- How does one determine whether a cleanup action uses permanent solutions to the maximum extent practicable (PMEP)?

  Use the "disproportionate cost analysis" specified in the rule.

  The cleanup action alternative that is PMEP is the most permanent cleanup action alternative with incremental costs not exceeding the incremental benefits, compared to less permanent alternatives.

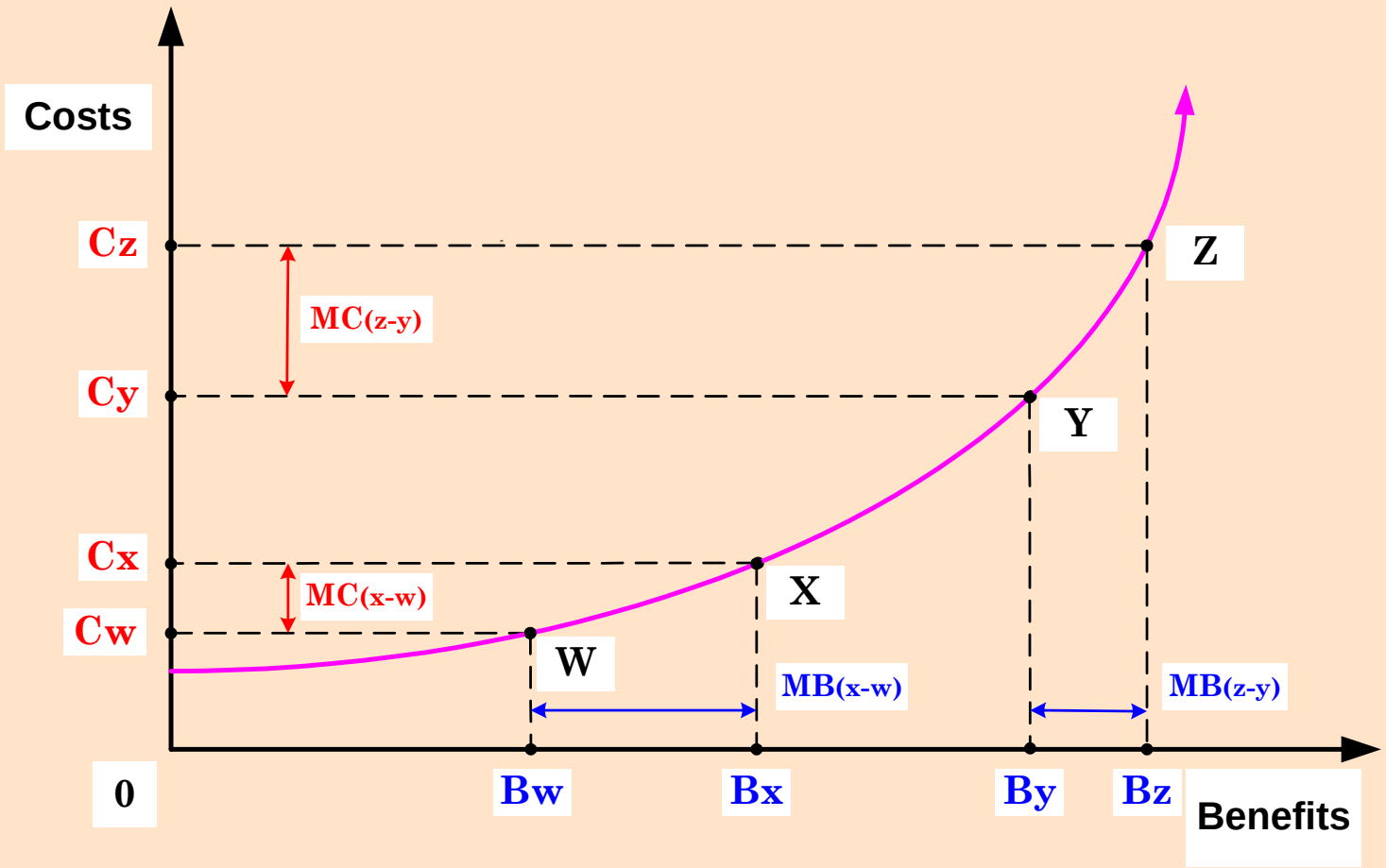
Permanent to the Maximum Extent Practicable

- What constitutes a "permanent cleanup action"?

