

Mercury Contaminated Sites: The urgent need for global guidance.

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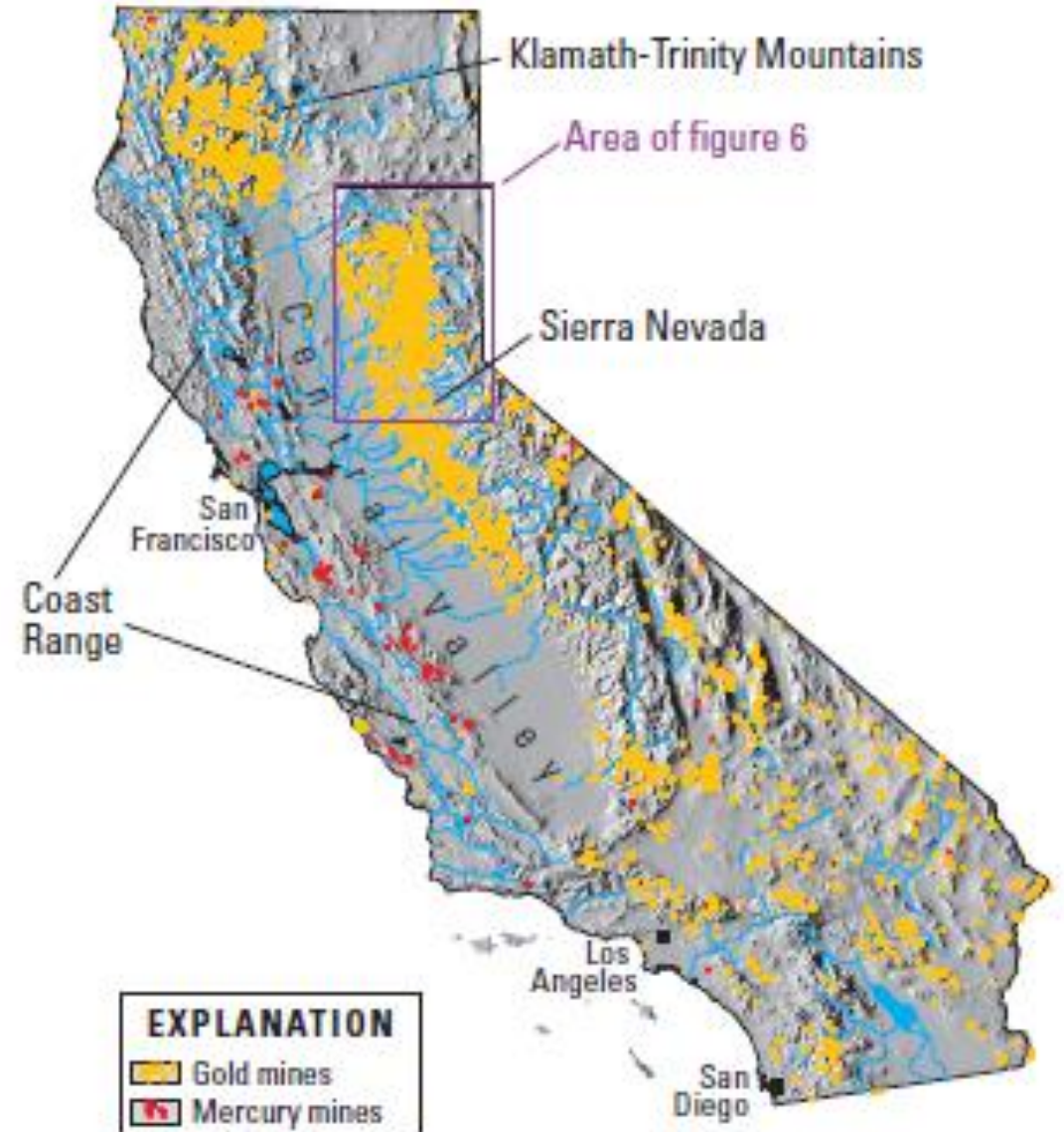
for a toxics-free future

