



Ministry of  
Environment

# *Screening Level Risk Assessment*

## **Northeast Producer's Meeting**

December 2<sup>nd</sup> & 3<sup>rd</sup>, 2010

Fort Saint John

Peggy Evans

Land Remediation Section  
BC Ministry of Environment

[Peggy.Evans@gov.bc.ca](mailto:Peggy.Evans@gov.bc.ca)

# Overview

---

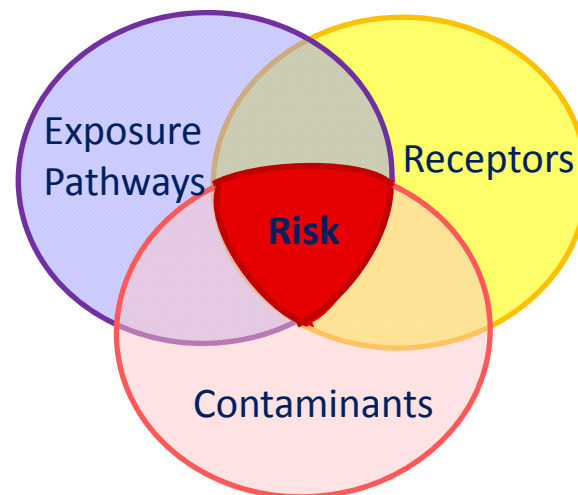
SLRA, Dec/10

- What
- Why
- When
- Where
- How
- What's not working
- What next

# *What is Screening Level Risk Assessment*

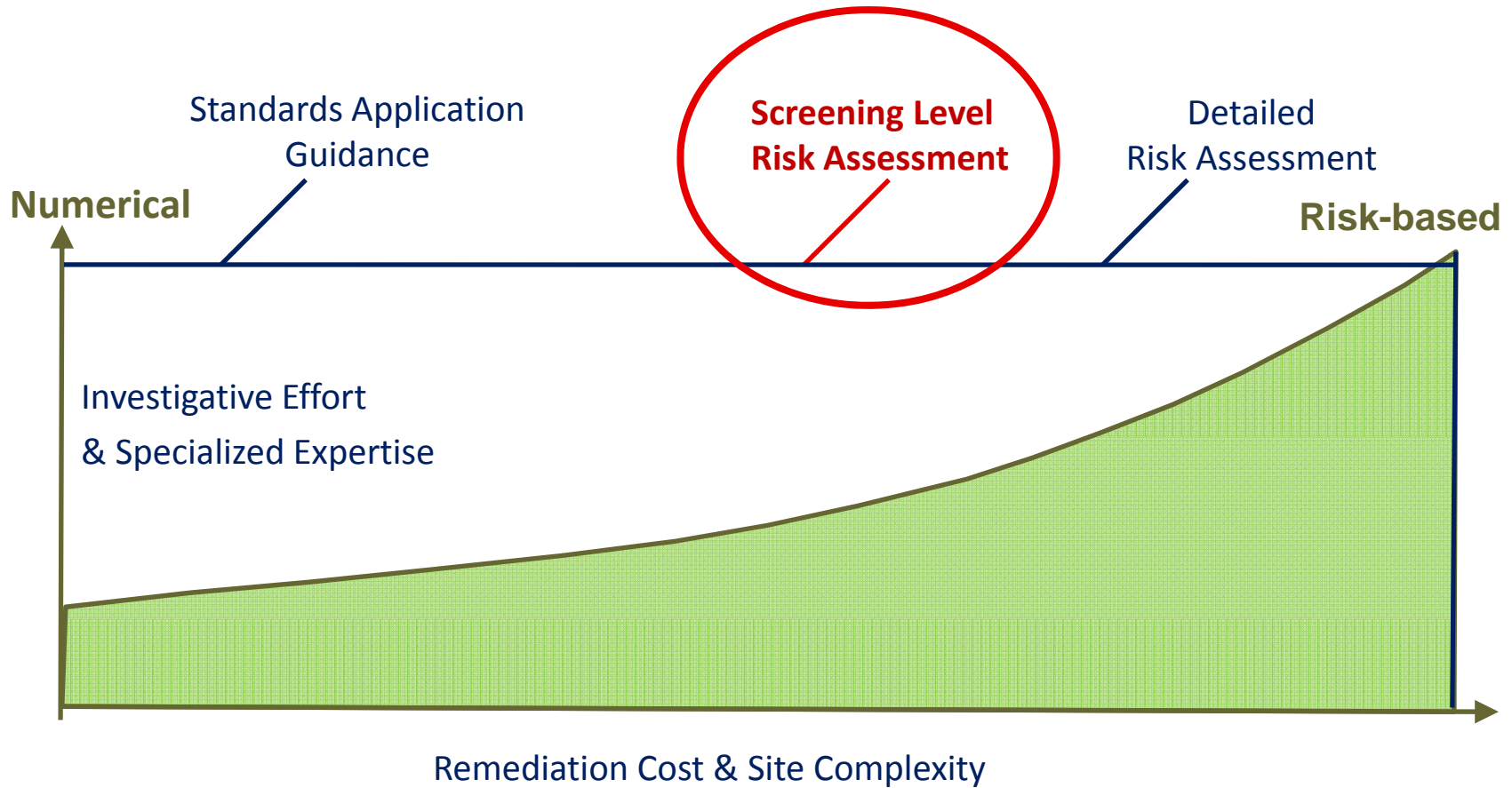
SLRA, Dec/10

- Simple, constrained risk assessment
- Evaluates presence/absence of exposure pathways and receptors
- Assesses whether contamination poses acceptable or unacceptable risks.
- Can be applied before or after remediation.



# Why Use SLRA

SLRA, Dec/10



## ***Step 1 – Problem Formulation***

---

.....SLRA, Dec/10

- Review detailed site investigation data
