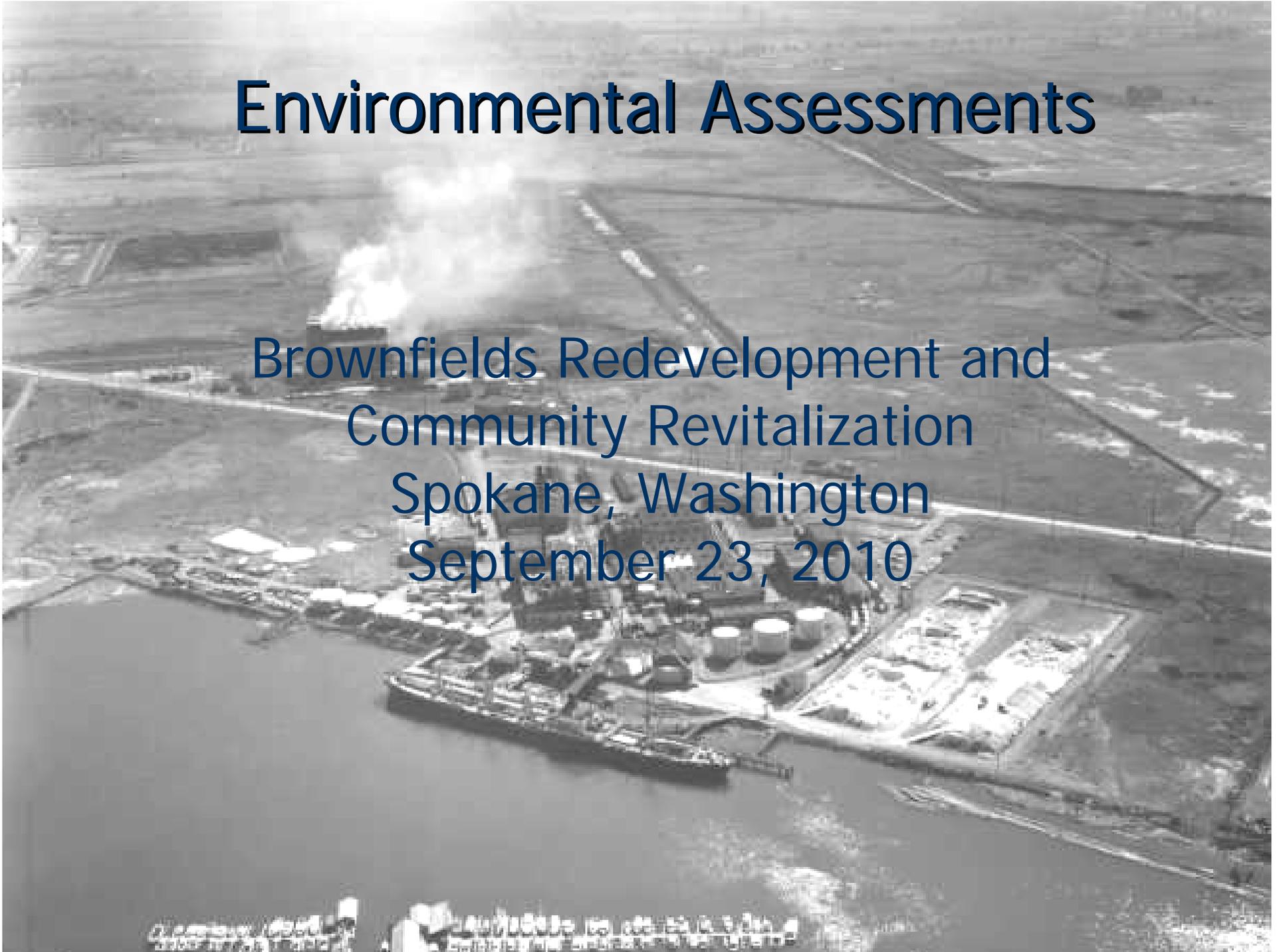


Environmental Assessments

Brownfields Redevelopment and
Community Revitalization
Spokane, Washington
September 23, 2010



Types of Environmental Assessments

- Due Diligence (Property Purchase)
 - Phase I Environmental Site Assessments (ESAs)
 - Phase II ESAs
 - Property Condition Assessments (PCAs)
- EPA (Federal Properties, Superfund Sites)
 - Preliminary Assessments (PAs), Site Investigations (SIs), Engineering Evaluation/Cost Analysis (EE/CA)
- Washington State Department of Ecology (Ecology)
 - Initial Assessment, Site Hazard Ranking
 - Remedial Investigation/Feasibility Study (RI/FS)

An Environmental Assessment is not:

- An Environmental Impact Statement (EIS)
 - This is completed under SEPA/NEPA
 - An EIS defines “the environment” not environmental pollutants
- An Endangered Species Act Assessment (ESA)
 - This identifies the presence and impacts to endangered species