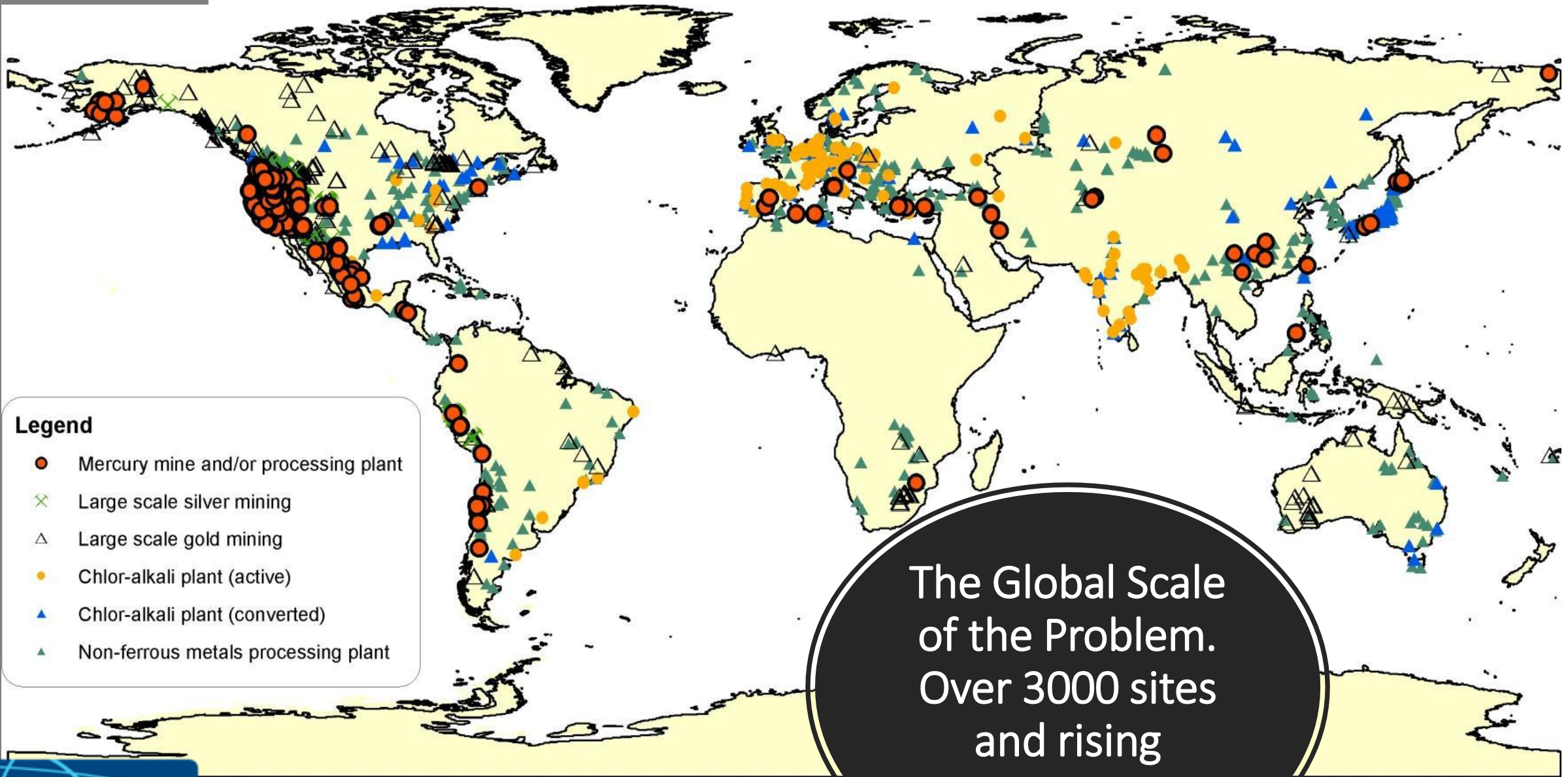
Why is urgent action required on mercury contaminated sites?

Environmental Perspective – Mercury emissions and releases from contaminated sites contributes significantly to the global mercury budget and continues to spread through atmospheric and hydrological cycles. In turn methylation processes in oceans, rivers, lakes and other waterways contaminates the aquatic food web impacting on human health. If left unaddressed the environmental impacts of these sites will continue from releases and emissions for a long time. The transboundary impacts make this a global problem irrespective of the location of the sites.

Contaminated sites created today can impact the environment for centuries

Mercury from mid-19th century 'gold rush' sites in California and Australia continue to release significant quantities of mercury to the atmosphere and hydrosphere where it is subject to methylation and food web magnification. Modern ASGM and industrial sites are replicating this problem and leaving a future legacy that must be addressed now.