  A "permanent cleanup action" is an action in which cleanup standards can be met without further action being required at the site being cleaned up or any other site involved with the cleanup action, other than the approved disposal of any residue from the treatment of hazardous substances.

  [WAC 173-340-200]

Graphical Analysis of Costs and Benefits



Remediation Levels

Relationship Between Cleanup Levels and Remediation Levels

- Cleanup levels define the concentration of hazardous substances above which a contaminated medium (e.g., soil) must be remediated in some manner (e.g., soil removal or treatment).
- Remediation levels define the concentration (or other method of identification) of a hazardous substance in a particular medium above or below which a particular cleanup action component (e.g., soil treatment or containment) will be used.
- Remediation levels, by definition, exceed cleanup levels.

RELs Example #1: Site Meeting Soil Cleanup Levels at POC

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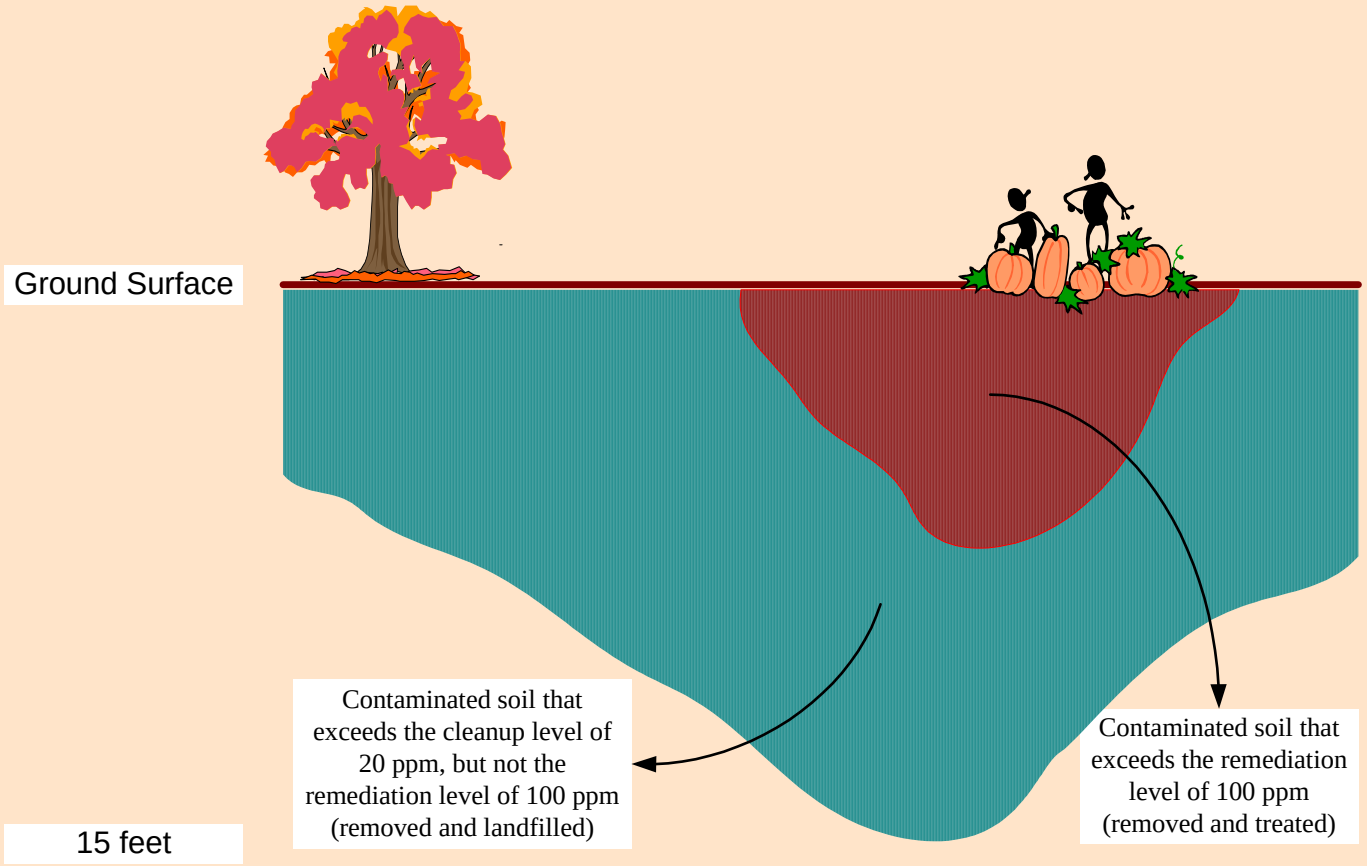
Cleanup Standard

- Soil cleanup level = 20 ppm
- Point of compliance = soils throughout the site from the ground surface to 15 feet
- To comply with cleanup standards, any soil that exceeds the 20 ppm cleanup level at the point of compliance must be remediated in some manner.