- Develop a conceptual model of contamination, pathways and receptors

## ***Step 2: Check for Precluding Conditions***

---

SLRA, Dec/10

- Q. Protocol 13 appears to indicate that SLRA may not be used at sites with one or more precluding conditions. This could limit the use of SLRA. Was this the actual intent?
- A. The intent is only to preclude the assessment of the substances or pathways to which the preclusion applies and not to preclude SLRA in general. All other exposure pathways can still be assessed using SLRA.

# Precluding Conditions

SLRA, Dec/10

- Presence of LNAPL or DNAPL.

LNAPL is considered present when :

- Free phase liquid is found in soil or on the soil surface; or
- Free phase liquid is found in monitoring wells at a thickness greater than 2 mm.



# *Precluding Conditions*

---

SLRA, Dec/10

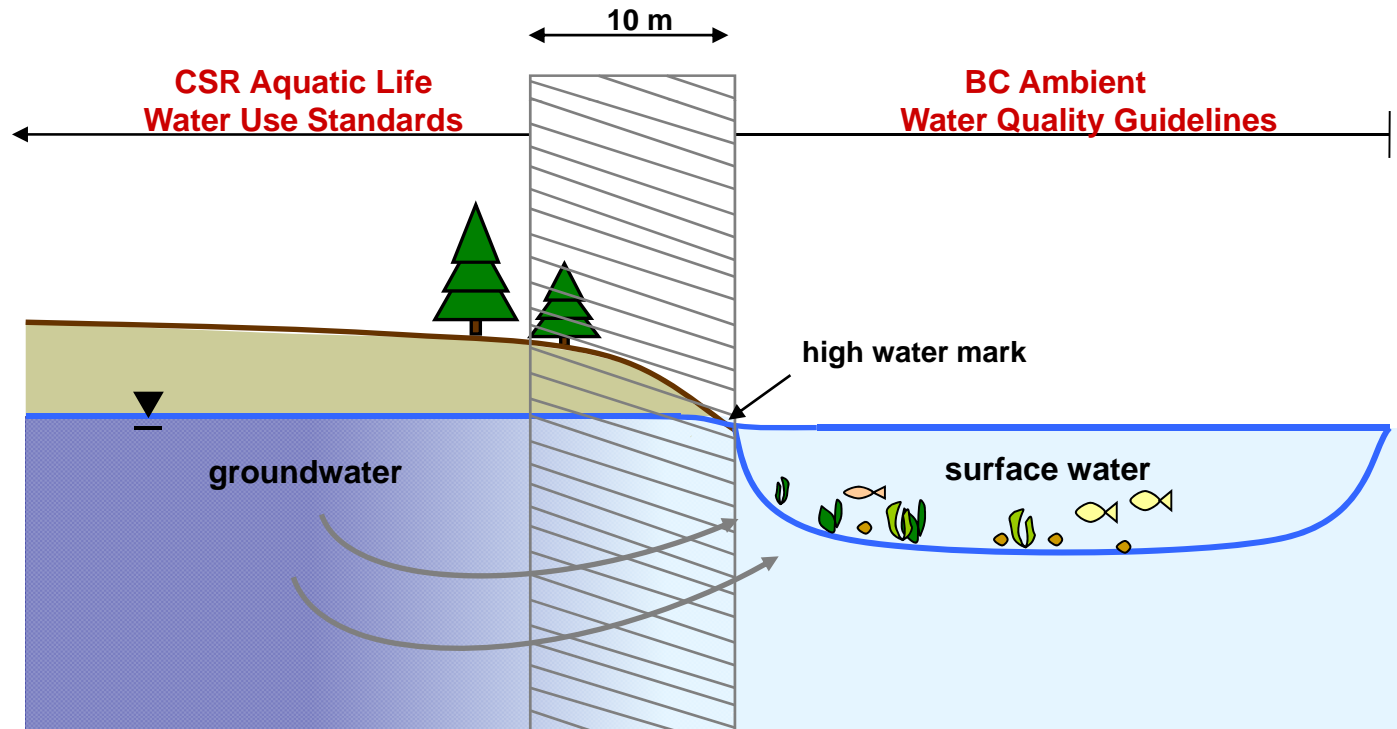
- Soil vapours (except wildland sites).