- Legend**
- Mercury mine and/or processing plant
 - ✕ Large scale silver mining
 - △ Large scale gold mining
 - Chlor-alkali plant (active)
 - ▲ Chlor-alkali plant (converted)
 - ▲ Non-ferrous metals processing plant

The Global Scale
of the Problem.
Over 3000 sites
and rising

Source: Horvat et al 2011



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Contaminated Sites -The Invisible Mercury Pollution Inventory

- Estimated the emissions and releases from 3000 georeferenced contaminated sites: amount to 198 (137-260) tonnes per annum.
- Of that, 82 (70-95) tonnes per annum were contributed to atmospheric releases, while 116 (67-165) tpa is estimated to be transported away from these sites by hydrological processes. Both exposure pathways contribute to seafood contamination.



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Kocman et al (2013) note that current mercury inventories, ***“neglect the contribution of areas contaminated with mercury from historical accumulation, which surround mines or production plants associated with mercury production or use. Action is needed by governments and NGO's in order to re-focus resources in making decisions regarding mitigation and remediation strategies on a global level.”***

COP 3 must focus on guidance adoption!

Article 12

Why is strong policy required on mercury contaminated sites?

To reduce human exposure to mercury and...

Quantify contaminated site emissions and releases in MIA inventories with standardised estimation techniques. This is a major gap in the coverage of the mercury sources under the Mercury Treaty.

The work by the 'releases expert group' should make release estimates from contaminated sites (especially ASGM) a key focus.

Build capacity for Identification , prioritisation, risk management and remediation of contaminated sites using a precautionary approach.

Sources of contaminated sites: Mineral ore processing

- Copper ore tailings
- Gold ore roasting
- Primary mercury mining waste and overburden and many more.

Korkinskiy Coal Quarry: Russia
Proposed dumpsite for mercury
contaminated copper ore
tailings.



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Small scale gold mining

Indonesian ball mills crush gold ore with mercury. Interior contamination in structures very difficult to remediate. How to manage demolition waste?





ASGM processing sites are complex:

- tailings;
- cyanidation/mercury complexes
- farms
- rice paddies/fish ponds
- household interiors

All require differing identification and remediation approaches.



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Mercury contaminated fish-ponds and rice paddies from ASGM Indonesia.