RELs Example #1: Site Meeting Soil Cleanup Levels at POC

- Cleanup action components = soil treatment and soil removal
- Remediation level of 100 ppm is used to define where those two components are used
- Under the cleanup action, any soil that exceeds the 100 ppm remediation level must be removed and treated. Any soil that does not exceed the 100 ppm remediation level, but exceeds the 20 ppm cleanup level, must be removed and landfilled.

Conceptual Depiction of Example #1



RELs Example #1: Site Meeting Soil Cleanup Levels at POC

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Does the cleanup action comply with the soil cleanup standard? YES

- The cleanup action involves the cleanup of all soils with hazardous substance concentrations exceeding the cleanup level at the point of compliance.
- As long as the soil cleanup level of 20 ppm is met at the point of compliance (throughout the site from the ground surface to 15 feet), the cleanup action may be determined to comply with soil cleanup standards.

RELs Example #2: Site Not Meeting Soil Cleanup Levels at POC

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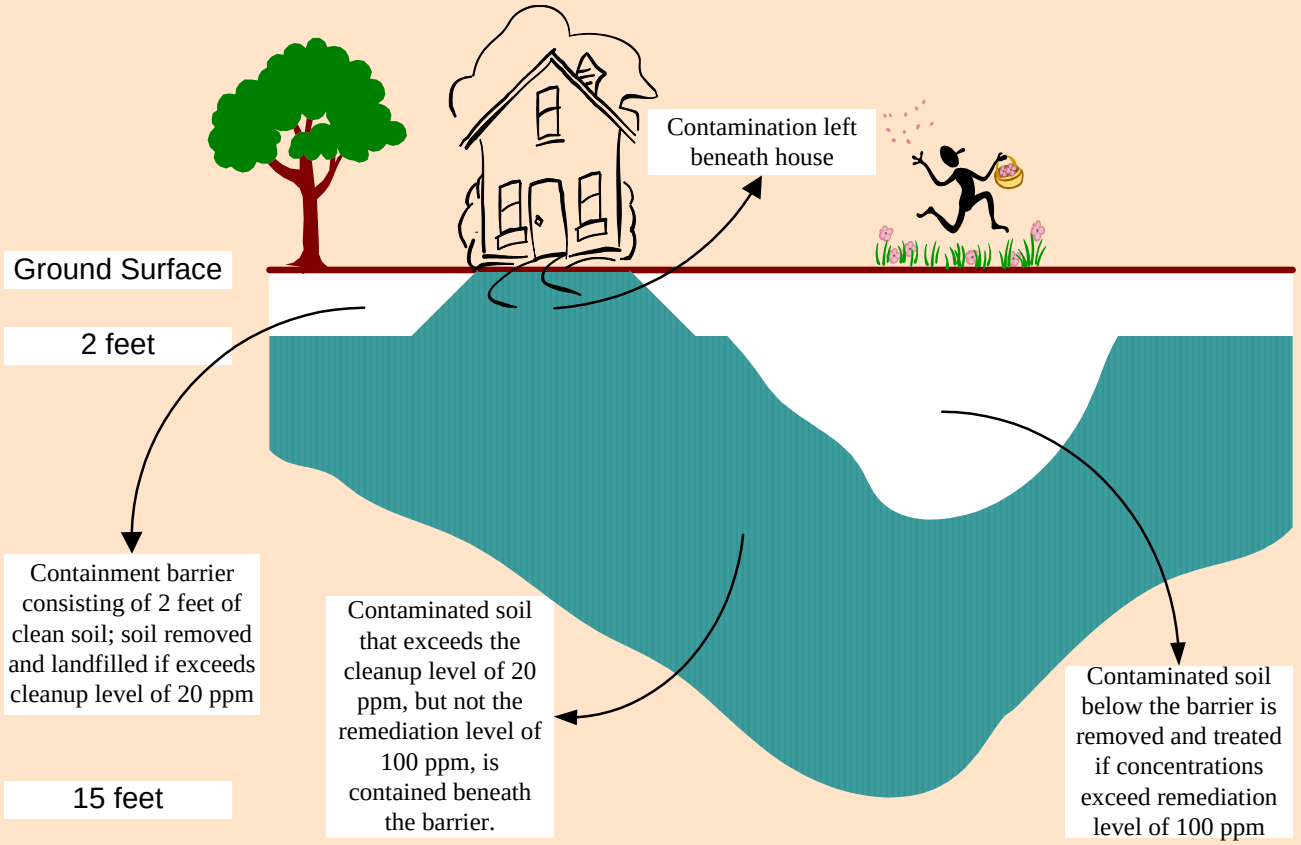
Cleanup Standard