# Precluding Conditions

SLRA, Dec/10

- Contamination in sediments or surface water (aquatic receiving environments – see draft TG15)



# *Precluding Conditions*

---

SLRA, Dec/10

- Deep rooting plants or trees (> 1 m rooting depth)



## ***Precluding Conditions***

---

.....SLRA, Dec/10

- Off-site groundwater contamination (where drinking water applies).
- Bioaccumulative substances in upper 1 m of soil.
- Complex hydrogeological regimes (fractured bedrock, preferential pathways)

## Step 3 – Evaluate Exposure Pathways

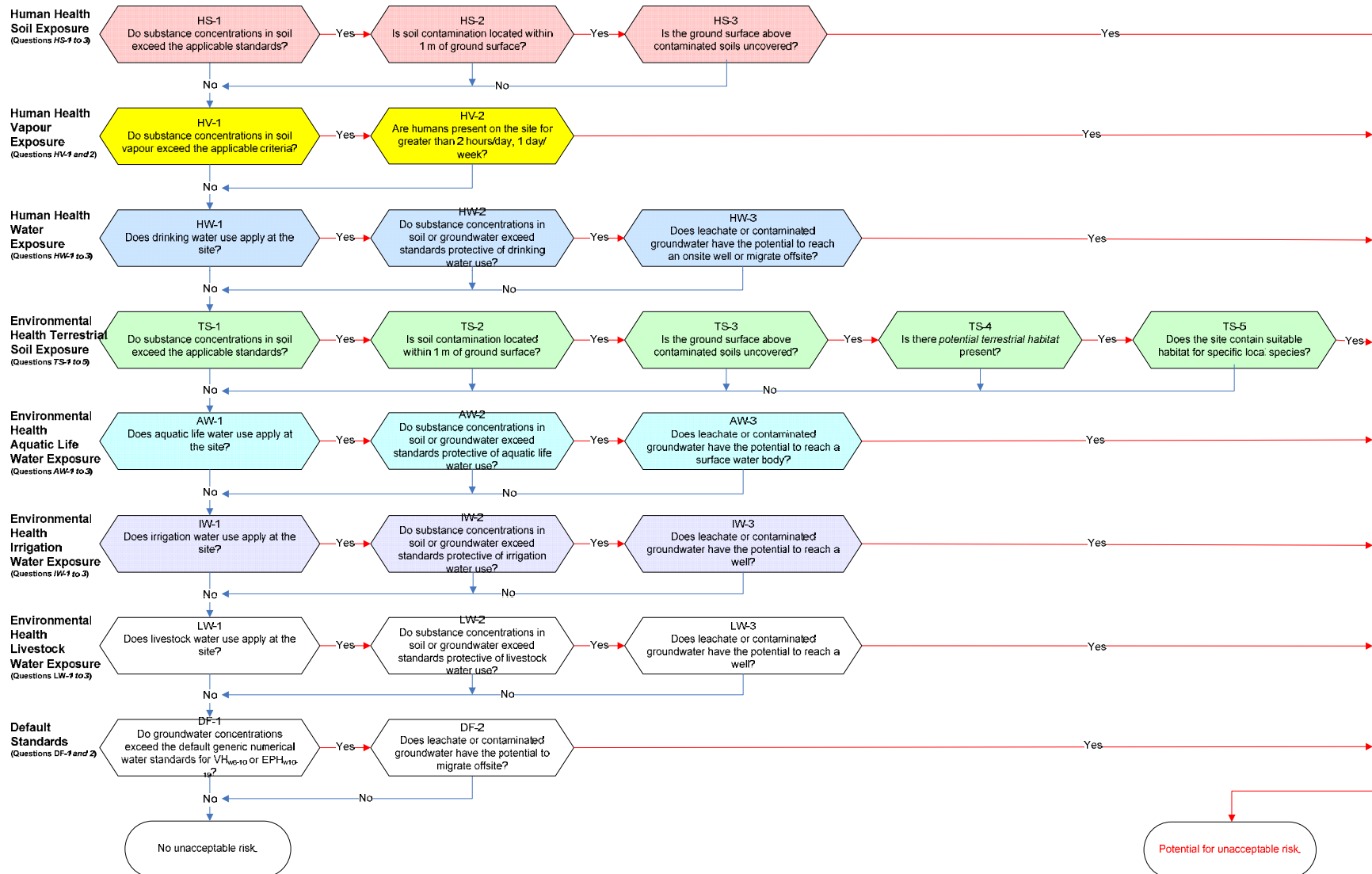
---

SLRA, Dec/10

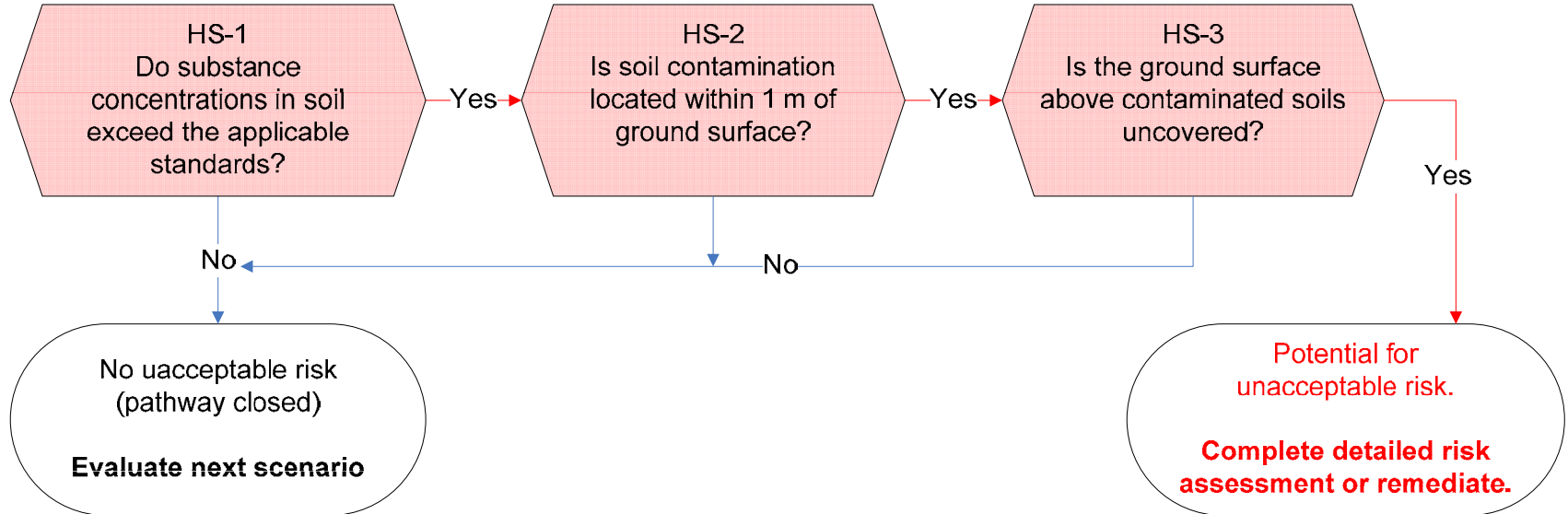
- *Humans*
  - Soil
  - Vapour
  - Water (drinking water)
  