Source: IPEN and Nexus 3

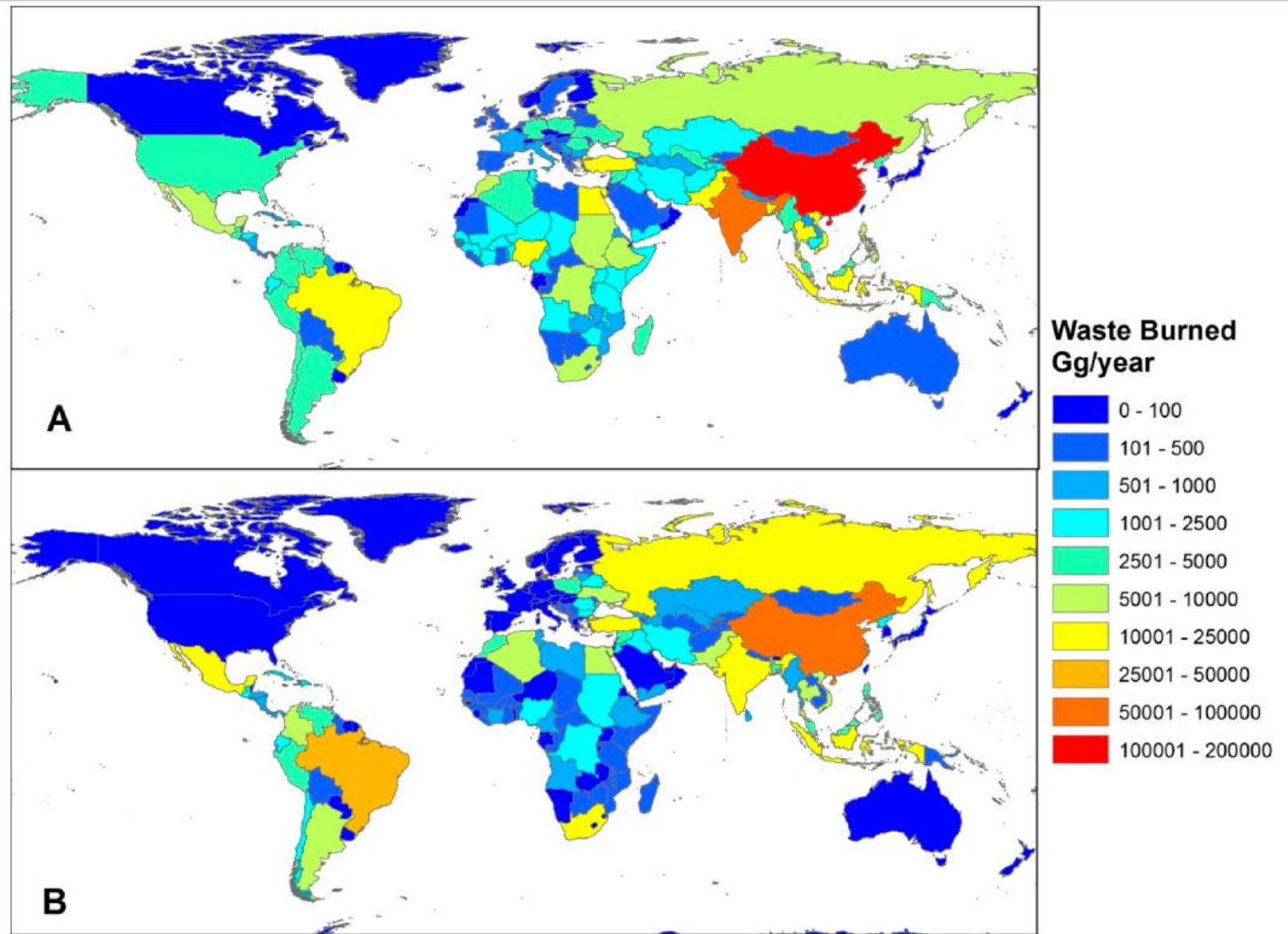


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Waste
dumping and
burning



Open burning is common around the world



1. Total estimated annual waste burned (Gg yr^{-1}) at the residential level (A) and at dumps (B).

Wiedinmyer et al 2014

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Ash from coal fired
power stations



Industrial plants and wastes

Free mercury on the ground at a demolished Australian chlor-alkali plant



**GUIDANCE ON THE IDENTIFICATION,
MANAGEMENT AND REMEDIATION OF
MERCURY-CONTAMINATED SITES**



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November 2016



Solutions:
COP 3 guidance on
contaminated sites
supported by dedicated
funding.

Until the COP adopts guidance:
IPEN Mercury Contaminated
Sites Guidance.

Resources under the mercury treaty.

- Currently limited and more attention must be given to funding under SIP and GEF programs for identification and remediation.
- While funds under SIP may be applied to investigation and remediation planning, GEF projects require actual mercury pollution reduction.
- The key is to develop broader integrated projects that actually result in mercury reduction. An example could be moving strengthening national capacity to reduce mercury emissions while investigating and trialing remediation technology on a site.

Source Polycogroup – Boroo, Mongolia clean up. UNIDO /GEF funded remediation trials. Focused on “strengthening national and local capacity to effectively manage and reduce mercury emissions”.