- Soil cleanup level = 20 ppm
- Point of compliance = soils throughout the site from the ground surface to 15 feet
- Under the cleanup standard, any soil that exceeds the 20 ppm cleanup level at the point of compliance must be remediated in some manner.

RELs Example #2: Site Not Meeting Soil Cleanup Levels at POC

- Cleanup action components = soil treatment and soil containment
- Remediation level of 100 ppm is used to define where those two components are used
- Under the cleanup action, any soil that exceeds the 100 ppm remediation level must be treated. Any soil that does not exceed the 100 ppm remediation level, but exceeds the 20 ppm cleanup level, must be contained under a physical barrier.

Conceptual Depiction of Example #2



RELs Example #2: Site Not Meeting Soil Cleanup Levels at POC

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Does the cleanup action comply with the soil cleanup standard?
MAYBE

- The cleanup action involves containment of soils with hazardous substance concentrations exceeding cleanup levels at the point of compliance. Residual contamination above the cleanup level will therefore remain at the site.

- However, the cleanup action may be determined to comply with the soil cleanup standard provided the cleanup action meets the requirements specified in WAC 173-340-740(6)(f) for soil containment actions.

RELs Example #3: Site Meeting Ground Water Cleanup Levels at POC

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Cleanup Standard

- Ground water cleanup level = 500 ug/l
- Point of compliance = conditional POC at the property boundary
- Under the cleanup standard, any ground water that exceeds the 500 ug/l cleanup level at the point of compliance must be remediated in some manner.

RELs Example #3: Site Meeting Ground Water Cleanup Levels at POC

- Cleanup action components =

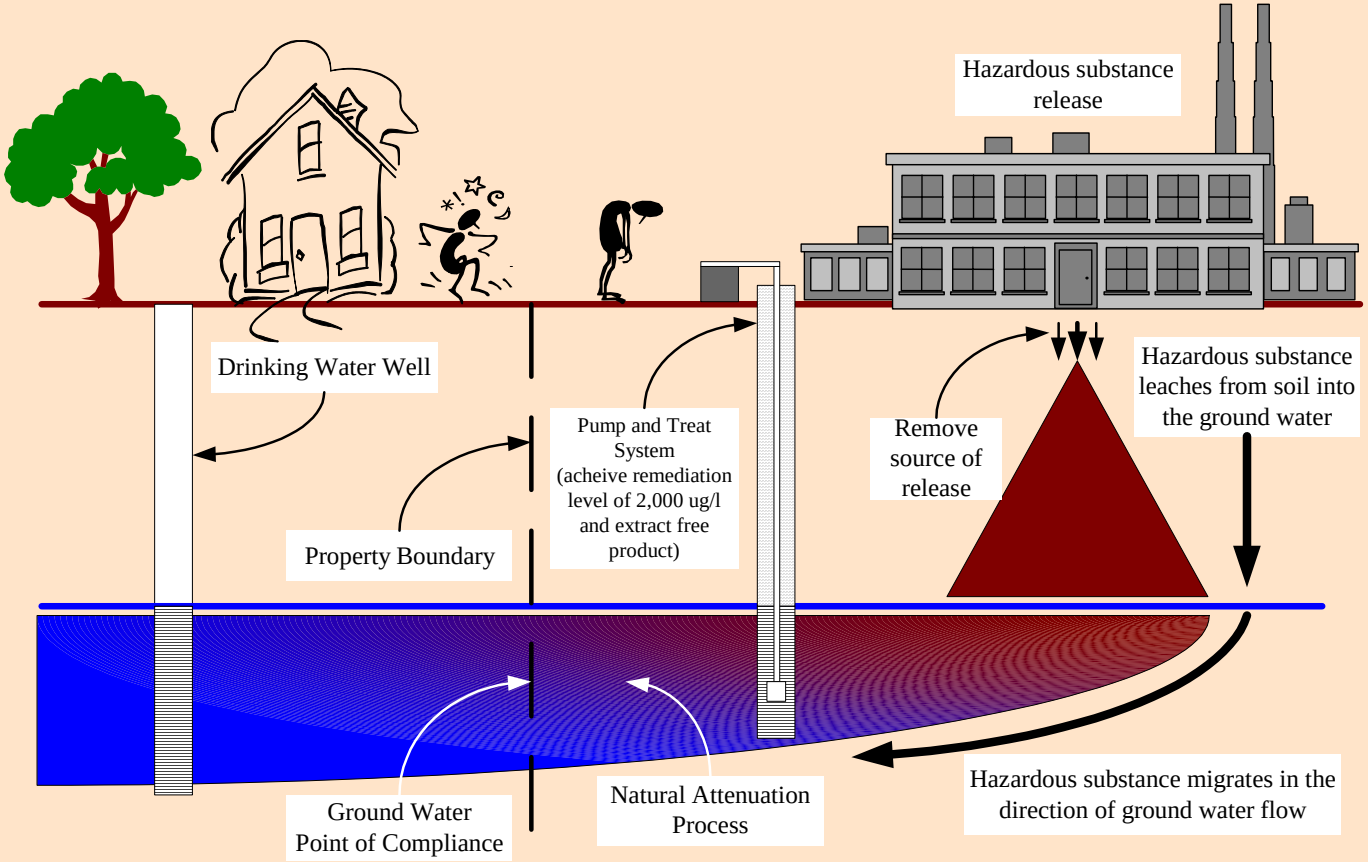
  1. Removing the source of the ground water contamination (contaminated soil)