- *Biota*
  - Soil
  - Water (livestock watering)
  - Water (irrigation)
  - Water (aquatic life)
  
- *Default*
  - Water (VPHw & EPHw)

# Exposure Pathways

SLRA, Dec/10

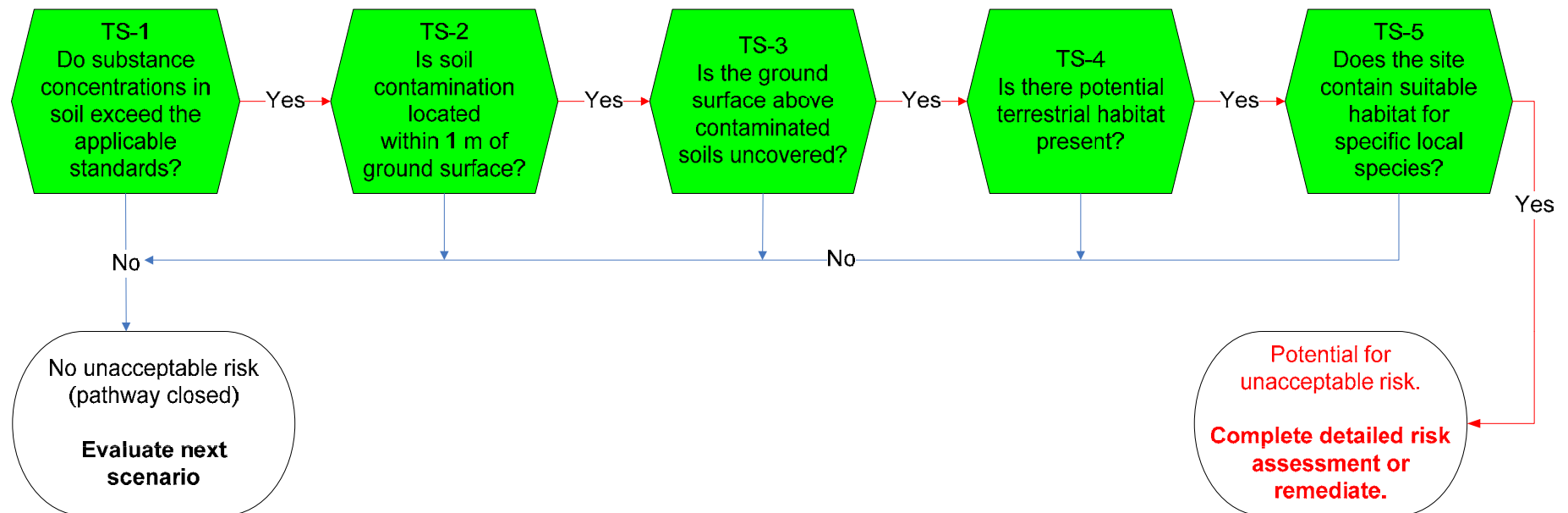


# Human Soil Exposure Pathway



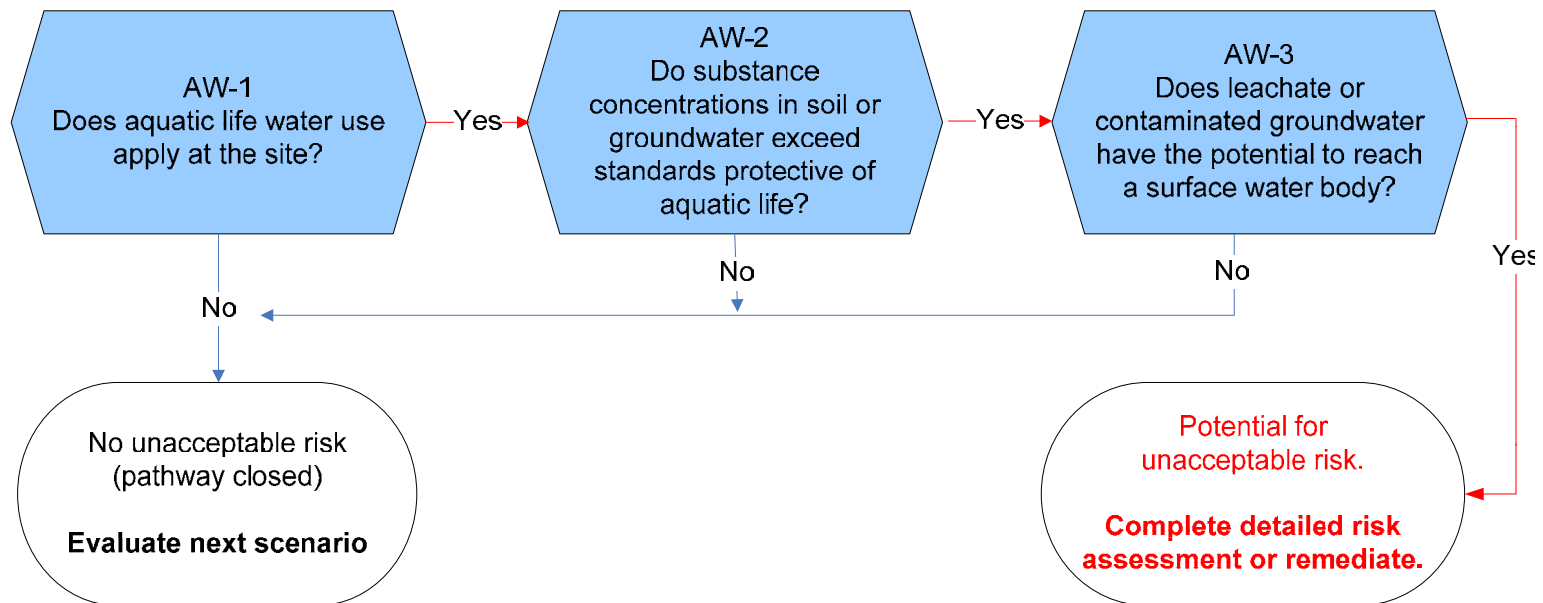
# Terrestrial Biota Soil Exposure Pathway

SLRA, Dec/10



➔ TS-5 Involves receptor/habitat assessment (Appendix B)

# Aquatic Biota Water Exposure Pathway



➔ AW-3 Involves groundwater transport assessment (Appendix A)

## ***STEP 4: Determination of Risk***

---

.....SLRA, Dec/10

### ➔ Unacceptable Risk(s)

- “Yes” responses to all the questions in the pathway sequence.
- Implement further remediation or detailed risk assessment.

### ➔ No Unacceptable Risk(s)

- At least one “no” response to a question in the sequence.
- No further remediation required.
- Site eligible for a Certificate of Compliance (remediation to risk-based standards).

- What is the linkage between SLRA and DRA?
- What assumptions apply to the 1 m depth of clean cover in the human health & terrestrial soil exposure pathways?

The 1 m depth scenario assumes that contamination will not migrate vertically upwards into the 1 m depth interval (e.g., by capillary action).

- Are risk management measures allowed by the SLRA protocol?

Use of risk management measures is permitted in SLRA (e.g., placement of permanent barriers, cover material, groundwater control measures, etc.). Such measures could be utilized to render an exposure pathway inoperable. Where a risk management approach is undertaken, prescription of monitoring, maintenance and reporting measures is required...