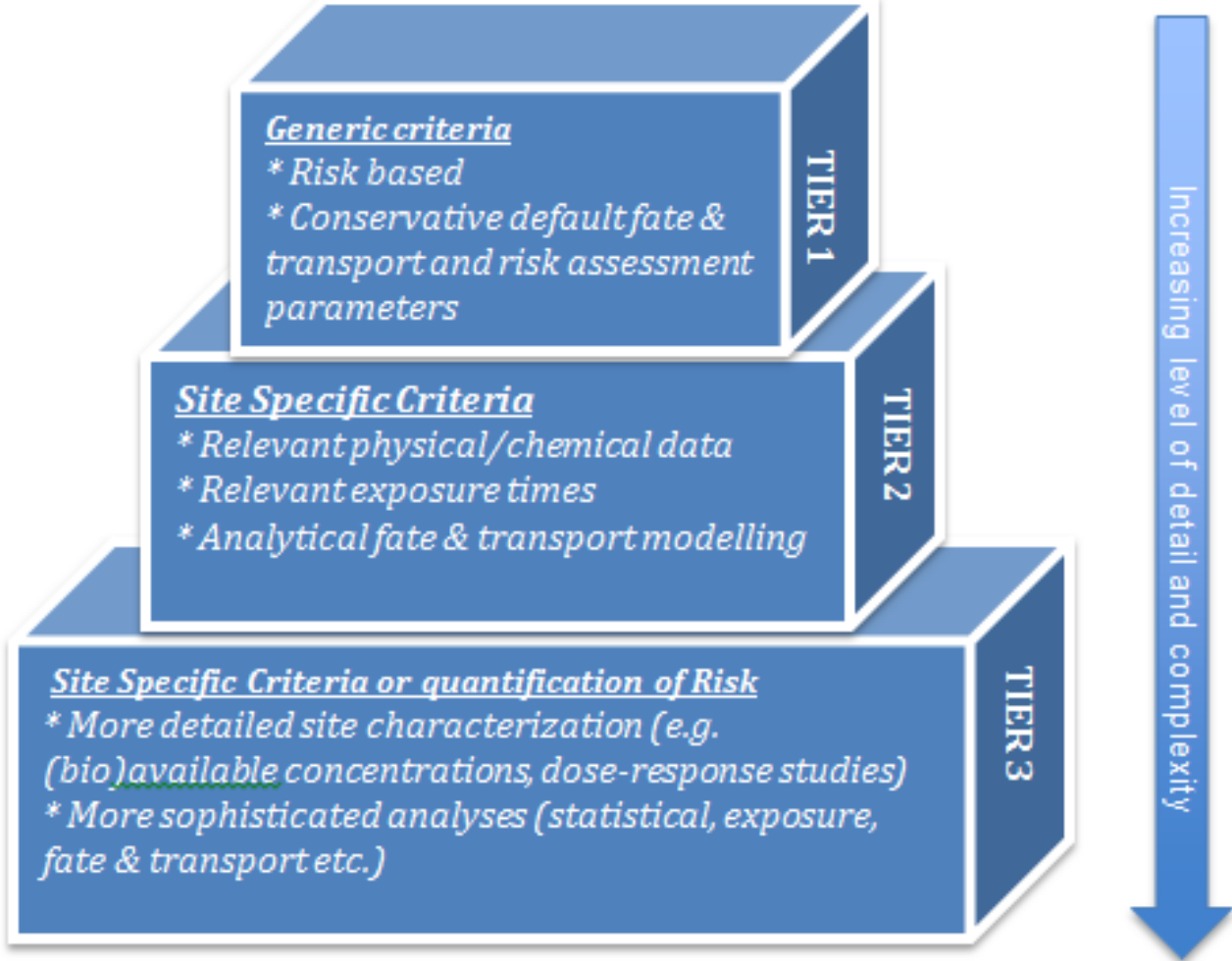
Ohio Lumex RA915+ Portable Mercury Vapor Analyser, which can also be adapted to sample soil and water.



The Olympus Delta portable X-Ray Fluorescence Analyser

Cost Effective Screening Techniques

Human Health
and
Environmental
Risk
Assessment



Ohlsson et al 2014

Remedial risk mitigation – Best Practice, precautionary principle based approaches.