  2. Extracting free product and any ground water exceeding a concentration of 2,000 ug/l; and

  3. Utilizing natural attenuation to restore the ground water to 500 ug/l before it arrives at the property boundary.

- The ground water concentration of 2,000 ug/l constitutes a remediation level because it defines the concentration of a hazardous substance at which different cleanup action components are used.

Conceptual Depiction of Example #3



RELs Example #3: Site Meeting Ground Water Cleanup Levels at POC

Does the cleanup action comply with the GW cleanup standard? YES

- The cleanup action involves the cleanup of ground water to the extent that the concentration of the hazardous substance will not exceed the cleanup level at the point of compliance (the property boundary).
- As long as the 500 ug/l ground water cleanup level is met at the point of compliance (the property boundary), the cleanup action may be determined to comply with the ground water cleanup standard.

RELs Example #3: Site Not Meeting Ground Water Cleanup Levels at POC

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Cleanup Standard

- Ground water cleanup level = 5 ug/l
- Point of compliance = conditional POC at the property boundary
- Under the cleanup standard, any ground water that exceeds the 5 ug/l cleanup level at the property boundary must be remediated in some manner.

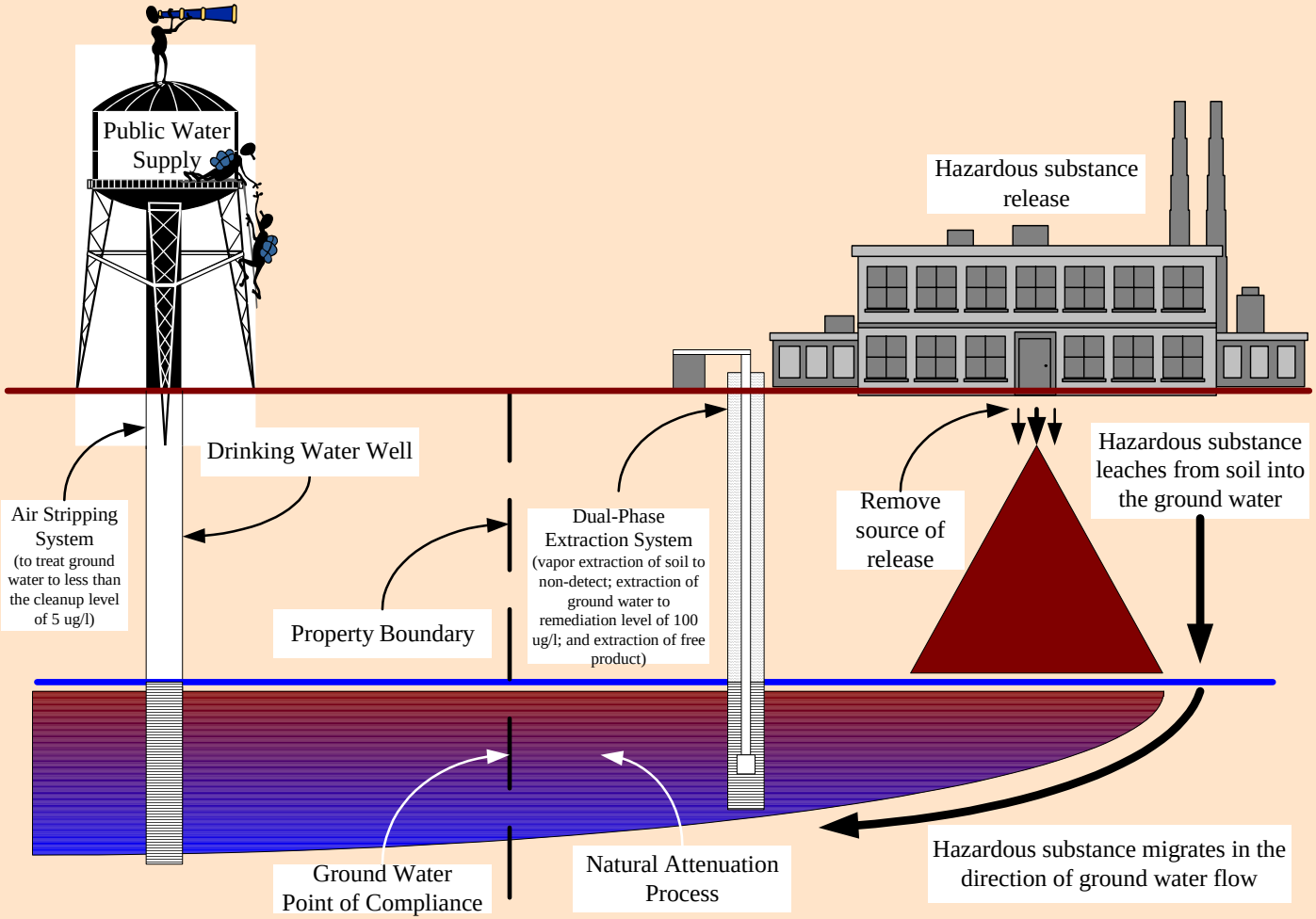
RELs Example #4: Site Not Meeting Ground Water Cleanup Levels at POC

Cleanup action components =

1. Vapor extraction of the soil to non-detectable concentrations (to prevent further ground water contamination);
2. Extraction and treatment of ground water with concentrations in excess of 100 ug/l; and
3. Installation of an air stripping system to treat ground water at a water supply well beyond the property boundary to less than 5 ug/l.