- Does the deep-rooting plants or trees precluding condition apply to vegetation larger than grass or ornamental plants?

The deep-rooting plants or trees precluding condition applies to any plants or trees at the present time.

- Can an upstream oil and gas drilling site with contamination below 1 metre depth be reclaimed with plants with root depths less than 1 metre to satisfy the precluding condition?

This type of reclamation measure is essentially a mitigative measure and therefore would need to be monitored and maintained into the future to ensure that the system remains shallow rooting (...No)

- With respect to questions HS-3 and TS-3 (is the ground surface uncovered?), if a liner was buried above the contamination to seal it off from the surface, is this considered covered?

An appropriately designed liner system would be considered an example of a satisfactory permanent barrier.

## ***What's Not Working***

---

SLRA, Dec/10

- Only 14 CoCs issued based on SLRA since August 2008

- Habitat & Receptor Assessment:
  - Re-assess linkages between terrestrial habitat, sensitive habitat and wildlife corridors.
- Groundwater Transport Assessment:
  - Update biodegradation rates for organic substances.
  - Harmonize with model used to develop soil standards
- Soil vapours:
  - Update to reflect Technical Guidance 4
- Deep-rooting plants and trees:
  - Re-assess 1 m depth precluding condition.



# Thank You

Questions?

Email:

[george.szefer@gov.bc.ca](mailto:george.szefer@gov.bc.ca)