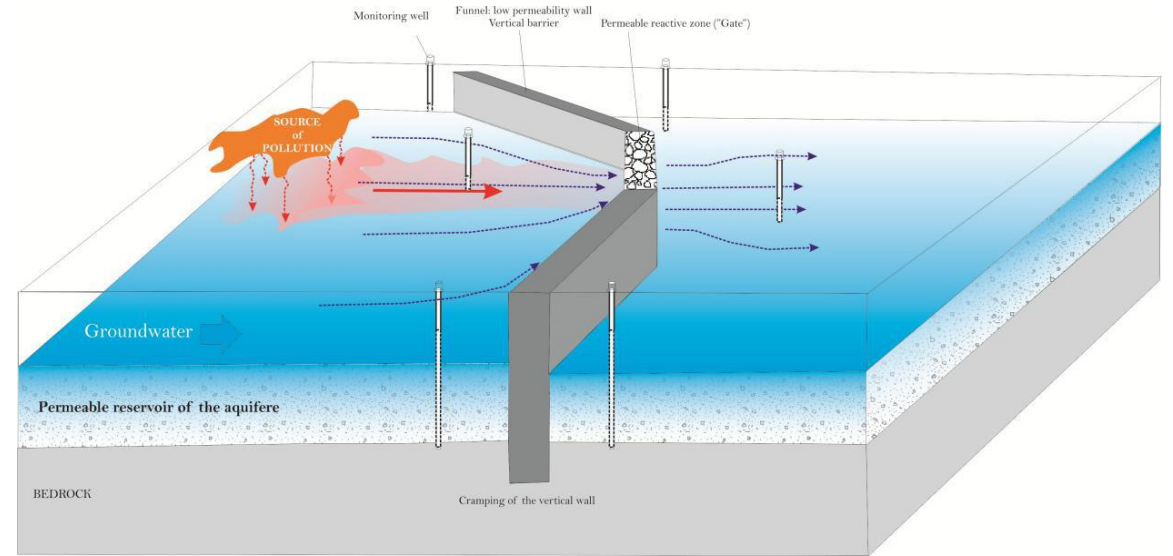


Remediation Practices to Avoid

Incineration and 'dig and dump' operations – simply shifting the problems

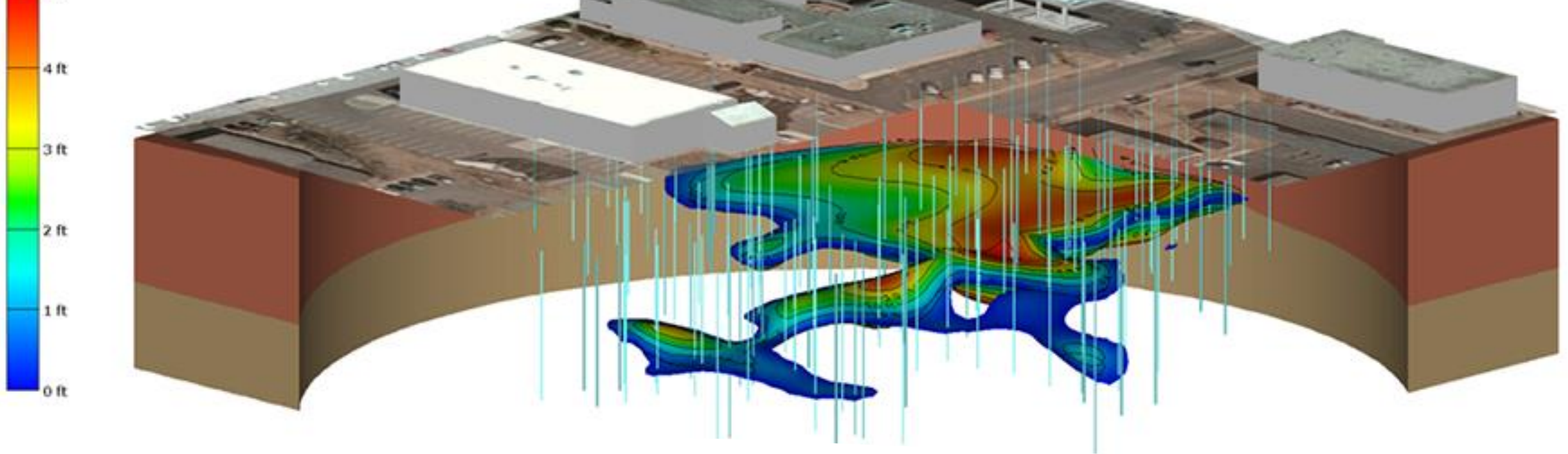


Indirectly heated vacuum distillation unit. Source: econ industries GmbH cited in UNEP/ISWA 2015



“Funnel and gate” principle of Permeable Reactive Barriers (Adapted from Colombano et al, 2010)

Techniques for addressing soil and water contamination



NGOs and communities have a strong role to play in site identification and characterisation.

GUIDANCE FOR SITE-SPECIFIC STAKEHOLDER ENGAGEMENT

- The expert group's guidance provides clear direction on effective stakeholder engagement.
- Community stakeholders have a right to information about environmental health factors that affect their lives, the lives of their children and families, and the future of their communities.
- Industries in possession of contaminated sites may also benefit from the information held by stakeholders on the historical use of the site and identification of potential hotspots where dumping may have occurred. Cost savings through targeted contamination assessment based on community information can be significant.

Thank you for your attention!

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References:

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- Milena Horvat, David Kocman, Nicola Pirrone, Sergi Cinnarella (2011) INC 3 presentation Nairobi.
- David Kocman, Milena Horvat, Nicola Pirrone, Sergi Cinnarella *Environ Res.* 2013 Aug;125:160-70. doi: 10.1016/j.envres.2012.12.011. Epub 2013 Mar 13.