- The ground water concentration of 100 ug/l constitutes a remediation level because it defines the concentration of a hazardous substance at which different cleanup action components are used.

Conceptual Depiction of Example #4



RELs Example #4: Site Not Meeting Ground Water Cleanup Levels at POC

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Does the cleanup action comply with the GW cleanup standard?

NO, this is considered an "interim action"

- The cleanup action only partially addresses the cleanup of the site and involves measures necessary to reduce a threat to human health.
- The cleanup action does not comply with the ground water cleanup standard because the ground water cleanup level will not be met at the conditional point of compliance (the property boundary).
- NOTE: An interim action may constitute a cleanup action for a site if the interim action is subsequently shown to comply with the minimum requirements for a cleanup action, including compliance with cleanup standards.

Soil Compliance Monitoring

- Soil Testing at a minimum. Vapor and ground water testing may be required.
- Direct comparison may be an option.
- If not eligible to use direct comparison, must use 3 Part Test
  - Upper 95% confidence limit on the true mean must meet the cleanup level
  - No sample > 2 times cleanup level
  - No more than 10% of samples > cleanup level

Remedy Selection--Summary

- Remedies <u>must</u> meet 7 requirements in the rule ("threshold" and "other")
- Remedies may also have to meet additional site-specific requirements, depending on remedy selected.
- A key requirement is that a remedy be "permanent to the maximum extent practicable". This determination is made through a "disproportionate cost analysis".
- Remediation levels can be a useful tool for complex cleanups and at sites that are not practicable to completely restore.