Phase I ESA

- Conducted during due-diligence of a property transaction; should the potential buyer “stay, walk, or run away”?
- Protects from CERCLA liability (All Appropriate Inquiry)
- Checks to see if site is “listed” for contamination
- Provides a list of Recognized Environmental Conditions (RECs)
- First step in developing a conceptual site model (CSM) of environmental contaminants







Phase II ESA

- Limited soil and possibly groundwater sampling
- Testing to determine if the site is contaminated (or not)
- Results are compared to cleanup levels – Model Toxics Control Act (MTCA)
- Provides limited information on contaminant type, magnitude, location, extents for the CSM
- If contaminated, the owner/operator (not the consultant) must report the “release” to Ecology

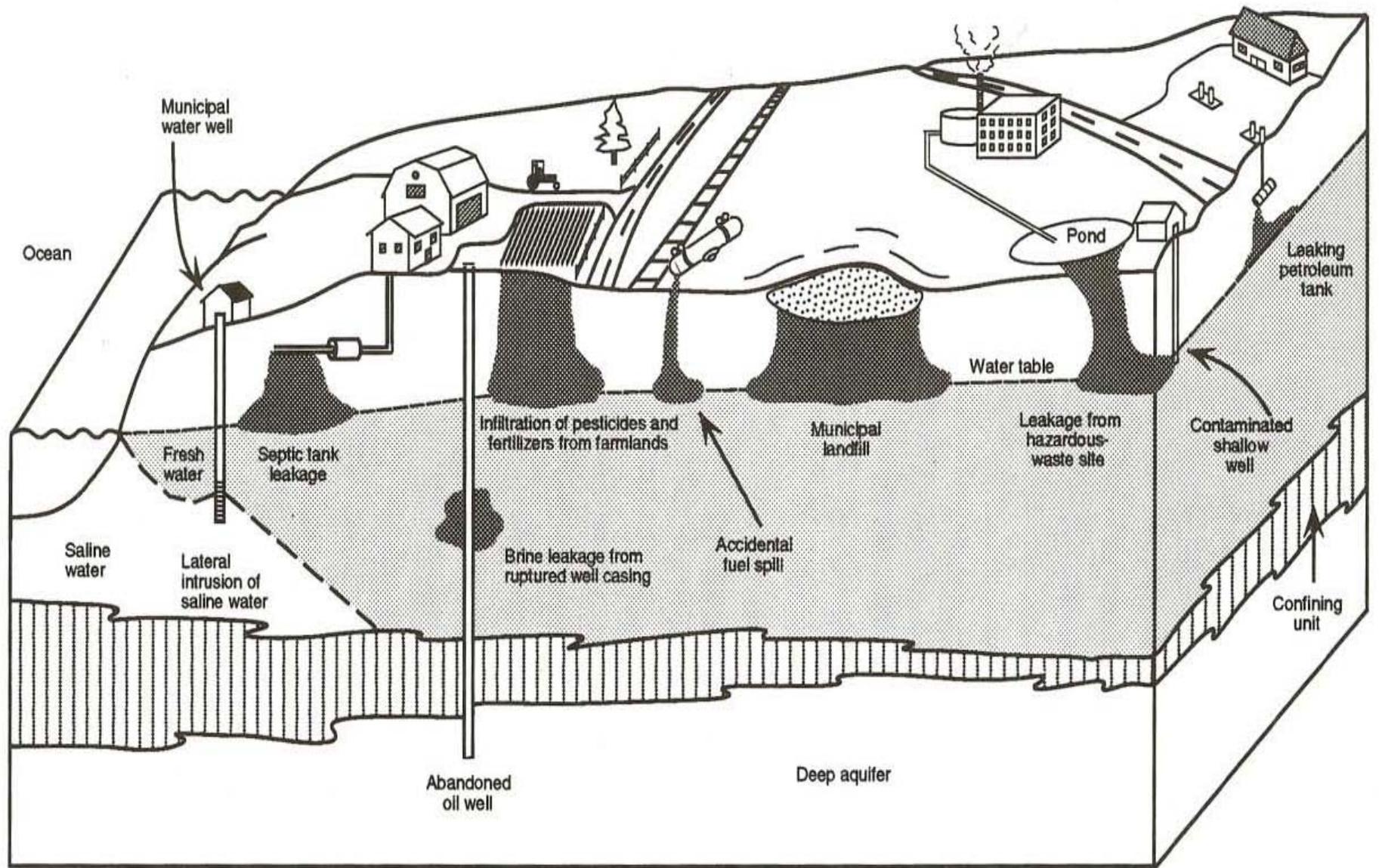


Figure 4.3 Mechanisms of ground water contamination. Source: Fetter, 1993.

