The True Cost of Remediation

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Introduction

• Remediation costs money – most of us are very familiar with the dollar value of remediation projects. But…

• There are many hidden or external costs and effects.

• The decision to undertake active remediation should take these into account.

• Are our efforts sustainable?
Presentation Outline

• Benefits of Active Remediation
  – Who benefits?
• Impacts of Active Remediation
  – Who pays the costs?
• What are the alternatives?
  – Quantifying costs
  – Sustainable Remediation
Benefits of Active Remediation

- Local improvement in environmental conditions
- Certainty of environmental risk
- Regulatory closure
- Public image of completing active remediation
- General improvement of environment?
Impacts of In Situ Remediation

• Surface disruption during installation
Impacts of In Situ Remediation

• Disruption of natural soil conditions
Impacts of In Situ Remediation

• Some techniques just result in shifting the contamination to a different medium.
Impacts of In Situ Remediation

• Power consumption – electrical and natural gas, propane, etc.

• Consumption and disposal of other resources: oxidizer chemicals, de-scaler, granular activated carbon, hydrovac wastes from cleaning
  – This is a particular concern for toxic materials.
Impacts of Excavation

- Surface and community disruption
Impacts of Excavation

• Fuel consumption and associated GHG emissions
Impacts of Excavation

• Additional loading of roadways with soil hauling
• Traffic safety due to additional driving hours
Impacts of Excavation

- Loading of landfills
Impacts of Excavation

• Obtaining clean fill
Impacts of Excavation

• New construction over backfill can be challenging
Impacts of Excavation

• And at the end of the day, excavation only moves the problem, it still doesn’t eliminate it.

• The waste generator still retains liability (hopefully well-managed by the landfill).
Understanding the Costs

• Quantification of the costs/impacts/risks is important.

• Some tools exist to help with this:
  – Fuel consumption and travel hours from contractors
  – Purchase (and subsequent disposal or use) of materials
  – Scale tickets for soil to landfill
Understanding the Costs

- **Greenhouse Gas Emissions:**
  - Environment Canada/EPA GHG Equivalencies Calculator
  - International Road Federation GHG calculator
  - Numerous other online tools
Understanding the Costs

- Even if you quantify a parameter, the units are usually different.
- Value decisions are required
  - What is the cost of disrupting a neighbour, or avoiding 80 hours of highway travel?
- Other conceptual guidance is available:
  - Cumulative Effects Assessment
  - SuRF UK
  - EPA Green Remediation document
Sustainability

- Protects the environment
- Encourages a vibrant economy
- Supports high quality of life
Sustainable Remediation

• Sustainable Remediation Forum (SURF)
  http://www.sustainableremediation.org/
  – Sustainable Remediation: a remedy or combination of remedies whose net benefit on human health and the environment is maximized through the judicious use of limited resources

• EPA Green Remediation: “The practice of considering all environmental effects of remedy implementation and incorporating options to maximize net environmental benefit of cleanup actions.” From “Green Remediation: Incorporating Sustainable Environmental Practices into Remediation of Contaminated Sites.” EPA 2008
Can you improve things?

- Two main concepts:
  - Reduction (or Elimination) & Efficiency
- **Reduction/Elimination** – risk assessment or risk management
  - no remediation = no impact due to remediation
- **Efficiency** – Can you complete the same tasks with less resources?
Reduction

• Site-specific criteria (risk assessment) can reduce the amount of remediation required while still protecting receptors.

• Risk management can reduce the intensity of your work, taking advantage of natural attenuation or less stringent interim receptor sensitivity.

• Some remediation systems reduce effluent (AS/SVE, bioaeration, etc.) or the need for toxic materials.
Reduction

(believe it or not, this is a reduction in volume as compared to the generic criteria!)
Efficiency

- Properly designed systems for your needs
- Maintenance to keep systems operating at peak performance
- Onsite treatment of excavated soils eliminates hauling, disposal & acquiring clean backfill
- Soil recycling facilities turns soil into a resource
Efficiency

Phytoremediation
Decision Time

- Every situation has to be considered on its own.
- More tools are becoming available.
- More companies are providing formal guidance on sustainable development.
- Stakeholders are becoming more aware of risk-based options, and impacts external to the project.
Decision Time

- This combination of events is making it easier (and, in fact, necessary) to assess and communicate the costs and benefits of various options for dealing with contaminated sites.

- We are at a point where we should be able to show that our actions result in the greatest benefit to the environment.
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