Regulatory Involvement

Once the site is reported, Ecology will do several things:

- Conduct an Initial Assessment. If the site is cleaned up by this time, No-Further-Action (NFA)
- List the site
- Conduct a Site Hazard Assessment (SHA) to rank the site 1 (high) to 5 (low) relative to threat to human health and the environment, and regional priority

Regulatory Involvement (continued)

Ecology administrative procedures to “get off the list”:

- Initial Investigation (II) Program
- Independent Remedial Action, Voluntary Cleanup Program (VCP)
- Consent Decree
- Agreed Order
- Enforcement Order

Each require that health risks from releases be identified so that future remedial actions can be shown to address risks, aka Remedial Investigation

Remedial Investigation

Characterize the Nature of Release to Support the Cleanup Action and Redevelopment

- Contaminants
 - Source, type, mobility, toxicity, fate
- Media
 - Soil, groundwater, surface water, sediments, air
- Pathways
 - Soil, groundwater, air, soil to groundwater, soil to air, groundwater to surface water, groundwater to air
- Receptors
 - Human (unrestricted, industrial), ecological
- Current and Future Land Use

Remedial Investigation Method

- Conduct a background review and plan the assessment
 - Review Phase I/II ESAs
 - Review the CSM
 - Identify cleanup levels considering contaminants, media, pathways, receptors, land use
 - Formulate likely cleanup actions
 - Consider what data is needed to support the cleanup action

Remedial Investigation Method (continued)

- Collect the data
 - Drilling, test pits, hand samples
 - Field and laboratory analysis
 - Describe conditions (geology, soil types, depth to groundwater, plants, animals, etc)
 - Mapping of site features



Types of Contaminants

- Petroleum Products
 - Automotive/vehicle fueling and repair, low to moderate mobility, low toxicity, degrades in environment
- Heavy Metals
 - Associated with many industrial processes, low mobility, high toxicity, does not degrade
- Solvents
 - Dry-cleaning and parts washing, high mobility/denser than water, high toxicity, degrades slowly

Media and Pathways

- Soil near the source
 - Risk to people and wildlife, can leach to groundwater
- Groundwater beneath the soil
 - Risk to people drinking the groundwater, or can discharge to surface water
- Air within buildings near the source
 - Risk to people in buildings

Receptors

- Human Health

- MTCA defines that for each pathway of exposure, the contaminant in the media must not exceed defined risk levels for the receptor.
- For example, human exposure to carcinogens in soil must not cause an increased risk of 1 case of cancer in 1,000,000 people.
 - This assumes people weighing 16 kg with 2,200 cm of skin roll in and eat 200 mg of soil every day for 6 years, and don't develop cancer over 75 years.
 - Applies to the upper 15 feet of soil at a site.
- MTCA provides different methods and tables to assist with this and other risk evaluations: Method A, Method B, and Method C.

Receptors (continued)

- Ecological Risks
 - Exclusions. MTCA provides an “off-ramp” for commercial and industrial site.
 - Simplified Ecological Risk Evaluation
 - Provides look-up tables that are similar to the Method A, B, C human risk tables.
 - Site Specific Ecological Risk Evaluation
 - Must be protective of plants, soil biota, wildlife (mammalian predator, avian predator, herbivore)
- Ecological risk applies to upper 6 feet of soil at the site

Feasibility Study Example

- You assess an old fruit orchard and find:
 - Soil is contaminated with lead and arsenic to a depth of 7 feet.
 - Lead is 900 mg/kg and arsenic is 100 mg/kg. Human health based cleanup levels are 250 mg/kg for lead and 20 mg/kg for arsenic.
 - You want to develop the 50,000 sq. ft. property as an apartment building with underground parking.

Feasibility Study Example (continued)

Cleanup Option A

Excavate all soil at the site above cleanup levels.

Soil will be disposed off-site at a landfill.

This is the most expensive option.

This option reduces on-site risk the most.

Cleanup Option B

Excavate soil only from planned development areas, such as building areas, utilities, landscaping.

Excavated soil is removed to landfill.

Rest of site is paved.

Implement land use restrictions that prevent future users of the property from accessing impacted soil.

On-site risk is reduced.

Cleanup Option C

Redesign site plan so that utility runs are shorter, parking is at grade, minimize below grade landscaping.

Excavate where necessary and consolidate soil under parking areas and buildings.

Implement land use restrictions.

On-site risk is reduced.

Pathway to Closure

- Conduct the Feasibility Study
- Select the most permanent or rank relative to:
 - protectiveness,
 - permanence,
 - cost,
 - effectiveness in long-term,
 - short-term risks,
 - implementability,
 - public concerns,
 - reasonable restoration timeframe

Cleanup

- Develop the Cleanup Action Plan
 - Engineering design report
 - Construction plans and specifications
 - Operation and maintenance plan
- Permits
- Conduct Construction
- Compliance Monitoring Plan
- Ecology will conduct periodic reviews if the cleanup is not permanent

Thank you